

# SMS Alarm Messenger Pro Edition

<b>SMS Basic</b>	<b>SMS GSM alarm device [Basic]</b>
<b>SMS Pro</b>	<b>SMS GSM alarm device [Advanced]</b>
<b>SMS Pro-X</b>	<b>SMS GSM alarm &amp; data capturing device [Professional]</b>
<b>SMS Pro-Q</b>	<b>SMS GSM alarm &amp; data capturing device [Quad Band]</b>

<b>SMS Pro-S</b>	<b>SMS GSM alarm &amp; data capturing device [Integrated Internal Temperature Sensor]</b>
<b>SMS Pro-QS</b>	<b>SMS GSM alarm &amp; data capturing device [Integrated Internal Temperature Sensor + Quad Band]</b>

Features	Basic	Pro	Pro-X	Pro-Q	Pro-S
Alarm Input	3	8	8	8	8
Relay Output	1	3	3	3	3
Phone Number	4	4	4	4	4
Low Voltage Alert	-	✓	✓	✓	✓
Program by SMS	✓	✓	✓	✓	✓
Program by PC Software	-	✓	✓	✓	✓
Voice	-	✓	✓	✓	✓
AD Channels	-	-	2	2	2
AD Hi/Lo Alert	-	-	✓	✓	✓
Temperature Hi/Lo Alert	-	-	-	-	✓
GSM Band (MHz)	900/1800	900/1800	900/1800	900/1800 850/1900	900/1800

# CONTENT

<b>Overview .....</b>	<b>3</b>
<b>Connection.....</b>	<b>5</b>
<b>Inserting SIM Card .....</b>	<b>6</b>
<b>Schematic Diagram.....</b>	<b>7</b>
<b>PC Software .....</b>	<b>8</b>
<b>Quick Startup.....</b>	<b>9</b>
<b>Alarm Trigger Response Time .....</b>	<b>9</b>
<b>GSM Network Connectivity.....</b>	<b>9</b>
<b>SMS Command List .....</b>	<b>10</b>

## (A) Overview

### 1. Introduction

SMS Pro Duo is designed and integrated with a 16 bit MCU and reliable Siemens GSM module.

### 2. Application

- ⊕ Industrial equipment monitoring
- ⊕ Data capturing
- ⊕ Rural Security
- ⊕ Car Security
- ⊕ Intelligent Home Security
- ⊕ Large scale area monitoring e.g. Power Plant

### 3. Features

- ☑ Operates in GSM covering zones, phone alarm dial & SMS alarm message
- ☑ Keep 10 latest SMS alarm message and resend when sending SMS failed
- ☑ Health Status report by GSM mobile phone or PC (RS232)
- ☑ Configuration setup by GSM mobile phone or PC (RS232)
- ☑ Arm/Disarm by GSM mobile phone
- ☑ 8 x Alarm Inputs (Opto-isolated)
- ☑ N/C, N/O, State Change, O/C triggered levels
- ☑ 2 x AD channels
- ☑ Threshold High, Threshold Low, Closed
- ☑ 3 x Relay Outputs, NC/NO
- ☑ Alarm or SMS activated
- ☑ 4 x Mobile/Fixed Phone Number
- ☑ Alarm Alert Modes – SMS, Phone Dial or SMS & Phone Dial
- ☑ System status reporting in Automatic, Schedule or Alarm triggered modes
- ☑ Central Station monitoring number
- ☑ Sound monitoring upon microphone connected
- ☑ SMS alarm message text programmable
- ☑ Automatic power supply voltage level checking
- ☑ Automatic reporting on low power voltage level
- ☑ Reply message verifying the receipt of each command

### 4. Safety

- Do not touch the antenna
- GSM 900MHz, 2W max.
- GSM 1800MHz, 1W max.
- Not designed for medical equipment or aerospace application

**5. Electrical Specification**

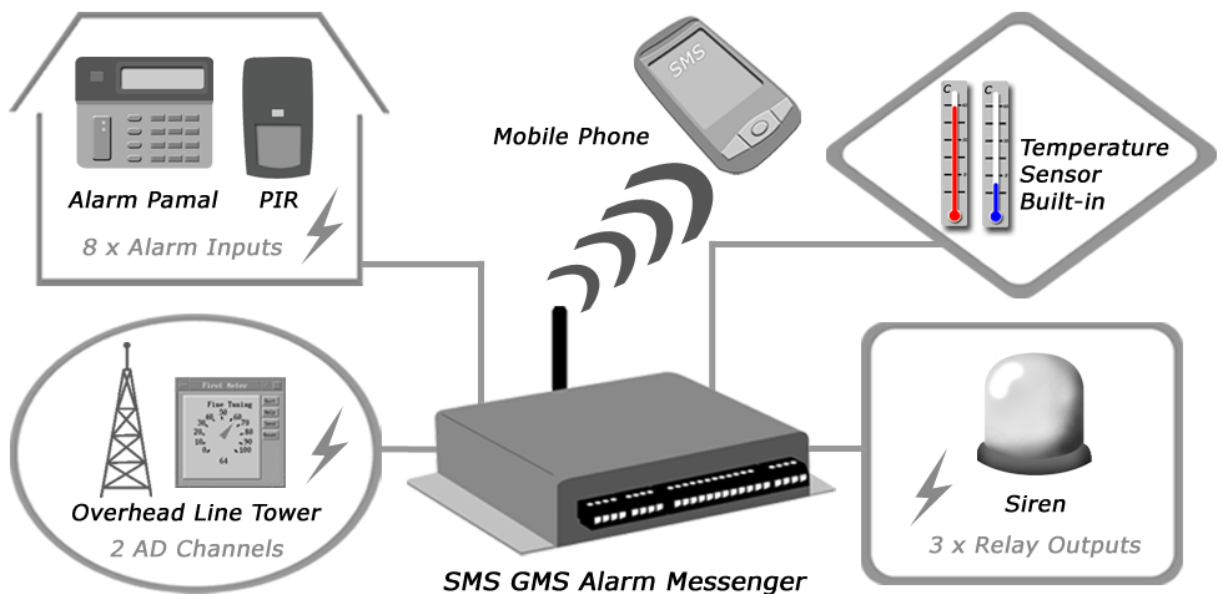
Operating Voltage	DC7~12V
Current	500mA (SMS Send/Receive) 50mA (standby)
Peak Pulse Current	< 2A
Dimension	135 x 105 x 25 mm
Operating Temperature	-25° C ~ 55° C
Weight	600g
RS232	9000bps, 8 Stop Bit, 1 Parity

**6. Antenna Requirement**

	GSM 900	GSM 1800
RF Frequency	925~960MHz	1805~1880MHz
TX Frequency	880~912MHz	1710~1785MHz
RF Rating	2W 12.5% Loop Loading	1W 12.5% Loop
Loading Resistance	50Ohm	
Radiation S/N	0dBi	

Note: GSM850/900/1800/1900MHZ is available in US or worldwide version [Pro-Q]

**7. Operation**

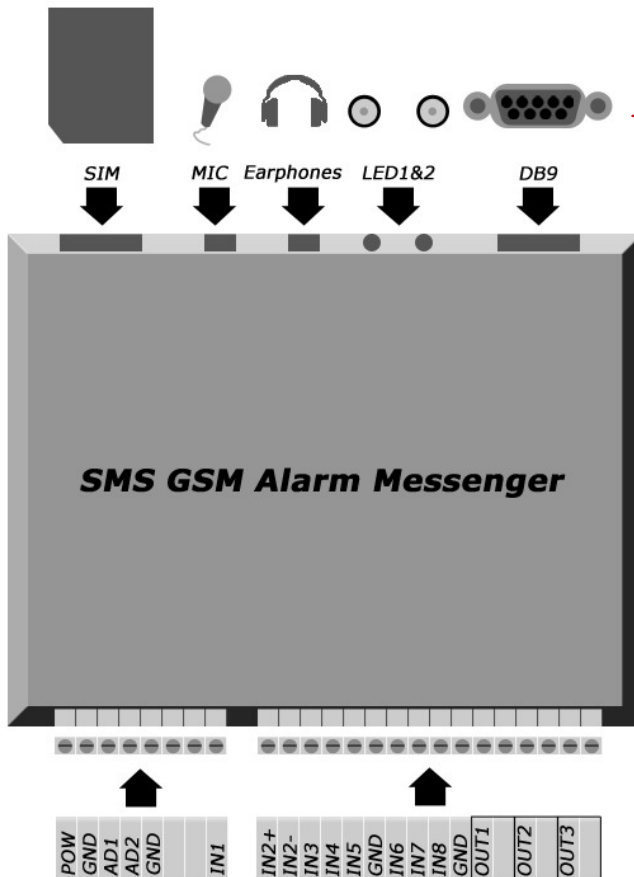
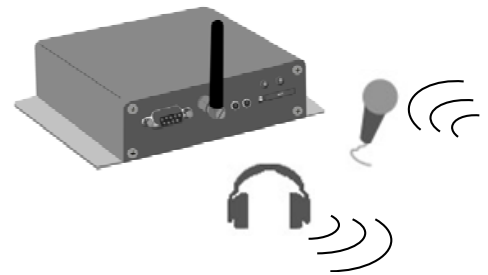


**(B) Connection**

Sound Monitoring

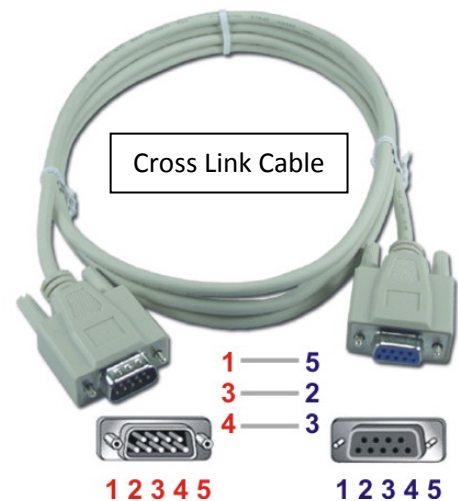
SMS Pro automatically picks up any phone call after 8 rings.

By connecting the microphone, mobile phone user can hear the sound from the SMS Messenger.



Connecting to PC  
RS232 Pin Assignment

Pin 2	RXD
Pin 3	TXD
Pin 5	GND



**LED1 green** [GSM Signal]

Flashing Off > On duration  
\* GSM Module Normal Operation

Flashing Same On/Off duration  
\* GSM Network Connection Problem

Reason:  
Antenna not connected  
No SIM Card  
Defective SIM Card  
GSM Module Defect

**LED2 red** [Operation Status]

On  
\* Normal

Flash  
\* Searching GSM Network  
\* Connecting GSM Network  
\* Receiving SMS messages  
\* Sending SMS messages  
\* Phone dialing

**(C) Inserting SIM card**

Press the yellow button to release the SIM card caddy as shown below.



Make sure that the golden contact is facing down when inserting the SIM card caddy.

**(D) Internal Temperature Sensor [Pro-S]**

An internal temperature sensor is integrated inside the SMS alarm metal case detecting the surrounding temperature.

Temperature Range: -20 ~ 100°C

Accuracy: 0.1°C

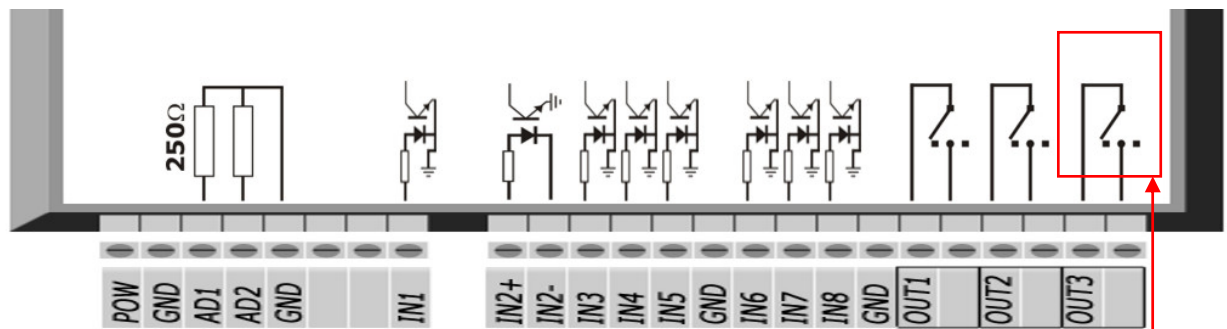
High Temperature SMS Alert

Low Temperature SMS Alert



Internal temperature sensor

**(E) Schematic Diagram**



POW Power Input, DC7~12V

GND Power Ground



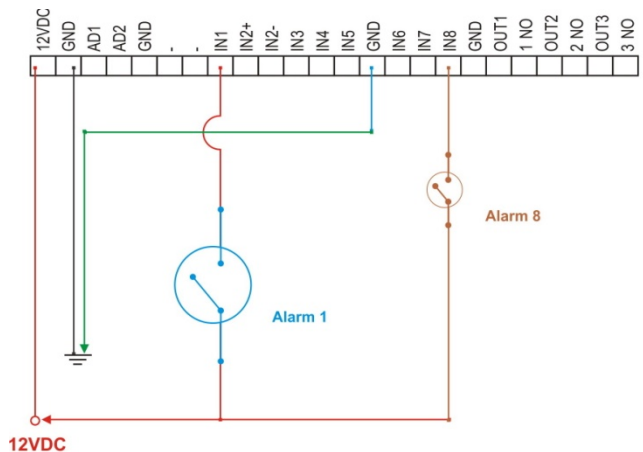
Relay Output jumper		
1	2	3
■	■	■
1-2 Short		Normal Close
2-3 Short		Normal Open (default)

Alarm Input

Input: 12VDC, 7 ~ 15mA, Opto-isolated Inputs (1KΩ Input Resistance)  
 24VDC, resistor 1~2.2KΩ should be used in serial

(a) IN1, IN3, IN4, IN5, IN6, IN7, IN8  
 DC12V Alarm Input, 7~15mA  
 GND - Common Ground

(b) IN2+, IN2-  
 Input DC7~12V



Relay Output

OUT1, OUT2, OUT3 Max. 1A, 24VDC, 1A, 120VAC  
 NC/NO (selected by jumper on board)

Analog to Digital Channel

AD1 Analog Digital Channel 1, DC 7-15V Current 4~20mA, 250 Ω  
 AD2 Analog Digital Channel 1, DC 7-15V Current 4~20mA, 250 Ω  
 AD2 is not available when temperature sensor is integrated.



**(G) Quick Startup**

1. Insert SIM Card into the alarm unit
2. Connect 12VDC power input
3. Wait until the **LED2** is on (no flash) about 15~30 seconds
4. Use another mobile phone, write a SMS message as below:

**PWD:1234,STATUS%**

5. Send the message to the phone number of SIM card in the alarm unit
6. Within 30 seconds, your mobile phone will receive a reply SMS message from the alarm unit about its health status.
7. The unit is working normal now. Go to the next pages for other operations.

**Note:** Caller ID service must be activated

**(H) Alarm Trigger Response Time**

After power on, the unit will take about 30 seconds for GSM module initialization and accessing the GSM network.

Upon alarm triggered, the unit will send the SMS alert message to Control Centre, and then other 4 programmable phone numbers. Control Centre can be disabled in order to make the users phone number receiving the alarm sooner.

**(I) GSM Network Connectivity**

1. When GSM network is inaccessible or disconnected on sending SMS, the SMS will be lost.
2. When GSM network is inaccessible or disconnected before sending SMS, the unit will keep searching for the network and send the SMS until the GSM network resumes.
3. When sending the SMS alarm message fails, the SMS unit will keep the last 10 SMS alarm message and resend when the unit succeeds in accessing the GSM network again.

**(J) SMS Command List****System Setup**

1.	New Password Setup .....	11
2.	Manual Health Reporting .....	11
3.	Serial Number Setup .....	12
4.	Control Centre Number & Health Reporting Schedule Setup.....	12
5.	Power Up Message .....	13
6.	System Clock Setup .....	14
7.	Phone Number Setup.....	14

**Alarm Setup**

8.	Alarm Input Level & Alert Setup .....	15
9.	SMS Alarm Message Setup .....	17
10.	Get the SMS Message Content .....	17
11.	Command the SMS unit to send SMS Message.....	18
12.	Relay Output Control .....	19
13.	Relay Output Delay Time.....	19
14.	Operating Voltage Low Level Alarm SMS.....	19
15.	Operating Voltage Low Level Alert .....	20
16.	Arm/Disarm Setup .....	21

**System Information Report**

17.	Default Setting .....	21
18.	System Parameters RESET .....	21
19.	Return Message .....	21
20.	System Parameters Report.....	22

**AD Channel Setup**

21.	AD Parameters Setup .....	24
22.	AD Channel Alarm Setup.....	24
23.	System Parameters Report (about AD channels).....	25

**Temperature Sensor Setup**

24.	Manual Health Reporting .....	27
25.	AD Parameters Setup .....	27
26.	Fine Tuning of Measuring Temperature.....	28

## Command Description

Configure the SMS Alarm Messenger Unit by sending the command text through the GSM Mobile Phone.

Upon command received and processed, the unit will send a confirmation SMS message back to the mobile phone.

If command is incorrect, the unit will reply "SMS format is error!" to the mobile phone.

### 1. New Password Setup

**Command:** PWD:XXXX,NEWPWD:YYYY%

XXXX Current Password

YYYY New Password (4 digits)

Example: PWD:1234,NEWPWD:2222%

Default Password: 1234

New Password: 2222

### 2. Manual Health Reporting

**Command:** PWD:XXXX,STATUS%

[SMS Message received]

ST:XXX;T:2005/01/28/13:00;V:XXXX;AI1:0000;AI2:0000;K1:X;K2:X;K3:X;K4:X;K5:X;K6:X;K7:X;K8:X;OUT1:Y;OUT2:Y;OUT3:Y;#.

Example

ST:002;2005/01/28/13:00;V:8.15;AI1:0000;AI2:0000;K1:1;K2:0;K3:0;K4:1;K5:1;K6:0;K7:0;K8:1;OUT1:1;OUT2:1;OUT3:1;#.

ST	Unit Serial Number	XXX	ASCII code
T	Unit Internal Clock	XXXX	year/month/day/time
V	Operating Voltage	XXXX	
AI1	A/D Channel 1	X	hex digits
AI2	A/D Channel 2	X	hex digits
K1	Alarm Channel 1	K2~8	Alarm Channel 2~8
	K1:0 means "Open"		
	K1:1 means "Closed"		
OUT1	Relay Output 1	OUT2~3	Relay Output 2~3
	OUT1:0 means "Open"		
	OUT1:1 means "Closed"		

### 3. Serial Number Setup

**Command:** PWD:XXXX,SN:YYY%

XXXX Password

YYY Serial Number (0-999)

Example: PWD:1234,SN:268%

Password: 1234 (default)  
Serial Number Set into the unit: 268 (default: 333)

### 4. Control Centre Number & Health Reporting Schedule Setup

Two values are configured by one single command.

(1) **Control Centre Number** is the phone number receiving the periodic report and regular report. Besides the periodic report on schedule (Command 5), report of any command will be sent to this number in addition to the mobile phone number sending the command. Max. 2 control centre can be defined.

**Command:** PWD:XXXX,CTRZ:YYYYYYYYYY,MM#%

XXXX Password

Z Control Centre Number (Max. 2 centres)

1 means the first centre number

2 means the second centre number

YYYYYYYYY Phone number in control centre

MM Period Code of Automatic Scheduled Health Report

Example: PWD:1234, CTR1:123456789,05#%

Password: 1234

Report Health Status every 1 hour (refer Table #1)

(2) **Periodic health** status and any command from other mobile phone will be reported to the first control centre with number 123456789.

Table #1 Reference Table for the Automatic Periodic Health Status Report

00	No automatic report	07	Every 6 hours
01	Every 5 minutes	08	Every 12 hours
02	Every 15 minutes	09	Every 1 day (8:00am)
03	Every 30 minutes	10	Every odd day (8:00am)
04	Every 1 hour	11	1 <sup>st</sup> , 7 <sup>th</sup> , 14 <sup>th</sup> , 21 <sup>st</sup> , 28 <sup>th</sup> Day (8:00am)
05	Every 2 hours	12	1 <sup>st</sup> , 15 <sup>th</sup> Day (8:00am)
06	Every 3 hours	13	1 <sup>st</sup> Day of Each Month (8:00am)

SMS Pro Duo automatically reports the unit health status on pre-defined schedule via SMS message.

[SMS Message received]

ST:XXX;T:2006/10/08/06:15;V:XXXX;AI1:0000;AI2:0000;K1:X;K2:X;K3:X;K4:X;K5:X;K6:X;K7:X;K8:X;OUT1:1;OUT2:1;OUT3:1;#.

ST	Unit Serial Number	XXX	ASCII code
T	Unit Internal Clock	XXXX	year/month/day/time
V	Operating Voltage	XXXX	
AI1	A/D Channel 1	X	hex digits
AI2	A/D Channel 2	X	hex digits
K1	Alarm Channel 1	K2~8	Alarm Channel 2~8
	K1:0 means "Open"		
	K1:1 means "Closed"		
OUT1	Relay Output 1	OUT2~3	Relay Output 2~3
	OUT1:0 means "Open"		
	OUT1:1 means "Closed"		

Example [SMS Message received]:

ST:001;2005/01/27/12:00;V:8.14;AI1:2312;AI2:2131;K1:1;K2:0;K3:0;K4:1;O:1

*SMS Unit Current Status*

ST	Unit Serial Number	001	
TIME	Unit Internal Clock	Date: 27 Jan 2005	Time: 12:00
V	Operating Voltage	8.14VDC	
AI1	A/D Channel 1	2132	
AI2	A/D Channel 2	X2131	
K1	Alarm Channel 1	1	Closed
K2	Alarm Channel 2	0	Open
K3	Alarm Channel 3	0	Open
K4	Alarm Channel 4	1	Closed
O	Output Relay 1	1	ON

## 5. Power Up Message

Whenever the unit is power up, the unit will automatically send the message "RESTART" to control centre configured in **command 4**.

**RESTART!**

## 6. System Clock Setup

**Command:** PWD:XXXX,TIME:AABBCCDDEE%

XXXX Password

AABBCCDDEE Year/Month/Day/Hour/Minute

Example: PWD:1234,TIME:0602031327%

Password: 1234

Clock Set: 3 Feb 2006, 13:27

## 7. Phone Number Setup

4 sets Phone Number (Mobile Phone Number) can be preprogrammed to receive the alarm phone dialing or alarm SMS.

**Command:** PWD:XXXX,ALMNU1:ZZZZZZZZZZ,2:ZZZZZZZZZZ,3:  
ZZZZZZZZZZ,4:ZZZZZZZZZZ#%

XXXX Password

ZZZZZZZZZZ Phone Number

Example 1:

PWD:1234,ALMNU1:12345678,2:36925814712,3:159357456,4:951753621#%

Password: 1234

Upon Alarm is triggered, call or SMS is made to following numbers.

Number 1 12345678

Number 2 36925814712

Number 3 159357456

Number 4 951753621

Example 2:

PWD:1234,ALMNU1:NUL,3:NUL#%

Password: 1234

Upon first example setup, call to following numbers is cancelled.

Number 1 12345678 Call not made

Number 2 36925814712 Call Retained

Number 3 159357456 Call not made

Number 4 951753621 Call Retained

**NUL** means no phone number will be set

## 8. Alarm Input Level & Alert Setup

**Command: PWD:XXXX,ALMLEVELR:X,YY,ZZZ,NNN%**

XXXX	Password
R	Alarm Channel Number
X	0 means "Disabled" 1 means "Close" triggered alarm 2 means "Open" triggered alarm 3 means both "Close" or "Open" triggered alarm
YY	00 means alarm not report to Control Centre 10 means alarm report to Control Centre 1 01 means alarm report to Control Centre 2 11 means alarm report to Control Centre 1 and 2
ZZZZ	Selection of alarm phone dial and alarm SMS 0 means no alarm report 1 means "SMS" only 2 means "phone dial" only 3 means "SMS" first, and then "phone dial"  Z Z Z Z               4 <sup>th</sup> phone number     3 <sup>rd</sup> phone number   2 <sup>nd</sup> phone number 1 <sup>st</sup> phone number
NNN	Relay Output Control 0 means no relay output control 1 means relay output triggered by alarm  N N N           3 <sup>rd</sup> Relay Control   2 <sup>nd</sup> Relay Control 1 <sup>st</sup> Relay Control

Note on PC Setup Software:

### Alarm Default Level

SMS Command Value (X)	PC Setup Display
0 means "Disabled"	NA
1 means "Close" triggered alarm	NP
2 means "Open" triggered alarm	NC
3 means both "Close" or "Open" triggered alarm	SC

Example 1:

PWD:1234,ALMLEVEL2:1,01,1030,010%

Password: 1234

Alarm Channel 2: Once input is closed, alarm is triggered.

Control Centre 2 will be reported by SMS.

Phone Number 1- SMS alert

Phone Number 2- no report

Phone Number 3- SMS alert , then phone dial

Phone Number 4- no report

Relay Output 1 - no control

Relay Output 2 - triggered "CLOSE" by alarm

Relay Output 3 - no control

Example 2:

PWD:1234,ALMLEVEL1:1,11,1230,100%

Password: 1234

Alarm Channel 1: Once input is closed, alarm is triggered.

Control Centre 1 & 2 will be reported by SMS.

Phone Number 1- SMS alert

Phone Number 2- alarm phone dial

Phone Number 3- SMS alert , then phone dial

Phone Number 4- no report

Relay Output 1 - triggered "CLOSE" by alarm

Relay Output 2 - no control

Relay Output 3 - no control

Example 3:

How to make the "Relay Output 3" triggered by alarm channels 2 & 5?

Once set, the relay output 3 will no longer be controlled by command 10 "COUT3:1'.

## Method 1

Enable the control 3 triggered by alarm channels 2 & 5

PWD:1234,ALMLEVEL2:1,11,1111,001%

PWD:1234,ALMLEVEL5:1,11,1111,001%

## Method 3

Programmed by PC Software "SMDPro" via RS232

**Note:** Microphone should be connected if "alarm phone dial" is selected.

## 9. SMS Alarm Message Setup

### Alarm Channel 1 ~ 8

**Command:** PWD:XXXX,ALMYTEXT:□□□□□□□□□□#%

XXXX Password

Y Alarm Channel Number (1~8)

□□□□□□□□ SMS Message (max. 100 characters – no space is allowed)

#### Example:

PWD:1234,ALM4TEXT:DoorContact1Open#%

Password: 1234

Alarm Channel 4 is triggered, SMS Message "Door Contact 1 Open" is sent to the pre-defined mobile phone numbers.

### AD Channel 1 ~ 2

**Command:** PWD:XXXX,ACHYTEXT:□□□□□□□□□□#%

XXXX Password

Y AD Channel Number (1~2)

□□□□□□□□ SMS Message (max. 100 characters – no space is allowed)

#### Example:

PWD:1234,ACH2TEXT:High Temperature Alert#%

Threshold High: 4.250

AD value: 5.123

Password: 1234

Date: 2007-06-12

Time: 19:23

AD value captured is higher than threshold high, so alert SMS is sent with the following message content.

High Temperature Alert ST:001;TM:200706121923;A2:5.123#

## 10. Get the SMS Message Content

Command 8 is used to program the alarm message content into the SMS Alarm Unit.

This command is used to get back the message content for verification.

**Command:** PWD:XXXX,READYTEXT%

XXXX Password

Y Alarm Channel Number (1~4)

SMS Alarm Unit will reply to the mobile phone with the message content for that alarm channel.

## 11. Command the SMS unit to send SMS Message

This command is used to make the SMS Alarm Unit to send the SMS for testing purpose.

**Command:** **PWD:XXXX,SENDMSA:B%**

XXXX Password  
 A Phone Number (1~4)  
 B SMS message selection  
 0: schedule health check content  
 1-8: Alarm Channel SMS message content  
 9: manual input message content

For example: **PWD:1234,SENDMS4:9,Good Morning%**

SMS message "Good Morning" will be sent to the phone number 4.

Reply confirmation message:

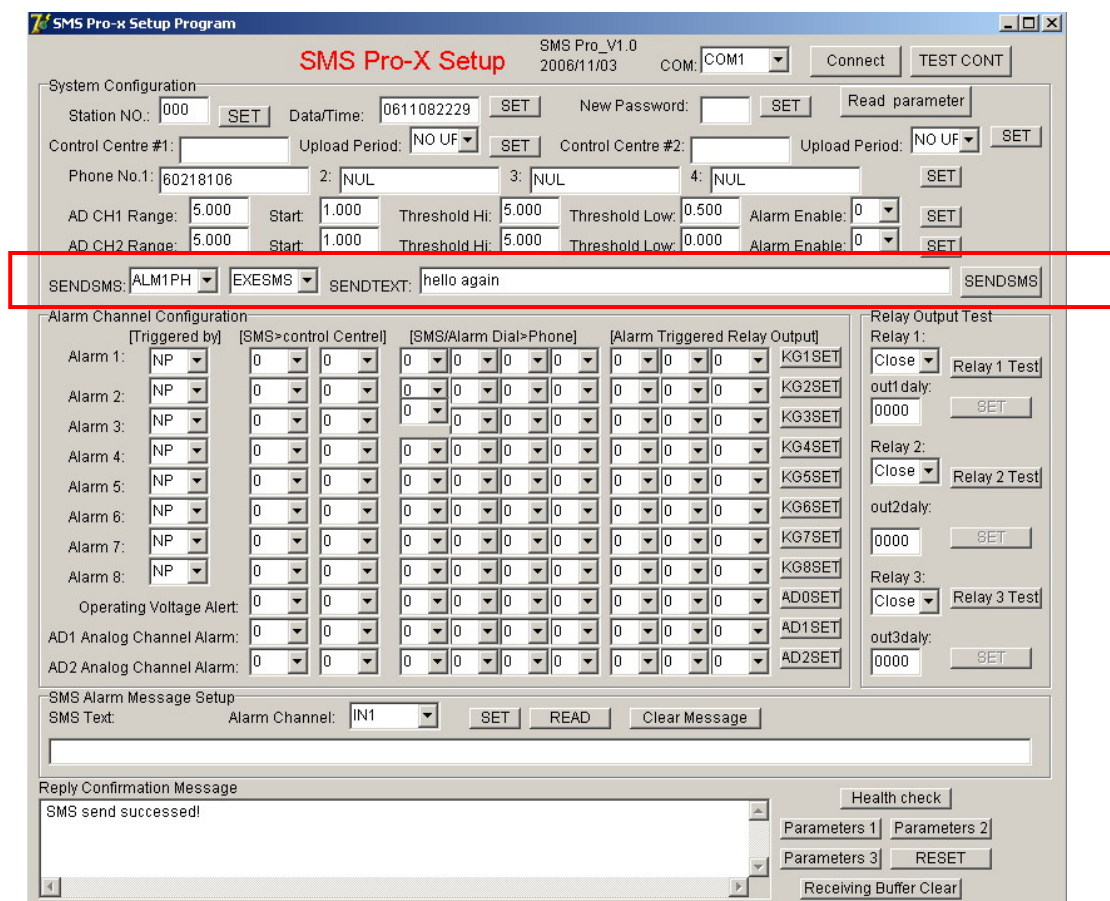
**Success!** SMS Alarm unit succeeds in sending out the message

**Default! NONB** No preset phone number, operation failed

**Default!** Operation failed but phone number exists

When using SMS PC Software, please select the following:

- o Alarm phone number
- o EXESMS
- o Type the message on "SENDTEXT" fill in box
- o Click "SENDSMS" button



## 12. Relay Output Control

**Command: PWD:XXXX,COUTN:Y%**

XXXX	Password
N	Relay Output Channel (1 ~ 3)
Y	1 Turn On (Close) the output
	0 Turn Off (Open) the output

Relay Output is Normally Open by default.

- Command "COUTN:1" is NOT valid when the relay output is triggered by alarm. Reply message will be "ST:XXX" in this case.
- In the above case, command "COUTN:0" is used to reset the relay output after the alarm is triggered.

## 13. Relay Output Delay Time

**Command: PWD:XXXX,OUTNDLAY:YYYY%**

XXXX	Password
N	Relay Output Channel (1 ~ 3)
YYYYY	0000 – 9999 seconds
	0000 Turn On or Off the output (default)
	0005 Turn On the output for 5 seconds, and then Off again
	Turn Off the output for 5 seconds, and then On again

Relay output delay time is good for controlling the device e.g. electric door lock/unlock. Only a time lapse on/off is necessary.

## 14. Operating Voltage Low Level Alarm SMS

When the power supply voltage level is below the min. level at 5.34VDC, alert SMS is sent.

Date: 2007-06-15

Time: 13:25

**ST:001;TM:200706151325;V:5.34#**

## 15. Operating Voltage Low Level Alert

This command is to set the action to be done once the operating voltage drops below 7.0VDC. Value of current operating voltage can be retrieved by the command 2.

**Command:** PWD:XXXX,ADCOUTO:YY,ZZZZ,NNN%

XXXX	Password																				
YY	00 means alarm not report to Control Centre 10 means alarm report to Control Centre 1 01 means alarm report to Control Centre 2 11 means alarm report to Control Centre 1 and 2																				
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			3 <sup>rd</sup> Relay Control																		
			2 <sup>nd</sup> Relay Control																		
			1 <sup>st</sup> Relay Control																		

**16.Arm/Disarm Setup****Command: PWD:XXXX,ARM%**

XXXX Password

Example: PWD:1234,ARM%

Password: 1234

Unit is armed, and in alert status

**Command: PWD:XXXX,DISARM%**

XXXX Password

Example: PWD:1234,DISARM%

Password: 1234

Unit is disarmed, and no alarm is reported

**17.Default Setting**

PWD:1234,PARAMETER1%

ST:000;T:2006/10/01/01:01;H:1;F1:,00;F2:,00;C1:,1;C2:,1;C3:,1;C4:,1;XH:20#;

PWD:1234,PARAMETER2%

ST:000:VL:7.00,O:00,0000,000;A1M:5.000,1.000,0,5.000,0.500,O:00,0000,000;A2M:5.000,1.000,0,5.000,0.000,O:00,0000,000;K1:1,O:00,0000,000;#;

PWD:1234,PARAMETER3%

ST:000;K2:1,O:00,000,0;K3:1,O:00,000,0;K4:1,O:00,000,0;K5:1,O:00,000,0;K6:1,O:00,000,0;K7:1,O:00,000,0;K8:1,O:00,000,0;

**18.System Parameters RESET****PWD:XXXX,PARAMETER&%**

[SMS Message received]

Parameter initialize success!

**19.Return Message**

Command succeeds

SMS Message: Function Code &amp; Setting Parameters Set in the command

Command fails

SMS Message: SMS format is error!

**20. System Parameters Report****PWD:XXXX,PARAMETER1%**

[SMS Message received]

ST:XXX;T:2006/10/08/08:00;H:X;F1:XXXXXXXXXX,YY;F2:XXXXXXXXXX,YY;C1:XXXX  
XXXXXXXX,Y;C2:XXXXXXXXXX,Y;C3:XXXXXXXXXX,Y;C4XXXXXXXXXX,Y;XH:XX#

ST:	Unit Serial Number
T:	Date/Time
H:X	Arm/Disarm
F1:	1 <sup>st</sup> Control Centre Number
XXXXXXXXXX	Control Centre Number
YY	Automatic Health Report Schedule
C1	1 <sup>st</sup> Alarm Report Phone Number
XXXXXXXXXX	Alarm Report Phone Number
Y	Alarm Report enabled/disabled
XH:XX	GSM Network Signal Strength (1 ~ 31)

**PWD:XXXX,PARAMETER2%**

(about Alarm Channel)

[SMS Message received]

ST:XXX;VL:XXXXX,O:AX,BBBB,CCC;A1M:XXXXX,XXXXX,R,WWWWW,WWWWW,O:AX,BB  
BB,CCC;A2M:XXXXX,XXXXX,R,WWWWW,WWWWW,O:AX,BBBB,CCC;K1:N,O:AX,BBBB,C  
CC;#

VL	Min. Operating Voltage, below this level will trigger alarm 7VDC by default
A	alarm report to Control Centre 1      0 means no report 1 means report
X	alarm report to Control Centre 2      0 means no report 1 means report
BBBB	report status for 4 phone numbers 0 means no report 1 means "SMS" but no "phone dialing" 2 means "phone dialing" but no "SMS" 3 means "SMS" and then "phone dialing"
CCC	relay output control 0 means control not triggered by alarm 1 means alarm triggered control

**K1:N,O:AX,BBBB,CCC;**

Alarm 1 status

Refer to next page

**PWD:XXXX,PARAMETER3%**

**ST:XXX;K2:N,O:AX,BBBB,CCC;K3:N,O:AX,BBBB,CCC;K4:N,O:AX,BBBB,CCC;K5:N,O:AX,  
BBBB,CCC;K6:N,O:AX,BBBB,CCC;K7:N,O:AX,BBBB,CCC;K8:N,O:AX,BBBB,CCC;#**

#### Alarm 2 ~ 8 Status Report

**K2:N,O:AX,BBBB,CCC;**

K2	Alarm Channel 2	
N	0 means "Disabled"	
	1 means "Close" triggered alarm	
	2 means "Open" triggered alarm	
	3 means both "Close" or "Open" triggered alarm	
O	Corresponding Output Relay Status	
A	alarm report to Control Centre 1	0 means no report
		1 means report
X	alarm report to Control Centre 2	0 means no report
		1 means report
BBBB	report status for 4 phone numbers	
	0 means no report	
	1 means "SMS" but no "phone dialing"	
	2 means "phone dialing" but no "SMS"	
	3 means "SMS" and then "phone dialing"	
CCC	relay output control	
	0 means control not triggered by alarm	
	1 means alarm triggered control	

**COMMAND (Analog to Digital Channel)****21.AD Parameters Setup****PWD:XXXX,ADVALE1:XXXXX,NNNNN,Y,ZZZZ,WWWWW%**

1	Channel 1
XXXXX	Measuring Range
NNNNN	Start Value
Y	1: Triggered Alarm enabled 0: Triggered Alarm disabled
ZZZZZ	Threshold High Value Setup
WWWWW	Threshold Low Value Setup

**22.AD Channel Alarm Setup****PWD:XXXX,ADCOUTB: YY,ZZZZ,NNN%**

B	0 [Please refer to COMMAND 10 – Low Voltage Alert] 1: AD Channel 1 2: AD Channel 2																				
XXXX	Password																				
YY	00 means alarm not report to Control Centre 10 means alarm report to Control Centre 1 01 means alarm report to Control Centre 2 11 means alarm report to Control Centre 1 and 2																				
ZZZZ	Selection of alarm phone dial and alarm SMS 0 means no alarm report 1 means "SMS" only 2 means "phone dial" only 3 means "SMS" first, and then "phone dial"																				
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				3 <sup>rd</sup> phone number																	
				2 <sup>nd</sup> phone number																	
				1 <sup>st</sup> phone number																	
NNN	Relay Output Control 0 means no relay output control 1 means relay output triggered by alarm																				
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			3 <sup>rd</sup> Relay Control																		
			2 <sup>nd</sup> Relay Control																		
			1 <sup>st</sup> Relay Control																		

**23. System Parameters Report (about AD channels)****PWD:XXXX,PARAMETER2%**

[SMS Message received]

ST:XXX;VL:XXXXX,O:AX,BBBB,CCC;A1M:XXXXX,XXXXX,R,WWWWW,WWWWW,O:AX,BB  
 BB,CCC;A2M:XXXXX,XXXXX,R,WWWWW,WWWWW,O:AX,BBBB,CCC;K1:A,O:AX,BBBB,C  
 CC;#

A1	AD Channel 1
M:XXXXX,XXXXX	Range Value, Start Value
R	AD Value Triggered Alarm enabled
WWWWW,WWWWW	Alarm Triggered Threshold High Value Alarm Triggered Threshold Low Value

AI1 value is reported by COMMAND 2 [PWD:XXXX,STATUS%]

A	alarm report to Control Centre 1	0 means no report 1 means report
X	alarm report to Control Centre 2	0 means no report 1 means report

BBBB	report status for 4 phone numbers
	0 means no report
	1 means "SMS" but no "phone dialing"
	2 means "phone dialing" but no "SMS"
	3 means "SMS" and then "phone dialing"

CCC	relay output control
	0 means control not triggered by alarm
	1 means alarm triggered control

A2M...	AD Channel 2
--------	--------------

Example:

A1M:0.600,1.000,1,0.500,0.100

0.600	Range from 0 to 600
1.000	Start Value is "1.000" (4mA * 250Ω=1)
1	Alarm Enabled
0.500	Threshold High
0.100	Threshold Low

Standard range of data captured in AD Channel 1 is 4~20mA.

AI1 value depends on user setting of "Range", "Start Value" and the input current "c".

Start Value = 4mA x 250Ω = 1

$$AI1 = \frac{(c \times 250 - \text{Start Value})}{(0.02 \times 250 - \text{Start Value})} \times \text{Range}$$

AI1 reported value will be = Range x (0.012 x 250 - Start Value) / (5 - Start Value)

When current input is 12mA, AI1 = 0.6 x (0.012 x 250 - 1) / (5 - 1) = 0.3

When user requires:

High level alarm at 0.018mA

Low level alarm at 0.008mA

$$H = (0.018 \times 250 - 1) \times 0.6 / (0.02 \times 250 - 1) = 0.525$$

$$L = (0.008 \times 250 - 1) \times 0.6 / (0.02 \times 250 - 1) = 0.15$$

When AI1 value is over 0.525 or below 0.150, alarm will be triggered – SMS alert message will be sent out to phone number 1 and relay 1 is turned on.

Command: PWD:1234,ADVALE1:0.600,1.000,1,0.525,0.150%

Command: PWD:1234,ADCOU1:10,1000,100%

## Built-in Temperature Sensor Operation

### [Pro-S]

- Temperature Sensor is built-in with measuring range 0 ~ 100°C.
- AD Channel 2 will be used for temperature measuring.
- Since this is the internal built-in sensor, the response time will be relatively slow for application of gradual temperature change.

#### 24. Manual Health Reporting

**Command:** PWD:XXXX,STATUS%

[SMS Message received]

ST:XXX;T:2005/01/28/13:00;V:XXXX;AI1:0000;AI2:0000;K1:X;K2:X;K3:X;K4:X;K5:X;K6:X;K7:X;K8:X;OUT1:Y;OUT2:Y;OUT3:Y;#.

AI2      Current Temperature

#### 25. AD Parameters Setup

**PWD:XXXX,ADVALE2:XXXXX,NNNNN,Y,ZZZZZ,WWWWW%**

2	AD Channel 2		
XXXXX	Measuring Range	250.0	Default
NNNNN	Start Value	00000	Default
Y	1: Triggered Alarm enabled 0: Triggered Alarm disabled		
ZZZZZ	Threshold High Temperature Setup		
WWWWW	Threshold Low Temperature Setup		

#### Example:

When temperature is above 70° or below 15°, SMS alarm message will be sent to phone number 3 and relay output 1 will be triggered.

AD Channel	2
Measuring Range	250.0
Start Value	00000
Triggered Alarm enabled	1
Threshold High Temperature Setup	070.0
Threshold Low Temperature Setup	015.0

PWD:1234,ADVALE2:250.0,00000,1,070.0,015.0%

PWD:1234,ADCOU2:00,0010,100%

## 26. Fine Tuning of Measuring Temperature

Comparing the measuring value of an accurate thermometer, the built-in temperature sensor can be fine tuned with tolerance 0~4°C.

### Case 1 When sensor reports a value lower than the actual, start value adjustment will be 0 ~ 4.

Actual Temperature:	25°
Sensor Report:	23.45°
Necessary Adjustment:	$25^{\circ} - 23.45^{\circ} = 01.55^{\circ}$
AD Channel	2
Measuring Range	250.0
Start Value	01.55
Triggered Alarm enabled	1
Threshold High Temperature Setup	070.0
Threshold Low Temperature Setup	015.0

**PWD:1234,ADVALE2:250.0,01.55,1,070.0,015.0%**

### Case 2 When sensor reports a value higher than the actual, start value adjustment will be 10 ~ 14.

Actual Temperature:	25°
Sensor Report:	27.45°
Necessary Adjustment:	$25^{\circ} - 27.45^{\circ} = -02.45^{\circ}$
AD Channel	2
Measuring Range	250.0
Start Value	12.45
Triggered Alarm enabled	1
Threshold High Temperature Setup	070.0
Threshold Low Temperature Setup	015.0

**PWD:1234,ADVALE2:250.0,12.45,1,070.0,015.0%**