USER MANUAL for Smart Alert. (VE SA 246M)

INTRODUCTION

SMART ALERT (SA) is used for obtaining quick SMS alerts from field inputs. VE SA 246M allows up to 4 Potential free inputs to be sensed. For every input, unique separate SMS is sent to multiple reporting numbers. Maximum up to 10 different persons could be notified with the alert. VE SA 246M allows 6 potential free outputs to be controlled remotely via SMS. VE SA 246M allows 2 analog inputs for 4~20 mA signals and also can poll Modbus slave devices through RS 485 interface and send an SMS containing Modbus data.

FEATURES

- 12 V/2A DC power supply.
- 4 number digital potential free alarm inputs with common ground pin
- 2 analog inputs for 4~20 mA signals.
- 6 number NO/NC outputs.
- Built in GSM modem.
- Storage of total 10 reporting telephone numbers. (Each with 14 digits max)
- Modbus protocol over RS485 interface supported.
- Buzzer for audible status.
- Configuration via preformatted SMS.
- Dimensions : 106 x 63 x 45 mm (Excluding connectors and antenna)

INSTALLING THE UNIT

Inserting/ Removing the SIM Card

To insert or remove the SIM Card, it is necessary to press the yellow SIM holder ejector button with Sharp edged object like a pen or a needle. When this is done the SIM holder comes out a little, then pull it out and insert or remove the SIM Card. It is very important that the SIM is placed in the right direction for proper working.

Connecting External Antenna

Connect the external SMA antenna to the male antenna connector of the unit. The frequency of the antenna should be GSM 850/900/1800/1900. The right Antenna should be used with the specified frequency otherwise it can affect the communication.

Power Supply – Screw type connector with +12V DC, 2A supply.

Digital Inputs –
For SA246 connect the potential free contact wires to DI1 ~ DI4 terminals of unit. The other end of contact can be connected to common GND terminal provided.

Analog Inputs-
AI1 and AI2 are provided for analog inputs. The 4-20mA sensor output should be connected to AI1 or AI2 terminal and other end is to be connected to GND.

Digital Outputs-
SA246 supports6 digital outputs with two potential free NO-NC contacts for each output. The contact rating is 230V / 15A.
So appropriate capacity load can be switched using these outputs. Whenever unit is powered off, DO status falls back to NC status and is restored to last condition upon resumption of power.

OPERATION

At power on, unit beeps twice and power LED glows steady. The unit checks for range and range LED 1 blinks while the unit gets the range. When the range is found, LEDs become steady. In good range, all 3 LEDs glow. In medium range, only 2 LEDs will glow and in low range, only 1 LED will glow.

Unit then starts scanning inputs and report alarm as and when it detects change of input state. When SMS to activate output is received, it changes the output state.

VE SA 246M has 4 inputs DI1 ~ DI4 and two common GND terminals. The four potential free contacts must be connected to these inputs. The inputs are configurable as NO (Normally Open) or NC (Normally closed) or bi-state inputs in normal condition. When any input changes its state, SMS for that input is sent to the configured reporting numbers. All numbers are reported one after another. The unit can send 4 different SMS messages for each input and the English text is also configurable. SMS text can be maximum 120 characters.

VE SA 246M supports two analog inputs AI1 and AI2 with one common GND terminal. Analog inputs can be set to indicate alarm on crossing low or high levels set in %. Two alarms can be set – Lo alarm and Hi alarm. When input to that analog channel goes below low level or goes above high level, alarm SMS corresponding to that analog input is sent to reporting numbers.

The status of each input channel is sent periodically to the reporting numbers along with data received from Modbus slave device. Also status message of input channels are sent indicating channel is in alarm or in normal state. The period of reporting is also configurable from 01 ~ 24 hours. If this value is set to zero, periodic status reporting is disabled. The instantaneous status can also be obtained on demand by user, by sending a SMS to the unit.

Any configuration of unit can be done through two authenticated numbers only. These numbers can be changed at site. At factory shipping time, default number is configured as per user request / blank.

When unit receives pre-formatted SMS messages, it acts per the message command. The configuration can be changed only through authenticated numbers; whereas general status read can be done through any number. Device continuously poll Modbus data and will send an SMS automatically when there is change of data and also at periodic time interval configured by user to receive periodic status. Total of 5 Modbus queries can be preconfigured.

SMS FORMATS FOR CONFIGURATION

- **To set SMS reporting numbers**

  #1231#XX#XX#XX#XX#XX#XX#XX#XX#XX#XX*

  Where, XX is dialing number. Maximum length can be 14 digits for each number.

  Unit will send acknowledgement SMS as following: (Assuming 2 numbers are configured)

  Command: ***#1231#+910123456789#+919876543210****
  Acknowledgement: ***SMS Nos:***
  +910123456789
  +919876543210

- **To set SMS text for each channel**

  #123MX#Text*

  Where Text is the text message for each of 1 ~ 4 inputs respectively and X is channel number. Please note characters „#" and „*" should not be part of SMS alert text. Maximum text length can be 120 characters. Default text is „Alarm on Channel X" for input X.

  Unit will send acknowledgement SMS for respective commands as follows.

  Set channel 1 Alarm text message:
  Command: ***#123M1#Alarm on channel 1****
  Acknowledgement: ***Reporting text for channel 1:***
  Alarm on channel 1

  Set channel 2 Alarm text message:
  Command: ***#123M2# Alarm on channel 2****
  Acknowledgement: ***Reporting text for channel 2:***
  Alarm on channel 2

  Set channel 3 Alarm text message:
  Command: ***#123M3# Alarm on channel 3****
  Acknowledgement: ***Reporting text for channel 3:***
  Alarm on channel 3

  Set channel 4 Alarm text message:
  Command: ***#123M4# Alarm on channel 4****
  Acknowledgement: ***Reporting text for channel 4:***
  Alarm on channel 4

Set analog channel 1 Alarm text message:

Command :	**#123M5#Alarm on Analog 1***
Acknowledgment:	***Reporting text for Analog 1: Alarm on Analog 1***

Set analog channel 2 Alarm text message:

Command :	**#123M6#Alarm on Analog 2***
Acknowledgment:	***Reporting text for Analog 2: Alarm on Analog 2***

- **To set configurable text to be added with periodic reporting SMS**

#123M7#Text*

Where Text is the text message which will be the part of periodic reporting SMS and will specify device information such as serial number, location etc configured by user. Please note that „#" and „*" should not be part of the text. Maximum text length can be of 50 characters. Default text for reporting text would be "Device Id: 023456"

Unit will send acknowledgement SMS as following:

Command:	***#123M7#Device ID: 0123456****
Acknowledgement:	***Reporting text for Device: Device ID: 0123456***

- **To set NO / NC status of inputs**

#1234#XXXX#AA#BB#CC#DD*

Where X = 0 means NO, 1 means NC and AA, BB, CC, DD are delays in seconds which can be set for input channels 1~4 respectively. These can take value from 00 to 99 seconds.

If unit is configured as NO, there will be alarm SMS if change of state is detected for specified delay period for particular channel.
For NO configuration, SMS format is:

Command:	***#1234#0000#90#90#90#90****
Acknowledgement:	***Configuration of input channels is: 0000 Delays set to 90 90 90 90***

In below message format input 1 & 2 is set to NC and input 3 & 4 is set to NO.
If this message format is set, each input channel will report alarm state if corresponding channel has retained it"s changed state for 90 seconds.

Command: ***#1234#1100#90#90#90#90****
Acknowledgement: ***Configuration of input channels is:***
1100
Delays set to
90
90
90
90

If unit is configured to bi-state, there will be alarm SMS if input goes from high to low or from low to high within specified delay period for particular channel.
For bi-state configuration, SMS format is:

Command: ***#1234#2222#00#00#00#00****
Acknowledgement: ***Configuration of input channels is:***
2222
Delays set to
00
00
00
00

So if this message format is set, each input channel will report alarm state immediately.

- **To set analog input levels**

Analog channel 1 and channel 2 high and low levels can be set using below SMS command. If analog channel value goes above / below set levels, then unit will send alert SMS.

Command: ***#1236#AI1L=08.0#AI1H=75.0#AI2L=10.5#AI2H=85.5****
Acknowledgement : ***Analog levels are set to :***
AI1LOW = 08.0%
AI1HIGH = 75.0%
AI2LOW = 10.5%
AI2HIGH = 85.5%

- **To set periodic status reporting time**

#123HXX*

XX in the above format represents hours which can take values from 01 to 24.

The status of input channels is sent periodically to reporting numbers .

e.g. #123H01* will set periodic reporting time to 1 hour. So, when this time is set through SMS, unit will send status message after every one hour.

Unit will send acknowledgement SMS as described below:

Command: ***#123H01****
Acknowledgement: ***Periodic Reporting hours are set to: 01***

Note: #123H00* will disable the periodic status reporting.

- **To set output status**

#1235#XY*

Where X means output number and X means NO/NC status. (Used only for SA42 model)
X = 1 means output 1 and X = 2 means output 2 and so on up to output number 6.
Y = 0 means NO and Y = 1 means NC.

When common (C) terminal is connected to NO, LED corresponding to that output is ON, otherwise OFF. E.g. If C1 connected to NO1 then O1 LED will be ON.

Unit will send acknowledgement SMS as following:

Command*:* ***#1235#10****
Acknowledgement: ***C1 is connected to NO1***

Command*:* ***#1235#21****
Acknowledgement: ***C2 is connected to NC2***

Command*:* ***#1235#30****
Acknowledgement: ***C3 is connected to NO3***

Command*:* ***#1235#41****
Acknowledgement: ***C4 is connected to NC4***

Command*:* ***#1235#50****
Acknowledgement: ***C5 is connected to NO5***

Command*:* ***#1235#61****
Acknowledgement: ***C6 is connected to NC6***

➢ To link Output with inputs

In VE SA 246M,outputs can be used by 2 methods. One using directly SMS specified in above #1235# format and second one is based on input channels alarm condition. If output is linked to the input channels, then that particular output is connected to NO when any one the input goes into alarm state. This output will restore to NC after set time (format explained in pulsed configuration below).

Command to link outputs to inputs.

#1238#XXXXXX* , where X = 1 or 0

E.g. #1238#101010* will link outputs 1,3,5 to the inputs and outputs 2,4,6 to be operated as independent output on SMS. Whenever any one of the 4 digital inputs goes into alarm, output 1,3,5 will be connected to NO and will restore automatically to NC, depending on next (Latch / Pulsed) configurations.

Unit will send acknowledgement SMS as following:

Command:	***#1238#101010****
Acknowledgement:	***Output linked to inputs:***
	OP1 = Y
	OP2 = N
	OP3 = Y
	OP4 = N
	OP5 = Y
	OP6 = N

➢ To set time out for output auto-restoral

Each output can be restored to NC after setting time period through following SMS format.

#1237#XAA#XAA#XAA#XAA#XAA#XAA*

Where, X = S (seconds) / M (Minutes) / H (hours).
A = Any digit between 0 – 9.

e.g. #1237#S60#M30#H05#S99#M99#H24* will configure output 1 to be connected to NO1 for 60 Seconds, output 2 to be connected to NO2 for 30 Minutes, Output 3 to be connected to NO3 for 5 Hours and so on.

If output is linked with input, output timing must be a non zero value. If configured zero, it will set to 5 seconds automatically.

If output is not linked with input, and timing is configured to 00, then it will not restore the output to NC.

Each reporting number will receive SMS after output is restored automatically.

Note: Output 2 is configured to be ON for 30 minutes. But user can restore the output to NC by sending SMS as #1235#X1* before 30 minutes are over. SMS override is allowed. Where X = 1,2,3,4,5,6 i.e. output number.

Unit will send acknowledgement SMS as following:

Command:	***#1237#S60#M30#H05#S99#M99#H24****
Acknowledgement:	***OP1 ON for 60 Sec***
	OP2 ON for 30 Min
	OP3 ON for 05 Hrs
	OP4 ON for 99 Sec
	OP5 ON for 99 Min
	OP6 ON for 24 Hrs

- **To set MODBUS query frame**

#123QX#YYYYYYYYYYY#ABC*

Where, X = Number of Queries (Maximum of 5 queries)
Y = MODBUS Query frame in HEX without check sum,
A = „S", "M, or „H" indicating Seconds, Minutes, Hours and
B = C = Numberic value between „0" to „9".

E.g. #123Q1#010300E80003#S05* will configure 010300E80003 as MODBUS query where 01 is device ID, 03 is function code, 00E8 is modbus address and 0003 is length to be read.S05 will indicate Query response timeout. If no response in this time is received, device will poll next query.

Command:	***#123Q1#01020000000A#S02****
Acknowledgement:	***MODBUS Queries are:***
	- Q1: 01020000000A S02
	- Q2: Undefined!
	- Q3: Undefined!
	- Q4: Undefined!
	- Q5: Undefined!

- **To set authentication numbers**

#123A#XX#XX*

Where, XX is authentication number. Maximum length can be 14 digits for each number.

E.g. #123A#+910123456789#+919876543210* will configure +919871045611 as first authentication number and +919871045501 as second authentication number.

Unit will send acknowledgement SMS as following:

Command: ***#123A#+910123456789#+919876543210****
Acknowledgement: ***Authentication numbers are:***
+910123456789
+919876543210

NOTE: Authentication numbers must be stored along with country code. Maximum of 2 authentication numbers can be stored.

SMS FORMATS TO READ CONFIGURATION

For reading the configuration, SMS can be sent from any number. i.e. it is not necessary that it should be authentication number only. The SMS formats are mentioned below.

- **To read authentication numbers**

  When unit receives this SMS, it will reply with an SMS as follows:

  Command: ***#123RA****
  Acknowledgement: ***Authentication numbers are:***
  +910123456789
  +919876543210

- **To read the currently configured SMS reporting numbers**
  When unit receives this SMS, it will reply with an SMS as follows: (Assuming only 02 reporting numbers are configured.)

  Command: ***#123R1****
  Acknowledgement: ***SMS Nos:***
  +910123456789
  +919876543210

- **To read configured SMS text**

  Read channel 1 Alarm text message: **Command:** ***#123RM1**** **Acknowledgement:** ***Reporting text for channel 1:***
  Alarm on channel 1

Read channel 2 Alarm text message: **Command:**
#123RM2* **Acknowledgement:** ***Reporting text for channel 2:***
Alarm on channel 2

Read channel 3 Alarm text message: **Command:**
#123RM3* **Acknowledgement:** ***Reporting text for channel 3:***
Alarm on channel 3

Read channel 4 Alarm text message: **Command:**
#123RM4* **Acknowledgement:** ***Reporting text for channel 4:***
Alarm on channel 4

Read reporting text for analog channel 1:
Command : **#123RM5***
Acknowledgment: ***Reporting text for Analog 1:***
Alarm on Analog 1

Read reporting text for analog channel 2:
Command : **#123RM6***
Acknowledgment: ***Reporting text for Analog 2:***
Alarm on Analog 2

Read Device Information text message: **Command:**
#123RM7* **Acknowledgement:** ***Reporting text for Device:***
Device ID: 0123456

- **<u>To read current NO / NC status of inputs</u>**

Command: ***#123R4****
Acknowledgement: ***Configuration of input channels is:***
2222
Delays set to
00
00
00
00

- **<u>To read current status of outputs</u>**

Command: **#123R5***
Acknowledgement: ***C1 is connected to NO1***
C2 is connected to NC2
C3 is connected to NO3

C4 is connected to NC4
C5 is connected to NO5
C6 is connected to NC6

- **To read analog input levels**

Command: ***#123R6****
Acknowledgement: ***Analog threshold values are set to:***
AI1LOW = 08.0%
AI1HIGH = 75.0%
AI2LOW = 10.5%
AI2HIGH = 85.5%

- **To read periodic status reporting hours**

Command: ***#123RH****
Acknowledgement: ***Periodic Reporting hours are set to:***
01

- **To read current status of inputs**

Command: ***#123RS****
Acknowledgement: ***CH1 NO (ALERT)***
CH2 NO (NORMAL)
CH3 NO (NORMAL)
CH4 NO (NORMAL)
AI1 (NORMAL)
AI2 (ALERT)
Device ID: 0123456

This message tells all input channls are configured as NO. Channel 2, 3 & 4 inputs and analog chanel 1 are in their normal state and Digital input 1 and analog input 2 is in alarm state. Also the message configured by user using M7 command will be added towards the end of periodic reporting to indicate device ID / location / Serial Number.

- **To read auto-restoral output timeout**

Command: **#123R7***
Acknowledgement: ***OP1 ON for 60 Sec***
OP2 ON for 30 Min
OP3 ON for 05 Hrs
OP4 ON for 99 Sec
OP5 ON for 99 Min
OP6 ON for 24 Hrs

- **To read output linked with input or not**

Command: **#123R8***
Acknowledgement: ***Output linked to inputs:***
OP1 = Y
OP2 = N
OP3 = Y
OP4 = N
OP5 = Y
OP6 = N

- **To read MODBUS Query set**

Command: ***#123RQ****
Acknowledgement: ***MODBUS Queries are:***
- Q1: 01020000000A S02
- Q2: Undefined!
- Q3: Undefined!
- Q4: Undefined!
- Q5: Undefined!

LED INDICATIONS

LED NAME	Meaning
PWR	ON - Unit is powered on.
DI1	ON - Input 1 is in alarm state. OFF - Input 1 is in normal state.
DI2	ON - Input 2 is in alarm state. OFF - Input 2 is in normal state.
DI3	ON - Input 3 is in alarm state. OFF - Input 3 is in normal state.
DI4	ON - Input 4 is in alarm state. OFF - Input 4 is in normal state.
AI1	ON - Analog Input 1 is in alarm state. OFF - Analog Input 1 is in normal state.
AI2	ON - Analog Input 2 is in alarm state. OFF - Analog Input 2 is in normal state.
O1	ON - C1 is connected to NO1. OFF- C1 is connected to NC1.
O2	ON - C2 is connected to NO2. OFF - C2 is conncted to NC2.
O3	ON – C3 is connected to NO3. OFF – C3 is conncted to NC3.

O4	ON - C4 is connected to NO4. OFF- C4 is connected to NC4.
O5	ON – C5 is connected to NO5. OFF – C5 is conncted to NC5.
O6	ON – C6 is connected to NO6. OFF – C6 is conncted to NC6.
RANGE	Indicates unit range.
	1 LED ON - Low rage.
	2 LEDs ON - Medium range.
	3 LEDs ON - Good range.

CONNECTOR DETAILS

- **9 Pin Howder connector for analog & digital inputs**

CONNECTOR NAME	DETAILS
DI1	Digital Input channel 1
GND	Common GND terminal
DI2	Digital Input channel 2
DI3	Digital Input channel 3
GND	Common GND terminal
DI4	Digital Input channel 4
AI1	Analog Input channel 1
GND	Common GND terminal
DI4	Analog Input channel 2

- **2 Pin Howder connector for Modbus communication**

CONNECTOR NAME	DETAILS
D+	RS485 D+ / Tx+
D-	RS485 D - / Tx-

- **4 Pin Howder connector for output 1 & 2 connection**

CONNECTOR NAME	DETAILS
C1	Comman 1
NO1	NO for output 1
C2	Common 2
NO2	NO for output 2

- **4 Pin Howder connector for output 3 & 4 connection**

CONNECTOR NAME	DETAILS
C3	Comman 3
NO3	NO for output 3
C4	Common 4
NO4	NO for output 4

- **4 Pin Howder connector for output 5 & 6 connection**

CONNECTOR NAME	DETAILS
C5	Comman 5
NO5	NO for output 5
C6	Common 6
NO6	NO for output 6

TROUBLESHOOTING

- Unit doesn"t power ON.

  1) Verify input voltage supply connections with their polarity.
  2) Check the supply 12 VDC with the help of Digital Multi Meter.

- Not receiving SMS from SA40/ SA42 unit.

  1) Ensure device has range. Range LEDs are constant. If range LED"s are blinking, then device has poor range. Check antenna connections or check if SIM card is present and if present then, make sure it is inserted properly.
  2) If device range indications LEDs are constant then make sure the SIM card has enough balance to send an SMS and/or is SMS service enabled. Before inserting new SIM card in the device, it is advised to check the new SIM card on a mobile device for SMS functionality and balance check.
  3) If Range LEDs are constant, and device SIM is inserted properly and has sufficient balance then send any configuration read command such as #123R1* or #123RH* and check if device makes a long beep. This indicates device has received SMS. Now closely follow the device, device will again give 2 short beeps, this indicates device has acknowledged the received SMS command. *(NOTE: Kindly be patient, sometimes due to network congestion or peak network traffic, it takes more than 1 minute for SMS reception)*
  4) If you still do not receive the SMS, then kindly return the device.

- I keep receiving “INVALID COMMAND!” SMS from unit.

    1) Kindly send SMS #123RA*
    2) Read the authentication numbers set.
    3) Ensure you are sending SMS from one of the two authentication numbers set.
    4) If authentication number is being used to send SMS then kindly ensure the command being sent is syntactically correct.

- Input LED"s keep turning ON and OFF in cyclic fashion.

    1) Kindly return the device.