EDAC Electronics Ltd

EDAC SMS 300 User Manual

Document Version 3.0

For Version 2 Hardware and Firmware from 3.01.12

www.edacelectronics.com

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2. Overview

2.1. About the EDAC SMS 300

The EDAC SMS 300 is a cost effective remote monitoring and control tool that communicates using CDMA cellular networks. The product provides peace of mind that critical situations are being monitored, and freedom from time consuming manual switching tasks.

The EDAC SMS 300 provides a remote interface between critical processes or machinery and the end users by means of SMS (text) messaging. The unit is programmed to send pre-defined SMS messages to up to 16 different pre-programmed cellphone numbers when an alarm condition occurs.

The EDAC SMS 300 has 8 input terminals which can be configured in any combination of digital (Normally Open or Normally Closed), 0-5V analog or 4-20mA analog. Analog inputs have full scaling functions meaning that the analog signals are translated into meaningful, real world units. Two sets of alarm points can be assigned on each analog input, allowing for 'minor alarm' and 'major alarm' situations to be monitored. The two alarm points can also be combined to allow 'Alarm inside range' and 'Alarm outside range' configurations on the input. Each Input has 'Alarm' and 'Non-alarm' messages. Users can receive any combination of alarm and non-alarm messages from any input.

The SMS 300 also has 4 output terminals, that can be controlled either independently (by the user) or automatically (tied to an input condition). The user can control the outputs simply by sending an SMS to the unit, containing a PIN code and the appropriate command (i.e. "1234 Pump On" or "0000 Fan Off"). The unit can be configured to send notifications of outputs being switched. Outputs can also be tied to input conditions. Outputs can be switched on/off automatically when an alarm/reset condition occurs. (i.e. "Input 1 alarms, switch output 1 on" and "Input 1 reset, switch output 1 off.") The outputs are of a relay type, and are rated at 2A, 50V AC/DC max. The outputs also have a momentary feature, meaning they can be configured to automatically turn off after a pre-defined period when activated.

The SMS 300 continually checks the status of its cellular network connection ensuring the prerequisites for reliable communications are present. If the unit detects that connectivity has been lost, it will periodically try to re-connect to the network until it becomes available.

The 'EDAC 300 Series Configuration Manager' software provides an easy to use GUI interface for configuration of the EDAC SMS 300 product. This configuration software can be used to set up, maintain and monitor SMS 300 units locally via an RS-232 Serial connection or remotely via a dial up CSD connection.

2.2. Specifications

Power Supply	12-28V AC/DC supply When in idle mode the SMS 300 draws less than 100mA. The PSU must be able to supply a peak current of up to 1A at 12VDC and 500mA at 24VDC
Fuse	1A 20x5mm Internal Cartridge Fuse.
Telephone Network Connection	GSM or CDMA – Telstra Australia, Telecom NZ or Vodafone NZ
Inputs	8 user selectable 10bit Analog or Digital inputs. Sensor out of range warnings
Input scan rate	< 0.5 second
De-bouncing	Configurable (0-10000 seconds)
Analog Input type	Individually configurable 0-5V or 4-20mA
Analog Input Units	Engineering units can be specified to match the sensor type
Analog Scaling	Scaling and zero offset parameters for each input
Analog Alarming	Hi-Alarm, Low-Alarm, Hi-Reset and Low-Reset parameters configurable in the specified engineering units for each input
Control	Alarms conditions can be set to activate outputs, either internally or on another SMS 300 unit configured in the phone book.
Outputs	Normally open relays. 2A max, 50V AC/DC, configurable as timed self-resetting (momentary) (0-255 seconds) or latching type.
Other Interfaces	RS-232
Diagnostic interface	Real time diagnostic interface showing condition of all I/O as well as signal strength and network status
Configuration Interfaces	Using the supplied windows configuration application via RS-232.
Phone number capacity	16 Numbers, each alarm can be sent to any combination of these numbers. Numbers can be programmed in international format meaning messages can be delivered to any network in the world that is interlinked with the host network
Site Message	20 characters (max) which is attached to every alarm message
Alarm and Reset messages	40 characters (max) for each alarm.
Output Name	20 characters (max) for each output name. This can be used to control switching of the output using an SMS.
Modem Through-mode	The modem can be used in “through mode” to provide a wireless serial link to an external device (e.g. PLC) or the SMS 300.
SMS Command Mode	The SMS 300 can forward messages received via the serial port

3. Getting Started

3.1. Network connection

The network connection is the first and most important part of setting up your new EDAC SMS 300. It is also important the once set up, the network connection is properly maintained. If the account lapses or the credit is used up, the device will not be able to send any notification messages meaning that critical alarm events may be missed.

Below is a table detailing the networks where the SMS 300 is currently approved for connection. The SMS 300 should only be used on approved networks. Correct and reliable operation cannot be guaranteed when connected to non-approved networks.

Approved Networks		
SMS 300-G	**SMS 300-CAU**	**SMS 300-CNZ**
Telstra Australia – GSM	Telstra Australia - CDMA	Telecom New Zealand
Vodafone New Zealand		

3.1.1. CDMA (SMS 300-CAU or CNZ)

To start using the EDAC SMS 300-CAU or CNZ it must be registered on an approved CDMA cellular network. The unit will need to be connected either on an existing account or assigned to pre-pay. Call you local CDMA network provider's new connections department, to organise having the unit connected to the network.

On the bottom of the SMS 300-CAU or CNZ unit will be a sticker, similar to the samples shown in Fig 4.1.1. This has critical information needed to connect the device.

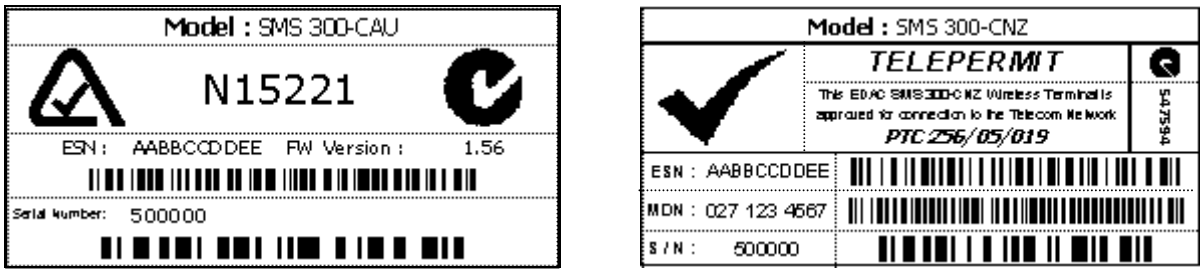


Fig 3.1.1 Serial/ESN Stickers

The network provider will need to know the 'ESN' number (and the 'MDN' number for CNZ models) in order to connect the device. Ensure this number is relayed correctly. If the external ESN sticker is damaged or defaced, the ESN and/or MDN can be found internally, printed on a sticker on the modem module.

The network provider should give you information as to how long the setup process will take, and how long before you can begin using your EDAC SMS 300.

3.1.2. GSM (SMS 300-G)

To start using the SMS300-G it must be registered on an approved GSM cellular network. To do this the unit must be fitted with a SIM (Subscriber Identity Module) card. This small card contains information about the account the unit is to be connected to. The SMS 300-G can work with pre-pay or contract SIM cards.

Visit your local GSM network provider's store to obtain a SIM card. Note the phone number listed on the SIM packaging as this will become the phone number of the SMS 300-G device.

Most SIM cards have a 'SIM PIN' feature. This is a PIN code that must be entered each time the SIM is powered up. Normally this feature is disabled on new SIM cards. If the 'SIM PIN' is enabled this pin **MUST** be the same as the SMS 300's 'Unit PIN' (see section 5.4 for more information on changing the 'Unit PIN'). Failure to ensure the two PINs match will result in the SIM being locked. If this occurs contact you local service provider for information on unlocking SIM cards.

The SIM must be fitted into the unit before the SMS 300-G will operate. To do this the unit must be powered down and end plate must be removed to expose the SIM connector. Remove the connector blocks from the end plate (the end the aerial connects to) and remove the screws securing the end plate as detailed in Fig 3.1.2a.

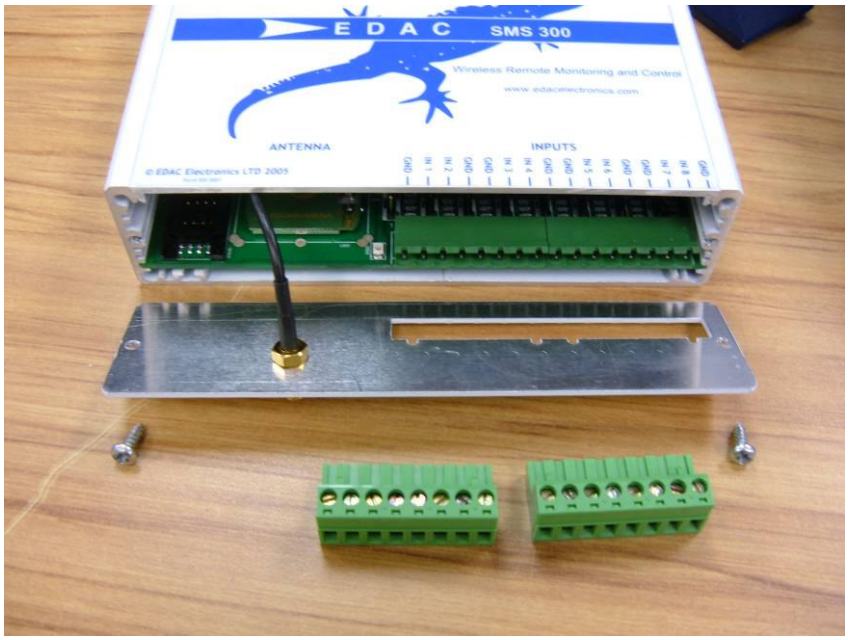


Fig 3.1.2a Removing terminal blocks and end plate

Relocate the endplate to allow access to the SIM connector. Slide the SIM connector back and lift and insert the SIM as shown in Fig 3.1.2b. The case lid may also be removed to allow easier access to the SIM holder.

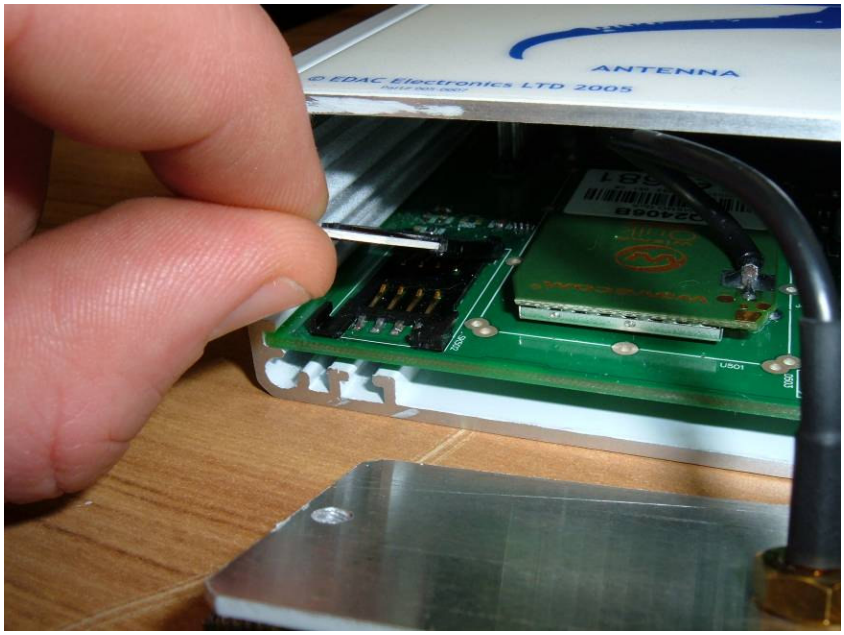


Fig 3.1.2b Inserting the SIM card

Insert the SIM into the holder as shown above. Due to the shape of the SIM card it is not possible to insert the card in an incorrect manner. Place the SIM holder down flat and slide forward to lock into place as shown in Fig. 3.1.2c.

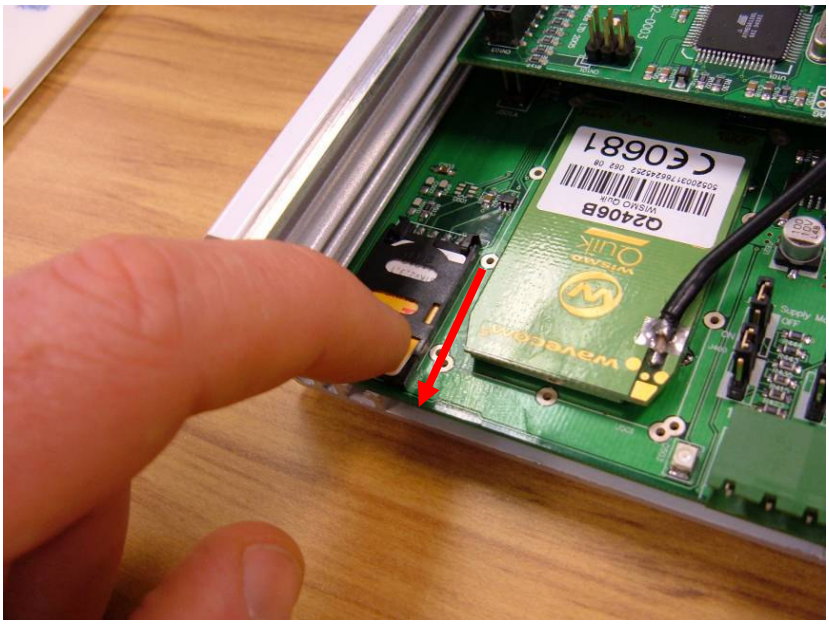


Fig 3.1.2c Locking SIM in place

Refit the end plate and connector blocks. The unit should now be ready for use.

3.1.3. Circuit Switched Data Number

Some features of the EDAC SMS 300 require a 'Circuit Switched Data' (or CSD) number to be enabled on the cellular providers account to function correctly.

Some cellular providers may issue a second number associated with the same account for CSD communications, other providers may use the same number. Dialling the CSD number ensures that modem calls are routed through the network in the most appropriate and reliable way.

The following features require a data number on order to function correctly:

Through Mode Data Connection	(see section 7.3)
Remote Configuration	(see section 5.3)

Contact your local network provider to have a data number enabled on your account. Most network providers will only enable a data number on post paid or contract accounts. Ensure the data number is recorded and kept safe.

3.2. Status LED's

The SMS 300 has three LED's, shown in Fig. 3.2, which indicate the status of the unit.

Fig 3.2 LED Indicators

3.2.1. Power

The power LED indicates if the EDAC SMS 300 is powered up, and if it is the status of the SD/MMC data card.

On	Powered up
Off	Not Powered

3.2.2. Active

The active LED indicates if the EDAC SMS 300 is actively processing incoming and outgoing messages.

On	EDAC SMS 300 is actively processing incoming/outgoing communications
Off	EDAC SMS 300 is idle

3.2.3. Status

The Status LED indicates the status of the SMS 300's connection to the cellular network

On	The cellular connection is active
Off	No cellular connection is available

4. Hardware Installation

When installing the EDAC SMS 300, considerations can be broken up into five main categories, Power, Inputs, Outputs, Aerial installation and other. The sections below will detail the most important issues in each of these categories.

4.1. Power Supply

The EDAC SMS 300 has a universal input power supply. The unit can accept AC or DC input power between 12 and 28 volts.

The EDAC SMS 300's idle current draw is quite low, however because of the nature of cellular radio communications, peak current draw can be quite high, the average current draw also varies depending on the input voltage. Table 4.1 details the EDAC SMS 300's approximate current draw figures, when the unit is in different states.

All figures listed below are based on a supply voltage of +12VDC and an RSSI reading of 25 (very good signal). These figures will vary depending on supply voltage and cellular signal strength.

State	Approx current draw (mA)
Idle (no outputs active)	30-40 mA
Idle (all outputs active)	90-100 mA
Initialisation	60-100 mA
Sending	80-120 mA
Receiving	60-100 mA
Max	1000 mA

Table 4.1 EDAC SMS 300 Current Draw

4.1.1. DC Power input

The DC power supply input will accept voltage between 12 and 28V, and has reverse polarity protection. The unit will not power, but will not be damaged if reverse DC voltage, within supply specifications, is applied. The product is DC over current protected by an internal 1 Amp fuse.

Only replace the fuse with one of the same rated value. Failure to do so may result in irreversible damage to the product or fire.

4.1.2. AC Power Input

The AC supply input will accept voltage between 12 and 28V.

If an AC Power supply is used it MUST be fully isolated (floating). Use of a non-isolated AC power supply may result in severe damage to the unit. If there is any doubt about the type of AC power supply you intend to use, please contact your supplier for more information.

It is required for warranty purposes that external fusing is fitted to the SMS 300 when powered from AC supplies. This prevents damage from ground loops and surges. Below Fig 4.1.2 details how the external fusing should be connected.

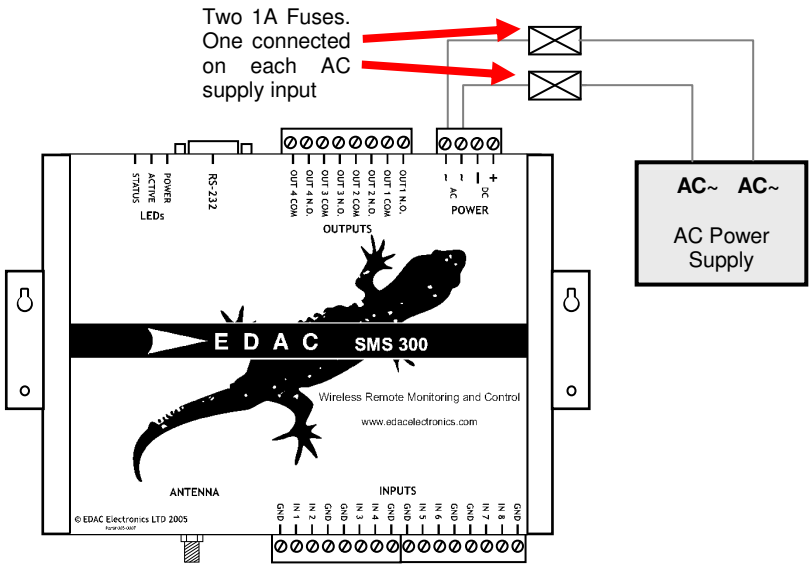


Fig.4.1.2 Fitting external fuses to AC powered device

4.2. Inputs

The EDAC SMS 300 has eight fully configurable inputs, capable of accepting three different types of input signals, Digital (N.O. or N.C.), 4-20mA analog and 0-5V analog. The following sections detail common configurations for these types of inputs.

4.2.1. Jumper Configuration

The unit has a series of 'hardware jumpers' which configure the internal sensing circuitry for the type of input being used. The jumper for each input must be set correctly for the input to operate properly. A jumper consists of a group of metal pins, protruding vertically from the circuit board; and a piece of plastic coated metal that shorts one or more of these pins together.

By default all jumpers are set to 'digital'. The following process need only be performed if the setting needs to be changed, or to check the configuration of a particular input.

To configure the jumpers first of all the case end plate and lid need to be removed. Remove the two input terminal blocks from the unit as shown in Fig. 4.2.1a.

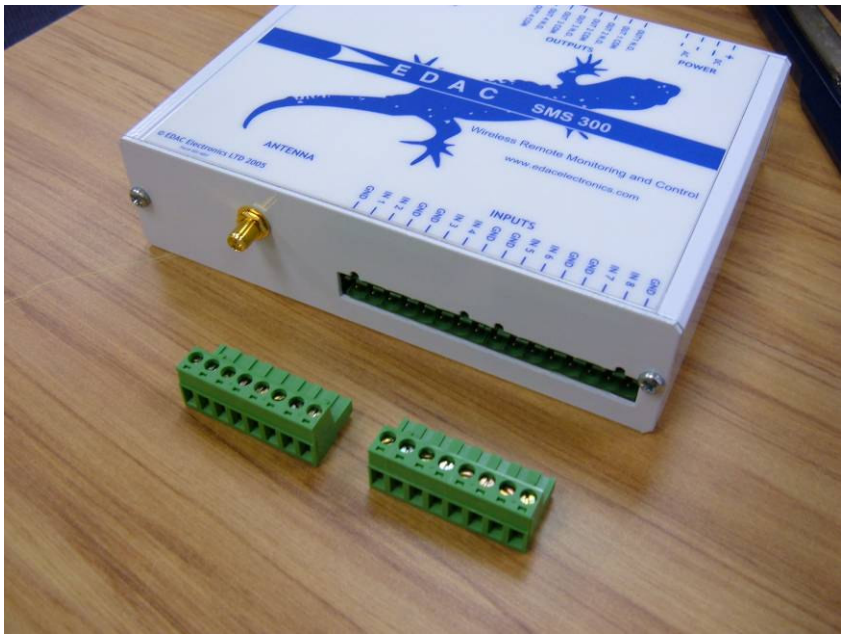


Fig. 4.2.1a Removing the input terminal blocks

Next remove the two screws securing the end plate as shown in Fig. 4.2.1b. Carefully move the end plate aside.

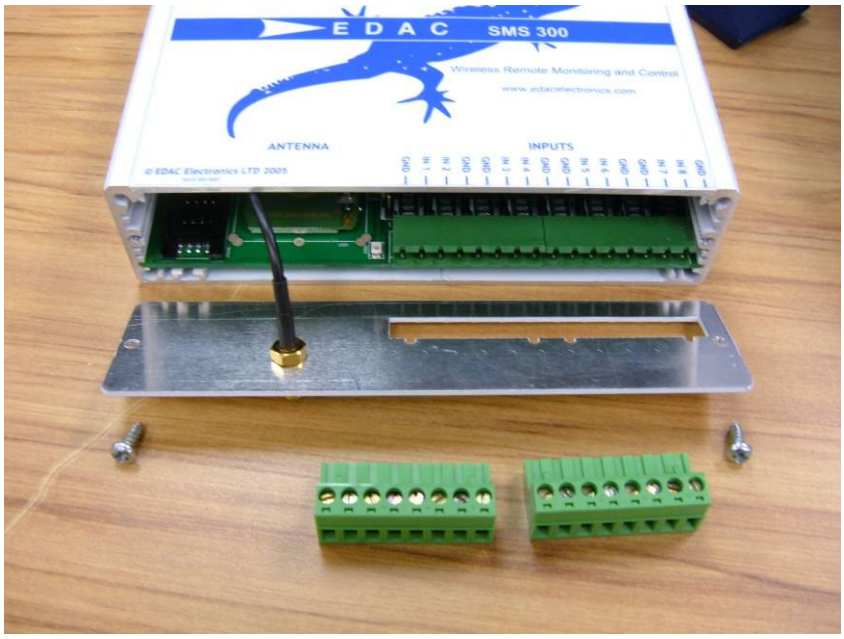


Fig 4.2.1b Removing end plate screws

The end plate will still be attached to the circuit board by the aerial cable, be careful not to stress or break the aerial cable.

Slide the lid out from the extrusion and place to one side as shown in Fig 4.2.1c. The circuit board and configuration jumpers should now be exposed.

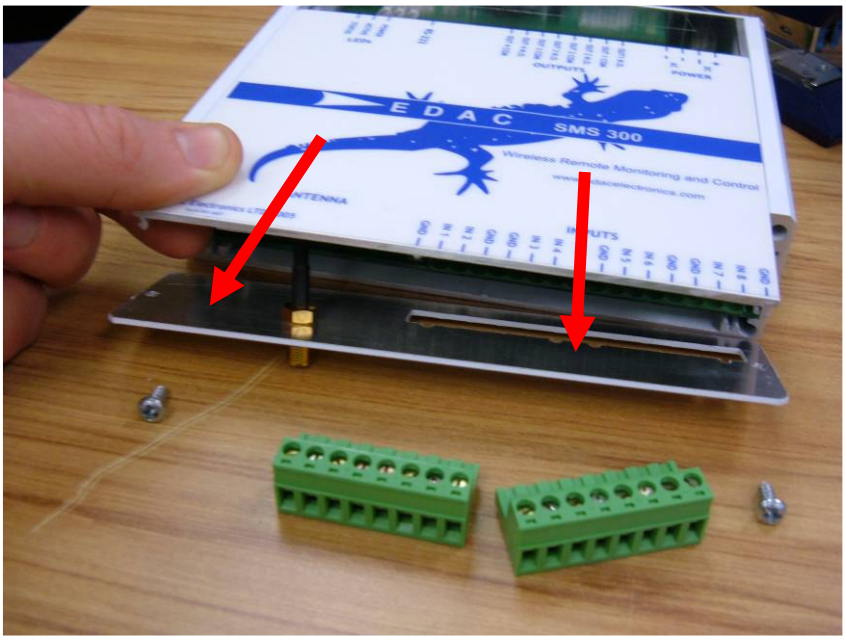


Fig. 4.2.1c Removing the case lid

Extreme caution should be taken not to touch any of the internal components of the SMS 300. Touching the components may cause a static discharge which could severely damage the unit and void the warranty.

Fig 4.2.1d below details the jumper configuration setup. Note that there is one jumper for each input channel and that there are two possible configurations: ‘down’ for 4-20mA and ‘up’ for digital or 0-5V.

Also note that input 1 has a ‘Power Supply Monitor’ jumper. Ensure this is set to ‘OFF’ if power supply monitoring is not to be used. See section 7.6 for more information on Power Supply Monitoring.

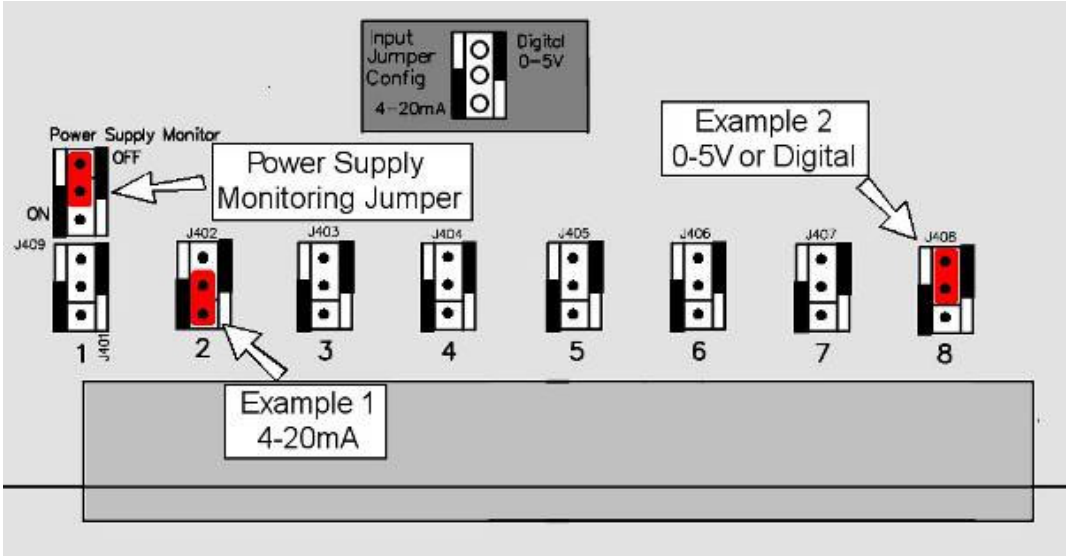


Fig 4.2.1d Input Jumper Configuration

4.2.2. Digital Configuration

The EDAC SMS 300 requires a 'clean contact, voltage free' type digital input. Basically what this means is that the input needs to be shorted to ground (for N.O.), or disconnected from ground (for N.C.) to indicate an alarm condition.

When configured as digital the input has an internal pull-up. This means that when the input is not connected to anything (or floating) it sits at +5VDC. When the input is shorted to ground a small amount of current (around 10 micro amps) is allowed to flow, which pulls the input voltage down to 0VDC. The microprocessor in the EDAC SMS 300 constantly monitors the voltage on the inputs checking if the input is shorted to ground or not.

No external voltage should be presented to the input terminals of the SMS 300 when configured as digital. If the device to be monitored has voltage driven outputs, use a relay to interface them.

Normally the inputs are driven from a relay, micro switch, reed switch or contact output from another control product (i.e. PLC or data logger). Fig 4.2.2 shows a typical wiring schematic.

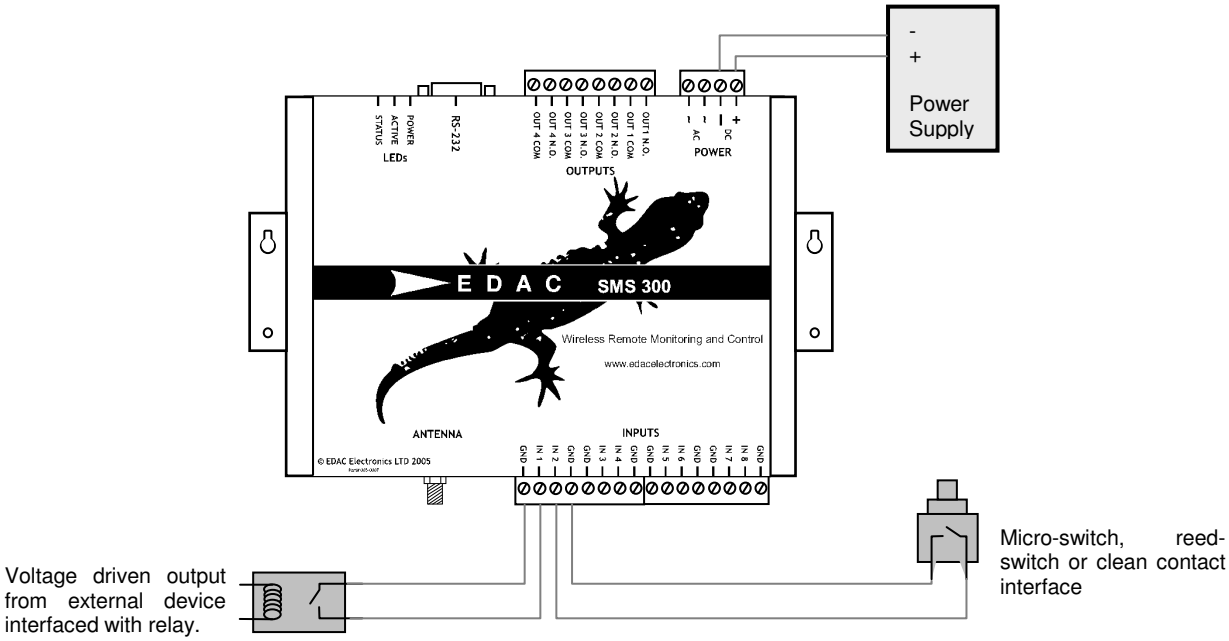


Fig 4.2.2 Typical Digital Wiring

Note that if an AC power supply is being used the GND terminals on the input side must be used for input signals, NOT the supply ground.

4.2.3. 4-20mA Analog Configuration

Generally speaking there are two different types of 4-20mA sensors that are commonly used in industry. 'Loop powered' and 'Sensor powered'

Loop powered transmitters are often referred to as 'parasitic powered' sensors as the sensor transmitter draws its power from the signal current loop. Fig. 4.2.3a shows a typical wiring diagram for a loop powered transmitter.

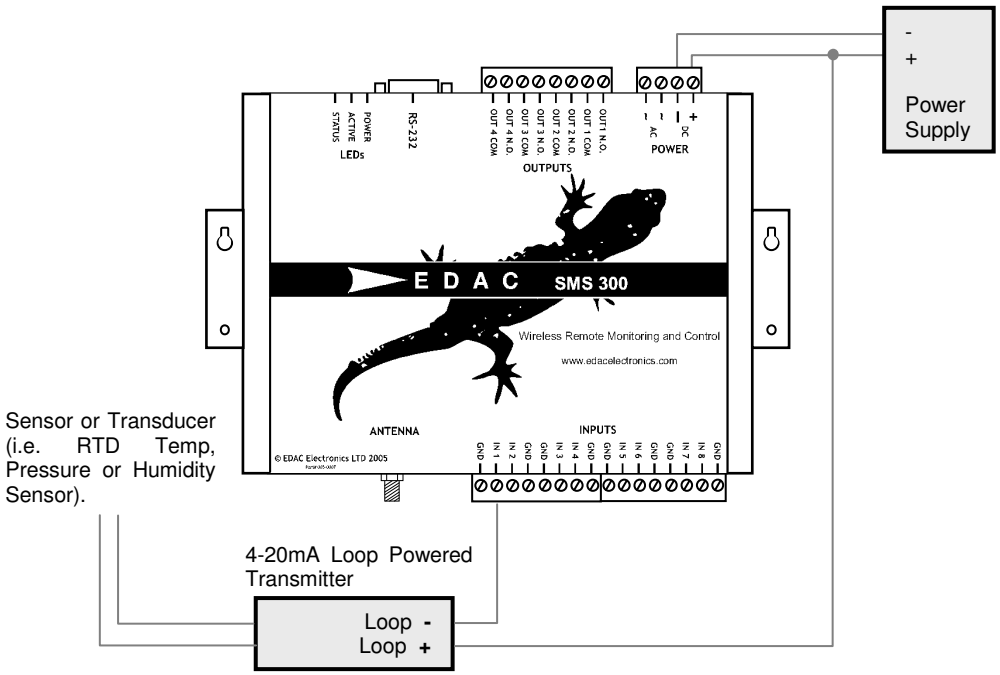


Fig. 4.2.3a Typical 4-20mA Loop Wiring

Note that the power supply used should match the supply requirements of the loop powered transmitter. Loop powered transmitters should generally only be used by D.C. power supplies. Also note that the 'INP 1' terminal is internally connected to DC- which completes the loop circuit.

Sensor powered or four wire transmitters draw their power from an external power source. Fig. 4.2.3b shows a typical wiring diagram.

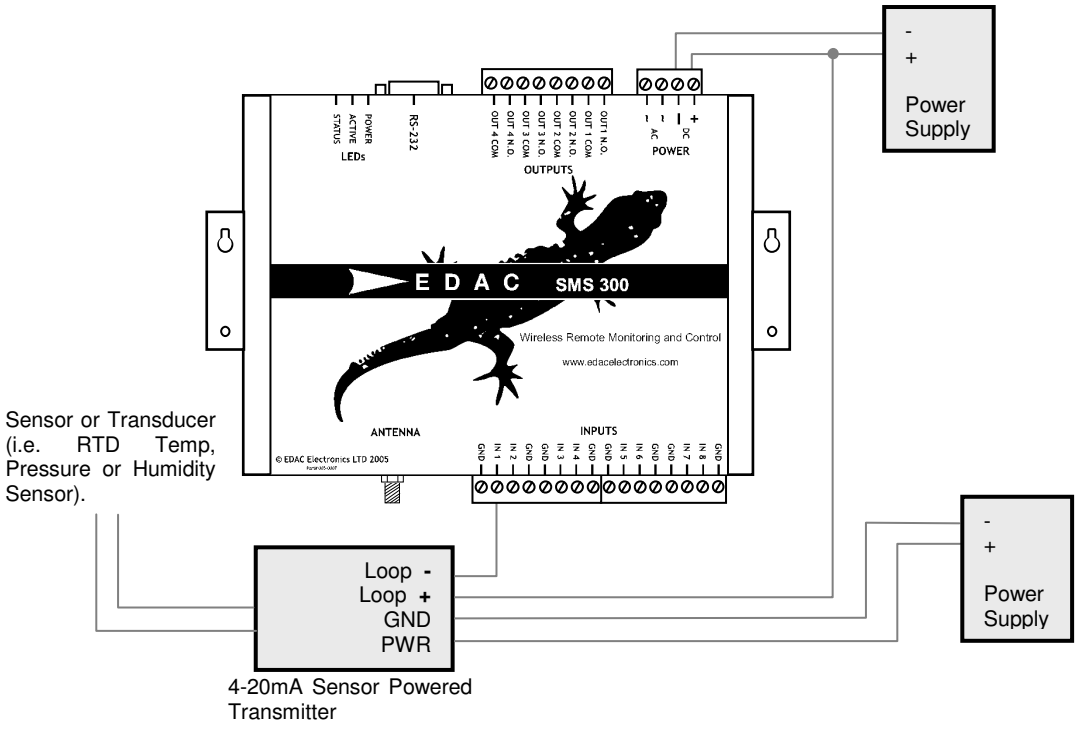


Fig 4.2.3b Typical 4-20mA Sensor Wiring

Note again that the power supply used should match the requirements of the sensor transmitter. Also note that the 'INP' terminals are internally connected to DC – which completes the loop circuit.

4.2.4. 0-5V Analog Configuration

0-5V sensors are probably the least commonly used of the three types or sensors. This is due to the fact that large amounts of the signal voltage can be dropped across long cable runs. A typical wiring schematic is shown in Fig 4.2.4.

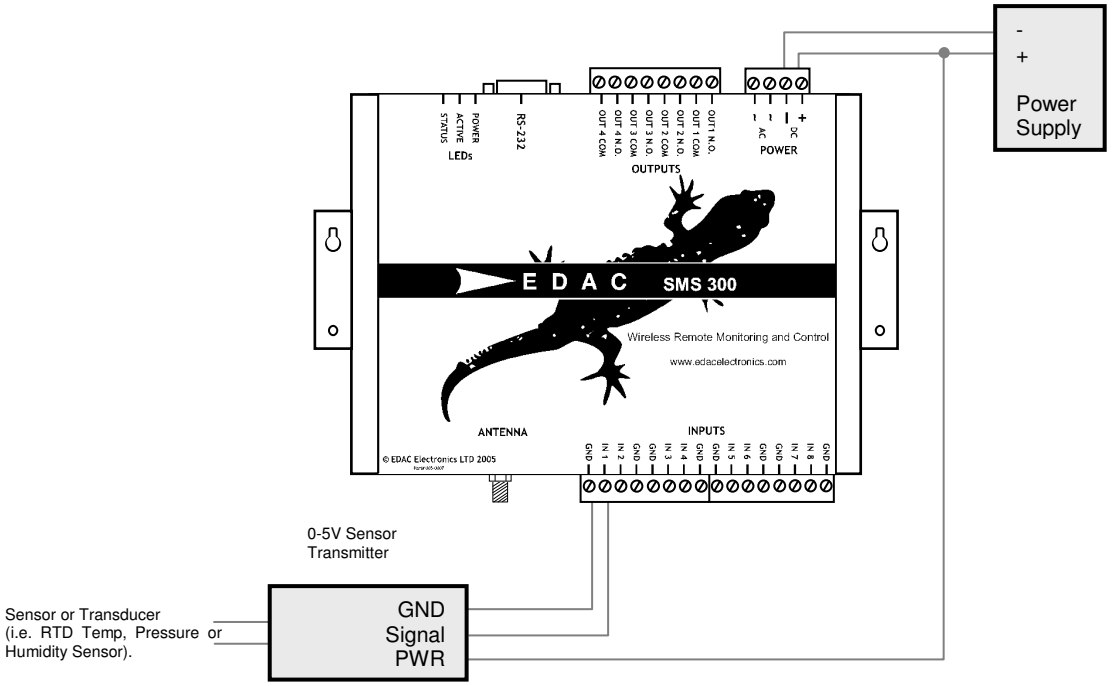


Fig 4.2.4 Typical 0-5V Wiring

Note that the power supply should match the requirements of the transmitter. One 0-5V transmitter can also provide signal to multiple devices, such as PLC, display units at the same time.

4.3. Outputs

The outputs on the EDAC SMS 300 are of a relay type, meaning that they can switch small to medium voltages and currents (Below 50V and 2A AC or DC). Where higher power is required the relays can be used to drive larger relays.

Below are typical wiring diagrams for both ‘direct load switching’ (Fig. 4.3.1) and ‘relay switching’ (Fig. 4.3.2) applications.

4.3.1. Direct Load Switching

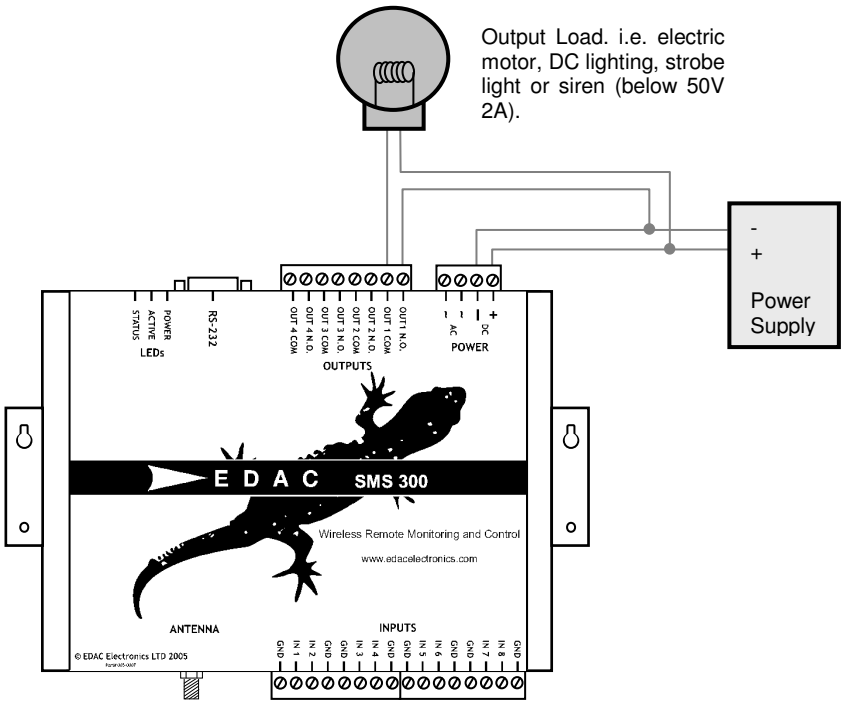


Fig 4.3.1 Direct Load Switching

Note that the load can be powered from the same power supply as the SMS 300, however the supply will need to match the voltage requirements of the load and will need to be able to supply enough current to power both the SMS 300 and the load. An additional external power supply can be used for the output load if required.

4.3.2. Relay Switching

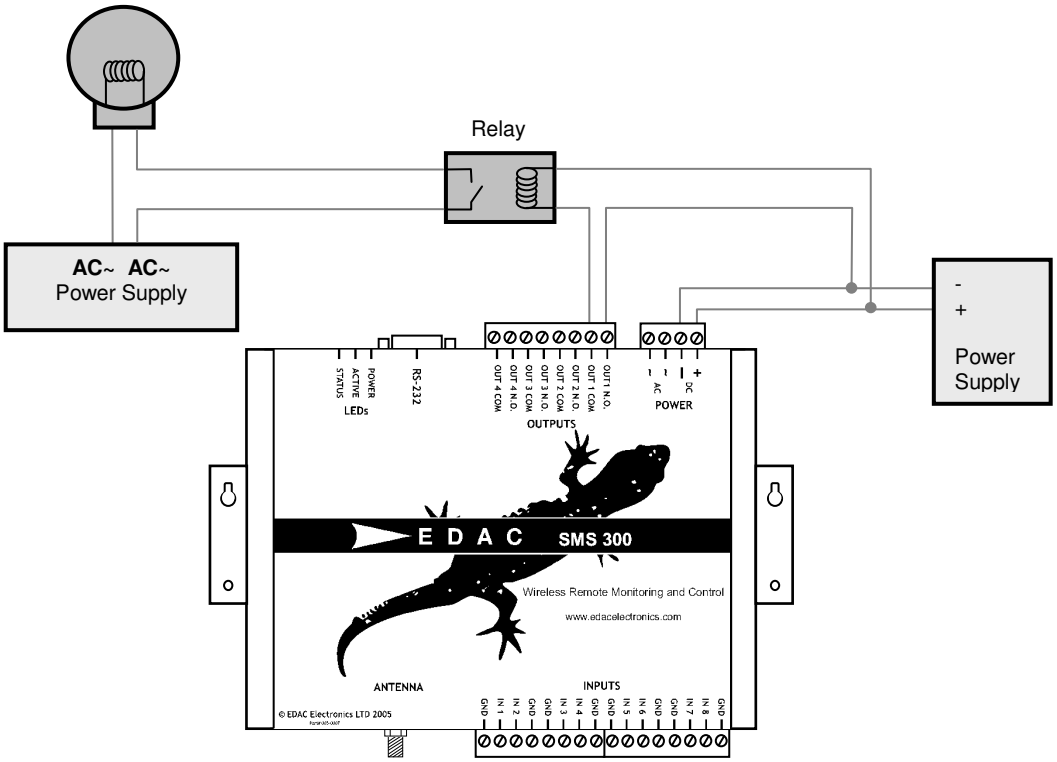


Fig 4.3.2 Relay Switching

Note the use of an external power supply, also the coil of the relay must be matched to the voltage of the SMS 300 power supply and the relay contacts must be matched to the voltage and current of the output load.

4.4. Aerial Installation

Aerial selection and installation needs to be carefully considered prior to commissioning. Selection and positioning of the aerial can make the difference between a system that works well and one that performs poorly. The EDAC SMS 300 has an SMA Female type aerial connector, allowing a wide variety of aerials to be fitted.

4.4.1. Aerial Selection

Not all aerials are created equal! Many different types of aerials are available on the market and each has its own pro's and con's. EDAC generally recommends and supplies the 'Pacific Aerials' range of cellular aerials because of their durability and performance at a budget price. Below the main type of aerials and the pro's and con's of each are listed.

- **Stubby**
  The stubby aerial is a short 'spike' type aerial suitable for use in indoor installations in metropolitan areas where good signal strength is available, or where mounting of an external aerial is not possible. This aerial is mounted directly on the SMA connector of the unit. The stubby provides around 1-2dbi of gain (depending on the type). A stubby aerial is not suitable where the unit is mounted inside a fully enclosed metal or concrete structure.

- **1/2 Wave**
  Half wave aerials are a short screw base aerial that can be mounted on external horizontal or vertical surfaces with the aid of a bracket. These aerial offer around 3-4dbi of gain, and are suited to metropolitan areas or sites where good general cell coverage is available. Because of the high dome shaped reception pattern of the ½ Wave it is quite well suited to hilly or obstructed areas also. The ½ Wave is an omni-directional aerial and will connect to the nearest available cell tower

- **Elevated Feed Colinear**
  The colinear is a larger screw base aerial at around 1m in height. The 1/4, 1/8, 1/4 element pattern provides around 6.5dbi of gain. The elevated feed aids in clearing obstructions when mounting. Because of the long flat reception pattern of the colinear it is suited to flat sites where the cell tower may be quite some distance away. The colinear is an omni-directional aerial and will connect to the

nearest available cell tower and can be mounted on horizontal or vertical surfaces with the aid of a bracket

- **Yagi**
  The Yagi is a specialised aerial consisting of a number of receiving elements mounted on a horizontal feed, much like a UHF TV aerial. The yagi can provide up to 22dbi of gain. The yagi is mounted on a 'hockey stick' pole affixed to an external structure. The Yagi provides excellent gain for the most remote of sites HOWEVER it has an Achilles heel. The Yagi is a *directional* aerial, this has two major implications. The first is that when the aerial is mounted, the location of the nearest cell tower needs to be known and the aerial needs to be pointed *directly* at it for best performance. The second is that because it is directional it can only communicate with the cell tower it is pointed at. If this cell tower is at maximum capacity, or is non-operational when the device is trying to communicate, it is unable to roam and find another available cell tower due to the directional nature of the aerial. The Yagi is best suited to the most remote sites or where only one cell tower is within range and the signal strength is weak.

It is highly recommended that a site survey is undertaken by the installer before the aerial is selected and installed. Using a test SMS 300 and a selection of aerials and a laptop running 'SMS 300 Configuration Manager' the installer can determine which type of aerial will give best performance. The 'SMS 300 Configuration Manager' and its diagnostics interface can be used to obtain an 'RSSI' (Relative Signal Strength Indication) reading. This reading works on a scale of 0 to 31 (zero being no signal, 31 being perfect). A minimum reading of 10 is recommended for reliable operation.

4.4.2. Mounting

Aerials need to be mounted in the highest possible position, clear of any obstructions, and preferably outside, on the exterior of a structure. If any aerial is mounted inside a steel shed for example, performance will be severely affected as the steel structure acts like a shield, blocking signal to and from the aerial. It is advisable to try the aerial in several different positions, obtaining an RSSI reading from the unit each time.

4.4.3. Cable Length

Cable length can play a critical part in the performance of an aerial. Basically the coaxial cable that connects the aerial to the device will 'drop' a portion of the signal that is transmitted. The longer the cable, the more signal will be 'dropped'. This is why keeping the cable as short as possible is important. RG58-AU coaxial will drop up to 35 percent of the signal across a 5 meter run at the common cellular frequencies. Generally we recommend using a cable that is 5m or less in length. This of course is not always practical as many aerials come pre-fitted with a length of cable. If there is spare cable left it is important to make sure this is not coiled or looped in any way, try to avoid the cable crossing over itself or any high voltage or signal cables wherever possible. This will help minimise cross-talk and interference and will maximise the performance of the aerial.

4.5. Other

4.5.1. RS-232

The EDAC SMS 300 has one fully configurable RS-232 (serial) interface which is used for configuration of the unit as well as remote communications to external devices (such as a PLC or data logger). The RS-232 interface is provided via a standard DB9 connector (see section 5 for detailed instructions on using the 'EDAC 300 Series Configuration Manager').

The RS-232 interface is fully configurable with speeds between 1200 and 19200 bps, 7 or 8 data bits, none, odd or even parity, and one or no stop bits. This allows flexibility in the types of external devices the SMS 300 can connect to (see section 7.7 for instructions on changing serial port properties).

5. Configuration – EDAC 300 Series Configuration Manager

The EDAC SMS 300 is configured using 'EDAC 300 Series Configuration Manager', a software interface custom designed for the EDAC 300 series family of products. This software runs on a Windows based P.C. and connects to the SMS 300 an RS-232 (Serial) connection. The 'Configuration Manager' is used to configure all aspects of the unit's functionality. 'EDAC 300 Series Configuration Manager' supports Windows © 98, 98SE, 2000 and XP Home SP2 and XP Pro SP2 operating systems.

The 'EDAC 300 Series Configuration Manager' provides the option of loading and saving configurations to file, as well as uploading and downloading configurations to and from a unit. A diagnostics interface is provided which reports the current status of all aspects of the unit. This includes input and outputs status as well as network connection status.

The 'EDAC 300 Series Configuration Manager' also supports remote configuration and diagnostics for EDAC 300 series products via a dial up CSD connection. A Windows dial-up modem must be properly installed on the host P.C. to support this function.

5.1. Software Installation

To begin the installation process, execute the installation file located in the 'Configuration Manager' folder on the CD-ROM supplied with the product. The window in Fig. 5.1a should appear.

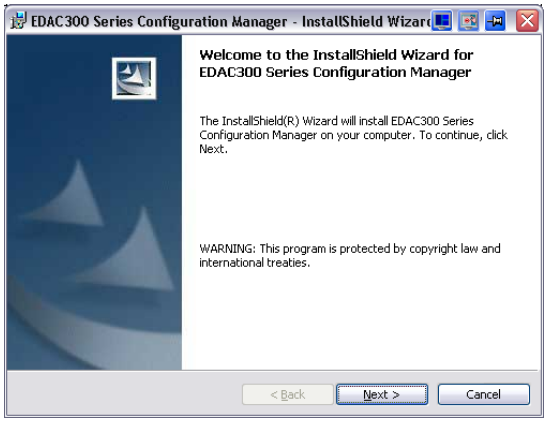


Fig 5.1a Software Installation - Starting

Click on the 'Next' button to proceed. The window shown below in Fig 5.1b will then appear.

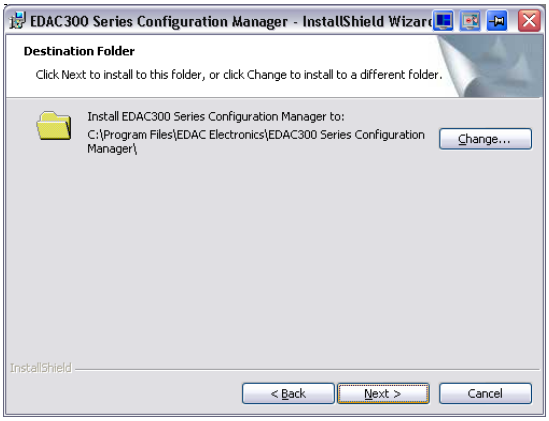


Fig. 5.1b Software Installation – Change Settings

On this window the destination directory for installation can be changed if desired. It is recommended that the default setting is used. Click 'Next' to proceed. The window in Fig 5.1c will then appear.

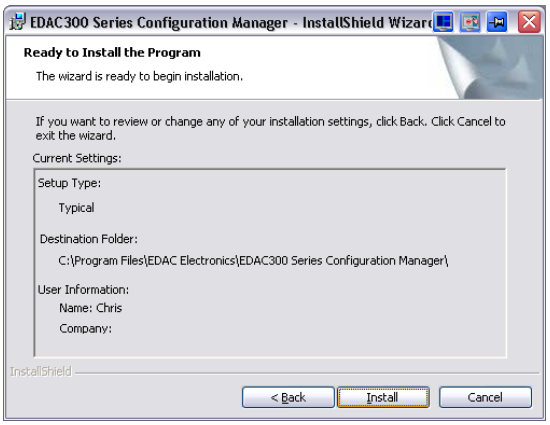


Fig 5.1c Software Installation – Check Settings

In this window the installation setting can be reviewed. Click ‘Back’ to go back and change any of these settings, click ‘Next’ to proceed. The software will now install. The following window will appear when installation is complete.

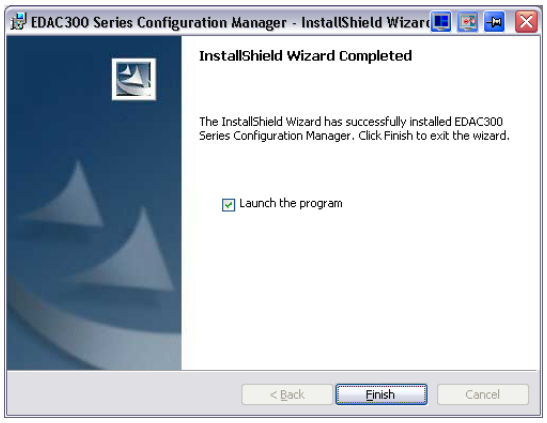


Fig. 5.1d Software Installation - Finish

Click on the ‘Finish’ button and the application will launch.

5.2. Setup

Before being used the 'EDAC 300 Series Configuration Manager' software must be configured correctly for the type of product being used, and the method being used to connect to the unit.

5.2.1. Product Type

Launch the 'EDAC 300 Series Configuration Manager' software either from the shortcut on the desktop or from the 'Start' menu.

From the 'Settings' menu select the 'Product Type' option as shown in Fig 5.2.1a below.

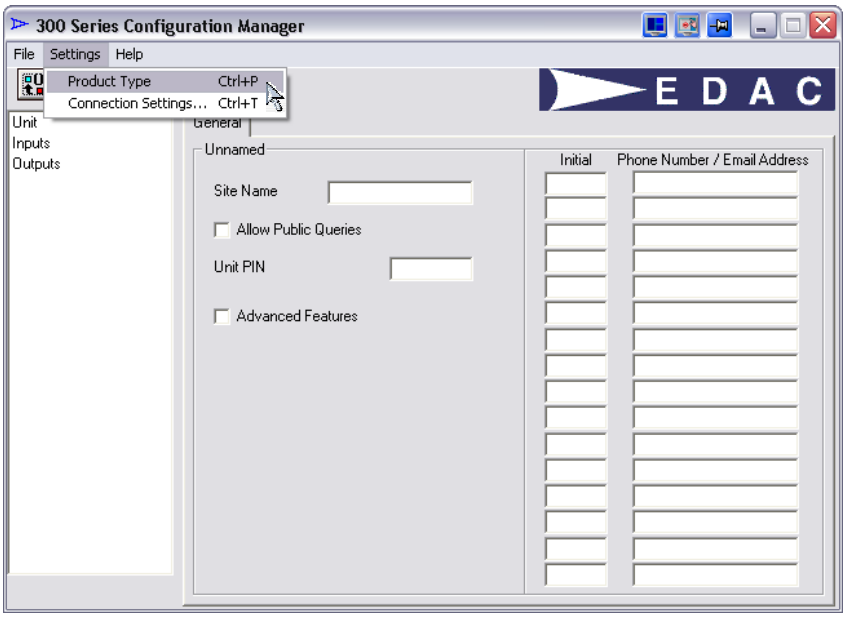


Fig 5.2.1a 300 Series Configuration Manager

This will then bring up the following 'Product Selection Form' window, from here select the '300 v3' product type (or the appropriate type for the product you wish to configure, this software will configure all types and versions of the EDAC 300 Series family) and click on 'O.K.' to save changes and close the window.

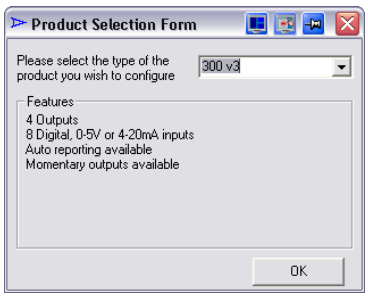


Fig 5.2.1b Product Selection Form

5.2.2. Connection Settings

The 'EDAC 300 Series Configuration Manager' must be configured for the type of connection it is going to use as the method of communication to the EDAC SMS 300 product.

Note that the 'EDAC 300 Series Configuration Manager' software can connect using either a local RS-232 serial port or remotely via a dial up CSD (or **C**ircuit **S**witched **D**ata) connection (see section 3.1.3 or more information on requirements for CSD data.

Also note that for CSD connections, a properly installed Windows dial-up modem, connected to a working PSTN telephone line is also required on the P.C. system where the 'EDAC 300 Series Configuration Manager' software is installed.

Select the 'Settings -> COM Settings' menu from the top of the main window a shown in Fig 5.2.2a or use the keyboard shortcut 'CTRL+T'.

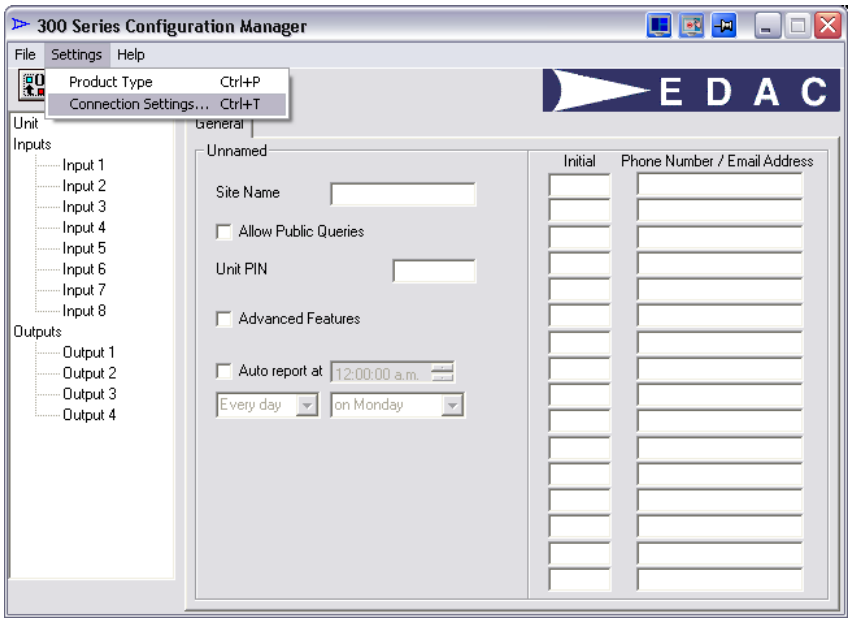


Fig 5.2.2a EDAC 300 Series Configuration Manager

The window in Fig. 5.2.2b will appear.

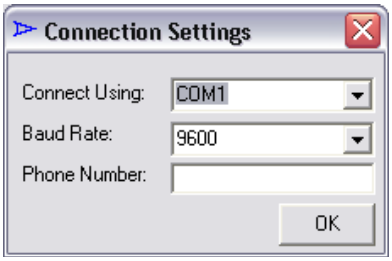


Fig 5.2.2b Connection Settings – COM Port

Select the COM port, or the Windows dial-up modem to be used to connect to the EDAC SMS 300.

If a COM port is selected choose the baud rate for the connection from the 'Baud Rate' list. Note that by default the RS-232 COM port on the EDAC SMS 300 is set to work at '9600'. This setting should not be changed unless the COM port on the EDAC SMS 300 has been configured to work at a different speed (see section 7.7 for more information on changing the RS-232 COM port properties)

If a Windows dial-up modem is selected as shown in Fig 5.2.2c, enter the CSD number (see section 3.1.3 for more information on CSD data numbers) of the remote unit that is to be configured, in the phone number field.

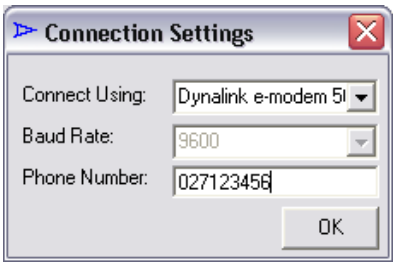


Fig 5.2.2c Connection Settings - Modem

5.3. Main Features

The 5 main features of the 'EDAC 300 Series Configuration Manager' software can be accessed from five buttons along the top of the main window. These buttons from left to right, perform the following functions, Upload Configuration, Download, Load from File, Save to File and Diagnostics.

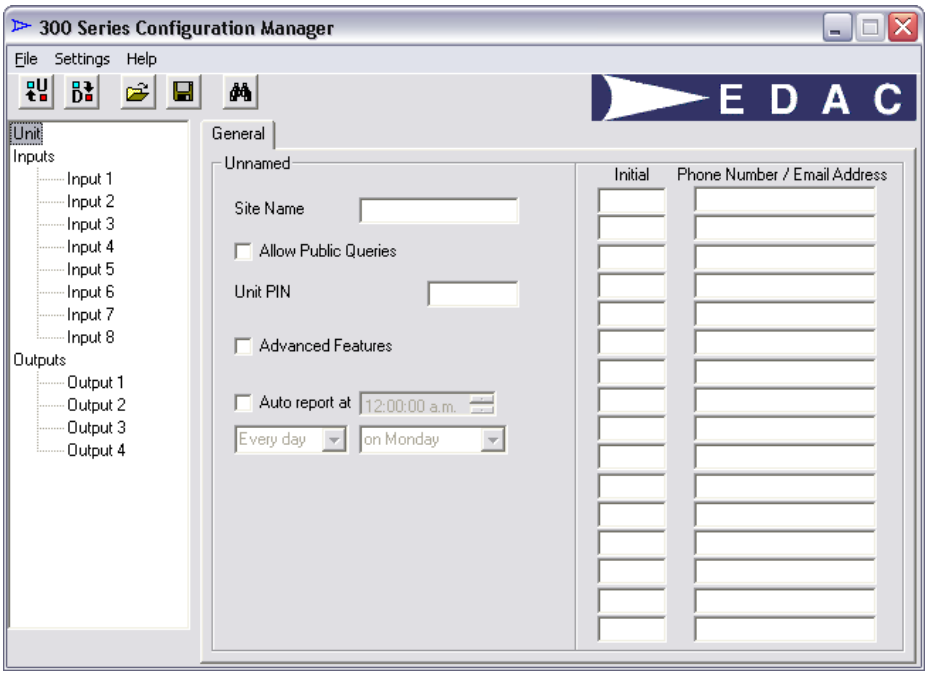


Fig 5.3 Main Config window

- **Upload**
  Fetches the configuration from the unit and loads it into the 'Configuration Manager'. If the 'EDAC 300 Series Configuration Manager' is setup to use a RS-232 COM connection, configuration retrieval will start immediately, if it is set up to use a Windows dial-up modem then the modem will dial an connect before retrieval will begin. A confirmation box will be displayed when retrieval is completed (see section 5.2.2 for more information on connection types and settings).

- **Download**
  Loads the configuration currently in the 'EDAC 300 Series Configuration Manager' software into the unit. If the 'EDAC 300 Series Configuration Manager' is setup to use a RS-232 COM connection, configuration will start immediately, if it is set up to use a Windows dial-up modem then the modem will dial an connect before configuration will begin. A confirmation box will be displayed when configuration is completed (see section 5.2.2 for more information on connection types and settings).

- **Load from File**
  Loads a configuration from a previously saved *.300 file into the 'Configuration Manager' a dialog will open asking for the location of the file to be loaded.

- **Save from File**
  Saves the configuration currently displayed in the 'Configuration Manager' to a *.300 file. A dialog will open prompting for the file save location.

- **Diagnostics**
  Switches to the diagnostics page and starts diagnostics running.

5.4. Global/Phone Numbers

The 'Global' and 'Phone Number' settings relate to all I/O on the unit, these settings are all found on the 'Unit' tree of the 'Configuration Manager 'as pictured in Fig. 5.4 below.

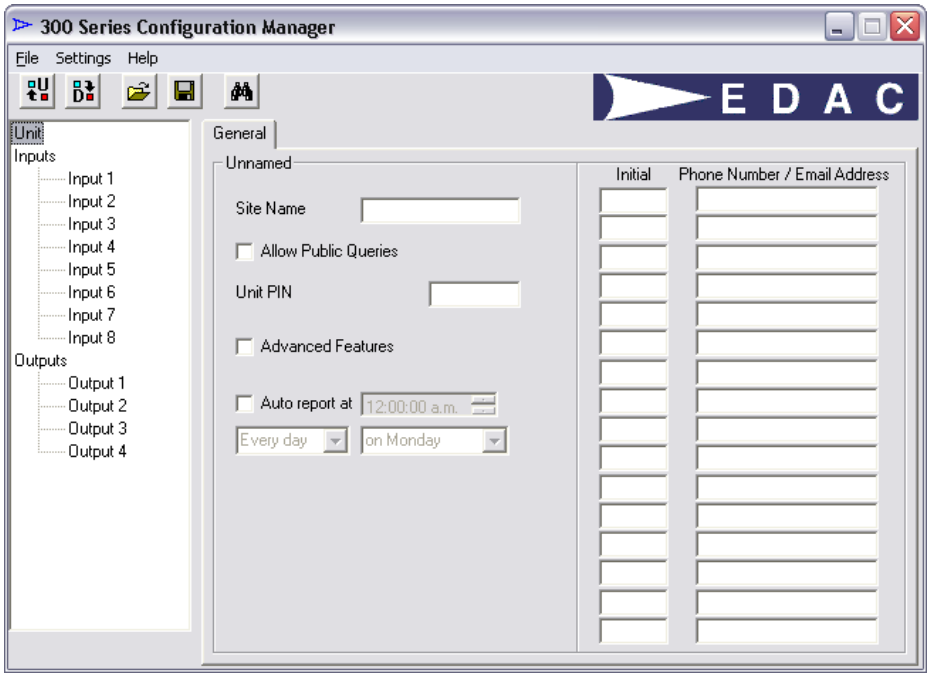


Fig. 5.4 Global/Phone Numbers Config

- **Site Name**
  The 'Site Name' is the text which is included at the beginning of every outgoing message from the SMS 300. This normally identifies the location or the owner of the unit.

- **Allow Public Queries**
  This option allows the unit to reply to queries from any cellphone. If this option is not selected the unit will only reply to phone numbers that are programmed in the contact list. If this option is selected it will reply to queries from all phones (see section 6.3 and section 6.4.1 for more information on sending queries).

- **Unit PIN**
  The unit PIN defines the PIN that is used when switching outputs. If a PIN is defined then it must be included at the beginning of all output switching messages.

- **Primary Phone Number**
  The Primary Phone Number is the user that will receive system and forwarded network notification messages. Enter the cellphone number of the primary user at the top of the list.

- **Other Phone Numbers**
  The other phone number fields are where the cellphone numbers of other users are entered. Note that these phone numbers can also be other EDAC SMS 300 devices when using the remote output switching features (see section 7.5 for more information on configuring remote output switching).

- **Phone Number Initials**
  This field allows three initials to be assigned to each contact. These initials are used on other pages of the 'Configuration Manager' and can help identify the contact on pages where the actual number is not shown (such as the 'Alarm A' page)

- **Advanced Features**
  Selecting this box enables automatic output switching options. If remote output switching is required, this box must be selected (see section 7.4 and section 7.5 for more information on configuring automatic output switching).

- **Auto Report At:**
  Selecting this box enables the 'Auto Reporting' feature. This enables the unit to send an 'Auto Report' message at pre-defined intervals, see section 7.1 for more information on 'Auto Reporting'.

5.4.1. Contact Number Format

Note that some networks may require cellular numbers to be programmed in either international or local format in order for an outgoing SMS to be successfully sent. Vodafone New Zealand for example requires that all overseas numbers be programmed in international format (i.e. '**+6421123456**' rather than '**021123456**'). Check with your network provider for more information on correct number format.

Please carefully check and test all programmed cellphone numbers before commissioning!

5.5. Inputs

The input configuration relates to input specific settings, such as alarm messages, input configuration and contact notifications. The settings for each input are found on the 'Input 1, 2, 3…etc' trees as pictured below.

Each input tree branch has three tabs for configuring the input, one for general options, one for the first set of alarm points, and another for the second set of alarm points.

5.5.1. 'Overall' Tab

A screen shot of the input tab is shown in Fig. 5.5.1 below. Each option on the tab is explained below this.

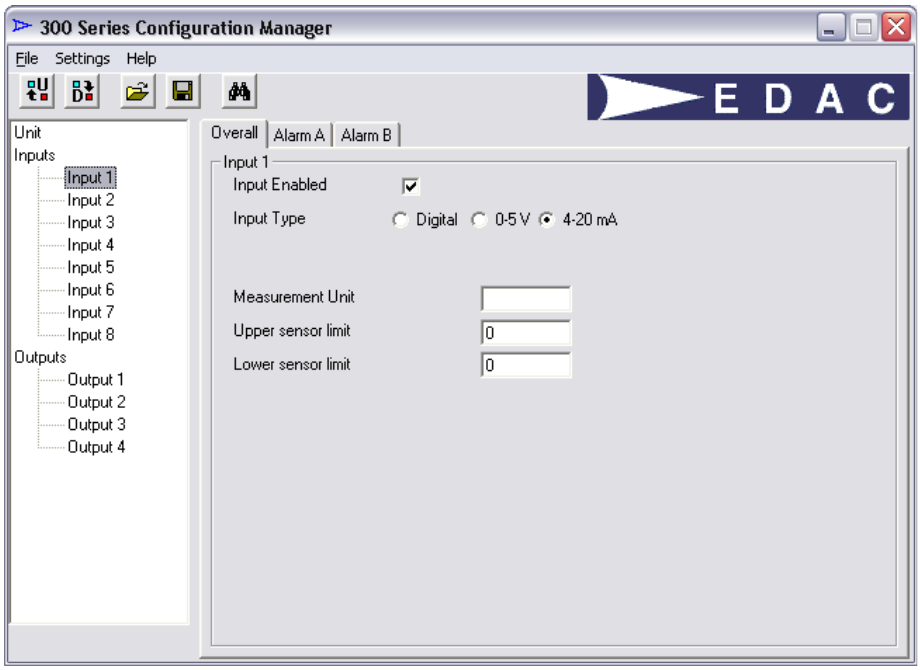


Fig. 5.5.1 Input Config

- **Input Enabled**
  Tick this box to enable the input. All other options will be greyed out and unavailable until this box is ticked.

- **Input Type**
  Select the type of sensor to be connected to this input, digital, 0-5V or 4-20mA.

- **Measurement Unit** *(0-5V and 4-20mA Analog only)*
  Enter the engineering units (or the measured units) of the sensor connected to this input (i.e. V for volts, *C for temperature or %RH for humidity). The contents of this field will be suffixed to the reading from the sensor when its value is sent to a user e.g. Temp Alarm 2.3*C.

- **Upper Sensor Limit** *(0-5V and 4-20mA Analog only)*
  Enter the upper sensor unit limit in this field, or the actual measured value at 20mA or 5V.

- **Lower Sensor Limit** *(0-5V and 4-20mA Analog only)*
  Enter the lower sensor unit limit in this field, or the actual measured value at 4mA or 0V.

5.5.2. 'Alarm A' Tab

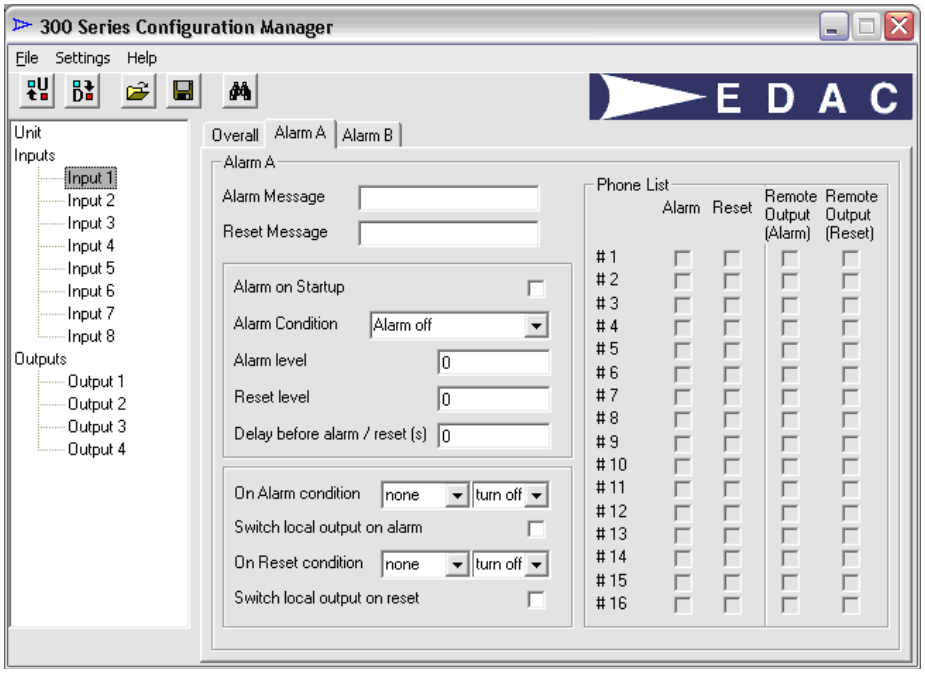


Fig. 5.5.2 Alarm A

- **Alarm Message**
  This is the message that will be sent to the users when this input goes into an 'Alarm State'. If an analog sensor is being used, the actual scaled reading and the measurement unit will be appended to this message. (40 chars max)

- **Reset Message**
  This is the message that will be sent to the users when this input goes into a 'Reset State'. If an analog sensor is being used, the actual scaled reading and the measurement unit will be appended to this message. (40 chars max)

- **Alarm Condition**
  Select the physical state of this input that indicates an alarm condition. If this input is configured as digital, 'Alarm Off', 'Alarm when open' and 'Alarm when closed' options will be available. If a 0-5V or 4-20mA analog is configured, 'Alarm Off', 'Alarm Above' and 'Alarm Below' options will be available.

  'Alarm Off' means the input will never generate alarm messages. The input will function in a reporting scenario and its readings will only be transmitted when the unit is queried.

  'Alarm when Open' *(digital only)* means the input will be in alarm state when the digital contact is open and in reset state when the digital contact is closed.

  'Alarm when Closed' *(digital only)* means the input will be in alarm state when the digital contact is closed and in reset state when the digital contact is open.

  'Alarm Above' *(analog only)* means the input will be in alarm state when the reading is above the set point, and will be in reset state when the reading is below the reset point.

  'Alarm Below' *(analog only)* means the input will be in alarm state when the reading is below the set point and will be reset when the reading is above the reset point.

- **Alarm on Startup**
  The SMS 300 records the current state of all configured inputs. If this option is selected on power up the SMS 300 unit will compare the current state of the input with the last know state, and will send the appropriate message if it has changed. If this option is not selected the SMS 300 will send notification messages for all alarm conditions on power-up.

- **Alarm Level** *(0-5V and 4-20mA Analog only)*
  Enter the real world value where the input will go into 'Alarm state'.

- **Reset Level** *(0-5V and 4-20mA Analog only)*
  Enter the real world value where the input will go into 'Reset state'.

- **Delay before Alarm/Reset**
  This option allows a time to be programmed, that the alarm/reset condition must be present for, before notifications messages will be sent. If the alarm/reset condition is removed before this time elapses, no notification messages will be sent. This allows for a de-bounce time to be programmed, which may help to eliminate false alarms. Enter the value in this field in seconds.

- **Phone List**
  Select the appropriate boxes for the users that are to receive alarm and reset messages for this input. Note that any combination of alarm and reset messages can be assigned to any user. The 'Alarm' and 'Reset' boxes should be used where the contact is a user, and the 'Remote Output (Alarm)' and 'Remote Output (Reset)' boxes should be used where the contact is another EDAC SMS 300 unit (see section 7.4 and section 7.5 for more information on 'Remote Output Switching').

- **On Alarm Condition**
  This feature gives the option of automatically switching outputs when this input goes into alarm condition. From the first drop down box select the output that is to be switched when this input goes into alarm condition. From the second box select whether the output is to be switched 'On' or 'Off' when this input goes into alarm condition.

- **Switch Local Output on Alarm**
  Select this check box if you wish to switch an output on this unit when this input goes into alarm state. If the output you wish to switch is on a second, remote unit, then the phone number of the remote unit needs to be entered into the contact list and the appropriate 'Remote Output' contact notification boxes need to be ticked (see section 7.4 and section 7.5 for more information on 'Remote Output Switching').

- **On Reset Condition**
  This feature gives the option of automatically switching outputs when this input goes into reset condition. From the first drop down box select the output that is to be switched when this input goes into reset condition. From the second box select whether the output is to be switched 'On' or 'Off' when this input goes into reset condition.

- **Switch Local Output on Reset**
  Select this check box if the output you wish to switch, when this input goes into reset state, is local (or is on same unit). If the output you wish to switch is on a second, remote unit, then the phone number of the remote unit needs to be entered into the contact list and the appropriate 'Remote Output' contact notification boxes need to be ticked.

5.5.3. 'Alarm B' Tab (0-5V and 4-20mA analog only)

The 'Alarm B' tab contains an identical set of fields to the 'Alarm A' tab. The 'Alarm B' tab can be used to set up a second set of messages, user notifications and alarm/reset points on the one input channel. This allows for a 'minor alarm' and 'major alarm' scenario to be configured.

5.6. Outputs

The settings for each output are found on the 'Output 1, 2, 3, and 4' trees as pictured in Fig 5.6 below.

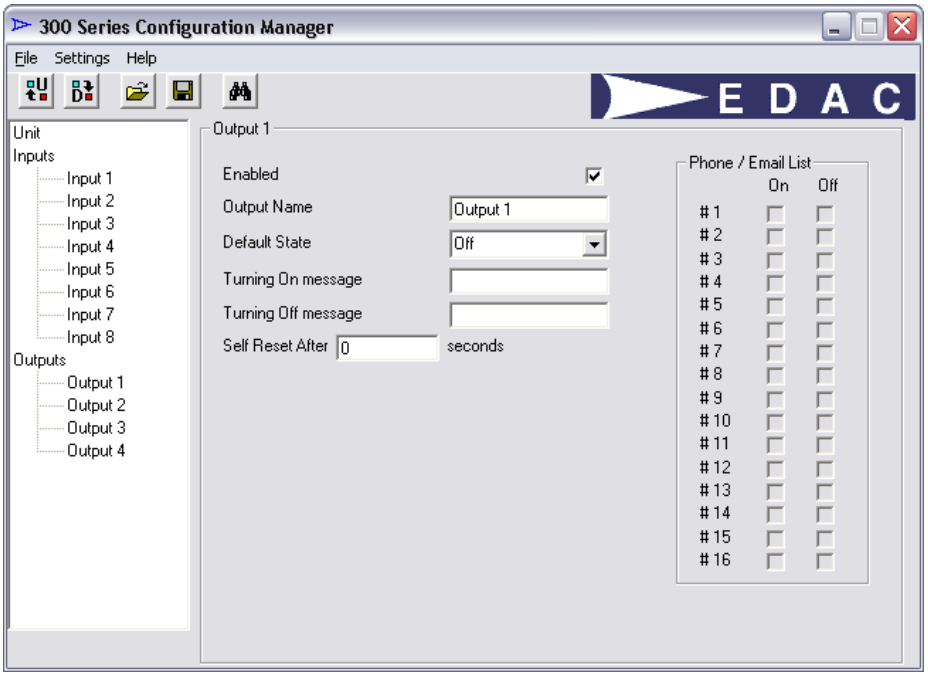


Fig. 5.6 Output Config

- **Enabled**
  Tick this box to enable the output. All other options will be greyed out and unavailable until this box is ticked.

- **Output Name**
  Enter a name for this output in this box. This name is used in the configuration interface, but can also be used in the switching message for this output (see section 6.2 for more information on controlling outputs).

  For example: If output name is *"Pump"*
  Then output switch command *"PIN# Pump on"*

  Each name must be unique and cannot be the same as another output on the same unit.

- **Default State**
  This assigns what state the output will be in when the unit is powered up, whether it be due to the unit suffering power loss, or if it is the first power up.

- **Turning On Message**
  This is the message which is sent to the users when the output is turned on. (40 chars max).

- **Turning Off Message**
  This is the message which is sent to the users when the output is turned off. (40 chars max).

- **Phone List**
  Select the appropriate boxes for the users that are to receive 'On' and 'Off' messages for this output. Note that any combination of 'On' and 'Off' messages can be assigned to any user.

- **Self Reset After 'x' Seconds**
  This option enables the output to be configured as self resetting or 'momentary' meaning that when activated, the output self resets after the time period defined in this option. See section 7.2 for more information on using 'Self Resetting Outputs'.

5.7. Diagnostics Interface

The diagnostics interface (Fig. 5.7) allows the installer/user to see the current status of the inputs, outputs and network connection in real time. This is useful when installing and mounting aerials, sensors and relays. To start the diagnostics interface running click on the 'Diagnostics' Button at the top of the main window.

If the 'EDAC 300 Series Configuration Manager' is setup to use a RS-232 COM connection, diagnostics will start immediately, if it is set up to use a Windows dial-up modem then the modem will dial an connect before diagnostics will begin.

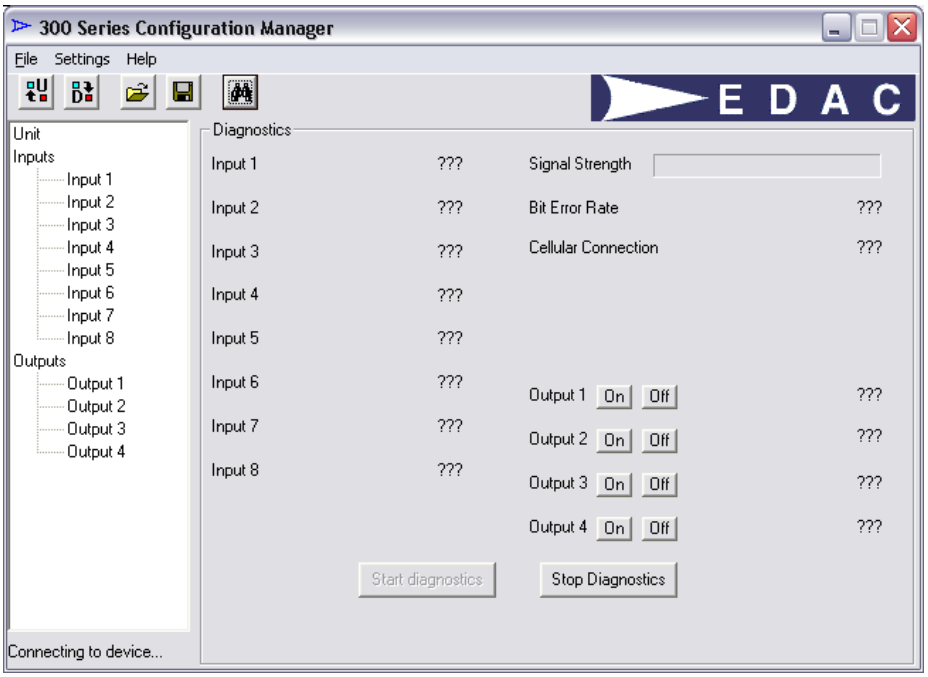


Fig. 5.7 Diagnostic Interface

- **Input**
  This reports the current status of each input and the associated message.

- **Signal Strength**
  This field reports the current RSSI (Relative Signal Strength Indication) form the modem. The bar gives a visual indication, move the cursor over the bar for an actual reading. RSSI is on a scale of 0 to 31, 0 being no signal and 31 being perfect.

- **Bit Error Rate**
  This reports the 'Bit Error Rate' of the cellular connection as reported by the modem. This is an indication of the quality of the cellphone network signal. Bite Error Rate (or BER) is basically a reading of how much of the digital data that is sent and received is being corrupted. Factors such as noise signal bounce and incorrect aerial installation can affect BER. Ideally a BER reading of zero should be seen.

- **Cellular Connection**
  This indicates if a valid connection to the network has been established. If a valid connection is indicated this confirms the account is properly configured and the unit has everything it needs in order to operate. If the cellular connection fails, then a button will appear that will allow the user to force the unit to try to re-connect to the network.

- **Output 1, 2, 3, 4**
  This provides information on the current status of all outputs. Each individual output can also be switched using the 'On' and 'Off' buttons next to each output. This can be useful when installing and testing output wiring.

- **Start Diagnostics**
  This button will start the diagnostics running.

- **Stop Diagnostics**
  This button will stop the diagnostics running. The last known values for each field will be displayed, until either the page is changed or the diagnostics is started again.

6. SMS 300 - Notification, Control and Queries

The main method of communication the EDAC SMS 300 uses is SMS (text) messaging. The unit can send messages to, and receive messages from standard cellular phones and other SMS 300 units. This can provide information about the current state of inputs and outputs, be used to switch outputs on and off and provided information about the system and cellular connection.

For information about sending and receiving SMS on your mobile phone see your phones user manual or contact your cellular service provider.

6.1. Alarm Notification Messages

Alarm notification messages are generated when an input changes state or an alarm condition is detected. These messages are user configurable and can be sent to any combination of cellphone users.

Alarm notification messages are made up of several different messages from within the SMS 300 unit. An example of a typical alarm message follows.

SMS 300 Demo	*'Site Message'*
Input 1 Alarm	*'I/O Message(s)'*
09:11 19/07/05	*'Time/Date'*

The SMS 300 continually monitors the state of all inputs. Occasionally, if an analog sensor becomes faulty or is not properly configured, it may read out of bounds. The SMS 300 will notify the primary user (see section 5.4 for more information on configuring the primary user) of the fact that an input sensor is reading out of bounds. This message will look similar to the following example:

SMS 300 Demo
Input 1's sensor is reading out of bounds, it might be faulty.
09:11 19/07/05

If this message is received the sensor, its associated wiring and the configuration should be carefully checked.

6.2. Controlling Outputs

The user can remotely control the state of any output by sending an SMS message to the unit. The EDAC SMS 300 uses two levels of security to ensure only authorised users can switch outputs. These are *'PIN'* security and *'Caller ID'* security. This means that the user must have two things in order to a switch an output, they must know the PIN number of the unit (if a PIN has been programmed) and they must have the number of the phone they are sending the command from, programmed into the phone number list of the unit.

6.2.1. Switching Commands

The message to switch an output must be in the correct format to be accepted. The format is as follows:

<PIN#>space**<Output number>**space**<on/off>**

i.e. ***'1234 1 On'***

Note the spaces between the PIN number, the output number and the command. Also note that if no PIN number has been configured in the unit, the PIN part of the message is not required.

Also note that the **<Output number>** part can be replaced by the **'Output name'** (see section 5.6 for details on configuring output names). For example if output one is setup with the name of 'Pump' the command could look like this:

'1234 Pump On'

6.2.2. Output Switch Command Expiry Times

Output control commands can often be time sensitive and due to the fact SMS messaging is not a time critical service, some commands should not be actioned if they are received after a certain time.

The EDAC SMS 300 allows an expiry time and date to be set on output command messages so that if they are received after a certain pre-defined time and date they are discarded by the EDAC SMS 300.

The context of the message should be structured as follows:

<**Output Control Command**>;<**Expiry Time/Date Command**>

The 'expiry time/date' command will only have an effect when coupled to a remote control command. However system and remote control commands are not dependant on being coupled to an 'expiry time/date' command, and will function independently.

The format of the 'expiry time/date' command is as follows:

YYYYMMDDHHMMSS

Where:

YYYY is the calendar year of expiry
MM is the calendar month of expiry
DD is the calendar day of expiry
HH is the hour of expiry (in 24 hour format)
MM is the minutes of expiry
SS is the seconds of expiry

For example:

Pump 4 Off;20070719000100

This command would be actioned if received before 00 hours 01minutes 00 seconds (or 12:01am) on the 19th of July 2007

Note that the resolution with which expiry time is defined can be set by omitting parts of the command. For example, a resolution of one hour can be set on a message by not defining the seconds and minutes in the command. The omitted parts are assumed to set to zero.

For example:

Pump 2 On;2007071913

This will be actioned if received before 1pm on the 19th of July 2007. Note how the minutes and seconds are not defined.

Resolution can be defined up to one year, so a message could be defined as valid for a whole year

For example:

Pump 2 On;2008

This will be actioned if received before the end of 2007. Note how the seconds, minutes, hours, days and month, are not defined.

6.2.3. Responses

The EDAC SMS 300 can be configured to respond to output commands, confirming that the command message has been received and the action has been taken (see section 5.6 for more information on configuring output switching notification). Output response messages are generated whenever an output is switched (either remotely or locally).

A typical response to an output command will look like the following:

SMS 300 Demo	*'Site Message'*
Output 1 On	*'Output Message'*
09:11 19/07/05	*'Time and Date'*

If an output command has been sent by a valid user (i.e. phone number programmed in contact list) and the command is invalid or in an incorrect format the SMS 300 unit will respond with the following message.

SMS 300 Demo
The command or pin number was not valid
09:44 22/07/05

If an output command has been sent by a valid user (i.e. phone number programmed in contact list) and the command is valid but the output is not enabled, the SMS 300 unit will respond with the following message.

SMS 300 Demo
Output 'x' is not enabled
09:44 22/07/05

If a valid command is sent by a valid user, but the expiry time/date has lapsed and the message is deemed to have expired, the EDAC SMS 300 will respond with the following message:

SMS 300 Demo 'Site Message'
Expired message received:
"<message content>"
09:11 19/07/05 'Time and Date'

If a command is sent by an invalid user (I.e phone number not programmed into contact list), no response will be sent.

6.2.4. Multiple Output Commands

It is possible to switch multiple outputs with one SMS message. This saves the time and expense of sending multiple messages when more than one output has to be switched at once. Binary like values are used to indicate the required state of each output. The format for switching multiple outputs is as follows:

<PIN#>space**<outall>**space**<OUT1><OUT2><OUT3><OUT4>**

Replace the <OUTx> field with any of the following values to indicate the required state of the output.

1 = ON
0 = OFF
x = Make no change to current state

For example a typical multiple output switch message may look like the following:

'1234 outall 110x'

This message would switch outputs 1 and 2 on, output 3 off and make no change to output 4. Notification messages will be sent for all outputs that have been switched. The command above would initiate three separate responses as detailed below (assuming the outputs are configured to send notifications messages – see section 5.6 for more information on configuring output notification messages).

SMS 300 Demo *'Site Message'*
Output 1 On *'Output Message'*
09:11 22/07/05 *'Time and Date'*

SMS 300 Demo
Output 2 On
09:11 22/07/05

SMS 300 Demo
Output 3 Off
09:11 22/07/05

6.3. Status Query

The status query provides information about the current state of all inputs and outputs. Note that if the 'Public Queries' option is not enabled, the number of the cellphone has to be programmed into the contact list in order to receive a response (see section 5.4 for more information on enabling public queries).

To obtain a status report, send the following command:

Status

A typical response to this command might look as follows: Note that this information may be split over two separate SMS messages if required.

SMS 300 Demo *'Site Message'*
Input 1 Alarm *'Input 1 current status' (alarm message)*
Input 2 OK *'Input 2 current status' (reset message)*
Input 3 OK *'Input 3 current status' (reset message)*
Output 1 On *'Output 1 current status' (turning on message)*
Output 2 Off *'Output 2 current status' (turning off message)*
Output 3 Off *'Output 3 current status' (turning off message)*
09:11 17/07/05 *'Time and Date'*

Disabled I/O will not appear in a reply to a status query.

6.4. Advanced SMS Commands

Additional SMS commands are available for advanced users as detailed in the following sections.

6.4.1. System Query

The system query provides information about the status of the units' cellular connection. In order to obtain a system report, send the following command:

Sys

A typical response to this command will look like the following

SMS 300 Demo	*'Site Message'*
RSSI = 20	*'RSSI reading from modem'*
BER = 0	*'BER reading from modem'*
09:11 17/07/05	*'Time and Date'*

RSSI (or 'Received Signal Strength Indication') gives information about the strength of the cellular network signal. RSSI is measured on a scale of 0 (no signal) to 31 (perfect signal). Note that a minimum RSSI reading of 10 is recommended for reliable operation.

BER (or 'Bit error Rate') gives an indication of the quality of the received signal. It gives an indication of the level of errors encountered when transmitting digital data. A BER reading of zero should normally be encountered.

6.4.2. Multiple Commands

Multiple SMS commands can be sent together in one message. This saves the time and expense of sending multiple messages to perform more than one task. Use the standard commands as described in the sections above, separated by a '**+**' symbol.

For example:

sys+status

This command would return both system and status information in separate messages. Note that the information, from each query, may be split over more than one message if required.

Another example

1234 Output1 On+1234 Output 2 Off

This command would turn output 1 on, and output 2 off at the same time. The responses will be sent back as required/configured (see section 5.6 for more information on configuring output responses).

7. Application Notes / Advanced Features

7.1. Auto Reporting

The 'Auto Reporting' feature is designed to give peace of mind in applications where the unit is either very remote, or is mission critical to the operation of the equipment it is connected to. This feature allows the unit to automatically send a status message, at a pre-defined interval, on a daily, weekly or monthly basis, providing peace of mind that the unit is alive and operating correctly.

The 'Auto Report' message is sent to the 'Primary User' in the phone number list (see section 5.4 for more information on Configuring the 'Primary User').

The auto report feature is configured on the 'Global/Phone Numbers' page of the 'EDAC 300 Series Configuration Manager' as described in section 5.4 and as shown below in Fig 7.1.

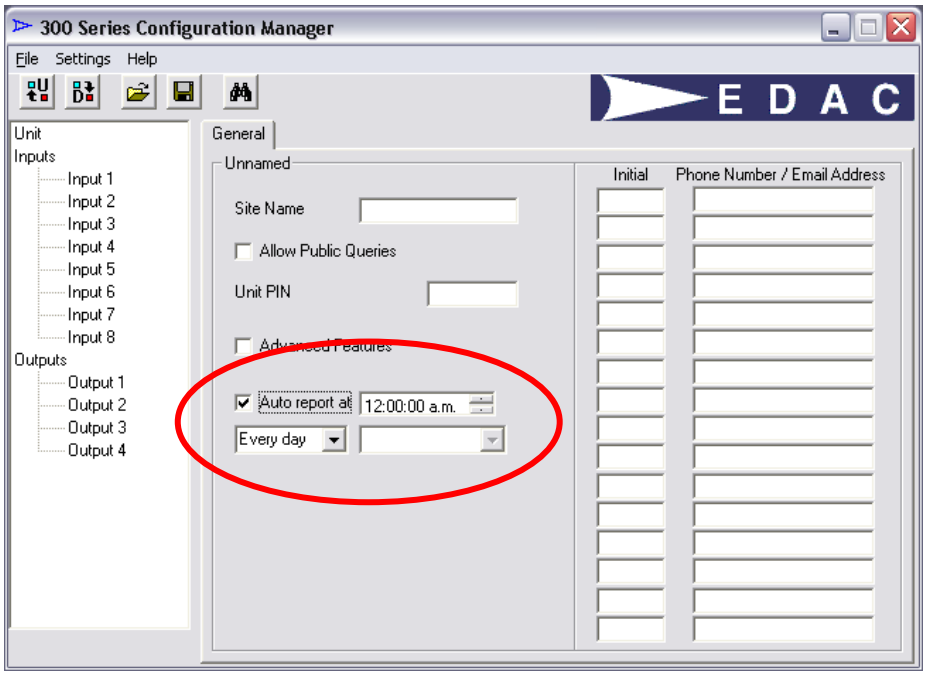


Fig 7.1 EDAC 300 Series Configuration Manager - Unit Page

Tick the 'Auto Report At' check box to enable the feature. Set the time of day for the message to be sent, and then select either a daily, weekly or monthly interval. If a weekly interval is selected, choose the day of the week for the 'Auto Report' message to be sent, if monthly is selected select the day of the month for the 'Auto Report' message to be sent.

Note that if monthly is selected, and either the 29th, 30th or 31st day of the month is selected, in months where the day selected does not exist (February for example only has 28 days) the message will be sent on the last day of month that the message is due for delivery in.

An example of what the 'Auto Report' message might look like is shown below:

SMS 300 Demo	*'Site Message'*
Reporting:	*'Reporting Message indication'*
Input 1 Alarm	*'Input 1 current status' (alarm message)*
Input 2 OK	*'Input 2 current status' (reset message)*
Input 3 OK	*'Input 3 current status' (reset message)*
Output 1 On	*'Output 1 current status' (turning on message)*
Output 2 Off	*'Output 2 current status' (turning off message)*
Output 3 Off	*'Output 3 current status' (turning off message)*
09:11 17/07/05	*'Time and Date'*

Note that the contents of this message may be split over two or more SMS messages if required

7.2. Self Resetting Outputs

The outputs on the EDAC SMS 300 can be configured as self resetting, or 'momentary'. The Self Resetting output feature allows the user to configure an output on the SMS 300 to turn on momentarily, for a pre-defined time when activated, and then automatically turn itself off.

This enables the SMS 300 to simulate a button press for starting and stopping devices such as pump soft start controllers, centre pivot and lateral irrigators, and process machinery.

The 'Self Resetting Output' feature is configured in the output page as described in section 5.6, and as shown below in Fig 7.2.

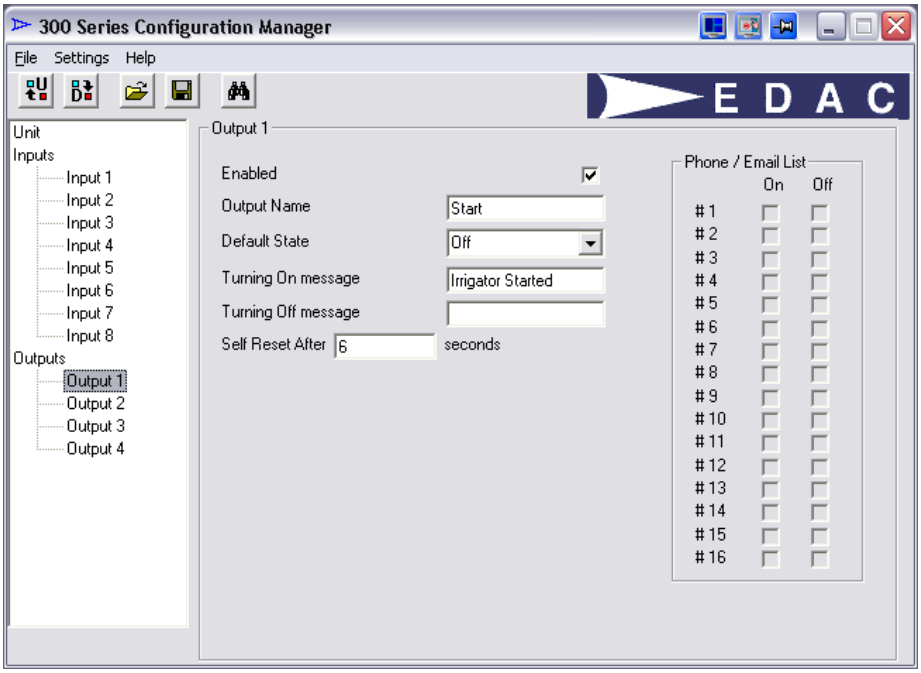


Fig 7.2 Output Configuration

To disable the 'Self Reset' feature and set the outputs as latching, enter '0' into the 'Self Reset after x seconds' field. To enable the feature enter the time (in seconds) that the output will remain active for before self resetting.

Note that this action will only occur when the output is being switched ***from*** the 'Default State' (as configured in the output page) and not if the output is manually switched back to the 'Default State' before the self reset time elapses.

7.2.1. Single Word Output Commands

When the 'Self Resetting Output' feature is enabled, single word output commands can be used. If the 'Output Name' is a single word, with no spaces, just the text entered in the 'Output Name' field can be used to switch the output from the 'Default State', without the 'On' or 'Off'.

For example, using the configuration in Fig 7.2 above ('Default State' is "Off", 'Output Name' is "Start" and 'Self Reset after x Seconds' is set to "6") sending the SMS message "**Start**" to the unit will turn the output on for 6 seconds, then it would self reset and turn off.

Note that the command will still have to meet the PIN number and caller ID security requirements described in section 6.2 and that the 'Output Name' used can not contain any spaces.

7.3. Through Mode CSD Data Connection

The RS-232 serial port on the EDAC SMS 300 can be used to connect to external devices such as PLC's or data-loggers. Put simply, the SMS 300 works like a RS-232 modem, but rather than working though traditional fixed line services, it works through wireless cellular networks using a technology called CSD or **C**ircuit **S**witched **D**ata. Remote connections can be established through the SMS 300 allowing data communications between a base P.C. and the remote device.

The cellphone account that the SMS 300 is connected on will need to have CSD enabled. See section 3.1.3 for more information on Circuit Switched Data numbers.

To initiate a through mode connection, the modem on the P.C. must start a connection with the SMS 300 unit, by dialling the number of the SMS 300 unit. The P.C. modem and the SMS 300 should negotiate a connection. Once connected data should be able to be sent to and from the SMS 300.

A terminal program such as 'HyperTerminal' or 'Terra Term' will need to be used to control the P.C. modem. Connect a terminal program to the COM port the modem is connected to (if the modem is internal the COM can normally be found in the hardware properties).

Some basic commands should be entered into the P.C. to set it up to work with the SMS 300. Below is an example of the commands that need to be entered to set up the P.C. modem and initiate the connection.

AT&F	**<ENTER>**	'Factory Reset modem'
ATn1	**<ENTER>**	'Enable auto baud rate detection'
AT&k4	**<ENTER>**	'Turns on flow control'
ATDT<Phone#>	**<ENTER>**	'Dials SMS 300 and connects'

Use the phone number of the SMS 300 in the <Phone#> field. The P.C. modem should now dial the SMS 300 and connect. Wait for the following response to confirm the connection was successful.

CONNECT 9600

The P.C. and the SMS 300 are now connected and data can be sent and receive between the two units.

The properties of the SMS 300's RS-232 port can be configured to work with any device that is externally connected. See section 7.7 'Serial AT Commands' for more information on changing the properties of the RS-232 port. It should be noted that if these are changed the unit may no longer communicate with 'SMS Configuration Manager'.

7.4. Automatic Local Output Switching

The SMS 300 can be configured to automatically switch the state of an output depending on the state of an input. For example an input can monitor a temperature sensor and automatically turn on a fan if it gets to hot. The following section will explain how to configure the SMS 300 to automatically switch local (i.e. on the same unit) outputs.

First of all the 'Advanced Features' option needs to be enabled. Using the 'SMS 300 Configuration Manager' (see section 5 for more info on 'EDAC 300 Series Configuration Manager') switch to the unit page and select the 'Advanced Features' option as shown in Fig 7.4a below.

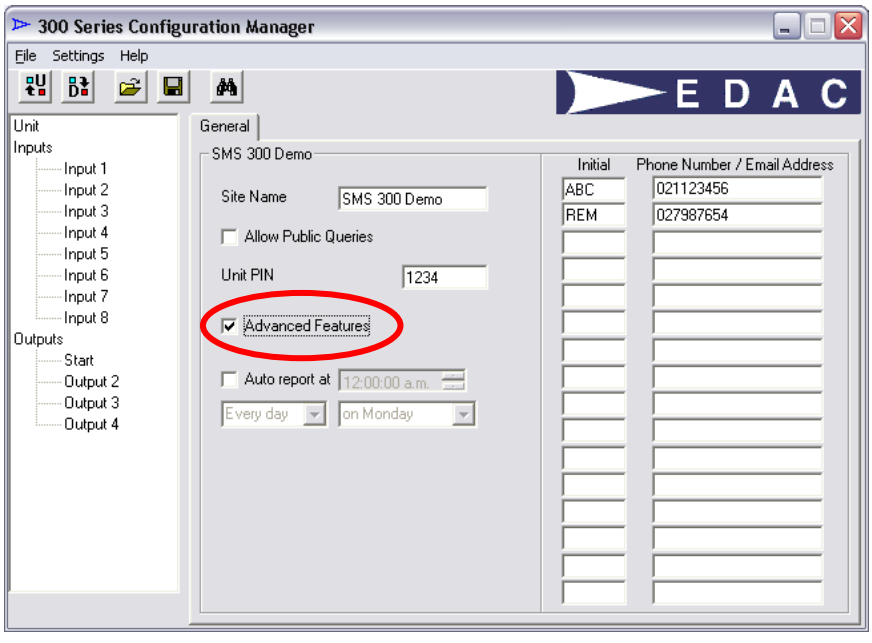


Fig 7.4a Enabling Advanced Features

Next the output that needs to be switched must be configured correctly. Bring up the configuration page for the output that you wish to control. This page is shown below in Fig. 7.4b. Make sure the output is enabled and the 'Turning On' and 'Turning Off' messages have been set up. The output should also be set up to send notification messages if required.

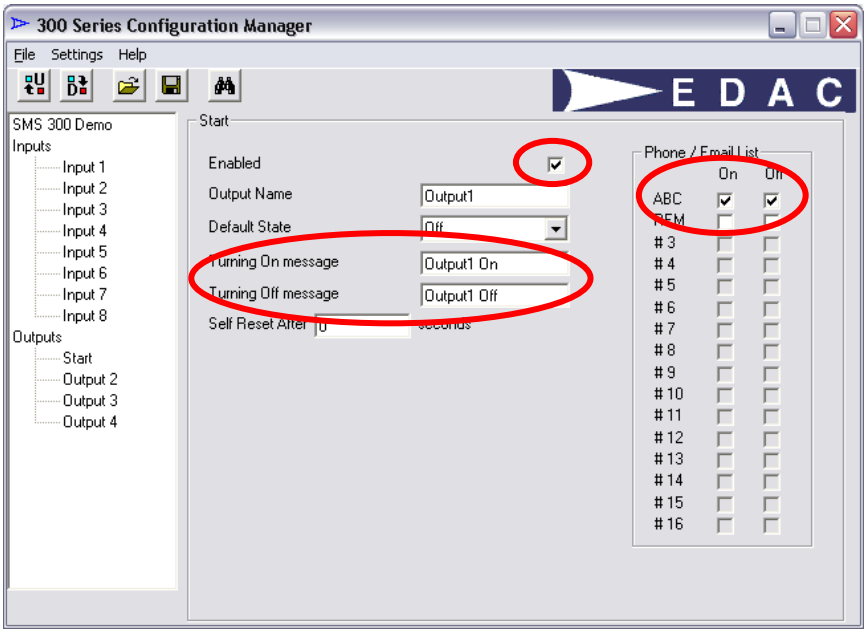


Fig. 7.4b Output Config

The input that is to control the output then needs to be set up. Bring up the appropriate input configuration page as shown below in Fig 7.4c.

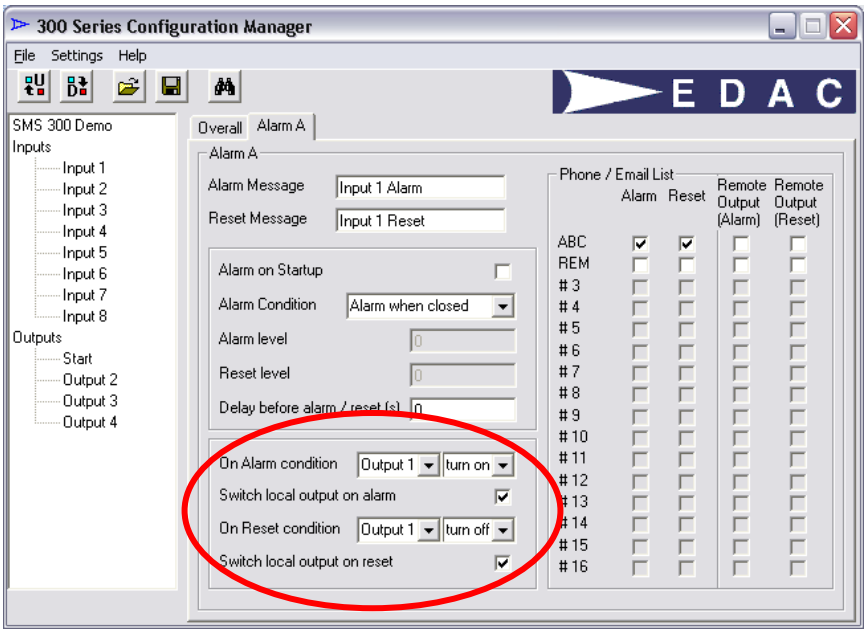


Fig. 7.4c Switching Config

Next to the 'On Alarm Condition' text, are two drop down boxes. Select the output to be switched from the first box, and the action to be taken when this input alarms from the second box. Next to 'On Reset Condition' select the output to be switched and the action to be taken when the input goes into a reset state. Ensure both 'Switch local output on alarm' and 'Switch local output on reset' boxes are ticked.

Also note that the 'Alarm Condition' box must not be set to 'Alarm Off', (i.e. input must be alarming) in order for the output to be switched.

The output should now be automatically controlled by the state of the input. Note that the output can still be switched manually. Also note that If the output is already in the state that it is to be switched to when a particular event occurs, no change will be made, and no output notification will be sent.

7.5. Automatic Remote Output Switching

As well as automatically controlling outputs on the same unit, the SMS 300 can automatically control outputs on other remote units. Because of the nature of cellular communications the physical distance between the two units is irrelevant, as long as cellular reception is available to both units. The diagram below graphically shows how two units can be linked together.

An example application for this feature could comprise of a frost monitoring and irrigation start system. One SMS 300 may be connected to a temperature sensor out in the middle of the orchard, but the pump that needs to be started when a frost occurs is some distance away at the edge of the orchard.

One SMS 300 can be connected to the pump and one to the temperature sensor. The two units can then communicate with one another when a frost occurs, the first unit detecting the frost, then sending an SMS to the second which starts the irrigation, which in turn, then notifies the user of the event.

The setup of this feature is very similar to that of 'Automatic Local Output Switching' (see section 7.4); however there are a few important setting that need to be configured properly.

The first is that the unit PIN needs to be *EXACTLY* the same on both units. Ensure the 'Unit PIN' as shown in Fig 7.5a, is identical on both units.

The phone number of the remote unit needs to be entered into the contact list of the first unit and vice versa. This is so that the remote unit and the local unit know to accept commands from each other. Ensure the phone number of the other unit is entered in the contact list in each unit. The example in Fig 7.5a shows the user configured in contact 1 (with initials ABC) and the remote unit configured in contact 2 (with initials REM).

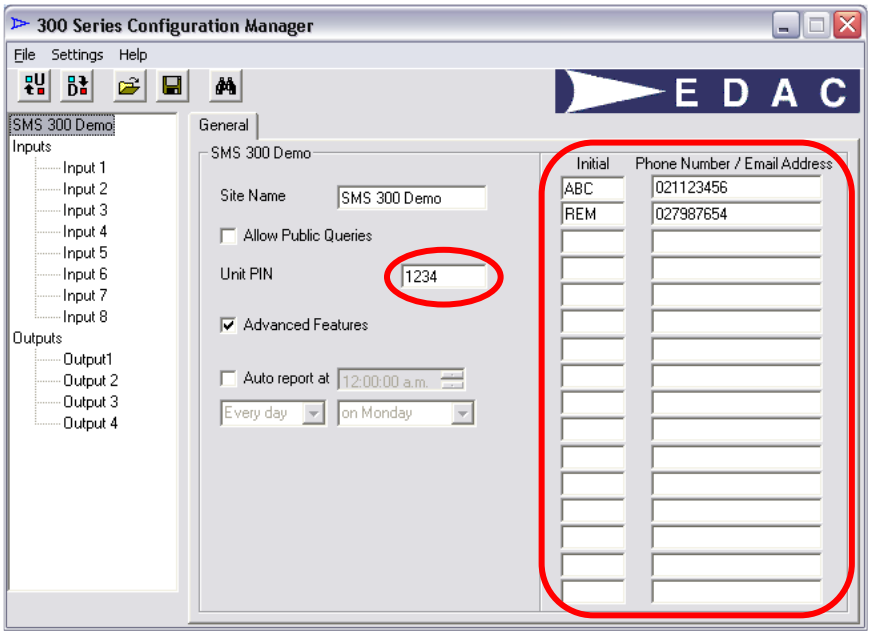


Fig 7.5a Remote Output Switching Setup

The last thing is to configure the base unit to send the appropriate command to the remote unit. This is setup in a similar fashion to local output switching, but the 'Switch Local Output on Alarm' and 'Switch local Output on Reset' boxes are not ticked, and the 'Remote Output (Alarm)' and 'Remote Output (Reset)' boxes must be ticked next to the contact that contains the base units' number.

The example in Fig 7.5b below shows the user configured on contact 1 (with initials ABC) and the remote unit configured in contact 2 (with initials REM).

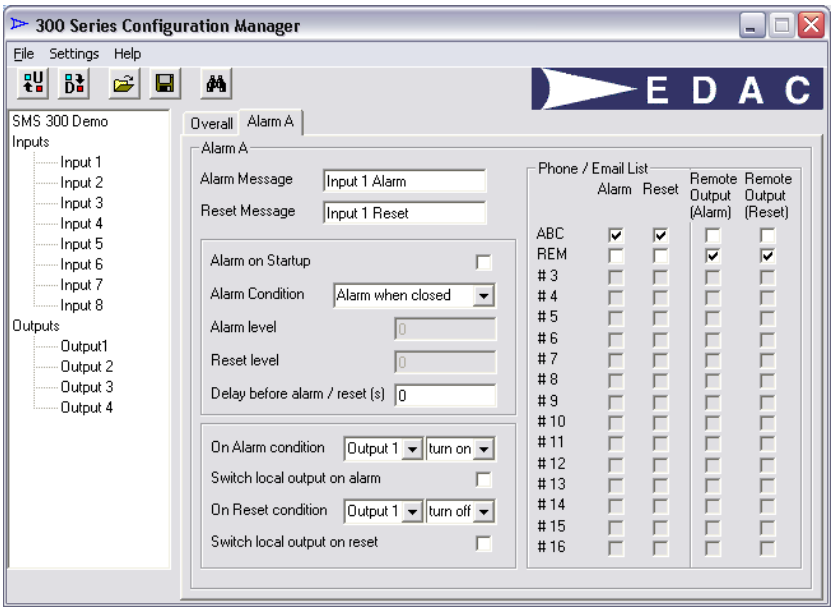


Fig 7.5 Remote Output Alarm Setup

Note how the 'Remote Output (Alarm)' and 'Remote Output (Reset)' tick boxes are used for the remote unit contact.

7.6. Power Supply Monitoring

The SMS 300 unit has the ability to monitor the voltage supplied to it when running from a D.C. power supply (contact the manufacturer for more information on monitoring AC supply voltage). The first input is dedicated when this function is enabled. There are two steps to setting up power supply monitoring, hardware setup and configuration setup.

7.6.1. Hardware Setup

The 'Power Supply Monitoring' Jumper needs to be enabled before this feature can be used. See section 4.2.1 for more information on changing the power supply monitoring jumper.

Please note that changing this jumper disables the standard features of input 1. Any sensors or contacts connected to input 1 will no longer operate. Shifting the power supply monitoring jumper to 'ON' effectively disconnects the input 1 terminal from the system. Any existing sensors or contacts on input 1 will need to be shifted to another spare input if power supply monitoring is enabled.

7.6.2. Configuration Setup

The first input is dedicated when the power supply monitoring jumper is changed and as such the configuration for input 1 needs to be correct for this to function correctly.

Fig. 7.6.2a below shows the values that need to be entered on the 'Input 1' configuration page.

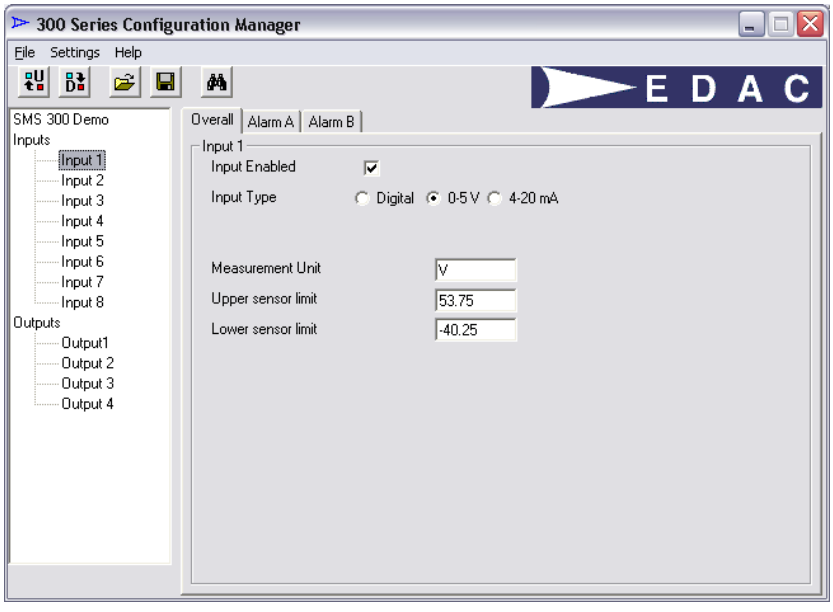


Fig. 7.6.2a PSU Monitoring Setup

Ensure the input is enabled, ‘Input Type’ is set to ‘0-5V’, ‘Measurement unit’ is entered as ‘V’, ‘Upper sensor limit’ is ’53.75’ and ‘Lower sensor limit’ is -40.25.

Alarm conditions and notification messages can now be set up for the power supply monitoring. Change to the ‘Alarm A’ tab to configure these. Fig. 7.6.2b shows how these might be typically set up.

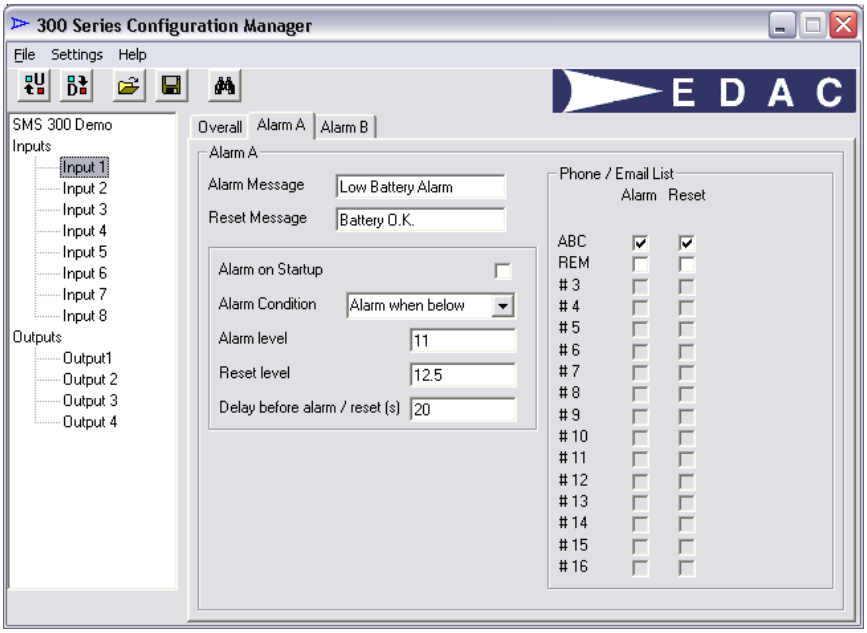


Fig 7.6.2b PSU Monitoring Alarms

Note that when the actual voltage falls below the value in ‘Alarm Level’, the input will alarm, and when the actual voltage comes back up above the value in ‘Reset Level’, the input will reset.

7.7. Serial AT Commands

Some features of the SMS 300 can be accessed through a terminal program connected to the COM port of your PC (e.g. Hyper-Terminal). The terminal session should be configured to 9600 baud rate, 8 data bits, no parity and 1 stop bit (9600 8,n,1).

It should be noted that using these commands is recommended for advanced users only. Incorrect use of these commands may render the unit inoperable.

To use one of the commands type the command into the terminal window and press enter. The SMS 300 will respond as required.

Basic Commands

Command	Response	Function
AT+BAUD?	+BAUD : {"1200","2400","4800","9600", "14400","19200"}	Returns the values the baud rate can be set to.
AT+BAUD=?	+BAUD=<baud rate>	Returns the current baud rate
AT+BAUD=<baud rate>	OK ERROR	Sets the baud rate to the defined value. Note you must now change the baud rate set in your terminal application to continue using this. Returns ERROR if the functions was not performed.
AT+COMM=?	+COMM = 8,n,1	Returns the current setup of the COM port. Note this may need to be changed to interface with external devices, e.g. PLC's.
AT+COMM?	+COMM : <data>,<parity>,<stop>	Returns the format to change the COM port settings.
AT+COMM=<data>, <parity>,<stop>	OK ERROR	Sets the COM port with the new settings. Returns ERROR if the functions was not performed.
AT+IN<input number>	+IN1=open	Returns the current status of the input chosen, e.g. AT+IN1 returns the state of input 1.
AT+OUT<output number>	+OUT1=1	Returns the current state of the output chosen, e.g. AT+OUT1 returns the state of output 1.
AT+OUT1=<state>	OK ERROR	Turns the output on or off. E.g. AT+OUT1=ON will turn output 1 on. State = {ON, OFF} Either the output is not enabled or is an invalid output number.
AT+OUTALL=<abcd>	OK ERROR	This allows you to control all of the outputs with one command. 'a' represents output 1, 'b' represents output 2, 'c' represents output 3, 'd' represents output 4. E.g. AT+OUTALL=0110 would turn output's 1 and 4 off and output's 2 and 3 on. The command was entered incorrectly.

AT+RSSI	+RSSI=<RSSI reading>	Returns the current RSSI (Received Signal Strength Indicator). If the value 99 is received, the value is unknown.
AT+BER	+BER=<BER value>	Returns the current BER (Bit Error Rate). If the value 99 is received, the value is unknown.
AT+CSQ	+CSQ: <RSSI>, <BER>	Returns both the RSSI and BER values for the modem
AT+CNI	+CNI=<status>	Returns the current network status. If the modem is successfully connected to the network +CNI=OK is returned, otherwise +CNI=failed is returned.
AT+RN	+CNI=<status>	At+RN forces the modem to try and reconnect to the network. The SMS 300 will only attempt this when +CNI=failed. AT+RN replies with the status of the network connection once the attempt to reconnect has been completed.
AT+TIME=?	+TIME="dd/mm/yy,hh:mm:ss"	Returns the current time set on the SMS 300. This is updated from the P.C. when the unit is configured.
AT&F	OK	Reset the Config to the factory configuration
AT&R	OK	This gives SMS 300 a software reset. So the unit starts up again.
AT+SMS="<phone number>", <message>	OK	This is used to send a SMS. The phone number must be a valid cell phone number, and the message can't exceed 160 characters. Note the message will be sent in capitals.
AT+SVER	+SVER: 1.50	Returns the version of software in the SMS 300
AT+CGMS= ? =? 1 0	+CMGS=<x>	Sets and returns the level of system reporting for initialisation. '?' returns the current status '=?' returns valid values '1' sets full reporting on initialisation '0' turns reporting on initialisation off
ATE 0 1	OK	Sets the echo setting for the RS-232 port '0' turns echo off '1' turns echo on
AT+VERBOSE= 0 1 2	OK	Sets the level of reporting on the RS-232 port by manipulating the 'ATE' and 'AT+CMGS' commands as well as setting the verbose flag. '0' sets the port to silent mode, '1' sets the port to low reporting (sets +CGMS to 1 and ATE to 0) '2' sets the port to full reporting (sets +CGMS to 1 and ATE to 1).

Serial Through Mode Commands

###	OK	This command is only accessible when the SMS 300 has been accessed via a CSD modem connection (i.e. Remote mode). ### takes the SMS 300 out of a transparent serial link, and allows you to access all of the normal commands.
AT+EXTM	OK	This command is only accessible when the SMS 300 has been accessed via a CSD modem connection (i.e. Remote mode). After you have pushed ### you can use this command to return to a transparent external through mode (as when the connection was first established.)

8. Glossary

Inputs
Inputs are devices, sensors or situations that can cause the SMS 300 to go into an alarm state and send notification messages.

Digital
Digital is a type of input, consisting of connecting an input to ground and disconnecting an input form ground.

N.C. (Normally Closed)
N.C. is a type of digital input, which is in a reset condition when shorted to ground (or closed) and in alarm condition when disconnected from ground (or open).

N.O. (Normally Open)
N.O. is a type of digital input, which is in a reset condition when disconnected from ground (or open) and in alarm condition when shorted to ground (or closed).

Analog
Analog is a type of input, consisting or a voltage or current signal over a range of 4-20mA or 0-5V. The analog signal can be scaled and converted into 'Real World' values, meaning the readings come back in the actual units that are being measured (i.e. temp = *C or pressure = kPa). Alarm and reset points are can be assigned in real world units. When these points are crossed, notification messages can be sent.

0-5V
0-5V is a type of analog input. It consists of a constant voltage, between 0 and 5 VDC, being presented to the SMS 300. The unit reads this value and scales it into real world units.

4-20mA
4-20mA is a type of analog input. It consists of a constant current flow, between 4 and 20mA, being presented to the SMS 300. The SMS 300 reads this value and scales it into real world units.

Loop Powered
Loop powered is a type of 4-20mA analog sensor which draws its power supply form the input terminal of the SMS 300 (sometimes referred to as parasitic power).

Sensor Powered
Sensor powered is a type of 4-20mA analog sensor which draws its power from an external supply, different form the supply to the SMS 300.

Alarm
Alarm is a pre-defined condition, detected by an input sensor, which will initiate notification messages.

Reset
Reset is a pre-defined condition, detected by an input sensor, which will initiate notification messages.

CDMA
CDMA (or **C**ode **D**ivision **M**ultiple **A**ccess) is a cellular communications network scheme, used by Telecom NZ and Telstra Australia. CDMA allows 3G technologies such as video/picture messaging and high speed data transfers to occur.

GSM
GSM (or **G**lobal **S**ystem for **M**obile communications) is a cellular communications network scheme, used commonly by Vodafone. GSM is an accessible, highly reliable, standard for voice, picture/video and data communications.

SIM card
A SIM card (or **S**ubscriber **I**dentity **M**odule) is a small card used on GSM cellphone network. The SIM card contains information about the account that the phone is connected on, as well as the number of the phone.

SMS
SMS (or **S**hort **M**essage **S**ervice) is a text message delivery service on cellular networks. The EDAC SMS 300 uses SMS messaging as it main means of communication.

CSD
CSD (or **C**ircuit **S**witched **D**ata) is a term for modem communications that occur through cellular networks. The EDAC SMS 300 uses CSD for transparently communications with externally connected devices.

Phone ESN
The Phone ESN (or **E**lectronic **S**erial **N**umber) is used to identify CDMA cellular devices. The Phone ESN is required when connecting a CDMA cellular device on the network. The Phone ESN can be found on a sticker on the bottom of the SMS 300-CNZ or 300-CAU.

Pre-Pay
'Pre-Pay' is a way of paying for cellular services. A device connected on a 'Pre-Pay' account is 'topped up' with credit, which is used up when services are accessed. 'Pre-Pay' is useful for non-critical monitoring and control applications. Care is advised however when using 'Pre-Pay' in critical applications. This is due to the fact that if the device runs out of credit, NO communications will be allowed by the network.

RSSI
RSSI (or **R**eceived **S**ignal **S**trength **I**ndication) is an indication of the strength of the cellular network signal. RSSI is read on a scale of 0 (no signal) to 31 (Perfect signal).

BER
BER (or **B**it **E**rror **R**ate) is an indication of the quality of the received signal. BER is calculated from the ratio of good data packets received compared to the number of bad or corrupted data packets received. Normally a BER reading of 0 should be seen.

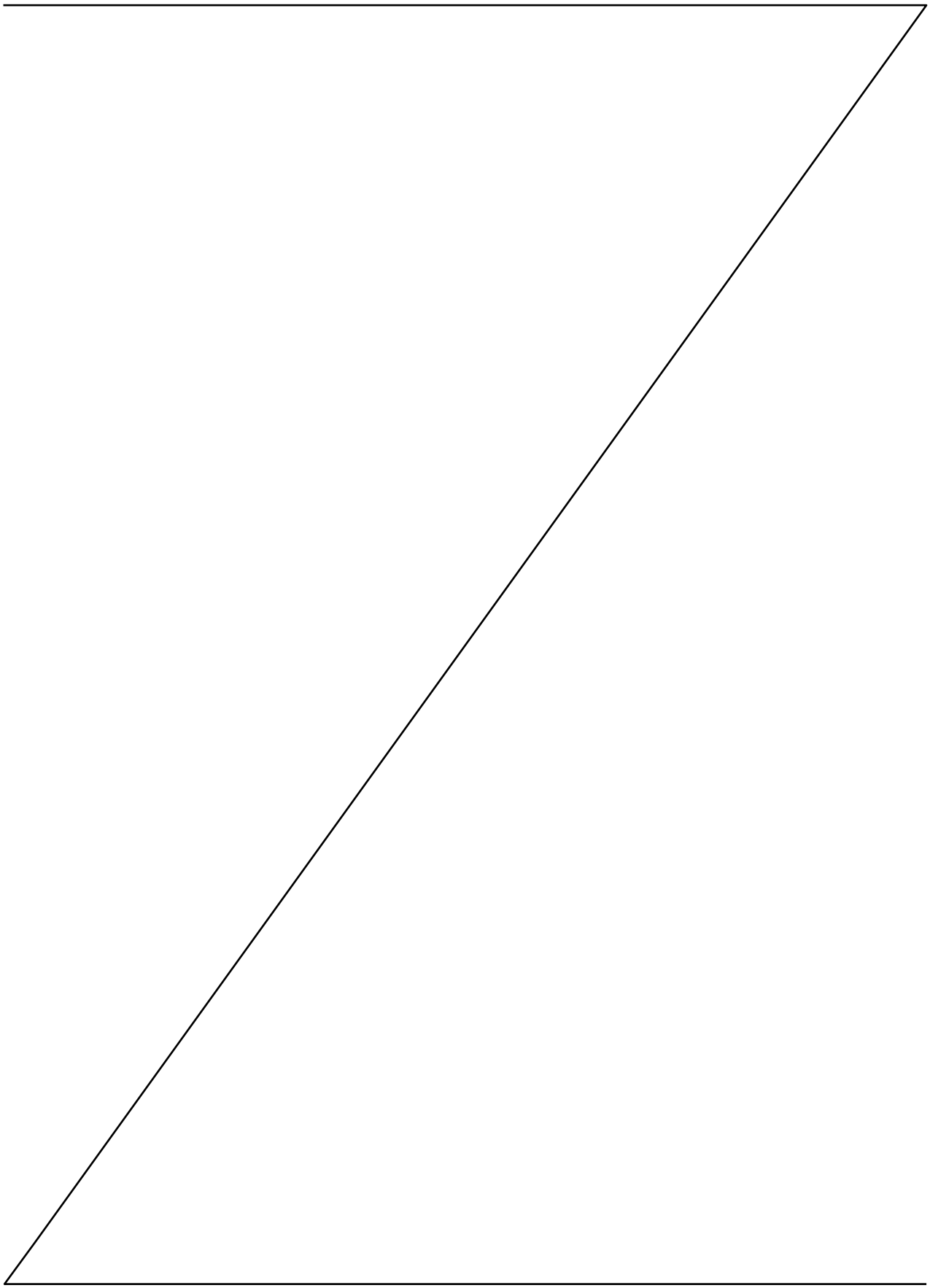
Jumper
A jumper is a connector device used to change the hardware configuration of the inputs on an EDAC SMS 300. The Jumper consists of three (or more) metal pins protruding from the circuit board at right angles, and a piece of plastic coated metal which slides over two (or more) of the pins, connecting them together.

Query
A query is a request for information sent to the EDAC SMS 300 unit. Depending on the type of query (see section 6.3 and section 6.4.1 for more information of the different types of queries) the SMS 300 will reply back with the requested, relevant information.

RS-232 (Serial)
RS-232 (or serial) is a communications protocol used by computers for sending and receiving information. RS-232 is commonly used for configuring devices, such as the SMS 300, from Windows based P.C.s.

9. Product Support

For end-user level customer support, contact your local distributor or installer.



10. Notes

11. Document History

Version	Date	Author	Notes
1.0	13/10/2005	Chris Butler	Document Creation
1.1	5/12/2005	Chris Butler	Added 'External AC Fusing'. Added 'Approved Networks List'. Various minor corrections and improvements.
1.2	30/08/2007	Chris Butler	Added major feature 'Output Command Expiry Times'. Updated wiring diagram with more accurate representation of SMS 300. Various minor changes and improvements
1.3	05/11/2007	Chris Butler	Added major features 'Self Resetting Outputs', 'Auto Reporting', 'Single Word Output Commands' and 'Config via CSD'. Updated Section 5 'Configuration – EDAC 300 Series Configuration Manager' for new release version. Added section on CSD Data numbers. Updated 'Contact number Format' section. Hyperlinks and formatting updated. Various minor improvements and corrections.