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FMGuard

Facility Management Controller User Manual

Model: FMG-1



Please read this user manual carefully before using the device.

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CHAPTER 1: INTRODUCTION

Thank you for your purchase of PICOBOX Facility Management Controller (FMGuard). FMGuard is an industrial DIN rail device used as remote surveillance or as a low-priced autonomous system, which will be able to monitor and control different process on distant localities. The device is powerful, easy to configure and install. You are advised to read through this User Manual to understand the features in details and to utilize fully the capability of the product.

FMGuard is a standalone alarm monitoring controller with 8 digital inputs, 8 digital outputs, 4 analog inputs and 4 analog outputs. The digital inputs can be connected by a switch contact type equipment while the analog inputs allow users to connect any industrial standard transmitter or sensor (0-20mA, 4-20mA, 0-5V and 0-10V). The user can define each input according to the type of equipment the inputs are interfaced to. When the input changes its state from normal to alarm or alarm to normal, the device will deliver an SMS message, send reports over TCP/IP network or send an e-mail to a predefined receiver.

CHAPTER 2: SAFE USE OF DEVICE

The following section contains important operating and maintenance (servicing) instructions. Please read it carefully.

WARNING!!!

To reduce the risk of electric shock:

- Do not remove the cover (or back) of this device. There are no user-serviceable parts inside. Refer servicing to the manufacturer.

NOTE:

The serial number of this device is shown at the side of the product or on the device information of the user interface. You should record the number and other vital information here and retain this booklet as a permanent record of your purchase.

Model No.:

Serial No.:

Date of Purchase:

Dealer Purchased from:

IMPORTANT SAFETY INSTRUCTIONS

In this safety instructions, the word **device** refers to FMGuard and all of its accessories.

Read Instructions – Read all safety and operating instructions before operating the device.

Retain Instructions – Save the safety and operating instructions for future references.

Heed Warnings – Heed all warnings on the device and in the operating instructions.

Follow Instructions – Follow all operating and maintenance instructions.

Cleaning – Cut the supply before cleaning. Wipe the device with a clean soft cloth. If necessary, put a cloth in a diluted neutral detergent and wring it well before wiping the device with it. Finally, clean the device with clean cloth. Do not use benzene, thinner or other volatile liquids or pesticides as they may damage the products finishing. When using chemical treated cleaning cloths, observe their precautions accordingly.

Accessories – Use only accessories recommended on this manual. Always use specified connection cables. Be careful on connecting devices correctly.

Water and Moisture (Hazard of Electric Shock) – Do not use the device near water or in rainy or moist situations.

Ambient Temperature – Do not put the device near a heater.

Placing or Moving – Do not place this device on a unstable cart, stand, tripod, bracket or table. The device may fall and cause serious damage or injury. A device and cart combination should be moved with care. Quick stops, excessive force and uneven surfaces may cause this device & cart to overturn.

Power Sources – The AC adapter should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply to your premises, consult your device dealer or local power company.

Power Cord Protection – Power cords should be routed so that they are not likely to be walked on, or pinched by items placed upon or against them. Pay particular attention to plugs and the point from which the cords exit the device.

Outdoor Antenna Grounding – If an outside antenna is connected to the device, be sure the antenna is grounded so as to provide some protection against voltage surges and built-up static charges.

Lighting – For added protection of the device during lightning storm, or when it is left unattended and unused for long period of time, disconnect it from the wall outlet and disconnect the antenna. This will prevent damage to the device due to lightning and power line surges.

Power Lines – An outside antenna system should not be located in the vicinity of overhead power lines or other electric light or power circuits, or where it can fall into such power lines or circuits. When installing an outside antenna system, extreme care should be taken to keep from touching such power lines or circuits, as contact with them might be fatal.

Overloading – Do not overload wall outlets and extension cords as this can result in a risk of fire or electric shock.

Object and Liquid Entry – Never push objects of any kind into this device through opening as they may touch dangerous voltage points or short out parts that could result in a fire or electric shock. Be careful not to spill liquid of any kind onto the device.

Servicing – Do not attempt to service this device yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified personnel. Opening the cover may void the warranty.

Do not install the device in the following locations as this can cause fire or electric shock.

- Hot locations
- Close to fire

- Very humid or dusty area
- Locations exposed to direct sunlight
- Locations exposed to salt spray
- Close to flammable solvents (alcohol, thinners, etc.)

If any of the following occurs, immediately switch the device OFF, unplug it from the main power supply and contact your distributor or agent.

- The device emits any smoke, heat, abnormal noise or unusual odor.
- A metal object falls to the device.
- The device is damaged in some way.

Do not continue to use the device as this can cause a fire or electric shock.

Please observe the following when using the device. Failure to do so can result in a fire or electric shock.

- Do not use flammable sprays near the device.
- Do not subject the device to strong impact.

Unboxing FMGuard



FMGuard will be delivered to you in an expected package box containing the FMGuard unit, 24VDC adapter and an ethernet cable. Kindly check for damages and make sure that each item is on your package.

CHAPTER 3: PRODUCT OVERVIEW

FMGuard is a standalone device empowered by Cortex-A5 32-bit ARM processor. It has a built-in 3G modem and a USB slot for 3rd party GSM/3G modem. The device has a large LCD display with touch screen that shows a detailed status of the device. There are also LED indicators at front and a reset switch. FMGuard is protected against wrong polarity, it also contains an internal high capacity backup battery, which will supply the device when power failure occurs. It has circuitry like switching power supply, optically coupled digital inputs, relay outputs, analog input, etc. FMGuard is IP based (Internet Protocol), comes with a user friendly web user interface and powerful feature set.

FEATURES

| Physical | |
|----------------------------------|---|
| Operating Voltage | 12 to 36 VDC |
| Battery | On-board 2Ah (nominal) Li-Ion Battery |
| Processor | Cortex A5 32 bit ARM processor |
| Cellular Modem | GSM: 850/900/1800/1900 MHz UMTS: 800/850/900/1900/2100 MHz |
| Operating Temperature & Humidity | 0-45 °C 5-90% non condensing |
| Physical Size | W 160.2 x H 89 (top) x D 53.5 mm without terminal blocks and connectors. |
| Weight | Approximately 465 g. without accessories |
| Mounting | Industrial standard ABS housing with 9M DIN rail mounting, pluggable |
| Connectors | 2-way pluggable terminal blocks |
| Security Feature | 2 Leve security, administrator and guest |
| Date and Time | Support NTP server time zone synchronization Real time clock w/ battery back up |
| LED Indicators | TX=Reserve for Modbus transmit RX=Reserve for Modbus receive S1 and S2 = for signaling status and possible errors |
| Communication Port | RJ45, Ethernet (10/100 Mbit) & RS232 Mini USB-B, Service port SMA female connector for UMTS USB host port (USB-A receptable) |

| | |
|----------------------------|---|
| Interface | HTML interface, via web browser Dot Matrix LCD with 240x160 pixels, touch screen with virtual buttons |
| Network | |
| Network Support | Static and Dynamic IP |
| Network Protocol | <ul style="list-style-type: none"> a. TCP (Transmission Control Protocol) b. IP (Internet Protocol) c. HTTP (Hyper Text Transfer Protocol) |
| Digital Input | |
| Digital Input Description | 8x Digital Input Logic high: 8 to 40VDC Logic Low: -5 to 3 VDC Impedance: 3.3k Ω |
| Configuration | Independent configuration of input description, open/close status description |
| Digital Output | |
| Digital Output Description | 8 x digital solid-state digital output Max. 36 volt / 1.5 A per. channel Short-circuit, ESD, Inductive kick-back protected up to 20 mH User supplied power |
| Configuration | User defined output description |
| Output Control | Through SMS or locally On / Off relay outputs through web browser and through Logic Expression |
| Analog Input | |
| Analog Input Description | 4 x analog inputs Range is 0-5, 0-10VDC or 0-20, 4-20 mA Resolution: 12 bit Accuracy: Typ. $\pm 0.3\%$ FSR @ 25°C Impedance: 40 k Ω (V)/504 ohm (C) |
| Configuration | Configurable input description, scaling, trigger delay, crit high/high/low/crit low alarm points |
| Analog Output | |
| Analog Output Description | 4 x analog outputs. Range is 0-5, 0-10VDC or 0-20, 4-20 mA Resolution: 12 bit Accuracy: Typ. $\pm 0.3\%$ FSR @ 25°C |

| | |
|--------------------------|--|
| Configuration | -- |
| Output Control | -- |
| Remote Management | |
| Remote Command | <ul style="list-style-type: none"> a. Add / edit / delete mobile phone groups, repeat time b. Query Operational / Authorizer / Forwarder mobile phone numbers c. Query digital input / digital output / analog input / analog output status d. Query health check e. On / Off output equipment / devices f. Acknowledgment |
| SMS Alert | |
| Phone Groups | <ul style="list-style-type: none"> a. 40 Operation Numbers b. 4 Authorized Numbers c. 8 Escalation Numbers d. Accepts International Phone Number format and supports Auto Roaming |
| Configurable SMS Message | <p>Digital Inputs, Digital Outputs: Alarm and Normal</p> <p>Analog Inputs, Analog Outputs: Crit low, Low, Normal, High and Crit High</p> |
| Auto Health Check | Programmable Daily or once a week health check |
| Time Stamp | SMS and Email sent and received with time stamps |

Table 3.1: Product Features

Physical Layout



Figure 3.1: FMGuard Front

| | Description | Comment |
|---|--------------------------|--|
| A | LCD Display, touchscreen | Shows the status of the device. See LCD Display for more information. |
| B | TX and RX | Modbus Transmit and Receive |
| C | S1 and S2 | Shows the status and possible errors of the device. See S1 and S2 function for more information. |
| D | Reset | Hold for 3 seconds to enter recovery mode Pressing reset will power reset the unit. |

Table 3.2: FMGuard Front, Parts Description

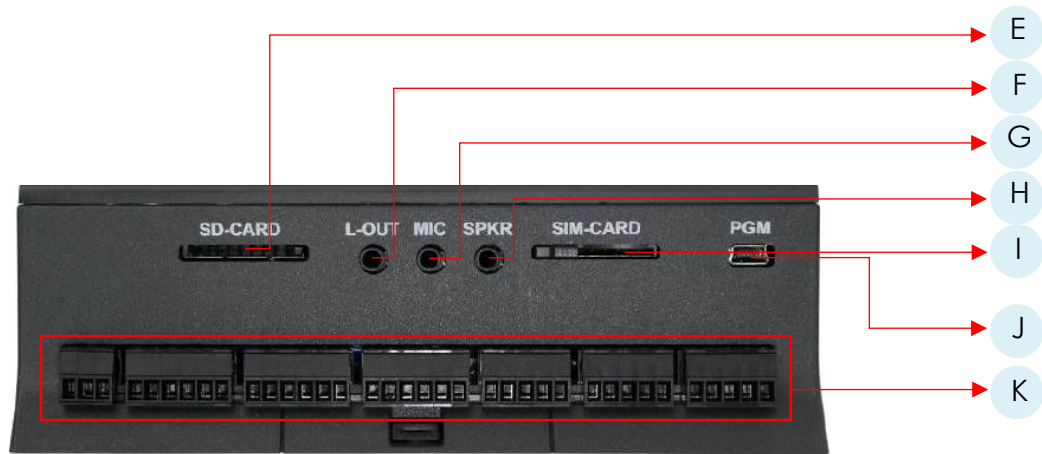


Figure 3.2: FMGuard Bottom

| | Description | Comment |
|---|-----------------|-----------------------------------|
| E | SD-Card | Used for data logging. |
| F | L-Out | <i>*not yet implemented</i> |
| G | Mic | <i>*not yet implemented</i> |
| H | SPKR | <i>*not yet implemented</i> |
| I | SIM-Card | Slot for SIM Card |
| J | PGM | <i>*developer's side only</i> |
| K | Terminal Blocks | Power, Input and Output Terminals |

Table 3.3: FMGuard Bottom, Parts Description



Figure 3.2: FMGuard Top

| | Description | Comment |
|---|-----------------|--|
| L | GSM | Antenna slot for GSM |
| M | WiFi/BT | <i>*not yet implemented</i> |
| N | USB | External storage or slot for GSM modem |
| O | ETH | RJ45 10/100Mbits |
| P | SER2 | <i>*not yet implemented</i> |
| Q | DIP | <i>*not yet implemented</i> |
| R | Terminal Blocks | Power, Input and Output Terminals |

Table 3.4: FMGuard Top, Parts Description

S1 and S2 Indicator Light Function

FMGuard has 2 indicator lights which shows the status and possible errors of the device.

Different blinking pattern is listed below as for your reference.

S1: System LED1 Pattern Overview

| Pattern | Description |
|--------------------------------------|---|
| Fast Blinking, green | The device is initializing, preparing to start the application. |
| Fast Blinking, green S2 On, green | The device is installing an update. Depending on the kind of update, it may take some time. The progress can also be observed on the display. |
| Fast blinking, green | The device has been forced to recovery mode with the use of the system switch. The application is not executing. |
| 500ms On / 500ms Off, green | The device is on RUN mode. |
| 1.5s On / 0.5 Off, green | The device is on RUN mode while charging the internal back-up battery. |
| Fast Blinking, red | Runtime Error. |
| Alternating Fast/Slow, red | The device lost its firmware. This can only happen if, during the firmware upgrade, FMGuard loses power or communication is lost completely. |
| 75ms On / 925ms Off, green | Execution speed is different from full-speed. |
| On yellow (All other LED's Off) | The device is booting, system initializing. |

Table 3.5: S1 LED Pattern

S2: System LED2 Pattern Overview

| Pattern | Description |
|--|--|
| Off | The GSM module is OFF. |
| 600ms On / 600ms Off, green | Missing SIM Card or PIN code. Network search and logon in progress. |
| 75ms On / 3s Off, green | Connected to a network. |
| 75ms On / 75ms Off / 75ms On / 3s Off, green | GPRS session is active. |
| Flashing green | GPRS on data transfer. |
| On green | Voice session active |
| On green (all other LED's off) | System booting. |
| On yellow (all other LED's off) | System booting on recovery mode. |
| On red (all other LED's off) | System booting on monitor mode. |
| 10s Off / 50ms On, green (all other LED's off) | Device is on low power mode. |

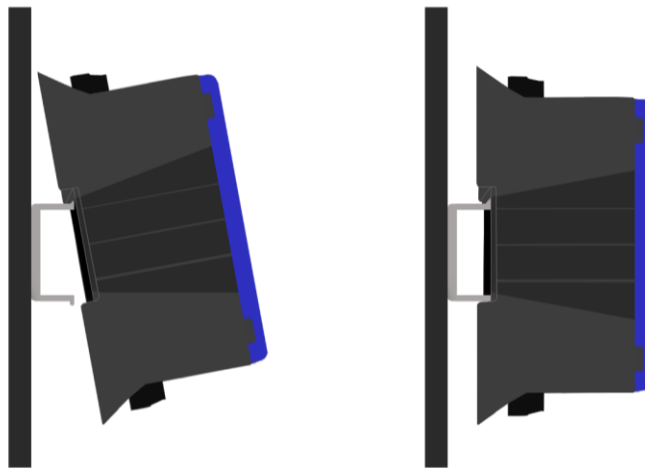
Table 3.6: S2 LED Pattern

CHAPTER 4: HARDWARE GUIDE

This section will guide you through the installation of your FMGuard. Follow the instructions here and you will have your FMGuard installed very quickly.

Mounting

Determine a suitable location for FMGuard. Mount FMGuard on a din-rail as illustrated below.



1 – Slide the top of FMGuard onto the din-rail

2 – Push the bottom of FMGuard onto the rail until the lock on the bottom clicked.

3 – Test if the device is properly mounted by trying to move it away from the din-rail, do not exert too much force on this test.

FMGUARD Installation

Step 1 - Determine a suitable location for FMGuard when selecting a location, remember that you will need to connect the power adapter, termination blocks and Ethernet cable, and have suitable GSM reception. Follow carefully the instructions provided earlier in this manual on the safe use of this device and the instructions above on mounting FMGuard on to the Din-Rail.

Step 2 – Insert a valid 3G or 2G Micro SIM card into the SIM card socket slot the bottom of FMGuard.

- Below shows the exact orientation of how the Micro SIM card should be inserted into the SIM card slot.
- Slide it in all the way until you feel it touching the end. Lock the SIM card by moving the mechanical lock to the right. To remove, move the mechanical lock to the left then gently press on the SIM card using a small slot head screwdriver.

Step 3 – Attach the antenna provided in the package onto the antenna socket. If an external antenna is required, contact your distributor for more information on external high gain antenna.



DC Input

FMGuard is supplied with 24VDC power adapter. If using user-supplied power supply, observe voltage polarity and voltage level. FMGuard operates on 24 VDC input but can accept supply voltage up to 36VDC. Do not exceed the recommended- input voltage, exceeding which will damage FMGuard.

Ethernet

The RJ-45 connector connects FMGuard to the computer or network using Cat5 UTP cable. For connection to a single PC, use a Ethernet cable supplied with the unit. A hub or Ethernet switch is not necessary for direct FMGuard to PC interface. FMGuard can be used as a standalone system, or connected to the local area network (LAN). A LAN connection gives greater flexibility as well as enabling FMGuard to work with other networking devices.

Antenna

This SMA connector interfaces the external antenna to the internal GSM modem of FMGuard. Choose suitable antenna for your installation. The SMA mount Antenna supplied, as standard accessory is the unity gain antenna. This antenna is suitable for most installation. If the location has low GSM signal strength, use high gain antenna or outdoor type. Check with your distributor for suitable antenna alternatives.

Reset Button

The button is located at the front side (lower right) of FMGuard, this button is a combined reset/diagnostic switch. It is necessary to use a small thin object with a diameter approximately 2mm for this purpose.

By activating the switch shortly, FMGuard will do a power reset, as if the power was removed and reapplied. If the reset switch is held down for approximately 3 seconds, the device will instead enter recovery mode and the application will not be restarted. In the recovery mode the system will automatically turn on the GSM module to establish connection to the GSM network and server gateway.

Pressing reset will also activate the device when in power down mode. If the external power is removed and the backup battery is disabled, the reset switch can still be used to boot into recovery mode, as long as there is enough power left in the battery.

Battery

FMGuard contains an internal Li-Ion battery for operation, even when the external power is absent making it possible to report power loss. Please note that when the external power is removed, the device will power down by default. This setting is can be changed on the LCD settings.

The analog outputs will automatically stop working when power failure occurs, the internal battery is not enough to power up or supply the voltage needed.

The battery charging is automatically by the system, leaving no need for user interaction.

The battery cycle (numbers of charges and discharges) also influences capacity. After 300 cycles the capacity has dropped to approximately 80% of initial capacity. Lifetime of the Lithium coin-cell in this state is 6+ years.

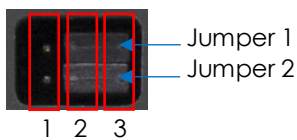
External Li-Ion Battery (Optional)

External battery connection is possible on the terminal block connectors on the top side. Jumpers located on the back side of the device is used to switch between the internal and external battery.

Note:

Only Lithium Ion batteries (3.7V nominal) are allowed as external battery, and both battery switching jumpers (jumper 1 and jumper 2) must be moved together. Mixing the jumpers in different positions may cause abnormal operation, and in worst case damage the battery/device.

Battery Selection Jumpers



| Jumper | Position | Used Battery |
|--------|----------|--|
| 1 | 1-2 | External battery (NTC temperature sensor) |
| | 2-3 | Internal battery (NTC temperature sensor, default) |
| 2 | 1-2 | External battery (positive terminal) |
| | 2-3 | Internal battery (positive terminal, default) |

Note:

The jumper pins are exposed, when not covered by the jumper. When mounting the device in the installation make sure that the jumper pins don't touch any metal surfaces. Covering the battery selection jumper opening after installation/selection of desired battery is advised.

WARNING!!!

Misusing the FMGuard may cause the built-in battery security circuit to be damaged.

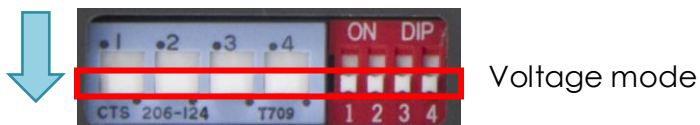
- Do not place the FMGuard device on high temperature locations such as in direct sunlight or near engines. Using the device in this harsh environment may result in loss of battery performance and a shortened life expectancy.
- Do not expose the device to water, salt water or allow the battery to get wet.
- Avoid strong impacts and shocks.

DIP SWITCH

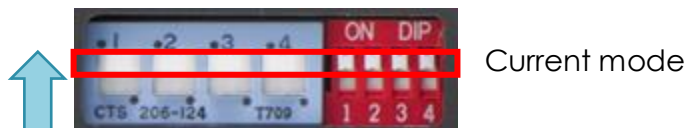


The DIP Switch located at the back of FMGuard is a mode selection switch for analog input and analog output. Both analog input and analog output operate on two modes: Voltage or Current mode.

The blue DIP switch is for the analog output while the red DIP switch is for the analog input.



The lower position of the DIP switch is for Voltage mode. The number above the blue DIP switch denotes the addressing of the analog output while the number below the red DIP switch denotes the addressing of the analog input. The voltage mode can be 0 - 5V or 0 - 10V, configurable on the user interface.



On the other hand, the upper position of the DIP switch is for the current mode. The current mode can be 0 - 20mA or 4 - 20mA, configurable on the user interface.

Terminal Blocks Signal Overview

| Group | Pin No. | Name | Description |
|-------|---------|------------|--|
| 1 | 1 | V+ | Power supply, positive (+) connection |
| | 2 | GND | Power ground, negative (-) connection |
| | 3 | GND | Power ground, negative (-) connection |
| 2 | 4 | V+ | Digital output isolated supply for the digital outputs 1-4 |
| | 5 | GND | Digital output isolated ground for the digital outputs 1-4 |
| | 6 | Y1 | Digital output 1 |
| | 7 | Y2 | Digital output 2 |
| | 8 | Y3 | Digital output 3 |
| | 9 | Y4 | Digital output 4 |
| | 3 | 10 | V+ |
| 11 | | GND | Digital output isolated ground for the digital outputs 5-8 |
| 12 | | Y5 | Digital output 5 |
| 13 | | Y6 | Digital output 6 |
| 14 | | Y7 | Digital output 7 |
| 15 | | Y8 | Digital output 8 |
| 4 | | 16 | S0 V+ |
| | 17 | GND | S0/digital input isolated ground / negative (-) terminal |
| | 18 | X1 | Digital input 1 / S0 input 1 / wake-up (ignition) input |
| | 19 | X2 | Digital input 2 / S0 input 2 |
| | 20 | X3 | Digital input 3 / S0 input 3 |
| | 21 | X4 | Digital input 4 / S0 input 4 |
| 5 | 22 | X5 | Digital input 5 |
| | 23 | X6 | Digital input 6 |
| | 24 | X7 | Digital input 7 |
| | 25 | X8 | Digital input 8 |
| | 26 | GND | Digital input isolated ground |
| 6 | 27 | GND | Analog ground |
| | 28 | AI1 | Analog input 1 |
| | 29 | AI2 | Analog input 2 |
| | 30 | AI3 | Analog input 3 |
| | 31 | AI4 | Analog input 4 |
| 7* | 32 | AO1 | Analog output 1 |
| | 33 | AO2 | Analog output 2 |
| | 34 | AO3 | Analog output 3 |
| | 35 | AO4 | Analog output 4 |
| | 36 | GND | Analog ground |
| 8* | 37 | CANH | CAN-Bus H-signal |
| | 38 | CANL | CAN-Bus L-signal |
| | 39 | GND | Signal ground |
| 9* | 40 | RS232-1 TX | Transmit data from serial port 1, RS232 compatible |
| | 41 | RS232-1 RX | Receive data from serial port 1, RS232 compatible |
| | 42 | RS232-GND | Signal ground |
| 10 | 43 | RS485-1 A | Modbus master non-inverting signal for RS485 port 1 |
| | 44 | RS485-1 B | Modbus master inverting signal for RS485 port 1 |

| | | | |
|------|----|----------------|--|
| | 45 | RS485-1 GND | Signal ground |
| 11* | 46 | RS485-2 A | Modbus slave non-inverting signal for RS485 port 1 |
| | 47 | RS485-2 B | Modbus slave inverting signal for RS485 port 1 |
| | 48 | RS485-2 GND | Signal ground |
| 12* | 49 | 1-WIRE | 1-wire bus for accessories such as ID-button/temperature sensors |
| | 50 | 1-WIRE LED | 1-wire ID-button LED |
| | 51 | GND | Signal ground |
| 13 | 52 | DC OUT | +5V / 300mA DC-OUT for external equipment (tied together internally) |
| | 53 | DC OUT | +5V / 300mA DC-OUT for external equipment (tied together internally) |
| | 54 | GND | Signal ground |
| 14** | 55 | XBAT+ | External battery positive (+) connection |
| | 56 | GND | External battery negative (-) connection |
| | 57 | XBAT NTC | External battery NTC temperature sensor connection |

* not yet implemented

**connector not supplied with the device.

Digital Inputs with S0

The eight digital inputs are all low-pass filtered (105 kHz) and transient-protected. The digital inputs are divided in two groups. Digital input X1-X4 can be configured as S0 input (IEC62053-31, Class A) by supplying the S0 circuit through the S0 V+ and digital input GND 1 terminal pins and enabling the S0 interface through the user application. When not supplied the inputs act as normal digital inputs. The digital inputs X5-X8 are normal digital inputs. To activate the normal digital inputs, connect a positive voltage between the corresponding input (X) and digital input GND on the corresponding terminal connector group.

The X1 can act as wakeup input sources.

S0 compliant inputs (IEC62053-31, Class A compatible)

In S0 configuration the relevant FMGuard input will act as a 'pulse input device', and a current is supplied into the input connector so that a simple switch between digital input GND 1 and the appropriate input will activate it. This is used in most electricity metering equipment.

Note:

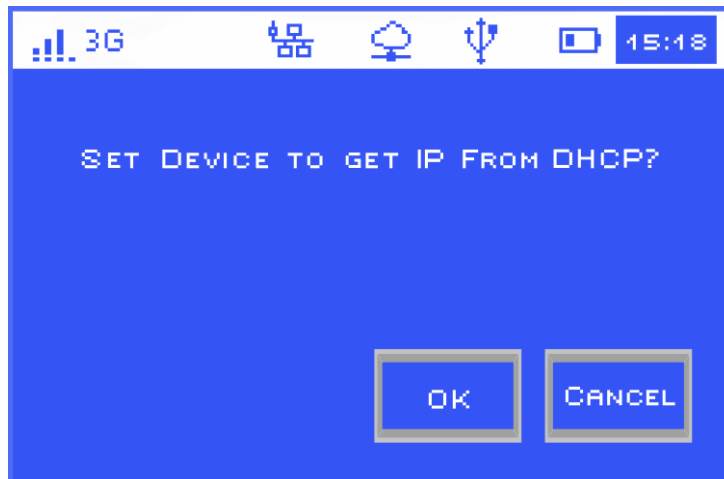
The S0 auxiliary supply input located on the terminal group 4 must be supplied with a minimum of 16 VDC for the S0 mode to work according to IEC62053-31, Class A. S0 must also be enabled from the application in order to work as an S0 compliant input. Digital input GND 1 and digital input GND 2 are isolated and not tied together internally.

LCD DISPLAY

The LCD display of FMGuard is a 240x160 pixel white on blue graphical display with built-in resistive touch sensing. A range of display functions are available for making graphical and alpha-numerical presentations of data and user interaction with menus.



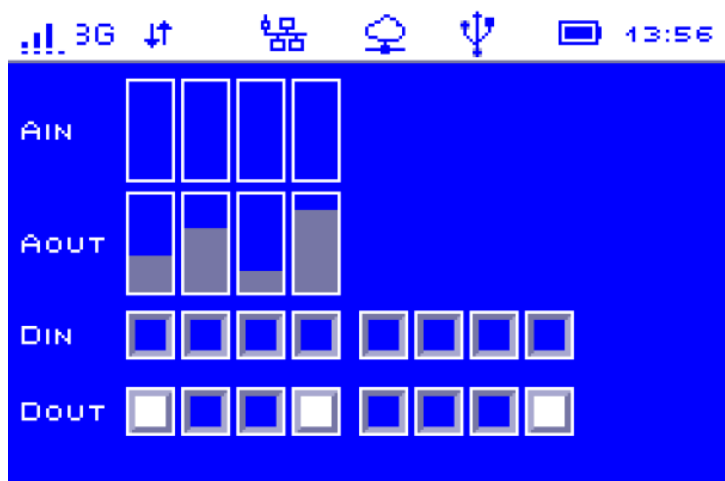
After loading, FMGuard will show the Device ID, IP address, Subnet Mask, Gateway, Button to enable DHCP, button to reset and lastly button to redirect on the main screen. Once you close this screen, you won't be able to access this setup anymore unless you restart your unit.



If you click DHCP a confirmation will pop up, afterwards the FMGuard IP address will be changed in accordance to the availability of IP on your network.



If you click the Reset a confirmation will pop, once you click ok the IP address of FMGuard will reset back to default (**192.168.1.10**)











Once you click Close you will be redirected to the home screen. The home screen is like a mini-mimic screen. You will be able to see the status of the built IOs. Once the Digital Input or Output was triggered, the box of the specific input or output will be filled with white color. Analog input and analog output are represented by a bar graph, depends on the value of analog, the graph will go up (high) and go down (low). Clicking the icon of a bar graph will show a more detailed information if it is enabled on the configuration settings.



The toolbar at the top of the touch screen are clickable. Once click an icon it will give you a detailed parameter of what it represents.

 3G GSM



| ICON | DESCRIPTION | ICON | DESCRIPTION |
|---|-----------------------------|---|--|
| | - GSM is OFF |  | - Data network connected |
|  | - GSM is ON |  | - Roaming ON |
|  | - Signal Strength |  | - Data network connected while roaming |
|  | - Connected to a 2G network |  | - Call active |
|  | - Connected to a 3G network | | |

STATUS – Tells if your SIM card is connected to the service provider.

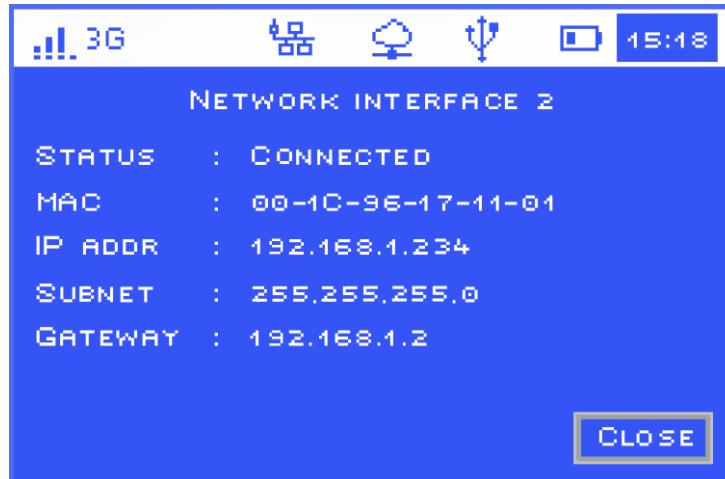
SIGNAL LEVEL – Measured value of signal in decibels.

NETWORK TYPE – Type of network you are currently connected (2G or 3G).

PROVIDER – PLMN mobile network code.



NETWORK INTERFACE



STATUS – Tells if your device is connected on internet or network

MAC – Mac Address of the device

IP ADDRESS – Preconfigure IP address of the device

SUBNET – Depends on the connectivity requirements and network technology employed on the device.

GATEWAY – The node in the network that uses IP protocol suite to serves as the forwarding host to other network when no other route specification matches the destination IP address of a packet.

| ICON | DESCRIPTION |
|------|---------------|
| | LAN OFF |
| | LAN ON |
| | LAN Connected |



GATEWAY STATUS





STATUS - Tells if your device is connected to a gateway.

GATEWAY – Server gateway IP address and port number.

NODE ID – Serial number of the device.

INTERFACE – Network connection type either ethernet or 3G.

| ICON | DESCRIPTION |
|---|---------------------|
| | Gateway not enabled |
|  | Gateway enabled |
|  | Gateway connected |

USB STATUS



For developing purposes only. Clicking this icon may show a dialog with the USB details, including the status of the host port and the USB programming cable.

BATTERY STATUS



BATTERY LEVEL – Ranges from 1-5 where 5 is fully charged

CHARGING – Tells if the battery is currently charging

RUN ON BATTERY – Battery will act during power interruptions without the device booting.

EXTERNAL SUPPLY – External supply that powers up the device during normal condition.

TEMPERATURE – The current temperature inside the device.

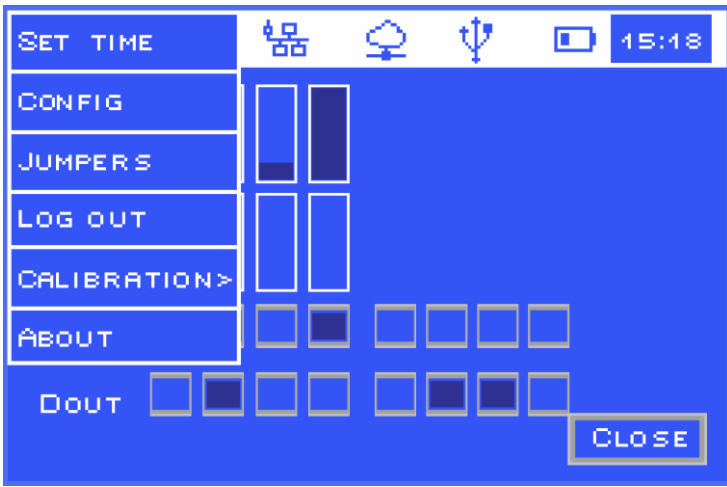
15:18

SETTINGS



The time on the upper right part of the LCD touchscreen is for the device settings. The blue highlights on the time actually means that you log on as an admin and can configure the settings. To log in typed in **RTCU** as password. To access the device settings, press the time on the status bar for more than 1 seconds and release.

A dialog box asking for the admin password appears. Take note that the password is case sensitive, and that the keyboard default is to lower case letters.



The device settings can be used to configure some properties for the device. Below are the settings you can change:

SET TIME – set the date and time on the LCD touchscreen.



CONFIG – set the device to use the internal battery during power outage. The configuration also has the setting to show the details of the input and output on the screen without logging in on the device and also the admin time-out.



JUMPERS – shows dialog for configuring virtual jumpers in the device.

LOG OUT – to log out on the device.

CALIBRATION – used to calibrate the contrast and accuracy of the LCD touchscreen.

ABOUT – details about the device (serial number, system firmware, runtime firmware, model and device version).

CHAPTER 5: SOFTWARE CONFIGURATION

Configuration of messages, phone groups etc are done using PC via ethernet port.

Alarm Triggering

An alarm event happens when any one or more digital and analog input changes state. FMGuard continuously monitor the input for these events. When an alarm event occurs, it picks up information from the configuration memory and performs the necessary SMS actions. In such event, all mobile phone numbers stored in the memory will receive the SMS notification.

The format of the message is:

```
[Date][Time] [Device ID] [Input Terminal Address]: [Input Description] ->
[Input Status] [(Alarm Description)]
```

Date and Time

The time of alarm event occurs. The real-time clock within FMGuard provides the time stamping information.

Device ID

The identity given by the user during the software configuration.

Input Terminal Address

The terminal address is where exactly the alarm is connected to the FMGuard such as X1, X2 or AI1 and AI2.

Input Description

The user defined input description during the software configuration. Commonly named after the device connected to the FMGuard.

Input Status

Status of the specified input, either OPEN or CLOSE (in digital) or the current value (in analog).

Alarm Description/Normalized Description

Configurable at the user interface, this depends highly on the state of the input. Each digital input has a unique input status text unlike analog who has preprogram input status.

Example of SMS alarm message

```
23/06/2018 18:27:33 (FMGuard) X1:Fire Alarm -> Open(Normal)
```

Upto 40 mobile phones can be alerted to. This group of phones numbers is known as operation phones.

Configuring the Device

FMGuard like Linkwise past products is a web – based product. Using any web-browser on the PC the user with administrative rights can access all the user configuration pages.

IP Address

Setup the device with RJ45 ethernet cable plugged onto the RJ45 socket of the device on one end and the other either to the network ethernet switch or directly to a PC.

FMGuard is can be either STATIC or Dynamic. Its default IP address is **192.168.1.10**.



Standalone Configuration: Static IP

An ethernet cable (provided with the FMGuard unit) is required to connect the FMGuard to a PC or laptop.

In order for the FMGuard and PC to connect to each other, the PC must be manually set to a static IP address that is within the same subnet as FMGuard. Given the default address 192.168.1.10 and 255.255.255.0 as subnet mask, a suitable address for the PC would be 192.168.1.2 or any other IP address other than 192.168.1.10.

WARNING!!!

Remember that you SHOULD NOT use the same IP address for your PC and FMGuard and both PC and FMGuard must be within same subnet.

If you are unsure on how to set the static IP address of your PC, please consult your PC operating system's documentation for details.

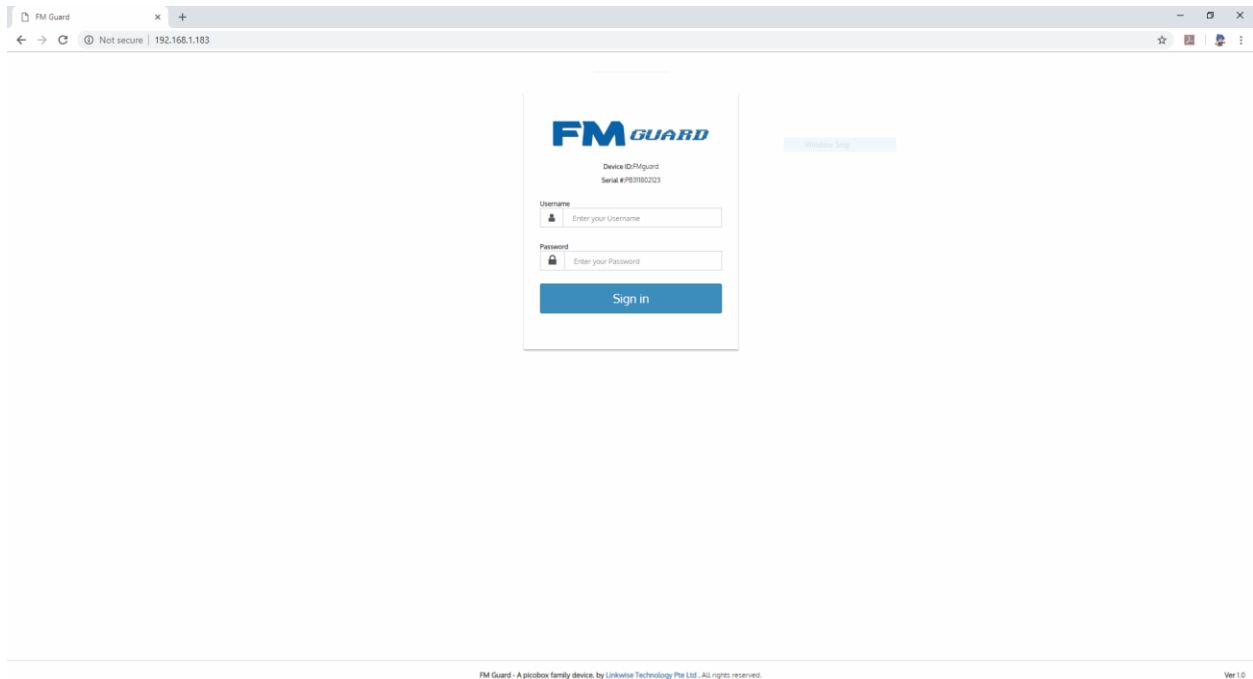
Accessing FMGuard Web Pages

Once the IP address of the PC has been configured, the user can set up the device using the PC browser. The PC IP address must be in the same network range as the device.

Open any web browser application on your PC. It can be Internet Explorer (version 6 above) Firefox, Safari, Netscape, Google Chrome or any standard web browser. At the address bar, type in the IP address of FMGuard (if you set the IP of FMGuard to dynamic, kindly check the IP address at the LCD of the device) and press enter, the Log in page should then loaded.

CHAPTER 6: LOG-IN PAGE

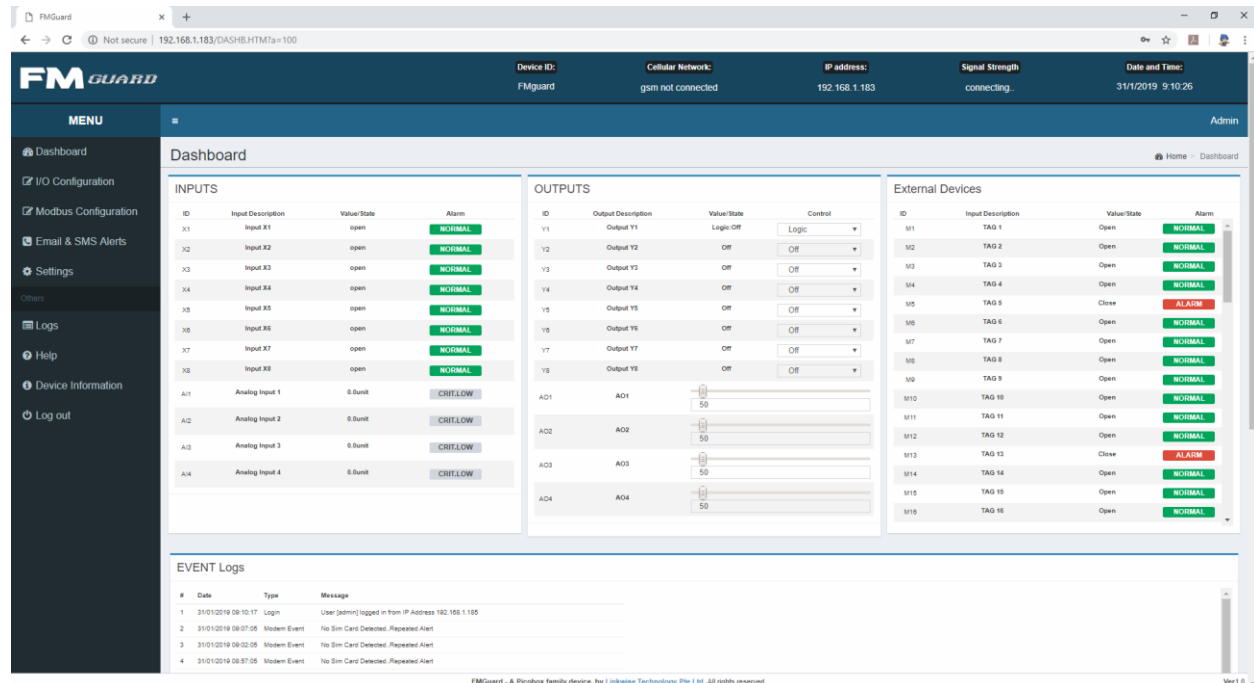
Enter the username and password on the textbox. The default user name and password for administrator is admin. Guest user's username and password is guest. Only the administrator has the right to change the password on the settings of user interface.



Follow through the various pages to setup the parameters according to the user's requirements.

CHAPTER 7: DASHBOARD PAGE

Once the user successfully logs in, the dashboard page appears. In a new unconfigured unit, the status page shows all preset information about the input and output states.



The top of the page contains the device information such as Cellular Network, Signal Strength, IP Address and Date and Time. Navigation to the other pages is located at the left side of the UI page. You can minimize the navigation panel by clicking the three parallel line icon besides it. The dashboard also shows the status of the external devices connected to the FMGuard via RS485-1 terminal (Modbus). It also shows the event logs located at the bottom of the page.

In a configured device, the status of all input and output channels are displayed in this page. Any change in the input and output will automatically updated live.

Digital Input (X)

This table shows the tags under digital input, its input description, value/state and the alarm state.

Input Description

These fields display what has been typed into the description field of digital input on IO Configuration page.

Value/State

The field displays the status of each equipment connected to FMGuard, either open or close.

Alarm/Control

For digital input this field will display what has been typed into the open/close fields of digital input located at the IO configuration page.

Analog Input (AI)

This field displays the AI descriptions and their perspective values. It also indicates whether the values are within low alarm or high alarm range, depending on the IO Configuration.

Description

These fields display what has been typed into the description field of analog input on IO Configuration page.

Value/State

Displays the computed value of the sensors attached at the analog terminals of FMGuard.

Alarm/Control

For analog input, this field will display Normal when the reading is within the normal range. High (alarm) when reading rises the preset High Alarm and Low (alarm) when reading falls to the preset Low Alarm.

Digital Output (Y)

This field displays the digital output descriptions. The status of the digital output displays either "ON" (the contact of the digital output is closed), "OFF" (the contact of the digital output is open), or "Logic" (the digital output is controlled by logical expression).

Description

These fields display what has been typed into the description field of digital output on IO configuration page.

Value/State

This field is a drop-down menu wherein the user can choose to make the digital output turn ON or OFF manually or automatically by using logic expressions.

Alarm/Control

For digital output this field will display either ON (the contact of the digital output is close), OFF (the contact of the digital output is open) or Logic controlled.

CHAPTER 8: I/O CONFIGURATION PAGE

Click on the I/O Configuration button on the navigation panel located at the left part of the user interface. Explanation is provided whenever is necessary.

Digital Input

Once you clicked the IO configuration page you will be directed to this page. This page shows the template for defining digital input description as well as the status. Each input can assume 2 states, one is when the input contact is closed and another when the input contact is opened. The administrator is free to define the labels according to the device characteristics.

Each digital alarm input has a set of variables for the user to enter. Following is the description of each field that the user can identify and configure. FMGuard has 8 digital inputs, X1-X8.

The screenshot displays the FMGuard I/O Configuration page. At the top, there is a status bar with fields for Device ID (FMguard), Cellular Network (gsm not connected), IP address (192.168.1.183), Signal Strength (connecting), and Date and Time (31/12/2019 9:11:5). Below this is a navigation menu with 'I/O Configuration' selected. The main content area is titled 'Digital Inputs' and contains a table with 8 rows, each representing a digital input (X1 to X8). Each row has the following fields: ID, Input Description (Max 40 characters), Open Status (Max 15 characters), Trigger Delay Close/Open (0.2-30.0 sec), Close Status (Max 15 characters), Trigger Delay Open/Close (0.2-30.0 sec), and Alarm State. The 'Input Description' field is a text input with 'Input X1' entered. The 'Open Status' field is a dropdown menu with 'open' selected. The 'Trigger Delay' and 'Close Status' fields are text inputs with '0.200' and 'close' entered respectively. The 'Alarm State' field is a dropdown menu with 'Close' selected. Below the table, there are checkboxes for 'OPERATION GROUP' (A, B, C, D, E, F) and 'SEND SMS TO ALL' and 'SEND EMAILS'.

Input Description: This field is for the user to provide meaningful name for the point to be monitored. The description can be up to 40 characters long.

Open Status: This field describes the state of the input when the contact is an open state. It can be of any wordings up to 15 characters long. Examples are *Alarm*, *Normal*, *Start*, *Stop*, *System Reset*, *Fault* etc.

Trigger Delay Close -> Open: A unique feature of FMGuard allowing user to define a valid input change time. This is used to delay a triggering from close to open until the input is stabilized. The time delay is can be set between 0.2-30 sec, where in 0.2s is the default delay.

Close Status: This field describes the state of the input when the contact is a close state. It can be of any wordings up to 15 characters long. Examples are *Alarm, Normal, Start, Stop, System Reset, Fault etc.*

Trigger Delay Open -> Close: A unique feature of FMGuard allowing user to define a valid input change time. This is used to delay a triggering from open to close until the input is stabilized. The time delay is can be set between 0.2-30 sec, where in 0.2s is the default delay.

Alarm State: Three possible settings can be selected – *None, Open, Close.* This setting defines what the alarm state is. The status page will show the state of the input, based on the state description configured.

Operation Group: Check box to allow SMS to be sent to Operation group A-F when digital input changes state. Check the send emails if you want to receive notification via email.

Analog Input

There are 4 analog input channels on FMGuard which can be interface to any industrial standard transmitter. FMGuard accepted voltage and current signal, (please see the DIP Switch to configure the type of signal), 0-20mA, 4-20mA, 0-5V, 0-10V. FMGuard can monitor *temperature, humidity, pressure, voltage, power etc.,* which will be sent by the transmitters connected to it. Please refer to the transmitter manufacturer specification for help in inputting the fields in this page.

The screenshot shows the FMGuard web interface for I/O Configuration. The top navigation bar includes the FMGuard logo and status information: Device ID (FMguard), Cellular Network (gsm not connected), IP address (192.168.1.183), Signal Strength (connecting), and Date and Time (31/1/2019 9:11:25). The main content area is titled 'I/O Configuration' and has tabs for Digital Inputs, Analog Inputs (selected), Digital Outputs, Modbus Discrete Inputs, and Modbus Input Register. Under 'Analog Inputs', there is a table with the following columns: ID, Description, Unit, Min, Max, Hysteresis, Offset Value, Critical Low, Low Alarm, High Alarm, and Critical High. Four rows are visible, each representing an analog input channel (AI1 to AI4). Each row has a dropdown menu for 'Analog Input Range' (set to 4-20mA) and a 'SWITCH STATUS UP' indicator. Below the table, there are checkboxes for 'OPERATION GROUP' (A-F) and 'SEND SMS TO ALL' and 'SEND EMAILS'. A note at the bottom of each row states: '*Please check the DIP switch located on the backside of the device for the toggling of the Analog Input Range.'

Unit: Input the unit for the analog input.

Engineering Value (min): The lowest possible value that the sensor can read, please refer to the transmitter manufacturer specification.

Engineering Value (max): The highest possible value that the sensor can read, please refer to the transmitter manufacturer specification.

Hysteresis: Set the minimal change required to revert from Critical High / High / Low / Critical Low alarm state.

Offset Value: Used to calibrate the raw value signal from the transmitter. You can add or subtract constant value to the raw value and FMGuard will show you the computed value on the dashboard.

Set Points: FMGuard has 4 setpoints for the analog input, *Critical Low, Low, High and Critical High*. Each setpoints are set to notify the users every time the signal passes or lowers the setpoints.

Note:

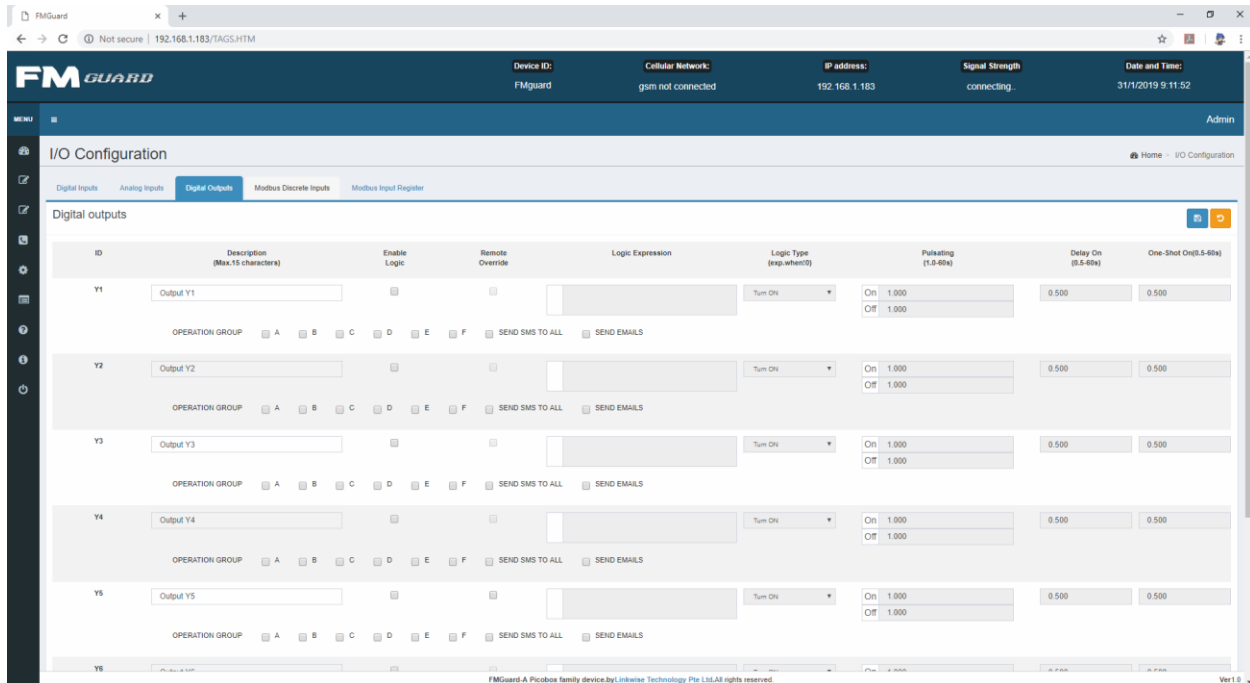
Set the Hysteresis to prevent the transmitter from flickering between two states.

WARNING!!!

If the user input any values that are out of range, FMGuard will not allow the user to save any configuration. The user must re-enter the correct values to avoid this.

Digital Output

FMGuard has 8 digital outputs. These outputs can be turn ON, OFF or PULSE ON remotely via SMS. It can also be controlled from locally or remotely from the dashboard of user interface (web access).



The user can create a description for each output of up to 20 characters long. Each output should have a unique description – they should not be identical. Each of them has their own set of settings.



Enable Logic: When enabled, FMGuard will evaluate the logic expression and perform necessary action.

Remote Override: When enabled the users with privilege will have the rights to turn ON and OFF digital output remotely via text.

Logic Expression: Logical expression to turn ON or OFF an output. The Logic expression has a built-in calculator shown at the left for easy typing.

Logic Type: Select the type of output when logic expression is true.

- ON – Turn ON the output when logic expression is true.
- Pulsating – The output will turn ON and OFF when logic expression is true. The frequency of pulse will depend on the configure setting.

- c. Delay On – The output will turn ON after “X” time has passed when the logic expression is true. The delay will depend on the configured setting.
- d. One-Shot – The output will immediately turn ON and will turn OFF depending on “X” time when the logic expression is true. The time will depend on the configured setting.

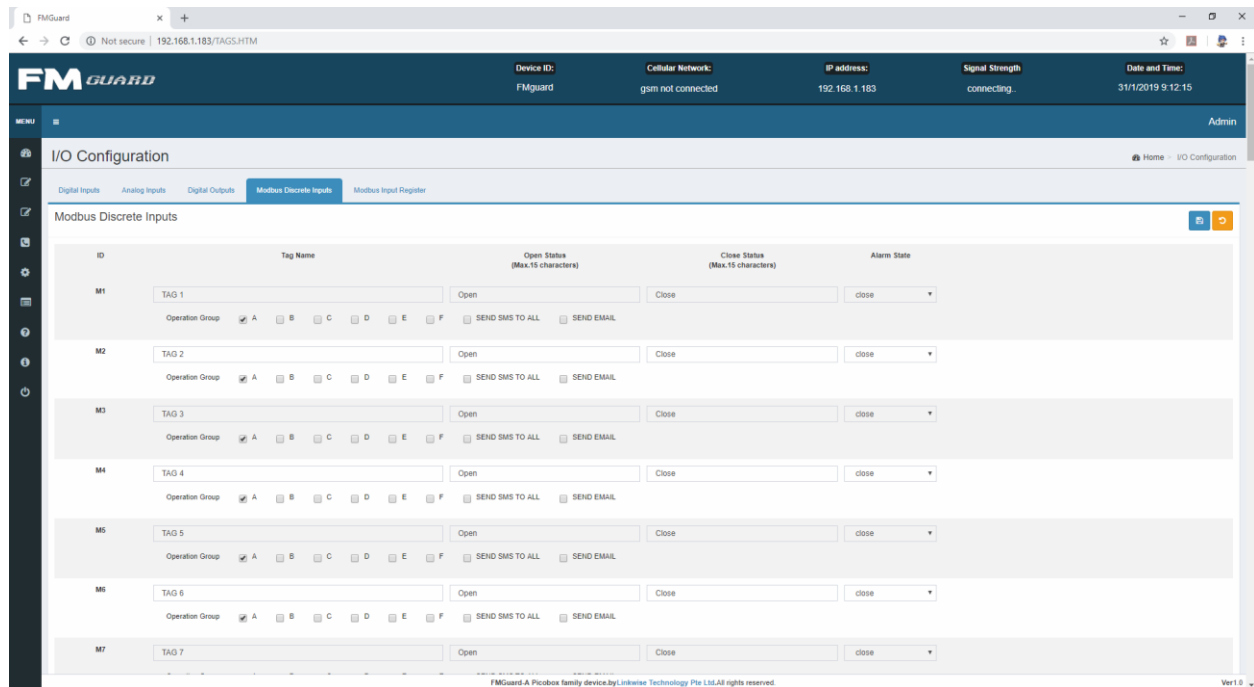
Remote Control Output using SMS

This feature enables user to switch any of the 4 output ON (contact close), OFF (contact open) by sending the appropriate ACTION SMS message on FMGuard unit. FMGuard is non-case sensitive the received action SMS messages. After performing the required action FMGuard replies to the sender with corresponding reply message.

Another way to control the digital output without going through the SMS is by clicking the output control section in the Dashboard.

Modbus Discrete Inputs

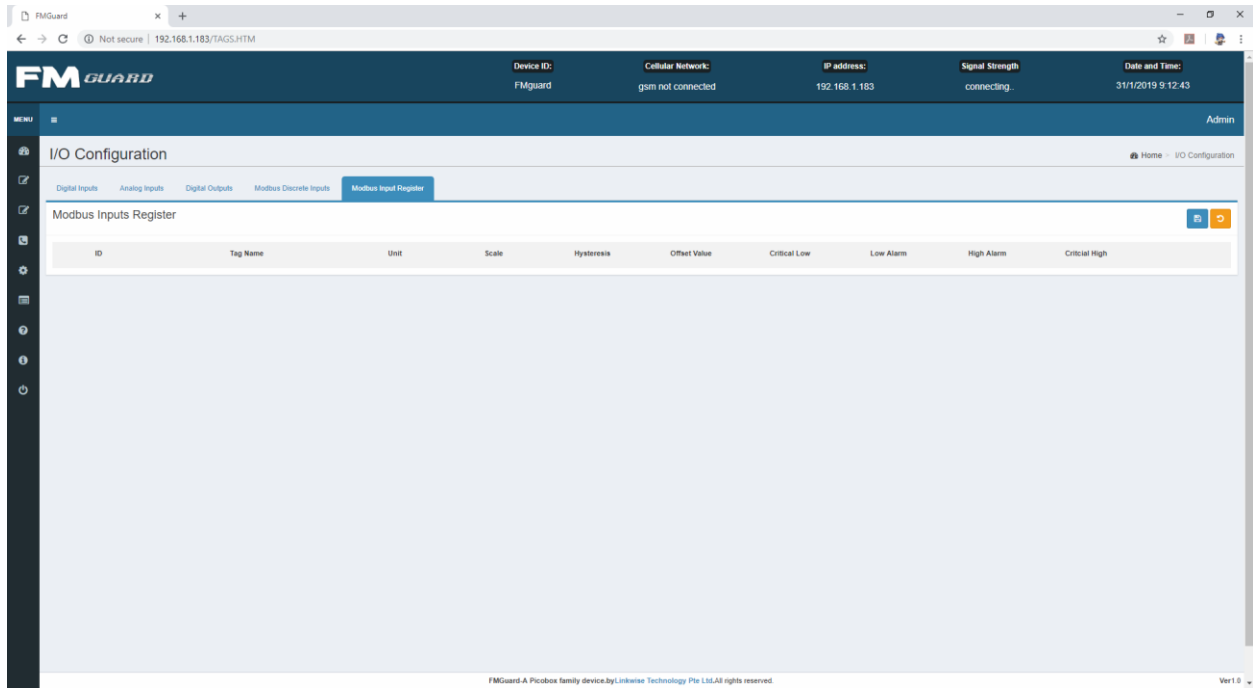
FMGuard is capable on expanding its monitoring points via RS485 Modbus. Modbus Discrete Input page is where you can configure your Picobox 16DI's tags. Same with the built-in digital input, Discrete Input has Input/Tag Name, Tag Status (Open/Close) and Alarm State.



Modbus discrete has same settings as digital input except for the triggering delay. Kindly refer to the Digital Input for more information.

Modbus Input Register

Aside from digital inputs, FMGuard has the capability to expand its analog input by using Picobox 8All via RS485 Modbus.



Modbus Input Register has same settings as Analog input. Kindly refer to the Digital Input for more information.

CHAPTER 9: MODBUS CONFIGURATION PAGE

Click on the Modbus Configuration button on the navigation panel located at the left part of the user interface. Explanation is provided whenever is necessary. Modbus of FMGuard has a capacity of 5 nodes, maximum of 64 monitoring points.

| ID | Modbus Type | Tag Name | Station | Tag Type | Tags Address | Parameterized |
|-------|-------------|-----------------|-----------------|---------------------------|-------------------|--------------------------|
| EXT1 | RTU | External Tag 1 | Enter Device ID | MODBUS DISCRETE INPUT(1x) | Enter Tag Address | <input type="checkbox"/> |
| EXT2 | RTU | External Tag 2 | Enter Device ID | MODBUS DISCRETE INPUT(1x) | Enter Tag Address | <input type="checkbox"/> |
| EXT3 | RTU | External Tag 3 | Enter Device ID | MODBUS DISCRETE INPUT(1x) | Enter Tag Address | <input type="checkbox"/> |
| EXT4 | RTU | External Tag 4 | Enter Device ID | MODBUS DISCRETE INPUT(1x) | Enter Tag Address | <input type="checkbox"/> |
| EXT5 | RTU | External Tag 5 | Enter Device ID | MODBUS DISCRETE INPUT(1x) | Enter Tag Address | <input type="checkbox"/> |
| EXT6 | RTU | External Tag 6 | Enter Device ID | MODBUS DISCRETE INPUT(1x) | Enter Tag Address | <input type="checkbox"/> |
| EXT7 | RTU | External Tag 7 | Enter Device ID | MODBUS DISCRETE INPUT(1x) | Enter Tag Address | <input type="checkbox"/> |
| EXT8 | RTU | External Tag 8 | Enter Device ID | MODBUS DISCRETE INPUT(1x) | Enter Tag Address | <input type="checkbox"/> |
| EXT9 | RTU | External Tag 9 | Enter Device ID | MODBUS DISCRETE INPUT(1x) | Enter Tag Address | <input type="checkbox"/> |
| EXT10 | RTU | External Tag 10 | Enter Device ID | MODBUS DISCRETE INPUT(1x) | Enter Tag Address | <input type="checkbox"/> |
| EXT11 | RTU | External Tag 11 | Enter Device ID | MODBUS DISCRETE INPUT(1x) | Enter Tag Address | <input type="checkbox"/> |
| EXT12 | RTU | External Tag 12 | Enter Device ID | MODBUS DISCRETE INPUT(1x) | Enter Tag Address | <input type="checkbox"/> |
| EXT13 | RTU | External Tag 13 | Enter Device ID | MODBUS DISCRETE INPUT(1x) | Enter Tag Address | <input type="checkbox"/> |
| EXT14 | RTU | External Tag 14 | Enter Device ID | MODBUS DISCRETE INPUT(1x) | Enter Tag Address | <input type="checkbox"/> |
| EXT15 | RTU | External Tag 15 | Enter Device ID | MODBUS DISCRETE INPUT(1x) | Enter Tag Address | <input type="checkbox"/> |
| EXT16 | RTU | External Tag 16 | Enter Device ID | MODBUS DISCRETE INPUT(1x) | Enter Tag Address | <input type="checkbox"/> |
| EXT17 | RTU | External Tag 17 | Enter Device ID | MODBUS DISCRETE INPUT(1x) | Enter Tag Address | <input type="checkbox"/> |
| EXT18 | RTU | External Tag 18 | Enter Device ID | MODBUS DISCRETE INPUT(1x) | Enter Tag Address | <input type="checkbox"/> |
| EXT19 | RTU | External Tag 19 | Enter Device ID | MODBUS DISCRETE INPUT(1x) | Enter Tag Address | <input type="checkbox"/> |
| FKT20 | RTU | External Tag 20 | Enter Device ID | MODBUS DISCRETE INPUT(1x) | Enter Tag Address | <input type="checkbox"/> |

The following steps are used to configure Modbus.

1. Configure the RTU settings. Please be reminded that FMGuard and any device integrated with it via Modbus should have the same RTU settings.

Baudrate – the rate of the data transferred through Modbus.

Parity – type of check bit used to detect error on data transmission.

Data Bits – Size of the data.

Stop Bit – basic error check to detect baud rate or byte length.

Polling Time Interval(ms) – a paused or break between polling of data.

Timeout(ms) – the time before FMG concludes that there is an error in communicating the device

2. Add Tags by filling the boxes below *Modbus Tags*. You can add up to 64 external tags.

Modbus Type – can be TCP/IP or RTU. As of firmware version 2.12, only Modbus RTU is available.

Tag Name – user can enter any convenient name for easy identification.

Station – also known as the device ID or the slave address. A unique address from 1 to 247.

Tag Type – Memory area on Modbus is divided into 4 basic areas. These areas are addressed absolutely.

| Memory Area | Function Code | Coil/Register Numbers | Register Type |
|-------------------------|---------------|-----------------------|----------------|
| Discrete Output (Coils) | 0x | 00001 - 9999 | Read and Write |
| Discrete Input | 1x | 10001 - 19999 | Read Only |
| Input Registers | 3x | 30001 - 39999 | Read Only |
| Holding Registers | 4x | 40001 - 49999 | Read and Write |

Tag Address – the specific register address of the data you need to poll

Paramitized – check if you want FMG to start polling data for the specific Modbus tag and make the register appear on the IO configuration.

CHAPTER 10: EMAIL AND SMS ALERTS

Click on the Email and SMS Alerts button on the navigation panel located at the left part of the user interface. Explanation is provided whenever is necessary. This page shows the phone groups, organized into 5 Operation group with 8 operational numbers each (total of 40), 2 groups of escalation group with 4 escalation numbers each (total of 8) and 4 authorize numbers. Click save for any changes to take effect. For each number, an optional name can be entered for easy identification of the contact person.

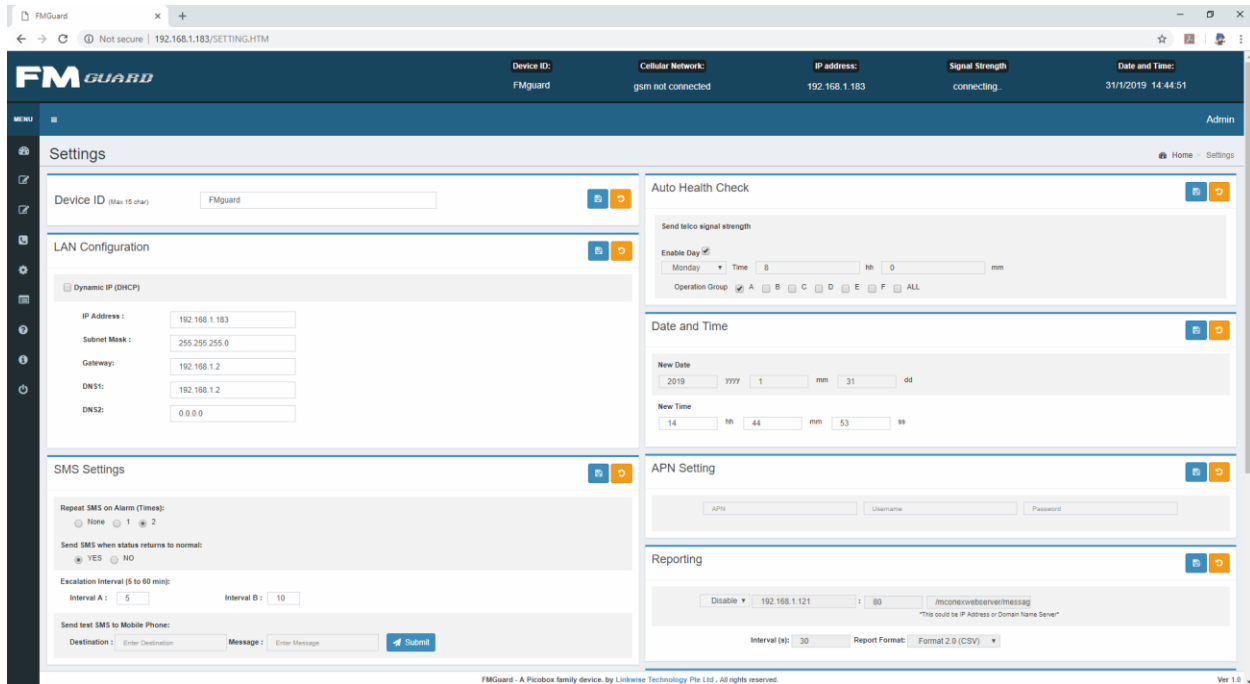
Operation Numbers (A-E): This group of users are those who will receive SMS alarm when one or more digital inputs are activated (open contact to close contact or vice versa), analog input is activated (normal to high vice versa or normal to low vice versa). Up to 40 mobile phone numbers can be assigned on this group. Phone numbers of up to 15 digits and (+) are valid formats. Example: 09123456789, +659123456789

Escalation Numbers: When alarm is triggered, escalation group timers are activated. If none of the operation numbers, who received the SMS prompt of FMGuard, respond an acknowledgement reply then when the escalation timer expires, the alarm message will be sent to escalation number(s). There are 8 escalation numbers with timer from 5-60 minutes. The timer will start after all repeat SMS alerts sent out.

Authorized Numbers: There are 4 authorized numbers in this group. They are the only group with administrator privileges. They are able to perform all remote commands available on FMGuard.

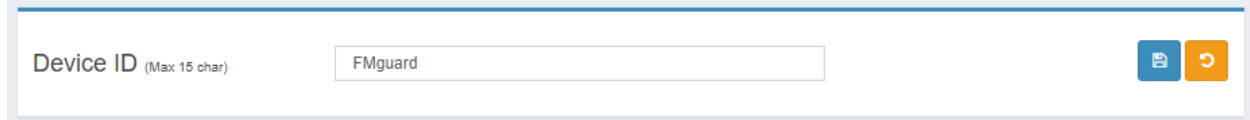
CHAPTER 11: SYSTEM CONFIGURATION

This page gives you administrator control over FMGuard.



Device ID

This entry is for the user to assign a unique name to FMGuard device. It accepts up to 15 alphanumeric characters. The device name will be in SMS notification along with other information when an alarm is triggered. It is advisable to change the Device ID according to the location or site name, as the user will know which location the SMS alert came from even if there was a change in the device's SIM card number.



LAN Configuration

This setting is self-explanatory. Care is to be exercised in setting IP address and subnet mask values. Incorrect IP address/ subnet mask setting will render FMGuard inaccessible from the network. Invalid IP/Subnet range will also cause FMGuard inaccessible to the network. FMGuard do have error tapping and will warn of any invalid settings. If for some reason, the tapping misses and the invalid values are accepted by the unit and cause network connection difficulties, contact your distributor for assistance.

LAN Configuration 📄 ↻

Dynamic IP (DHCP)

| | |
|---------------|--|
| IP Address : | <input type="text" value="192.168.1.183"/> |
| Subnet Mask : | <input type="text" value="255.255.255.0"/> |
| Gateway: | <input type="text" value="192.168.1.2"/> |
| DNS1: | <input type="text" value="192.168.1.2"/> |
| DNS2: | <input type="text" value="0.0.0.0"/> |

By checking the checkbox for DHCP the FMGuard will automatically connect to your network using this protocol during power up.

SMS Settings

FMGuard is an alarm monitoring system that prompts the user using SMS. The device can send 15 simultaneous alarms to the users.

SMS Settings 📄 ↻

Repeat SMS on Alarm (Times):
 None 1 2

Send SMS when status returns to normal:
 YES NO

Escalation Interval (5 to 60 min):
 Interval A : Interval B :

Send test SMS to Mobile Phone:
 Destination : Message : Submit

Repeat SMS on Alarm

If set, when an alarm is triggered, the SMS will be sent repeatedly according to the number of times specified. Choices are 1 & 2 times of repeated SMS. The sending of SMS will be cancelled when user reply with an acknowledge command.

Repeat Interval

Repeat SMS alerts has a fixed time interval of 5mins after sending out all alarm notification and 1st repeat SMS alerts. Repeat SMS alerts will not start if there are still alarm notification on que, FMGuard will continue to check if there are unsend alarm notification.

Once the system detects that there is no more unsend alarm notification, the system will start sending out 1st repeat SMS alerts after 5mins and then will send out the 2nd repeat SMS after another 5 mins.

If there are still unsend repeat SMS and yet another alarm occurs, repeat SMS alerts will automatically stops sending SMS to allow sending out SMS of a new alarm. New alarms has the highest priority on sending SMS.

Send SMS when Status Returns to Normal

If yes is selected, SMS will be sent once the status of IO changes from alarm to normal state. There is no repeat SMS for normalization SMS.

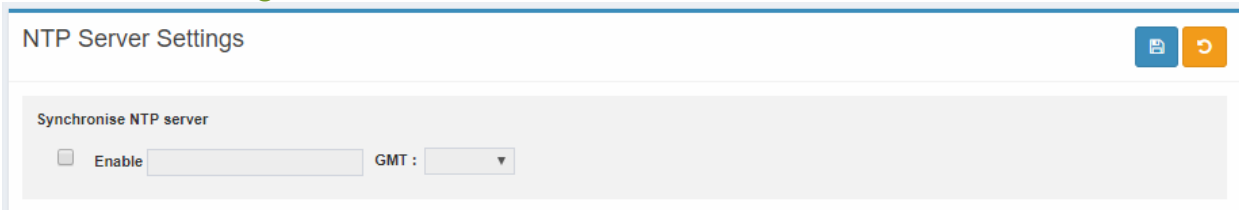
Escalation Interval

Escalation interval can be set between 5-60 mins per group.

Send test SMS to Mobile Phone

Use to test if the SIM card can send SMS.

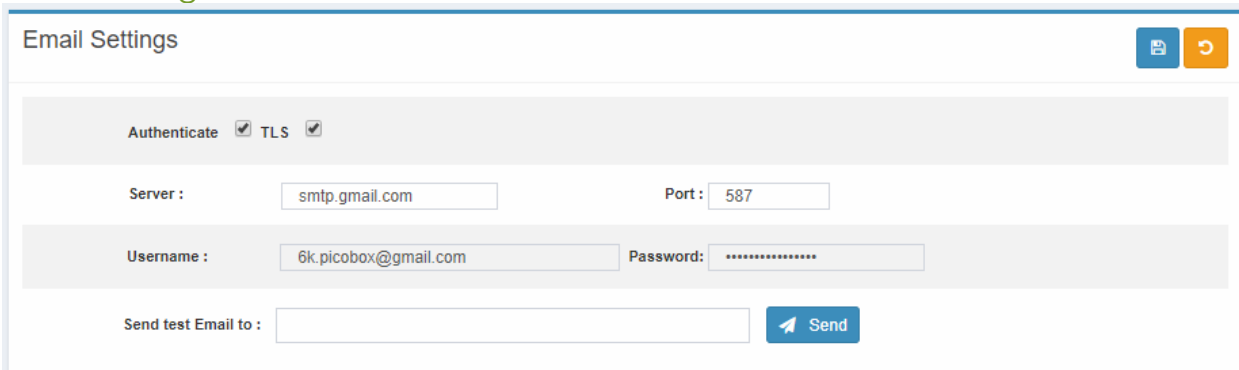
NTP Server Settings



The screenshot shows the 'NTP Server Settings' configuration page. At the top right, there are two buttons: a blue 'Save' button and an orange 'Refresh' button. Below the title bar, there is a section titled 'Synchronise NTP server'. This section contains an 'Enable' checkbox, which is currently unchecked. To the right of the checkbox is a text input field. Further right is a 'GMT:' label followed by a dropdown menu.

To enable time synchronization with an NTP server. Set the host IP address of the NTP server to be used. Select the GMT from the drop-down box and select the GMT of your country. The NTP will synchronize the time with the server that has a smaller number of strata.

Email Settings



The screenshot shows the 'Email Settings' configuration page. At the top right, there are two buttons: a blue 'Save' button and an orange 'Refresh' button. Below the title bar, there is a section titled 'Authenticate' with two checked checkboxes: 'Authenticate' and 'TLS'. Below this, there are two rows of input fields. The first row has 'Server :' followed by a text input field containing 'smtp.gmail.com' and 'Port :' followed by a text input field containing '587'. The second row has 'Username :' followed by a text input field containing '6k.picobox@gmail.com' and 'Password:' followed by a text input field containing a series of asterisks. At the bottom, there is a 'Send test Email to :' label followed by a text input field and a blue 'Send' button with a paper plane icon.

Authentication – Tick this box if your email needed authentication.

TLS – Tick this box if your email is encrypted.

Server – Outgoing server of your email provider.

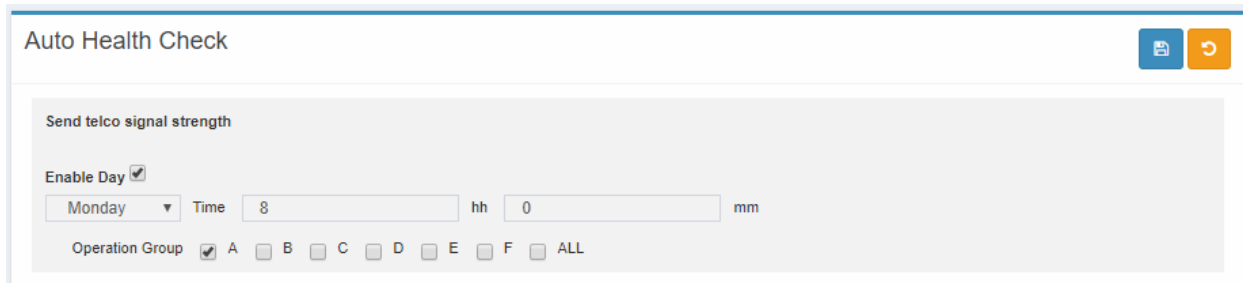
Port – The port to use, default for SMTP without encryption is port 25 (584 and 2525 are also used). For encrypted TLS usually, port 587.

Username – The log in credential to use when authenticating.

Password – The password credential to use when authenticating.

Send Test Email to – Input email address that you want to send test e-mail, then click send to see if you have fill up the correct settings. Be sure to save first the configuration before testing email.

Auto Health Check



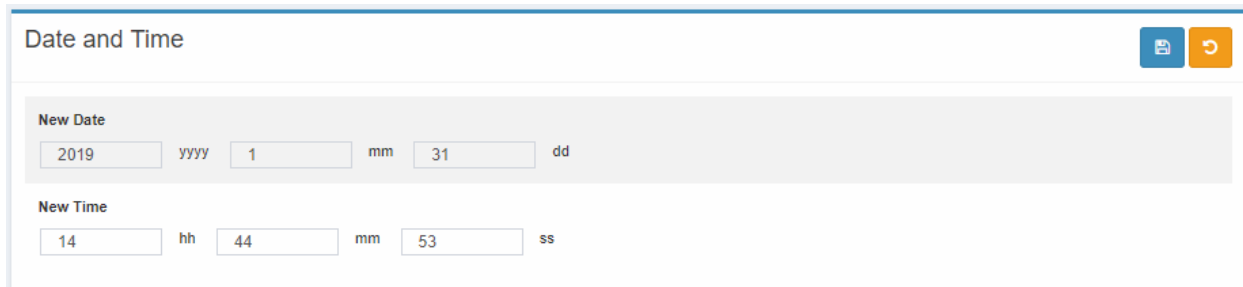
The screenshot shows the 'Auto Health Check' configuration window. It features a title bar with a save icon and a refresh icon. The main content area is titled 'Send telco signal strength' and includes the following controls:

- An 'Enable Day' checkbox that is checked.
- A dropdown menu for the day, currently set to 'Monday'.
- Time input fields: 'Time' is set to '8', 'hh' is set to '0', and 'mm' is empty.
- An 'Operation Group' section with radio buttons for 'A', 'B', 'C', 'D', 'E', 'F', and 'ALL'. 'A' is selected.

This feature will automatically send reports to the users depend on the set day and time to the appointed operation phone group.

Send Telco Signal Strength – Send telco signal strength on the preset day and time.

Date and Time

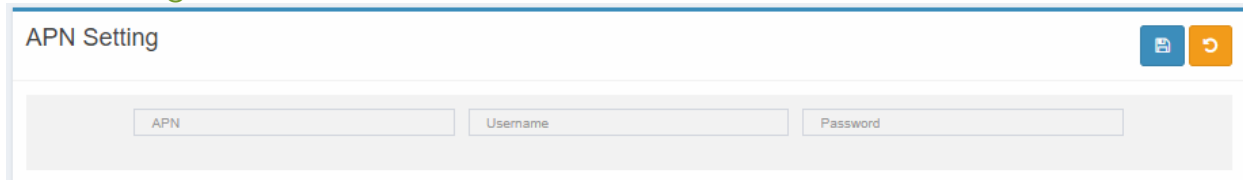


The screenshot shows the 'Date and Time' configuration window. It features a title bar with a save icon and a refresh icon. The main content area is titled 'New Date' and includes the following controls:

- 'New Date' section with input fields for 'yyyy' (2019), 'mm' (1), and 'dd' (31).
- 'New Time' section with input fields for 'hh' (14), 'mm' (44), and 'ss' (53).

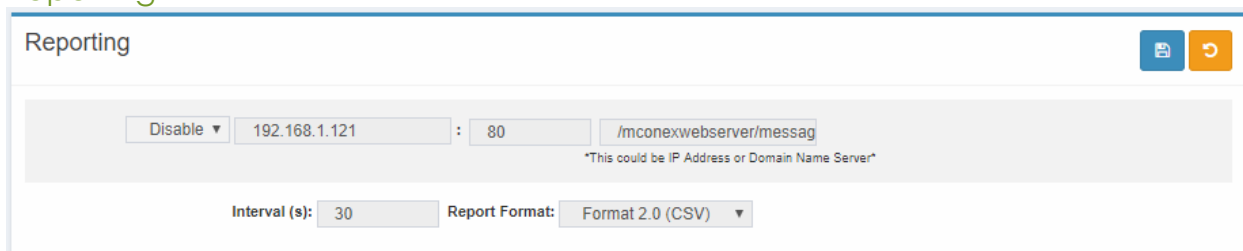
Enter the new date and time in this field. This setting is for the time stamp of events of FMGuard. Date and time information is also present at the SMS notification when alarm is triggered.

APN Settings



An Access Point Name (APN) is the name of a gateway between a GSM, GPRS, 3G or 4G mobile network and another computer network, frequently the public Internet. A mobile device making a data connection must be configured with an APN to present to the carrier.

Reporting

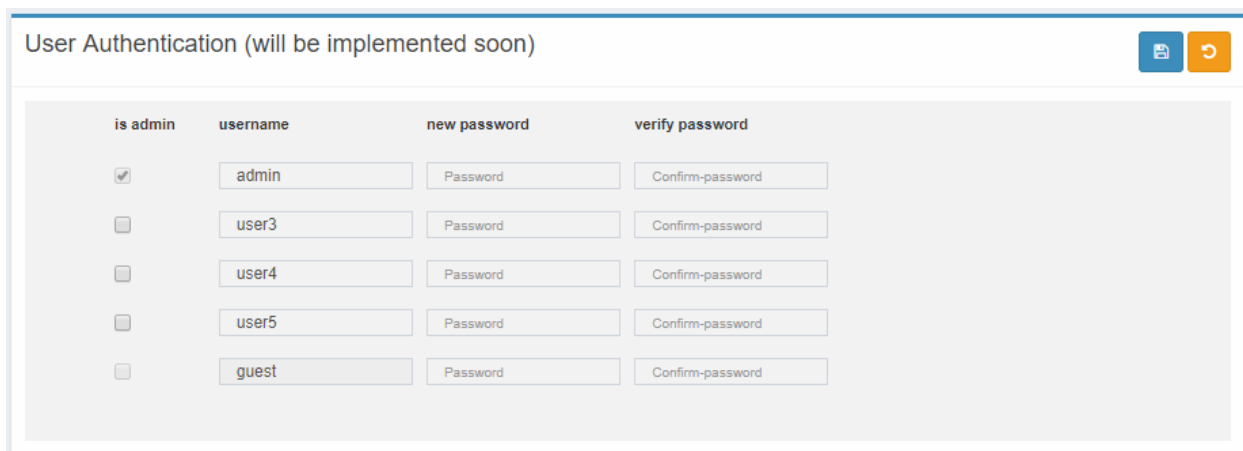


FMGuard can push reports to remote servers. Each report contains current status information of each tags recorded on the unit. The report format is in easy to parse text format, the format is available on request from Linkwise Technology. FMGuard has 4 formats of report: *CSV*, *URL encoded Form*, *JSON* and *XML*.

Currently FMGuard does not yet support the mobile data connection. Connect you FMGuard to an ethernet network with internet to enable this feature.

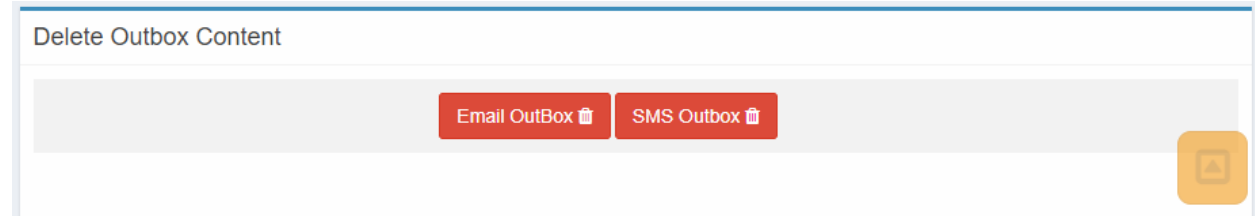
User Authentication

Used to change the username and password. Upto 5 users can be register.



| is admin | username | new password | verify password |
|-------------------------------------|----------|--------------|------------------|
| <input checked="" type="checkbox"/> | admin | Password | Confirm-password |
| <input type="checkbox"/> | user3 | Password | Confirm-password |
| <input type="checkbox"/> | user4 | Password | Confirm-password |
| <input type="checkbox"/> | user5 | Password | Confirm-password |
| <input type="checkbox"/> | guest | Password | Confirm-password |

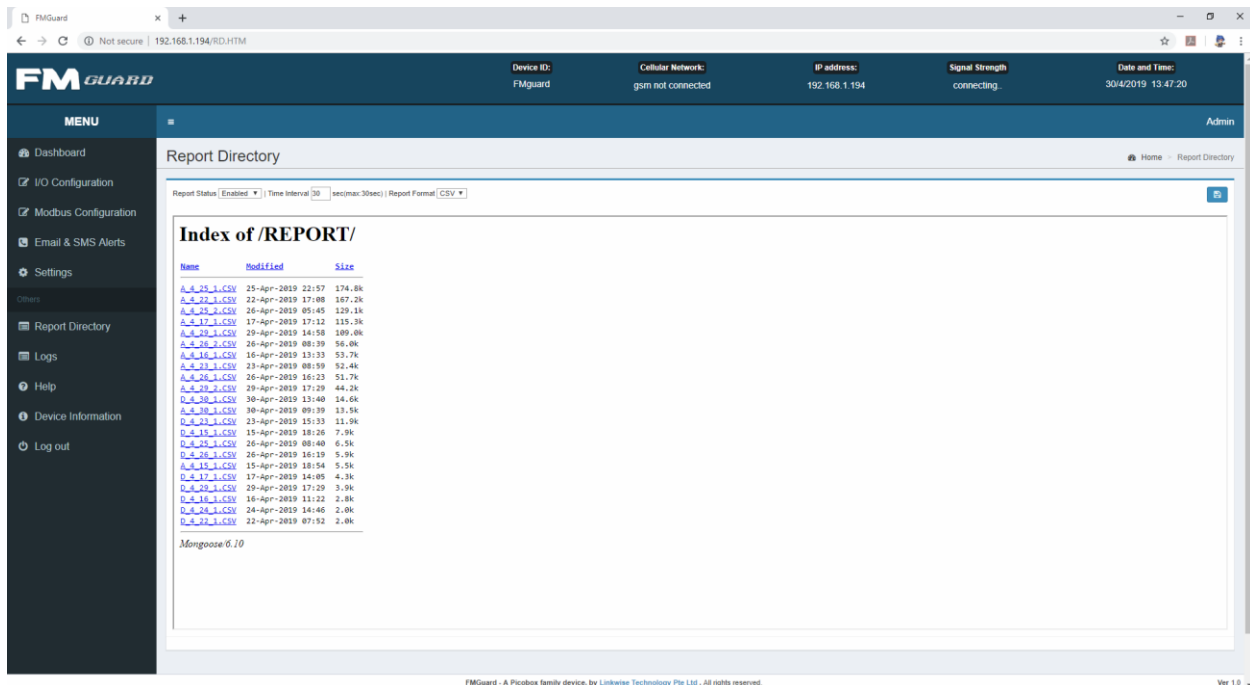
Delete Outbox Content



Delete the outbox messages of email and SMS.

CHAPTER 12: REPORT DIRECTORY

This page records data over time and acts as a data logger. The memory capacity is dependent to the size of the memory card inserted to the FMG.



Report Status – used to enable and disable the data logger function

Time Interval – the time paused between recording data.

Report Format – the file format you wished to use in saving the data logger. Currently only CSV is available.

Under Index of /REPORT/ click the file you wish to save.

Name – a generated name for the data log files.

Modified – the date and time the file was last modified.

Size – the file size.

Data logger has auto deleted function when the size of the files exceeded the designated memory. The order of deleting is first in first out.

CHAPTER 13: LOGS

This page has all of the events occur on FMGuard. It has maximum of 500 entries first in first out. It has search function for easy access.

Logs can be saved manually by clicking either the CSV button and XML button (format depends on the button).

The screenshot shows the FMGuard web interface. At the top, there is a navigation bar with the following information: Device ID: FMguard, Cellular Network: gsm not connected, IP address: 192.168.1.163, Signal Strength: connecting..., and Date and Time: 3/1/2019 15:56:45. Below this is a 'MENU' sidebar with 'Logs' selected. The main content area is titled 'Logs' and contains a table of events. The table has columns for ID, Date and Time, Event, and Details. The events listed include IO State Change, SMS Sent, and IO State Change for various tags (M08, M01, M16, X8). At the bottom of the page, there is a footer that reads 'FMGuard - A Picobox family device, by Linkwise Technology Pte Ltd. All rights reserved. Ver 1.0'.

| ID | Date and Time | Event | Details |
|-----|-------------------|-----------------|---|
| 180 | 3/1/2019 17:21:08 | IO State Change | X1 Input X1->open(Normal) |
| 181 | 3/1/2019 17:21:08 | IO State Change | X1 Input X1->open(Normal) |
| 182 | 3/1/2019 17:20:22 | Sms Sent | +339455233960.D-A-1.3/1/2019 17:20:12 (FMguard), M08 TAG B-> Close(Alarm) Repeated alarm:2 |
| 183 | 3/1/2019 17:20:17 | Sms Sent | +339455233960.D-A-1.3/1/2019 17:20:11 (FMguard), M01 TAG B-> Close(Alarm) Repeated alarm:2 |
| 184 | 3/1/2019 17:20:07 | Sms Sent | +339455233960.D-A-1.3/1/2019 17:20:01 (FMguard), X1 Input X1->close(Alarm) Repeated alarm:2 |
| 185 | 3/1/2019 17:17:26 | Sms Sent | +339455233960.D-A-1.3/1/2019 17:17:11 (FMguard), M08 TAG B-> Close(Alarm) Repeated alarm:1 |
| 186 | 3/1/2019 17:17:21 | Sms Sent | +339455233960.D-A-1.3/1/2019 17:17:11 (FMguard), M01 TAG B-> Close(Alarm) Repeated alarm:1 |
| 187 | 3/1/2019 17:17:16 | Sms Sent | +339455233960.D-A-1.3/1/2019 17:17:01 (FMguard), X1 Input X1->close(Alarm) Repeated alarm:1 |
| 188 | 3/1/2019 17:17:11 | Sms Sent | +339455233960.D-A-1.3/1/2019 17:16:51 (FMguard), M08 TAG B-> Close(Alarm) |
| 189 | 3/1/2019 17:17:06 | Sms Sent | +339455233960.D-A-1.3/1/2019 17:16:51 (FMguard), M01 TAG B-> Close(Alarm) |
| 190 | 3/1/2019 17:17:01 | Sms Sent | +339455233960.D-A-1.3/1/2019 17:16:50 (FMguard), X1 Input X1->close(Alarm) |
| 191 | 3/1/2019 17:16:56 | Sms Sent | +339455233960.D-A-1.3/1/2019 17:16:43 (FMguard), M16 TAG B-> Open(Normal) |
| 192 | 3/1/2019 17:16:52 | IO State Change | M08 TAG B-> Close(Alarm) |
| 193 | 3/1/2019 17:16:51 | IO State Change | M01 TAG B-> Close(Alarm) |
| 194 | 3/1/2019 17:16:51 | Sms Sent | +339455233960.D-A-1.3/1/2019 17:16:43 (FMguard), M08 TAG B-> Open(Normal) |
| 195 | 3/1/2019 17:16:50 | IO State Change | X1 Input X1->close(Alarm) |
| 196 | 3/1/2019 17:16:48 | Sms Sent | +339455233960.D-A-1.3/1/2019 17:16:40 (FMguard), X8 Input X8->open(Normal) |
| 197 | 3/1/2019 17:16:44 | IO State Change | M16 TAG B-> Open(Normal) |
| 198 | 3/1/2019 17:16:43 | IO State Change | M08 TAG B-> Open(Normal) |
| 199 | 3/1/2019 17:16:41 | IO State Change | X8 Input X8->open(Normal) |
| 200 | 3/1/2019 17:16:10 | Sms Sent | +339455233960.D-A-1.3/1/2019 17:15:58 (FMguard), M16 TAG B-> Close(Alarm) Repeated alarm:2 |

CHAPTER 13: HELP

FMGuard allows a number of important functions to be accessed and controlled remotely via SMS by the listed operation and authorized mobile phones. The two categories of users (Operation and Authorizer) have specific rights in the use of various remote-control functions. This page summarizes each function and rights.

Two important arguments are used in conjunction with the action commands. #RD is a query while #SET is an argument.

Example: #RD-ALL is to query the device to read all tags.

#SET-Y1=ON is used to turn on Y1 of the device.

Note:

If a command sent to FMGuard does not match the required format or is invalid, FMGuard will response "INVALID PARAMETERS" and no action is taken by it. Any unauthorized mobile phones that tried to query a status or do a set command will be disregard and no action will be taken.

IO Command

Operation and authorized users can query the status of Inputs/outputs. While the Authorized users can control the output. FMGuard will reply the current state of the Input and Output status using the respective commands.

| Description | Format | Sample Command | Remarks | Rights | |
|----------------|---|--|--|-----------|------------|
| | | | | Operation | Authorized |
| Query IOs | #RD-ALL | #RD-ALL | - | ✓ | ✓ |
| | #RD-X | #RD-X | - | ✓ | ✓ |
| | #RD-X(n) #RD-X(di_name) | #RD-X1 #RD-X-Door Access | n=digital input 1-8 di_name=digital input description | ✓ | ✓ |
| | #RD-AI | #RD-AI | - | ✓ | ✓ |
| | #RD-AI(n) #RD-AI(ai_name) | #RD-AI1 #RD-AI-Temperature | n=analog input 1-4 ai_name=analog input description | ✓ | ✓ |
| Output Control | #SET-Y(n)=ON #SET-Y- (do_name)=ON | #SET-Y1=ON #SET-Y-Light=ON | n=digital output 1-8 do_name=digital output description | X | ✓ |
| | #SET-Y(n)=OFF #SET-Y- (do_name)=OFF | #SET-Y1=OFF #SET-Y-Light=OFF | n=digital output 1-8 do_name=digital output description | X | ✓ |
| | #SET-AO(n)=N #SET-AO- (ao_name)=N | #SET-AO1=1953 #SET-AO-Servo Motor=1953 | n=analog output 1-8 N=Set value ao_name=digital output description | X | ✓ |

Acknowledgement

To cancel repeat sending or to avoid FMGuard to send escalation message, any mobile phone from the operation group must acknowledge to FMGuard by replying the acknowledge command (#ack). While system check is basically letting the user knows the current status of the unit anytime using the #syscheck command.

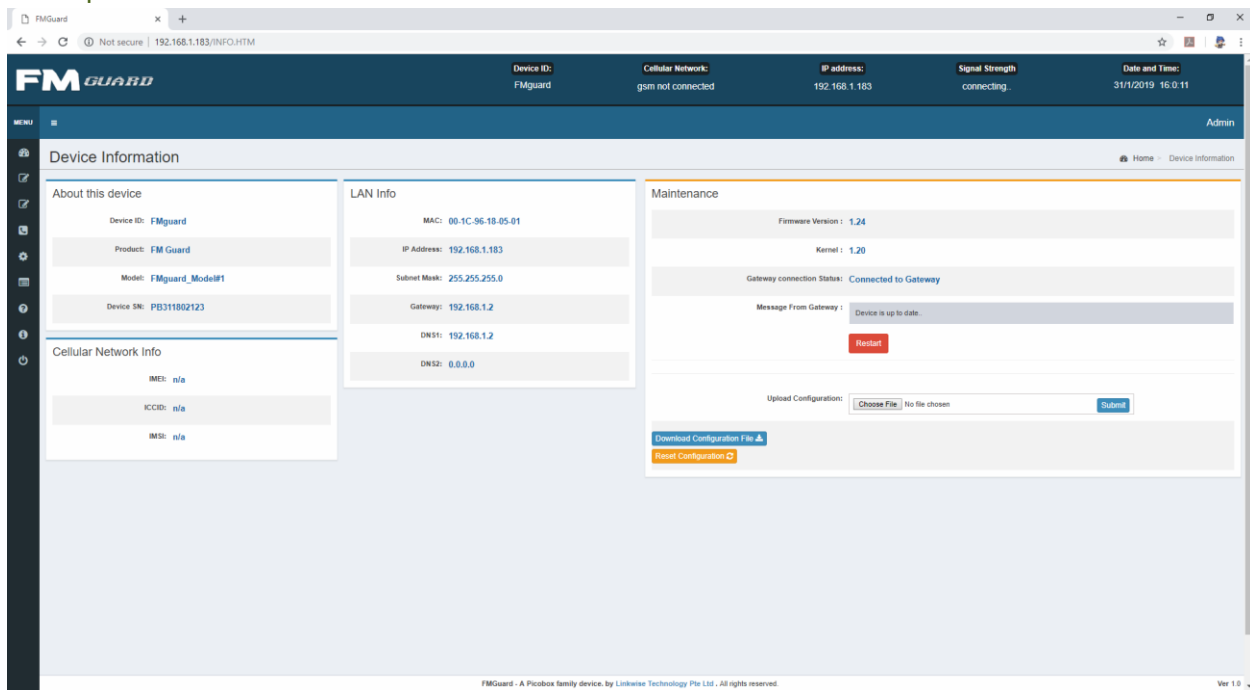
| Description | Format | Sample Command | Remarks | Rights | |
|---|------------|----------------|--|-----------|------------|
| | | | | Operation | Authorized |
| Acknowledge specific digital input alarm | #ACK-X(n) | #ACK-X1 | n=digital input 1 to 8 | ✓ | ✓ |
| analog input alarm | #ACK-AI(n) | #ACK-AI1 | n=analog input 1 to 4 | ✓ | ✓ |
| Acknowledge specific digital output alarm | #ACK-Y(n) | #ACK-Y1 | n=digital output 1 to 8 | ✓ | ✓ |
| Acknowledge specific digital output alarm | #ACK-AO(n) | #ACK-AO1 | n=analog output 1 to 4 | ✓ | ✓ |
| Acknowledge all alarms | #ACK | #ACK | - | ✓ | ✓ |
| System Check | #syscheck | #syscheck | Checking the current status of FMGuard | ✓ | ✓ |

Remote SMS command Benefits

With the remote command functionality above, it saves time and effort.

- Rather than having to physically go to the installation site with a notebook computer, the authorized personnel can check the current status of the devices and the equipment interfacing with it anywhere using their mobile phone. Where there are many installed sites this becomes very efficient.
- All these controls are just as simple by using the above remote command from anywhere using your mobile phone.

Chapter 14: Device Information



Device information page contains all necessary details for FMGuard such as the *Device ID*, *Product Name*, *Model*, *Serial Number*, *Cellular Network Info*, and *LAN information*.

FMGuard has a feature by which it automatically updates its firmware when connected to the internet. It will download the firmware and kernel if the gateway prompts the unit that it has new update. The device will then need to be repowered in order to install the downloaded kernel and firmware.

Gateway connection Status:

Connected to Gateway

: The device has successfully connected to the server

Not connected

: The device may not be connected to internet. Kindly check you ethernet port and cables

Message from Gateway:

Currently downloading New Update..

: FMGuard is requesting for the new firmware/kernel on the server.

transferring new update..

: FMGuard is currently downloading new firmware or kernel. Most bugs and errors are fixed after the update.

new kernel version update downloaded..

: FMGuard has finished downloading new kernel version.

new firmware update downloaded..

: FMGuard has finished downloading new firmware version

New Firmware update downloaded..Waiting for Reset..

: FMGuard is requesting for power cycle to install the new update.

New Kernel version update downloaded..Waiting for Reset..

: FMGuard is requesting for power cycle to install the new update.