

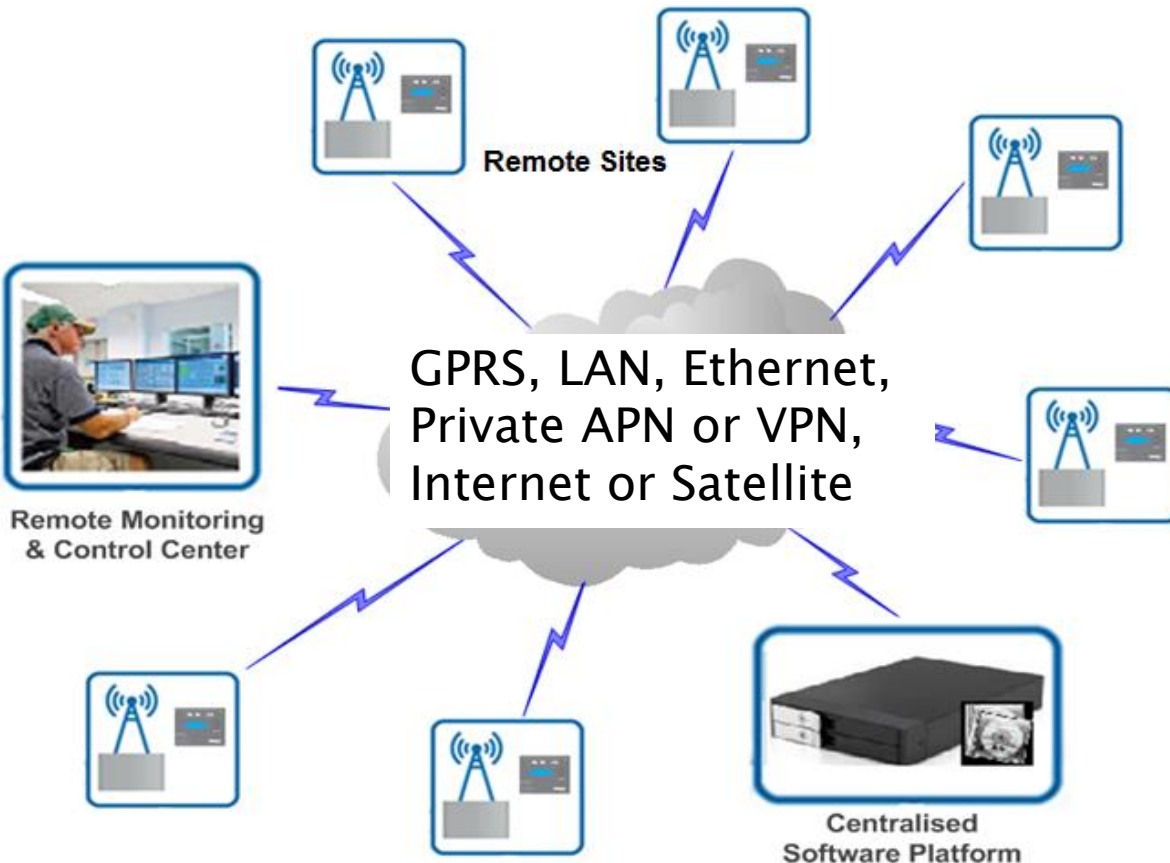


Your Solution for:

**Energy Smart Management
Real Time Power Monitoring
Fuel Theft Prevention**

Technical presentation

How it Works:



Site Controller Unit
Stand alone intelligent unit
deployed at each site



Real Time Software

Web-based software platform to gather data from site controllers, control site's equipment, analyze and produce reports... All data is stored into a SQL Server database and may be stored for unlimited duration

Your Data is Safe



▶ 100% Local Control:

- The Central Software can be deployed on a Windows Server on a Virtual Machine in customer's own server room
- MastMinder monitoring will operate entirely within customer's own environment (upon request, the central software can also Push SNMP Traps to existing SNMP management system)

▶ Safety of the Software:

- The system uses standard Microsoft security and has been approved during vulnerability software controls by sensitive companies such as Telecom operators, Banks, etc.

▶ Data Loss Prevention:

- Network failure is overcome by the site controller unit storing remotely data up to 1 week, and auto downloading on network return
- All data on SQL server database can be stored for an unlimited duration and is secured by regular backup



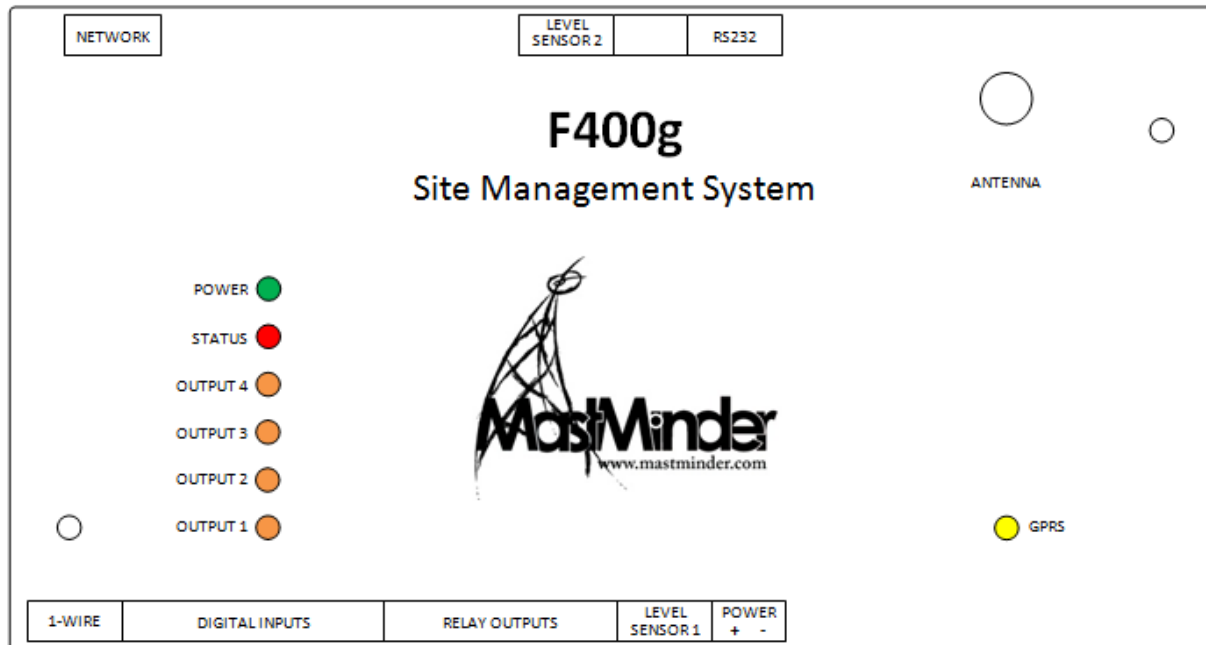
Site Controller Unit

- ▶ Real time data collection
- ▶ Remote control of local operations
- ▶ Safe access to authorised users only
- ▶ On board data storage for network failures
- ▶ Ethernet and/or cellular data backhaul
(either can be set as auto backup to the other)



Communication Protocols:

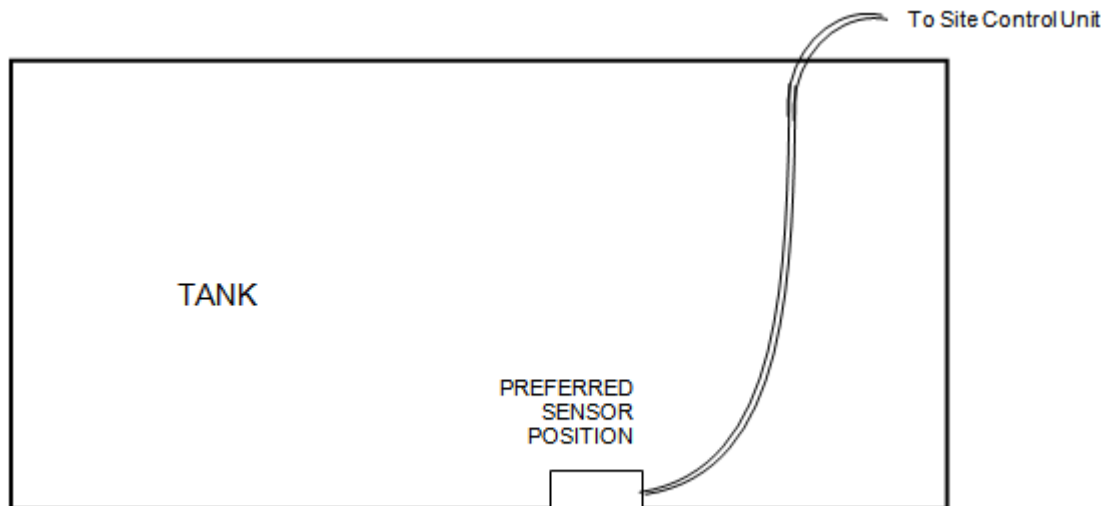
- SNMP
- RS232
- RS485
- 1-wire
- GPRS
- Ethernet
- 4-20mA
- Voltage
- Current
- Temperature
- Humidity
- Fuel level x 2
- Dry contact in
- Relay outputs
- Etc ...



Fuel Sensor



- ▶ Easily installed hydrostatic pressure sensor
- ▶ Configure to any size or shape tank
- ▶ Accuracy of $\pm 0.25\%$ full scale
- ▶ Various depth ranges
- ▶ Tamper alarm if disconnected
- ▶ Designed to withstand harsh environments
- ▶ Low power consumption, particularly suitable for use in battery-powered or remote applications



Typical installation:



Generator



Communication and Command:

- ▶ RS232 available to most generator control panels
- ▶ RS485 available to most generator control panels
- ▶ Dry contact inputs available for Alarm inputs

Typically :

- Generator running
- Generator on load
- Common alarm ... etc

- ▶ Relay output contacts available for control

Typically :

- Test start generator
- Reset fault condition
- Force AUTO mode
- Reset maintenance alarm

Generator Communication options

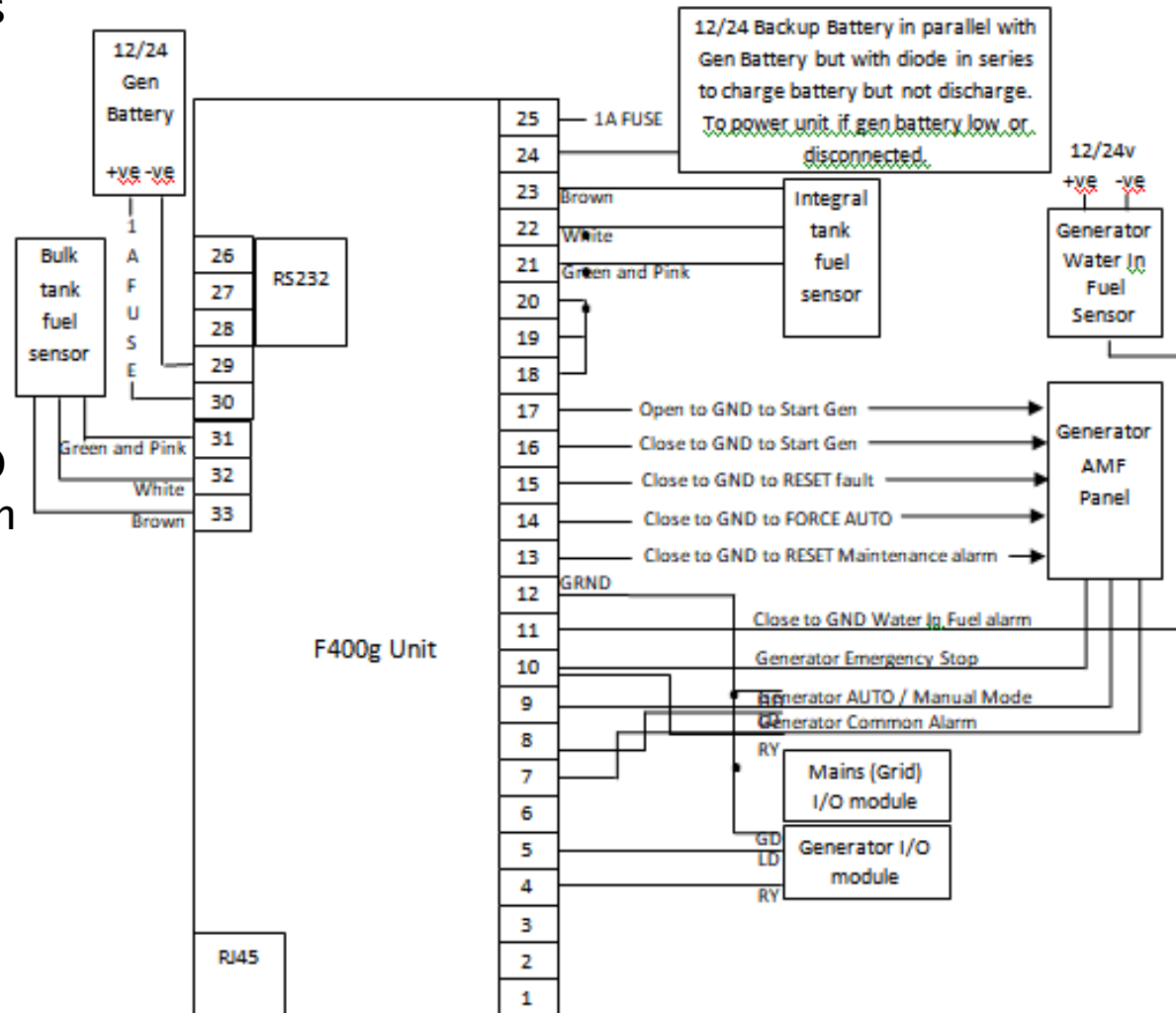


- ▶ **To monitor generator running:**
 - Via RS232 or RS485 or
 - Generator control panel dry contact output
 - Via MastMinder Generator Interface Unit to measure voltage on phase
- ▶ **To monitor generator on load:**
 - Via RS232 or RS485 or
 - Generator control panel dry contact output
 - Via auxiliary dry contacts on Automatic Transfer Switch
- ▶ **To monitor generator Common Alarm:**
 - Via RS232 or RS485 or
 - Generator control panel dry contact output
- ▶ **To control generator:**
 - Via RS232 or RS485 or MastMinder relay output contacts

Typical wiring diagram



- ▶ Power supply 12 to 48 volts
- ▶ Backup battery option
- ▶ One or two fuel tanks
- ▶ One or two generators
- ▶ Water in fuel sensor
- ▶ Generator running sensor
- ▶ Generator on load sensor
- ▶ Relay to control gen start
- ▶ Relay to control fault reset
- ▶ Relay to control force AUTO
- ▶ Relay to control maint alarm
- ▶ Further inputs available for:
 - AC Voltage sensors
 - AC Current sensors
 - DC Voltage sensors
 - DC Current sensors
 - Temperature sensors
 - Humidity sensors
 - etc ...



Site communications

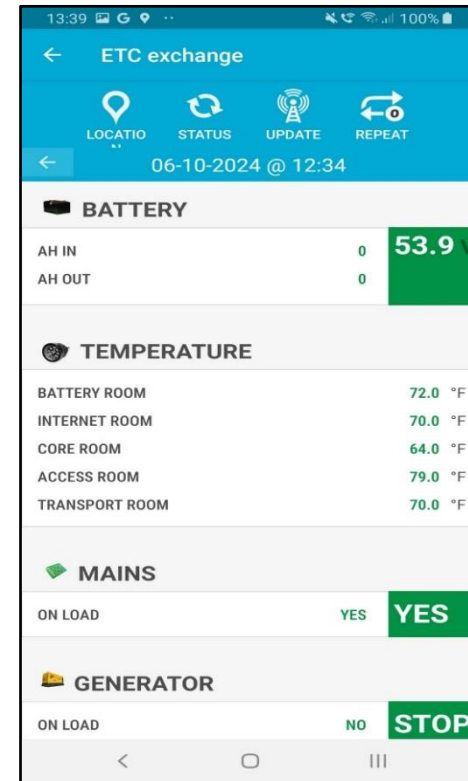
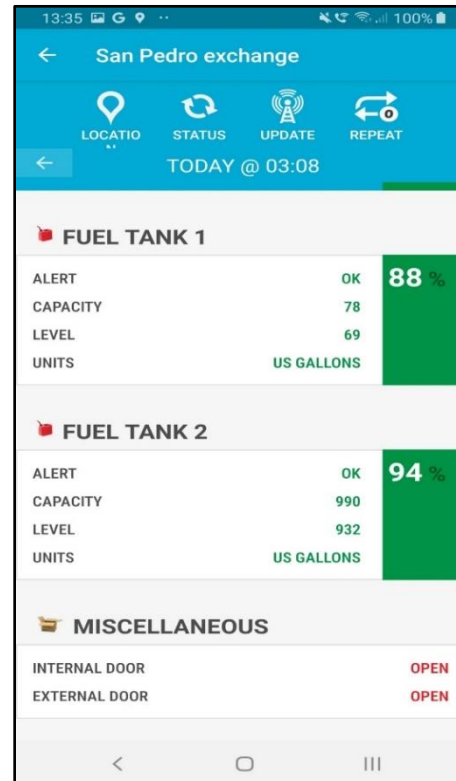
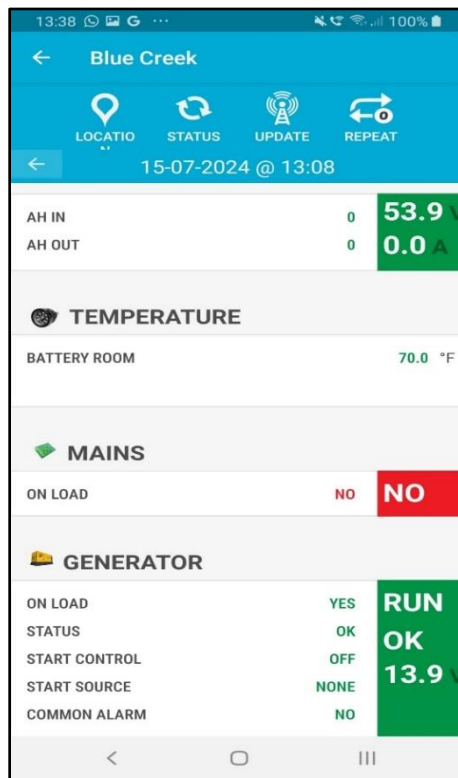
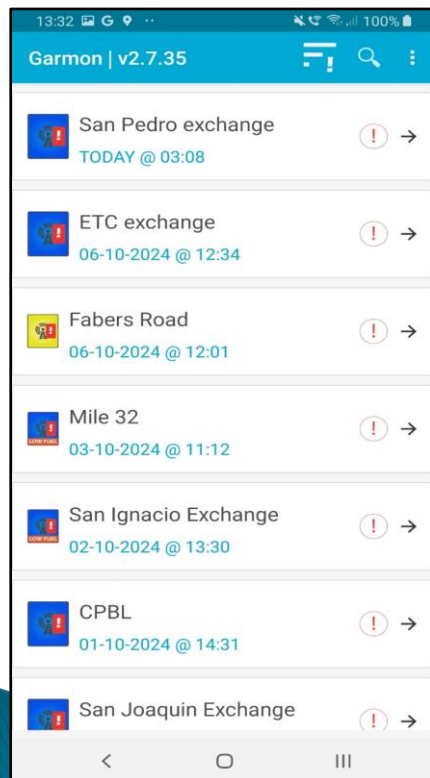


- ▶ **Site Communications to server:**
 - GPRS
 - Ethernet
 - SMS
 - Satellite
- ▶ **Alerts are sent via :**
 - Mobile App
 - SMS
 - Emails
 - “North bound interface” to send SNMP Trap to up to two different Third-Party management systems (for example, “Assure1” and / or “SolarWinds” NMS)

The Mobile App



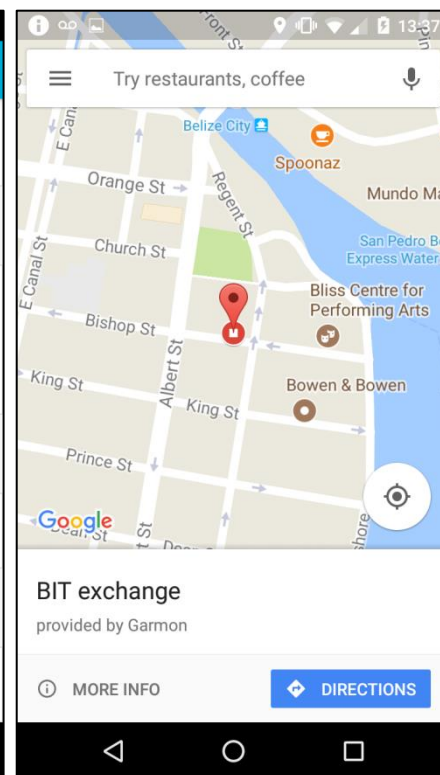
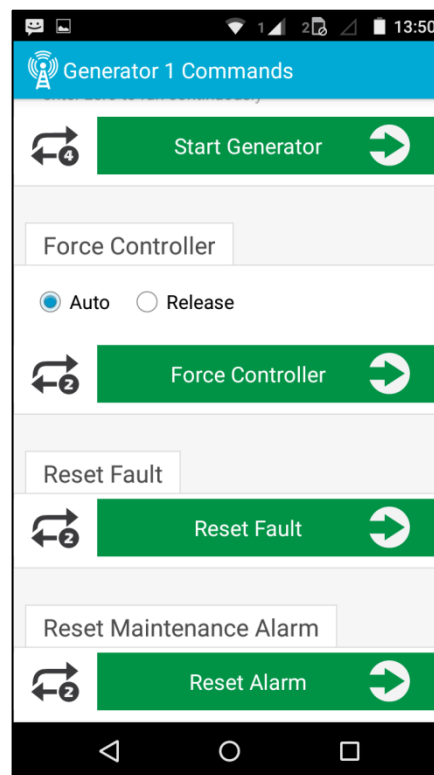
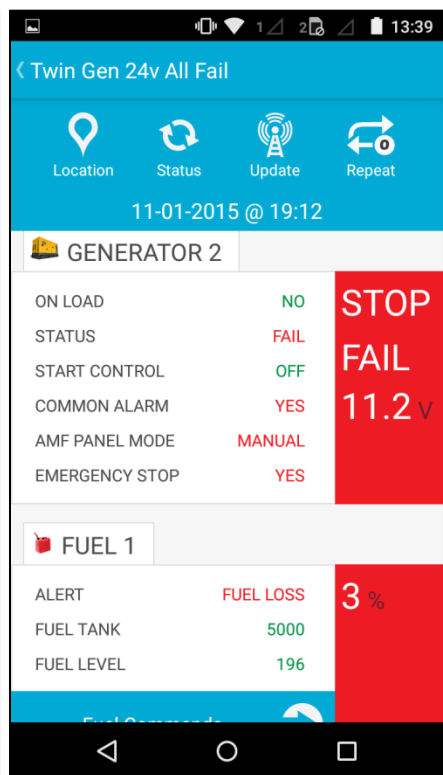
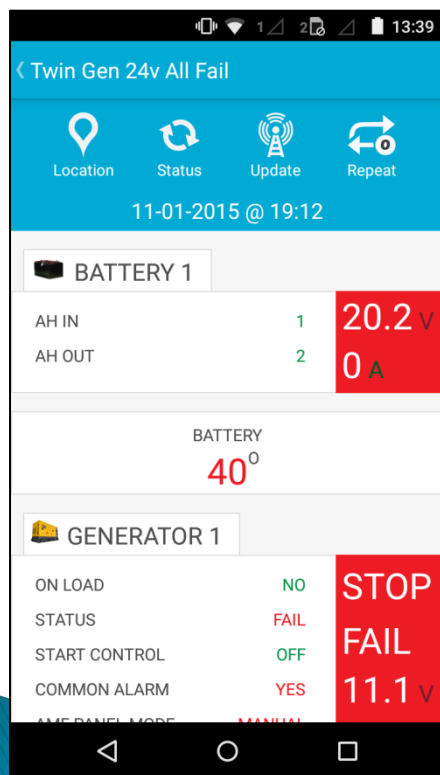
- ▶ Real Time Monitoring wherever you are
- ▶ Safe Access to authorised users only
- ▶ Receive continuous updates or only alerts



The Mobile App



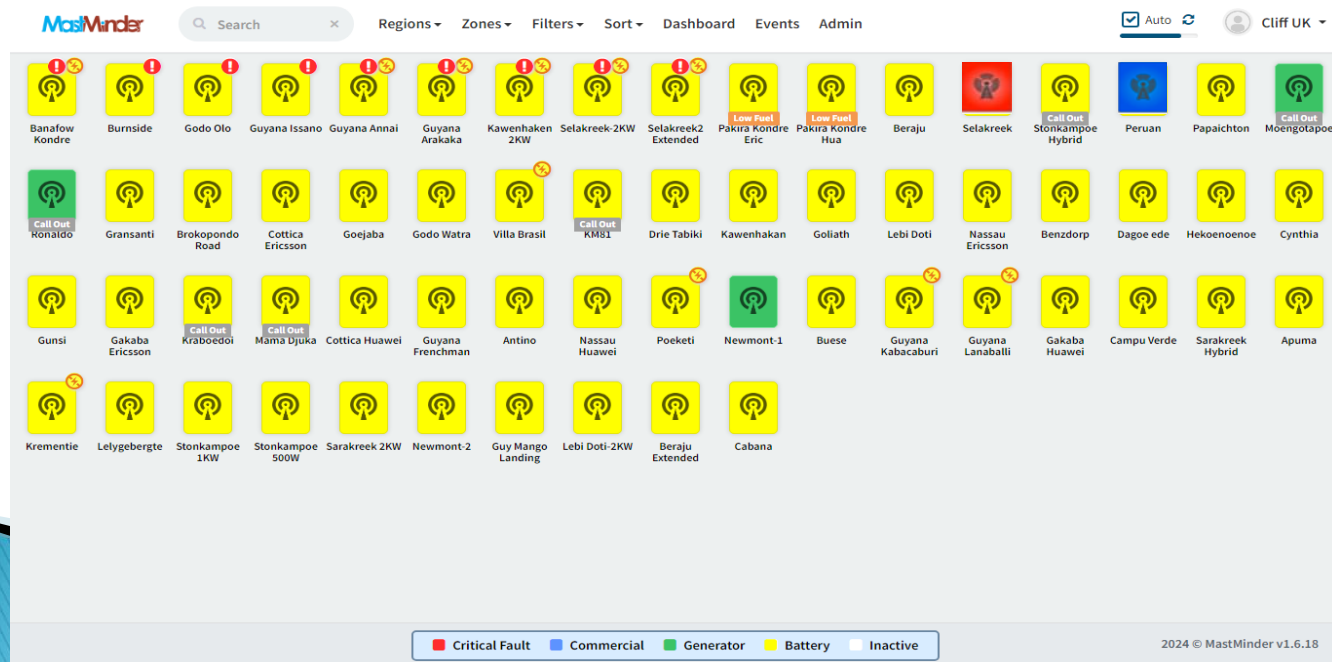
- ▶ Actions via Remote Control
- ▶ Test start generators, reset faults remotely
- ▶ Access location data Immediate



Overview at the Operations Centre



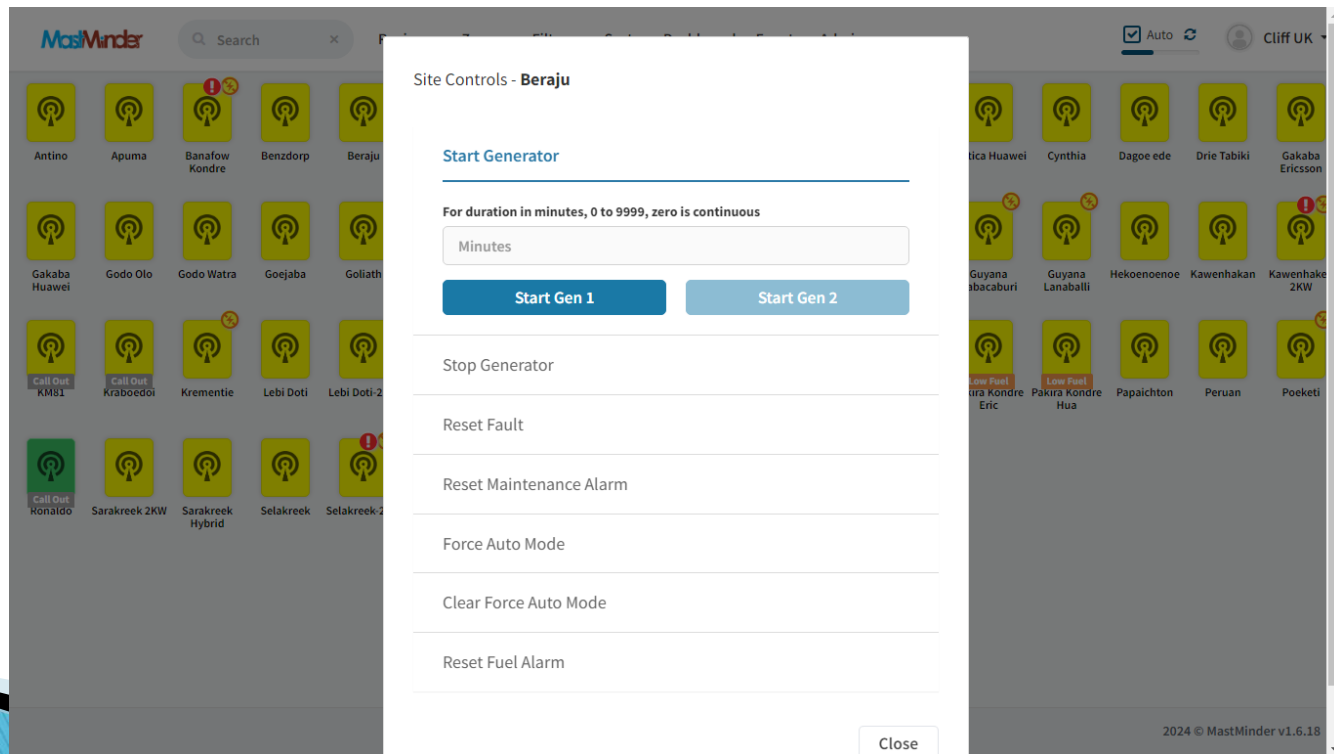
- ▶ **Red** for Critical fault requiring urgent attention on the site
- ▶ **Blue** when site is running on the Commercial Electrical Grid
- ▶ **Green** when site is running on Generator
- ▶ **Yellow** when site is running on Battery
- ▶ **“!”** When a Fault has been detected
- ▶ **“Low Fuel”** when the level of fuel is low
- ▶ **“Call out”** when an engineer is scheduled to visit the site



Controls from the NOC



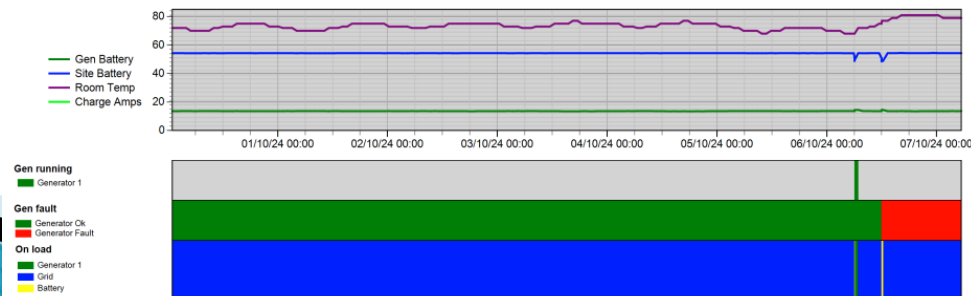
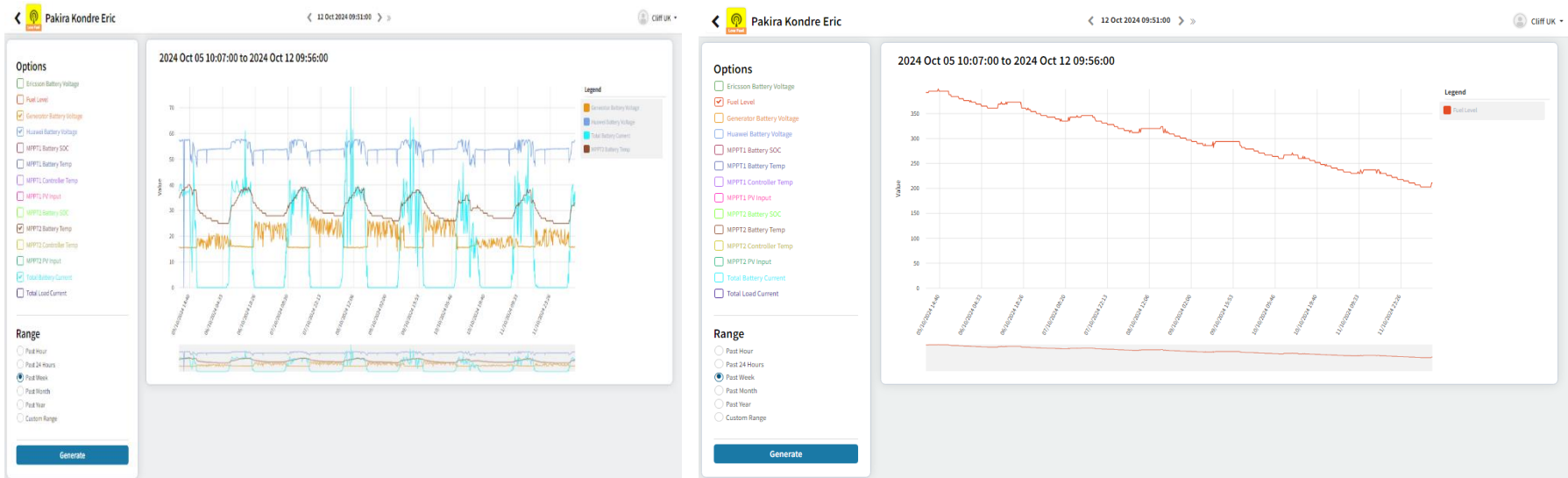
- ▶ View the details of events for each site and take actions directly from the NOC
- ▶ Commands to the Generator for alerts or routine checks
- ▶ Call out for a site visit in case of emergency



Automatic and Manual Reporting



- ▶ Regular reporting automatically produced and emailed
- ▶ Reports can be produced on demand for any time frame / site
- ▶ Reports can be auto emailed to any number of recipients
- ▶ If the data is available, we will configure any report for you



Increased Visibility



► Commercial Grid monitoring examples:

Port Of BTR - Total Grid Outage for period is 6:17:28 (hh:mm:ss)

Grid Status	From Time	To Time	ON Duration	OFF Duration
ON	9/30/2024 12:00:00 AM	10/6/2024 6:05:01 AM	150:05:02	
OFF	10/6/2024 6:05:02 AM	10/6/2024 12:22:29 PM		6:17:28
ON	10/6/2024 12:22:30 PM	10/7/2024 5:35:00 AM	17:12:31	

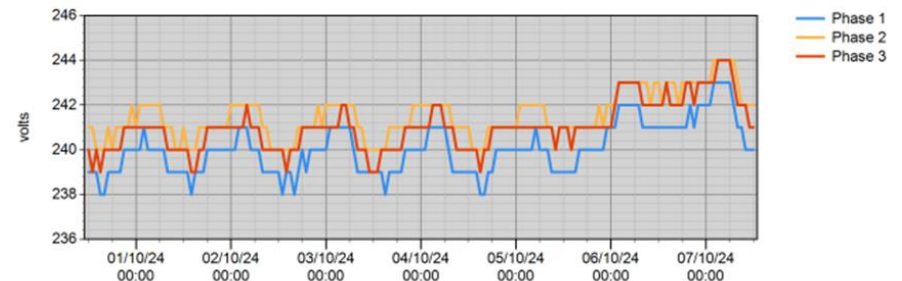
Main Grid Incomer Feed - voltage per phase

Lowest voltage reading 238 volts

Highest voltage reading 244 volts

Monday, September 30, 2024 12:00:00 to Monday, October 07, 2024 12:00:00

Voltage per phase



Increased Visibility



- ▶ Environment monitoring examples (temperature, humidity, security such as doors open, etc.):

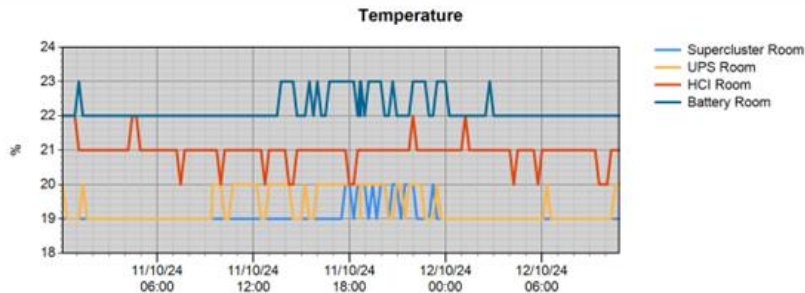
Environment - Temperature

Temperature

Lowest temperature reading 19 °C

Highest temperature reading 23 °C

Friday, October 11, 2024 00:00:00 to Saturday, October 12, 2024 23:59:59



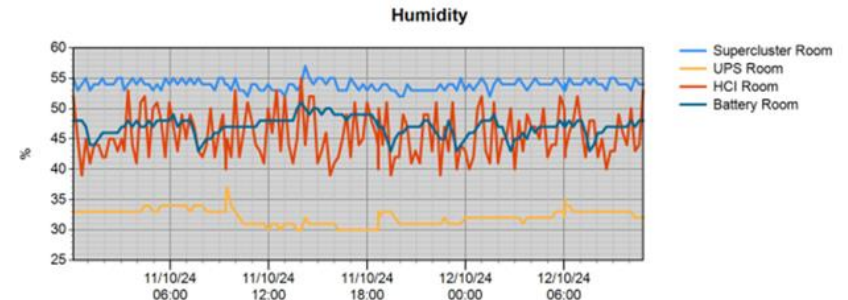
Environment - Humidity

Humidity

Lowest humidity reading 30 %

Highest humidity reading 57 %

Friday, October 11, 2024 00:00:00 to Saturday, October 12, 2024 23:59:59



Internal Door Alarms - Monday, September 30, 2024 12:57:00 AM to Monday, October 07, 2024 6:10:00 AM

Internal Door(s)
Door Closed
Door Open

30/09/24 00:00 01/10/24 00:00 02/10/24 00:00 03/10/24 00:00 04/10/24 00:00 05/10/24 00:00 06/10/24 00:00 07/10/24 00:00

External Door Alarms - Monday, September 30, 2024 12:57:00 AM to Monday, October 07, 2024 6:10:00 AM

External Door(s)
Door Closed
Door Open

30/09/24 00:00 01/10/24 00:00 02/10/24 00:00 03/10/24 00:00 04/10/24 00:00 05/10/24 00:00 06/10/24 00:00 07/10/24 00:00

Increased Visibility

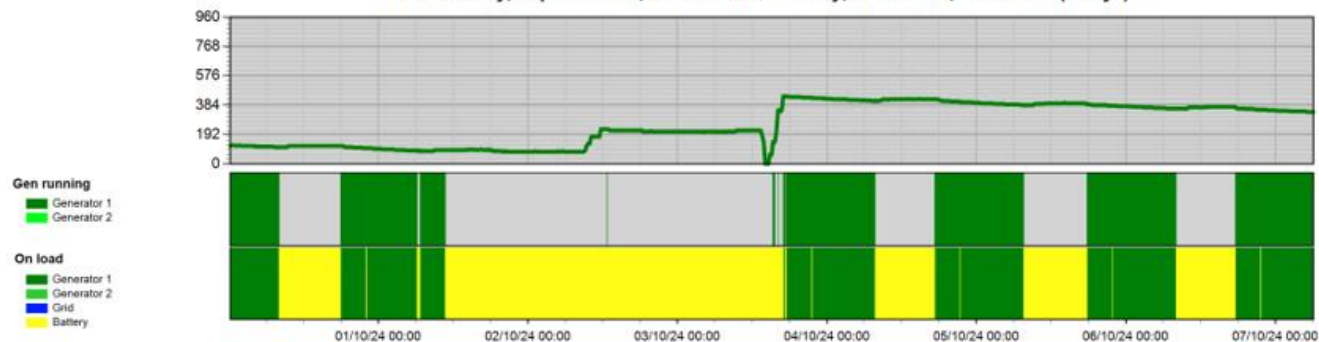


► Fuel monitoring examples:

Pakira Site Fuel Analysis report

07 Oct 2024 06:10

Zone: Marakele , Region: Tanzania , Site ID: SMW01 , Site Name: Pakira
From Monday, September 30, 2024 00:13 to Monday, October 07, 2024 06:05 (8 days)



Fuel statistics

fuel tank total working capacity (litres)	960
litres at start of period	120
litres added during period (deliveries)	+434
litres lost during period (leakage or theft)	-0
litres at end of period	339
litres actually consumed during period	215
low fuel alarm	not active

Delivery details

DATE	FROM	TO	ID	NAME	LITRES
02 October, 2024	10:30	11:30	SMW011	Pakira Kondre Hua	99
03 October, 2024	16:30	17:30	SMW011	Pakira Kondre Hua	335
Total					434

Generator statistics

generator 1 running hours during period	80.04
generator 2 running hours during period	0.00

Calculated statistics

average fuel consumption during period (litres per running hour)	2.69
predicted low fuel (240 litres) approximately	Thursday, October 10, 2024
predicted empty approximately	Friday, October 18, 2024

Auto Alerts via SMS and Email



- ▶ Auto Alerts may be configured for any number of users
- ▶ May be received by SMS and Email and Android App

Subject: MastMinder AutoAlert - Mongotape Generator is Running since 10/12/2024 8:30:05 AM
Importance: High

MastMinder AutoAlert - Mongotape Generator is Running since 10/12/2024 8:30:05 AM

Site name: Mongotape
Site ID: GMW04
Zone: Marowam
Region: Guinea
Site location: <http://maps.google.com/maps?q=loc:5,-4.1867>
Reason for gen start is: Site Battery Low

Subject: MastMinder AutoAlert - Brokondo Road Main Battery Voltage Low since 10/11/2024 6:58:00 PM 47.1 volts
Importance: High

MastMinder AutoAlert - Brokondo Road Main Battery Voltage Low since 10/11/2024 6:58:00 PM 47.1 volts

Site name: Brokondo Road
Site ID: SB006
Zone: Brokondo
Region: Zambia
Site location: <http://maps.google.com/maps?q=loc:623612>

Subject: MastMinder AutoAlert - Papachon MPPT Load Current Low since 9/13/2024 2:44:22 PM
Importance: High

MastMinder AutoAlert - Papachon MPPT Load Current Low since 9/13/2024 2:44:22 PM

Site name: Papachon
Site ID: CSP031
Zone: Sipalini
Region: Seychelles
Site location: <http://maps.google.com/maps?q=loc:80,-54.1130>

Simple and Secure Configuration



- ▶ Only an Administrator can add users to the system
- ▶ Only an Administrator can authorise user's functionality
- ▶ Restrictions include:
 - who can see which sites (all or just some of the sites)
 - who can perform activities and which ones (such as test starting a generator or remotely resetting a fault condition)

The login form is a simple, clean interface. At the top, it features the MastMinder logo and the text "INFRASTRUCTURE MANAGEMENT". Below this, there are two input fields: "Username" and "Password". A blue "Log In" button is positioned to the right of the password field. The entire form is enclosed in a light grey border.The configuration form is divided into three sections. The first section, "Mobile App (Optional)", has a green checkmark icon and contains a dropdown menu set to "IP Only" and a checked checkbox for "Send All". The second section, "Permissions (Optional)", also has a green checkmark icon and lists several permissions with checkboxes: "Update Request" (checked), "Test Start Generator" (unchecked), "Reset Generator Alarm" (checked), "Reset Maintenance Alarm" (unchecked), "Force Auto Mode" (unchecked), "Reset Fuel Alarm" (unchecked), and "Reset Inverter" (unchecked). The third section, "Email Alerts (Optional)", has a green checkmark icon and contains two input fields: "Email" (with the value "guy@digj.com") and "Email CC" (empty).

Key Benefits



▶ Opex Decrease

- Reduced service costs and in person maintenance on remote sites
- Control fuel theft and “short deliveries”
- Generator running times may be greatly reduced when Hybrid Power Management function is enabled

▶ Energy Efficiency

- Programmable preferred power sources for automatic sequences
- Identification of power «waste» in the network
- Benchmarking of site performance
- Monitor the performance of your solar sites
- Use the system to automatically control and exercise the backup generator at solar sites

Key Benefits



▶ Longer Equipment Lifespan:

- Improved Preventive and Corrective maintenance
- Better Battery Management
- Optimized voltage and temperature control
- Peace of mind knowing exactly what is happening at your sites

▶ 100% Customizable and Scalable:

- Language and preferences can be chosen by client
- Customised technical and financial reports easily generated using the built-in Microsoft SQL Server Reporting Services
- System is licenced for any number of sites
- System is licenced for any number of users
- Numerous options and functionalities can be added over time

Total monitoring of your Passive Infrastructure



- ▶ **The standard kit will allow monitoring / control of:**
 - Generator function
 - Fuel tank
 - Site Batteries
 - Electrical Commercial Grid
 - Solar
 - Hybrid Function
 - Rectifiers
- ▶ **Non-Exhaustive List of Optional Additional Functions:**
 - Environment
 - Security
 - On demand Features

Applications



- ▶ Telecom Operator Networks/ ISPs
- ▶ Solar sites
- ▶ Data Centers
- ▶ Power companies
- ▶ Government facilities and buildings
- ▶ Banks
- ▶ Mines
- ▶ Hospitals
- ▶ Etc.





For further information, please contact us:

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+44.17.87.26.90.18

Thank you !