eGenKit
Product Manual

Model: Logger 1.0

CE Declaration of Conformity

This device complies with CE Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B product.

FCC Declaration of Conformity

This device complies with Part 15b of the FCC Rules. Operation is subject to the following two conditions.

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment to an outlet on a circuit other than the one to which the receiver is connected.
- Consult the dealer or an experienced radio/ TV technician for help.

Type Approval and Certifications

This device has been tested and issued with the following countries Telecommunication Type Approval:

- Europe (CE)
- USA (FCC)
- Brunei (JTB)
- Cambodia (ISC)
- Indonesia (DGPOSTEL)

- Malaysia (SIRIM)
- Philippines (NTC)
- Singapore (iDA)
- Thailand (NTC)
- Vietnam (DGPT)

Disclaimer

This product is not intended for use in medical, life saving, or life sustaining applications. Power Instruments may make changes to specifications and product descriptions at any time without notice. Power Instruments reserves the right to make improvements or/ and changes to this manual, or to the products or/ and the programs described in this manual at any time. The information provided in this manual is intended to be accurate and reliable. However, Power Instruments assumes no responsibility for its use, or for any infringements on the rights of third parties that may result from its use.

Intended Audience

The Product Guide is intended for technically qualified personnel. It is not intended for general audiences.

Box Contents

- eGenKit Data Logger set (~ 160 mm x 128 mm x 85.2 mm)
- GSM/ GPRS Antenna (Quad band)
- GPS Antenna
- 2 meter shielded RJ45 Ethernet cross cable
- Quick Startup Guide
- This User Manual

Email Technical Support:
eGenKit@powerinstruments.com.sg

Download updated product information, animated demo guide, user manuals and drivers:
http://www.eGenKit.com/

Phone: +65-6288 1183

40 Toh Guan Road East
#01-62 Singapore 608582
Singapore

Table of Contents

1. Product Specifications

General Specification

Processor:	Motorola MPC8241, 32-bit PowerPC 603e core (200MHz)
GSM/ GPRS Module:	Wavecom Q24 Automotive
SDRAM:	32 MB
On Board Flash:	8 MB
Data Logging Memory:	1GB
Power Consumption:	GPRS Searching (220mA @ 24V DC)
	GPRS connected (160mA @ 24V DC)
	Initial start-up current: 1A
Input Voltage Range:	9V DC to 32V DC
Input Voltage (Nominal):	24V DC
LED Indicator:	Power On, LAN port, Debug port, GPS, GPRS connected
Firmware Upgrade:	Through Debug Port (Cross LAN cable supplied)
Parameter setting:	Through Debug Port (Cross LAN cable supplied)
Protocol supported:	TCP/IP, PPP + SSH
Security:	VPN and SSH Encryption
Interface to equipment:	RS485 (2 wires) + GND
Build in Watch Dog:	Yes

GSM/ GPRS Specification

Frequency Band:	Quad Band (850MHz, 900MHz, 1800MHz, and 1900MHz)
GPRS Multi-slot:	Class 10
GPRS Module Approval:	GCF, CE, FCC
Code Scheme:	CS1, CS2
Output Connector:	SMA Female Reverse Polarity

GPS Specification

Acquisition Rate:	Cold/ Warm/ Hot: 42/ 38/ 1 sec (Average)
NMEA Protocol:	GGA, GSA, GSV, RMC, VTG, GLL
Datum:	WGS-84
Accuracy Position:	10m @ 2D
Sensitivity:	Cold/ Warm/ Tracking: 30/ 15/ 13 dB-Hz

Output Connector:	SMA Female

Mechanical Specification:

Operating Temperature:	0 ^{o}C to 50 ^{o}C
Operating Humidity:	5% to 95%
Storage Temperature:	-20 ^{o}C to +85 ^{o}C
Dimension (mm):	160 (L) x 128 (W) x 85.2 (H)
Weight:	~ 1.3 kg
Product Class (EMC):	Class B
Safety Class:	Class 3
Regulatory Approval:	FCC and CE Mark
Type Approval:	Brunei (JTB) Cambodia (ISC) Indonesia (DGPOSTEL) Malaysia (SIRIM) Philippines (NTC) Singapore (iDA) Thailand (NTC) Vietnam (DGPT)
SIM card Holder:	3V/ 1.8V
Wall Mount:	Yes
Din-Rail:	Yes

2. Introduction

This Product guide gives information about the installation, and setting of the eGenKit data logger device.

The e**GenKit** is a Telemetry data acquisition and system control data logger which primary purpose is to be used in stationary or mobile Diesel-Power-Generator-Control (Gen-set Controller) facilities. However this data logger device may also be used for other data monitoring and control industrial equipments (i.e. Power Metering, Programmable Logic Control – PLC, etc) that have a RS485 Modbus interface to the logger. Please check **Appendix A** for the type and model of the Gen-set controller equipments supported with e**GenKit.**

The main functions and features of e**GenKit** logger are to provide:

- Remote monitoring and simple diagnostic of power generator equipments via the internet.
- Send control signal to remote Gen-set Controller.
- Send SMS and email to alert Gen-set service personnel and engineers when a Gen-set Controller alarm has been trigger, which requires technical personnel attention and servicing.
- Data logging and transmission of Gen-set activities.
- Reports the earth geographic position of the e**GenKit** logger device using Global Positioning System (GPS), and therefore locates the power Gen-set equipments location on the server web page.

The **eGenKit** is a standalone data logger (Remote Terminating Unit - RTU) which can be connected to most diesels Gen-set Controller which has a RS485 Modbus interface. The RS485 Modbus is the most common serial interface found in most Gen-set Controller and industrial equipments. Via the two wires RS485 Modbus interface the e**GenKit** data logger is able to monitor the status of the generator, and to send out signals that control the generator. Service personnel located anywhere in the world who needs to check the status or send out control signals to the Gen-set Controller can now do so once they are accessed to the Master Terminating Computer Server via the internet, which the e**GenKit** logger communicates to.

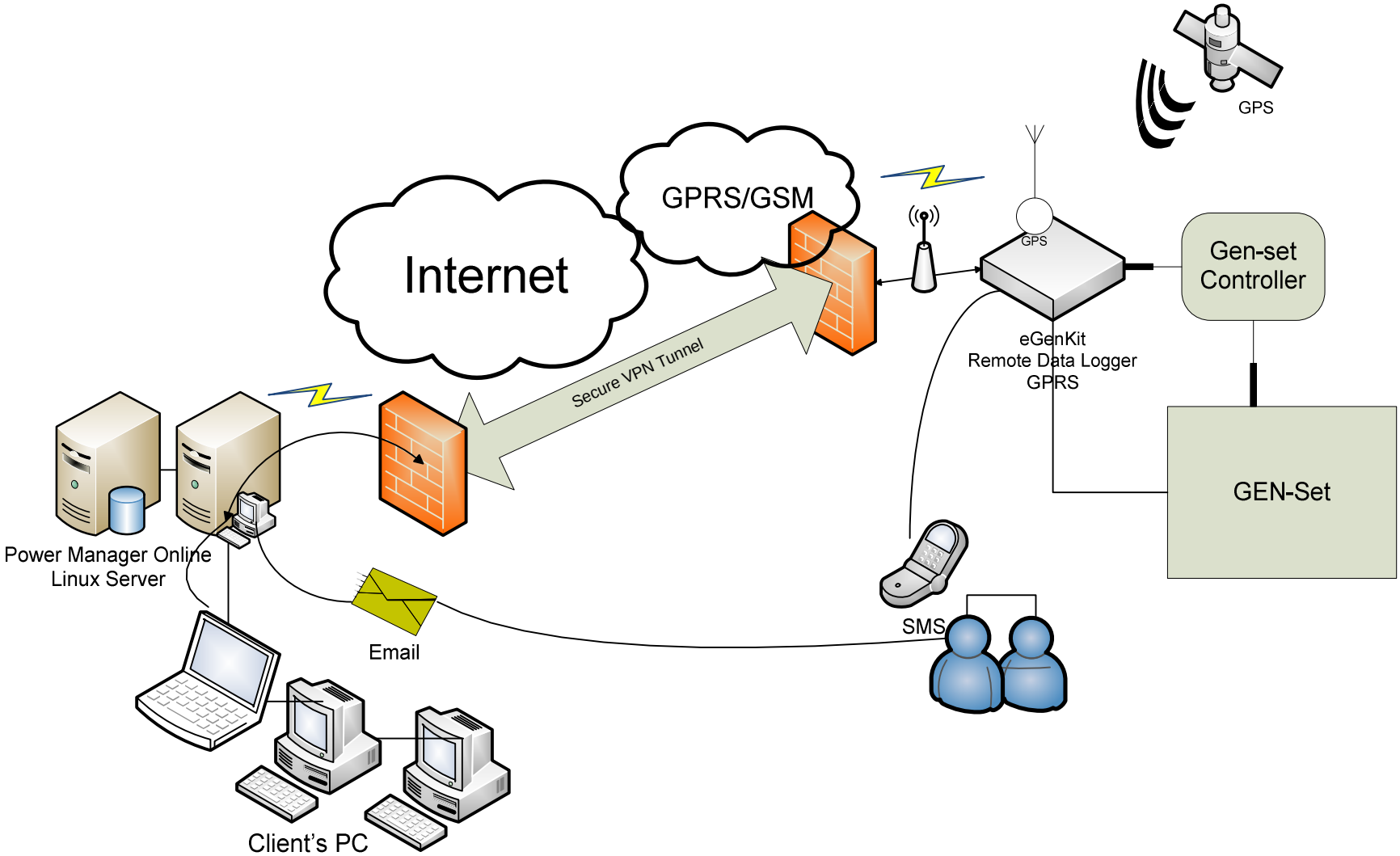
The e**GenKit** standalone data logger has two different options of connecting to its Computer Server (housed and maintained by Power Instruments in Singapore). It can either connect using Ethernet LAN cable or wireless GPRS (a GSM SIM card with GPRS enabled from the local service provider is required) connection. The programmable firmware inside the logger devices will decide whether it will choose to connect using LAN or GPRS. The default setting is GPRS. Once powered on the logger will connect to it's service provider and link itself to the e**GenKit** default Server located in Singapore via the internet. You may also be connected to additional servers maintained in other parts

of the world to speed up the connectivity depending on your location. Authorized service personnel each with an individual login user name and password shall be able to logon to the e**GenKit** (http://www.eGenKit.com) server webpage to monitor and control the whole event happening at the generator side. The server webpage is specially designed to provide a clear view animated circuit diagram of the diesel power generator, busbar and circuit breakers status and conditions. Various individual and collective parameters like Line and Phase Voltage, Current, kW, kVA, kVAR, Frequency, Power Factor, logging events and alarm signals, etc are constantly updated and archived onto the server computer system, enabling personnel to remotely access all information. In the event when the internet connection is down or the GPRS signal is lost, the parameters of the generator relative to time are being captured and saved on to the 1GB USB flash memory inside the **eGenKit** RTU data logger. These collected data information will then be sent back to the server to be archived once internet connection is established again. During fault detection when the generator controller issues an autonomous alarm signal due to generator malfunction or drastic fluctuation in measurement parameters, the e**GenKit** logger will capture the alarm status, update the server. The system will activate a SMS automatically to alert the generator plant duty service personnel of the warning status as soon as the alarm is raised on the unit. At the same time the server will also issue an email to inform designated personnel on the warning alarm event. There is a built in GPS module inside the e**GenKit** logger which purpose is to identify it's own geographical position and therefore the generator facility location. The purpose for this feature is to provide geographical identification of each generator location when managing multiple power generator facilities. This feature also eases tracking the location of mobile diesel power generators.

The e**GenKit** logger is designed to operate at 24 hours, 7 days a week monitoring of the diesels power generators. In the event when GPRS is disconnected deliberately or due to GSM network failure, all data events will be log and saved inside the logger internal memory.

The system has an option to allow user to operates in GPRS sleeping mode function which the logger will be activate via SMS (automatically send out by Power Instruments international Bulk SMS service) to connect to the internet server once a user is log in to the server webpage to view the plant activity, thus optimizing the GPRS connection duration. The GPRS connection remains connected for an hour even after the user has log off from the webpage. Thereafter the logger will go into GPRS sleeping mode again.

eGenKit Communications Network Description



3. Configuring the eGenKit Logger via the Debug Port

- Connect the Debug port of the logger to the RJ45 socket of a computer or Notebook using the Cross Ethernet cable provided.
- Go to Window Internet Explorer Web Page
- Enter: http//192.168.100.1

3.1 System Settings

- Go System Settings.
- The system setting will synchronize with the settings found at the Power Instruments server and will update itself accordingly when the eGenkit data logger is connected to the server. However user can choose to update the following information and click ‘Apply’ to update the server information.

3.2 GPRS Settings

- Go to GPRS Settings.
- Enable/ check the GPRS box when using GPRS mode. Default setting is GPRS. Uncheck this box only when using the Ethernet LAN option.
- Enable/ check the Auto Mode box.
- Enter an APN description name.
- Enter your SIM card service provider call number.

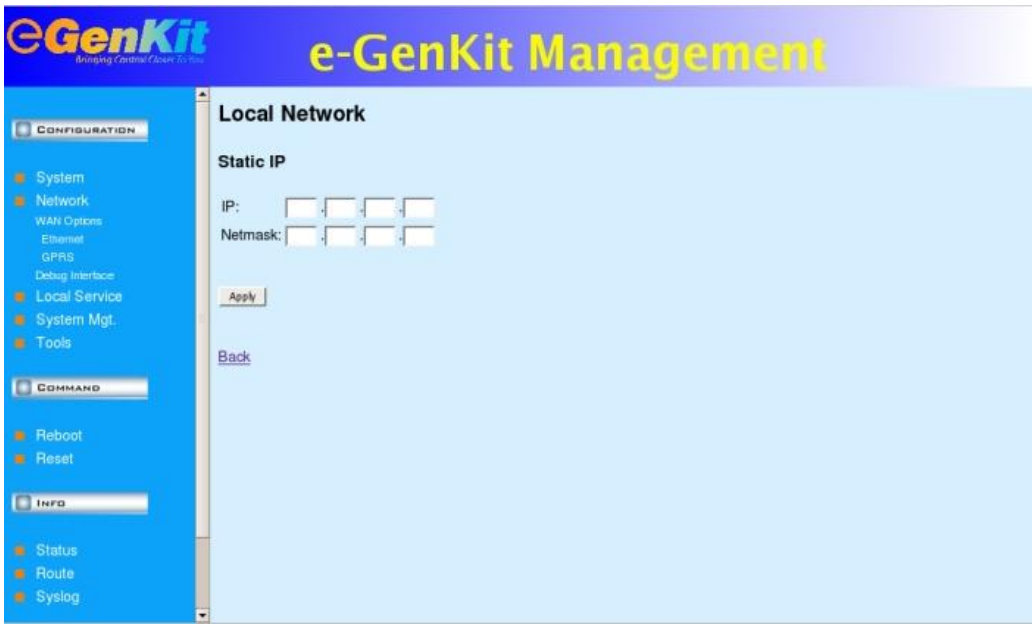
- System settings leave it as default.

3.3 Operating Mode

- Select VPN or Non VPN mode depending on your type of SIM card provided by your GSM service provider. Default setting is VPN mode.

3.4 Local Network Setting For LAN Application

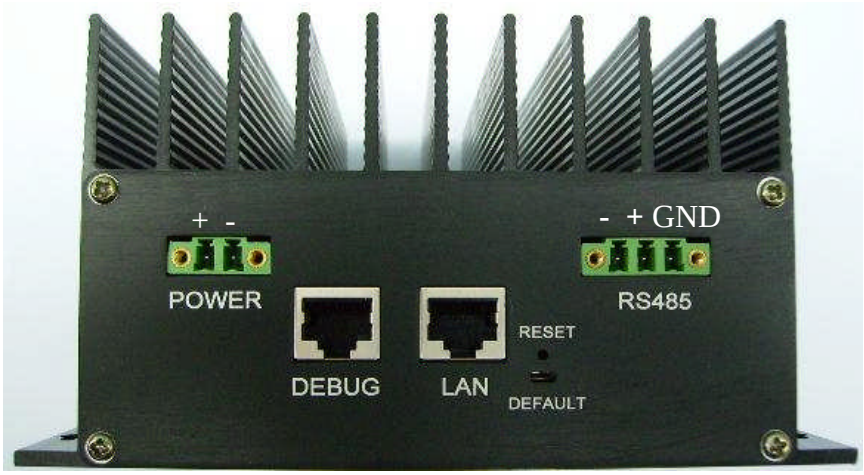
- Go to Local Network setting
- Select DHCPC for dynamic IP address.
- Default is DHCPC
- Select only Static IP only when you have a permanent IP address.
- Enter the Gateway IP address, primary and secondary DNS server IP accordingly under Network Parameters when Static IP is selected.
- Enter the Static IP Address and Netmask



4. Product Hardware Overview

4.1 Front View

4.2 Rear View



4.3 LED Indications:

- **PWR**: Power Supply Indication. Solid Red when DC supply is on
- **LAN**: Solid Green when Ethernet LAN connection is connected to a LAN hub/ switch or router using a straight Ethernet cable.
- **DEBUG**: Solid Green when connected to computer Ethernet com port using a cross cable.
- **GPS**: Blinking Green when connected to a GPS antenna searching/ receiving satellite signals.
- **GPRS**: Solid Green when is not detecting or synchronize with any GSM frequency band; Blinking Green when is synchronized with one of the GSM frequency or transmitting data.

4.4 Connectors Descriptions

- **GPS ANT**: 'SMA Female' for connecting to the GPS Antenna provided.
- **GPRS ANT**: 'SMA Female Reverse Polarity' for connecting to the GPRS Antenna provided.
- **SIM**: SIM card holder slot for placing the GSM/ GPRS SIM card provided by your mobile network service provider.
- **POWER**: DC supply (9V to 32V range) input. Note the + positive and – negative polarity.
- RS485: RS485/ Modbus signal lines. Note the + positive and – negative polarity of the differential signal lines. Connect the GND point when applicable.
- **LAN**: 10/ 100 MBPS Ethernet LAN port. Connect using an Ethernet straight cable to a hub/ switch or router.
- **DEBUG**: Debug Port for system setting, configuration and firmware upgrade. Connect using an Ethernet cross cable to a computer.
- **RESET**: Hardware reset button to reset/ reboot the full system during a system hang. Insert a pointed object into the Reset hole to activate reset. Alternatively switch On/ Off the DC Input Power Supply.
- **DEFAULT**: Switch to default setting for service personnel used only.

* Please do not unscrew the front and real panel screws or attempt to remove the front and real panel covers.

5. eGenKit Hardware Installation

5.1. Using GPRS Connection (Default Setting)

- A SIM card with GPRS data enable is needed. Delete any SMS messages from the SIM card and disable any PIN code request so it will not prompt for a PIN code when turning on.
- Use a pointed object to press on the pin on the right beside the SIM card holder to push out the SIM card holder slot. Place your GSM (GPRS enabled) SIM card into the card holder and insert it back into the SIM slot.
- Connect the GPRS antenna to the 'Female SMA RP' GPRS connector port.
- Connect the GPS antenna to the 'Female SMA' GPS connector.
- Connect the RS485 + and – connections to the Gen-set controller RS485 + and – connections respectively. Connect the GND connection when applicable.
- Connect the DC (9V to 32V) input supply + and – to a DC supply which can supply at least up to 1A max current.
- Turn on the supply.

5.2. Using LAN Connection

- Connect the LAN port of the logger to the RJ45 socket of a hub/ switch or a router (LAN side of the router) using a straight Ethernet cable.
- Connect the GPS antenna to the 'Female SMA' GPS connector.
- Connect the RS485 + and – connections to the Gen-set controller RS485 + and – connections respectively. Connect the GND connection when applicable.
- Connect the DC (9V to 32V) input supply + and – to a DC supply which can supply at least up to 1A max current.
- Turn on the supply.

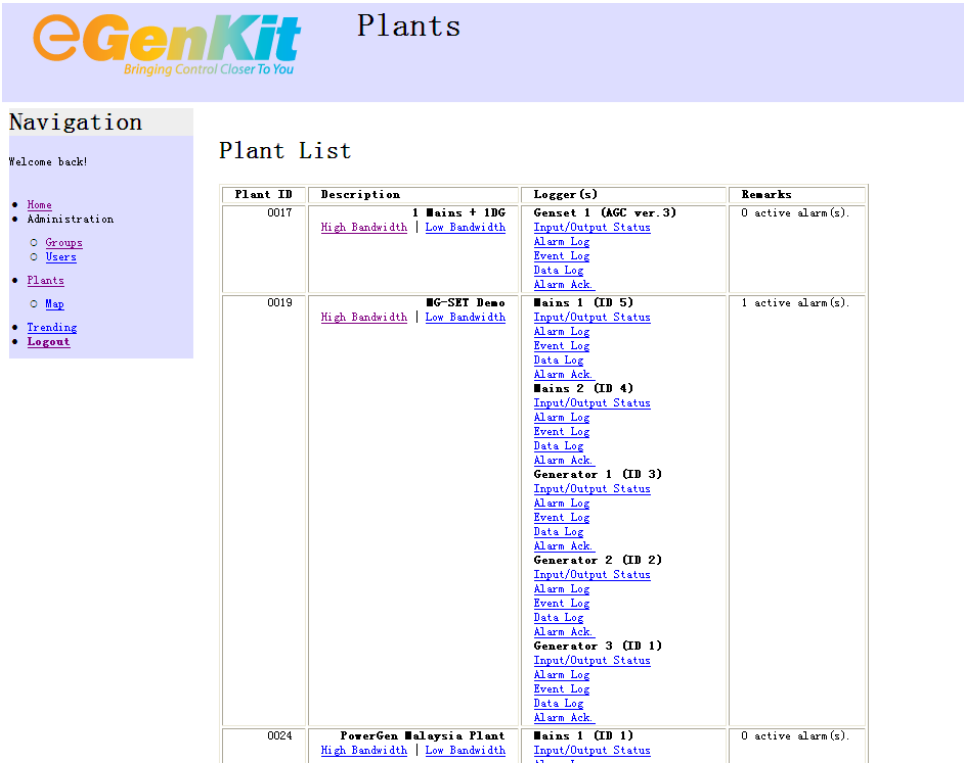
6. eGenKit Remote Monitoring and Control Website

The remote computer recommended minimum basic operating system for viewing and operating the eGenkit webpage are:

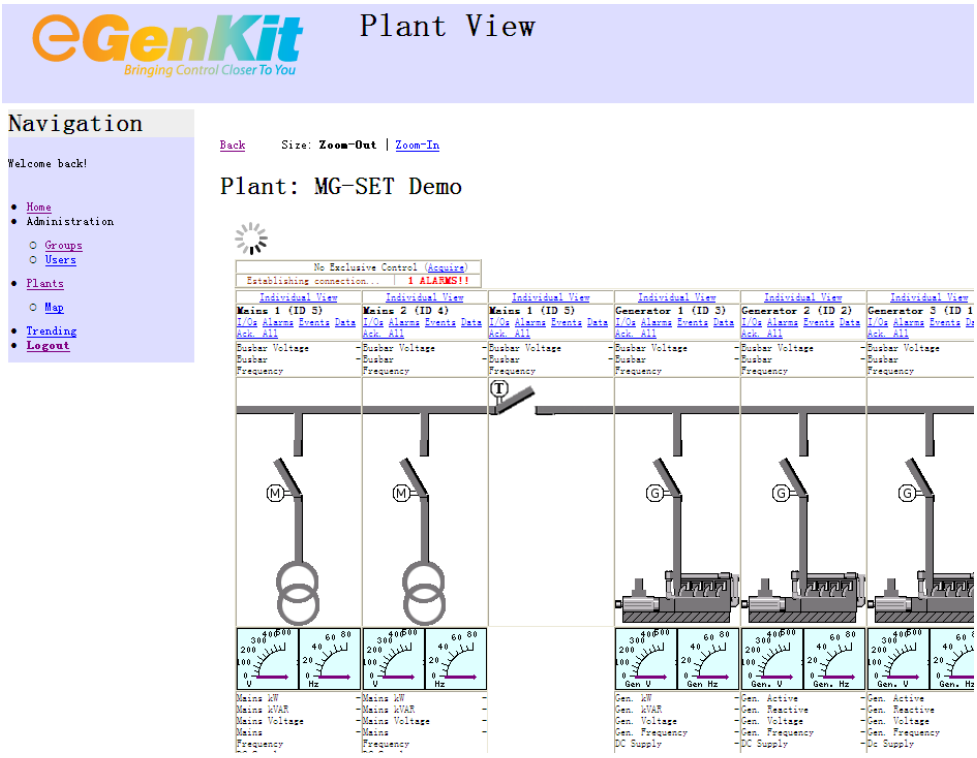
i. **Operating System**: Microsoft Windows 2000/ Windows XP
ii. **Web Brower**: Microsoft Internet Explorer 7 and above
iii. **CPU**: Intel Pentium 4/ Intel Celeron 2 GHz
iv. **Memory (DDR):** 512 MB
v. **LAN port**: 10/ 100 MBPS
vi. **Internet Connection Speed**: 1 MBPS

Using a remote computer which is already connected to the internet, go to the Internet Explorer.

- Enter the URL: http://www.eGenKit.com/
- Click 'Login'
- Enter your User name and Password provided to you by Power Instruments eGenKit system administrator.
- Click 'Plant' on the Navigation column on the left side of the page to view all the connected generator plants description.



- Click ‘High Bandwidth’ under one the ‘Plant ID Description’ on the Plant List Table of the page to view and monitor the generator plant status, data and activities.



- Please refer to the eGenKit http://www.eGenKit.com/ website user learner demo for more guides and tips on using the eGenKit Navigation webpage.

7. Appendix A:

Gen-set Controller Model and Version Supported with the eGenKit Data Logger

1. Deif Gen-set Controller
    - Deif Automatic Generator Controller, AGC-3
    - Deif Basic Generator Controller, BGC
    - Deif Generator Paralleling Controller, GPC

2. Caterpillar
    - Caterpillar EMCP 3.3

8. Frequently Ask Questions

1) What can eGenkit provides?

Allows remote monitoring, data logging, events reporting and control multiple sites such as generators, power plants, water tank and equipments which needs remote monitoring services.

2) Who requires such application?

Any fleet management companies, generator service maintenance provider or even power plant owners who need remote access to their running power generators.

3) What is GSM?

GSM – Global System for Mobile Communication is a digital mobile telephone widely use in today's world. GSM digitizes and send out user data in time slot channel. It operates at either 900 MHz or 1800 MHz frequency band. GSM 900/ 1800 is called the EURO Band whereas GSM 850/ 1900 is called US Band.

4) What is GPRS?

The Global Packet Radio Services (GPRS) is an integrated part of GSM core networks that is available to users of 2G cellular communication systems. It is a packet oriented Mobile Data service that provides support to 3G based networks.

5) What is APN?

Access Point Name (APN) is a network identity in GPRS standard to identify the service or network to which user can connect within the GPRS network. It is associated with access characteristics, including security and method of dynamic addressing.

6) What is VPN?

A secure Virtual Private Networks (VPN) that run as part of trusted channel of communication. It uses cryptographic tunneling protocols to provide the intended confidentiality such as blocking snooping and packet sniffing.

7) Can GPRS connection be set to sleep mode when not in use?

Yes, user can configure eGenKit into sleep mode condition and wakes up automatically when there is alarm triggered. This will optimize GRPS bandwidth and data usage.

8) Will the VPN connection disconnect unnecessarily?

It depends on the VPN networks provided by the respective Telco. Signal strength and coverage area is the key factor that contributes to the stability of data networks.

9) How secure are eGenkit Server and eGenKit data logger?

eGenkit server and eGenKit data logger is using secure remote access (VPN) solutions as a path of communication between client and server. A secure modular router for hardware encryption and firewalls is designed to provide secure data networks.

10) How secure is VPN in GPRS networks?

Most telecommunication companies are offering public Access Point Name (APN) for secure data access with standard protocols. Private APN is only visible to within dedicated users.

11) Can any Modbus equipment connect to eGenKit?

No, only Modbus equipments listed in Appendix A is supported with the eGenkit.

12) Can user connect the eGenkit data logger without server?

No, each eGenKit is required to establish connection (Ethernet or GPRS) with the server placed at centralize location.

13) How to apply this VPN service from Telco?

User is required to request for GPRS data service with end-to-end communication package.

14) What is the available communication option in eGenkit?

GPRS and Ethernet LAN.

15) What else does the user need besides purchasing the eGenKit?

User will require a UserID and Password to eGenKit Server in order to view their plant. One UserID and Password is considered as a license. There are two types of license: Administrative and User.

- Administrative: This login license allows right-access to configure the plant
- User: This login license can only allow monitoring, viewing and controlling.

User can sign-up multiple Administrative or User licenses depending on their requirements

16) Can user use both Ethernet and GPRS connection at the same time?

No, only one connection mode can be selected for communication at any single time.

17) How eGenkit data logger communicates with the automation instruments such as Gen-Set controllers?

It utilizes Modbus RTU protocol (2-wire) to communicate with Gen-Set Controllers.

18) eGenkit data logger can be set as Master and/or slave. Can user have multiple eGenKit data logger as Master?

No, there can only be one Master eGenKit data logger connecting to multiple slave eGenKit data logger.

19) How many gen-set can a eGenKit data logger handles at one time?

Modbus RTU limit to 32 slaves with one (master) eGenkit data logger. It is recommended to connect maximum up to 4-6 slaves on one Master eGenKit data logger for optimum speed performance.

20) Can user use any GPRS SIM card for eGenkit to communicate with the server?

User is required to make sure their GPRS package comes with Public IP or VPN Services.

21) Can user set different timing for GRPS connection with the server?

Yes, user can schedule the connection with eGenKit server. This can only be done from Administrative login.

22) What will eGenkit react when system hang?

eGenKit data logger is equipped with internal watch dog mechanism that will auto reboot if system hang.

23) During sleep mode, is the eGenKit data logger able to send out SMS in the event alarm trigger?

Yes, once alarm signal is received by the eGenKit it will send out SMS before establish GPRS connection. When connection to server through GPRS is established, the server will also send an email to the designated recipients.

24) How many users are provided when one account is created?

Standard account comes with 1 administrative and 2 user license.

25) Can I configure the plant layout admin level?

No, each plant layout can only be customized by super admin level. Only the Power Instruments has the right to configure the plant. User will need to provide plant requirements to Power Instruments for system setting. Form will be provided prior to commissioning work.

26) Can admin level determine the access privilege of normal user?
Yes, admin can limit the access privilege (plant list) of specific user.

27) Can I use two units of eGenkit data logger in one single plant layout?
Yes, we can configure 2 units of eGenkit data logger in one single plant.

28) Can user login from two different computers using one login license?
No, the system does not allow multiple login of the same license.

29) How Global Positioning System (GPS) works?
GPS can pinpoint eGenKit data logger location anywhere on Earth. The GPS satellites transmit signals to device on the ground and receivers passively receive satellite signals. It works only when GPS antenna is placed with access to 'open sky' which means line of sight to a GPS satellite.