

▶ Integrated Power Solution

▶ SYSTEM INPUTS

Room Temperature range:-40 + 140C / accuracy 2%) (sensor included)

Ambient temperature range:-40 + 140C / accuracy 2%) (sensor included)

Generator temperature range:-40 + 140C / accuracy 2%) (sensor included)

Compressor 1 current (Range 5A)

Compressor 2 current (Range 5A)

Exhaust fan current (Range 5A)

Common electricity current (Generator 1 or 2 or public) (Range 5A)

Wind turbine current (Range 5A)

Battery current (shunt 200A)

Common electricity Voltage (Generator 1 or 2 or public)

Wind turbine Voltage (240VD input)

Battery Voltage

▶ SYSTEM DIGITAL OUTPUT

Air Condition Unit 1

Air Condition Unit 2

Exhaust fan

Wind Turbine enable

Generator 1 enable

Generator 2 enable

Battery testing resistive load

No.	Name	Size	Qty
1	Wind Generator	2KVA	1
2	Wind Generator Controller	2KVA Controller	1
3	Tower	8M	1
4	Winch	Tower Accessories	1
5	Diesel Generator	13KVA/240V	1
6	Batteries	200AH/12V	8
7	Rectifier		1

Typical System Configuration

▶ BENEFITS

Reliable Control over the whole system.

Cost savings through efficient utilization of power.

Local / remote management of site.

Reliable & consistent feed to the equipment providing uninterruptible power supply.

User friendly embedded Graphical User Interface for cost and time saving and ease of configuration.

Built-in memory registering all system events timings (error occurrence and automatic fixing)

▶ RESOLVES

Power usage in remote locations

Remote site power grid solution.

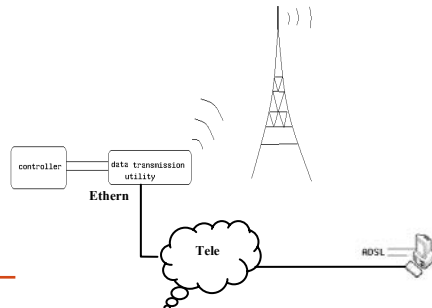
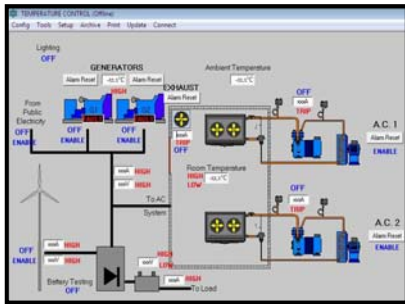
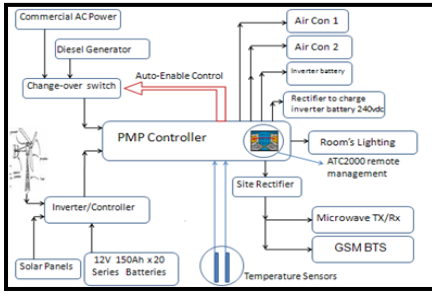
remote site management information and statistics.

Solar and based wind solution to reduce operational expenditure.



Phone: +44 20-3397-0670
 Fax: +44 20-3397-0671
 E-mail: sales@spectrummea.com
 www.spectrummea.com

Spectrum UK Ltd
 United Kingdom



▶ System Components

Telecom Sites especially Mobile Base Station (BTS) sites are invariably located across the country and sometimes in remote places where availability of electricity is either unstable or non-existent. This situation is somewhat more applicable to developing countries where National Electric Power Grid System are mostly located in towns and cities.

The alternative electric power source to the National Power Grid System has been the use of small petrol or diesel powered generators to provide sufficient electric power for BTS sites. These generators usually run continuously resulting in very high maintenance requirements as well as regular refuelling. However this has been the only viable option until now.

THE NEED to REDUCE OPEX BY MOBILE OPERATORS has never been greater. Increasing competition is driving down ARPUS and ever increasing operational cost to maintain remote low revenue generating sites is effecting the bottom line.

The Integrated solution from Spectrum provides Wind Turbines, Solar Panels and Maintenance Free Batteries together with the Power Management Panel (PMP).

The PMP is at the heart of the System. It manages the various power sources and also manages power consumption to ensure efficient utilization of existing resources.

The PMP System provides remote/local power management at a typical cell site. In addition provides live monitoring and alarm history. The PMP manages switching amongst wind turbine, power generator & other power sources to assure consistent power supply to the equipment. Temperature sensors automatically control air conditioners to keep site at optimal temperature there by saving power/cost. Temperature and voltage Levels sensors provide programmable control to automatically switch the power generators and Air Conditioners. The block diagram describes the different components of the system.

GUI Based Configuration System

The Graphical User Interface based software provides easy local & remote system configuration, maintenance and handling. The user friendly environment enhances the system understanding and functionality towards remote management. Please see figure describes different components of the GUI based software.

Remote management

An external data transmission utility can be connected to the controller. It stores essential system parameters that can be forwarded into a pc via wireless eg. GPRS and via Ethernet. Data frequency and number of parameters can

be chosen freely to determine the storing period In addition there are two analog input ports in the data transmission utility .These Ports can be used to connect with the wind turbine to provide additional information Such as wind, speed, module temperature...



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 Fax: +44 20-3397-0671
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 www.spectrummea.com

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▶ Remote Access

Remotely configurable parameters and Alarms settings through GUI

1-Room Settings:

ROOM SETTINGS

SYSTEM ENABLE
A.C.1 A.C.2

DELAY TIMERS
Startup Delay Time: []
Compressor Maximum Running Time: []
Lighting ON Time: [00:00] []
Lighting OFF Time: [00:00] []

ROOM TEMPERATURE SETPOINTS
Exhaust Temp Setpoint: []
Second Compressor Temp Setpoint: []
Cooling Temperature High Setpoint: []
Cooling Temperature Low Setpoint: []

ROOM TEMP. ALARM LIMITS
Floor Temperature High Limit Alarm: []
Floor Temperature Low Limit Alarm: []

SENSOR CALIBRATION
[] [] [] []

CURRENT SETTINGS
A.C.1 CURRENT High Limit Alarm: [] []
A.C.2 CURRENT High Limit Alarm: [] []
EXHAUST CURRENT High Limit Alarm: [] []

CANCEL

2-Current Settings:

GENERATOR & PUBLIC ELEC. SETTINGS

SYSTEM ENABLE
GEN.1 GEN.2 PUB. ELEC.

DELAY TIMERS
Generator Maximum Running Time: []

VOLTAGE AND CURRENT SETTINGS
ELEC VOLTAGE
High Limit Alarm: [] []
ELEC CURRENT
High Limit Alarm: [] []

GENERATOR TEMP. ALARM LIMITS
Gen. Temperature High Limit Alarm: []

SENSOR CALIBRATION
[] []

CANCEL

3-Wind Turbine Settings:

WIND TURBINE SETTINGS

SYSTEM ENABLE
WIND

VOLTAGE SETPOINTS
Start Voltage: []
Stop Voltage: []

VOLTAGE AND CURRENT ALARMS
WIND VOLTAGE High Limit Alarm: [] []
WIND CURRENT High Limit Alarm: [] []

CANCEL

4-Battery Settings:

BATTERY SETTINGS

VOLTAGE AND CURRENT SETTINGS
BATTERY VOLTAGE
High Limit Alarm: [] []
Low Limit Alarm: [] []
BATTERY CURRENT
High Limit Alarm: [] []

VOLTAGE SETPOINTS
Not Empty Voltage: []
Empty Voltage: []

BATTERY TESTING
Battery Voltage: []
START BATTERY TESTING

CANCEL