PowerOptimal PowerGuard Commercial Range User Manual v1.5

POWEROPTIMAL

THE FUTURE OF ENERGY

POWERGUARD

PowerGuard Commercial Range User Manual

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Author(s): Dr. Sean Moolman

Mr. Johan Theron

General contact: sean.moolman@poweroptimal.com

082 788 1615

Technical contact: johan.theron@poweroptimal.com

083 600 1827

Address: PO Box 39521

Capricorn Square

7948

Cape Town

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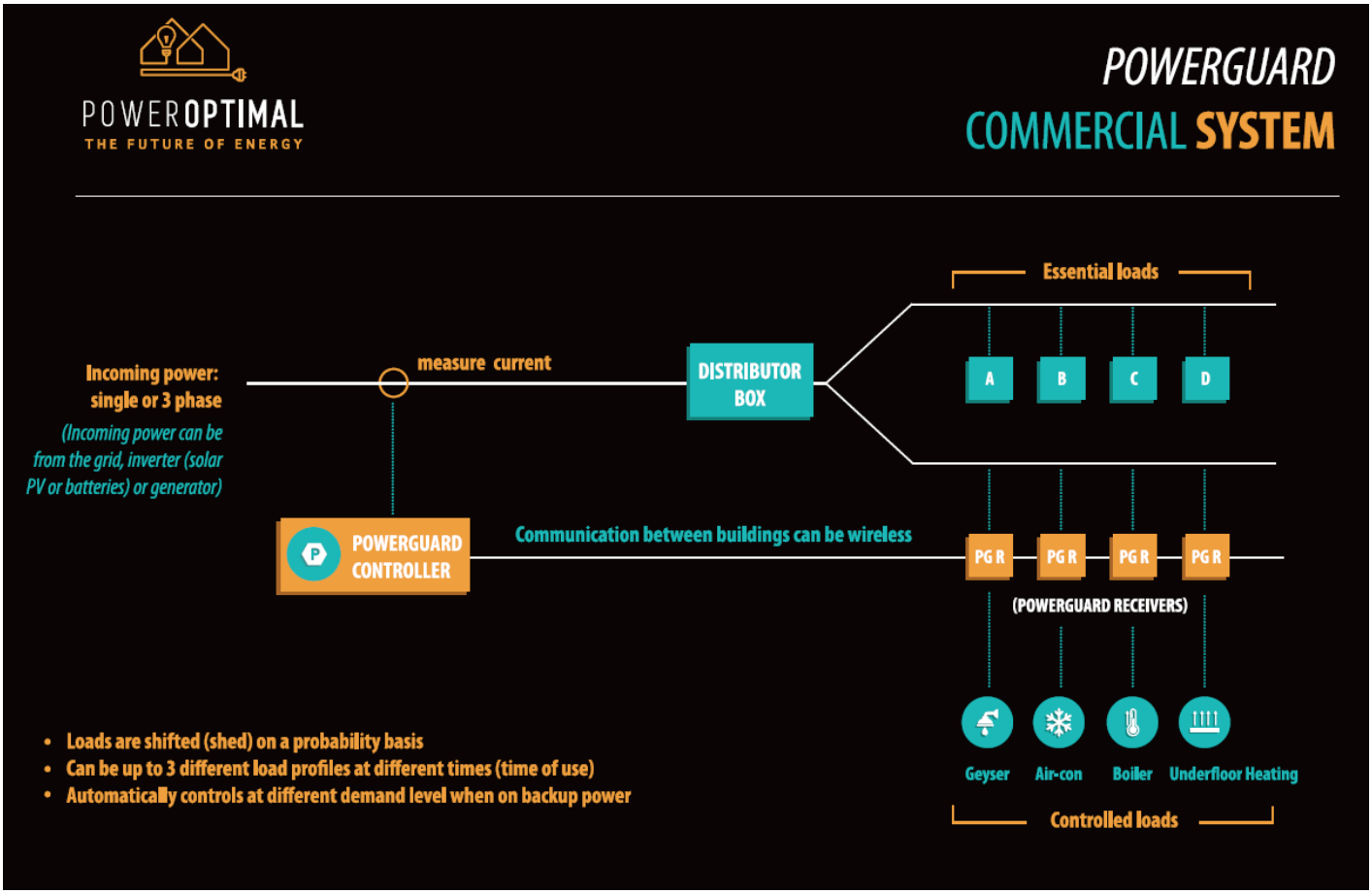
1. PowerGuard unit operation

The PowerGuard system is fully automated and has been designed to require no user intervention.

1.1 System operation

The below simplified diagram shows how the PowerGuard system is connected to a facility’s electrical system.



The PowerGuard Controller measures the total incoming current using current transformers installed on the incoming power line(s) (either single phase or 3 phase). It also measures the average voltage on the incoming power line(s).

Based on the measured current and voltage values, the Controller calculates the power demand (in kVA) for the facility. This value (total power demand of the facility) is displayed on the LCD screen.

a. Normal operation

Based on the preset **control level**, the PowerGuard Controller will start sending out **shed requests** to all the Receivers (PG R in the diagram). Each Receiver has its own pre-set settings that determine how it will respond to the controller – specifically, how regularly it should switch off (probability of responding), for how long it should switch off, and for how long after a previous switch-off it should not switch off again (see Section 1.4).

The Controller will continue to send shed requests until the power demand stabilises at a level below the control level.

This simple configuration allows a lot of flexibility in how the facility can be managed, and effectively distributes switch-off of loads across the facility in a balanced manner. (However, it is not necessary to change ANY settings once the system has been commissioned and configured by PowerOptimal. The overall **control level** can be changed if there are substantial changes to occupancy or circumstances, but no other settings need to be changed.)

The facility can be controlled either at a maximum current value (A) or a maximum demand value (kVA). This setting is found on the Controller (see Section 1.3). Whether it is controlled at maximum current value or maximum demand value is determined by the main purpose of the system – i.e. is it to (i) alleviate power supply constraints, or (ii) reduce demand charges. **Note:** this setting is typically only configured once (during installation) by PowerOptimal, and there is no need to change it.

(i) Power supply constraints – control at maximum current (A)

If the facility has power supply constraints (e.g. experiencing power trips), control at a maximum current value is more suitable, since loads will then only be shed on the phase that requires reduction in current to avoid power trips. The online monitoring system can be used to determine whether load balancing across the phases can be improved – e.g. if one notes that a specific phase is the main or only cause of shedding, loads can be moved from that phase to another phase.

(ii) Reducing demand charges – control at maximum demand (kVA)

When demand charge (electricity cost) reduction is the main purpose of the system, then it is better to control the facility's power use on a maximum demand (kVA) basis, since this is what demand charges are calculated on by the utility / municipality.

b. Time of use settings

The system can be configured to manage at three different control levels based on input from timers: 'normal', and two time of use settings. It can also be configured to completely switch off all loads at certain times. Please speak to a PowerOptimal representative if you wish to implement any of these settings. It will require installation of one or more timers.

c. Backup power setting

The system can be configured to automatically detect when there is a switch to backup power, and to manage at a different control level on backup power. Please speak to a PowerOptimal representative if you wish to configure the system for backup power management.

d. Power failures

When power returns after a power failure, the system will wait four minutes for the power to stabilise, and then it will systematically switch on the loads in a staggered manner, in order to avoid the cold pick-up power demand spike.

All controlled loads are protected against under- and overvoltage, and will be switched off should such an event occur.

1.2 LCD screen readout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