WT2500 MANUAL

SYSTEM SPECIFICATION

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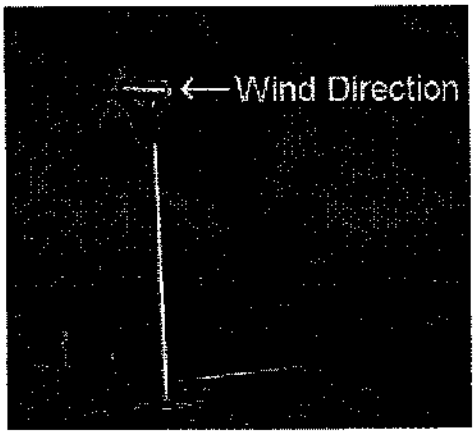

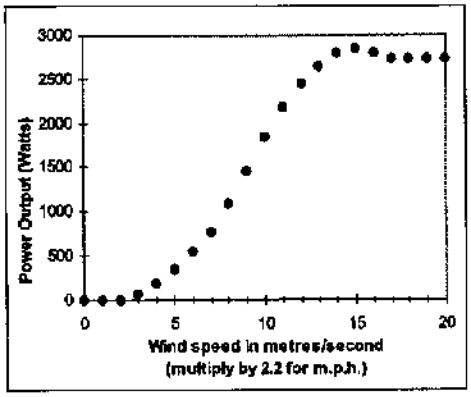

Rotor Speed Control

Above 12m/s (25mph) the blade pitch is automatically adjusted to maintain 300 rpm and full output up to 67m/s (150mph).

High Build Quality

All components are hot-dipped galvanised steel, stainless steel or plastic. All bearings are triple sealed.

Low Speed Equals Durability

Low rotor speed (half the speed of comparable machines) ensures extended durability of blades and bearings. It also means that Proven WTs are the quietest in the world!

Proven WT2500 2.5kW Wind Turbine
Proven TM650 6.5m Un-Guyed Mast

Performance

Cut-In Wind Speed	2.5 metres/second (5.6 mph)
Cut-Out Wind Speed	>70 metres/second (>155mph)
Rated Wind Speed	12 metres/second (26 mph)

Rotor

Type	Down-wind, Self-Regulating
Number of Blades	3, Flexible
Blade Material	Polypropylene
Rotor Diameter	3.5 metres (11' 1")

Generator

Type	Brushless, Direct Drive Permanent Magnet (No Gear-Box, Zero Maintenance)
Output	24/48/120V 3-phase AC (20Hz
nom)	
Rated RPM	300 nom.
Rated Power	2500 Watts
Annual Output	3000-8000 kWh depending on site

Mast

Type	Tapered, Hinged, Self-Supporting
Hub Height	6.5m (21' 4")
Foundation	1 m^3 concrete (no guy wires)
Base ∅	300 mm (11.8")
Top ∅	150 mm (5.9")

Noise (all readings taken with an ATP SL-25 Portable Meter)

45dB	At 5m/s
60dB	At 20m/s
70-80dB	Car 15m away at approx 40 mph.

Weight

WT2500	200 kg (440 lb.)
TM650	190 kg (418 lb.)

Sample of UK Commercial Customers

British Telecom	Scottish Youth Hostel Association
British Rail	Irish Lighthouse Authority
Welsh Water	UK Lighthouse Authority

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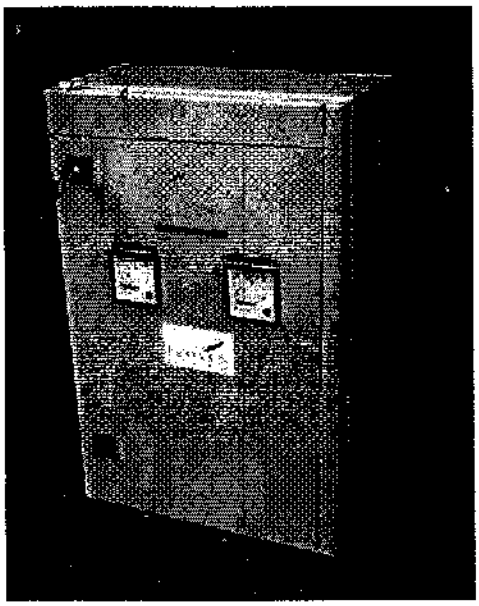
Proven ECM2501/ECM2502
24V/48V Wind Turbine Controller



Functions

Voltmeter, Ammeter, Rectification of 3-phase input from WT2500, Isolator, Low Battery Voltage Warning, Multi-Mode Charging Control plus Solar PV connections.

Mode 1: Full Charging

To 120A/60A at nominal 24V/48V

Mode 2: Excess Energy Divert (Battery Full)

2 DC (ECM2501 only) & 3 AC Divert Load Relays are switched in sequentially to prevent battery overvoltage (Up to 5 AC Divert switches on request).
Each switch has pre-set 'ON at' and 'OFF at' Voltages.

Mode 3: Reduced 'Trickle' Charging (Dump Load Fail)

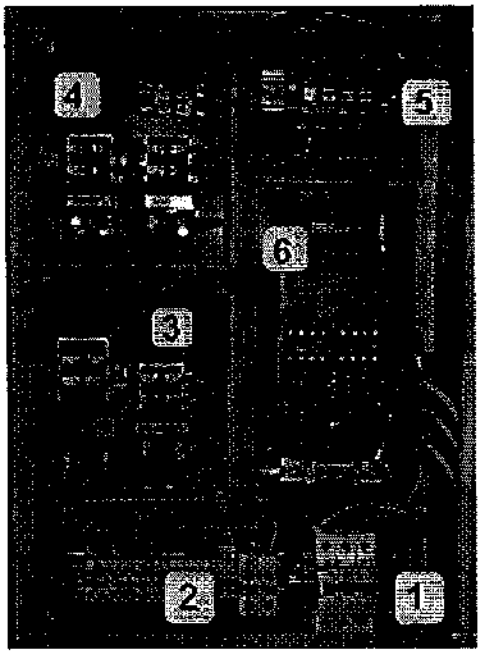
Charging reduced to 20A max by series resistor on input.

Mode 4: Auto-disconnect (Second Fail Safe)

WT runs off-load

Enclosure

IP66 Box, height: 600mm, width 400mm, depth 200mm.. Heatsink for rectifier on RHS adds 50mm to overall width. All connections via glands in base.



LED Indicator Display

1. (Green)	Volts High, WT Disconnected
2. (Green)	Volts High, Trickle Charging
3. (Red)	Volts High, DC Dump 1 On (ECM2501)
4. (Yellow)	Warning, Volts Low
5. (Red)	Volts High, DC Dump 2 On (ECM2501)
6. (Red)	Volts High, AC Dump 1 On
7. (Red)	Volts High, AC Dump 2 On
8. (Red)	Volts High, AC Dump 3 On

Layout

1. Minature Circuit Breaker (MCB) WT Isolator
2. Terminal Strip
3. Full & Trickle Charge DC Contactors
4. DC Dump Contactors (ECM2501 only)
5. AC Dump Relays
6. Control Circuit (includes LED Indicator Display)

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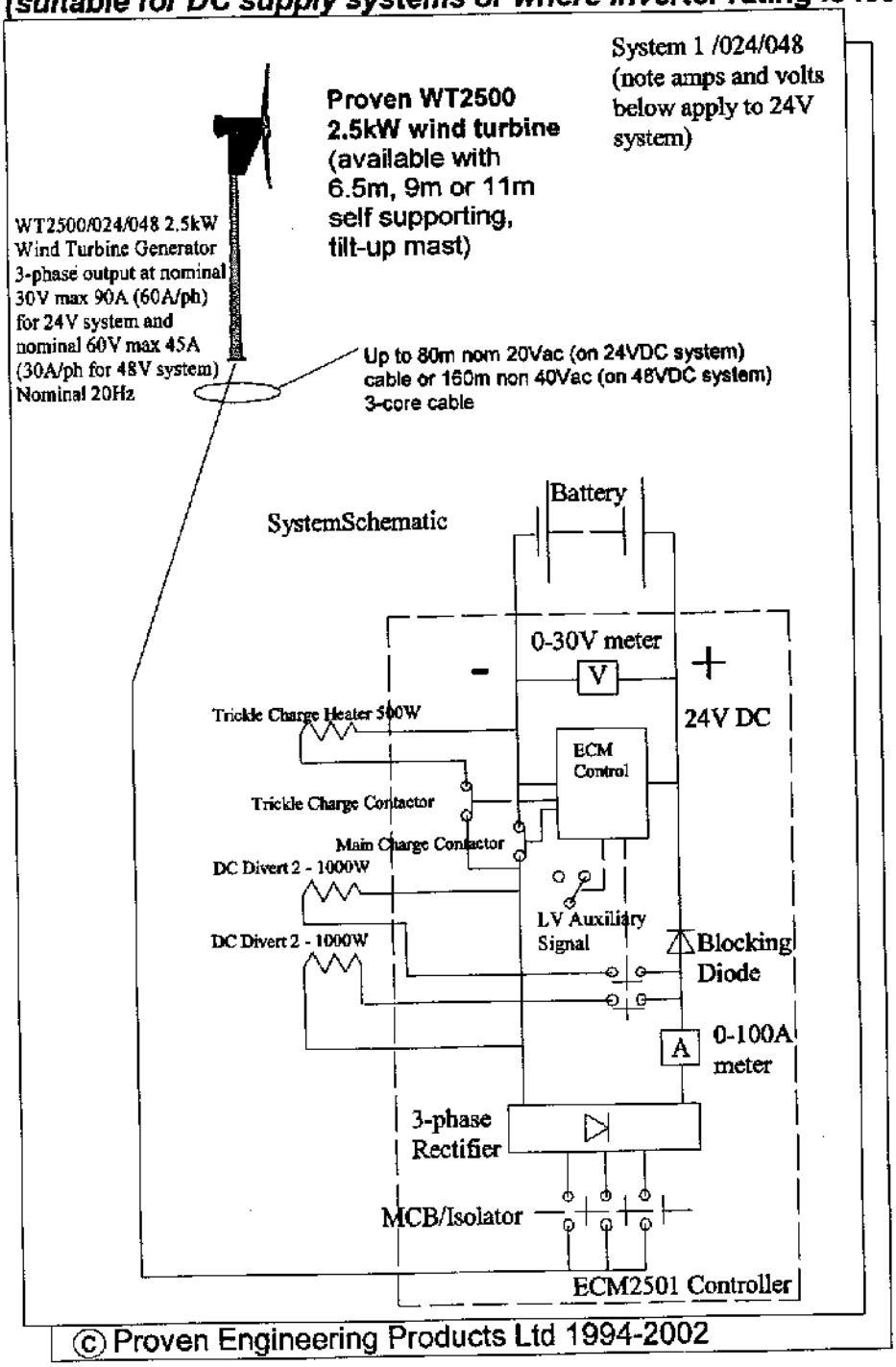
System 1 - Proven 24V/48V Battery Charge with 24V/48V Heat Dump

(suitable for DC supply systems or where inverter rating is less than WT)



System 1 gives full power output to battery charging (at up to 90 Amperes on a 24V system) until the battery is full and the voltage rises to just about gassing level.

If the battery voltage tries to rise further then a 1kW 24V heating load is switched in to use the excess power.

If the voltage still rises then a second 1kW load is switched in. This should control the battery top voltage is most conditions. If there is a sustained high wind or a heating load is lost then if the battery voltage rises a little further the main charge contactor opens and the wind turbine output is fed through the trickle charge resistor/heater with the result of reducing input amps to 10-20% of normal values.

There is a further level of control to protect batteries: should battery voltage still continue to rise then the trickle charge contactor opens and no power input is allowed from the wind turbine. The wind turbine then spins free and will run up to its maximum speed when the Proven ***Zebedee Furl*** mechanism will twist the blades to stall to control rotor speed.

Each stage of control is by means of a bistable switch which has a voltage gap between on and off levels to provide stability. This gap is adjustable and is preset for average battery conditions.

The blocking diode shown is optional. Use the blocking diode to run the divert loads directly from the turbine. This will protect the battery from very mild cycling at very close to float voltage but get less heat output from the divert loads (turbine is not optimally loaded).

Short out the diode to run the divert loads from the battery. The battery will be cycled close to float voltage as divert loads come on and off but you get much more divert power.

Filename: 2500 SS 003 rev3 draft 1.drw
Package: Micrografx Draw
Author: BR
Date: 10/04/02

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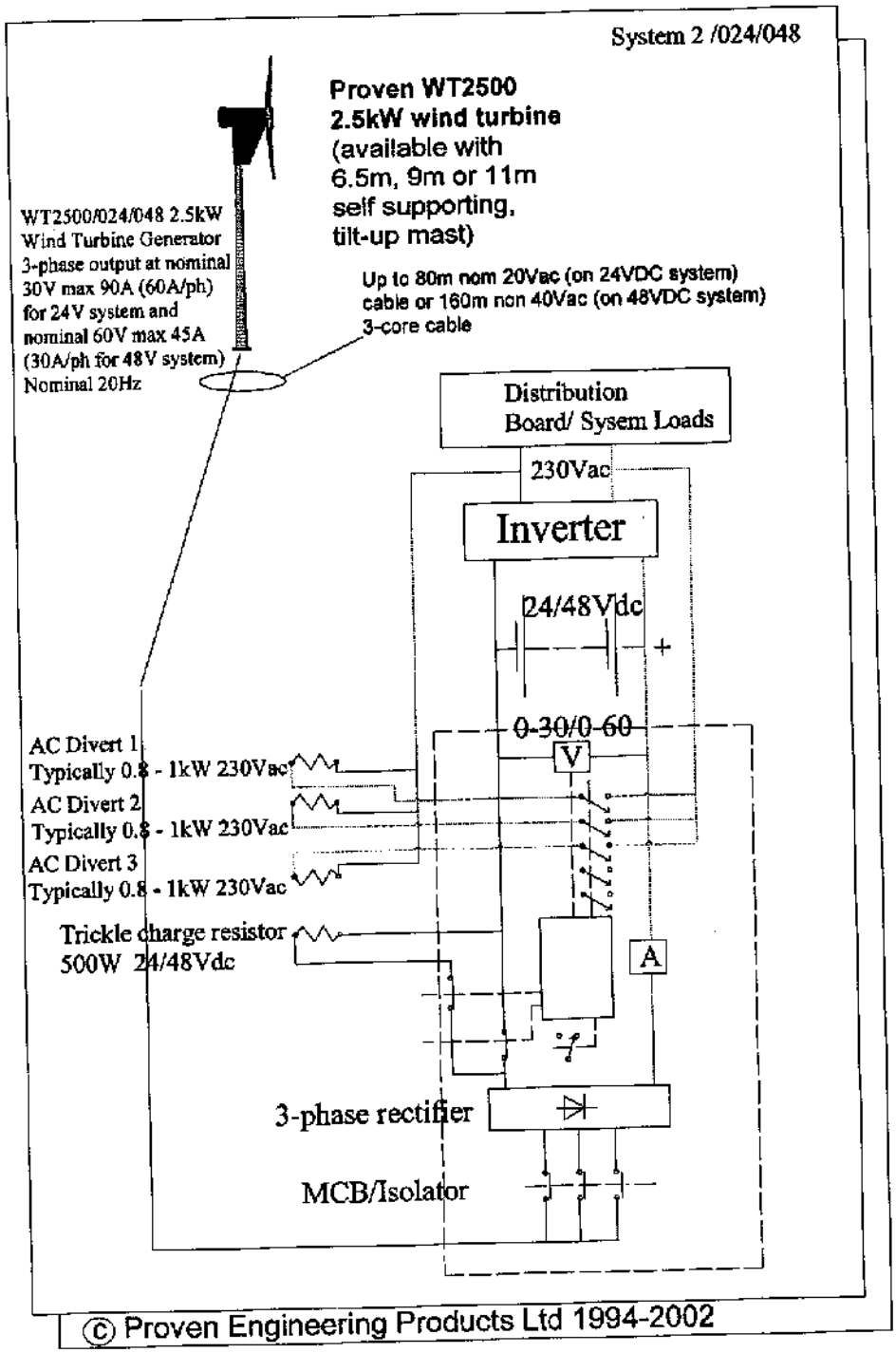
System 2 - Proven 24V/48V Battery Charge with AC Heat Dump

(suitable for domestic or commercial systems where inverter rating is more than WT)



Filename: 2500 SS 004 rev3 draft 1.drw
Package: Micrografx Draw
Author: BR
Date: 11/04/02

System 2 gives full power output to battery charging (at up to 90 Amperes on a 24V system) until the battery is full and the voltage rises to just about gassing level.

If the battery voltage tries to rise further then a 1kW 230Vac heating load is switched in via the inverter to use the excess power.

If the voltage still rises then a second 1kW load is switched in. A third 1kW load may be provided if one of the first ones will trip out on a thermostat setting (e.g. immersion element). 3 AC divert load AC relays are provided within the ECM2502 as standard although 2 more can be fitted on request. A further relay provides clean contacts low battery warning signal.

If there is a sustained high wind or a heating load is lost (e.g. by thermostat switch out) then if the battery voltage rises a little further the main charge contactor opens and the wind turbine output is fed through the trickle charge resistor/heater with the result of reducing input amps to 10-20% of normal values.

There is a further level of control to protect batteries: should battery voltage STILL continue to rise then the trickle charge contactor opens and no power input is allowed from the wind turbine. The wind turbine then spins free and will run up to its maximum speed when the Proven ***Zebedee Furl*** mechanism will twist the blades to stall to control rotor speed.

Each stage of control is by means of a bistable switch which has a voltage gap between on and off levels to provide stability. This gap is adjustable and is preset for average battery conditions.