
DL300 Charge Controller
Installation & Operation Guide



PWM Charge Controller for use with 12v and 24v wind turbines

Leading Edge Turbines Ltd

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Disclaimer

- All specifications are subject to change without prior notice.
- The information given in this user manual is believed to be accurate and reliable. *Leading Edge Turbines* assumes no responsibility for omissions or inaccuracies.
- The user of this information and product assumes full responsibility and risk.
- The Micro-Turbine is a source of electrical power. It must be installed in accordance with local building and electrical regulations. Consult your local planning (zoning) office for details.
- The Micro-Turbine has moving parts that may cause injury due to poor installation and unsafe operation. *Leading Edge Turbines* assumes no responsibility for problems caused by unsafe or unsatisfactory installation or operation.

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Compliant with
EN BS 61400-2: Safety of Small Wind Turbines

Introduction

Please read this manual thoroughly before attempting to assemble, install or operate your *DL300 Charge Controller*. This will assure optimum performance and safety.

The DL300 Series Dump Controller and Load is an integrated solution designed to prevent 12 or 24 volt batteries from overcharging. It is designed to be used with small wind systems operating a LE300 or LE600 Micro-turbine. Compact and easy to install, the DL300 was developed especially for Leading Edge Turbines range of Micro-turbines. It incorporates a 300 watt resistor / heater and controller board in a stout powder coated steel enclosure.

Operation & Specification

As the turbine charges the batteries the State of Charge (SOC) and battery voltage will rise. Once the batteries reach full capacity, the dump load controller begins to bleed power from the turbine into the dump load. This energy is then dissipated as heat into the surrounding environment. More or less power is diverted to the dump load according to how much power is being supplied to the battery and also in relation to the state of charge of the battery.

Specification

- PWM (Pulse Width Modulation) for highest charging performance without flicker
- Selectable three stage charging or over voltage protection mode
- Selectable for sealed or flooded batteries

Power, 12 volt version, DL300-12:

- Recommend fuse or circuit breaker: 30 amps
- Integrated load resistor: 300 watt, wire wound
- Quiescent current when not load dumping: 2.6mA @ 12 volts

Power, 24 volt version, DL300-24:

- Recommend fuse or circuit breaker: 15 amps
- Integrated load resistor: 300 watt, wire wound
- Quiescent current when not load dumping: 3.0mA @ 24 volts

Connections

- #10-32 brass screws for V+ and V-
- Two 1/2" / 3/4" concentric NPT knockouts and two 1/2" NPT knockouts

Mounting

- Mounts to vertical concrete, metal, drywall or other non-flammable surface.
- Uses four #10 screws
- Body sits 19mm out from wall
- Enclosure suitable for indoor mounting

Weight and Dimensions

- Dimensions: 88mm wide, 95mm tall, 470mm long (3.375x 3.75 x 18.5 in)
- Weight: 1.94 kg (4.28 pounds)
- Shipping Dimensions: 102 mm wide, 108 mm tall, • 508 mm long (4.0 x 4.25 x 20 in)
- Shipping Weight: 2.15 kg (4.75 pounds)

Materials

- Enclosure: 18 gauge mild steel, powder coated black
- Circuit board: FR-4, 1.6mm (0.062 in), double sided, plated through holes, solder mask, silk screen, gold plating.
- Hardware: stainless steel, zinc plated steel, aluminium, and Nylon

Safety Precautions

Safety must always be your primary concern during the assembly, installation and operation of your *Leading Edge Turbines* wind turbine and DL300 charge controller. Always be aware of the risks involved with mechanical and electrical installation work. If in doubt about any issue regarding your turbine system, please seek further assistance before proceeding.

Mechanical Safety Hazards

- Whilst installing the DL300 charge controller or when performing routine inspection or maintenance, always stop the turbine by activating a stop switch.

Electrical Safety Hazards

- The *LE300* or *LE600* generates rectified DC voltage and the DL300 controller also operates at these voltages. Even at these low voltages there are inherent risks. Caution should always be used when connecting a wind turbine or DL300 controller to the electrical system.
- Ensure that you have followed the cable-sizing guidelines to ensure that the correct size of cable has been selected. If a cable of insufficient cross-sectional area is used at any point in the electrical system, heat will build up in the cables causing a potential fire hazard. A properly sized fuse or circuit breaker should be used in the cables connected to the battery. This will stop the risk of short circuit currents.
- Batteries used in renewable energy systems can deliver a serious amount of current. A short circuit in the battery circuit can lead to hundreds of amps flowing through the battery cables. This will cause a heat build up and ultimately an electrical fire. Batteries can explode when shorted. Always use insulated electrical tools when working on the battery's electrical connections.
- Batteries are very heavy. Do not attempt to move batteries by yourself. Always use manual handling tools and an assistant.
- Always keep lead-acid batteries the correct way up. Do not allow the acidic electrolyte to spill or come into contact with your skin or face. Always follow the manufacturer's safety instructions when handling lead-acid batteries.

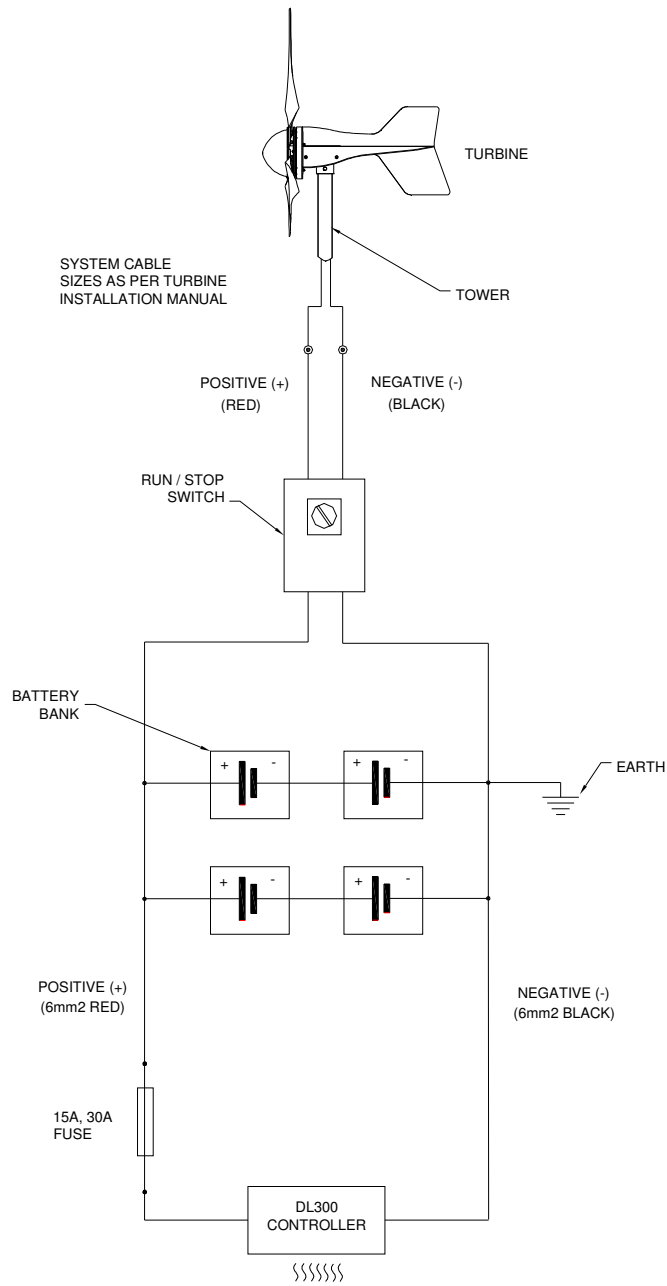
Please use common sense when installing and operating your turbine and DL300 Charge Controller

Electrical Installation

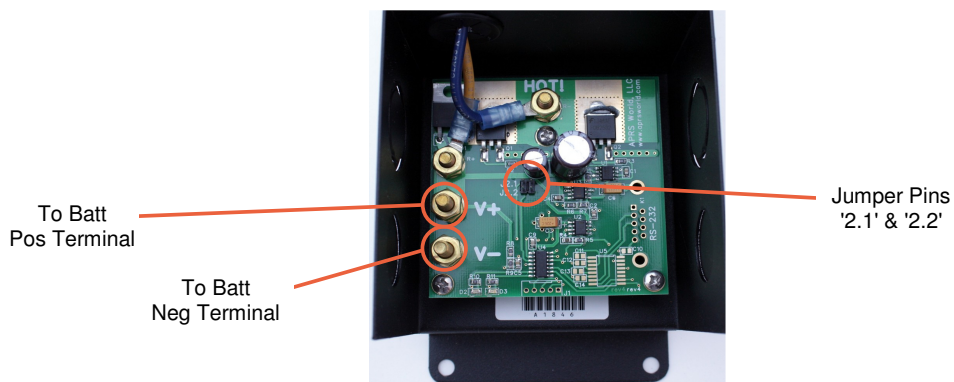
Please refer to electrical schematic for appropriate generic wiring diagrams. In a battery charging renewable energy system, there may be different ways of wiring small wind turbines, photovoltaic panels, charge controllers and batteries together. This type of system will often expand 'organically', but the following guidelines should be followed:

- **Location** – The DL300 controller should be mounted in an adequately ventilated area, which is not exposed to moisture or spray. The dump load elements become hot during normal operation and should not be covered or blocked.
- **Gel or Flooded Batteries** – An electrical jumper can be configured in order to make the controller more suitable for use with Gel batteries. A jumper (supplied) should be applied to pins labelled '2.2' when the DL300 is to be used with flooded batteries. When the DL300 is to be used with Gel batteries, no jumper should be applied to pins '2.2'. No jumper should ever be applied to pins '2.1'.
- **Use the correct voltage controller** – A 12v DL300 controller should only be used on a 12v battery system. A 24v DL300 controller should only be used on a 24v battery system. Do not interchange. If using the DL300 for the LE600 wind turbine 2 x DL300 units need to be installed in parallel. DL300's **cannot** be used on a LE600 48V wind turbine, please contact us for more information and support.
- **Follow the appropriate electrical code** - The electrical wiring of your turbine and associated electrical systems must be done in accordance with national and local electrical codes and regulations.
- **Do not connect the turbine or batteries during the installation** - Ensure that the turbine is not running or connected to the batteries during the installation or wiring process. Connect the output cables of the turbine together to prevent the rotor from starting up.
- **Galvanic corrosion of electrical joints** - Try to avoid connections between dissimilar metals. For example, connecting copper and aluminium together will result in galvanic corrosion of the connection. This will increase the electrical resistance of the connection (wasting energy) and reduce the mechanical integrity of the joint. Where possible use a fluxed solder to make electrical joints.
- **Protect the cables** - The power transmission cables must be protected from mechanical damage and fatigue. Run the cables through an approved conduit / trunking.
- **Cable strain relief** - Prevent mechanical strain on all cables. Cable ties or cable glands are a good way to prevent mechanical strain on the cables.
- **Cable Selection** - The cable size table shown on page 12 should be used to select the minimum sized cable for a given transmission distance. Voltage drop in the cable will be improved if a larger cable is used. We recommend using 'Tri-Rated' cable as it should comply with the wiring codes for your area.
- **Fuses** - The DL300 controller should be protected with a suitably rated 'slow-blow' DC fuse or DC circuit breaker. Please refer to the table below for the correct rating. The fuse or breaker should be positioned between the DL300 and batteries (on the positive cable)

Nominal Voltage	DC Fuse / DC Circuit Breaker Rating
12V	30 Amp
24V	15 Amp



Typical 'Stand-Alone' Battery Charging Wiring Diagram



Electrical Connections of DL300 Controller

Warranty

Your *DL300 Charge Controller* carries a two-year warranty from the original purchase date.

During the warranty period any component found to be defective in material or workmanship will, at the discretion of *Leading Edge Turbines*, be replaced or repaired at no charge.

For minor component failures, replacements may be sent directly to the customer / dealer for replacement. For more serious defects we may suggest a 'return-to-base' arrangement for replacement or repair. In all cases *Leading Edge Turbines* will take reasonable action to ensure customer satisfaction. You will always receive a warm, courteous service in or out of your warranty period.

Your equipment must be installed and operated in accordance with this guide and local codes. Failure to do so will result in this warranty becoming null and void. Any unauthorised modifications to the equipment will void the warranty and may compromise the safety of the machine.