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Aria Libellula DC

Wind turbine for battery centric systems

1. GENERAL

Libellula DC is a special version of *Libellula* 55kW, designed in order to be used in stand-alone systems, not connected to the electrical network (off-grid).

Mechanical and aerodynamic characteristics are those of the standard on-grid model *Libellula* 55kW, while the electrical control system is designed to be connected with an external battery bank.

The wind turbine is able to charge the battery bank, for the electrical supply of isolated users and for the electrification of remote areas without grid availability.

Libellula DC allows the composition of a small and simple stand-alone power station supplied by renewable energy sources and equipped with accumulators for energy storage. Stored energy will be available in case of lack of wind.



2. TYPICAL APPLICATIONS

Libellula DC is suitable to build stand-alone systems ideal for supplying:

- isolated communities
- pumping, desalinization, water purification systems
- telecommunication plants
- refrigerating systems
- isolated holiday resorts
- electrical machinery in isolated yards

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3. TECHNICAL SPECIFICATION

Libellula DC is provided with the same rotor and generator of *Libellula 55kW* on-grid turbine model, therefore its main features are:

- two-bladed high performance rotor with passive pitch regulation;
- reliable industrial asynchronous generator;
- tubular tower with internal ascent ladder;
- internal access to the nacelle for easy and cheap maintenance;
- “industrial” concept design oriented to easy operation and maintenance.

The energy conversion system has been modified, compared with that of *Libellula 55kW* in order to work in parallel with a battery bank.

Wind energy is captured by the rotor and is transformed in electric energy by the three phase asynchronous generator; then it is converted into direct current by means of a regenerative industrial inverter.

Once the battery bank is completely recharged and the DC bus voltage reaches the programmed level, the turbine is automatically stopped.

Technical data:

Cut-in wind speed	3 m/sec.	Nominal output voltage	640 Vdc
Nominal wind speed	11 m/sec	Tower	tubular
Cut-out wind speed	25 m/sec.	Number of sections	2 or 3
Extreme wind	$V_{e50} = 52,5$ m/sec.	Hub height	19m - 25m - 31m
Nominal power	60kW	Material	hot dip galvanized steel
DC bus voltage	640Vdc	Location ascent	internal
Number of blades	2	Remote control	YES
Rotor diameter	18 m	Yawning system	active
Rotor speed	variable 60 - 95 rpm	Yawning motor	n.1
Gearbox	2 stages – parallel axes	1st safety system	passive blade pitch
Ratio	1:20	2nd safety system	yawning out of the wind
Nominal power	125 kW	Rotor weight	900 kg
Generator type	asynchronous – 4 poles	Nacelle weight incl. rotor	2.900 kg
Nominal power	63 kW @ 60Hz/90rpm	Tower weight	5.700 kg (H=25m)
Nominal voltage	400 V		
Converter type	inverter		
Conversion principle	regenerative with DC output		