

WIND

POWER IN CONTROL

RENEWABLE ENERGY CONTROLS



power in control

Pure, green energy

Wind power is the conversion of wind energy into more useful forms. For centuries, it was used for milling of grain, pumping water and the operation of sawmills. But today, wind turbines are used to convert wind energy into electricity – the most refined form of energy. And wind power is the fastest growing of the renewable energy technologies.

In fact, the production of windpowered energy has become ever-more important, and although it currently produces less than 1% of world-wide electricity use, wind power generation more than quadrupled between 2000 and 2006.

DEIF's power management systems, wind sensors, controllers and protection relays for wind power have been developed on the basis of seven decades of experience. Experience gained from a variety of other business areas that require the same from us. To deliver solutions that keep power in control and are customised to fit your requirements.



Not only our products were built to last

DEIF is a world leading manufacturer and supplier of systems for control, protection and parallel operation to the grid for all types of generators. Having commissioned many thousands of controller systems for parallel operation under harsh weather conditions, we know how to manufacture, commission and service customised systems that last.

Our products have been delivered to the renewable energy sector for decades. As a result, we have accumulated extensive knowledge within this particular area and are now a worldwide player in the business.



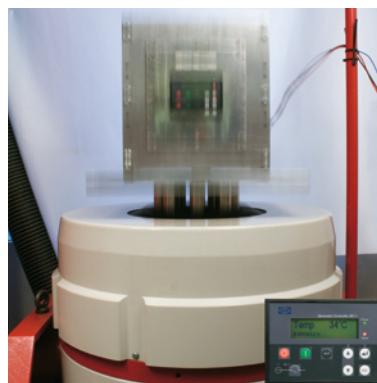
We have the size and staying power to offer our customers an unrivalled level of product flexibility. And we aim to build lasting partnerships in which customised OEM solutions can be developed.

Product philosophy

Constant, reliable operations are the alpha and omega of electricity production. A plant breakdown is extremely expensive and leads to tremendous inconvenience for consumers.

Electronic control systems are the central nervous system of power systems and they must be able to react rapidly and have a very long lifetime.

At DEIF, we realise that our responsibility does not cease at the end of the warranty period. We design our products and systems so that they have as long a useful life as the plant they are part of – typically 20 years at minimum.



All DEIF products are tested at our own laboratory and, among other things, are subjected to vibration tests. This is one aspect of our ISO 9001 quality management.

Own test laboratory

All DEIF products are tested at our own laboratory and type approved by leading classification companies. In fact, our products often exceed classification requirements as our own norms are even more rigorous. Why? Because this ensures our customers unproblematic operation.

Controls for all kinds of turbines

The past two decades have developed wind turbines from simple mechanical machine designs into some of the world's most extreme machines.

DEIF's control concept covers the entire range. Right from simple applications with centralised I/O to advanced control systems with pitch algorithms, generator algorithms and perhaps more than 300-400 I/Os in a distributed system.

Due to our many years of experience from the wind turbine industry, we have accumulated a high degree of process knowledge thus enabling us to supply complete control systems with both hardware and software.

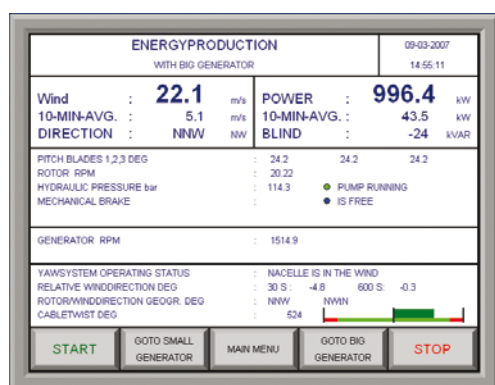
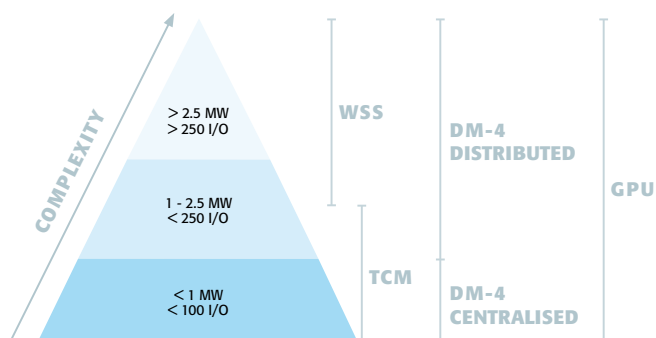
Most customers cooperate with us to describe a module design which forms the basis of the control algorithms. This eliminates the risk of misunderstandings and provides a very efficient workflow.

Others may prefer to order an extremely stable hardware with an open software structure which they will then manage on their own.



Synergy effect

Since 1933, DEIF has developed and manufactured control systems for machines and plants with a long service life in critical operation such as power plants and ships. We have developed a unique mind-set which gives us additional strength within wind power where the same conditions apply. As a result, we can offer top class solutions customised to fit your every need.



The graphical human-man-interface allows the operator to start, stop and modify operation parameters. Moreover, a test menu for each component of the wind turbine can be activated to support maintenance.

Intelligent networks

The trend in global electricity supplies points towards intelligent networks that are capable of utilising and coordinating different types of production such as hydropower stations, wind turbines, natural gas-fired power stations, and coal-fired power stations. DEIF wind turbine controllers are easily integrated in intelligent networks such as central data facilities that control many wind turbines so that they function as one major power station. This is important in modern electricity production where electricity is sold at ten-minute intervals on the electricity exchange and both underproduction and overproduction are penalised rigorously with regard to price.



The TCM-1 offers superb protection of your drive train and the grid.

Integrated system – unique updating

The Delomatic 4 rack system is a fully integrated solution including both digital and analogue input/output, PT-100 input and power measurements. The system offers operational data-logging, both event (main state log) and time-based (10 minute log), for advanced statistical documentation of system performance and operation.

Grid protection functionality (vector jump, df/dt (ROCOF) and additional functions) is incorporated, as is generator protection functionality (insulation failure, reverse power) for synchronous and asynchronous generators.

Delomatic 4 works with a standard PC-based, fully graphic human-machine-interface (HMI) for the machine operator with touch-screen support. And remote supervisor capability enables access via e.g. the internet.

The software for the HMI screens is stored in the Delomatic 4 (PCM board) itself. As a result, PC software updates become unnecessary.



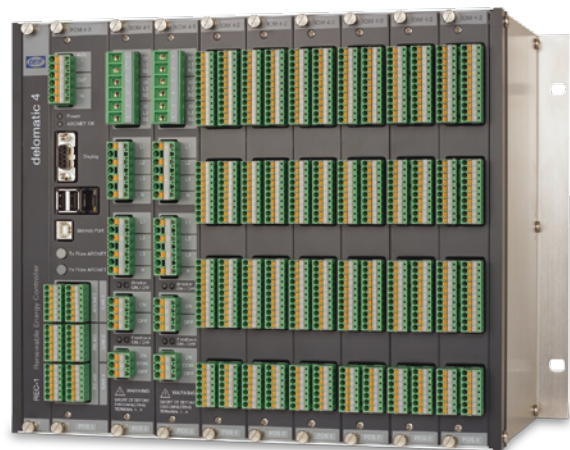
Three boards do it all!

The heart of Delomatic 4 is its modular concept. Individual solutions are provided by three main print modules to suit all applications perfectly – simple and highly efficient.

PCM – Rack system supply with main system CPU, I/O router and external communication interface.

SCM – High precision three-phase electrical measurement (class 0.5) of U, I, real power, blind power and phase angle.

IOM – Universal I/O module for standard I/O signals (temperature input, digital and analogue inputs/outputs).



Wind measuring system WSS

The WSS is a static wind sensor based on ultrasonic measurement and therefore contains no moving parts. This eliminates wear-out problems and the need for frequent service. The WSS has undergone thorough laboratory and field tests to meet strict marine approval requirements.



GPU

A controller and protection relay including everything you need for modern control and protection of synchronous/asynchronous generators. The GPU can be integrated in the network via commonly used field bus systems such as CAN open, Modbus or Profibus.

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In addition, DEIF has many distributors throughout the world.
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