

# Power Control Group

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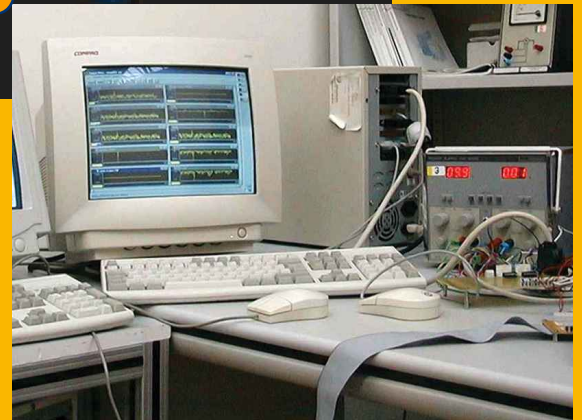


UNIVERSIDAD CARLOS III DE MADRID



# Power Control Group

Results of a power control experiment  
in a wind generator.



**The Power Control Group** is made of professors and doctoral students who are experts in developing new solutions to solve industrial problems related to the control of electrical components and systems in the renewable energy sector.

We have a great deal of experience in R&D projects dealing with the modelling and control of electrical machines. We collaborate habitually with companies in the field of generation, transport and distribution of electrical energy, providing integral services of R&D, consulting, assessment, and training.

Also, we are members of the Institute of Electrical and Electronics Engineers (IEEE) and we participate actively in the activities of the Power Electronics Society.

# READY FOR CHANGE?

Incorporating technological changes can be a daunting goal, for it requires a high level of specialisation and adequate means. Our Group offers a highly qualified human team with the most advanced technical support for:

**Designing and developing control systems for variable speed wind energy generators.** Our group has wide and proven experience in developing solutions that make possible the connection of electrical energy generated at variable frequency by variable speed wind energy generators to the grid of fixed frequency.

**Designing and developing control systems for electrical drives.** We know all the techniques required for developing electrical drive control solutions: field oriented vector control, direct torque control, parameter identification, sensorless control, etc.

**Developing solutions for integration of distributed generation into the grid.** We are specialists in providing solutions for the control of wind farms with specifications of power-frequency regulation and voltage-reactive power, with the aim of improving the integration of wind energy into the grid.

**Designing and developing control systems for grid connection of photovoltaic systems.** Currently, we have an innovative solution of industrial interest for the control of grid inverters for photovoltaic generators.

Offshore wind farm.



# OUR FACILITIES

Our laboratory has an advanced and specific infrastructure for the developing of our work.

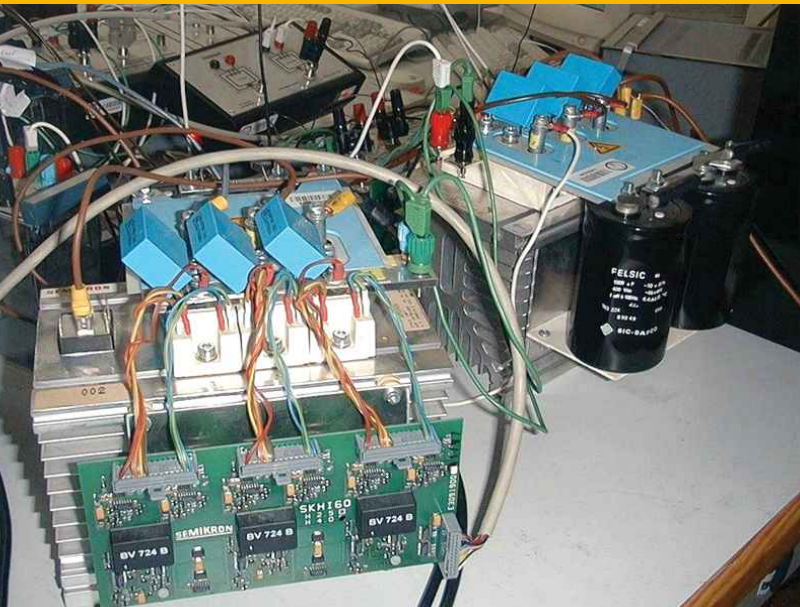
We have electrical machine banks with:

- Synchronous machine with excitation winding.
- Permanent magnets synchronous machine.
- Asynchronous machine with rotor winding.
- Asynchronous machine with squirrel cage rotor.

And also:

- Real time control cards.
- Electronic power converters.
- Instrumentation and data acquisition equipment.

Inverters of the Power Control Group Research Laboratory.



Motor – permanent magnets synchronous generator bank of the Power Control Group Research Laboratory.



# OUR EXPERIENCE

We have stable collaboration with companies of electrical energy sector. We develop R&D projects, consulting and assessment, we design tailored formation curses and we participate actively in R&D programmes at regional, national and European levels. Among our main partners and clients are:

GAMESA

ECOTECNIA

IBERINCO

PLATAFORMA EMPRESARIAL EÓLICA

Wind turbine with direct driven  
synchronous generator.





Photovoltaic experimental installation of the Power Control Group.



Results of electrical drive control experiment.

# INNOVATIVE SOLUTIONS

Our works have produced innovative solutions for solving real problems of industrial interest, like for example:

- **Control system for doubly fed asynchronous generators.**
- **Control system for permanent magnets synchronous generators.**
- **Control system for brushless AC drives.**
- **Control system for photovoltaic generator grid inverter.**

Wind turbine.





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