



-power in control

## RENEWABLE ENERGY CONTROLS



### Thyristor Control Module, TCM-2

- Operating temperature  $-25^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$
- Adaptive cut-in
- CAN bus interface

WIND

# Thyristor Control Module, TCM-2

## - built to last!



### Built to last

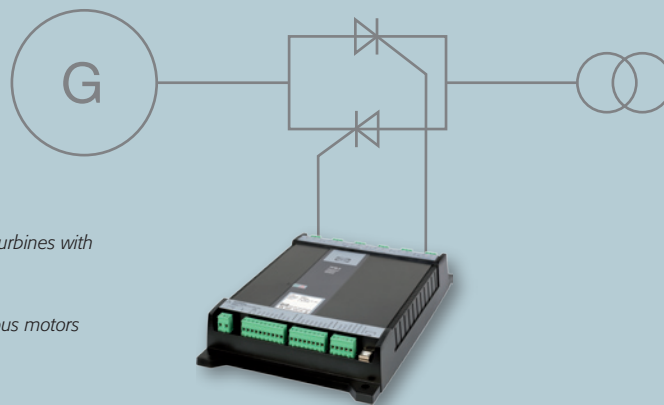
The TCM-2 is designed to operate in harsh environments. Similar to other DEIF products designed for offshore and marine applications, the TCM-2 can withstand strong vibrations and operate under temperatures far beyond the typical industrial ranges. This makes it ideal for offshore and onshore wind turbine installations.

### Stand-alone or slave – the choice is yours

The TCM-2 can be applied either as a stand-alone unit or as a slave. When operating as an intelligent stand-alone unit, the TCM-2 requires only a few standard industrial interface signals to carry out a variety of thyristor regulation strategies in real-time. Alternatively, it can operate as a slave unit under the direct real-time control of a superior process controller connected via CAN bus.

### Drive train loads reduced during cut-in

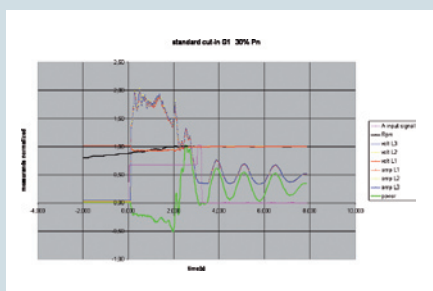
When applied as a stand-alone cut-in controller, the TCM-2 follows a highly innovative and adaptive cut-in strategy. Comparative measurements with similar products on today's market show a significant reduction of electrical and mechanical drive train loads during cut-in (as indicated in the below diagram).



#### Typical applications

- Cut-in controller for wind turbines with induction generators
- Soft starter for asynchronous motors and generators

#### Standard cut-in

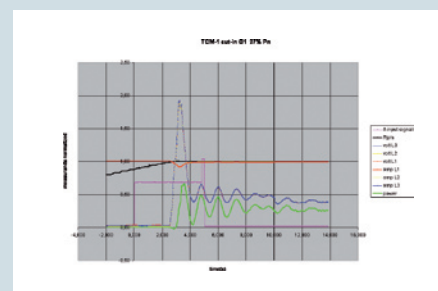


- $P_{min}$  305.4kW (duration 2 seconds)
- $P_{max}$  +610.6kW
- $\Delta t$  0.56s
- $\Delta E$  443.5kJ

◀ A standard cut-in initiates generator magnetization undersynchronously, thus operating the generator as a motor.

A TCM-2 avoids motor operation during cut-in because it magnetizes the generator exactly when the speed is correct.

#### DEIF's TCM-2



- $P_{min}$  11.4kW
- $P_{max}$  +393.6kW
- $\Delta t$  0.78s
- $\Delta E$  136.6kJ



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