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Wind Power Generation Testbench (Power Industry)

Client Background

The Client is a multinational heavy engineering company engaged in the manufacturing of wind turbines. Their stringent quality norms required them to have a system that would give them utmost confidence in every turbine that is moving out of their factory.

The Wind Power Generation Testbench (WPGT) simplifies and streamlines the process of conducting diverse wind power generation tests for end-users. It offers a fully automated system on the test bench, facilitating seamless testing procedures. The integrated data server efficiently shares test data with the ERP system, ensuring that customer orders are met with precision according to their specifications. Additionally, all data is meticulously preserved in the company's CRM, facilitating warranty and post-warranty support for the generators.

Challenge

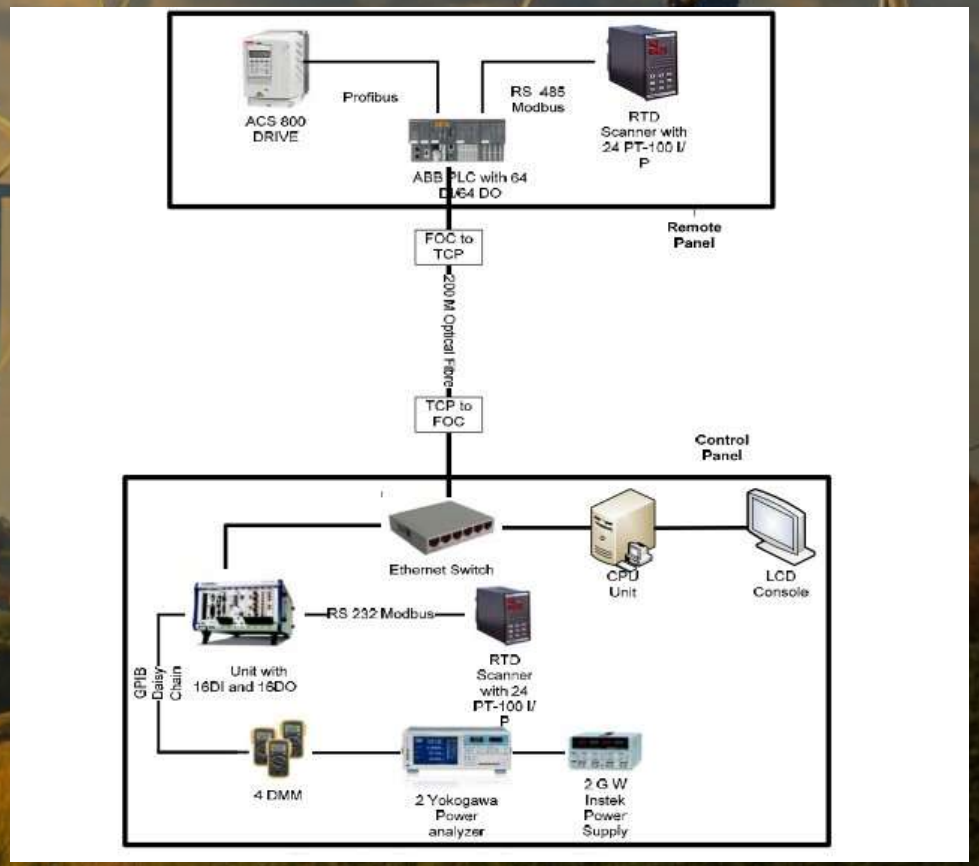
The primary objective of the customer was to conduct wind turbine testing without the need for an actual windmill. It was imperative to simulate all potential challenges encountered in real-world scenarios on the test bench. The system required the capability to handle large power outputs with high precision, accurately replicating conditions experienced in actual operations, while also accommodating user-defined testing parameters.

Solution

With the help of real time modular hardware and powerful application software, WPGT system was developed to perform various tests on wind turbine.

The real time data acquisition hardware is system's access point to field instruments. It acquires data from field instruments, processes and controls field instruments. Data is also fetched from multiple buses including USB, GPIB, RS485 and Profibus. The host application software communicates and instructs real time operating system of modular hardware to acquire data and control field devices as per the system requirements.

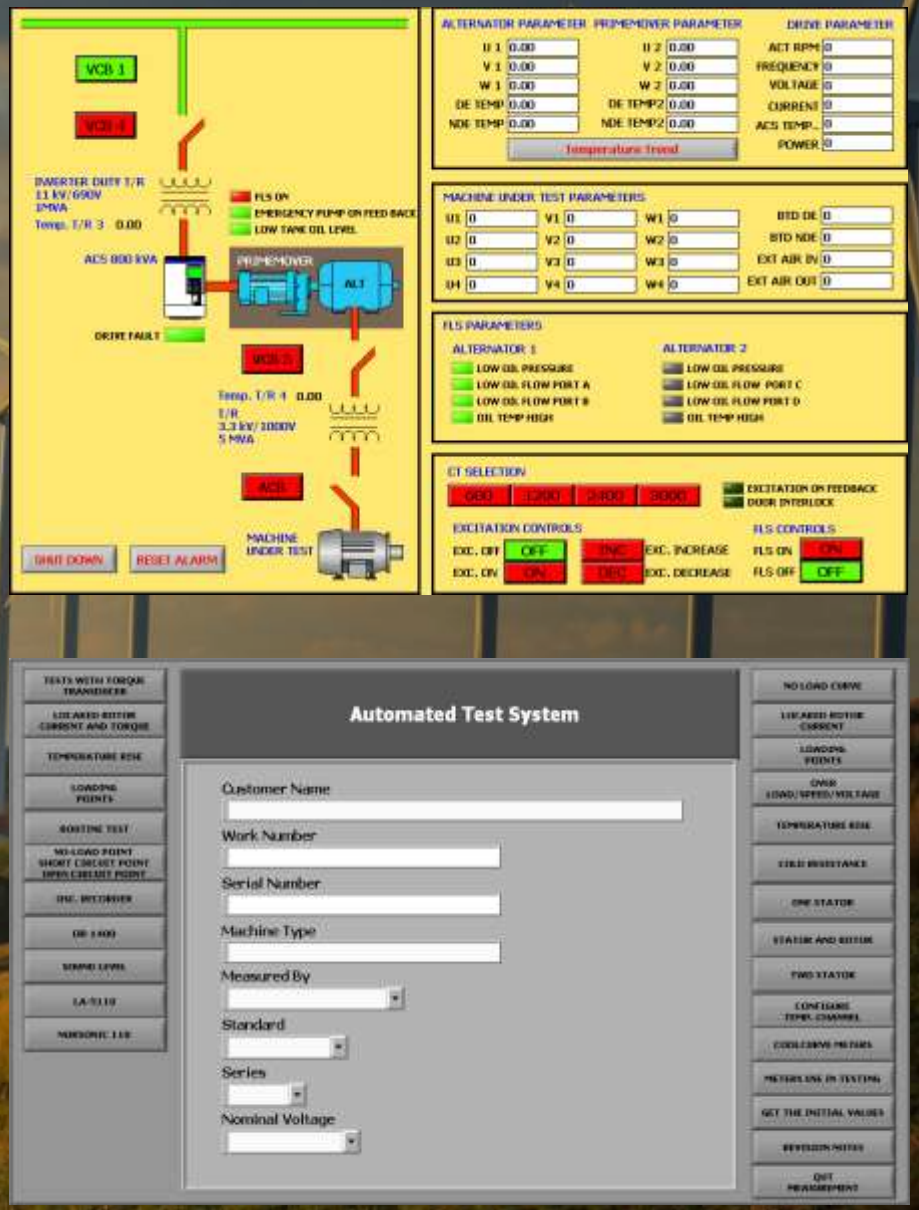
To create actual test scenario, we developed the system to display parameters like live rpm, temperature, applied voltage, applied power, various interlocking status, various feedbacks and ongoing system status. System also controls switching of power states, rpm of motor, and amount of magnetic excitation to alternator and cooling system.



Solution

After creating test scenario, the system is given actual wind turbine to test under this test facility. The test carried out here tests all the possibilities that actual turbine can face during on-field operation. Here, some of the tests carried out on the turbine are: No load test, Short circuit test, Temperature raise test, overload test, over speed test, over voltage test etc. to ensure reliability of the product. Bench has been given provision to make system's own alarm states and interlocking to ensure no damage to the machine under test during test. All the test data coming through many instruments and field gathers in RT and finally in host. This is only possible when all the instruments communicate properly and in- time in all the possible situations.

WPGT shares database of ERP system to integrate with CRM software. It is also used to generate different tests reports which have been carried out.



Benefits

1. **Modular System:** The Wind Power Generation Testbench offers a modular design, allowing for flexibility and scalability to meet evolving testing needs.
2. **Reduced Operation Costs:** By streamlining testing processes and minimizing resource requirements, the project significantly lowers operational expenses.
3. **High Accuracy:** With precise instrumentation and advanced control mechanisms, the test bench ensures accurate measurement and analysis of wind turbine performance.
4. **User-Friendly Interface:** Utilizing LabVIEW software, the system provides a seamlessly intuitive interface, facilitating smooth data acquisition and presentation for enhanced usability.
5. **Reliable Operation:** Incorporating PXI RT technology, the test bench guarantees reliable operation even with high-power components, ensuring consistent and dependable performance throughout testing procedures.

Benefits against alternatives

In contrast to alternatives, Wind Power Generation Testbench (WPGT) provides unparalleled benefits. With full test visibility from a single seat, it ensures clients access information as expected. WPGT simplifies wind power generation testing, offering a user-friendly, automated system. Integrated data sharing between the test bench and ERP system ensures precise order fulfilment and data preservation for warranty support. The comprehensive solution includes a desktop workstation, PXI system cabinet, control console, and fibre optic network. WPGT optimizes efficiency, reduces manual intervention, and guarantees reliable wind turbine testing, making it the ideal choice for streamlined and effective operations.

Value Proposition

- Optimized Solutions introduces the Wind Power Generation Testbench, offering complete test visibility from a single viewing point.
- The Testbench offers complete test visibility from a single point.
- Clients receive information exactly as anticipated, enhancing decision-making.
- Streamlined operations ensure a seamless user experience.
- Centralized data access and presentation enhance efficiency.
- The Testbench revolutionizes wind turbine testing with its intuitive interface.
- Optimized Solutions' commitment to value-added solutions is evident in this innovative offering.