



FESCO Direct LLC

New & Used Equipment Solutions

Concrete Production • Wind Energy • Material Handling

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Remanufactured Wind Turbines From FESCO Direct

All of our remanufactured wind turbines are ideal for large consumers of electricity, commercial or industrial applications or those looking for the benefits of being paid for the extra power you produce above and beyond what you consume. These advanced, proven, well recognized brand name wind turbines have previously been in service in commercial wind farms and maintained longevity through routine maintenance. We remanufacture each turbine to original manufacturer specifications and update the automatic control system. Through our remanufacturing process, each turbine is delivered to you in as-new condition with a use life comparable to a new system but at a fraction of the price. We stand behind our products and remanufacturing process by including a two or five year warranty, giving you peace of mind.



Blades

We inspect each blade and repair any structural or cosmetic damage. All blades undergo deflection testing which measures blade integrity. The roots are closely inspected with particular emphasis on checking for de-lamination of the root bundles. Then each blade is brought through our surface preparation process and recoated. For those units with blade tip brakes, we inspect and replace parts as needed in the tip brake mechanism. Each mechanism is thoroughly cleaned and lubricated.

Note: Blades used are always from matched original sets. We do not purchase turbines in portions. The blades are weighed and balanced prior to installation.

Yaw

The initial inspection checks the turning torque, free-state clearance, and gear size. The yaw motor and pinion gear are inspected and rebuilt or replaced as necessary. The bull gear is inspected for wear and repaired or replaced as necessary to insure good alignment with the yaw pinion gear. External features are inspected and documented. During the disassembly and cleaning process - bearings are disassembled, the races, rolling elements, and the spacers are cleaned. The races are then brought through non-destructive testing where the races are visually and magnetic particle inspected to detect any cracks or defects and hardness readings are recorded. The bearings are reviewed to determine reparability or replacement. The bearing races are then precision ground to the proper geometry optimizing load carrying capability. The bearings are then assembled with new rolling elements and seals and packed with new lubricant. The assembly then goes through final inspection and documentation of all critical features.



For more information, or to discuss options and pricing, please contact a FESCO Direct account executive today.

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Gearbox

New bearing and seals are installed. High speed and intermediate bearings are replaced. The main shaft is checked for wear and repaired as necessary or replaced. Disc brake calipers are dismantled, cleaned and rebuilt. New brake pads are installed. The main shaft brake disc is inspected and turned as necessary. All gear set tooth surfaces are inspected and gearing is replaced if deterioration is detected. All components are thoroughly cleaned. Oil filters are replaced. All tolerances are measured to return the gearbox to optimal performance. The gearbox is filled with new oil designed to meet the temperature profile of the region where it will be operated.

Generator

New bearings are installed on all generators. The units are rewound and reinsulated and the rotor is dynamically balanced. 100% epoxy dip and bake. The stator and end bells are sandblasted. All parts are steam cleaned and a new coating is applied.

Machine Bedplate

The bedplate is inspected for any structural damage before undergoing mechanical and chemical surface preparation prior to coating application.



Brakes

All internal nacelle hydraulic lines are replaced as are wiring harnesses as necessary. The braking system is rebuilt and calipers are rebuilt or replaced as necessary with original manufacturer parts. Brake motor electronics (relays, solenoid valve, coil for solenoid valve, wiring), reservoir and reservoir gasket are replaced and upgraded as necessary. New brake pads and wear sensors are installed.

Nacelle Cover

The nacelle cover is inspected for any structural damage, then the springs are replaced, and the cover is cleaned and coated.

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Control Systems

The control system is all new. It allows complete and safe automatic operation. The updates increase the efficiency and reliability of the system along with increasing the ease of operation. Optional internet based monitoring of the system is available.



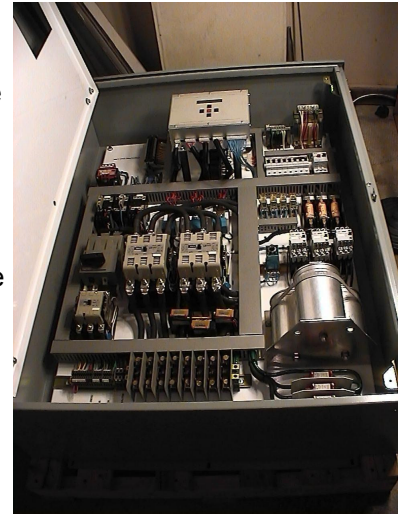
Tower

The towers are inspected for any cracks and or bends that would affect the structural integrity. The tubular towers are then fully degreased and brought through a mechanical and chemical surface preparation prior to being coated.

Coatings

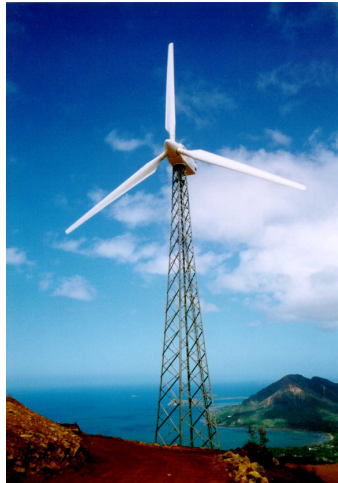
High quality DuPont® industrial finishes are applied to surfaces including towers, blades, nacelles, major parts, etc. Coatings used are equal in quality and color to those used on new commercial MW class turbines.

Surface preparation prior to application of coatings includes a combination of sanding, sand blasting, solvent cleaning, and solvent etching.



Miscellaneous

New high quality stainless steel and brass sensor anemometer and wind vanes are installed. New high and low speed RPM sensors are installed.



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