

# Wind Turbine Pitch Control System

## D1FC and D3FC Proportional Directional Control Valves



### Challenge

Component maintenance is key on wind turbines mostly because of expired manufacturer's warranties. A wind turbine's pitch control system is critical as it rotates the blades in unison, optimizing power generation and protects from overexertion and overspeeding. Hydraulically controlled systems have one proportional valve per blade. The installed base of competitor valves often fails from tough environmental factors - vibration, heat and moisture ingress. Unplanned downtime often was due to failure of the on-board electronics, preventing the turbine controller from commanding the valve. Maintenance and replacement is costly (both parts and labor), but the lost revenue from not generating electricity is the bigger pain point.

### Solution

Parker engineers partnered with service companies and end customers to create a robust drop-in replacement design that handles tough environments. The D1FC (nominal size: NG06/D03,) and the D3FC (nominal size NG10/D05,) direct operated proportional directional control valve with position feedback are now widely used across the industry. The valves are designed to meet IEC 68-2-6, -7 and -36 vibration standards for sinus, random noise and shock. The electronic driver card is installed with anti-shock mounting technology to minimize vibrational effects. Unlike other OEM valves, all fasteners are thread locked to guard against vibration as an additional measure of safety and adhere to an IP65 designation, which inhibits moisture and dust ingress.



Reduced Lifetime Ownership Costs



Robust Design



Innovative Technology



Increased Productivity

### Success Factors:

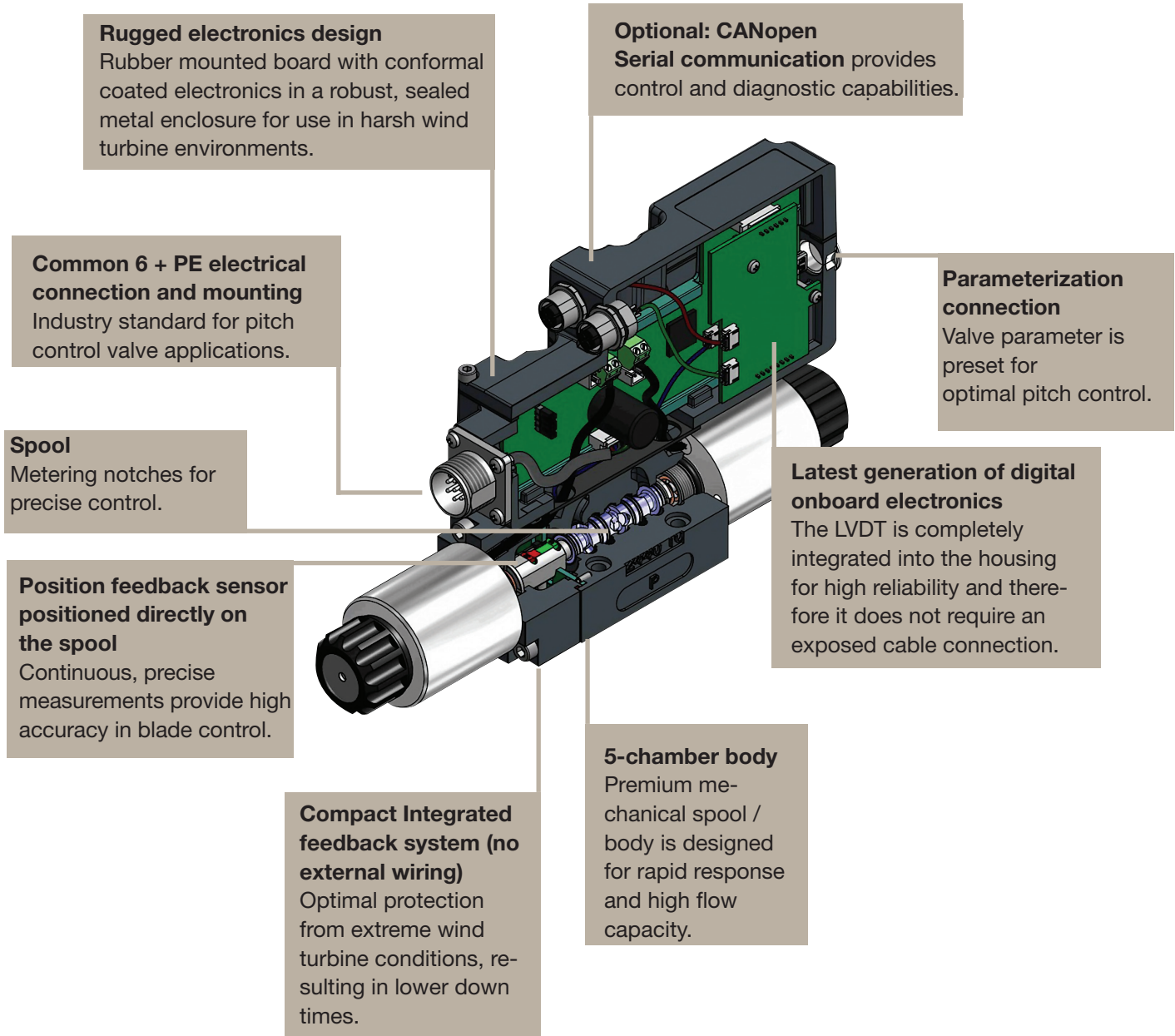
- More robust design of onboard electronics (OBE) solved competitive valve issue
- Field support by factory and distribution
- Factory pre-tuned electronics per OEM turbine model

### Customer Values:

- Total cost of ownership savings (reduced labor and parts)
- Increased uptime creating more power generation
- Parker Tracking System (PTS) digital information access



ENGINEERING YOUR SUCCESS.



**Rugged electronics design**

Rubber mounted board with conformal coated electronics in a robust, sealed metal enclosure for use in harsh wind turbine environments.

**Optional: CANopen**

**Serial communication** provides control and diagnostic capabilities.

**Common 6 + PE electrical connection and mounting**

Industry standard for pitch control valve applications.

**Parameterization connection**

Valve parameter is preset for optimal pitch control.

**Spool**

Metering notches for precise control.

**Latest generation of digital onboard electronics**

The LVDT is completely integrated into the housing for high reliability and therefore it does not require an exposed cable connection.

**Position feedback sensor positioned directly on the spool**

Continuous, precise measurements provide high accuracy in blade control.

**Compact Integrated feedback system (no external wiring)**

Optimal protection from extreme wind turbine conditions, resulting in lower down times.

**5-chamber body**

Premium mechanical spool / body is designed for rapid response and high flow capacity.

## Contact Information:

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