

# PowerDrive Orbit Rotary Steerable System

Black Diamond are proud to offer the PowerDrive Orbit Rotary Steerable System (RSS). The system epitomizes versatility, durability, and reliability, seamlessly adapting to and excelling in diverse drilling environments with unparalleled performance. By harnessing the ability to operate at high RPM the system increases drilling efficiency and reduces drilling time. PowerDrive Orbit provides the unique ability to drill from shoe to TD in a single run by virtue of its enhanced reliability in complex operations where such risks as severe shock and torque, high levels of stick/slip or complex hydraulic systems can severely impact operations. By combining high accuracy near-bit measurements with advanced real-time closed loop trajectory control the PowerDrive Orbit delivers unrivaled well bore positioning accuracy.

## Features and Benefits

- **High RPM:** Supporting up to 350 rpm delivers high ROP, minimized stick/slip and enhanced directional control.
- **Continuous Survey:** High accuracy six-axis near-bit continuous survey measurements enable high precision wellbore placement and remove requirements for directional corrections.
- **Closed Loop Directional Control:** Fully automated real-time downhole directional control, including inclination and azimuth hold modes, optimize outcomes for well placement, trajectory control and smoother boreholes.
- **8-Sector Azimuthal Gamma:** High resolution near-bit borehole images allow high precision geo-steering and early identification of zones of interest.
- **Advanced Sealing:** Advanced metal to metal seals and an innovative pad design deliver unmatched performance in aggressive drilling fluids and severe downhole conditions.
- **Dual Downlink Capability:** Fully configurable transmission options (flow/ rotation) ensure reliable communication in any rig or wellbore environment.
- **QuickDownlink® Technology:** Continuous circulation downlink system ensures full system control with minimal impact on drilling operations.
- **Enhanced Drilling Efficiency:** Combining high RPM and closed-loop directional control allows PowerDrive Orbit to achieve the highest ROP while maintaining precise wellbore placement.
- **Performance Focused Design:** Guarantees unparalleled reliability, enabling high RPM capabilities for superior directional control and operational consistency resulting in smoother wellbores and greatly reduced dog legs.
- **Precise Kick-Off from Vertical:** High accuracy continuous directional measurements ensure kick-offs are achieved at the finest level of precision.
- **Broad Range of Applications:** Reliable execution with exemplary results in the most challenging of operations including extended reach, complex drilling fluids, high-performance drilling and severe downhole conditions.
- **Extended Window of Operating Parameters:** Enhanced durability and sensor reliability offer the extension of parameters which can be limited when deploying traditional RSS systems.



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PowerDrive Orbit RSS Specifications						
Nominal Tool O.D. (in.)	4 ¾	5 ¼	6 ¾	8 ¼	9	11
Nominal Hole Size (in.)	5.75 - 6.75	6.25 - 6.75	8.5 - 9.875	9.875 - 10.625	12.25 - 18.125	26
Length (ft)	13.5	13.5	13.53	13.84	14.05	15.22
Bit Connection Box	3½ in. REG	3½ in. REG	4½ in. REG	6 ⅝ in. REG	6 ⅝ in. REG/ 7 ⅝ in. REG	7 ⅝ in. REG
Maximum Torque on bit (lbf-ft) <sup>1</sup>	9,000	9,000	18,500	45,000	45,000	70,000
Maximum Overpull (lbf)	340,000	340,000	1,100,000	1,100,000	1,800,000	2,500,000
Maximum Weight on Bit (lbf) <sup>2</sup>	31,000	31,000	180,000	270,000	370,000	225,000
Maximum Dog Leg Severity %/ 100 ft <sup>3</sup>	10	10	8	6	5	2
Passthrough (DLS Sliding) (°)	30	30	16	12	10	4
Bit Speed (rpm)	0 - 350	0 - 350	0 - 350	0 - 350	0 - 350	0 - 220
Flow Range (gpm) <sup>4</sup>	120 - 355	120 - 355	210 - 970	280 - 2,000	280 - 2,000	280 - 2,000
Maximum Mud Density (ppg)	24					
Maximum LCM Limit (lb/bbl) <sup>5</sup>	35	35	50	50	50	50
Maximum Sand Content	1%					
Acidity Level (pH)	9.5 - 12.0					
Maximum Oxygen (ppm)	1.0					
Maximum Temperature (°F)	302					
Maximum Pressure (psi)	20,000					
Inclination Offset to Bottom (ft)	6.93	6.93	7.19	7.94	7.81	8.99
Azimuth Offset to Bottom (ft)	9.03	9.03	9.39	10.14	10.01	11.19
Gamma Offset to Bottom (ft)	6.03	6.03	6.39	7.14	7.01	8.19
Azimuthal Gamma Ray	Eight Bin					
Average Gamma Ray	API Calibrated					
Vibration Range, Axial (g <sub>n</sub> )	0 - 35					
Vibration Range, Lateral (g <sub>n</sub> )	0 - 75					
Shock Range (g <sub>n</sub> )	0 - 625					
Shock and Vibration Axes	Tri-axial					
Magnetic Field Zone of Exclusion	None					
Automated Loop	Inclination and Azimuth					
Downlink Method	Flow and rpm					

<sup>1</sup> Maximum at 0 lbf Weight on Bit (WOB),

<sup>2</sup> Maximum at 0 lbf-ft torque on Bit (WOB), bit recommendations should be considered

<sup>3</sup> Dependent on application - bit, BHA, parameters, formation type etc.

<sup>4</sup> Dependent on Mud Density

<sup>5</sup> Dependent on type of LCM