

# PowerDrive Orbit

## Rotary steerable system

### APPLICATIONS

- High-performance drilling
- Complex fluid systems
- Extended-reach drilling

### BENEFITS

- Improved drilling efficiency
- Enhanced trajectory control
- Precise kickoff from vertical
- Increased operating parameter window

### FEATURES

- Performance-focused design
- Up to 350 revolutions per minute
- Metal-to-metal sealing on pad
- QuikDownlink\* continuous-circulation downlink service
- Eight-sector near-bit azimuthal gamma ray
- Six-axis continuous survey to provide advanced automated tangent controls
- Optional hybrid configuration

PowerDrive Orbit\* RSS is part of the PowerDrive\* RSS family of fully rotating steerable systems that minimize the risk of sticking. The entire family has a complete direction and inclination sensor package close to the bit for precise well placement and independently generates power for 3D steering and control.

In any drilling environment, the PowerDrive RSS family delivers the power required to place wells accurately with superior borehole quality while ensuring maximum drilling efficiency.

### Toughness and versatility to take on any environment

The PowerDrive Orbit RSS is highly versatile, tough, and reliable in any global operational environment. It cuts drilling time and increases efficiency with its ability to steer at high surface rpm. An innovative pad design features metal-to-metal sealing to handle aggressive drilling fluids and severe downhole conditions. With dual downlink options, including the QuikDownlink\* continuous-circulation downlink service, it fulfills all commands from surface in any rig type, enables real-time decision making, and provides excellent trajectory control.

The PowerDrive Orbit RSS has enhanced durability for severe downhole conditions. It can drill from shoe to TD in a single run, reducing operating days. It provides extra reliability in complex operations where stick/slip, severe shock and torque, and complex hydraulic systems are significant risks.

### Performance drilling with enhanced trajectory control

Supporting up to 350 rpm, the PowerDrive Orbit RSS delivers higher ROP and helps to minimize stick/slip. It provides six-axis continuous survey measurements that, together with automated downhole closed loops that include hold inclination and azimuth mode, optimize outcomes for well placement, trajectory control, and smoother boreholes. PowerDrive Orbit RSS minimizes dogleg severity in laterals, enables automated control, and drives consistency in drilling operations with minimal surface intervention. Early identification of zones of interest are provided by its extended gamma ray measurement.



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Specifications	PowerDrive Orbit 475 RSS	PowerDrive Orbit 675 RSS	PowerDrive Orbit 825 RSS	PowerDrive Orbit 900 RSS	PowerDrive Orbit 1100 RSS	
Mechanical	Nominal OD, in [mm]	4¾ [120.7]	6¾ [171.5]	8¼ [209.6]	9 [228.6]	11 [279.4]
	Overall length, ft [m]	13.50 [4.11]	13.53 [4.12]	13.84 [4.21]	14.05 [4.28]	15.22 [4.63]
	Dogleg severity (DLS) capability, °/100 ft [°/30 m] <sup>†</sup>	10 [10]	8 [8]	6 [6]	5 [5]	2 [2]
	Hole sizes, in [mm]	5¾–6¾ [146.1–171.5]	8½–8¾ [215.9–222.3]	10% [269.86]	12¼–18½ [311.2–460.4]	26 [660.4]
	Bit speed, rpm	0–350	0–350	0–350	0–350	0–220
	Maximum weight on bit, lbf [N] <sup>‡</sup>	31,000 [137,894]	180,000 [800,679]	270,000 [1,201,019]	370,000 [1,645,841]	225,000 [1,000,849]
	Maximum torque on bit, ft.lbf [N.m] <sup>§</sup>	9,000 [12,202]	18,500 [25,082]	45,000 [61,011]	45,000 [61,011]	70,000 [94,907]
	Maximum overpull, lbf [N]	340,000 [1,512,395]	1,100,000 [4,893,044]	1,100,000 [4,893,044]	1,800,000 [8,006,799]	2,500,000 [11,120,554]
	Passthrough (DLS sliding), °	30	16	12	10	4
	Bit connection (box)	3½ Reg	4½ Reg	6¾ Reg	6¾ Reg or 7¾ Reg	7¾ Reg
Hydraulics <sup>§§</sup>	Flow range, galUS/min [L/min] <sup>††</sup>	120–355 <sup>‡‡</sup> [454–1,343]	210–970 [794–3,671]	280–2,000 [1,059–7,571]	280–2,000 [1,059–7,571]	280–2,000 [1,059–7,571]
	Maximum mud density, lbm/galUS [kg/L]	24 [2.88]	24 [2.88]	24 [2.88]	24 [2.88]	24 [2.88]
	Maximum sand content, %	1	1	1	1	1
	Lost circulation material (LCM), lbm/bbl [kg/L] <sup>†††</sup>	35 [0.13] <sup>†††</sup>	50 [0.19] <sup>†††</sup>	50 [0.19] <sup>†††</sup>	50 [0.19] <sup>†††</sup>	50 [0.19] <sup>†††</sup>
	Acidity level, pH	9.5–12	9.5–12	9.5–12	9.5–12	9.5–12
	Oxygen, ppm	1	1	1	1	1
Pressure and temperature	Maximum temperature, degF [degC]	302 [150]	302 [150]	302 [150]	302 [150]	302 [150]
	Maximum pressure, psi [MPa]	20,000 [137.9]	20,000 [137.9] <sup>††††</sup>	20,000 [137.9] <sup>††††</sup>	20,000 [137.9] <sup>††††</sup>	20,000 [137.9] <sup>††††</sup>
Measurements <sup>§§§</sup>	Inclination offset to tool bottom, ft [m]	6.93 [2.11]	7.19 [2.19]	7.94 [2.42]	7.81 [2.38]	8.99 [2.74]
	Azimuth offset to tool bottom, ft [m]	9.03 [2.75]	9.39 [2.86]	10.14 [3.09]	10.01 [3.05]	11.19 [3.41]
	Azimuthal gamma ray	Eight bin	Eight bin	Eight bin	Eight bin	Eight bin
	Average gamma ray	API calibrated	API calibrated	API calibrated	API calibrated	API calibrated
	Gamma ray offset to tool bottom, ft [m]	6.03 [1.84]	6.39 [1.95]	7.14 [2.18]	7.01 [2.14]	8.19 [2.50]
	Vibration range (axial), g <sub>n</sub>	0–35	0–35	0–35	0–35	0–35
	Vibration range (radial), g <sub>n</sub>	0–75	0–75	0–75	0–75	0–75
	Shock range, g <sub>n</sub>	625	625	625	625	625
	Shock and vibration axis	Triaxial	Triaxial	Triaxial	Triaxial	Triaxial
Magnetic field cone of exclusion	None	None	None	None	None	
Specifics	Automated loop	Inclination and azimuth	Inclination and azimuth	Inclination and azimuth	Inclination and azimuth	Inclination and azimuth
	Downlinking method	Flow and rpm	Flow and rpm	Flow and rpm	Flow and rpm	Flow and rpm

<sup>†</sup> Value dependent on application—bit, BHA, parameters, formation type, etc.

<sup>‡</sup> Maximum at 0-ft.lbf torque on bit; bit recommendations should be considered.

<sup>§</sup> Maximum at 0-lbf weight on bit.

<sup>††</sup> Dependent on mud density.

<sup>‡‡</sup> Maximum flow of 320 galUS/min for 5¾ and 5¾ BU.

<sup>§§</sup> Special configuration available for silicate muds.

<sup>†††</sup> Depends on the type of LCM.

<sup>††††</sup> Alternative LCM configuration available (up to 120 lbm/bbl).

<sup>§§§</sup> Sensor offsets and tool weight vary depending on hole size configuration.

<sup>†††††</sup> High pressure configuration available up to 35,000 psi.

Refer to the Schlumberger Shock and Vibration references for details regarding axial, lateral, and torsional limits of tools.

[slb.com/powerdriveorbit](http://slb.com/powerdriveorbit)

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