

# 2011 Rotary steerable drilling systems directory

Product trade name	Point-the-bit or Push-the-bit?	Length (ft)	O. D. & I. D. (inches)	Hole size (inches)	Max DLS capability (°/100')	Automated closed loop deviation control (yes/no) (+/-degrees)	Build rate increment	Is deviation force continuous?	Max temp (°C /°F)	Max internal pressure (psi)	Other special pressure limitations	Require configuration based on anticipated flow rate?
<b>APS Technology Bob Joyce (Program Mgr) 281-773-7944, VP Global Sales - Denis Biglin 860-613-4450 ext 102, North America - BICO Drilling Tools, Bob Howard 281-590-6966</b>												
Rotary Steerable Motor RSM675 (6-3/4")	Push	Steering Section (14.5'), Power Section (17.2')	OD: 7.78 ID: 1.5	8.5 to 8.75 nominal	6	Yes, Inclination and MTF to within 0.1°	?	Yes and variable	150/302	20,000	None	No
<b>Baker Hughes http://www.bakerhughesdirect.com</b>												
9.5" AutoTrak G3.0 RCLS	Hybrid of point and push	58 (fully inclusive of steering system & MWD/LWD) Steering head length = 8.2	OD: 9.5 ID: N/A	12.00 - 28.00	6.5	Yes Precise to within 0.1°	1.5%	Yes >7,000 Steering vectors continuously available	150/300 (175/347 on request)	25,000 (30,000 on request)	None	Steering system: No MWD system: Yes
8.25" AutoTrak G3.0 RCLS	Hybrid of point and push	57 (fully inclusive of steering system & MWD/LWD) Steering head length = 7.2	OD: 8.25 ID: N/A	10.625	6.5	Yes Precise to within 0.1°	1.5%	Yes >7,000 Steering vectors continuously available	150/300 (175/347 on request)	25,000 (30,000 on request)	None	Steering system: No MWD system: Yes
6.75" AutoTrak G3.0 RCLS	Hybrid of point and push	50 (fully inclusive of steering system & MWD/LWD) Steering head length = 7.2	OD: 6.75 ID: N/A	8.375 - 10.625	6.5	Yes Precise to within 0.1°	1.5%	Yes >7,000 Steering vectors continuously available	150/300 (175/347 on request)	25,000 (30,000 on request)	None	Steering system: No MWD system: Yes
4.75" AutoTrak G3.0 RCLS	Hybrid of point and push	48.1 (fully inclusive of steering system & MWD/LWD) Steering head length = 10.5	OD: 4.75 ID: N/A	5.75 - 6.75	10	Yes Precise to within 0.1°	1.5%	Yes >7,000 Steering vectors continuously available	150/300 (175/347 on request)	25,000 (30,000 on request)	None	Yes
9.5" AutoTrak X-treme (Integrated pre-contoured drilling motor)	Hybrid of point and push	88 (fully inclusive of steering system, motor power section & MWD/LWD) Steering head length = 8.2	OD: 9.5 ID: N/A	12.00 - 28	6.5	Yes Precise to within 0.1°	1.5%	Yes >7,000 Steering vectors continuously available	150/300 (175/347 on request)	25,000 (30,000 on request)	None	Steering system: No MWD system: Yes
6.75" AutoTrak X-treme (Integrated pre-contoured drilling motor)	Hybrid of point and push	76 (fully inclusive of steering system, motor power section & MWD/LWD) Steering head length = 7.2	OD: 6.75 ID: N/A	8.375 - 10.625	6.5	Yes Precise to within 0.1°	1.5%	Yes >7,000 Steering vectors continuously available	150/300 (175/347 on request)	25,000 (30,000 on request)	None	Steering system: No MWD system: Yes
4.75" AutoTrak X-treme (Integrated pre-contoured drilling motor)	Hybrid of point and push	73 (fully inclusive of steering system, motor power section & MWD/LWD) Steering head length = 10.5	OD: 4.75 ID: N/A	5.875 - 6.75	10	Yes Precise to within 0.1°	1.5%	Yes >7,000 Steering vectors continuously available	150/300 (175/347 on request)	25,000 (30,000 on request)	None	Yes
9.5" AutoTrak eXpress RCLS (Base level RSS service)	Hybrid of point and push	64.6 (fully inclusive of steering system & MWD) Steering head length = 8.2	OD: 9.5 ID: N/A	12.00 - 28.00	6.5	Yes Precise to within 0.1°	Programmable from surface via downlink from 0-6.5° /100 ft	Yes Steering vectors continuously available	150/300	20,000	None	Steering system: No MWD system: Yes
6.75" AutoTrak eXpress RCLS (Base level RSS service)	Hybrid of point and push	58.2 (fully inclusive of steering system & MWD) Steering head length = 7.2	OD: 6.75 ID: N/A	8.375 - 10.625	8	Yes Precise to within 0.1°	Programmable from surface via downlink from 0-8° /100 ft	Yes Steering vectors continuously available	150/300	20,000	None	Steering system: No MWD system: Yes
4.75" AutoTrak eXpress RCLS (Base level RSS service)	Hybrid of point and push	56.8 BHA inclusive of steering system & MWD Steering head length = 9.97	OD: 4.75 ID: N/A	5.75 - 6.75	10	Yes Precise to within 0.1°	Programmable from surface via downlink from 0-10° /100 ft	Yes Steering vectors continuously available	150/300	20,000	None	Yes
9.5" AutoTrak V RCLS for vertical drilling	Hybrid of point and push	22.3 fully inclusive. Steering head = 8.2	OD: 9.5 ID: N/A	12.00 - 28.00	6.5	Yes Precise to within 0.1°	Programmable from surface via downlink from 0-6.5° /100 ft	Yes Steering vectors continuously available	150/301	20,001	None	No
6.75" AutoTrak V RCLS for vertical drilling	Hybrid of point and push	19.7 fully inclusive. Steering head = 7.2	OD: 6.75 ID: N/A	8.375 - 10.625	6.5	Yes Precise to within 0.1°	Programmable from surface via downlink from 0-6.5° /100 ft	Yes Steering vectors continuously available	150/302	20,002	None	No
4.75" AutoTrak V RCLS for vertical drilling	Hybrid of point and push	23.1 fully inclusive. Steering head = 10.5	OD: 4.75 ID: N/A	5.75 - 6.75	10	Yes Precise to within 0.1°	Programmable from surface via downlink from 0-10° /100 ft	Yes Steering vectors continuously available	150/303	20,003	None	Yes

# Power That Lasts™

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Sensor distance (ft) Inc/Azm/GR/Res	Control from surface (Downlink)? (Y / N)	If yes, tool control method	Req'd to communicate change in target (minutes)	Minimum kickoff inclination (degrees)	Max RPM / WOB	Min flow rate (gpm)	Max flow rate (gpm)	LCM limits	Power source	Bit requirements	Integrated LWD?
4 Inc/Mag Tool Face	Y	Mud Pumps and Rotary	6-Mar	0	80 RPM, 50 klb	300	600	None	Alternator driven off motor	Best bit for formation	No - Can be operated below any LWD/MWD
3.9 / 33.1 / 24.3 / 25.6	Y	Negative pulse from surface skid unit	While drilling ahead	0	300 RPM 100 klb	300	1,600	Steering system: None MWD system: 40 lb/bbl fine nutplug (higher conc. on request)	Turbine generator	Application specific	Yes
3.1 / 32.4 / 20.3 / 25.6	Y	Negative pulse from surface skid unit	While drilling ahead	0	400 RPM 57 klb	300	1,290	Steering system: None MWD system: 40 lb/bbl fine nutplug (higher conc. on request)	Turbine generator	Application specific	Yes
3.1 / 27.5 / 17.7 / 21.6	Y	Negative pulse from surface skid unit	While drilling ahead	0	400 RPM 57 klb	200	900	Steering system: None MWD system: 40 lb/bbl fine nutplug (higher conc. on request)	Turbine generator	Application specific	Yes
4.3 / 26.2 / 13.0 / 20.2	Y	Negative pulse from surface skid unit	While drilling ahead	0	400 RPM 22.5 klb	125	350	40 lb/bbl fine nutplug (higher conc. on request)	Turbine generator	Application specific	Yes
Inc: 3.9 Others BHA dependent	Y	Negative pulse from surface skid unit	While drilling ahead	0	300 RPM 60 klb	530	1,600	Steering system: None MWD system: 40 lb/bbl fine nutplug (higher conc. on request)	Turbine generator	Application specific	Yes
Inc: 3.1 Others BHA dependent	Y	Negative pulse from surface skid unit	While drilling ahead	0	400 RPM 36 klb	265	660	Steering system: None MWD system: 40 lb/bbl fine nutplug (higher conc. on request)	Turbine generator	Application specific	Yes
Inc: 4.3 Others BHA dependent	Y	Negative pulse from surface skid unit	While drilling ahead	0	400 RPM 14.6 klb	105	315	40 lb/bbl fine nutplug (higher conc. on request)	Turbine generator	Application specific	Yes
3.9 / 40.8 / 37.5 / -	Y	Flow rate change	While drilling ahead	0	300 RPM 100 klb	300	1,600	Steering system: None MWD system: 40 lb/bbl fine nutplug (higher conc. on request)	Turbine generator	Application specific	NO
3.1 / 34.7 / 31.5 / -	Y	Flow rate change	While drilling ahead	0	400 RPM 55 klb	200	900	Steering system: None MWD system: 40 lb/bbl fine nutplug (higher conc. on request)	Turbine generator	Application specific	NO
3.8 / 32.9 / 29.6 / -	Y	Flow rate change	While drilling ahead	0	400 RPM 22.5 klb	125	350	40 lb/bbl fine nutplug (higher conc. on request)	Turbine generator	Application specific	NO
3.9 / NA / NA / NA	Y	Flow rate change	While drilling ahead	0	300 RPM 100 klb	300	1,600	Steering system: None MWD system: 40 lb/bbl fine nutplug (higher conc. on request)	Turbine generator	Application specific	NO
3.1 / NA / NA / NA	Y	Flow rate change	While drilling ahead	0	400 RPM 55 klb	200	900	Steering system: None MWD system: 40 lb/bbl fine nutplug (higher conc. on request)	Turbine generator	Application specific	NO
3.9 / NA / 5.74 / NA	Y	Flow rate change	While drilling ahead	0	400 RPM 22.5 klb	125	350	Steering system: None MWD system: 40 lb/bbl fine nutplug (higher conc. on request)	Turbine generator	Application specific	NO

**Dyna-Drill**®

# Power Sections

Sizes: 1 11/16" - 11 1/2"

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<b>Gyrodatta Western Hemisphere</b> Jeff Weimer 713-461-3146 (jefw@gyrodatta.com) www.gyrodatta.com												
Well-Guide 10-300	Point	31 collar	OD:10.25 ID: 2.813	12.25 - 17.5	3	Yes inclination and azimuth to within 0.1°	0 to 100%	Yes	150/302	20,000	None	No
<b>Gyrodatta Eastern Hemisphere</b> Sandy Lawson 44-1224-823060 (sandy@gyrodatta.com) www.gyrodatta.com												
Well-Guide 7-100	Point	24 collar	OD: 7.25 ID: 1.9375	8.375 - 9.875	7	Yes inclination and azimuth to within 0.1°	0 to 100%	Yes	150/302	20,000	None	No
Well-Guide 7-200	Point	28 collar	OD: 7.25 ID: 1.9375	8.375 - 9.875	7	Yes inclination and azimuth to within 0.1°	0 to 100%	Yes	150/302	20,000	None	No
<b>Halliburton Sperry Drilling</b> Hernando Jerez Global Product Champion - Drilling Optimization (hernando.jerez@halliburton.com) www.halliburton.com												
Geo-Pilot System 5200 Series	Point	16.2 + 11.5 flex collar	OD: 5.25 ID: 1.125	5.875 - 6.75	10	No	0-100% in 1% increments, and 3° TF increments	Yes >12,000 Steering vectors continuously available	150/302	20,000	None	No
Geo-Pilot XL System 5200 Series	Point	16.2 + 11.5 flex collar	OD: 5.25 ID: 1.125	5.875 - 6.75	10	No	0-100% in 1% increments, and 3° TF increments	Yes >12,000 Steering vectors continuously available	150/302	20,000	None	No
Geo-Pilot XL System 5200 Series Solar	Point	16.2	OD: 5.25 ID: 1.125	5.875 - 6.75	10	No	0-100% in 1% increments, and 3° TF increments	Yes >12,000 Steering vectors continuously available	175 / 347	30,000	None	No
Geo-Pilot System 7600 Series	Point	20	OD: 7.625 ID: 1.625	8.375 - 10.625	5	Yes within 0.1°	0-100% in 1% increments, and 3° TF increments	Yes >12,000 Steering vectors continuously available	150/302	18,000	None	No
Geo-Pilot XL System 7600 Series	Point	20	OD: 7.625 ID: 1.625	8.375 - 10.625	5	Yes within 0.1°	0-100% in 1% increments, and 3° TF increments	Yes >12,000 Steering vectors continuously available	150/302	18,000	None	No
Geo-Pilot XL EDL System 7600 Series	Point	20	OD: 7.625 ID: 1.625	8.375 - 10.625	9	Yes within 0.1°	0-100% in 1% increments, and 3° TF increments	Yes >12,000 Steering vectors continuously available	150/302	18,000	None	No
Geo-Pilot XL System Vertical Mode 7600 Series	Point	20	OD: 7.625 ID: 1.625	8.375 - 10.625	N/A	0.25° Verticality	0-100% in 1% increments, and 3° TF increments	Yes >12,000 Steering vectors continuously available	150/302	18,000	None	No
Geo-Pilot XL System 7600 Series Solar	Point	20	OD: 7.625 ID: 1.625	8.375 - 10.625	5	Yes within 0.1°	0-100% in 1% increments, and 3° TF increments	Yes >12,000 Steering vectors continuously available	175 / 347	25,000	None	No
Geo-Pilot XL System 7600 Series XHP	Point	20	OD: 7.625 ID: 1.625	8.375 - 10.625	5	Yes within 0.1°	0-100% in 1% increments, and 3° TF increments	Yes >12,000 Steering vectors continuously available	150/302	30,000	None	No
Geo-Pilot XL System 7600 Series Solar XHP	Point	20	OD: 7.625 ID: 1.625	8.375 - 10.625	5	Yes within 0.1°	0-100% in 1% increments, and 3° TF increments	Yes >12,000 Steering vectors continuously available	175/347	30,000	None	No
Geo-Pilot System 9600 Series	Point	22	OD: 9.625 ID: 2.375	12.25 - 26	6	Yes within 0.1°	0-100% in 1% increments, and 3° TF increments	Yes >12,000 Steering vectors continuously available	150/302	20,000	None	No
Geo-Pilot XL System 9600 Series	Point	22	OD: 9.625 ID: 2.375	12.25 - 26	6	Yes within 0.1°	0-100% in 1% increments, and 3° TF increments	Yes >12,000 Steering vectors continuously available	150/302	20,000	None	No
Geo-Pilot XL EDL System 9600 Series	Point	22	OD: 9.625 ID: 2.375	12.25 - 26	9	Yes within 0.1°	0-100% in 1% increments, and 3° TF increments	Yes >12,000 Steering vectors continuously available	150/302	20,000	None	No
Geo-Pilot System Vertical Mode 9600 Series	Point	22	OD: 9.625 ID: 2.375	12.25 - 26	N/A	0.25° Verticality	0-100% in 1% increments, and 3° TF increments	Yes >12,000 Steering vectors continuously available	150/302	20,000	None	No
Geo-Pilot XL System 9600 Series Solar	Point	22	OD: 9.625 ID: 2.375	12.25 - 26	6	Yes within 0.1°	0-100% in 1% increments, and 3° TF increments	Yes >12,000 Steering vectors continuously available	175/347	25,000	None	No
Geo-Pilot XL System 9600 Series XHP	Point	22	OD: 9.625 ID: 2.375	12.25 - 26	6	Yes within 0.1°	0-100% in 1% increments, and 3° TF increments	Yes >12,000 Steering vectors continuously available	150/302	30,000	None	No



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Geo-Pilot XL System 9600 Series Solar XHP	Point	22	OD: 9.625 ID: 2.375	12.25 - 26	6	Yes within 0.1°	0-100% in 1% increments, and 3° TF increments	Yes >12,000 Steering vectors continuously available	175/347	30,000	None	No
Geo-Pilot GXT System 5200 Series (Integrated GeoForce even- wall power section)	Point	16.2 + 11.5 flex collar + 27.4 (power section)	OD: 5.25 ID: 1.125	5.875 - 6.75	10	No	0-100% in 1% increments, and 3° TF increments	Yes >12,000 Steering vectors continuously available	150 / 302	20,000	None	No
Geo-Pilot GXT System 5200 Series Solar (Integrated GeoForce even- wall power section)	Point	16.2 + 27.4 (power section)	OD: 5.25 ID: 1.125	5.875 - 6.75	10	No	0-100% in 1% increments, and 3° TF increments	Yes >12,000 Steering vectors continuously available	175 / 347	30,000	None	No
Geo-Pilot GXT System 7600 Series (Integrated GeoForce even- wall power section)	Point	20 + 27.4 (power section)	OD: 7.625 ID: 1.625	8.375 - 10.625	5	Yes within 0.1°	0-100% in 1% increments, and 3° TF increments	Yes >12,000 Steering vectors continuously available	150/302	18,000	None	No
Geo-Pilot GXT System 7600 Series Solar (Integrated GeoForce even- wall power section)	Point	20 + 27.4 (power section)	OD: 7.625 ID: 1.625	8.375 - 10.625	5	Yes within 0.1°	0-100% in 1% increments, and 3° TF increments	Yes >12,000 Steering vectors continuously available	175/347	25,000	None	No
Geo-Pilot GXT System 9600 Series (Integrated GeoForce even- wall power section)	Point	22 + 29.7 (power section)	OD: 9.625 ID: 2.375	12.25 - 26	6	Yes within 0.1°	0-100% in 1% increments, and 3° TF increments	Yes >12,000 Steering vectors continuously available	150/302	20,000	None	No
Geo-Pilot GXT System 9600 Series Solar (Integrated GeoForce even- wall power section)	Point	22 + 29.7 (power section)	OD: 9.625 ID: 2.375	12.25 - 26	6	Yes within 0.1°	0-100% in 1% increments, and 3° TF increments	Yes >12,000 Steering vectors continuously available	175/347	25,000	None	No
EZ-Pilot 850 System	Point	13	OD: 7.25 ID: 2.0	8.375 - 9.875	5	No	Surface selectable from 0-5° /100 ft	Yes	150/302	20,000	None	No
<b>Schlumberger Mike Williams, 300 Schlumberger Dr., Sugar Land, TX 77478 Tel: +1-281-285-3000</b>												
PowerDrive Xceed 675	Point	25	OD: 6.75 ID: N/A	8.375 - 9.875	8	Yes +/- 0.1°	1% and 1° TF resolution	Adjustable	150/302	20,000	None	Yes
PowerDrive Xceed 900	Point	28	OD: 9.00 ID: N/A	12.25 - 17.5	6.5	Yes +/- 0.1°	1% and 1° TF resolution	Adjustable	150/302	20,000	None	Yes
PowerDrive X5 1100	Push	15.1	OD: 9.5 ID: N/A	15.5 - 28	4	Yes +/- 0.1°	1% and 1° TF resolution	Adjustable	150/302	25,000	Pressure drop at bit consider- ation required	Yes
PowerDrive X5 900	Push	16.5	OD: 9.0 ID: N/A	12 - 14.75	5	Yes +/- 0.1°	1% and 1° TF resolution	Adjustable	150/302	25,000	Pressure drop at bit consider- ation required	Yes
PowerDrive X5 825	Push	15.9	OD: 8.25 ID: N/A	10.625 - 11.625	6	Yes +/- 0.1°	1% and 1° TF resolution	Adjustable	150/302	25,000	Pressure drop at bit consider- ation required	Yes
PowerDrive X5 675	Push	13.4	OD: 6.75 ID: N/A	8.5 - 9.875	8	Yes +/- 0.1°	1% and 1° TF resolution	Adjustable	150/302	30,000	Pressure drop at bit consider- ation required	Yes
PowerDrive X5 475	Push	14.6	OD: 4.75 ID: N/A	5.5 - 6.75	8	Yes +/- 0.1°	1% and 1° TF resolution	Adjustable	150/302	30,000	Pressure drop at bit consider- ation required	Yes
PowerDrive X6 1100	Push	15.1	OD: 9.5 ID: N/A	15.5 - 28	4	Yes +/- 0.1°	1% and 1° TF resolution	Adjustable	150/302	25,000	Pressure drop at bit consider- ation required	Yes
PowerDrive X6 900	Push	16.5	OD: 9.0 ID: N/A	12 - 14.75	5	Yes +/- 0.1°	1% and 1° TF resolution	Adjustable	150/302	25,000	Pressure drop at bit consider- ation required	Yes
PowerDrive X6 825	Push	15.9	OD: 8.25 ID: N/A	10.625 - 11.625	6	Yes +/- 0.1°	1% and 1° TF resolution	Adjustable	150/302	25,000	Pressure drop at bit consider- ation required	Yes
PowerDrive X6 675	Push	13.4	OD: 6.75 ID: N/A	8.5 - 9.875	8	Yes +/- 0.1°	1% and 1° TF resolution	Adjustable	150/302	25,000	Pressure drop at bit consider- ation required	Yes
PowerDrive X6 475	Push	14.6	OD: 4.75 ID: N/A	5.5 - 6.75	8	Yes +/- 0.1°	1% and 1° TF resolution	Adjustable	150/302	25,000	Pressure drop at bit consider- ation required	Yes
PowerDrive Xbow	Push	36.5	3.125	3.75 - 4.5	15	Yes +/- 0.1°	1% and 1° TF resolution	Adjustable	150/302	25,000	Pressure drop at bit consider- ation required	Yes
PowerDrive Archer 675	Hybrid	16.6	OD: 6.75 ID: 2.81	8.5 - 8.75	15	Yes +/- 0.1°	1% and 1° TF resolution	Adjustable	150/302	25,000	Pressure drop at bit consider- ation required	Yes
<b>Weatherford International Ltd. Paul Roberts, Global RSS Product Line Manager paul.roberts@me.weatherford.com www.weatherford.com</b>												
Revolution 825 rotary steerable system	Point	14.5	OD: 8.25 ID: 2.75	18.25 - 10.625	7.5	Yes	Variable	Yes	175/347 operating	25,000	None	No
Revolution 675 rotary steerable system	Point	12.7	OD: 6.75 ID: 2.0	8.375 - 9.875	10	Yes	Variable	Yes	175/347 operating	25,000	None	No
Revolution 475 rotary steerable system	Point	11.2	OD: 4.75 ID: 1.75	5.875 - 6.75	10	Yes	Variable	Yes	175/347 operating	25,000	None	No

Sensor distance (ft) Inc/Azm/GR/Res	Control from surface (Downlink)? (Y / N)	If yes, tool control method	Req'd to communicate change in target (minutes)	Minimum kickoff inclination (degrees)	Max RPM / WOB	Min flow rate (gpm)	Max flow rate (gpm)	LCM limits	Power source	Bit requirements	Integrated LWD?
3/23/3/40	Y	Negative pulse from surface skid unit	0	0	250 RPM 100klb	Recommend 500 psi differential across MWD for telemetry	20,000 lbs/min (e.g., 2,000 gpm @10 ppg)	None	Lithium batteries	Extended gauge	Yes
10/20/22/70	Y	Negative pulse from surface skid unit	0	5	250 RPM 25klb	Recommend 500 psi differential across MWD for telemetry	5,000 lbs/min (e.g., 333 gpm @ 15.0 ppg)	None	Lithium batteries	Extended gauge	Yes
10/20/22/70	Y	Negative pulse from surface skid unit	0	5	250 RPM 25klb	Recommend 500 psi differential across MWD for telemetry	5,000 lbs/min (e.g., 333 gpm @ 15.0 ppg)	None	Lithium batteries	Extended gauge	Yes
3/23/3/56	Y	Negative pulse from surface skid unit	0	0	250 bit RPM 55klb	Recommend 500 psi differential across MWD for telemetry	10,000 lbs/min (e.g., 1,000 gpm @10 ppg)	None	Lithium batteries	Extended gauge	Yes
3/23/3/56	Y	Negative pulse from surface skid unit	0	0	250 bit RPM 55klb	Recommend 500 psi differential across MWD for telemetry	10,000 lbs/min (e.g., 1,000 gpm @10 ppg)	None	Lithium batteries	Extended gauge	Yes
3/23/3/58	Y	Negative pulse from surface skid unit	0	0	250 bit RPM 90klb	Recommend 500 psi differential across MWD for telemetry	12,000 lbs/min (e.g., 1,200 gpm @10 ppg)	None	Lithium batteries	Extended gauge	Yes
3/23/3/58	Y	Negative pulse from surface skid unit	0	0	250 bit RPM 90klb	Recommend 500 psi differential across MWD for telemetry	12,000 lbs/min (e.g., 1,200 gpm @10 ppg)	None	Lithium batteries	Extended gauge	Yes
7.5/28/35	Y	Negative pulse from surface skid unit	0	0	280 RPM 42.5klb	Recommend 500 psi differential across MWD for telemetry	1400	None	Lithium batteries	Extended gauge	Yes
Inc / Azm 12.8 / 12.8	Y	Flow rate change	While drilling ahead	0	350 RPM 55 klf	290	800	50 lb/bbl med. nut plug	Turbine generator	Application specific - bi-center compatible	Modular
Inc / Azm 16.7 / 16.7	Y	Flow rate change	While drilling ahead	0	350 RPM 75 klf	450	1,800	50 lb/bbl med. nut plug	Turbine generator	Application specific - bi-center compatible	Modular
Inc / Azm 8.8 / 10.9 GR 8.0	Y	Flow rate change	While drilling ahead	0	220 RPM 65 klf	480	1,900	50 lb/bbl med. nut plug	Turbine generator	Application specific	Modular
Inc / Azm 8.4 / 10.5 GR 7.6	Y	Flow rate change	While drilling ahead	0	220 RPM 65 klf	360	1,900	50 lb/bbl med. nut plug	Turbine generator	Application specific	Modular
Inc / Azm 8.4 / 10.5 GR 7.6	Y	Flow rate change	While drilling ahead	0	220 RPM 65 klf	360	1,500	50 lb/bbl med. nut plug	Turbine generator	Application specific	Modular
Inc / Azm 7.3 / 9.4 GR 6.4	Y	Flow rate change	While drilling ahead	0	220 RPM 65 klf	250	800	50 lb/bbl med. nut plug	Turbine generator	Application specific	Modular
Inc / Azm 6.7 / 8.8 GR 5.9	Y	Flow rate change	While drilling ahead	0	250 RPM 50 klf	130	400	35 lb/bbl med. nut plug	Turbine generator	Application specific	Modular
Inc / Azm 8.8 / 10.9 GR 8.0	Y	Flow rate change	While drilling ahead	0	220 RPM 65 klf	300	2,000	50 lb/bbl med. nut plug	Turbine generator	Application specific	Modular
Inc / Azm 8.4 / 10.5 GR 7.6	Y	Flow rate change	While drilling ahead	0	220 RPM 65 klf	300	2,000	50 lb/bbl med. nut plug	Turbine generator	Application specific	Modular
Inc / Azm 8.4 / 10.5 GR 7.6	Y	Flow rate change	While drilling ahead	0	220 RPM 65 klf	300	2,000	50 lb/bbl med. nut plug	Turbine generator	Application specific	Modular
Inc / Azm 7.3 / 9.4 GR 6.4	Y	Flow rate change	While drilling ahead	0	220 RPM 65 klf	200	950	50 lb/bbl med. nut plug	Turbine generator	Application specific	Modular
Inc / Azm 6.7 / 8.8 GR 5.9	Y	Flow rate change	While drilling ahead	0	220 RPM 50 klf	100	380	35 lb/bbl med. nut plug	Turbine generator	Application specific	Modular
Inc / Azm 16.9 / 16.9	Y	Flow rate change	While drilling ahead	0	400 RPM 5 klf	80	140	35 lb/bbl med. nut plug	Turbine generator	Application specific	Modular
Inc / Azm 9.9 / 12.1 GR 9.7	Y	Flow rate change	While drilling ahead	0	350 RPM 60 Klf	250	650	50 lb/bbl med. nut plug	Turbine generator	Application specific	Modular
14/14/16/39	Y	Drillstring rotation or negative pulse from surface skid unit	Typically < 3	0	250 RPM 90 klf	No minimum requirement	1500	Steering system: None MWD system: 80 lb/bbl fine/med (higher conc. on request)	Lithium batteries	Long passive gauge PDC	Yes
12/ 12/14/39	Y	Drillstring rotation or negative pulse from surface skid unit	Typically < 3	0	250 RPM 50 klf	No minimum requirement	750	Steering system: None MWD system: 80 lb/bbl fine/med (higher conc. on request)	Lithium batteries	Long passive gauge PDC	Yes
9/ 9/16/39	Y	Drillstring rotation or negative pulse from surface skid unit	Typically < 3	0	250 RPM 25 klf	No minimum requirement	350	Steering system: None MWD system: 80 lb/bbl fine/med (higher conc. on request)	Lithium batteries	Long passive gauge PDC	Yes