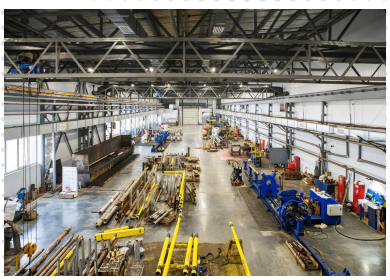
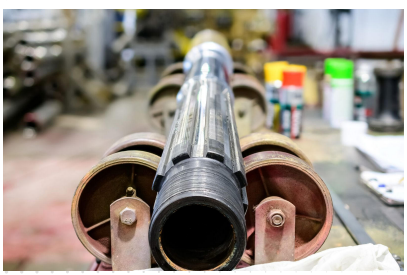
Deepwells

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Leading Oil & Gas Equipment Supply & Service Company in MENA







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Our Core Activities

01

Rental Downhole Products

We rent Downhole Drilling tools like, jars, circulations subs and shock tools with completion tools in addition, offering all sizes for the mentioned tools.

02

Chemical Technologies

We also provide advanced oil and gas Chemical Technologies. Serving the oil, gas, petrochemical, and manufacturing sectors.

03

Maintenance & Related Services

DEEPWELLS offers high-quality maintenance and solutions for all tools, at the workshop using advanced tests and service equipment for precise and safe operations.

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About Us

"DEEPWELLS GROUP LLC is a leading provider of Downhole Tools like Jars, Circulation Subs, Shock Tools, and Mud Motors. We are able to offer our clients in the oil, gas, petrochemical, and manufacturing industries unparalleled service, ensuring their assets function safely and effectively.

Our comprehensive suite of downhole tools empowers you to optimize every stage of your well drilling operation, from exploration to production. We offer a diverse range of solutions designed to optimize every stage of your well development, from drilling and completion to workover operations.

"At DEEPWELLS GROUP LLC, providing industry-leading tools is just the baseline. Ourtrue value lies in collaborative problem-solving—working alongside our clients to develop innovative yet practical solutions from conception to completion. DEEPWELLS integrates this holistic mindset to streamline your project management from upstream to downstream, ensuring that every technology we deploy translates into tangible, real-world success for your operations."

Why Choose Us

- The expertise of highly skilled professionals.
- Skilled Team delivers efficient solutions.
- Value-Added Quality Services.
- Flexible and Time-Bounded Solutions.



Our Speciality

- Global partnership with multinational companies, and drilling contractors.
- Expert team with highly skilled professionals.
- Holistic approach focusing on the Upstream to Downstream solutions.
- Unparalleled Client support system.



Mission

To provide our clients with a professional service that meets and exceeds their expectations.

Vision

to be a global leader in the oil industry. We are renowned for our commitment to exceptional service, innovative problem-solving mechanisms, and holistic approaches to our clients' operations from Upstream to Downstream.

Values

Integrity, Excellence, Innovation, and client satisfaction, driving every aspect of our operations and interactions with stakeholders worldwide.



Code of Conduct

We require that all our employees conduct themselves according to the highest standards of ethics, integrity, and behavior when dealing with our:

- Customers
- Employees
- Other stakeholders

This includes full compliance with all legal obligations required by any source of law.

The policy must be complied with the following:

Our policy establishes the standards of behavior that must be met by all employees. If these standards are not met, then we will take appropriate disciplinary action.

If the breach involves serious misconduct, then it may result in summary dismissal. If breaching of any law, then we will notify the relevant government authorities or the police.



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Our Services

Our comprehensive suite of downhole tools empowers you to optimize every stage of your well drilling operation, from exploration to production. We offer a diverse range of solutions designed to optimize every stage of your well development, from drilling and completion to workover operations.

- Circulation Subs
- Drilling Jars
- Shock Tools
- Mud Motors
- AVDS
- Hydraulic Whipstock
- Completions Tools
- Survey Tools



DEMAND MORE
DRILL BITTER



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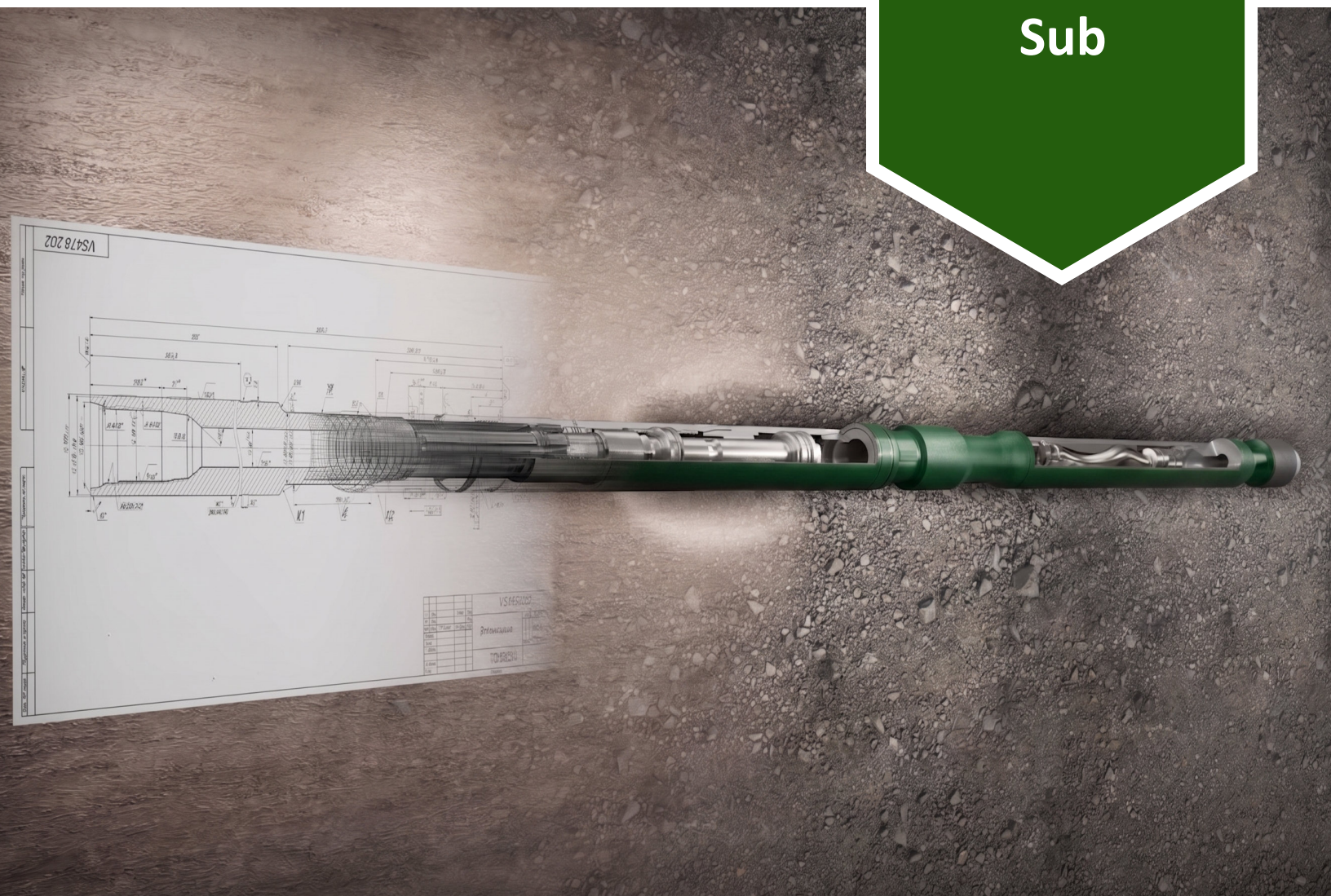
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Drilling Tools

Circulation Sub



Circulation Sub

Circulaion sub is designed to allow diversion of mud flow into annulus whenever required and combat common drilling problems, such as lost circulation and limited circulating rates. Sub operation control does not require dedicated trips.

It is always recommended to include the circulation sub into BHA in following cases:

» Acid, chemical and bridging agent treatments, which can be dangerous for below located BHA components.
» Reaming during loss of circulation, full loss of circulation.
» Wellbore cleanout required for acceleration of the flow in annular space by increase of mud flow.

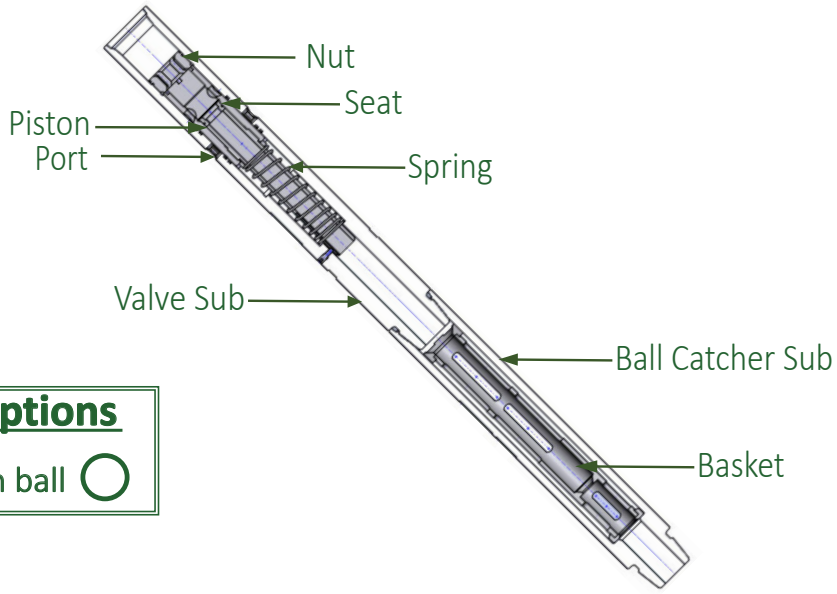
The sub has several configurations, which differ by number of operation cycles and activation/deactivation pressures without need of pulling out of hole.

Features & Benefits

- ►Significantly increases economical efficiency by reducing time per operation trips.
- ►Restore circulation, bottom hole chemical treatments are possible without BHA additional tripping.
- ►Up to 10 activations at one BHA trip (4/5 activations is standard).
- ►Different options for deactivation pressures (2100psi, 3000psi, 4500psi).
- ►Simple visual control of pressure drop.
- ►No limitations for LCM type of materials to fight loss of circulation.
- ►In case of circulation stop, the sub blocks the ports automatically to prevent cross flow of mud between annular space and the drilling string.
- ►A “dump sub” function can activated after pulling out of hole.
- ►Sub has been successfully run in the harshest environments including CO2 and H2S.

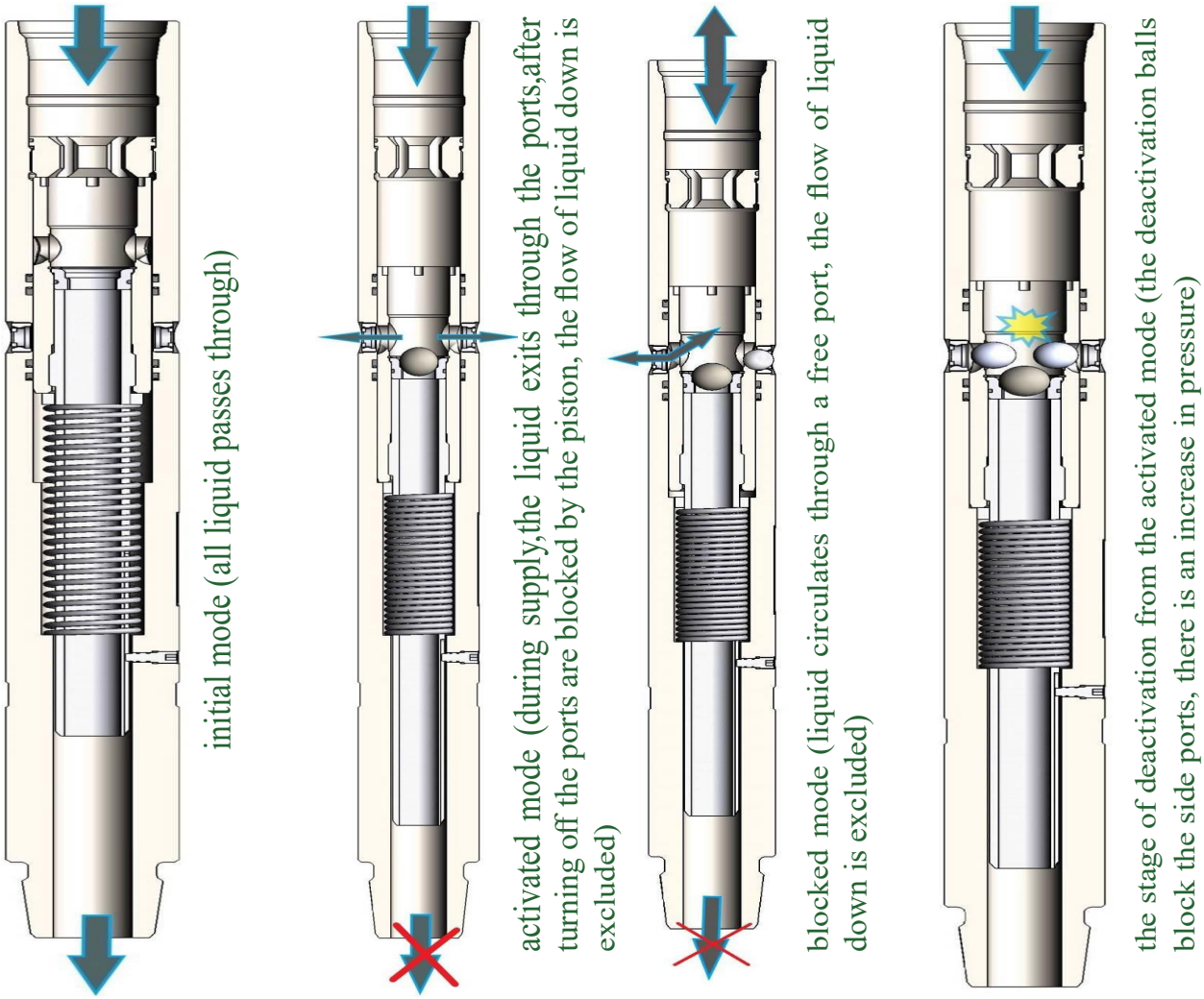


Circulation Sub

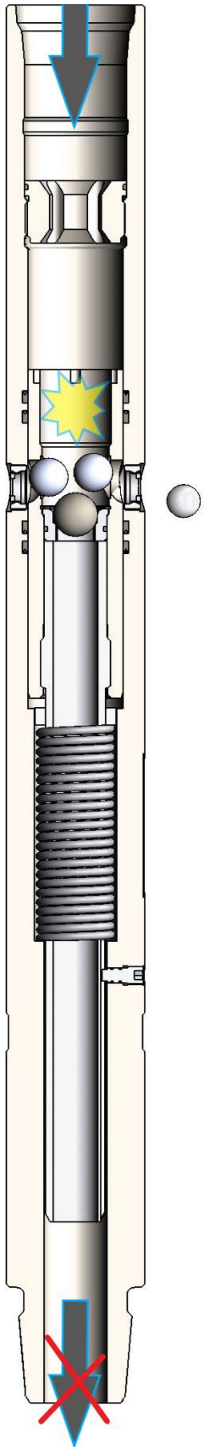


Activation Options

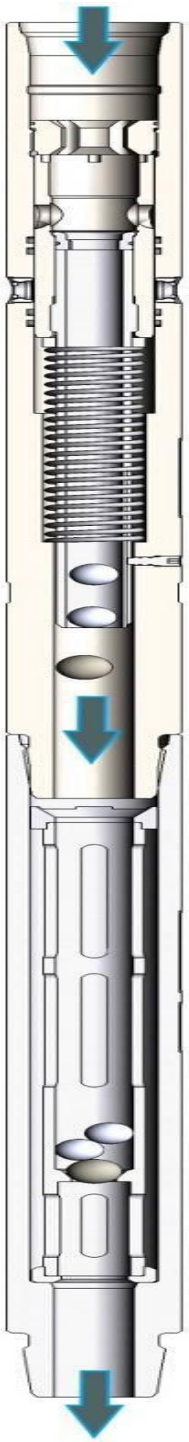
plastic activation ball ◯



Circulation Sub



the stage of the deactivation from the blocked mode (the deactivation balls block the side ports, there is an increase in pressure)



after deactivation (the balls of activation and deactivation are caught by the basket, the balls in the basket from the previous deactivation are conditionally shown)

Circulation Sub

Specifications (Imperial)			
	CS475	**CS675**	**CS825**
Outer diameter d, (in)	4 ¾	6 ¾	8 ¼
The length of the Sub L, (in)	83.9	102.2	115.9
Weight (lb)	276	772	1124
Quantity of ports, piece	2	2	2
Activation ball OD (in)	1.5	2	2.25
Blocking ball OD (in)	1.13	1.13	1.37
Deactivation ball OD (in)	1.31	1.38	1.73
Port size (in)	1.02	1.12	1.36
Connecting threads	NC 38	NC 50	6 5/8 Reg
Operating Parameters			
Maximum flow rate (gpm)	396	713	1014
Pressure drop with direct circulation (with empty basket) (psi)	61	145	72.5
Pressure drop (circulation through side ports) (psi)	54	217.6	174
Make-Up torque (ft·lbs)	8,482 – 10,695	29,500 – 33,900	56,800 – 64,200
Number of cycles (std / ext)	5/10	5/10	5/10
Activation pressure (psi)	87	116	58
Deactivation pressure (psi)	2100	2103	2103
Blocking ball push-through pressure (psi)	1088	1088	1088
TFA (non-activated tool) (in.sq.)	1.7	2.97	3.78
Flow area when tool is activated (in.sq.)	0.99	0.99	1.45
Maximum tensile load (lb)	737,250	1,344,000	2,136,000
Torsional strength main body (ft·lb)	18,880	199,141	346,653



Circulation Sub

Specifications (Metric)			
	CS475	**CS675**	**CS825**
Outer diameter d, (mm)	120	172	210
The length of the Sub L, (mm)	2132	2596	2945
Weight (kg)	125	350	510
Quantity of ports, piece	2	2	2
Activation ball OD (mm)	38.1	50.8	57.1
Blocking ball OD (mm)	28.6	28.6	34.9
Deactivation ball OD (mm)	33.33	34.92	44.45
Port size (mm)	28.5	28.5	34.5
Connecting threads	NC 38	NC 50	6 5/8 Reg
Operating Parameters			
Maximum flow rate (l/s)	25	45	64
Pressure drop with direct circulation (with empty basket) (mpa)	0.42	1.0	0.5
Pressure drop (circulation through side ports) (mpa)	0.37	1.5	1.2
Make-Up torque (N·m)	11,500 – 14,500	40,000 – 46,000	77,000 – 87,000
Number of cycles (std / ext)	5/10	5/10	5/10
Activation pressure (mpa)	0.4	0.8	0.4
Deactivation pressure (mpa)	14.5	14.5	14.5
Blocking ball push-through pressure (mpa)	7.5	7.5	7.5
TFA (non-activated tool) (mm.sq.)	1095	1917	2440
Flow area when tool is activated (mm.sq.)	638	638	935
Maximum tensile load (kN)	2500	5980	9500
Torsional strength main body (N·m)	80,000	270,000	470,000



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Drilling Tools

Drilling Jars

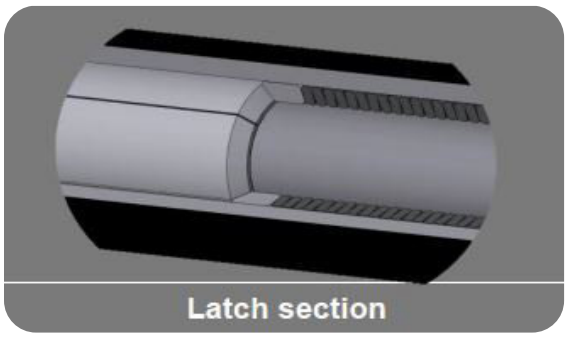


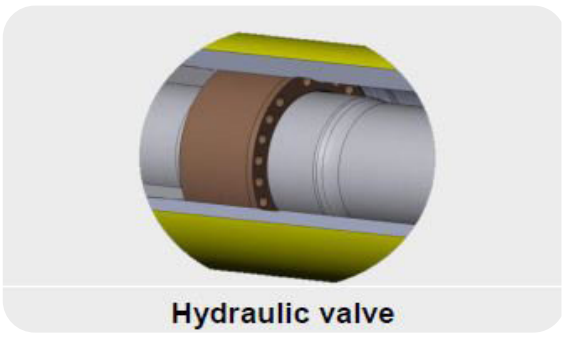
Drilling Jars

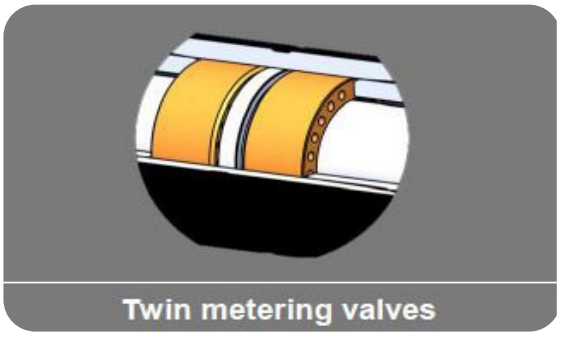
Drilling jar is used to amplify the force applied at surface in order to free stuck drill string components during drilling and fishing operations. The direction of jarring can be both up and down.

Features & Benefits

- The hydraulic delay mechanism is located in a separate chamber to prevent contamination and provide for increased reliability.
- The jar operates with a simple up and down motion and is not affected by torque.
- Standard seals in the tool are rated to 250ºF (120ºC). The jar can be dressed with seals rated to 400ºF (200ºC) for hot hole environments.
- External sealing surfaces are tungsten carbide-coated to enhance wear and corrosion resistance.
- New design and technologies used in manufacturing provide for dramatically increased allowable overpull forces as well as overall tool robustness.


Latch section


Hydraulic valve


Twin metering valves

Drilling Jars

Hydraulic Mechanical jar is a double acting jar. designed to deliver hydraulic delay when jarring in the up direction. and mechanical release when jarring in the down direction. The HMJ incorporates a latch mechanism to keep the jar locked in the neutral position and eliminate unexpected jarring while tripping or racking on the derrick.

Features & Benefits

- The HMJ is normally operated in the latched position to reduce unexpected jarring while drilling and eliminate movement between jar components increasing service life.
- The spline drive and latch mechanism are enclosed in a single sealed oil chamber without ports to the annulus. Such ports on other jars may become filled with cuttings/debris and restrict the down jar stroke.
- With the latch mechanism in the latched position the inner mandrel and outer housing work integrally essentially eliminating seal and inner tool wear during normal drilling conditions. There is no need to un-latch or open the jar before running in the hole.
- The HMJ can be run in tension or in compression within the preset latch setting.



Drilling Jars

Specifications (Imperial)			
	HMJ475	**HMJ675**	**HMJ800**
Nominal OD (A), in	4.88	6.73	8
Thru Bore (B), in	2.16	2.75	2.75
Free stroke Up, in	9	9	9
Free stroke Down, in	5.9	5.9	5.9
Length in fixed position (C), ft	22.14	22.15	22.97
Hydraulic delay time, sec	30 – 150	30 – 150	30 – 150
Nominal Up latch setting, lbs	55,000	130,000	154,300
Nominal Down latch setting, lbs	35,900	70,500	99,200
Pump Open Area, in.sq.	11.78	23.7	30.69
Maximum pull during hydraulic delay, lbs	76,200	189,600	242,500
Tensile yield, lbs	391,000	705,500	804,500
Torsional limit, ft-lbs	13,276	36,100	61,900
Connecting threads	NC38	NC50	6 5/8 Reg
Make up torque, ft-lbs	**8,851 – 10,325**	**28,750 – 33,200**	**47,900 – 51,500**
Maximum operating temperature, °F	302	302	302
Weight, lb	749	1926	2866

Specifications (Metric)			
	HMJ475	**HMJ675**	**HMJ800**
Nominal OD, mm	124	175	203
Thru Bore, mm	55	70	70
Free stroke Up, mm	230	230	230
Free stroke Down, mm	150	150	150
Length in fixed position, mm	6750	6750	7000
Hydraulic delay time, sec	30 – 150	30 – 150	30 – 150
Nominal Up latch setting, kgf	25,000	59,000	70,000
Nominal Down latch setting, kgf	16,300	32,000	45,000
Pump Open Area, sm.sq.	76	153	198
Maximum pull during hydraulic delay, kgf	34,600	86,000	110,000
Tensile yield, kgf	177,350	320,000	365,000
Torsional limit, Nm	18,000	49,000	84,000
Connecting threads	NC38	NC50	6 5/8 Reg
Make up torque, kgf*m	1200 – 1400	3900 – 4500	6500 – 7000
Maximum operating temperature, °C	150	150	150
Weight, kg	340	874	1 300

*** Actual values are supplied in tool test report**

**** Tool should be sent for maintenance every 250 hours when used in environment with chloride content higher than 50,000 mg/l**

***** As per special request tool can be equipped with seals of up to 175 deg C (350 deg °F)**

Drilling Jars

Hydraulic Jar (HJ) is a bi-directional drilling jar incorporating hydraulic delay without a latch mechanism. This type of jar allows operator to apply variable impact in both the up and down directions. The HJDA is intended for use in highly deviated or high friction wells where conditions may prevent applying sufficient force to release a mechanical latch.

Features & Benefits

- The HJ is hydraulically controlled and jars in both directions with impact force controlled by the operator.
- Impact force is controlled by a metering device that ensures consistent delay times over the full range of operating temperatures.
- The HJ operates via a simple up and down motion and is unaffected by torque.



Drilling Jars

Specifications (Imperial)			
	HJ475	**HJ650**	**HJ800**
Nominal OD, in	4.88	6.61	8.15
Thru Bore, in	2.2	2.76	2.76
Length in open position, ft	18	18.4	22.3
Length in closed position, ft	16	16.4	20.3
Free stroke after hyd. delay during extension, in	7.28	7.48	7.87
Free stroke after hyd. delay during compression, in	7.28	7.48	7.87
Hydraulic delay time*, sec	30 – 150	30 – 150	30 – 150
Pump Open Area, in.sq.	11.78	23.7	30.7
Maximum tensile (compressive) load during hydraulic delay, lbs	77,150	176,370	242,500
Maximum tensile load during pulling out of hole, lbs	286,600	617,290	804,700
Maximum torque, ft-lbs	13,000	22,120	60,700
Connecting threads	NC38	NC50	6 5/8 Reg
Make up torque, ft-lbs	8680– 10120	18400 – 19900	47000 – 50600
Maximum operating temperature***, °F	248	248	248
Weight, lb	705.5	1 313	2 425
Overhaul period, hrs below the rotary table**, hrs	500	750	750

Specifications (Metric)			
	HJ475	**HJ650**	**HJ800**
Nominal OD (A), mm	124	168	207
Thru Bore (B), mm	56	70	70
Length in open position, mm	5 500	5 600	6 800
Length in closed position (C), mm	4 900	5 000	6 190
Free stroke after hyd. delay during extension, mm	185	190	190
Free stroke after hyd. delay during compression, mm	185	190	190
Hydraulic delay time*, sec	30 – 150	30 – 150	30 – 150
Pump Open Area, sm.sq.	76	153	198
Maximum tensile (compressive) load during hydraulic delay, kgf	35,000	80,000	110,000
Maximum tensile load during pulling out of hole, kgf	130,000	280,000	365,000
Maximum torque, kgf*m	1800	3000	8390
Connecting threads	NC38	NC50	6 5/8 Reg
Make up torque, kgf*m	1200 – 1400	2500 – 2700	6500 – 7000
Maximum operating temperature***, °C	120	120	120
Weight, kg	320	596	1 100
Overhaul period, hrs below the rotary table**, hrs	500	750	750

*** Actual values are supplied in tool test report**
**** Tool should be sent for maintenance every 250 hours when used in environment with chloride content higher than 50,000 mg/l**
***** As per special request tool can be equipped with seals of up to 175 deg C (350 deg °F)**

Drilling Jars

Hydraulic jar with mechanical latch is a double acting jar designed to deliver hydraulic delay when jarring up or down equipped with mechanical lock in each direction. The HJML incorporates a latch mechanism to keep the jar locked in the neutral position and eliminate unexpected jarring while tripping or racking back on the derrick

Features & Benefits

- The HJML is normally operated in the latched position to reduce unexpected jarring while drilling and eliminate movement between jar components increasing service life.
- The HJML operates with a simple up and down motion and is not affected by torque.



Drilling Jars

Specifications (Imperial)			
	HJML475	HJML650	HJML800
Nominal OD, in	4.88	6.61	8.15
Thru Bore, in	2.2	2.76	2.76
Length in fixed position, ft	23.13	24.1	24.93
Free stroke after hyd. delay during extension, in	7.28	7.48	7.87
Free stroke after hyd. delay during compression, in	7.28	7.48	7.87
Hydraulic delay time*, sec	30 – 150	30 – 150	30 – 150
Nominal Up latch setting, lbs	55,000	130,000	154300
Nominal Down latch setting, lbs	35,900	70,500	99,200
Pump open area, in.sq.	11.78	24.8	30.7
Maximum tensile (compressive) load during hydraulic delay, lbs	77,150	176,370	242,500
Tensile yield, lbs	286,600	617,290	804,700
Maximum torque, ft-lbs	13,000	22,120	60,700
Thread connections	NC38	NC50	6 5/8 Reg
Make up torque, ft-lbs	8680 - 10120	18400 - 19900	47000 - 50600
Maximum operating temperature ***, °F	248	248	248
Weight, lb	930	1 800	3 140
Time between service, hrs below rotary table**, hrs	500	750	750

Specifications (Metric)			
	HJML475	HJML650	HJML800
Nominal OD, mm	124	168	207
Thru Bore, mm	56	70	70
Length in fixed position, mm	7050	7350	7600
Free stroke after hyd. delay during extension, mm	185	190	200
Free stroke after hyd. delay during compression, mm	185	190	200
Hydraulic delay time*, sec	30 – 150	30 – 150	30 – 150
Nominal Up latch setting, kgf	25,000	59,000	70,000
Nominal Down latch setting, kgf	16,300	32,000	45,000
Pump open area, sm.sq.	76	153	198
Maximum tensile (compressive) load during hydraulic delay, kgf	35,000	80,000	110,000
Tensile yield, kgf	130,000	280,000	365,000
Maximum torque, kgf*m	1800	3000	8400
Thread connections	NC38	NC50	6 5/8 Reg
Make up torque, kgf*m	1200 – 1400	2500 – 2700	6500 –7000
Maximum operating temperature ***, °C	120	120	120
Weight, kg	422	820	1 425
Time between service, hrs below rotary table**, hrs	500	750	750

*** Actual values are supplied in tool test report**

**** Tool should be sent for maintenance every 250 hours when used in environment with chloride content higher than 50,000 mg/l**

***** As per special request tool can be equipped with seals of up to 175 deg C (350 deg °F)**

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Drilling Tools

Shock Tools



Shock Subs

Shock tool is designed to reduce the impact of vibrations on the elements of the bottom of the drill string, and to absorb shocks and vibrations acting on the string in the process of drilling oil and gas wells.

By isolating vibration from the bottom hole assembly caused by the drilling operations, the shock tool reduces the probability of a drill string failure or and electronic components due to fatigue destruction.

Shock tool design ensures efficient operation under various combinations of axial loads on bit and reduce fluctuation/spikes in mud flow rates and pressures.

When drilling a well using a downhole drive shock tool installed in the BHA directly above the bottom hole drive, when drilling in a rotary mode - above the bit.

Features & Benefits

- Reduce the risks of accidents related to drill string partition.
- Increase the service life of the drill bit and BHA elements.
- Protects electronics used in BHA MWD/LWD tools.
- Provides for increase in ROP.
- Isolates bit/formation induced vibrations from the drill string.
- Fully oil sealed and lubricated for extended service life.
- Does not use temperature sensitive elastomers for shock absorption, therefore is suitable for use in temperatures up to 250 F 120 C), with optional seals available for temperatures up to 320 F 160 C).
- Reduces wear and tear on rig and equipment, and fatigue failures on drill collars and drill pipe.
- Automatically compensates for pump created forces.



Shock Subs

Specifications (Imperial)			
	ST800	**ST950**	**ST1100**
Nominal OD (in)	8	9.5	11
Thru Bore (in)	2 3/4	3.0	3.0
Length (ft)	11.9	12.3	13
Torsional Limit (ft.lbs)	82,200	131,000	225,600
Tensile Yield (lbs)	1,378,800	1,209,000	1,628,300
Pump Open Area (in. sq)	30.6	41.3	63.6
Maximum Bottom hole temperature, (°F)	250 - 320	250 - 320	250 - 320
Weight (lbs)	1,690	2,500	3,240
Connection	6 5/8 REG	7 5/8 REG	7 5/8 REG

Specifications (Metric)			
	ST800	**ST950**	**ST1100**
Nominal OD (mm)	203	241	279
Thru Bore (mm)	70	76	76
Length (m)	3.62	3.74	3.96
Torsional Limit (N.m)	114,000	177,600	305,900
Tensile Yield (daN)	613,300	537,800	724,300
Pump Open Area (mm.sq.)	19,700	26,000	41,000
Maximum Bottom hole temperature, (°F)	250 - 320	250 - 320	250 - 320
Weight (kg)	770	1,140	1,470
Connection	6 5/8 REG	7 5/8 REG	7 5/8 REG



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Drilling Tools

Mud Motors



Mud Motors

Mud Motor consists of a power section and a bearing section.

The bearing section is assembled with the following to impart a bend to a motor:

- Adjustable bent housing assembly — for DRU motors. The adjustable bent housing assembly allows rig floor bend adjustment.
- Bent sub — for DOT motors. The motor bend is adjusted by changing the bent sub. For a straight motor, a straight sub is used instead of a bent sub.

The hydraulic downhole motor is a volumetric (hydrostatic) machine. Torque output and rotary speed depend on the number of rotor and stator lobes (lobe configuration). The more lobes, the lower the speed and the higher the torque. Speed, torque output, power, differential pressure are proportional to the flow rate of the drilling fluid. The longer the motor with respectively more stages, the higher the horse power and torque output of the motor.

Features & Benefits

- The power section converts the hydraulic energy of the drilling fluid into mechanical rotary energy. The power section is composed of a rotor and a stator. The stator is a steel tube with left-hand lobe elastomer molded to the interior surface of the tube. The elastomer is formed with left-handed helical lobe profile. The steel rotor has external lobes, one fewer than the stator. As the drilling fluid is pumped through by mud pumps from the surface, it causes the rotor to rotate inside the stator.
- The bearing section supports the hydraulic thrust of the power section, bottom reaction and radial loads from the bit during drilling. The bearing section includes radial thrust ball bearing or multiple-row rubber/metal thrust bearing and radial journal bearings



Mud Motors

PDM is new universal hydraulic downhole motors used for:
- drilling of oil and gas wells with 5 1/2 - 23” bits.
- well reconstruction by sidetracking with rock bits, PDC bits, including bicentric ones.
- well workover operations.

An adjustable bent sub is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3° .
Bearing section has axial multi-row rolling bearing and radial hard alloy bearings.



Specifications (Imperial)

	PDM825	PDM962
Housing OD (in)	8 1/4	9 7/16
Power section lobe configuration	7/8	5/6
Stages	4	5
Specific rotation, (rev/gal)	0.16	0.15
PDM length, ft	27	31
Power section Length, ft	17	18
Bearing Length, to the KOP, ft	7	8
Diameter of bits used, inch	9 7/8 - 19 5/16	11 1/4 - 23
Connecting thread to drill pipes	6 5/8 Reg	6 5/8 Reg
Connecting thread to bits	6 5/8 Reg	6 5/8 FH
Maximum density of drilling mud, ppg	16	16
Allowed axial compressive load, lbs	88185	88185
Allowed axial tensile load, lbs	286600	352700
Weight, lbs	3743	5405
Maximum permissible torque on housing parts, ft-lb	33190	42778
Working fluid flow rate, gpm	475 - 1030	634 - 1110
Rotation speed in idle mode, rpm	80 - 160	95 - 163
Rotation speed at maximum differential pressure drop, rpm	35 - 115	65 - 130
Rotation speed in max. power, rpm	5 - 85	60 - 105
Torque at maximum power, ft*lbs	14013 - 16226	16816
Torque at maximum permissible differential drop, ft*lbs	13128	14455
Maximum permissible pressure drop across the motor, psi	870	870
Pressure drop at maximum power, psi	1015 - 1189	1174

Mud Motors

PDM is new universal hydraulic downhole motors used for:
- drilling of oil and gas wells with 5 1/2 - 23” bits.
- well reconstruction by sidetracking with rock bits, PDC bits, including bicentric ones.
- well workover operations.

An adjustable bent sub is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3° .
Bearing section has axial multi-row rolling bearing and radial hard alloy bearings.

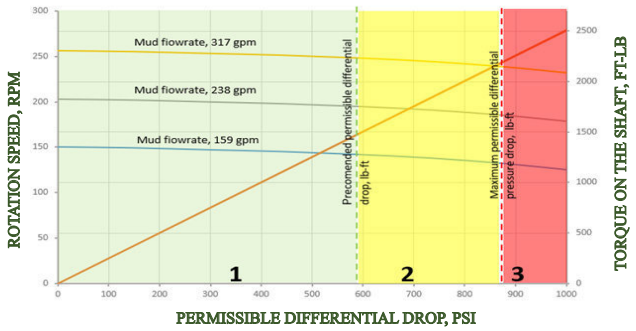


Specifications (Imperial)

	PDM825	PDM962
Housing OD (in)	8 1/4	9 7/16
Power section lobe configuration	7/8	5/6
Stages	4	5
Specific rotation, (rev/gal)	0.16	0.15
PDM length, ft	27	31
Power section Length, ft	17	18
Bearing Length, to the KOP, ft	7	8
Diameter of bits used, inch	9 7/8 - 19 5/16	11 1/4 - 23
Connecting thread to drill pipes	6 5/8 Reg	6 5/8 Reg
Connecting thread to bits	6 5/8 Reg	6 5/8 FH
Maximum density of drilling mud, ppg	16	16
Allowed axial compressive load, lbs	88185	88185
Allowed axial tensile load, lbs	286600	352700
Weight, lbs	3743	5405
Maximum permissible torque on housing parts, ft-lb	33190	42778
Working fluid flow rate, gpm	475 - 1030	634 - 1110
Rotation speed in idle mode, rpm	80 - 160	95 - 163
Rotation speed at maximum differential pressure drop, rpm	35 - 115	65 - 130
Rotation speed in max. power, rpm	5 - 85	60 - 105
Torque at maximum power, ft*lbs	14013 - 16226	16816
Torque at maximum permissible differential drop, ft*lbs	13128	14455
Maximum permissible pressure drop across the motor, psi	870	870
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Mud Motors

PDM 4 3/4.NGT.7/8

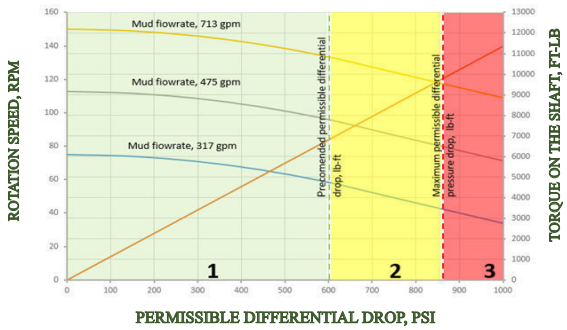


Area No.1 - recommended differential drop operating range

Area No.2 - range of operation differentail drop of the PDM with increased power, but decrease in the service life of the power section

Area No.3 - PDM braking with catastrothic wear of the power section. Operation in the mood is PROHIBITED

PDM 7.NGT.7/8

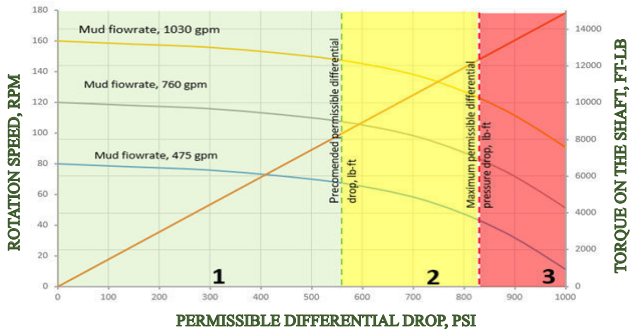


Area No.1 - recommended differential drop operating range

Area No.2 - range of operation differentail drop of the PDM with increased power, but decrease in the service life of the power section

Area No.3 - PDM braking with catastrothic wear of the power section. Operation in the mood is PROHIBITED

PDM 8 1/4.NGT.7/8

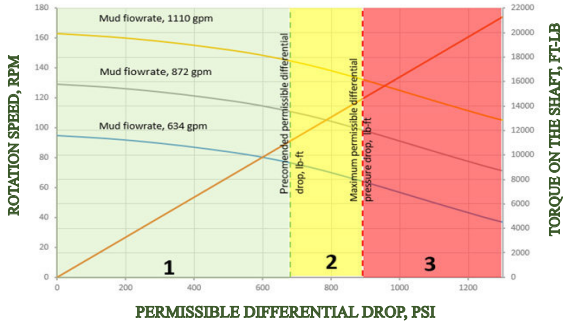


Area No.1 - recommended differential drop operating range

Area No.2 - range of operation differentail drop of the PDM with increased power, but decrease in the service life of the power section

Area No.3 - PDM braking with catastrothic wear of the power section. Operation in the mood is PROHIBITED

PDM 9 5/8.NGT.5/6



Area No.1 - recommended differential drop operating range

Area No.2 - range of operation differentail drop of the PDM with increased power, but decrease in the service life of the power section

Area No.3 - PDM braking with catastrothic wear of the power section. Operation in the mood is PROHIBITED



Max Deg. Build Against Bent Housing Degrees

PDM 4 3/4”

Spindle axis bent angle adjustment controller	Dogleg severity, degrees/33ft		
	Bit diameter, in		
	5 5/8	6	7
0,27 °	-	-	-
0,5 °	0,5	-	-
0,77 °	1,2	0,7	0,1
1,0 °	1,9	1,4	0,8
1,22 °	2,5	2	1,4
1,42 °	3,1	2,6	2
1,58 °	3,6	3,1	2,5
1,73 °	4	3,5	2,9
1,85 °	4,3	3,9	3,2
1,93 °	4,6	4,1	3,5
1,98 °	4,7	4,2	3,6
2,0 °	4,8	4,3	3,7

Recalculation of the severity parameter for a different length of the drill string section or the bit diameter with sufficient practical accuracy is carried out by solving an arithmetic proportion.

* - the data are given without taking into account the BHA design, rock properties, drilling modes, calculated geometrically and are for reference purposes only

When a bypass valve and other rigid BHA components are installed directly above the PDM, the dogleg severity is reduced by approximately 0.5–1.0 degrees/10 m. At the same time, the greater the angle of installation of the controller, the shorter the drill string section and the smaller the diameter of the wellbore, the more the dogleg severity from the installation of such BHA elements is reduced.

When a slotted filter with a relatively «flexible» body is installed directly above the PDM, no adjustment is made for the reduction in dogleg severity.



Max Deg. Build Against Bent Housing Degrees

PDM 7”

Spindle axis bent angle adjustment controller	Dogleg severity, degrees/33ft		
	Bit diameter, in		
	8 ½	8 11/16	9 5/8
0,22 °	-	-	-
0,42 °	0,3	0,2	-
0,62 °	0,7	0,6	-
0.82 °	1,1	1,0	0,3
1 °	1,5	1,4	0,7
1,18 °	1,9	1,7	1,1
1,33 °	2,2	2,0	1,4
1,48 °	2,5	2,4	1,7
1,62 °	2,8	2,6	2,0
1,73 °	3,0	2,9	2,2
1,83 °	3,2	3,1	2,4
1,9 °	3,3	3,2	2,6
2,0 °	3,5	3,4	2,8

Recalculation of the severity parameter for a different length of the drill string section or the bit diameter with sufficient practical accuracy is carried out by solving an arithmetic proportion.

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When a bypass valve and other rigid BHA components are installed directly above the PDM, the dogleg severity is reduced by approximately 0.5–1.0 degrees/10 m. At the same time, the greater the angle of installation of the controller, the shorter the drill string section and the smaller the diameter of the wellbore, the more the dogleg severity from the installation of such BHA elements is reduced.

When a slotted filter with a relatively «flexible» body is installed directly above the PDM, no adjustment is made for the reduction in dogleg severity.



Max Deg. Build Against Bent Housing Degrees

PDM 8 1/4”

Spindle axis bent angle adjustment controller	Dogleg severity, degrees/33ft		
	Bit diameter, in		
	9 7/8	11 5/8	14 3/4
0,22 °	0,7	-	-
0,42 °	1,1	-	-
0,62 °	1,6	0,4	-
0.82 °	2,1	0,8	-
1 °	2,5	1,3	-
1,18 °	2,9	1,7	-
1,33 °	3,3	2,0	0,1
1,48 °	3,6	2,4	0,4
1,62 °	4,0	2,7	0,7
1,73 °	4,2	3,0	1,0
1,83 °	4,5	3,2	1,2
1,9 °	4,6	3,4	1,4
2,0 °	4,9	3,6	1,6

Recalculation of the severity parameter for a different length of the drill string section or the bit diameter with sufficient practical accuracy is carried out by solving an arithmetic proportion.

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When a bypass valve and other rigid BHA components are installed directly above the PDM, the dogleg severity is reduced by approximately 0.5–1.0 degrees/10 m. At the same time, the greater the angle of installation of the controller, the shorter the drill string section and the smaller the diameter of the wellbore, the more the dogleg severity from the installation of such BHA elements is reduced.

When a slotted filter with a relatively «flexible» body is installed directly above the PDM, no adjustment is made for the reduction in dogleg severity.



Max Deg. Build Against Bent Housing Degrees

PDM 9 5/8”

Spindle axis bent angle adjustment controller	Dogleg severity, degrees/33ft			Dogleg severity, degrees/33ft		
	Bit diameter, in			Bit diameter, in		
	11 5/8	12 ¼	15 ½	11 5/8	12 ¼	15 ½
0,22 °	-	-	-	-	-	-
0,42 °	-	-	-	-	-	-
0,62 °	0,4	0,1	-	0,3	0,1	-
0.82 °	0,8	0,5	-	0,7	0,4	-
1 °	1,2	0,9	-	1,1	0,8	-
1,18 °	1,5	1,2	-	1,5	1,2	-
1,33 °	1,8	1,5	-	1,7	1,5	-
1,48 °	2,2	1,8	0,2	2,0	1,7	0,2
1,62 °	2,4	2,1	0,5	2,3	2,0	0,5
1,73 °	2,7	2,4	0,7	2,5	2,2	0,7
1,83 °	2,9	2,6	1,0	2,7	2,4	0,9
1,9 °	3,0	2,7	1,1	2,9	2,6	1,0
2,0 °	3,2	2,9	1,3	3,1	2,8	1,2

Recalculation of the severity parameter for a different length of the drill string section or the bit diameter with sufficient practical accuracy is carried out by solving an arithmetic proportion.

* - the data are given without taking into account the BHA design, rock properties, drilling modes, calculated geometrically and are for reference purposes only

When a bypass valve and other rigid BHA components are installed directly above the PDM, the dogleg severity is reduced by approximately 0.5–1.0 degrees/10 m. At the same time, the greater the angle of installation of the controller, the shorter the drill string section and the smaller the diameter of the wellbore, the more the dogleg severity from the installation of such BHA elements is reduced.

When a slotted filter with a relatively «flexible» body is installed directly above the PDM, no adjustment is made for the reduction in dogleg severity.



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Drilling Tools

AVDS



AVDS



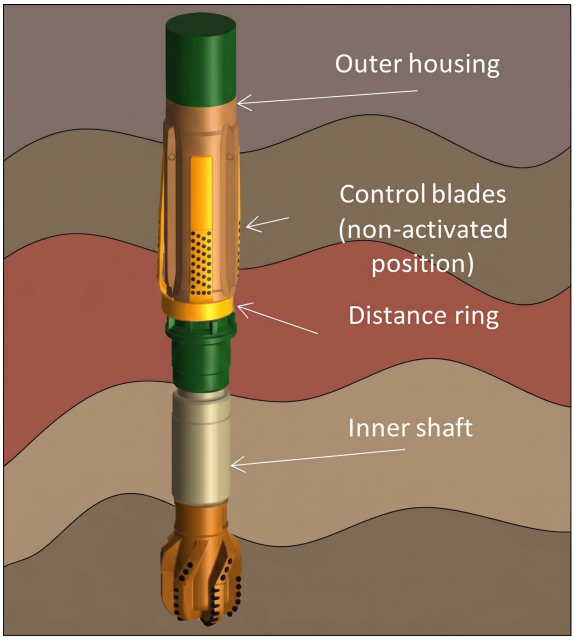
AVDS is a downhole tool for vertical drilling designed to achieve and maintain a vertical wellbore trajectory. This unique design allows operation in extreme high temperatures, when drilling in salt, steeply dipping beds or fault zones. When drilling in those conditions, it is often necessary to reduce weight on bit to prevent deviation problems that lead to the need for costly, time-consuming corrective runs. When using AVDS, it is possible to increase WOB without deviating the well trajectory. This usually results in increased ROP and, as a result, significant cost-efficiency. AVDS can be used both with a downhole motor and without it.

AVDS consists of non-rotating **outer housing** and rotating **inner shaft**, which is connected to the bit and drill string. The outer housing includes a control housing, **control blades** and control mechanism.

AVDS "Automatic Control System “includes **fluid passages control system** and **pistons** under each **control blade**, which are connected by **fluid passages** with inner drilling mud flow. The pistons transmit lateral force to the blades.

Lateral force of a blade is provided by hydraulics due to the creation of a pressure drop on the bit by selecting bit nozzles. Lateral force is in direct proportion to the pressure drop on the bit.

A **distance ring** covers the ends of the control blades around the circumference and keeps them moving to a predetermined diameter. When one blade extends, the opposite blade retracts. The blades cannot extend beyond the nominal diameter of the bit.



AVDS

As soon as the wellbore begins to deviate from the vertical, the AVDS "Automatic Control System" instantly mechanically reacts and opens fluid passages under one or two blades. The opposite blades extend and apply a corrective lateral force to the borehole wall and direct the borehole trajectory back to the strict verticality.

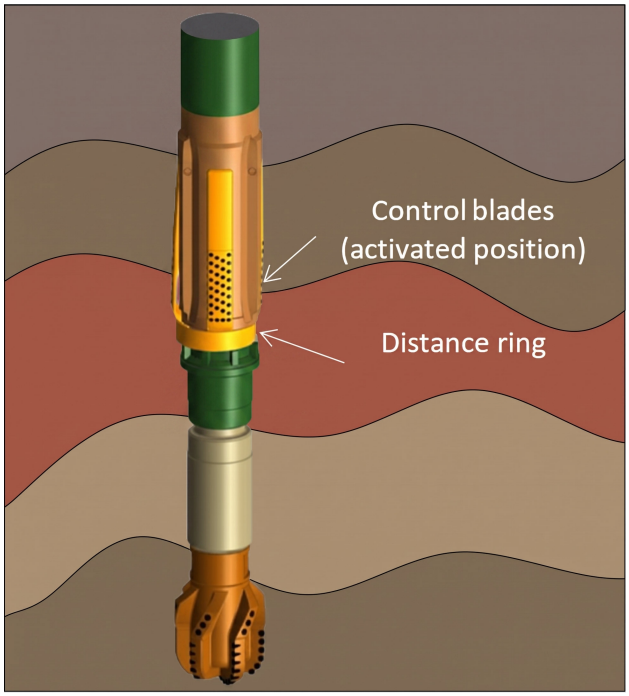
It should be noted that:

- when drilling with AVDS, the axial WOB is not transmitted through the AVDS thrust bearing, so the WOB is not limited and depends only on the type of the bit when drilling with a rotary assembly. When drilling with an assembly using a positive displacement motor, the weight limit is regulated only by the drilling technology and the PDM tolerance.

- when drilling with AVDS directly above it it is necessary to use the Stabilizer. It is also recommended to use one or two drill string stabilizers.

The main advantages of AVDS include:

- ✓ Automatic correction
- ✓ Maintain verticality
- ✓ Increase WOB
- ✓ Improve ROP
- ✓ Reduce drilling cost





AVDS

Specifications (Imperial)				
	AVDS-850	AVDS-1163	AVDS-1225	AVDS-1550
Bit diameter, (in)	8.50	11.63	12.25	15.50
Housing diameter (control blades are activated), (in)	8.50	11.62	12.24	15.49
Housing diameter (control blades are not activated), (in)	7.95	11.02	11.61	14.53
Inner diameter of the hole in AVDS, (in)	1.57	2.52	2.52	2.52
Full length, (ft)	15.26	16.80	16.80	16.80
Maximum load during the salvage operation (nondestructive), (klbs)	290.6	510.7	510.7	510.7
Maximum load (destructive), (klbs)	735.1	1292.6	1292.6	1292.6
Maximum force of control blades, (klbs)	2.95	5.10	5.10	7.94

Specifications (Metric)				
	AVDS-215.9	AVDS-295.3	AVDS-311.1	AVDS-393.7
Bit diameter, (mm)	215.9	295.3	311.1	393.7
Housing diameter (control blades are activated), (mm)	215.8	295.15	311.0	393.55
Housing diameter (control blades are not activated), (mm)	202.0	280.0	295.0	369.0
Inner diameter of the hole in AVDS, (mm)	40	64	64	64
Full length, (m)	4.65	5.12	5.12	5.12
Maximum load during the salvage operation (nondestructive), (kN)	1 293	2272	2272	2272
Maximum load (destructive), (kN)	3 270	5750	5 750	5 750
Maximum force of control blades, (kN)	13.1	22.7	22.7	35.3

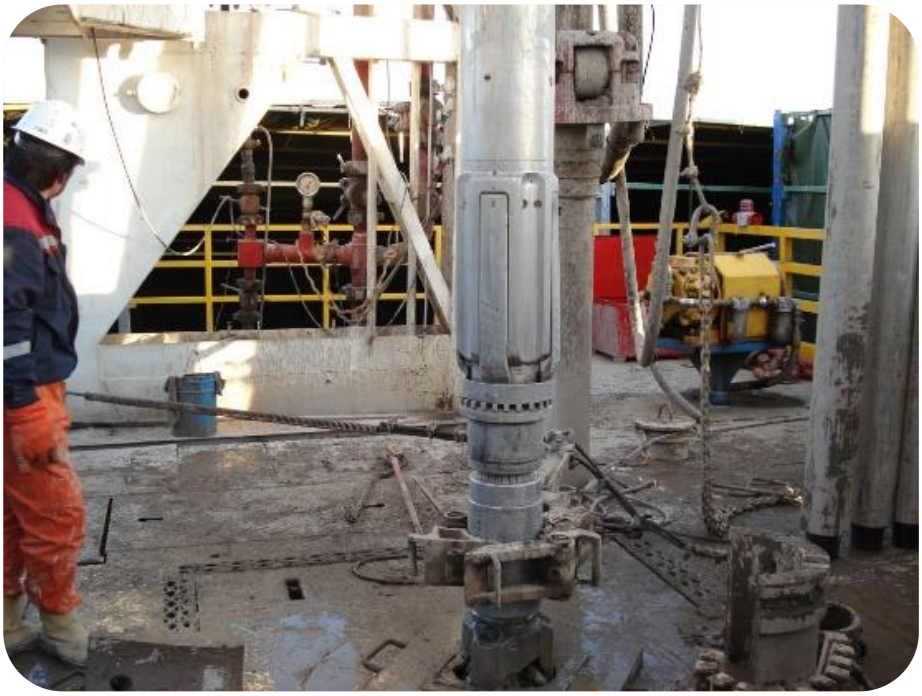




AVDS Application

1- At the **Yuzhny Alibek field (Caspineft) in Kazakhstan**, test activities were carried out using **AVDS-311.1**. Based on the results of the tests, positive results from the use of **AVDS-311.1** were obtained:

12 runs with the Smith BitType S-519BPX 12 1/4” (5-blade PDC bit), and 5 runs with Smith BitType GF15BVC (tri-cone bit) were completed, zenith angle value when drilling using AVDS-311.1 did not exceed 1.85° even in nonpersistent saline deposits. High WOB in compact rock intervals, which could lead to the very curving of the well, an increase in the ROP by 3-4 times compared to the offset well was allowed, which was drilled with a rotor or a turbodrill, one AVDS-311.1 drilled the entire interval with a diameter of 311.1 mm. The total drilling and flushing time on one AVDS-311.1 was 341 hours.





AVDS Application

Currently (July 2022), operation on the project of **Gazprom Burenie OOO**, Astrakhan Burenie Branch, namely, on well **No. 325** of the Astrakhan oil and gas condensate field continues, where, in cooperation with NII TS Pilot OOO, the **AVDS-393** product has already successfully drilled the corresponding section in the interval 380-1746m, and now the section with AVDS-295. is being drilled (bottom as of May, 7, 2022 is 2220m).

Despite the complex geology, AVDS show consistent results both in maintaining the verticality of the wellbore and in the average POP of the BHA in comparison with the alternative expensive RSS system traditionally used on this project.



AVDS Components & Operation

AVDS

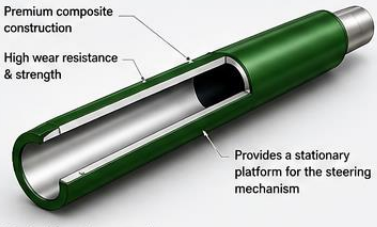
AUTOMATIC VERTICAL DRILLING SYSTEM

ENGINEERED FOR PRECISE DIRECTIONAL CONTROL

The AVDS (Automatic Vertical Drilling System) delivers accurate steering and reliable performance in the most demanding drilling environments.



1 NON-ROTATING OUTER HOUSING
(GREEN COMPOSITE BODY)



- Protects internal components
- Prevents rotation of control blades
- Maintains stability against borehole wall

2 ROTATING INNER SHAFT
(METAL CORE)



- Rotates with the drill string
- Drives the drill bit
- Carries drilling fluid to the bit nozzles

3 CONTROL HOUSING SECTION
(DETAIL VIEW)



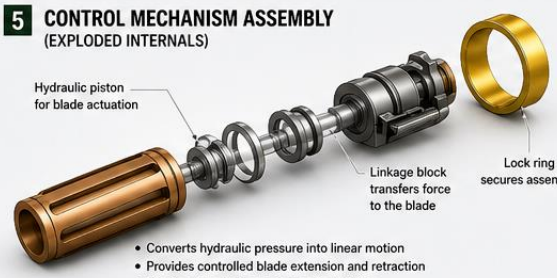
- Houses the hydraulic steering mechanism
- Converts hydraulic energy into mechanical motion
- Ensures reliable actuation of control blades

4 CONTROL BLADE
(SINGLE BLADE DETAIL)



- Extends to push against the borehole wall
- Retracts when pressure is released
- Replaceable for extended service life

5 CONTROL MECHANISM ASSEMBLY
(EXPLODED INTERNALS)



- Converts hydraulic pressure into linear motion
- Provides controlled blade extension and retraction
- Designed for high pressure and reliability

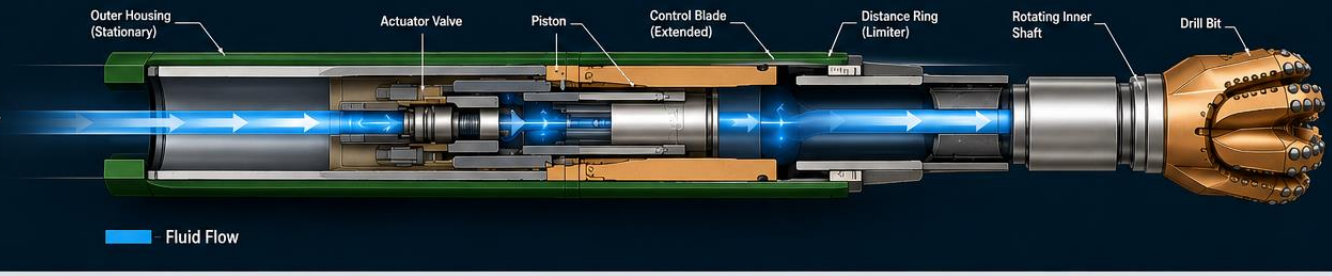
6 DISTANCE RING
(POSITION LIMITER)



- Ensures consistent blade travel
- Prevents over-extension and damage
- Improves tool durability and performance

HOW IT WORKS

1. Drilling fluid flows through the inner shaft and exits at the bit nozzles.
2. Pressure drop across the bit creates hydraulic pressure in the control system.
3. Pressure is directed to the piston chamber via the actuator valve.
4. The piston extends, pushing the control blade against the borehole wall.
5. The reaction force steers the bit in the desired direction.
6. Pressure is released and the blade retracts to neutral position.



KEY BENEFITS

- **Automatic Correction** — Instantly reacts to deviation
- **Maintain Verticality** — Holds a strict vertical path
- **Increase WOB** — Allows higher weight on bit
- **Improve ROP** — Increase rate of penetration
- **Reduce Drilling Cost** — Improves overall efficiency





Frequently Asked Questions

•How is the tool activated?
Answer: The mechanism is automatic; there is no need to activate it.
As soon as the borehole begins to deviate from the vertical, the tool's "Automatic Control System" instantly reacts mechanically and opens hydraulic channels under one or two blades. The opposing blades extend, creating a corrective lateral force on the borehole wall and directing the borehole trajectory back to a strictly vertical path.

•Do we have to use an MWD tool with this tool?
Answer: During the initial testing phase, this is mandatory to monitor the borehole's verticality during testing and confirm the AVDS's functionality without the risk of the drilled borehole not being vertical after drilling.

•What are the recommended BHA design requirements, including stabilizer placement and spacing?
Answer: The next element to be installed above the vertical well drilling tool in the bottom hole assembly (BHA) is a stabilizer. It is also recommended to include additional stabilizers in the BHA: one at the first stand (drill collar) and a second at intervals of 100-120 meters. The diameter of the stabilizers above the vertical well drilling tool should be arranged from largest to smallest.

•Do we need special software to install the tool?
Answer: No, the system works automatically, that's the whole point.

•Do you have any history data regarding the runs?
Answer: Case histories:
- At the Yuzhny Alibek field (Caspineft) in Kazakhstan, test activities were carried out using AVDS-311.1.
Based on the results of the tests, positive results from the use of AVDS-311.1 were obtained: 12 runs with the Smith BitType S-519BPX 12 1/4” (5-blade PDC bit), and 5 runs with Smith BitType GF15BVC (tri-cone bit) were completed, zenith angle value when drilling using AVDS-311.1 did not exceed 1.85° even in nonpersistent saline deposits. High WOB in compact rock intervals, which could lead to the very curving of the well, an increase in the ROP by 3-4 times compared to the offset well was allowed, which was drilled with a rotor or a turbodrill, one AVDS-311.1 drilled the entire interval with a diameter of 311.1 mm. The total drilling and flushing time on one AVDS-311.1 was 341 hours.

- (July 2022), operation on the project of Gazprom Burenie OOO, Astrakhan Burenie Branch, namely, on well No. 325 of the Astrakhan oil and gas condensate field continues, where, in cooperation with NII TS Pilot OOO, the AVDS-393.NGT product has already successfully drilled the corresponding section in the interval 380-1746m, and now the section with AVDS-295.NGT is being drilled (bottom as of May, 7, 2022 is 2220m). Despite the complex geology, NGT AVDS show consistent results both in maintaining the verticality of the wellbore and in the average POP of the BHA in comparison with the alternative expensive RSS system raditionally used on this project.

Frequently Asked Questions



•Is the tool easy to service and maintain? What would be the average tool life/run life between maintenance cycles?
Answer: We recommend performing maintenance after one or two wells (planned 200-300 drilling hours) to check the condition of internal components. The actual service interval is currently undefined. The criteria for sending the tool for inspection will be specified in the operating instructions; please be patient. If no criteria are met after one well, the tool can be used for the next.), We plan to dispatch a specialist to perform this work.

•What maintenance and inspection procedures are required after each run?
Answer: The main thing is to ensure tight sealing to prevent drilling fluid from drying out after work to prevent the deviation blades from drying out.

•What field engineer qualifications are needed to run the tool (is this a standard MWD engineer?
Answer: One who supervises the drilling process and deviations from the vertical.

•We noticed that the 8 1/2" tool size ID is 1.57", while end users usually request a minimum of 2.81"?
Answer: Unfortunately, due to the internal design, it is impossible to increase the size to 2.81”.

•What pressure drop across the bit is required for optimal tool performance?
Answer: From 30 to 50 atmospheres, the calculation will also be provided in the instructions.

•What are the maximum operating temperature and pressure ratings of the tool?
Answer: The standard is 100 degrees Celsius; if higher temperatures are required, heat-resistant seals can be installed.

•Can we use the tool in any type of formation?
Answer: We don't see any limitations, but testing is required in any case.

•What is the typical deviation correction capability (e.g., maximum inclination correction per 100 ft)?
Answer: We have a general tolerance that the device should not allow the formation to deviate more than 5 degrees. This means it will hold the blade in the 0-5 degree range.

•Can the tool be used with all downhole motors?
Answer: Yes, it's possible, but our experience has only been with a rotary blade.

•What are the minimum and maximum flow rates required for proper blade activation?
Answer: There are no restrictions, the main requirement is to ensure the required pressure differential.

Deepwells
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Drilling Tools

Hydraulic Whipstock



9 5/8” Hydraulic Whipstock Set

DEEPWELLS WHIPSTOCK SYSTEM WITH HYDROMECH ANCHOR NO ABANDONMENT PLUG REQUIRED

The toolkit is designed for cutting out a casing window and sidetracking in one run without artificial bottomhole. The hydraulic anchor has an overflow valve in the form of a ball in its design, which closes the channel during direct circulation and opens the channel during backwash and ensures that the pipe space is filled during descent.

Contents:

- 9 5/8” non-retrievable hydraulic anchor
- 7 3/32” Whipstock
- 8.46” Starting mill
- 8.62” Watermelon mill

Application

The system type KOT-245 OGN1 is designed to cut a window in 9-5/8” OD casing (Ø245 mm), by one trip operation without downhole support requirements (like cement or bridge plugs). After setting the Whipstock remains in the well permanently. The orientation is performed in inclined wells with whipstock set upwards with angle ± 45^{O} from vertical and depending on the planned side hole azimuth direction. At small inclination angles (from 2 to 10^{O}) at the whipstock installation depth, the whipstock face/ramp can be installed upwards within ± 70^{O}.

Design

The set consist of: hydraulic non-retrievable anchor, whipstock, shear screw, starting and watermelon mill.

Operation mode

The whipstock system is lowered to a required depth and orientated in required direction using geophysical equipment, after that the anchor is being set by the mud pressure and the whipstock is fixed inside the casing, by drill string weight the shear screw which connects the whipstock to the mill is being cut and the milling started. To prevent the "window" from getting into the casing joint, the connection thread between the anchor and Whipstock is designed to be able to add tubing or DP pup joint as per client requirement.

9 5/8” Hydraulic Whipstock Set

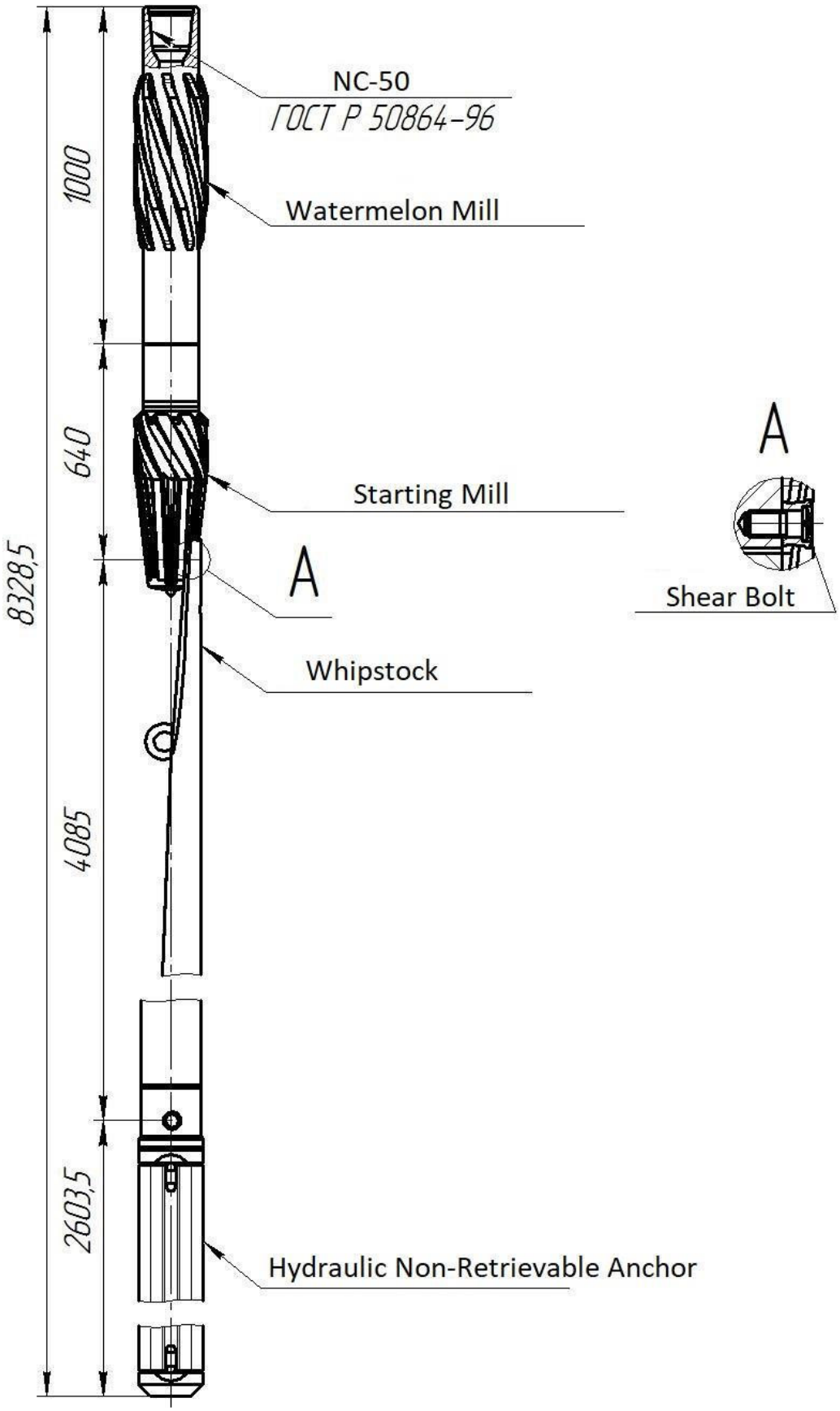


Fig. 1 - Sketch of Whipstock set hydraulic non-retrievable 9-5/8” Ø 245 mm.

9 5/8” Hydraulic Whipstock Set

Specifications (Hydraulic anchor)	
	YaGN-245
External body diameter while RIH (in)	7 3/32”
Nominal diameter of casing where the anchor is to be installed (in)	9 5/8”
Length (ft)	8.63’
Weight (kg)	103

Specifications (Whipstock)	
	KG-180.05
External body diameter (in)	7 3/32”
Length (ft)	13.78’
Wedge angle (deg)	2.5°
Transportation bolt axial shear load (kN) (±10 kN)	160
Weight (kg) (± 1)	525



9 5/8” Hydraulic Whipstock Set

Starting (Lead) mill

A mill with a steel body reinforced with a carbide composite material, designed for cutting out a "window" in the casing for sidetracking operation.

The starting mill is supplied complete with a watermelon mill and is included in the whipstock set.

Technical Specifications	
	FSO - 8.46” - 215
Outer diameter, in/mm ($D_{-0,2}$ mm)	8.46” / 215mm
Mill length (without pin length), ft	2.43 ft
Flow nozzle’s number and diameter, inch	1 pc × 0.827”, 4 pc × 0.472”
Connecting thread	4 ½” IF box
Weight, kg	100
Working parameters	
Mill rotation speed, min^{-1}	40-120
Circulation rate, l/s	8-20
Pressure drop, MPa (calculated with water)	0.26-2.60
Mill load, tons (in case of a decrease in the ROP, it is allowed to increase the axial load for a short time, but no more than 12 tons and no more than 30 min.)	0.5-10.0
Make up torque, kN.m	18-22
RIH speed, m/s (not more	0.5
Maximum permissible axial tensile loads, tons (not more)	50



9 5/8” Hydraulic Whipstock Set

Watermelon mill (Lead) mill

A mill with a steel body reinforced with a carbide composite material, designed for cutting out a "window" in the casing for sidetracking operation. The watermelon mill is supplied complete with a starting mill and is included in the whipstock set.

Technical Specifications	
	FA - 8.62” - 219 mm
Outer diameter, in/mm ($D_{-0,2}$ mm)	8.62”- 219 mm
Mill length (without pin), ft	3.94 ft
Flow nozzle diameter, in	2 ¾”
Connecting thread	4 ½” IF box / 4 ½” IF pin
Weight, kg	195
Working parameters	
Mill rotation speed, min^{-1}	40-120
Circulation rate, l/s	8-20
Make up torque, kN.m	18-22
RIH speed, m/s (not more	0.5
Maximum permissible axial tensile loads, tons (not more)	50



7” hydraulic whipstock set

DEEPWELLS WHIPSTOCK SYSTEM WITH HYDROMECH ANCHOR NO ABANDONMENT PLUG REQUIRED

The tool set is intended for cutting a window in the casing string of pipes Ø178 mm and drilling a sidetrack in one trip without relying on an artificial bottom hole.

Contents:

- hydraulic non-removable anchor YaGN-178.05
- whipstock KG-135.08
- start-window cutter FSO, watermelon-shaped cutter FA

Specifications (Hydraulic anchor)	
	YAGN-178.05
Outer diameter while RIH, inch	5 5/16”
The nominal diam. of the casing pipe in which the anchor is installed, in	7”
Length, ft	8.56 ft
Weight, kg	66

Specifications (Whipstock)	
	KG-135.08
Outer diameter, inch	5 5/16”
Length, ft	9.84 ft
Wedge angle, degrees	2.5°
Axial load of transport screw shear, kN (±10 kN)	100
Weight (kg) (± 1)	214



7” hydraulic whipstock set

Cutter start - window

A cutter with a steel body reinforced with a hard-alloy composite material is designed to cut a “window” in the casing string when drilling a sidetrack. The starting window cutter is supplied complete with a watermelon-shaped cutter and is included in the tool kit for cutting a window in the casing string and sidetracking.

Technical Specifications	
	FSO-150.31
Outer diameter of the cutter, inch	5.91”
Total cutter length, ft	1.82 ft
Number and diameter of flushing units, inch	1 pc. × 0.827 in, 2 pcs. × 0394 in
Connecting thread according to API standards	2 7/8 IF
Cutter weight, kg (±1 kg)	34
Operation parameters	
Cutter rotation frequency, RPM	40-120
Flushing liquid consumption, l/s	8-20
Pressure drop across the cutter, MPa (calculated for water)	0.4-1.0
Recommended load on the cutter, t	0.5-6.0
Make-up torque of connecting thread, kN.m	8-9
Speed of descent of the cutter in a cased wellbore, m/s (no more than)	0.5
Maximum allowable axial tensile loads, t (not more than)	50

When penetration falls below 0.1 m/h, a load on the milling cutter up to 9 tons is allowed without vibrations, excess torque of more than 6.3 kN.m from the moment during idle rotation and wedging of the tool.



7” hydraulic whipstock set

Watermelon Cutter

A cutter with a steel body reinforced with a hard-alloy composite material is designed to cut a “window” in the casing string when drilling a sidetrack. The watermelon shaped cutter is supplied with a start - window cutter and is included in the tool kit for cutting a window in the casing string and sidetracking.

Technical Specifications	
	FA-157.20
Outer diameter of the cutter, inch	6.1811”
Cutter length excluding nipple length, Ft	4.27 ft
Flushing channel diameter, inch	3 1/8”
Connecting thread according to API standards	2 7/8 IF box / 2 7/8 IF bin
Cutter weight, kg (±3 kg)	97
Working parameters	
Cutter rotation frequency, min^{-1}	40-120
Flushing fluid consumption, l / s	8-20
Connecting thread make-up torque, kN.m	coupling/nipple 8-9/8-9
Speed of descent of the cutter in a cased wellbore, m/s (no more than)	0.5
Maximum allowable axial tensile loads, tons (not more than)	50



Deepwells
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Comprehensive solutions for Drilling & Well Completion Industry



Survey Tools

GWD



Gyro While Drilling

Gyro DEEPWELLS NSG

Accurate & robust solid-state gyro compassing tool

Fast, reliable results





2 AXIS GYROSCOPE

The 2-axis Gyro is designed with state-of-the-art solid-state sensors that provide more robust and accurare results up to 70 Degrees Inclination.

ACCURATE RESULTS IN EXTREME CONDITIONS

The Gyro tool uses two solid-state single axis gyroscopes to measure the earth's rotation and three solid-state accelerometers. The system is designed for fast gyrocompassing in E-line, memory or in a drop-gyro configuration

IMPROVED PERFORMANCE

The new Gyro provides better overall performance than clunky mechanical gyros used by our competitors, with no mass imbalance or shifts in calibration.

INSTANT RESULTS

Gyro tools are fast with gyro compassing times as low as 15s and are completely digital - survey results are available immediately upon recovery with the latest USB interface.

RELIABILTY

Gyro is one of the most rugged and reliable designs in the industry, making it the most dependable instrument available for use for all survey applications with 1000's of runs to date.

SPECIFICATIONS:

Sensor Type : Inclination	
Type :	Triaxial
Range :	0-180°
Accuracy :	±0.1°
Shock :	6000G
Sensor Type : Gyroscope	
Type :	Dual Axis
Range :	0-360°
Accuracy :	±0.1°
Shock :	2000G
Sensor Type : Temperature	
Type :	Solid-state
Range :	-30◦C to +85◦C
Accuracy :	±1°
Shock :	N/A

DIMENSIONS:

Bare Instrument	
Diameter :	30 mm (1.18")
Length :	1.14m (44.9")
Weight :	4.05Kg(8.9lbs)
In pressure barrel	
Diameter :	38.1mm (1.50")
Length :	1.88m (73.8")
Weight :	8.6Kg(19lbs)
Pressure rating :	3,000 psi
30 hours runtime (memory limited) -30◦C to +85◦C temperature range Saft LSH 14 (C size)	



Gyro While Drilling

North seeking gyro compassing and all-attitude rate-continuous gyro system.

Flexibility, efficiency and high-speed

ACCURATE RESULTS IN EXTREME CONDITIONS

Gyro is designed with state-of-the-art solid-state sensors that provide more robust and accurate results up to 70 degrees inclination in gyro compassing mode and all-attitude (all angles and azimuths) in high-speed rate-continuous mode.

The Gyro tool uses two solid-state single axis gyroscopes to measure the earth's rotation, or rate of change, and three solid-state accelerometers. The system is designed for fast gyro compassing and or rate continuous in E-line, memory or in a drop-gyro configurations.

ADVANCED SOLID-STATE SENSOR PERFORMANCE

The new Gyro provides better overall performance than low quality and high drift sensors used by our competitors, with an extremely stable calibration performance.

HIGH-SPEED SURVEYING

Gyro tools are fast with gyro compassing times as low as 15s and rate continuous surveying up to 500 ft per minute and are completely digital - survey results are available immediately upon recovery or instantly if using E-line.

RELIABILTY

Gyro is one of the most rugged and reliable designs in the industry, making it the most dependable instrument available for use for all survey applications with thousands of runs to date.

INSTANT SURVEY QA/QC

Robust survey quality control is available immediately during or after the surveyin an easy to understand and auditable format.

SPECIFICATIONS:

Sensor Type : Inclination	
Type :	Triaxial
Range :	0-180°
Accuracy :	±0.1°
Shock :	6000G
Sensor Type : Gyroscope	
Type :	Dual Axis
Range :	0-360°
Accuracy :	±0.1°
Shock :	2000G
Sensor Type : Temperature	
Type :	Solid-state
Range :	-30°C to +85°C
Accuracy :	±1°
Shock :	N/A

DIMENSIONS:

Bare Instrument	
Diameter :	30 mm (1.18")
Length :	1.14m (44.9")
Weight :	4.05Kg(8.9lbs)
In pressure barrel	
Diameter :	38.1mm (1.50")
Length :	1.88m (73.8")
Weight :	8.6Kg(19lbs)
Pressure rating :	3,000 psi
30 hours runtime (memory limited) -30°C to +85°C temperature range Saft LSH 14 (C size)	



Gyro While Drilling

Fast, accurate and easy to use gyro tool ideal for mining applications.

Instant results, easy to use, accurate and robust



6 AXIS GYROSCOPE

The 6-axis is designed with state-of-the-art solid-state sensors that provide more robust operating paramaters than ever before, delivering accurate, continuous results in all orientations.

ACCURATE RESULTS IN EXTREME CONDITIONS

The uses a hexaxial gyroscope module to monitor the rotations of the instrument through time. Continuous recording and self-calibration permits long-term operation while maintaining accuracy. The tool also contains a magnetometer that can be used to record the magnetic profile of the borehole, or as a second independant measure of hole azimuth.

IMPROVED PERFORMANCE

The Tool provides better overall performance including expanded memory capability, greater battery life and high-speed data transfer via USB.

INSTANT RESULTS

The tools are completely digital, meaning that survey results are available immediately upon recovery. Digital data also means no more manual entry errors, and easy to use graphical software produces files suitbale for loading into spreadsheets and popular data visualisation software.







INSTANT RESULTS

the tool is the most rugged and reliable design in the industry, making it the most dependable instrument available for use with all survey applications. Unlike our competitors, batteries are field replaceable. A ruggedised PC is included with each purchase or rental.

SPECIFICATIONS:

Sensor Type : Inclination	
Type :	Triaxial
Range :	0-180°
Accuracy :	±0.1°
Shock :	6000G
Sensor Type : Gyroscope	
Type :	Hexaxial
Range :	0-360° (0-195°/s)
Accuracy :	±0.1°
Shock :	2000G
Sensor Type : Temperature	
Type :	Solid-state
Range :	-30°C to +85°C
Accuracy :	±1°
Shock :	N/A
Sensor Type : Magnetometer	
Type :	Triaxial
Range :	-30°C to +85°C
Accuracy :	±0.5°
Shock :	6000G

DIMENSIONS:

Bare Instrument	
Diameter :	25.4mm (1.00”)
Length :	1.14m (45.6”)
Weight :	1.9Kg(4.2lbs)
Pressure rating :	300m (H20)
In pressure barrel	
Diameter :	33.4mm (1.315”)
Length :	1.88m (73.8”)
Weight :	8.6Kg(19lbs)
Pressure rating :	3,500m (H20)
36 hours runtime (memory limited)	
-30◦C to +85◦C temperature range	
6 x A or AA, Alkaline or Lithium batteries	

Gyro While Drilling

All-attitude high-accuracy solid-state gyro compassing tool

Designed for high angle and horizontal borehole surveying applications

THREE AXIS GYROSCOPE

The three-axis is designed with state-of-the-art solid-state sensors that provide more robust and accurate results at any inclination and azimuth



ACCURATE RESULTS IN EXTREME CONDITIONS

The tool uses three solid-state single axis gyroscopes to measure the earth's rotation and three solid state accelerometers. The system is designed for fast gyro compassing in E-line, memory or in a drop-gyro configuration.

IMPROVED PERFORMANCE AND QC

The tool provides better overall performance than clunky mechanical gyros used by our competitors, with no mass imbalance or shifts in calibration. QC is robust and transparent.

INSTANT RESULTS

the tools are fast with gyro compassing times as low as 15s and are completely digital - survey results are available immediately upon recovery.

RELIABILTY

The gyro family is one of the most rugged and reliable designs in the industry, making it the most dependable instrument available for use for all survey applications with 1000's of runs to date.

SPECIFICATIONS:

Sensor Type : Inclination	
Type :	Triaxial
Range :	0-180°
Accuracy :	±0.1°
Shock :	6000G
Sensor Type : Gyroscope	
Type :	Triaxial
Range :	0-360°
Accuracy :	±0.1°
Shock :	2000G
Sensor Type : Temperature	
Type :	Solid-state
Range :	-30◦C to +85◦C
Accuracy :	±1°
Shock :	N/A

DIMENSIONS:

Bare Instrument	
Diameter :	30 mm (1.18")
Length :	1.14m (44.9")
Weight :	4.05Kg(8.9lbs)
In pressure barrel	
Diameter :	38.1mm (1.50")
Length :	1.88m (73.8")
Weight :	8.6Kg(19lbs)
Pressure rating :	3,000 psi
30 hours runtime (memory limited) -30◦C to +85◦C temperature range Saft LSH 14 (C size)	



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We prioritise client partnerships by collaborating with global oil companies and contractors. Our skilled staff, including Welding Engineers, QA/QC Engineers, and more, deliver efficient solutions. From innovative problem-solving to project management, we add value across the Upstream to Downstream spectrum.

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