

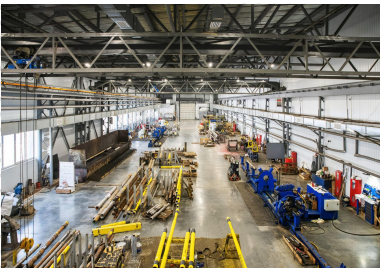
Deepwells

THINK DEEP GO DEEPER

TECHNOLOGY
THERMOTICS
Petroleum Services



Leading
Oil & Gas
Equipment
Supply &
Service
Company in MENA





» 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

Mud Motors

We also rent High-Effective Mud Motor at all sizes, with big storage spare parts in oil base and water base mud, at hard to medium rocks, and high temperature environments

03

Maintenance & Related Services

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

» About Us

"THERMOTICS TECHNOLOGY 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 THERMOTICS TECHNOLOGY LLC, providing industry-leading tools is just the baseline. Our true value lies in collaborative problem-solving—working alongside our clients to develop innovative yet practical solutions from conception to completion. THERMOTICS 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."

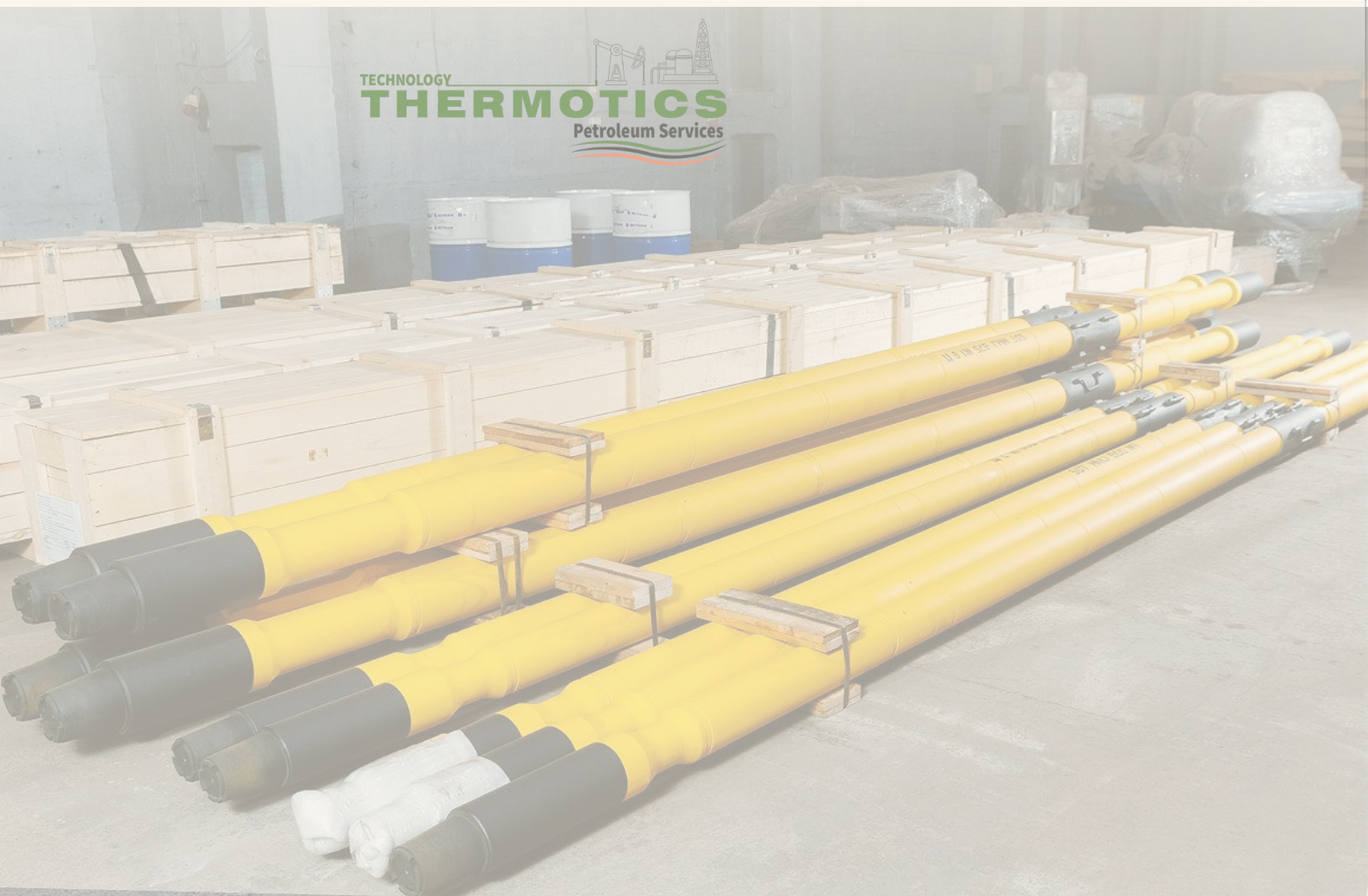
➤ Why Choose Us

-  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.



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:

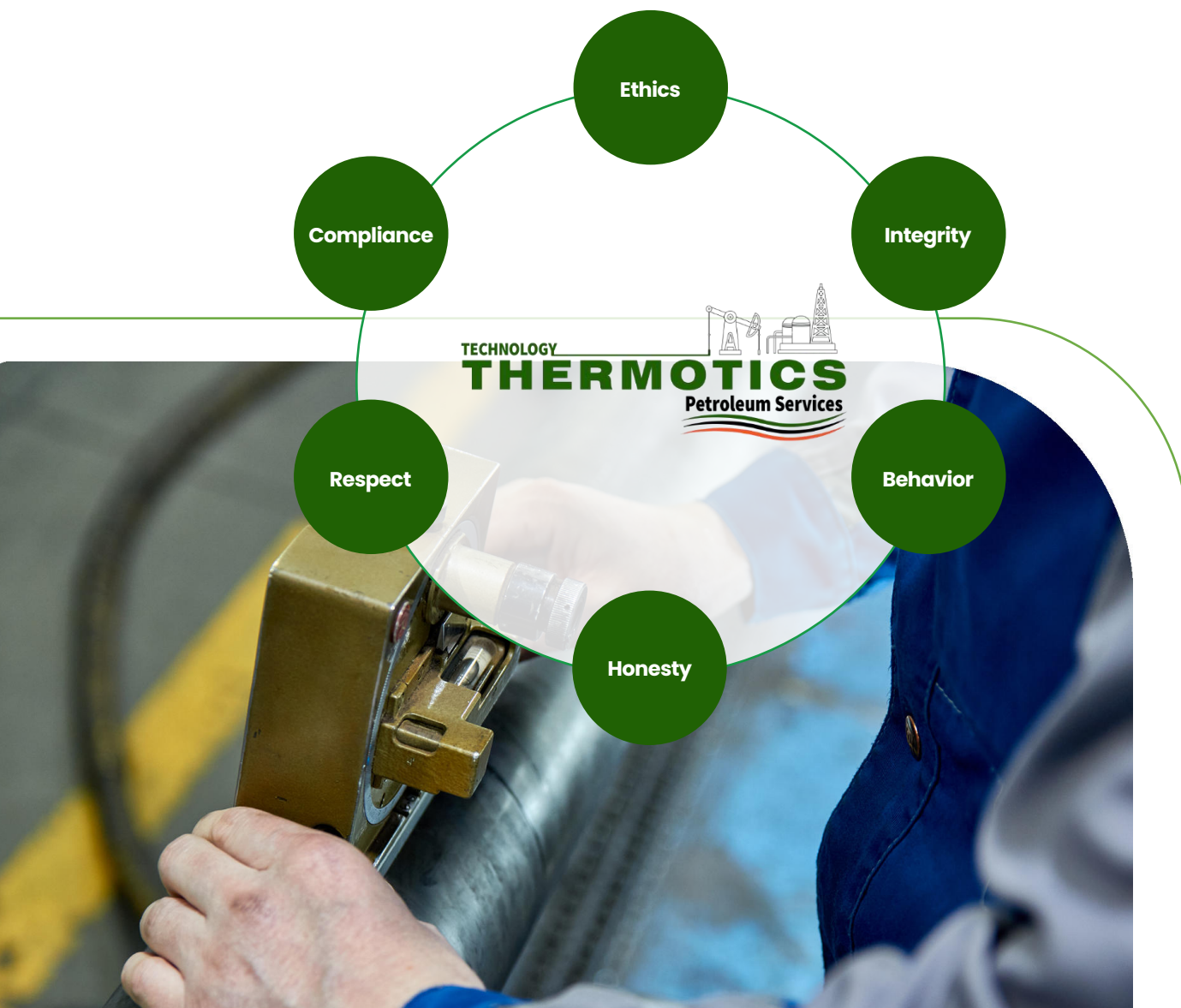
-  Customers
-  Employees
-  Other stakeholders

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.



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



Completions Tools



Survey Tools



DEMAND MORE DRILL BITTER



TECHNOLOGY

THERMOTICS

Petroleum Services



➤ Comprehensive solutions for Drilling & Well Completion Industry



Downhole Tools

Circulation
Sub



» Circulation Sub

Circulation 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.

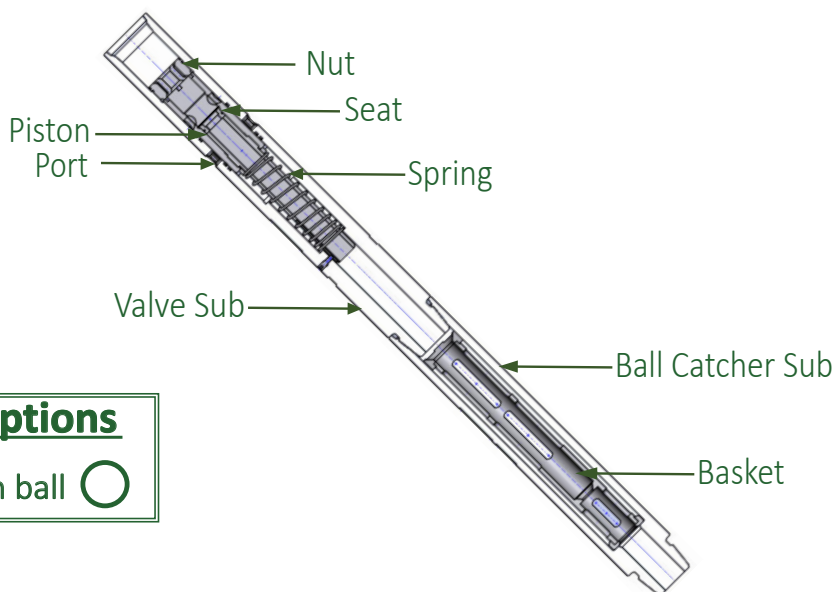
The sub has several configurations, which differ by number of operation cycles and activation/deactivation pressures without need of pulling out of hole.

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.

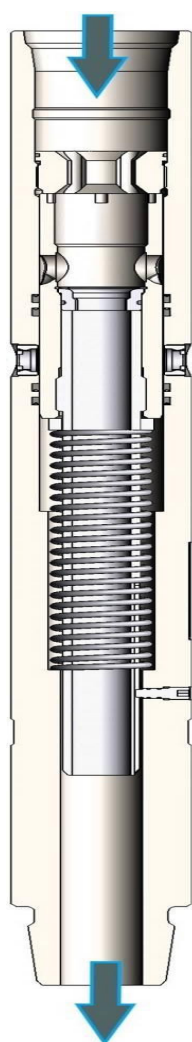


» Circulation Sub

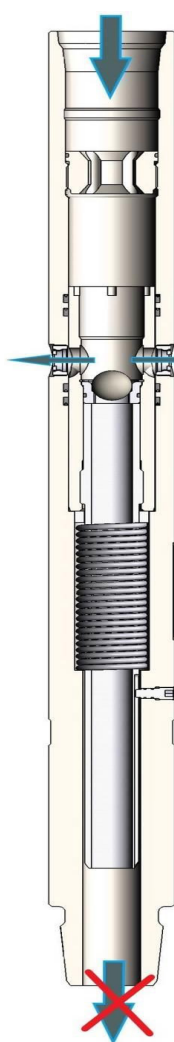


Activation Options

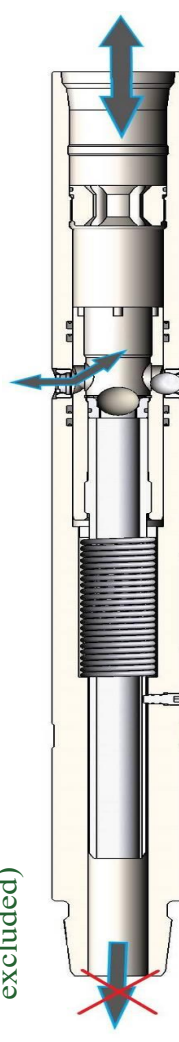
plastic activation ball ○



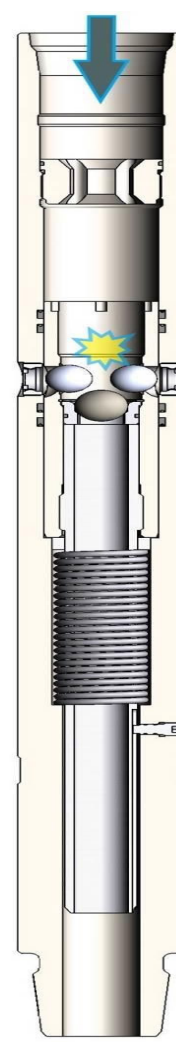
initial mode (all liquid passes through)



activated mode (during supply, the liquid exits through the ports, after turning off the ports are blocked by the piston, the flow of liquid down is excluded)

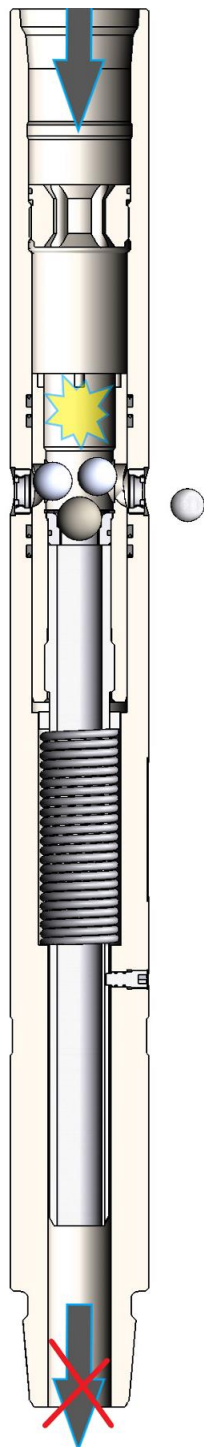


blocked mode (liquid circulates through a free port, the flow of liquid down is excluded)

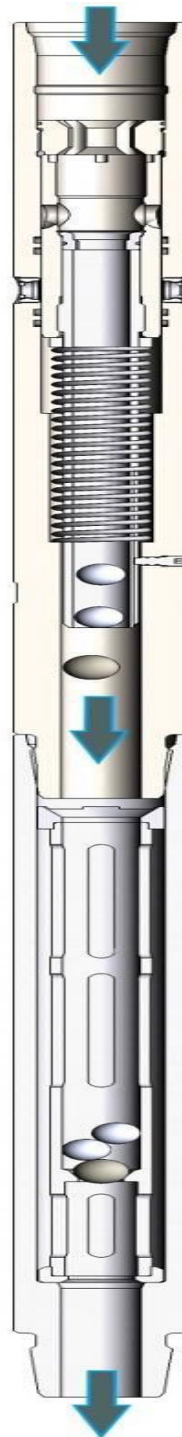


the stage of deactivation from the activated mode (the deactivation balls block the side ports, there is an increase in pressure)

» 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	CS650
Outer diameter d, in	4 3/4	6 1/2
Minimum flow area diameter, in	1.41	1.88
The length of the Sub L, in	72.75	78.74
Quantity of ports, piece	2	2
Activation ball OD (in)	1.49	1.96
Deactivation ball OD (in)	1.00	1.37
Diameter of flushing ports, in	0.94	1.11
Quantity of cycles (activating/ de-activating)	6	6
Activating ball pumping pressure, psi	2132 (-284/+568)	2132 (-284/+568)
Pressure drop when the sub is turned on, psi	113...142	142...213
Maximum permissible liquid flow rate in the closed position (pumping liquid through the inline channel of the sub), gpm	396	792
Range of flushing fluid flow rate in the open position (pumping fluid into the annular space through the ports of the sub), gpm	158...396	348...792
Maximum allowed mud density, ppg	13.3	13.3
Maximum allowed size of colmatant and plugging materials, in	0.31	0.35
Connecting threads	NC38	NC50
Make-Up torque, (kgf.m)	8679...10126	19529...20975
Maximum allowed axial load, lbf	396832	396832
Emergency axial load, lbf (when a greater load is applied, the Sub can be broken)	440924	440924
Maximum permissible torque transmitted to parts, ft/lbs	8679	19529
Mass, lbs	198	496



➤ Comprehensive solutions for Drilling & Well Completion Industry



Downhole Tools

Drilling Jars

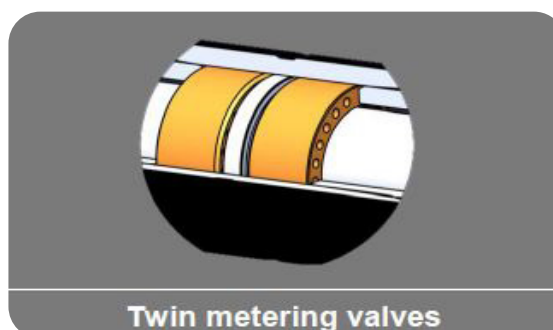
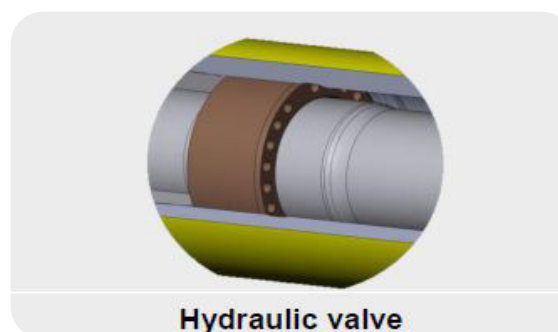
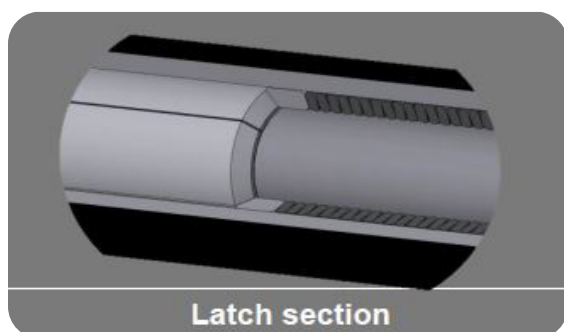


» Drilling Jars

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 250°F (120°C). The jar can be dressed with seals rated to 400°F (200°C) 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.

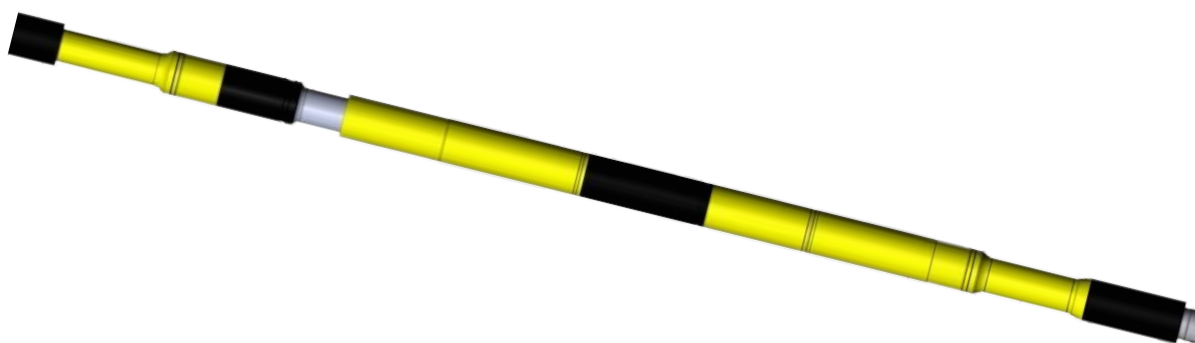


» Drilling Jars

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.

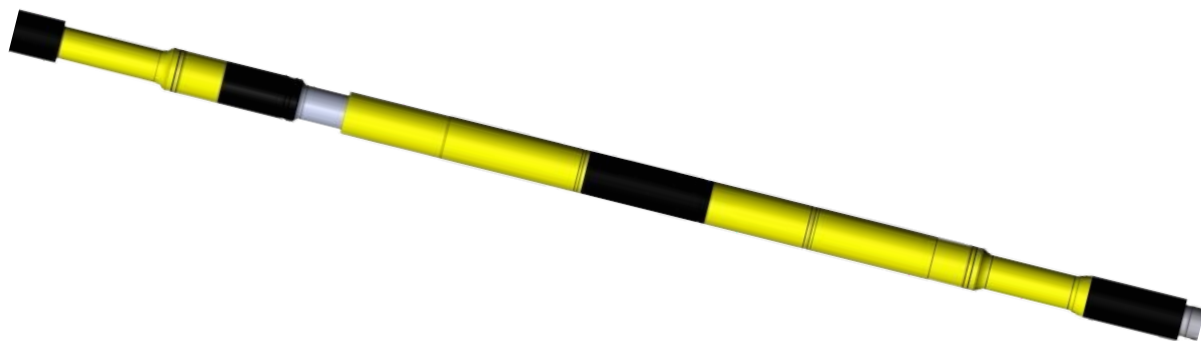


» Drilling Jars

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.

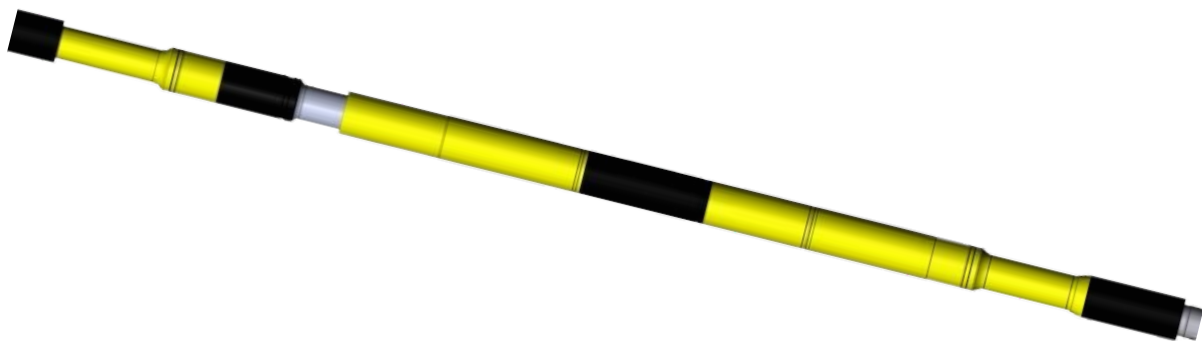


» Drilling Jars

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)

	HJ475	HJ650	HJ800
Tool Size (in)	4 3/4	6 1/2	8
Nominal OD (in)	4.88	6.61	8.15
Thru Bore (in)	2.2	2.76	2.76
Length (ft)	18	18.4	22.3
Free Stroke Up & Down (in)	7.28	7.87	7.87
Total Stroke (in)	23.6	24	24
Hydraulic delay test load, (lbs)	40,780 - 47,400	83,800 - 92,600	94,800 - 103,600
Hydraulic delay time, (Sec)	30 - 150	30 - 150	30 - 150
Pump open area, (in.sq.)	12.4	24.8	30.7
Maximum tensile (compressive) load during hydraulic delay, (lbs)	77,150	176,370	242,500
Tensile yield, (lbs)	573,200	1,234,580	1,609,400
Maximum torque, (ft-lbs)	26,000	46,240	121,400
Maximum Overpull, (lbf)	92,600	176,370	304,700
Maximum Weight on bit, (lbs)	92,600*	176,370*	242,500*
Connecting threads	NC38	NC50	6 5/8 Reg
Make up torque, (ft-lbs)	6,680 - 10,120	18,400 - 19,900	47,000 - 50,600
Maximum operating temperature, (°F)	248-302	248-302	248-302
Bending Strength ratios (BSR) ranges	1.9-2.5	2.25-2.75	2.25-2.75
Max Circulating pressure (psi)	no limit	no limit	no limit
Weight, (lbs)	705.5	1,313	2,425

* according bit specification but no higher as indicated parameters



» Drilling Jars

Specifications (Imperial)

	HJML475	HJML650	HJML800	HJML950
Tool Size (in)	4 3/4	6 1/2	8	9 1/2
Nominal OD (in)	4.88	6.61	8.15	9.49
Thru Bore (in)	2.2	2.76	2.76	3
Length (ft)	23.13	24.1	24.93	25.26
Free Stroke Up & Down (in)	7.28	7.48	7.87	7.87
Hydraulic delay test load, (lbs)	40,780 - 47,400	83,800 - 92,600	94,800 - 103,600	103,600 - 112,400
Hydraulic delay time*, (Sec)	30 - 150	30 - 150	30 - 150	30 - 150
Nominal Up latch setting*, (lbs)	55,000	130,000	154,300	165,000
Nominal Down latch setting, (lbs)	35,900	70,500	99,200	108,000
Pump open area, (in.sq.)	11.78	24.8	30.7	41.2
Maximum tensile (compressive) load during hydraulic delay, (lbs)	77,150	176,370	242,500	242,500
Tensile yield, (lbs)	286,600	617,290	804,700	1,197,100
Maximum torque, (ft-lbs)	13,000	22,120	60,700	122,960
Connecting threads	NC38	NC50 / XH	6 5/8 Reg	7 5/8 Reg
Make up torque, (ft-lbs)	6,680 - 10,120	18,400 - 19,900	47,000 - 50,600	57,850 - 65,100
Maximum operating temperature, (°F)	248-302	248-302	248-302	248-302
Weight, (lbs)	930	1,800	3,140	4,300

** Actual values are indicated in the tool test report*



» Drilling Jars

Specifications (Imperial)

	HMJ475	HMJ675	HMJ800
Tool Size (in)	4 3/4	6 1/2	8
Nominal OD (in)	4.88	6.73	8
Thru Bore (in)	2.16	2.75	2.75
Length (ft)	20.34	22.15	22.97
Free Stroke Up (in)	9	9	9
Free Stroke Down (in)	5.9	5.9	5.9
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
Compressive latch release load (lbs)	12,500 - 41,200	26,400 - 97,000	31,500 - 119,900
Jar working area (in.sq.)	11.78	23.7	30.69
Maximum pull during hydraulic delay (lbs)	76,200	189,600	242,500
Tensile yield (lbs)	275,500	705,500	804,500
Torsional limit (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 °F	302 °F	302 °F
Weight, (lbs)	749	1,926	28,66



➤ Comprehensive solutions for Drilling & Well Completion Industry



Downhole 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 1/2	11
Thru Bore (in)	2 3/4	3	3
Length (ft)	11.9	12.3	12
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



➤ Comprehensive solutions for Drilling & Well Completion Industry



Downhole Tools

Mud Motors



FROM HYDRAULIC POWER TO ROCK DESTRUCTION

THE HIDDEN MECHANICS OF A CONVENTIONAL
POSITIVE DISPLACEMENT MOTOR (PDM)

A downhole motor converts hydraulic energy from the drilling fluid into mechanical energy that rotates the bit and drills the well efficiently.



ROTOR ORBITAL MOTION

The rotor does not spin on its own axis. It makes an orbital movement inside the stator, creating continuous rotation at the output.

INSIDE THE POWER SECTION



PERFORMANCE FACTORS



FLOW RATE
(GPM)

200 – 800
(OPTIMAL RANGE)



DIFFERENTIAL
PRESSURE (ΔP)

300 – 1,000
PSI



OUTPUT TORQUE

1,000 – 6,000
lb-ft



OUTPUT RPM

50 – 300
RPM



WEIGHT ON BIT
(WOB)

10,000 – 50,000
lbf



TEMPERATURE
RATING

UP TO 350°F
(177°C)

“BEHIND EVERY EFFICIENT WELL, THERE IS A **CONTROLLED TRANSFER OF ENERGY** OCCURRING THOUSANDS OF FEET BELOW THE SURFACE.”

► 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

Specifications (Imperial)

	PDM475	PDM700
Housing OD (in)	4 3/4	6 3/4
Power section lobe configuration	7/8	7/8
PDM length, ft	22	31
Power section Length, ft	15	21
Bearing Length, to the KOP, ft	4	6
Diameter of bits used, inch	5 1/2 - 7	8 3/8 - 9 7/8
Connecting thread to drill pipes	NC 38	5 1/2 FH
Connecting thread to bits	3 1/2 Reg	4 1/2 Reg
Maximum density of drilling mud, ppg	16	16
Allowed axial compressive load, lbs	26455	55115
Allowed axial tensile load, lbs	97003	156528
Weight, lbs	989	3047
Maximum permissible torque on housing parts, ft-lb	8113	27289
Working fluid flow rate, gpm	159 - 317	317 - 713
Rotation speed in idle mode, rpm	150 - 256	75 - 150
Rotation speed at maximum differential pressure drop, rpm	130 - 238	40 - 116
Rotation speed in max. power, rpm	95 - 190	35 - 100
Torque at maximum power, ft*lbs	3466 - 4572	11874 - 13054
Torque at maximum permissible differential drop, ft*lbs	2212	10030
Maximum permissible pressure drop across the motor, psi	870	870
Pressure drop at maximum power, psi	1305 - 1856	1044
Power, hp	114	152 - 304
Overhaul life of equipment, subject to compliance with the requirements for operation, storage and transportation, h	150	180



» Mud Motors

Specifications (Imperial)

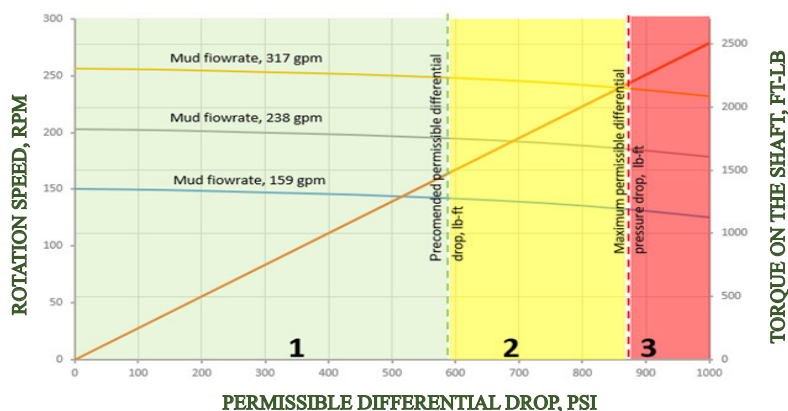
	PDM825	PDM950
Housing OD (in)	8 1/4	9 7/16
Power section lobe configuration	7/8	5/6
PDM length, ft	27	31
Power section Length, ft	17	18
Bearing Length, to the KOP, ft	7	8
Diameter of bits used, inch	9 7/8 - 19 5/16	11 1/4 - 23
Connecting thread to drill pipes	6 5/8 Reg	6 5/8 Reg
Connecting thread to 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
Power, hp	217 - 308	214 - 321
Overhaul life of equipment, subject to compilance with the requirements for operation, storage and transportation, h	160	160



Mud Motors



PDM 4 3/4.NGT.7/8

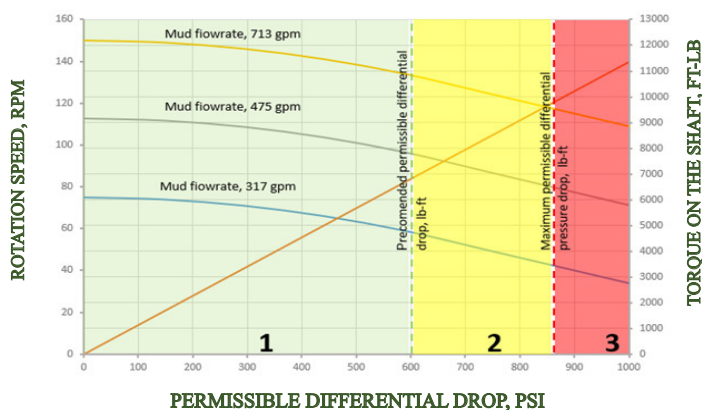


Area No.1 - recommended differential drop operating range

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

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

PDM 7.NGT.7/8



Area No.1 - recommended differential drop operating range

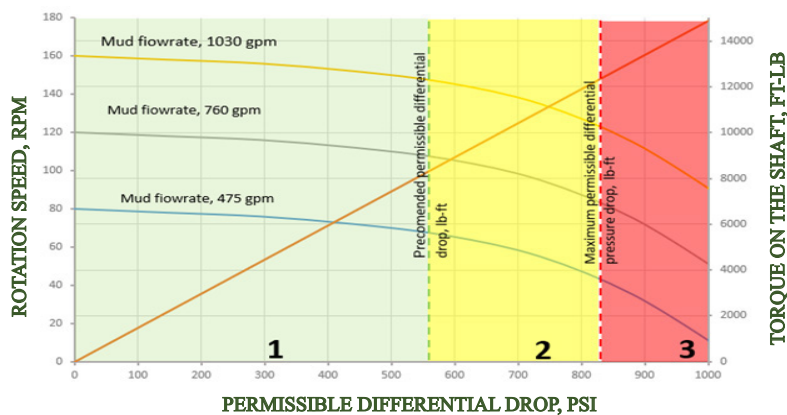
Area No.2 - range of operation differential drop of the PDM with increased power, but decrease in the service life of the power section

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

Mud Motors



PDM 8 1/4.NGT.7/8

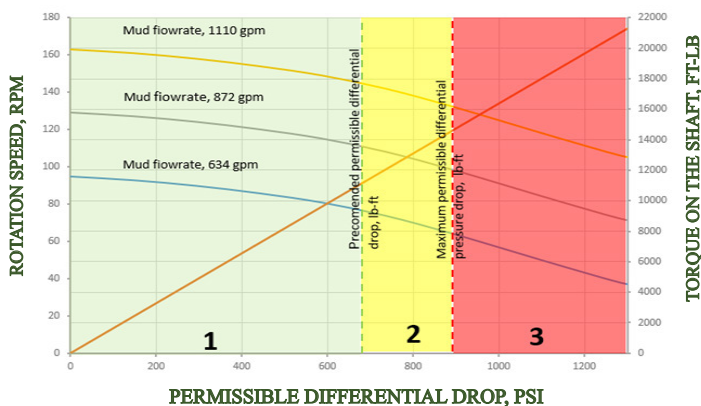


Area No.1 - recommended differential drop operating range

Area No.2 - range of operation differential 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 1/2.NGT.5/6



Area No.1 - recommended differential drop operating range

Area No.2 - range of operation differential 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**

➤ Comprehensive solutions for Drilling & Well Completion Industry



Downhole Tools

AVDS



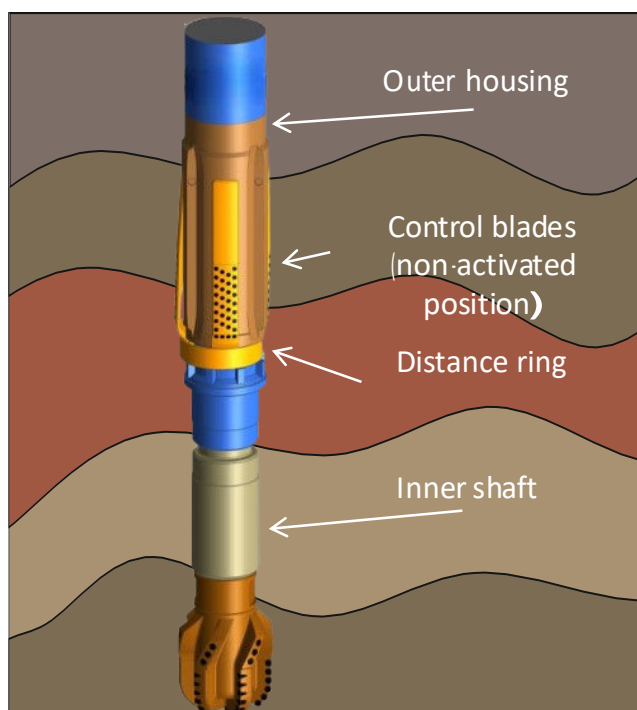
» AVDS

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.

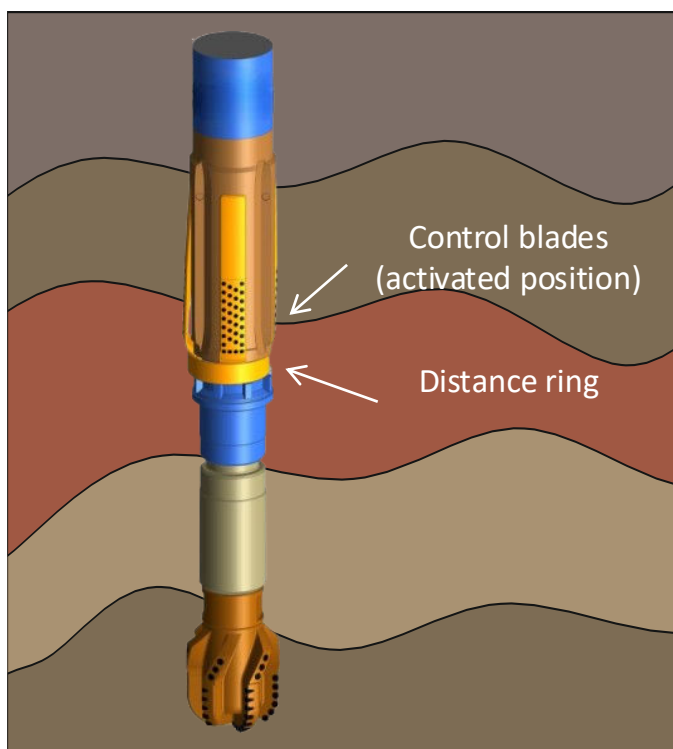


» AVDS

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.



» AVDS

The main advantages of AVDS include:

- Automatic provision of wellbore verticality without personnel intervention into the instrument control
- Increasing the rate of penetration due to the absence of additional weight restrictions;
- It is important to note that AVDS production is localized and does not depend on sanctions.

Parameter Name	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 (non-destructive), 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

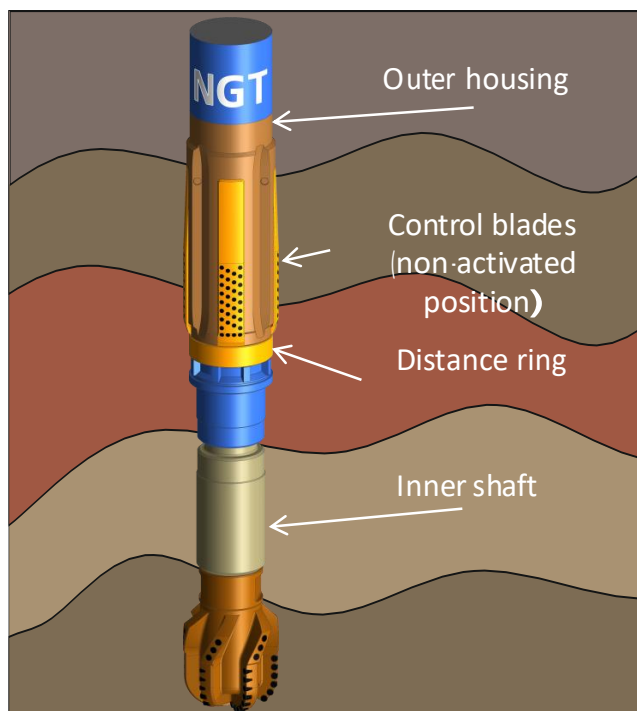
» AVDS

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.



➤ Comprehensive solutions for Drilling & Well Completion Industry



Completion Tools

Floating Equipment



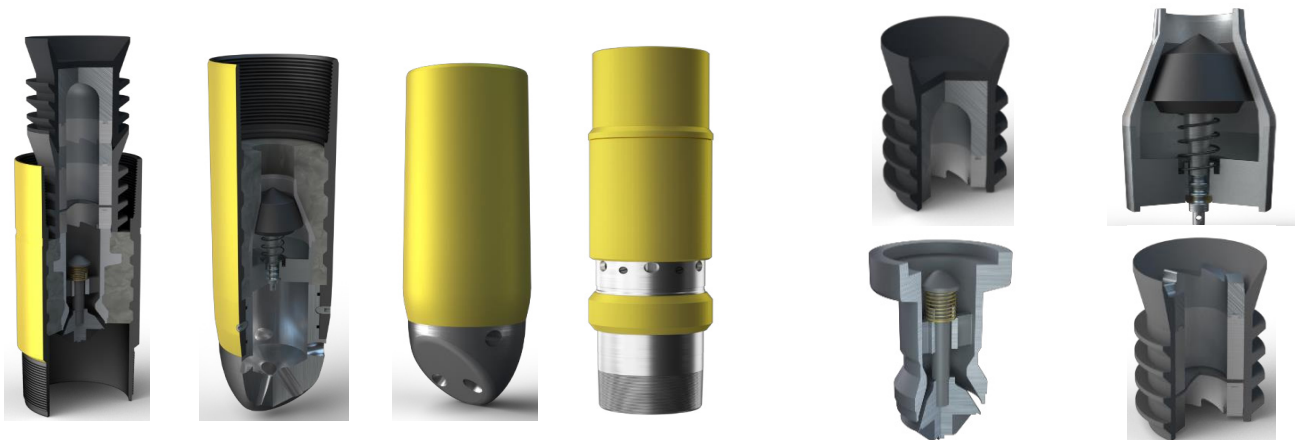
» Floating Equipment

SDT-Avrora Float Equipment namely Float Shoe and Float Collars are used to guide the casing to set in the hole which ensures the quality of cementing. Float equipment from Avrora is generally used in the lower section of the well to help decrease strain on the derrick while directing casing past edges and bog zones in the open hole

The float shoe and float collar manufactured by SDT-Avrora use the spring driven float valves and are very reliable. The material used for float shoe is drillable with any bit type. Float Collar is run in a casing assembly, usually several joints above the Float Shoe. It serves as an extra back pressure valve sealing against pressures from blow while running the assembly and after the cementing job.

Features & Benefits

- ▶ All the oil field sizes available (custom sizes made upon request)
- ▶ Float collar & shoe is supplied with valve providing sure seal and API RP 10F CATEGORY IIIC qualified
- ▶ Available in all casing grades with API and Premium threads
- ▶ Guide shoes drillable material can be concrete, highperformance polymer or aluminum
- ▶ Float equipment's are drillable with any drill bit type
- ▶ Float collar and plugs are made with anti-rotational design
- ▶ Designed with maximum industry delta P
- ▶ Double valve design is available
- ▶ Cementing stage collars of all sizes available
- ▶ Protects casing - cementing pressures are confined to the
- ▶ drill pipes in a squeeze job



➤ Comprehensive solutions for Drilling & Well Completion Industry



Completion Tools

Casing
Reamer
Shoe



» Casing Reamer Shoe Technologies

There are different types of **Casing Reamer Shoes** available in SDT technologies portfolio including mechanical, turbine powered and most powerful motorized type reamer shoes. Any shoe reamer helps to reach Target Depth with casing or liner and provides that extra insurance when running in complicated conditions.

Casing Reamer Shoe eliminates the need for casing string rotation from surface. Motor-powered reamer has the benefit of low to mid speed and highest torque output. SDT casing reamer shoes is the best solution when high torque tough reaming is required through the most challenging hole intervals. It offers exceptional performance and TD insurance to operator.

Features & Benefits

- ▶ All downhole drive options available in all oilfield sizes
- ▶ Mechanical when no circulation is possible
- ▶ Hydro-jetting reamer
- ▶ Hydraulic turbine powered reamer
- ▶ Hydraulic motorized powered reamer
- ▶ Gets your casing or screens to TD when hole problems would stop normal deployment
- ▶ Rotates string bottom assembly when surface string rotation is not possible
- ▶ Solution to save huge costs of numerous wiper trips, stuck casings, lost wells or well sections
- ▶ Tool pays for itself with savings and can be run 100% of casing jobs just as contingency



➤ Comprehensive solutions for Drilling & Well Completion Industry



Completion Tools

Airlock Casing

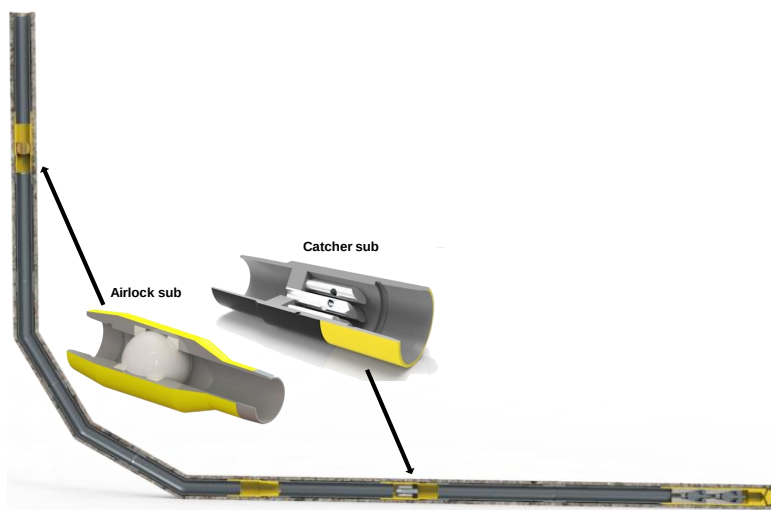


➤➤ Airlock Casing Floating

SDT's **AIRLOCK** system helps operators to run casing or liner to target depth in long horizontal, highly deviated or ERD type wells from very first attempt without need for extensive wiper trips and time-consuming reaming operations. The Airlock system has simple, robust and failure free design. Airlock system is normally installed in between casing or liner pipes in the well interval where vertical trajectory starts changing to horizontal. Airlock tool has unique design with built-in ceramic barrier which allows fluid to be placed above the tool and air to be trapped inside casing or liner below the tool.

Features & Benefits

- ▶ Unique solution to ensure TD of liner (casing) in highly deviated, long horizontal sections or ERD type wells
- ▶ The trapped air increases buoyancy of casing below the Airlock tool and hence reducing the frictional forces along the horizontal section of the wellbore, resulting in less weight needed to deliver casing to final depth
- ▶ Once casing reaches the target depth, the ceramic barrier shatters to fine pieces by applying hydraulic pressure from surface and flow path created for the cement job, establishing the standard ID of casing pipe
- ▶ The Airlock system has junk catcher device which is normally installed on top of casing guide shoe and below the cementing plug landing collar
- ▶ Weight of fluid placed above the Airlock tool provides additional push force to deliver casing or liner to target depth
- ▶ Airlock system can be used in other applications such as
- ▶ separating intervals for casing pressure tests when running long strings to save time on potential pull out operations



➤ Comprehensive solutions for Drilling & Well Completion Industry



Completion Tools

Multistage Fracking



➤➤ Multistage Fracking

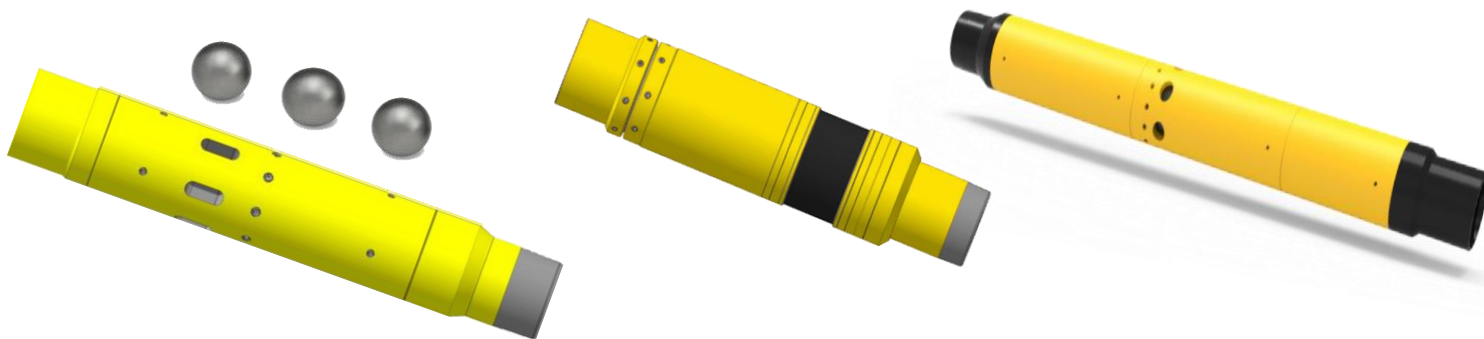
SDT has designed and developed complete line of multistage fracking equipment and technologies. The SDT's multi-stage completion system provides high intensity stimulation in unconventional tight oil and gas formations.

An advanced seat and port activation design along with a proprietary anti-erosion coating enables smaller ball and seat increments to be used for increased stage counts. Once the stimulation operation is complete, the well can be immediately flowed back and put on production. SDT's systems provide operators with an efficient and costeffective method to complete their wells.

The SDT's system is modular regarding tool placement and can be combined with other SDT's tools and systems, enabling customized stimulation programs.

Features & Benefits

- ▶ Ball-actuated, hydraulically activated injection/production ports (dissolvable balls technology available)
- ▶ Ports provide unrestricted flow for stimulation Drillable Closeable (DC) version available water or gas shutoff, flow control, re-fracturing, production testing
- ▶ High performance, hydraulically and mechanically set stage separation packers with premium seal technology
- ▶ Reliable high-pressure zonal isolation during stimulation and throughout the life of the well
- ▶ Short length, minimum outside diameter and anti-preset features improve ease of installation



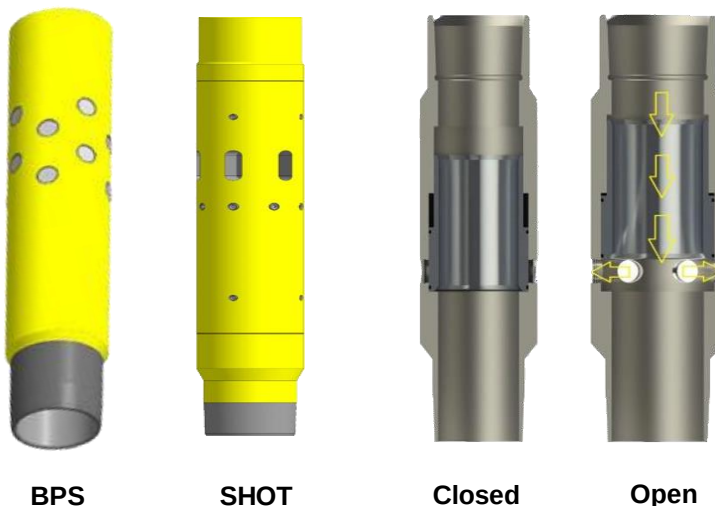
➤ Multistage Fracking

SDT has **SELECTIVE STAGE PACKER TOOL** technology available for the use with full bore drift ports in unlimited stage fracking applications. Selective packer stage tool can be used for stimulation of new drilled wells and for secondary stimulation operations in old wells.

Full bore drift ports PBS and SHOT types can be used with selective stage packer tool technology.

Features & Benefits

- ▶ Best solution for fracking stimulation of thin and tight reservoirs
- ▶ Unlimited number of stages/ports
- ▶ Maximum TFA for the port's holes
- ▶ Wide pressure setting range for ports activation
- ▶ No risks of premature port's activation
- ▶ Cemented and uncemented port's designs
- ▶ Ports with option of closure available
- ▶ SHOT design provides for guaranteed opening of 100% port holes
- ▶ Up to 10m stimulation interval can be isolated by selective stage packer tool
- ▶ Can be set and un-set as many times as needed
- ▶ Build-in couplings locator to correctly position the tool in required zone (no need for other means of BHA positioning)

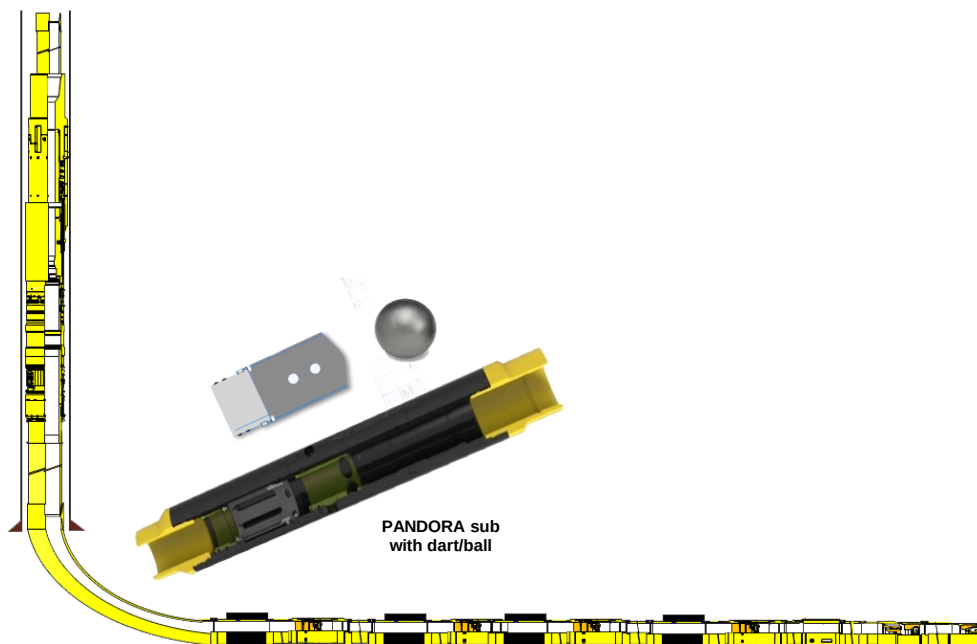


► Multistage Fracking

SDT has designed and developed full bore drift **PANDORA** frack port technology activated by darts/balls and with unlimited stage fracking applications. **PANDORA** technology was developed for extremely tight and low-permeability reservoirs with HT/HP environment where larger scope stimulation operations required. All inner elements of the **PANDORA** are dissolved after port activation resulting in full bore ID drift and eliminating drill out operations.

Features & Benefits

- ▶ Best solution for fracking stimulation of extremely tight and low permeable reservoirs when large amounts of proppant placement is required
- ▶ Unlimited number of stages/ports
- ▶ Maximum TFA for the port's holes
- ▶ No dart/ball seats and no risks of premature port's activation
- ▶ Fracking with any types of gels with up to 15 m³/min
- ▶ Same OD darts/balls used for all ports activation
- ▶ No need for drill out operations, wireline or testing can be started right after ports inner elements dissolving
- ▶ Dissolving with preset time or forced with special liquids
- ▶ Applicable for the use in cased hole completions with separation packers (including recompletions projects)
- ▶ Best solution for Cluster type fracking completions



➤ 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

SPECIFICATIONS:



2 AXIS GYROSCOPE

The 2-axis Gyro is designed with state-of-the-art solid-state sensors that provide more robust and accurate 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.

RELIABILITY

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.

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	
Soft 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.

RELIABILITY

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 survey in 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

SPECIFICATIONS:



6 AXIS GYROSCOPE

The 6-axis is designed with state-of-the-art solid-state sensors that provide more robust operating parameters 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 independent 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 suitable 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.

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 (H2O)
In pressure barrel	
Diameter :	33.4mm (1.315")
Length :	1.88m (73.8")
Weight :	8.6Kg(19lbs)
Pressure rating :	3,500m (H2O)
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.

RELIABILITY

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)	



» Business Partners / Clients

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.





(968) 91227409
(965) 69091117
(965) 69601259
(20) 1501900095



operatitons@thermoticstechnology.com
ehamdi@thermoticstechnology.com
operations@deepwellsfz.com



www.thermoticstechnology.com
www.deepwellsfz.com

