

GROUNDPOUNDER™ DRILLING JAR

Introducing the GROUNDPOUNDER™ Hydromechanical Drilling Jar

Jars are typically used in sticky hole conditions in an attempt to free Drilling Assemblies when they become mechanically stuck in hole. The Jars allow for the push/pull impact forces to be intensified potentially to six times the force that can be normally applied.

Operational Features:

- SIMPLE UP/DOWN MOTION
- INSENSITIVE TO TORQUE
- COMMONLY RUN AS HYDRAULIC/MECHANICAL
- CAN ALSO BE RUN EITHER AS A STRAIGHT MECHANICAL OR STRAIGHT HYDRAULIC.
- NORMALLY MECHANICAL LATCH SET AT 50% OF THE JARRING LOAD
- EASILY ALTERABLE JARRING LOADS AND TRIPPING RATIOS
- EASY OPERATION

Design Features

1. All working parts are housed in one sealed oil chamber, eliminating the need for ports which can fill with cuttings, possibly restricting the down jar stroke. This unique design also makes it ideal in air drilling applications.
2. Extended tool runs are due to the collet or tripping mechanism being designed to run in the cocked or latched position causing the inner mandrel and outer housing to behave an integral part virtually eliminating seal wear or inner tool wear during normal drilling operations.
3. Tool joints are torqued to the same values as the equivalent sized drill collars.
4. Designed to run in the latched position eliminates
 - a. The need to extend or open the jar before running in the hole.
 - b. Unexpected jarring while tripping in/out of the hole.
 - c. Virtually eliminates the Jars being set while tripping in the hole due to drill collar weight below the jar.
 - d. Eliminates tool extension due to pressure drop across the bit.
5. The tool can be run in tension, at the neutral point, or in compression, within the preset latch settings.
6. Standard seals in the tool are effective to 125°C. 200°C seals are optional.
7. Single primary carbide seal area exposed to the drilling fluid, backed with a secondary seal lubricated on both sides and never exposed to the drilling fluid unless the first/primary seal fails.



Tool Size		ID		Mandrel Area		Tensile Strength	Torsional Strength	Make-Up Torque	Length		Max. Mechanical Latch Setting	Max. Hydraulic Delay
In	mm	In	mm	sq.in.	mm ²	lbs.	ft.lbs.	ft.lbs.	In	mm	lbs.	lbs.
3.125	79.4	1.0	25.4	3.9	2565.2	132 000	15 000	5 000	12'9"	3.69	12 000	20 000
3.5	88.9	1.25	31.75	5.9	3806.4	250 000	25 000	7 500	12'3"	3.73	30 000	50 000
4.75	120.65	2.25	57.15	10	6451.6	380 000	33 000	10 000	13	3.96	50 000	85 000
6.25-6.5	158.75	2.25	57.15	16.8	10,838.7	700 000	60 000	30 000	14	4.26	130 000	160 000
6.75-7	171.45	2.5	63.5	19.6	12,645.1	900 000	85 000	35 000	14	4.26	145 000	190 000
8	203.2	2.75	69.85	24.8	15,999.9	1 150 000	100 000	50 000	14'6"	4.41	160 000	240 000
9	228.6	2.8125	71.43	35	22,580.6	1 500 000	120 000	60 000	14'6"	4.41	175 000	240 000



DEPARTURE
ENERGY SERVICES INC.

LEDUC OPERATIONS FACILITY

#106, 8009 - 39th Street
Leduc, Alberta, Canada
T9E 0B3

Phone **780.980.3900** 24hrs

CALGARY SALES OFFICE

Phone **403.266.3940**

Toll Free **877.233.3940**

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Operation

Jarring Up (Heavy Jarring)

A pull of at least equal to the mechanical latch trip setting must be taken to trip the latch, at this point the hydraulic delay takes over. The jar can be fired at this pull or the pull increased up to the maximum allowable. The jarring cycle is repeated by closing the jar to where the latch resets.

Jarring Up (Light Jarring)

A pull equal to the mechanical latch setting must fire, and then the string can be slacked off to the desired jarring pull, and wait for the hydraulic delay to fire the jar.

Down Jarring

To jar down, the jar is simply put in compression until the preset latch tripping load is reached, at which point the jar will jar down. Picking up on the jar resets it for another cycle.

Straight mechanical

When run as a straight mechanical a jar, a load in either tension or compression equal to the preset latch trip setting will cause the tool to jar.

The extending force is obtained by multiplying the pressure drop across the bit times the cross sectional area of the mandrel.

Example

6.25" jar
1000 p.s.i. pressure drop across the bit
Mandrel area= 16.8
Extending force=1000x 16.8= 16,800 lbs.

Straight Hydraulic

When run as a straight hydraulic jar, its operation is similar to existing hydraulic jars. From a closed position the jar will have a 6.5" free stroke, then the valve will seat causing the hydraulic delay, then the 6" free jar stroke.

Pump Open

Since the jar is basically an unbalanced slip joint, the pressure drop across the bit, while maintaining circulation will have an extending force on the jar. If circulation is maintained while jarring, this extending force will reduce the pull required to jar up and increase the load required to jar down.

Weight Below Jar

This weight must be subtracted from the up latch trip setting and added to the down latch trip setting for determining the up and down latch trip setting while in the hole.

Example:

Pull at surface to trip the latch 6.25" jar
Tripping load 100,000 lbs. up - 50,000 down
16.8 sq. in. mandrel area
250,000 lbs. string weight
30,000 lbs. below jar

Up (without circulation)

To determine the pull at surface or indicator reading to trip the latch, add the latch tripping load to the total string weight and subtract the weight below the jar. Therefore, 250,000 lbs. string weight plus 100,000 lbs. tripping load, minus 30,000 lbs. Weight below jar equals 320,000 lbs pull at surface to trip the latch.

Up (While circulating with 1000 p.s.i. pressured drop across the bit)

Extending force from pressure drop across the bit = $16.8 \times 1000 = 16,800$ lbs. Therefore 250,000 lbs. string weight plus 100,000 lbs. tripping load = 350,000 lbs.
30,000 lbs. weight below jar plus 16,900 lbs. hydraulic extending force = 46,800 lbs. = 303,200 lbs, pull at surface or indicator reading to trip the latch up.

Down (without Circulation)

To trip the latch down it is necessary to put the jar in compression the amount the latch is set to trip at, so it is necessary to slack off from the total string weight, the weight below the jar plus the tripping load. Therefore, the string will have to be slacked off to 250,000 lbs. minus $(50,000 + 30,000) = 170,000$ lbs. to trip the latch down.

Down (while circulating with 1000 p.s.i. pressured drop across the bit)

Extending force= 16,800 lbs.
Therefore the string will have to be slacked off to 250,000 lbs. minus (50,000 lbs.) plus 30,000lbs. Plus 16,800 lbs.) = 153,200 lbs to trip the latch down.



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