Schlumberger

Hydra-Jar AP Double-Acting Hydraulic Drilling Jar

The Hydra-Jar AP* double-acting hydraulic drilling jar is used to amplify the force applied at surface in order to free stuck drillstem components during drilling and fishing operations. The direction of jarring can be both up and down. The jar uses a unique temperature-compensation process to provide consistent impact, blow after blow, and high-temperature seals that make it suitable for hostile drilling conditions. In most applications, the tool should be run in conjunction with the Accelerator AP* impact tool to increase the impact while protecting the drillstring and surface equipment from shock. The jars are serviced and inspected at our service centers to ensure proper downhole operation.

Call your local service facility for technical service if required.

Do not place rig tongs on service connections or on the chromed area of the mandrel. Do not remove vent or fill plugs; mud or grease running out of vent ports is not detrimental to the operation of the tool.

Operating instructions

Make up the lift sub and hoist the tool in the elevator. Remove the safety clamp just prior to lowering the tool into the hole.

Working string weight above the jar = drag + string weight from drilling jar to surface. Drag = weight indicator reading up – weight indicator reading down.

Jarring up

- Establish the "jar load up (overpull)" to be applied, subject to the maximum detent working load shown in the table of specifications. Jar load up = final weight indicator reading up, before impact – working string weight above the jar.
- Apply pull to the drillstring as per the established final weight indicator reading and wait for the impact. The weight indicator will display a small loss just before impact, corresponding to the retraction of the drillstring. There should be a clear change in the reading after impact.
- To repeat the operation, slack off until the indicator reads 10,000 to 15,000 lbf lower than the "working load down" and immediately apply the previous jar load up again.

Jarring down

- Select the "jar load down (slack-off)," subject to
  - the maximum detent working load shown in the specifications table and
  - the weight of the drill collars or Hevi-Wate* transition drillpipe just above the Hydra-Jar AP jar, whichever is less. Jar load down = working string weight above the jar – final weight indicator reading down, before impact.
- Slack off per the established final weight indicator reading, and wait for impact.
- To repeat the operation, pull up until the weight indicator reads 10,000 to 15,000 lbf higher than it did before impact, and immediately slack off to the previously selected "jar load down" again.

Down-jar impacts may not be transmitted through shock tools run in the lower drilling assembly. When jarring down with a small number of drill collars or Hevi-Wate drillpipe on top of the jar, select a load that will not buckle the drillpipe run above the jar. Adequate weight just above the jar provides optimal impact for down-jarring. The mud pump should be shut down or slowed before down-jarring operations begin.

Specifications

OD, in	ID, in	Tool Joint Connection, in	Overall Length Extended, ft	Maximum Detent Working Load, lbf	Tensile Yield Strength, lbf	Torsional Yield Strength, lbf.ft	Up Stroke, in	Down Stroke, in	Total Stroke, in	Tool Weight, lbm
3⅜	1½	2⅜ API IF	24.42	44,000	236,062	6,842	7	7	21	500
4¼	2	2⅞ API IF	29.83	70,000	377,871	15,381	8	7	25	800
4¾	2¼	3½ API IF	29.83	95,000	492,284	19,126	8	7	25	1,050
5⅛	2¼	WT-38	29.83	95,000	492,284	30,000	8	6 13/16	25	1,155
6¼	2¾	4½ XH	31.17	150,000	730,324	40,505	8	7	25	1,600
6¼ Mod	2¾	4½ XH	31.17	150,000	964,207	50,757	8	7	25	1,600
6½	2¾	4½ API IF	31.17	175,000	964,207	54,796	8	7	25	1,850
7	2¾	5 H-90	31.50	230,000	1,179,933	67,396	8	8	25	2,600
7	2⅞	XT50	31.50	200,000	945,876	58,874	8	8	25	2,600
7¼	2¾	5½ H-90	31.50	240,000	1,261,162	84,155	8	8	25	3,000
7¾	3	6⅝ API REG	32.00	260,000	1,315,225	86,848	8	7	25	3,200
8	3	6⅝ API REG	32.00	300,000	1,621,565	98,490	8	7	25	3,550
8¼	3	6⅝ API REG	32.00	350,000	1,819,384	115,418	8	8	25	4,000
8½	3	6⅝ API REG	32.00	350,000	1,846,269	115,418	8	8	25	4,500
9½	3	7⅝ API REG	32.50	500,000	1,654,172	152,802	8	8	25	5,600

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Hydra-Jar AP Drilling Jar
Recommended hours of use before servicing when used in rotating vertical, horizontal, deviated, or build and drop sections

Tool OD, in [mm]	3⅜ [86]	4¼ [108]	4¾ [121]	5⅛ [130]	6¼ [159]	6½ [165]	7 [178]	7¼ [184]	7¾ [197]	8 [203]	8¼ [210]	8½ [216]	9½ [241]
Bottomhole temperature <400 degF [204 degC]	500 h												
Bottomhole temperature 400–500 degF [204–260 degC]	150 h												
Recommended hours of use before servicing when used while fishing or milling													
Fishing	100 h												
Milling	50 h												

Hydra-Jar AP Drilling Jar
Maximum hole size versus tool size

Tool OD, in [mm]	3⅜ [86]	4¼ [108]	4¾ [121]	5⅛ [130]	6¼ [159]	6½ [165]	7 [178]	7¼ [184]	7¾ [197]	8 [203]	8¼ [210]	8½ [216]	9½ [241]
Maximum hole size, in	5⅞	6¾	7⅞	8¾	10⅝	12¼	12¼	12¼	12¼	17½	17½	17½	26†

†Exemption needed for hole sizes larger than 26 inches

Hydra-Jar AP Drilling Jar
Connections strength

Tool OD, in [mm]	3⅜ [86]	4¼ [108]	4¾ [121]	5⅛ [130]	6¼ [159]	6½ [165]	7 [178]	7¼ [184]	7¾ [197]	8 [203]	8¼ [210]	8½ [216]	9½ [241]
Normal-torque applications, ft.lbf	4,730	11,000	16,065	25,935	31,500	31,500	36,400	41,600	41,600	46,800	52,000	56,650	61,800
High-torque applications, ft.lbf	4,900	11,200	15,300	24,700	37,900	41,300	51,000	64,300	64,600	73,900	86,800	87,500	103,000

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Changing the impact load

Impact can be changed by adjusting the working load on the Hydra-Jar AP jar.

Changeout recommendations

The Hydra-Jar AP jar should be changed out periodically for servicing. In the tables shown, the changeout recommendations refer to the total number of hours in the hole (drilling, circulating, and jarring) between services. Use the tables to determine the applicable changeout hours based on jar size, use, hole size, and bottomhole temperature; the lower of the two values is the correct one.

Wash the jar out with clean water every time it comes out of the hole. The purpose of this is to ensure the jar is in good condition on the rig floor before sending the tool back to the Schlumberger service shop.

After the Hydra-Jar AP jar is laid down, use a high-pressure water jet to flush the following parts (see figure next page):

- kelly mandrel internal bore
- kelly mandrel area coated with high-velocity oxygen fuel (HVOF) (apply grease after cleaning)
- fluid cylinder through vent ports
- neutralizer cylinder through vent holes
- bottom of the lower sub internal bore.

Ensure the drilling fluid is removed from fluid cylinder vent ports and neutralizer cylinder vent holes. If the high-pressure jet is unable to gain access to the holes or ports, a water hose is recommended for the above.

Ensure the thread protectors are installed correctly while transporting the Hydra-Jar AP jar.

Placement recommendations

- Always place a minimum of 10% to 20% of the expected drilling jar load as hammer weight above the jar.
- Maintain 20% of weight on bit (WOB) between the drilling jar and neutral point to ensure that the jar is outside the neutral point transition zone.
- Always be aware that the placement of the drilling jar needs to be reconsidered when there is a change in the BHA or in WOB.
- Do not place stabilizers or other BHA components with an OD larger than that of the jar above the drilling jar.
- Always keep any stabilizer at least 90 ft away from the drilling jar.
- Never use the jar as a crossover between drill collars and Hevi-Wate drillpipe or two different sizes of collars. High bending stresses occur in these locations and increase the risk of tool damage.
- Placing the jar within the Hevi-Wate drillpipe compared with drill collars has been shown to reduce the bending stress at the jar by up to 50%. It is required to place the jar within the Hevi-Wate drillpipe if
  - the dogleg severity (DLS) while rotating is expected to be greater than 4°/100 ft
  - the application is classified as underream only or any other application where shocks higher than level 2 are expected.
- The HydraJar AP jar and accelerator tools should not be fired with torque in the string. This could reduce the tensile and tortional designed maximum load limits and result in a service quality event. Trapped torque should not be used while operating these tools.
- Jar placement is critical. Always contact your Schlumberger representative to determine the proper placement.
- Jar can be placed in tension or compression; see accompanying table for differences. We recommend running in tension when possible.
- In case of backreaming, it is recommended to rotate at 40 rpm or the minimum rpm to maintain continuous rotation of the pipe without torsional or lateral vibrations. Low rpm will result in lower stresses on the connections. When backreaming, establish a baseline for optimal parameters (pump pressure, torque, and hookload) and determine backreaming speed based on those parameters. An increase in these parameters can indicate loading up of the annulus.

KEY TERMS

Detent: The mechanism by which the hydraulic fluid in the jar is slowly metered through the detent ring orifice when a load is applied, thus providing a delay before the jar fires.

Full detent: Jar in fully open (or closed) position prior to applying jar load.

Short detent: Jar in partially open (or closed) position prior to applying jar load.

Delay time: Time elapsed between cocking and firing the jar.

Test load: Load used to perform functional test at service facility.

Placement Recommendations

Hydra-Jar AP Jar in Tension	Hydra-Jar AP Jar in Compression
Neutral point is below the jar.	Neutral point is below the jar.
Drilling jar remains open and cocked for down jarring while drilling.	Drilling jar remains closed and cocked for up jarring while drilling.
Drilling jar will not fire prematurely when picked up off the bottom.	Drilling jar may fire prematurely if the drillstring is picked up off the bottom too quickly.
Pump-open force will help extend the drilling jar open while drilling and does not affect the WOB.	Drilling jar must be picked up off bottom and allowed to bleed through detent before tripping out or setting the slips, to prevent accidental firing.
Use in tension generally for low-angle wellbores when there is sufficient BHA weight.	Use in compression is unavoidable in highly deviated wellbores when there is insufficient BHA weight.

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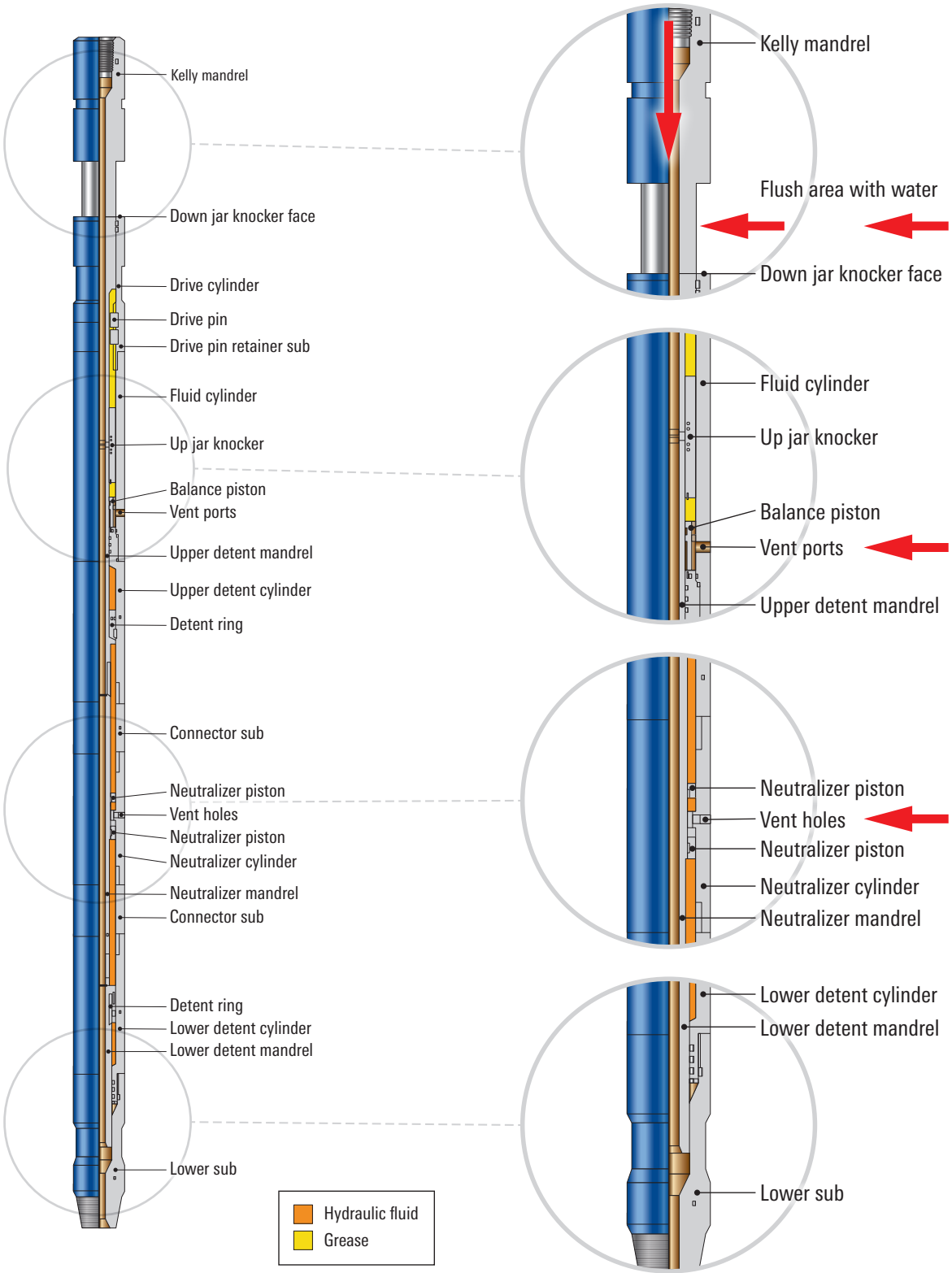

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