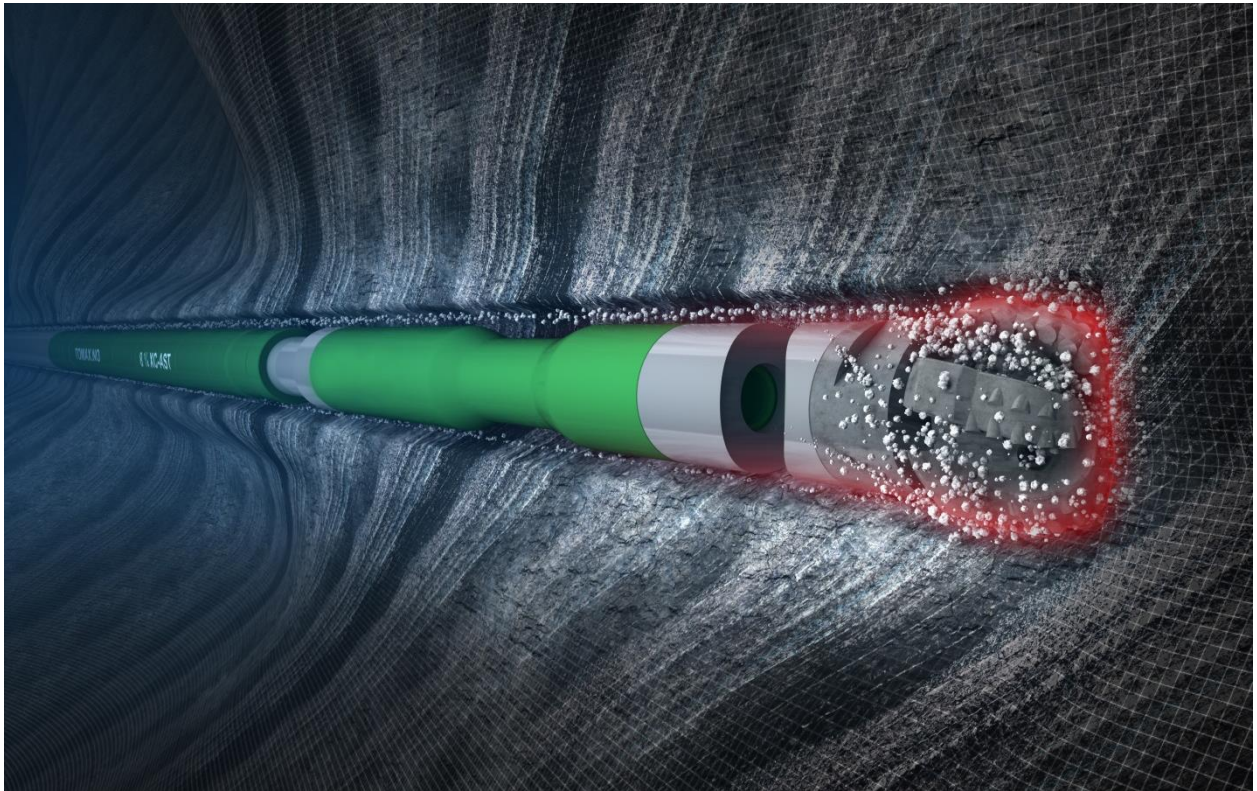


# ***Tomax***

## USER MANUAL



### **X-Series Anti Stick-Slip Tool (AST)**

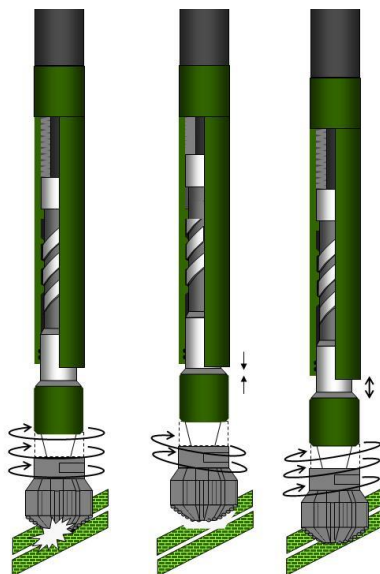
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## AST FUNCTION

The Anti Stick-Slip Tool (AST) stabilizes the drilling torque created by the bit through a direct mechanical process where excess torque causes the tool to contract along internal helical splines. This contraction will momentarily decrease the weight on bit (WOB) and prevent further onset of stick-slip. An internal spring is energized in the process and will cause the tool to re-extend, restoring WOB as the torque spike subsides. This process ensures efficient drilling is maintained and destructive torsional vibrations are removed along with secondary effects such as lateral vibrations and axial excitation. The stroke of the tool is sufficient to provide the desired effect without affecting depth tracking. The weight on bit is controlled from surface and no changes to standard drilling procedures are required. This means the tool can be run without a specialist at the well site.



*This illustration shows how the AST contracts to reduce WOB when high stick-slip is encountered.*

## BHA CONFIGURATION

The AST tool is typically placed in the BHA directly above the non-magnetic drill collars. If a roller-reamer or a stabilizer is placed near the AST, then it is recommended to position the AST below it. **DO NOT** position the AST in a string transition area e.g. between collars and HWDP. Avoid having the tool placed between stiffer BHA components. In a BHA with an under-reamer, the AST must be placed above the under-reamer and should be spaced out by a collar or pony collar to limit bending forces on the AST.

## AST HANDLING

The unit is robust and cannot be damaged by standard pipe-handling equipment. However **under no circumstances** should any handling tools or equipment be used on chromed surface of the telescopic extension (Illustration A).

The AST is fitted with a protective transport clamp (Illustration B). Remove the clamp in the rotary – do not run the clamp into the mouse hole or the well. Please ensure the clamp is attached when the tool is laid out.

Illustration A



Illustration B



*Protective clamp (all elastomer)*

**CAUTION 1:** The tool can compress and rotate slightly if weight is applied during handling in the rotary table

## DRILLING WITH AST

No particular steps are necessary when drilling with AST other than the cautions and notes detailed in this manual.

**NOTE 1:** In boreholes with high friction, standing harmonic oscillations in the BHA can develop. Although unable to absorb these oscillations, the AST tool will still have its function on the drill bit.

**NOTE 2:** In simultaneous drilling and under-reaming operations, the AST must be positioned at least 10 feet (3m) above the under-reamer. This will prevent bending forces acting on the AST, which can create high levels of internal friction resulting in sub-optimal performance of the AST.

## **AST TOOL (RIG) CHECKS**

A surface check must be performed every time an AST is re-run. The AST can only be re-run if the accumulated total rotating hours do not exceed 200. The AST should also be replaced for any of the reasons detailed in the Lay-out Procedure.

### Surface Acceptance Check Procedure

1. Seals and surfaces:
  - a. Wipe the polished section of the mandrel dry and check for oil / mud leakage.
  - b. Check for mechanical damage on the polished section that may damage the seals. Junk damage, transport damage, etc.
  - c. If there is leaking oil/mud or visible damage the tool must be laid out.

### Downhole Check

It is possible to check the mechanical integrity of the AST (and other tools in the upper BHA) in abnormal situations, such as when working a stuck BHA or having no drilling progress. This is done by comparing downhole RPM from the MWD / RSS tool with surface RPM. If the average downhole RPM is the same as the surface reading, the AST and all other components between the two measuring points have their mechanical integrity intact.

### Lay-Out Procedure

The maximum recommended rotating hours (as per IADC report) on an AST tool is 200. In practical terms, the tool should be laid out prior to a run that will result in accumulated rotating hours beyond 200. In cases where a tool has been subjected to abnormal conditions, e.g. excessive jarring, drilling with a ringed out or under gauged bit, damaged under-reamer, high sand / solids content in the mud, then the AST may have suffered accelerated wear and should be laid out sooner.

More information: **[tomax.no](http://tomax.no)**