Overview
The TTRD (Through-Tubing Rotary Drilling) protection sleeve is designed to protect downhole seal bores from damage as the drillpipe rotates within the tubing during a TTRD operation.

Typically, these seal bores would be located within downhole tubing-mounted safety valves, safety valve nipples, polished bore receptacles (PBR) or christmas trees.

The TTRD sleeve is run on a dedicated running tool that is an integral part of the drill string. The TTRD sleeve is locked and verified in place as the drill string is run through the safety valve and is subsequently picked back up again upon retrieval of the drill string.

Features and Benefits
- **Efficient Deployment**
  Deployed and retrieved on the drill string – saving multiple runs. Can also be deployed on wireline.

- **Slimline Design**
  Large ID maximizes the bypass flow area between the sleeve and the drillpipe OD. This aids deployment, and the subsequent flow of cuttings, and lowers the equivalent circulating density (ECD).

- **Positive Location**
  Lock mechanism helps ensure that the sleeve is firmly located into the correct profile during drilling operations.

- **Versatility**
  Latch mechanism can be manufactured to fit any lock profile with a no-go shoulder.

- **Debris Tolerant**
  No “dead spaces” where debris can become lodged and prevent proper operation.

Operation
The TTRD protection sleeve is made up to a dedicated running tool via a shear-ring.

As the TTRD sleeve approaches the target seal bore, it locates against the no-go shoulder of the nipple. Application of set-down weight shears the shear-ring located within the lock allowing the collet support to move down and support the collet fingers.

When the fingers are fully supported, the sleeve is mechanically locked in place. An overpull can be taken at this point to verify that the TTRD sleeve is located properly. Further set-down load shears a second shear-ring allowing the drillstring to continue downhole.

To retrieve the sleeve, the running tool simply locates against the bottom of the sleeve during retrieval of the drill string. A predetermined overpull shears the release shear-ring unsetting the mechanical lock and allowing retrieval of the sleeve with the drillstring.

Applying additional overpull will shear the back-up release mechanism should the primary mechanism fail.
Applications
While developed specifically for use on TTRD operations, the TTRD sleeve can be used in any application where the existing well equipment and seal bores need to be protected such as:

- Through-Tubing Rotary Drilling operations
- Electric and slickline operations
- Snubbing and coiled tubing operations

Specifications
The TTRD sleeve can be custom designed to fit any lock profile and no-go shoulder. The specifications are therefore dependent on the specific requirements, such as nipple profile or safety valve dimensions, etc. Your Halliburton representative will be able to provide further details.

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<td>Overall Length</td>
<td>To suit application but at least 155-in (3,937 mm)</td>
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For more information about the TTRD protection sleeve, contact your local Halliburton representative or email completions@halliburton.com.

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