

PolyVolve SWIVEL DS

Ultra-durable drillstring swivel



PolyVolve SWIVEL DS is the world's strongest and most durable swivel. It's patented stackable polymer bearing design allows an unlimited number of bearing modules to be added to give unlimited load bearing and durability capabilities.

Inclusion of PolyVolve SWIVEL DS in the drillstring above a liner or casing during deployment allows dynamic rotation to mitigate the negative effects of static friction and can significantly improve deployment capability. This provides operators with the utmost confidence of speedy, accurate and safe placement of their wellbore systems and can allow for longer more complex wells to be planned with confidence and executed safely.

PolyVolve SWIVEL DS is recommended for use in any application where the system deployment may be encumbered or hampered by excessive friction due to well conditions or wellbore geometry. It is ideally suited to assist with the controlled, precise and speedy deployment of liners and sand-face completions, TCPs, casing, perf and wash systems, and wellbore clean-up systems. The compliant nature of the bearing under bending load delivers excellent performance in high dogleg and deviated applications.

Operator Benefits

- Reduced static friction gives better weight transfer for speedy deployment
- Enhanced durability over alternative technology
- Compliant bearing excellent in bending for dogleg applications
- Safe, controlled & accurate deployment
- Reduced operational time
- Increased operational success

Technical Specification

| Nominal Size | 3-1/2" | 5" | 5-7/8" |
|--|-------------------------------|---------------------------------|---------------------------------|
| OD in (mm) | 5-5/8 (142.87) | 7-1/2 (190.8) | 8 (203.20) |
| ID in (mm) | 1-15/16 (49.21) | 2-13/16 (71.45) | 3 (76.2) |
| Connection | XT39, 3-1/2IF | NC50, 4-1/2IF | VX57, 6-5/8REG |
| Bearing Static Tensile Load lbf (mT) | 150,000 (57) to 750,000 (340) | 180,000 (82) to 1,000,000 (454) | 200,000 (90) to 1,200,000 (545) |
| Bearing Rotating Tensile Load lbf (mT) | 75,000 (34) to 375,000 (170) | 90,000 (41) to 450,000 (205) | 100,000 (45) to 500,000 (227) |
| Bearing Static Compressive Load lbf (mT) | 750,000 (340) | 1,000,000 (454) | 1,200,000 (545) |
| Bearing Rotating Compressive Load lbf (mT) | 150,000 (57) to 750,000 (340) | 180,000 (82) to 1,000,000 (454) | 200,000 (90) to 1,200,000 (545) |
| Mechanical Yield Strength lbf (mT) | 750,000 (340) | 1,000,000 (454) | 1,200,000 (545) |
| Non-rotating dogleg | 20deg/100ft | 20deg/100ft | 20deg/100ft |
| Rotating dogleg | 10deg/100ft | 10deg/100ft | 10deg/100ft |
| Rotational Speed Range (RPM) | 0-120 | 0-120 | 0-120 |
| Length ft(m) | ~17 | ~17 | ~17 |
| Temperature f (C) | 400 (204) | 400 (204) | 400 (204) |
| Circulation/Operation Pressure Psi (bar) | 6500 | 6500 | 6500 |
| 'Low' Threshold pressure psi (bar) | 500 (35) | 500 (35) | 500 (35) |
| 'Elevated' threshold pressure | 1000-4000 (69-275) | 1000-4000 (69-275) | 1000-4000 (69-275) |

Load ranges are subject to QTY of modules added. Specifications are maximum, w/o FOS, are for guidance only and are subject to change. Alternative connection threads available.

Technical Advantages

- Reduced static friction = better weight transfer for deployment
- Extreme durability = unrestricted operation capability
- Extreme load capability = greater available deployable force
- Simple, rugged spline drive = reliable torque delivery when needed
- Selective on-off locking = versatile operational capability
- Contingency locking system = operational assurance
- Pressure-safe mode = will not accidentally lock during pressure testing
- Compliant bearing material = higher dog-leg tolerance

Operating guide to use

PolyVolve SWIVEL DS is a simple and robust system which requires only conventional rig systems to operate and control its function.

PolyVolve features five modes of operation.

1. UP-SWIVEL mode

The swivel is in tension and is free to rotate up to the maximum swivel rating.

2. DOWN-SWIVEL mode

The swivel is in compression and is free to rotate up to the maximum swivel rating.

3. TEMPORARY LOCK mode

The swivel mandrel is temporarily locked into the splined position following application of a low threshold pressure within the deployment drill pipe. This allows torque transmission through the swivel. This lock is released on bleeding/relieving the system pressure.

4. PERMANENT LOCK mode

The swivel mandrel is permanently locked into the splined position following application of an elevated threshold pressure.

5. OVERRIDE LOCK mode

The swivel mandrel is permanently locked by pressurised action of a dropped dart or by wireline intervention through the drill pipe.

Operation of the PolyVolve SWIVEL DS is very simple:

- To engage UP-SWIVEL mode: pickup then free rotate
- To engage DOWN-SWIVEL mode: slack-off then free rotate
- To temporarily lock rotation: apply 'Low' threshold pressure and move up or down.
- To unlock rotation: bleed off pressure and move to desired position.
- To permanently lock: apply 'Elevated' threshold pressure and move up or down
- To Permanently lock with dart: drop/pump dart onto seat and apply 'Dart' threshold pressure, then move up or down.

Technical Features



Premium Connection Sub

PolyVolve SWIVEL DS can be dressed with any standard or premium threaded connection, removing the need for cross-overs.

UP-SWIVEL PolyVolve Module

The UP-SWIVEL POLYVOLVE module allows high tension forces to be applied to the device whilst allowing rotation. POLYVOLVE is a modular, stackable, polymeric thrust bearing swivel capable of withstanding ultra-high thrust forces whilst rotating for extended periods in extremely hostile conditions.

POLYVOLVE delivers a proven and unrivalled thrust load bearing capability, is impervious to wellbore fluids and debris and can operate comfortably at high temperatures.

Secondary Lock Module

This is the secondary or contingency system for rotationally locking the mandrel of the swivel in the splined position to allow tool manipulation such as releasing from a liner hanger system.

Drive Spline Module

A precision high-torque drive spline provides the torsional drive force required for manipulation of deployment tools as and when required. The drive spline is disengaged in the swivel modes.

Primary Lock Module

The primary lock module provides a system for rotationally locking the mandrel of the swivel in the splined position to allow tool manipulation such as releasing from a liner hanger system. This is pressure activated. A low pressure threshold temporarily locks the mandrel in the splined position which can then be released with the relief of the pressure. An elevated pressure threshold permanently locks the mandrel in the splined position once the desired shear rating is exceeded. The shear rating is adjustable at the wellsite.

HAMMER Transmission Module

This system provides torque transmission through the lower PolyVolve modules to power the HAMMER vibro-impact deployment.

DOWN-SWIVEL PolyVolve Module

The DOWN-SWIVEL POLYVOLVE module allows high compression forces to be applied to the device whilst allowing rotation.

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Add or subtract POLYVOLVE bearing modules as desired to achieve the optimal required thrust load rating.

HAMMER Module Option

A HAMMER vibro-impact module may optionally be fitted to the lower end of a PolyVolve SWIVEL DS to provide superior deployment capability by delivering precise, controllable friction-reducing downward acting vibrational and axial impacting forces.

Premium Connection Sub

PolyVolve SWIVEL DS can be dressed with any standard or premium threaded connection, removing the need for cross-overs.