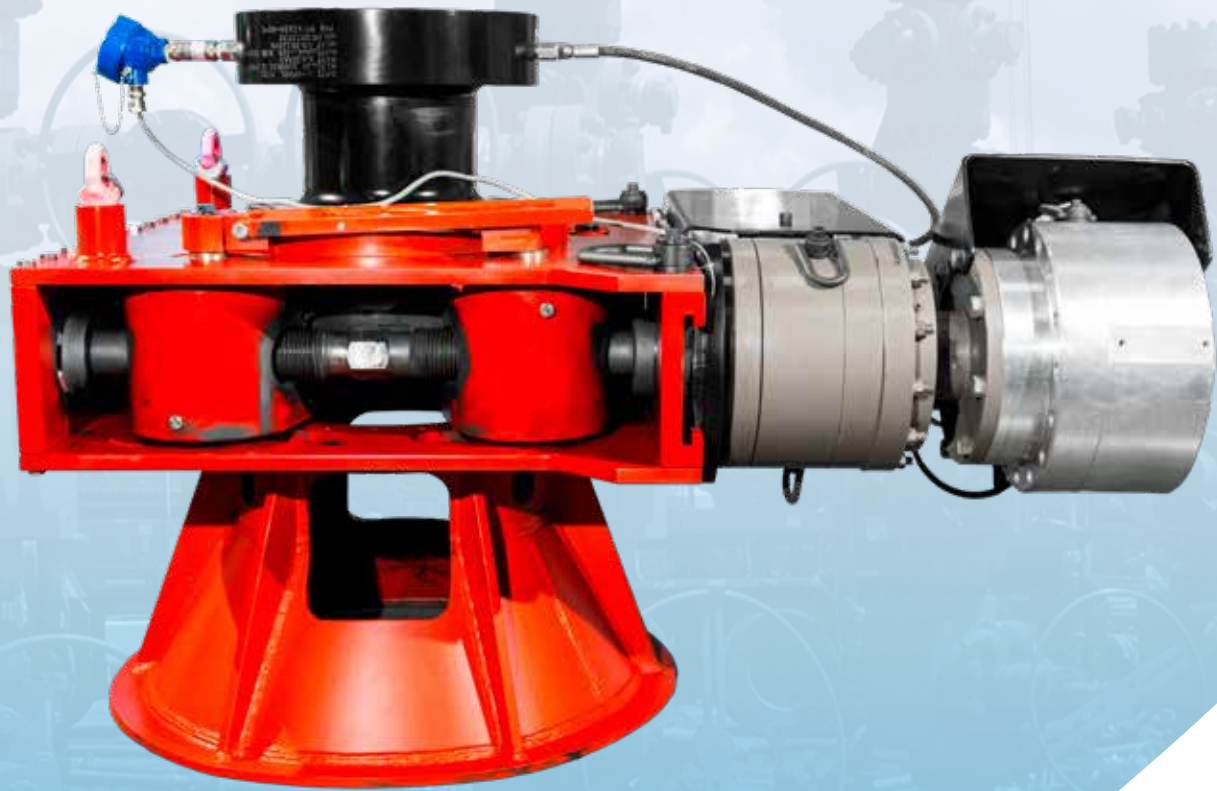


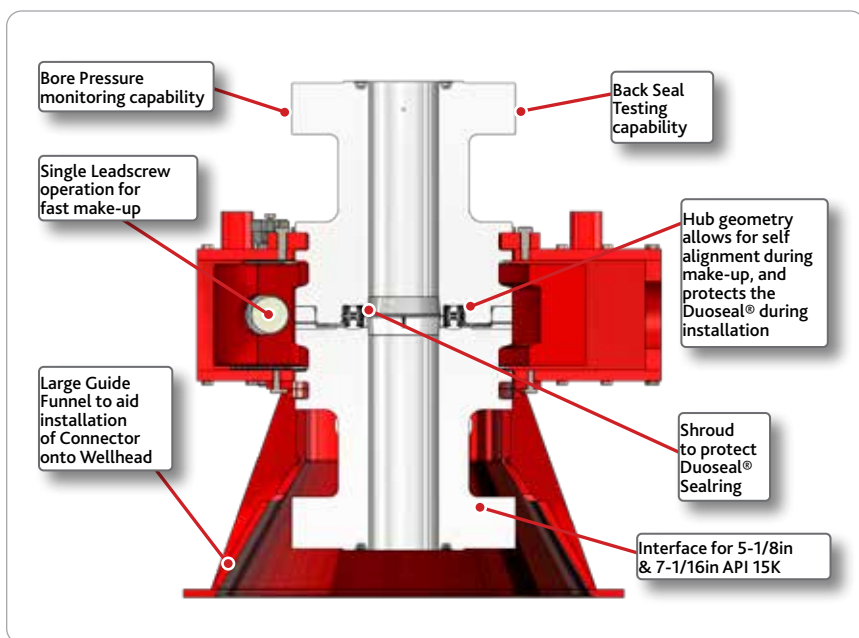


VECTOR OPTIMA[®] E-CONNECTOR[™]

FULLY ELECTRIC | API 6A
15,000 PSI | REMOTE OPERATION

VECTOR OPTIMA® E-CONNECTOR™

The Vector Optima® E-Connector™ is the only fully electric, API 6A-compliant clamp connector designed for high-pressure applications such as fracturing, flowback, and intervention. It adapts more than 25+ years of proven subsea Optima® and DuoSeal™ sealing technology to high-pressure operations. Engineered for connections up to 15,000 psi, its compact, self-aligning, and fail-safe design uses an electrically actuated single-lead screw mechanism for fast, precise make-up and disconnect. Integrated smart functionality delivers torque validation, process control, and digital traceability, while the fully electric drive simplifies site operations — optimizing safety, efficiency, and reliability in critical field environments.



FIRST TIME, EVERY TIME RELIABILITY

Engineered for demanding land-based applications, Vector Optima® E-Connector™ delivers reliable first-time, every-time performance while minimizing impact on interfacing equipment. Its single lead screw design provides predictable operational timing and enables a fast, efficient connection system for operators.

Vector Optima® E-Connector™ is Type Approved by Bureau Veritas and manufactured in accordance with the BS EN ISO 9001 Quality Assurance Accreditation Program, ensuring consistent quality and dependable operation.

Vector Optima® E-Connector™ provides an ideal remote connection solution for a wide range of onshore installations, including tree and manifold connections.

FEATURES

1. Electric Actuation (no hydraulics)

- Electric motor drives a single leadscrew clamping mechanism.
- No hydraulic hoses, pumps, or accumulators are required.
- Reduces mechanical interfaces and potential leak paths.

2. Remote Control and Monitoring

- Operated from laptop through Ethernet connection or integrated user interface.
- Real-time monitoring of clamp position, torque, and pressure.
- One full system can operate multiple connectors.



3. Seal Verification

- Integrated annulus test port allows Reverse Integrity Test (RIT) without disassembly.
- The same port can also be used to monitor seal condition and performance during operations.

4. Fail-Safe Locking

- A mechanical brake engages at the end of each open/close to prevent clamp back-off in vibration-prone environments.
- The system continuously monitors leadscrew torque, number of turns, clamp position, back-seal pressure, and bore pressure.
- Mechanism remains mechanically locked if power is lost.
- Visual indication of open/closed position via a light, mechanical lever, and UI notifications.
- Multiple Open and close indicators inform the operator of the connector's position, allowing the operator to continue operations safely.

TECHNICAL SPECIFICATIONS

Parameter	Specification
Pressure Rating	Up to 15,000 psi (API 6A 15K)
Temperature Range	-20 °F to +250 °F
Interface Sizes	5-1/8" and 7-1/16" API 6A 15K Flanges (other interfaces available upon request)
Actuation	Electric Class 1 Div 1 Electric motor-driven single leadscrew
Sealing	Vector Duo seal™ seal with annulus test port
Construction Materials	Available in all material specifications with customization options
Control Unit	Digital interface with pressure transducer; multi-connector capable



APPLICATIONS

- **Frac Operations:** Rapid connection/disconnection of frac trees and manifolds across multiple wells.
- **Wireline / Pump-Down:** Remote connection of lubricator stack during all operations required.
- **Well Testing / Flowback:** Fast tie-in of test manifolds with in-situ seal verification.
- **Emergency Disconnect:** Controlled separation from a safe distance; connector remains locked until intentionally released.

DESIGN AND PERFORMANCE DIFFERENTIATORS

Feature	Vector Optima® E-Connector™	Conventional Hydraulic Quick
Actuation	Electric motor (single leadscrew)	Hydraulic cylinders
Power Requirement	Electric supply only (standard 120 volt outlet)	Hydraulic power unit (HPU)
Seal Type	Bi-directional Metal with Wipers (Duoseal™)	Elastomeric O-ring or rubber seals
Seal Verification	Reverse integrity test and seal performance monitoring integrated	Cannot monitor the seal performance
Fail-Safe Lock	Mechanical fail-safe design with password protected overwrite	Hydraulic lock dependent on pressure
Data Monitoring	Digital torque / pressure feedback	Manual gauges or indicators

HUB MISALIGNMENT CAPABILITY

- Angular misalignment up to 5° or 30mm axial hub separation
- Male-female configuration controls misalignment
- Accurate radial misalignment provided by male-female hub
- Radiused profile of male hub prevents binding during makeup
- Angular and radial misalignment controlled to prevent any damage to sealing surfaces during makeup



Alignment controlled in 3 stages

STAGE 1	Coarse alignment provided by pull-in system
STAGE 2	Mid-range alignment provided by integral guide funnel (or similar)
STAGE 3	Fine alignment provided by male/female hub system

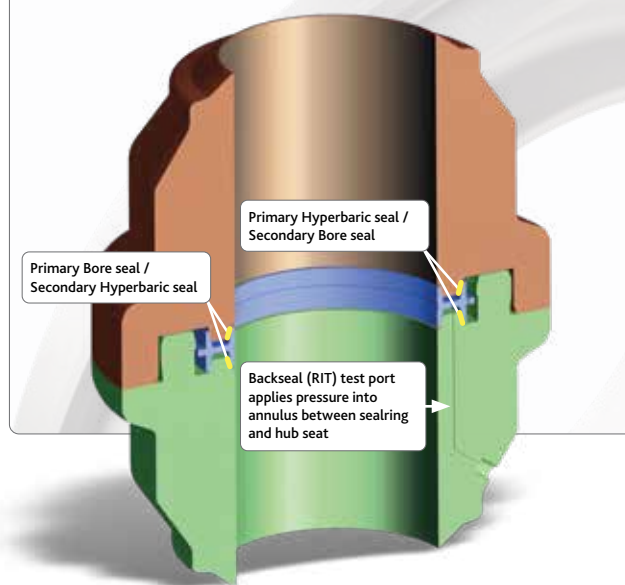
E-CON DUOSEAL™: REMOTE CLEANING FOR SEAL INTEGRITY

The patent-pending E-Con Duoseal™ is a specialized enhancement to the existing Duoseal™ to be used with the Optima® E-Connector, engineered to clear debris, sand and particulates before the seal makes contact with the mating surface — ensuring a clean, reliable connection



Bi-directional, dual-acting pressure energized seal

The advanced Vector Duoseal™ system is effective and highly flexible. An external test port allows for a Reverse Integrity Test to be conducted. Duoseals have been qualified and delivered for 15,000psi applications up to 34" inside diameter.



every time. By incorporating a uniquely formulated HNBR elastomer, the scraper is rigid enough to push debris clear of the seal seat, yet flexible enough to self-align to the sealing surface without pinching or damage. This feature enables remote, in-line cleaning, eliminating the need for manual intervention in red zones and ensuring clean, consistent and high-integrity connections every time — even in the harshest frac environments.

Field Services & Product Support:

At Freudenberg Flow Technologies our Field Services and Product Support teams provide critical, on-site solutions designed to enhance operational performance and ensure the longevity of your systems. With a deep understanding of industry demands, our highly trained specialists deliver precise installation, maintenance, and diagnostic services tailored to your technical requirements.

Our service teams are equipped to address complex challenges with efficiency, minimizing downtime while ensuring compliance with industry standards. Whether it's system upgrades, preventative maintenance, or emergency repairs, we offer end-to-end support that keeps your operations optimized.

24/7/365 Availability — Continuous, Expert Support

We understand the importance of immediate response; our technical support team is available 24/7/365, ensuring you have access to expert guidance and assistance at any time. From remote diagnostics to rapid field deployment, we are committed to delivering timely solutions that reduce unplanned outages and improve productivity.

With Freudenberg Flow Technologies, you gain a trusted partner dedicated to maximizing the performance of your systems, no matter when or where support is needed.



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