



**INNOVATIVE
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Oklahoma City, Oklahoma USA



Innovative Products
Web Site

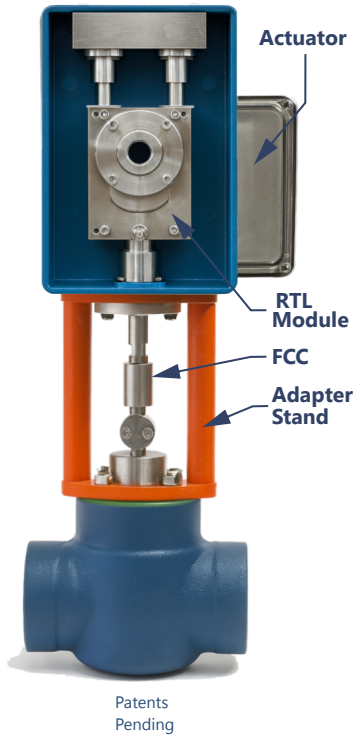


PATENTS PENDING

ROTARY TO LINEAR TRANSLATOR

THE QUAD "0" EMISSIONS SOLUTION
FOR DIAPHRAGM OPERATED VALVES

RTL



ROTARY TO LINEAR TRANSLATOR

The RTL converts rotary motion into linear movement. The patented **CamDrive™** technology provides smooth and accurate motion for millions of cycles. A **Force Compliance Control™** (FCC) incorporated in the valve stem shaft mitigates any excessive motion (Over Travel) and streamlines the setup and calibration process.

Additionally, the RTL Translator is compatible with all ISO-5211 rotary actuators featuring an ISO footprint. The versatile "Adapter Stand" can be paired with a diverse range of control valve brands. The assembly is designed to meet IP65 weatherproof standards, ensuring optimal performance across diverse environmental conditions.

Models are available to retrofit valves with up to 3 inches of travel. Actuator drive adapters are available in multiple geometries and sizes.

KEY DESIGN FEATURES

Eccentrically Mounted Drive Shaft

Enables precise cam motion for converting rotary input into predictable linear output with consistent stroke control.

Roller Bearing Drive Shaft Support

Maintains rotational axis integrity under load, minimizing deflection, vibration, and mechanical wear.

CamBearing to Cage Interface

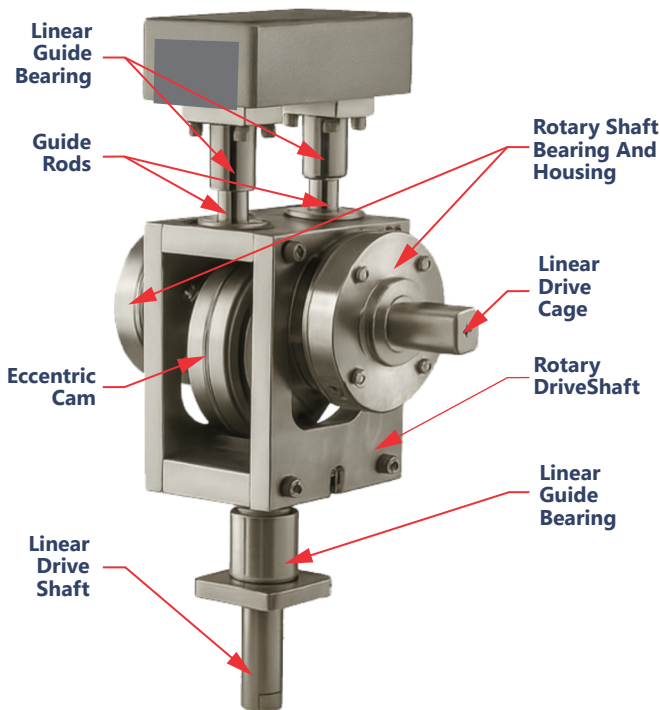
Translates orbital bearing motion into linear displacement with minimal backlash and smooth, repeatable actuation.

Tri-Rod Linear Guidance System

Provides stable vertical translation, suppresses twisting, and ensures coaxial alignment with valve stems.

Recirculating Linear Ball Bearings

Low-friction guidance under dynamic load, supporting high-cycle



RTL MODULE

RTL CONVERTER TECHNICAL DESCRIPTION

The **RTL mechanism** is a high-precision (Rotary-To-Linear) translation system designed for precise axial displacement. It operates on a principle of **eccentric cam geometry**, with its primary actuation driven on the vertical shaft. The shaft is inserted eccentrically through a precision-machined disk which is concentrically inserted into the inner diameter of a large, heavy duty rotary roller bearing.

For rotational stability and low-friction operation, the vertical drive shaft is radially supported by precision roller bearings at both shaft ends, rigidly mounted into the housing. The dual-bearing configuration preserves shaft concentricity and minimizes angular deflection under load, ensuring long-term kinematic integrity. The cam-bearing assembly is housed within a **translator cage**, which translates the orbital bearing motion into linear vertical movement. The cage is constrained along the Z-axis using a **tri-column vertical guide rod system** mounted in **recirculating linear ball bearings** secured to the R2L housing, enabling precision, low-friction axial displacement.

Alignment & Kinematic Constraints

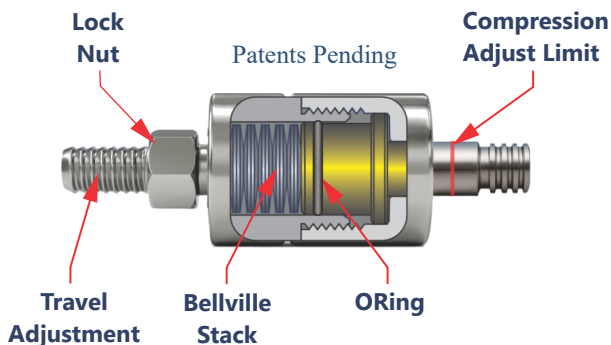
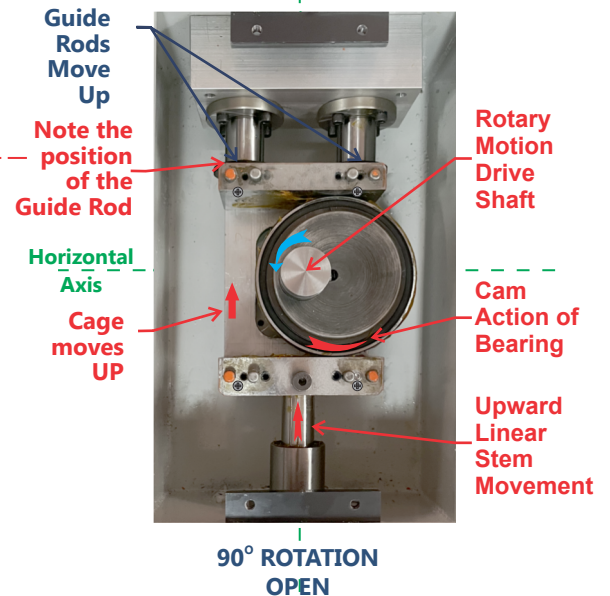
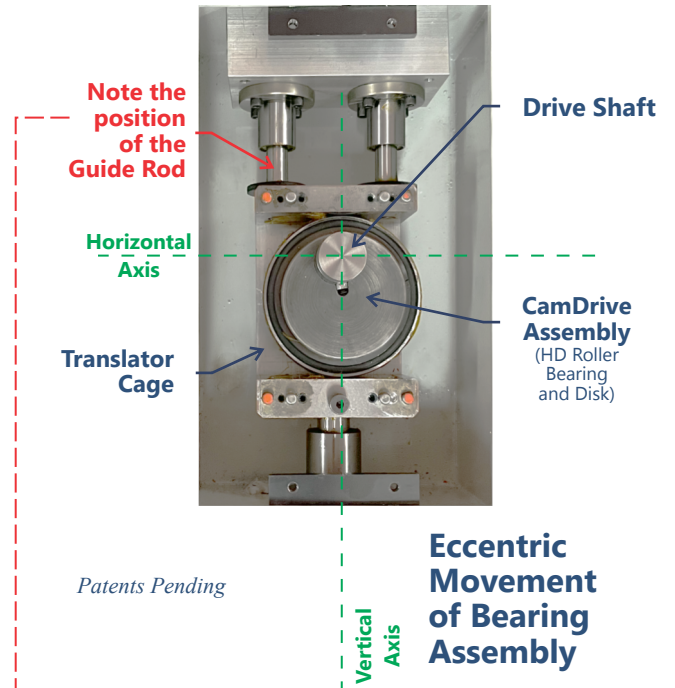
The upper guide rods maintain vertical perpendicularity of the cage and suppress undesired torsional rotation (yaw/twist) during actuation. The lower guide rod reinforces stroke alignment, absorbing lateral forces while preserving stroke fidelity relative to the valve stem interface.

Motion Profile

During operation, **the vertical shaft rotates**, causing the Cam bearing assembly to follow a defined orbital path. The outer face of the bearing engages the top and bottom races of the cage functioning as a rolling cam follower.

The resultant lateral orbital deviation of the bearing is constrained by the guide rod system, transforming it into a **pure linear translation**. This produces a vertical stroke suitable for precision actuation with minimal backlash and exceptional repeatability.

0° ROTATION
CLOSED



FORCE COMPLIANCE CONTROLLER

An integrated **Force Compliance Control (FCC)** modulation system within the stem shaft provides intrinsic over-travel mitigation, safeguarding critical end-of-stroke interfaces while reducing the need for post-installation mechanical tuning. This built-in damping element further optimizes alignment tolerance during setup and accelerates calibration throughput.



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