

Exlar's Technology

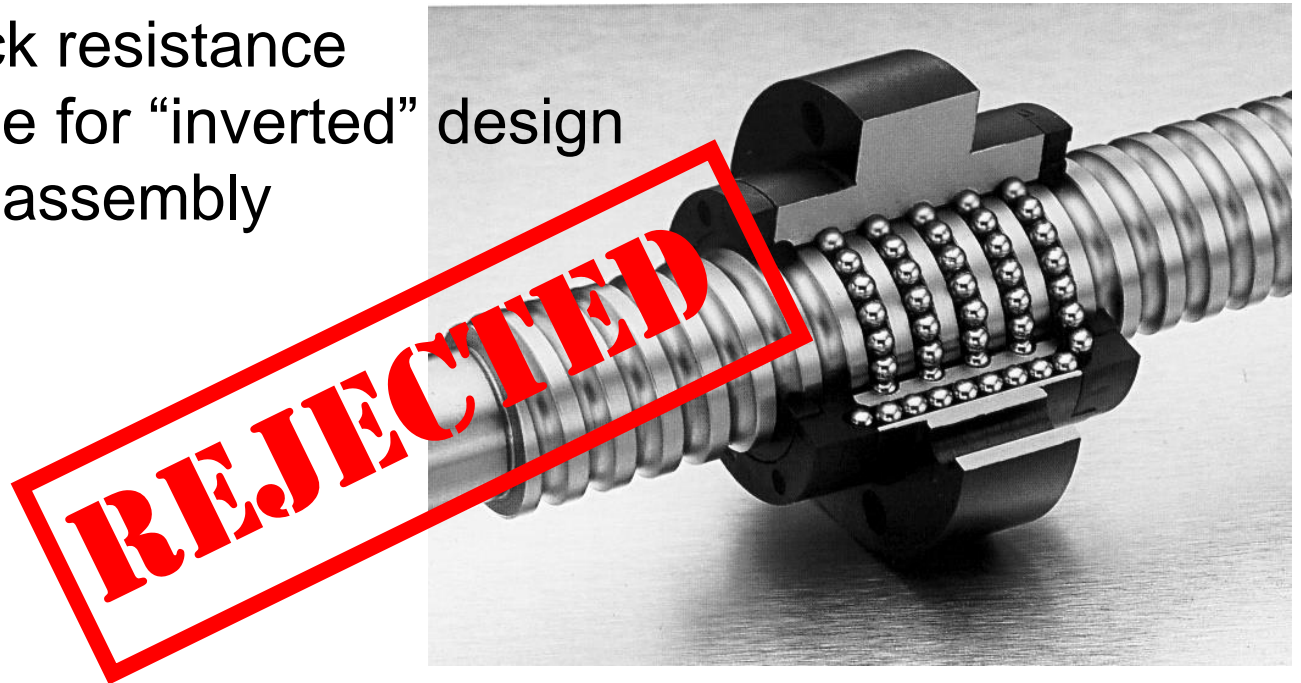
Exlar's development of unique actuator products began because of industry's call for a cleaner, more efficient and controllable alternative to hydraulic and pneumatic cylinders.

The logo for EXLAR, featuring the word "EXLAR" in a bold, dark red, sans-serif font. The letter "X" is stylized with a diagonal slash through it.

Selection of Rotary to Linear Converter

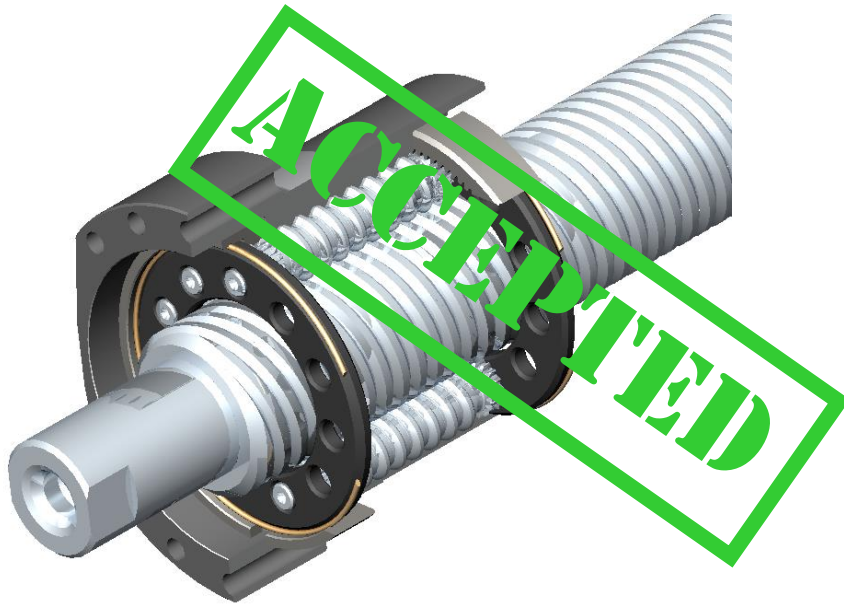
Ball Screw Technology

- Short service life
- Low shock resistance
- Unsuitable for “inverted” design
- Tricky disassembly



Selection of Rotary to Linear Converter

Roller Screw Technology



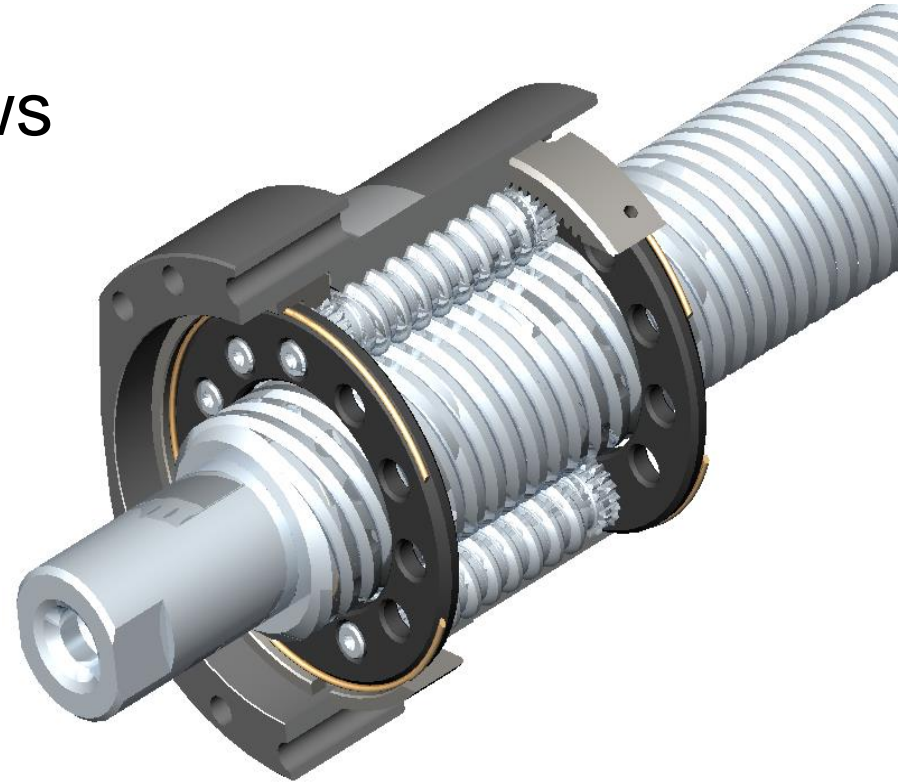
- Very long service life
- High shock resistance
- Allows “inverted” design
- Easy disassembly



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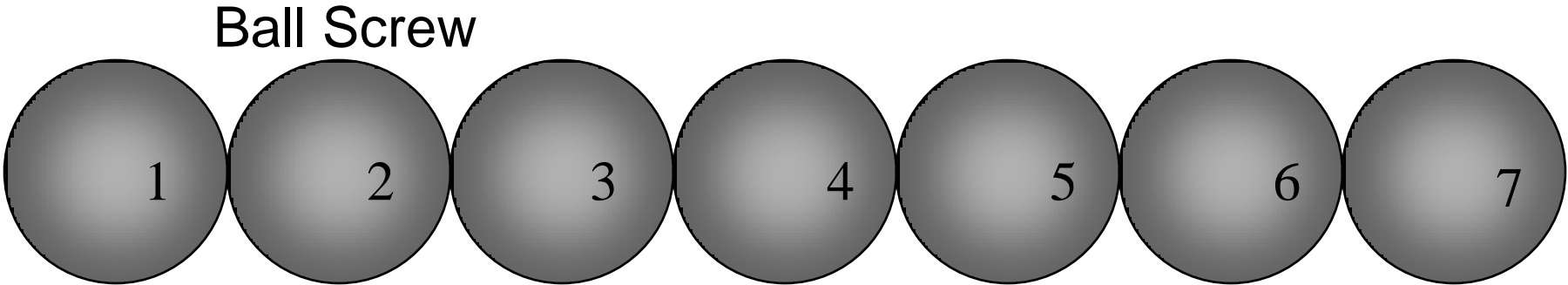
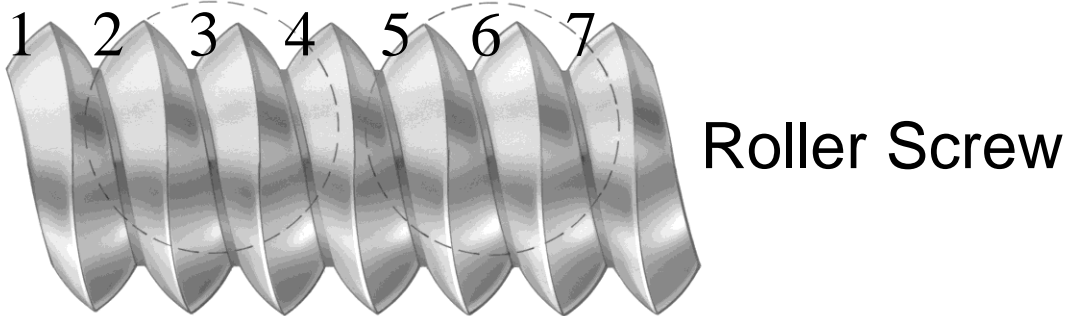
Why Roller Screw Technology?

- Efficiency equal to ball screws
- Mechanically Stiff
- Shock Resistant
- Extremely Compact
- Allowed inverted design
- At least 15 times the travel life of equivalent size ball screw



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Roller Screw Advantages

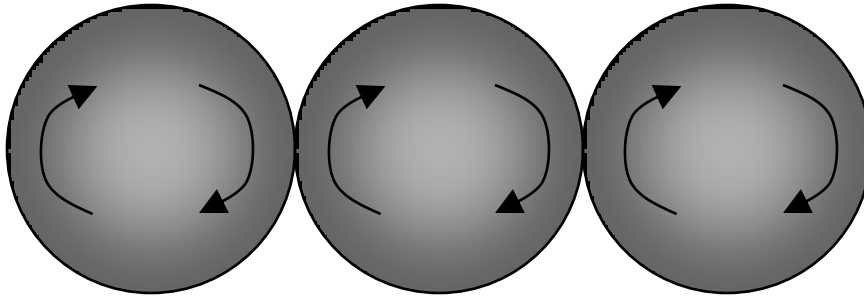


Much Less Space for Equal Contact Area



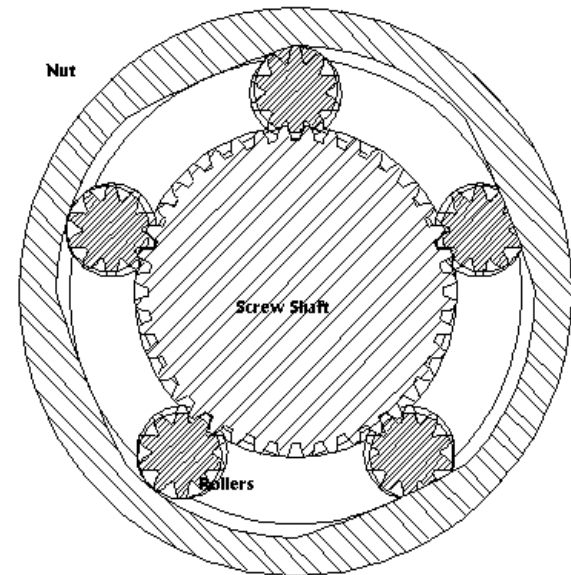
Roller Screw Advantages

Adjacent balls within a ball screw have conflicting friction leading to heating and wear. The planetary design of a roller screw does not exhibit this problem.

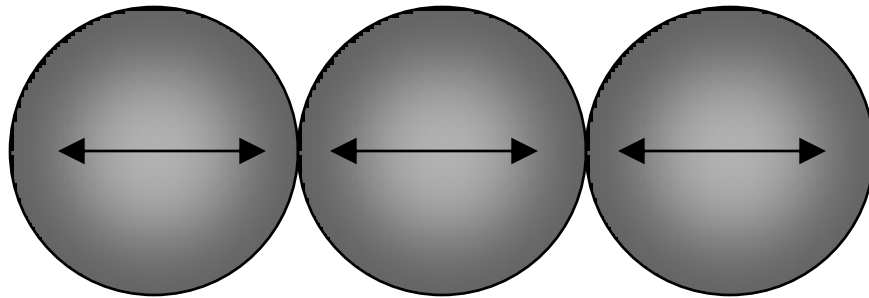


Ball screw

Roller screw

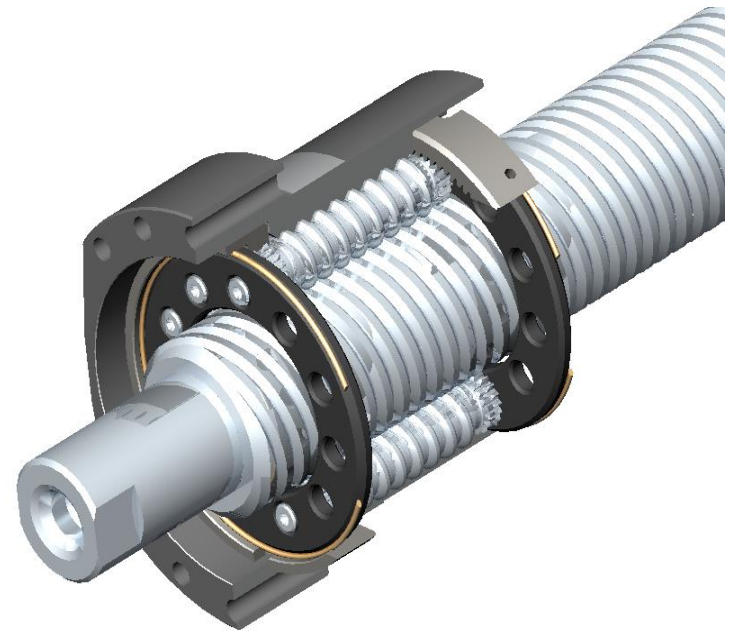


Roller Screw Advantages



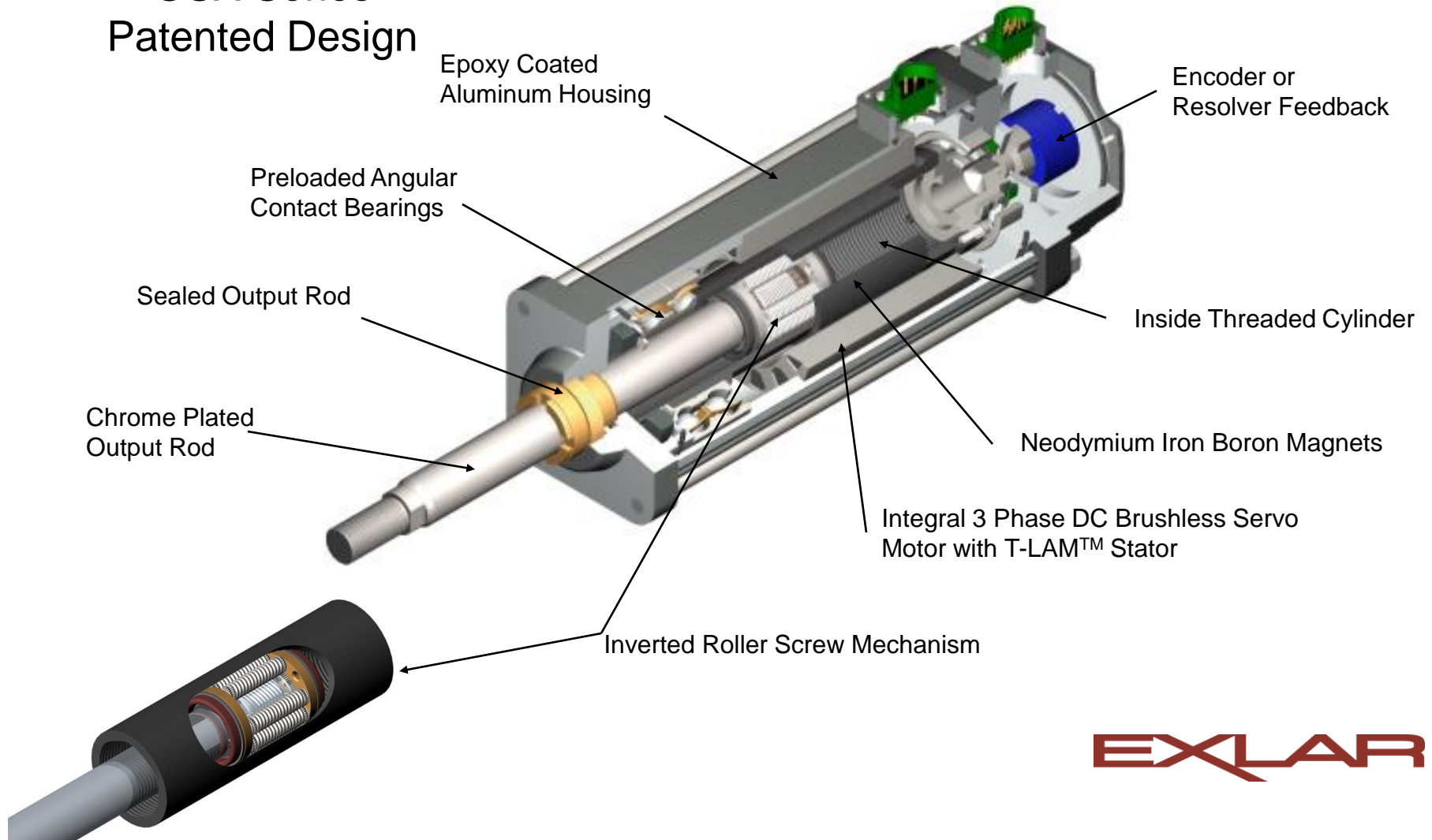
Ball screws are limited to 1000 RPM, as energy causes balls to vibrate and collide violently

In a roller screw, the rollers are constrained by journals



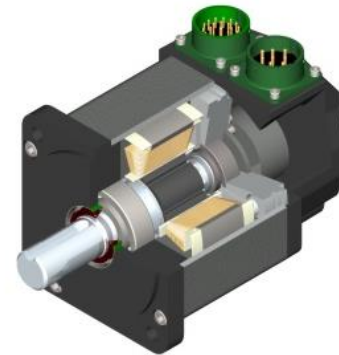
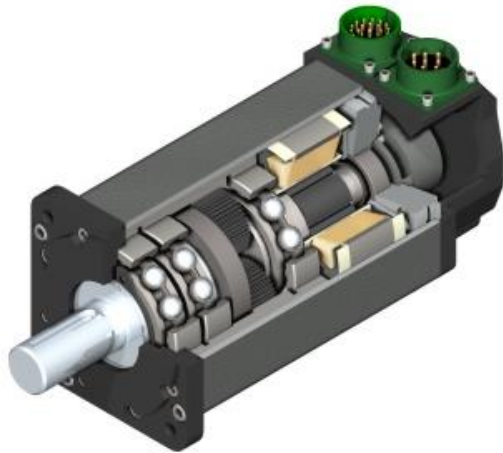
Result – Integrated Linear Actuator

GSX Series Patented Design



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Rotary Motor Technology



T-LAM™ Segmented
Lamination Technology

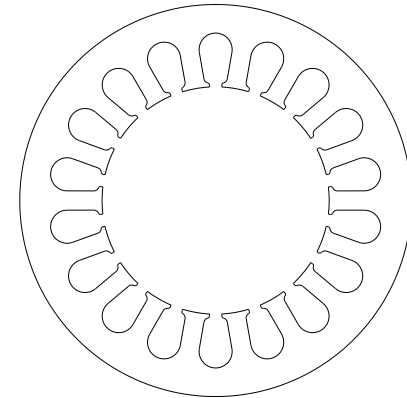
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T-LAM™ Motor Technology

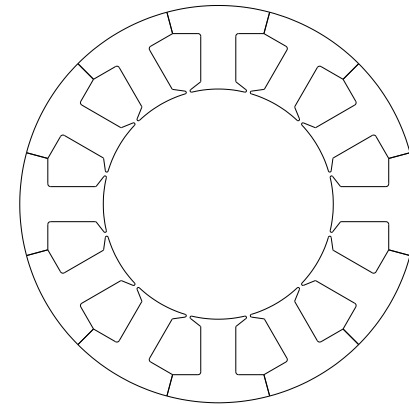
Developed T-LAM™ segmented lamination motor technology.

30% more torque in equal space

20% more efficient than traditional brushless motors.



Traditional Lamination

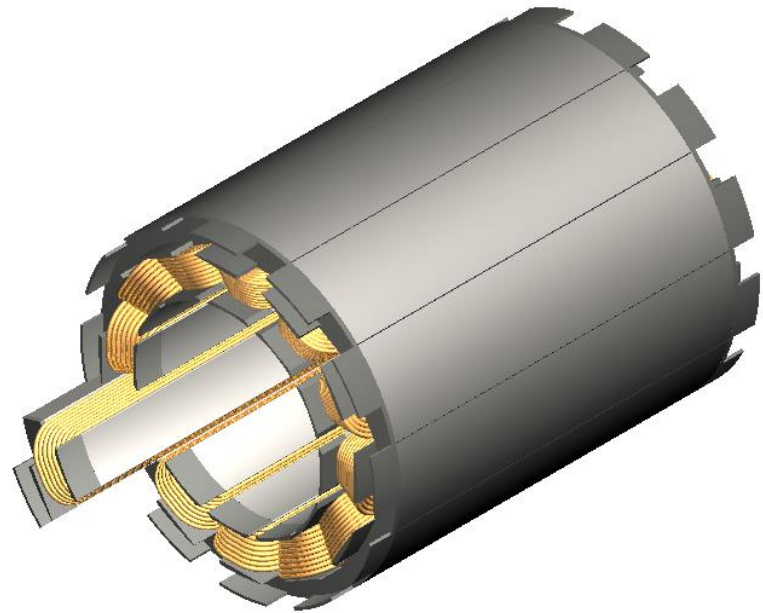


T-LAM Lamination Segments

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T-LAM Motor Technology

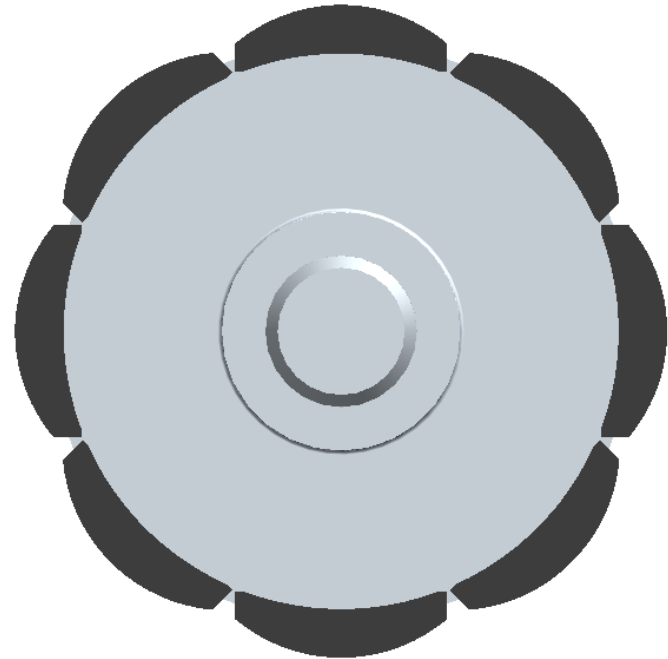
- Segmented “T” Shaped Lamination Design
- External “bobbin” wound straight stacks vs. inserted coils in skewed stack slots
- High slot fill, minimal end-turns
- 3 Phase, w y e winding configuration
- Rynite lam caps, Nomex Slot insulation, Nomex interphase insulation
- Final assembly encapsulated in epoxy



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T-LAM ARMATURE

- 8 pole configuration
- Bread loaf shaped high-coercive neo-dymium iron boron magnets
- Low cogging torque – (1 – 1.5%)
- Other pole counts possible, but not currently offered

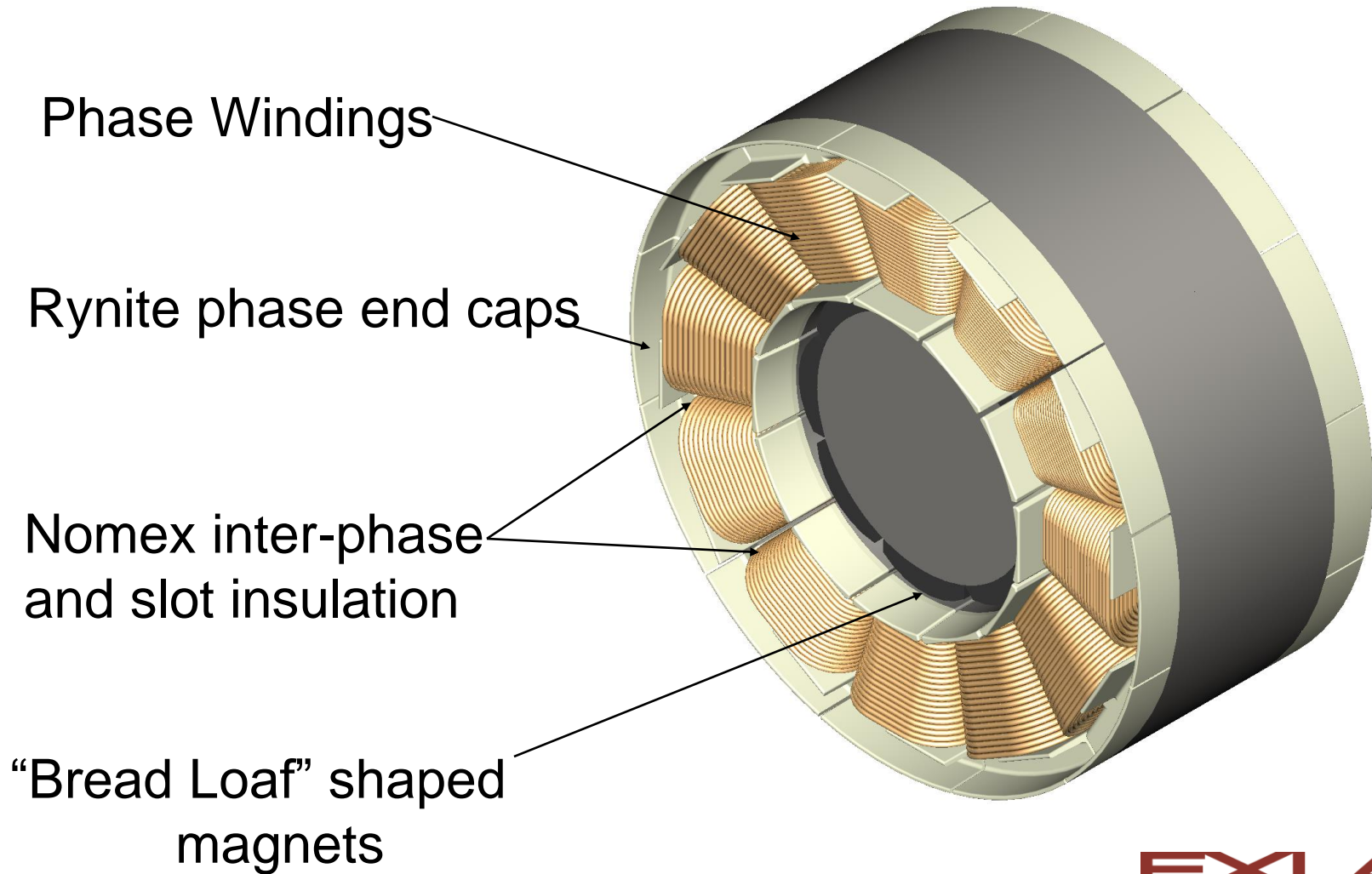


T-LAM Armature and Stator

- Minimized end-turns
- Inter-phase insulation
- High slot fill
- Class 180(H), 460 volt insulation system in all UL recognized motors (115 Volt and above)



T-LAM Armature and Stator



UL Recognition

Insulation System

- Class 180(H), 460 Volt Insulation System
- UL Recognized H-1340 system from Loctite
- Exlar UL File number: E225465
- Applies to all T-LAM products designed to Operate on drives 115 VAC and above (up to 460 VAC)



UL & CSA Recognized

- UL & CSA certification in progress for all four T-LAM product lines: GSX, SR, SLM & SLG
- UL 1004; CSA C22.2 No. 100-95 certifications
- Exlar UL File: E225288
- Consistent with Exlar's goal to accommodate OEM customers - broad UL/CSA recognition sought
- All standard, and many special/custom actuator and motor configurations per catalog model masks will be covered

