

110mm | 30:1

GenesisTM Reflex



Injection Molded CF Peek

110mm | 30:1
Reflex™ Torque Amplifier
Pre-Release Design

The Genesis REFLEX™ Torque Amplifier reference design is a revolutionary gear technology that provides the torque of a conventional metal gearbox, has no backlash, and is injection molded out of engineered plastic.

This incredibly unique gearing solution delivers a powerful, lightweight, backdrivable and cost-effective solution, enabling affordable robotic systems for the industrial, collaborative and consumer markets.

The distinctive central output eliminates scissor points, facilitating human-like arm motion. This enhances safety and enables robots to be much lighter and more efficient in their movement.

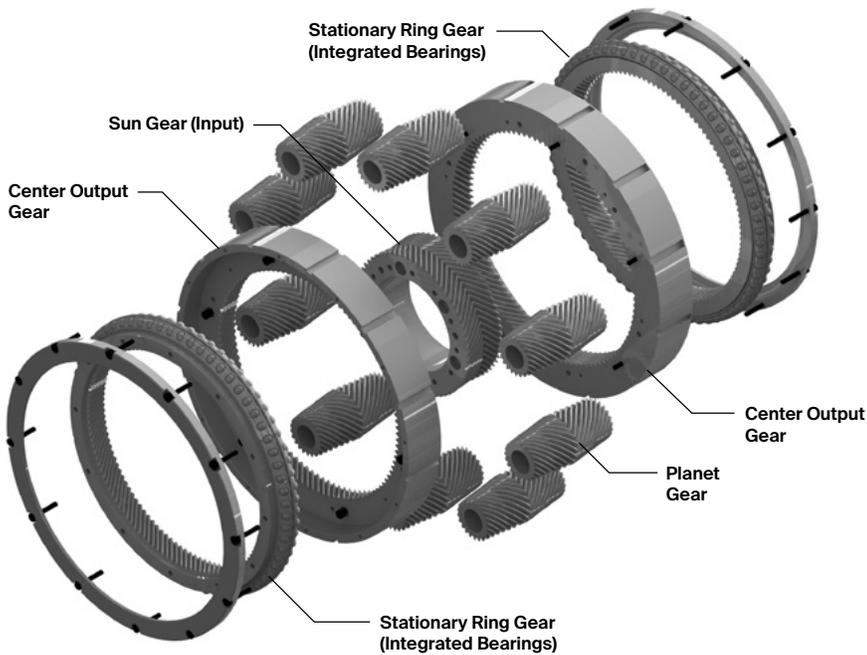
The REFLEX™ Torque Amplifier. A cost-effective, high-performing, injection-moldable gearing solution, unlocking tomorrow's robotics market.



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The key to the REFLEX™ Torque Amplifier design is how it symmetrically transfers force from a pair of stationary ring gears on each end, to a central output ring gear. The symmetric construction eliminates torsional deflection of the planet gears as well as the need for a planet carrier and corresponding planet gear bearings.

By eliminating the carrier, the planet gears can be hollow, reducing the weight and introducing a slight compressibility in the radial direction. The combination of tapered gear teeth and preloaded gears eliminates all backlash. Expansion due to heat is compensated for by the slight flexing of the planets in the radial direction, allowing them to operate smoothly.

The REFLEX™ Torque Amplifier has, on average, 4 times the number of teeth engaged compared to a conventional gearbox. This allows it to achieve higher rated torque to weight than a conventional gearbox made from steel.

Size ⁽¹⁾	Units	Value
Outer Diameter	mm	110
Inner Diameter	mm	31
Width	mm	42
Weight	kg	0.4
Reflected Inertia ⁽¹⁾	$\times 10^{-4}$ kg·m ²	0.3
Gear Ratio	–	30:1

Simulated Performance ⁽²⁾	Units	Value
Peak Torque	N·m	65
Rated Torque	N·m	50
Rated Output Speed	Rpm	100

Configurations

Size	Scalable Diameter And Length
Gear Ratio	4:1 To 200:1
Material	30% CF Peek
Lubrication	Multi-Lubricant Compatible

The Genesis Reflex™ Torque Amplifier is injection molded out of engineered plastic and has the torque of a conventional metal gearbox, making it a lightweight and cost-effective solution.

(1) Inertial load measured at gear UNIT input

(2) Simulated performance is based on:

- > S-N data extrapolated from 30% CF PEEK at 100 RPM output
- > Steady state operating temperature of 80°C