

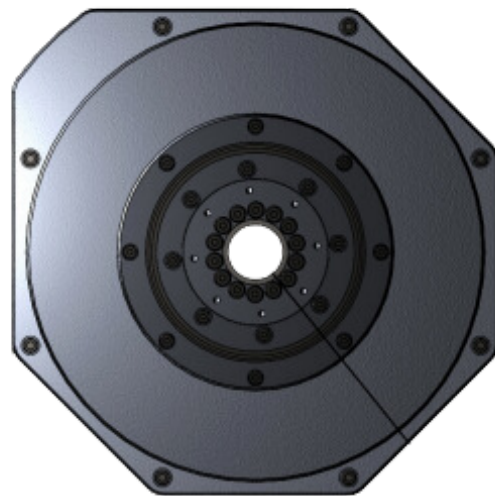
**ecm****PCB  
STATOR  
TECH**

## CASE STUDY

# ECM integrates PCB Stator Technology into Robotic Joint Actuator applications

## Overview

ECM recently integrated its printed circuit board (PCB) stator technology into remarkably small, powerful, integrated actuator packages for robotic applications. Most notably, ECM partnered with a large, multinational, high-tech precision gearing company, whose products are widely used in industrial robots, semiconductor manufacturing equipment, medical equipment, and aerospace programs to prototype one of our most impressive robotic joint actuator designs.



## Benefits

ECM can integrate seamlessly into a range of robotic applications to provide compact, efficient, torque-dense solutions. Our flexible form factor and the ability to produce our motor as a thin ring allows for compact integration with a variety of torque multipliers (strain wave, planetary gear, etc.). Leveraging ECM's technology creates motors with high power density and minimal axial length, which allows for compact, lightweight robotic designs that were previously not possible. Increased motor efficiency improves battery life for mobile applications and reduces energy costs for stationary ones. Additionally, the ease of hollow shaft designs adds to the technology's flexibility.



## Results

ECM provided an elegant solution without disruption or alteration of existing form factors. ECM's design allowed for compact integration with harmonic drive torque multipliers without compromising the design advantage of a hollow shaft. Our robotic joint actuator was more efficient at half the weight and half the axial length of a commercially available competitors' integration.

**"ECM's technology simplifies the geometry of the rotor and stator, reducing the number of parts within a fully integrated actuator gear drive platform for a wide range of robotic automation applications."**

Chris Fielding  
ECM, Vice President of Applications

Integrated Actuator & Drive	Currently Available	ECM
Actuator/Drive Type	Hollow Shaft	Hollow Shaft
Strain Wave Gear Size	17	17
Reduction Ratio	100:1	100:1
Motor	Brushless Servo: 200\100VAC, DC24V	PCB Stator: 200\100VAC, 12-72V DC
Continuous Torque (Nm)	24	24
Max Torque (Nm)	57	57
Max Speed	4,800	4,800
<b>Axial Length</b>	<b>78</b>	<b>39.9</b>
OD Size	128	13.4
Bore Sizes	18	18
Max Radial Load (kN)	2.9	5.1
Max Axial Load (kN)	9.8	16.3
Moment Load (Nm)	188	205
<b>Mass (KG)</b>	<b>2.5</b>	<b>1.25</b>

## Next Steps

ECM is in the process of expanding PrintStator and PCB Stator Technology into a variety of robotic applications including medical, manufacturing and automation. Form factor flexibility, increased efficiency, and weight reduction are a few of the many benefits when a motor solution is built with an ECM PCB stator, making the technology applicable for almost any application. To discuss the benefits of ECM's PCB stator technology within your product line, please email us at [info@pcbstator.com](mailto:info@pcbstator.com) or visit [pcbstator.com/design-your-own](http://pcbstator.com/design-your-own) to learn more about our 5-step integration process.

