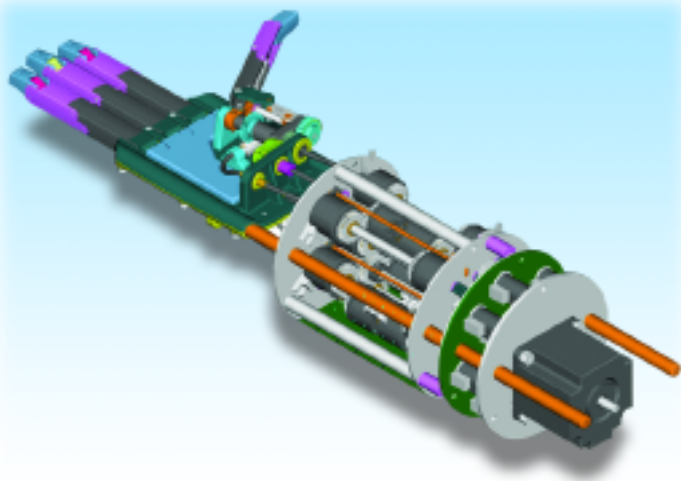


APPLICATION STORY

THE ART OF LIFE IS TO SHOW YOUR HAND – The SingletonHand™



The SingletonHand™ uses 18 clutches per assembly



The SingletonHand™

A good hand is a great thing. A strong hand is even better. Inventor Lawrence J. Singleton, Jr. knew that if he was going to make a difference in designing a new articulated robotic hand, his would have to be stronger and lighter than what is currently available in the industry today.

This unique application uses 18 Ogura MIC-2.5NE micro clutches per hand . . . the highest torque, smallest size clutches available today.

Sure there are robotic hands, but few are easy to operate, lightweight, strong and cost effective. Even the Space Shuttle has an articulated robotic hand at the end of its long satellite launching arm. But that hand cost \$30,000,000! His idea was to produce a robotic hand that matched the size of an adult hand (with similar strength and weight) and still be affordable. Fine motor control capabilities mimic precise human hand and finger movements.

Other robotic hands typically use

small electric motors to articulate each joint. This means that 9 joints (2 for each of the hands 3 fingers plus 3 for the thumb) would require 9 motors sized to fit inside the hand. These smaller motors have less torque and together are quite heavy. His unique idea was to use one large higher torque stepper motor, then couple Ogura's high torque, electro magnetic micro clutches to each of the fingers joints. In this way, he could send the large motor's full "strength" or torque to each of the finger's miniature ball screws. By reversing the ball screw's direction of rotation, you allow the joint to open and close. This design allows a solid grip without slippage.

HOW IT WORKS

When finger movement is needed, the stepper motor is turned on, rotating the central shaft. This central shaft is surrounded by 9 parallel shafts, each with an integral "planet type" geared Ogura micro clutch assembly. These 9 shafts are coupled

to thin flexible shafts, which are connected to each joint's small ball screw nut assembly. By electrically engaging specific clutches (thereby turning the output flex shaft and ball screw clockwise or counterclockwise), the fingers will open or close.

This unique application uses 18 Ogura MIC-2.5NE micro clutches per hand. These are some of the highest torque, smallest size clutches available today. In addition, Ogura's high volume production gives him a very cost effective solution. The MIC series has super fast response times (5 ms typical) due to the permanent magnet return mechanism. Make the Ogura MIC the right choice for this unique application.



The MIC 2.5 NE series clutch

Mr. Singleton is currently in pilot production of this device and has received solid recognition in the industry for his unique approach. Ogura is very happy to be lending a hand with this unique business.

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www.singletonhand.com