

## OGURA IMPROVES AIRCRAFT PARTS PRODUCTIVITY

Kiryu, Japan

Ogura manufactures a number of components for use in jet commuter aircraft. For 2006 a number of production changes are taking place which will allow Ogura to maintain the high quality expected in aircraft components, but at the same time reducing manufacturing cost.



Typical Commuter Jet

The main product provided by Ogura for this industry is the jet engine starter clutch. Since this device contains both a gear driven outer housing and interlocking angled teeth, machining is both critical and time consuming. The old manufacturing process involved one machining center performing two functions. To reduce overall production time Ogura invested in two new machining centers which can perform functions faster. These new centers will significantly reduce component manufacturing time by approximately 43%.

A new machining center was also purchased to cut the valve body for the hydraulic bypass valve used in the landing gear actuators. The previous machining on valve bodies involved initial machining on a lathe then transferring over to a separate milling machine then to another lathe for the final operation. A new multi-function machine was purchased and now all three operations are combined into one in one location.



Set up of a new machining center

The transmission gear drive for the jets is made out of a magnesium composite material which requires sensitive machining. By changing the way the original profile was cut on the housing spline, machining time for this piece has been reduced, providing an additional cost savings.



Hydraulic landing gear actuator

Previously the bodies of the hydraulic landing gear actuators (there are actually three used per plane) were sent outside of Ogura for painting. This has been changed to an in-house procedure and although there is not a significant cost savings there is a significant savings in delivery time and an improvement in the quality of the painting.



Starter clutch input



Starter clutch output



Transmission Housing

## NEW SALES REPRESENTATIVE PROFILE



Vin Nolan, Fire Chief Brighton Volunteer Fire Department

### Vin Nolan Sales Representative

**H**ello, I am Vin Nolan, and I am the most recent addition to the Keller Industrial Products sales force, covering the Rochester, NY and Corning, NY areas.

I graduated from Rensselaer Polytechnic Institute in 1997 with a Bachelor's Degree in Electrical Engineering, and began my career in industrial automation as a field service engineer for an international web-handling firm. I quickly became a project engineer for a second firm, where I was heavily involved in designing, programming, and delivering fully automated servo-controlled systems for seven years. Applications included: semiconductor transport, inspection, and perforating systems; Pactiv's "Slide-Right" zip-up plastic bags; car washing systems; Wonder Bread bag making machines; Kodak film inspection stations; and many others.

Never one to enjoy being at a desk all day creating drawings and programming drives, I knew a position with Keller would be a great move. I'm coming up to speed quickly on Ogura's products, and really enjoy the quantity and variety of applications and customers I'm in contact with regularly.

On a personal note, the majority of my free time is devoted to my suburb's volunteer fire department, which I've been involved with for 16 years. I was recently elected chief of the department, and oversee 120 firefighters and three stations. There are few things more rewarding than serving your neighbors in their times of need.

In my remaining free time, my wife of two years, Kim, and I enjoy numerous activities, including boating, cooking, skiing, home and garden improvements, and dining with friends. No kids yet, but our puppy, Jasper, a 6 lb. Maltese, is a handful.

Thank you, Ogura, for this opportunity. I'm proud to be part of the team!



Vin Nolan

## Thank You Plaque Received From Ohio State University

Somerset, NJ

**A** plaque acknowledging Ogura's contribution to the 2005 1/4 scale tractor design competition was given to Ogura Industrial Corporation. OIC contributed both product and clutch suggestions for the competition. Finished tractors were judged in 5 performance events measuring both strength and durability of the tractor design. The Ohio State University team received 1st place in 3 of the events and a 2nd place in a fourth event.



Ohio State Tractor Design Team Wins 3 Events

OIC believes that contributing to these types of competitions helps students learn through practical experience. Besides Ohio State, Ogura has contributed to many other student design competitions ranging from fighting robots to solar cars. The students of today will be the design engineers of tomorrow and OIC will continue to support these efforts.

## Ogura Receives Environmental Partner Award From Fuji, Xerox

Kiryu, Japan

**A**t the end of last year Fuji Xerox performed an environmental audit on Ogura's plant #3 in Kiryu, Japan. Plant #3 manufactures micro clutches for use in copy machines, printers and fax machines. The plant passed all aspects of the environmental audit and was awarded the certificate on December 1st. Certification is good through March 2007.

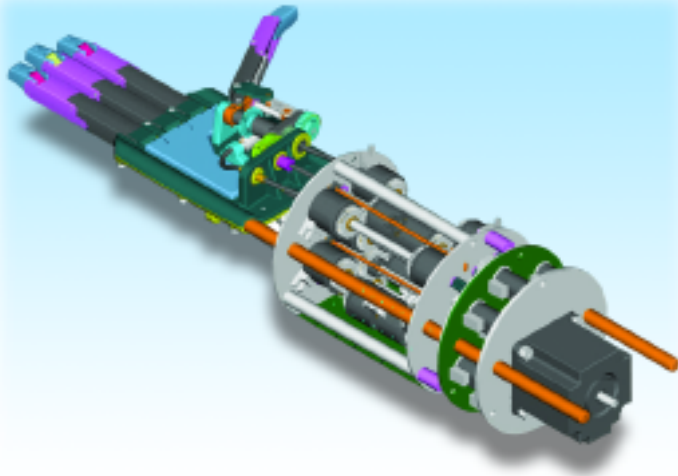


Environmental Certification Received from Fuji Xerox



## 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.

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.

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.

U.S. Patent Number 6,817,641  
[www.singletonhand.com](http://www.singletonhand.com)

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



The MIC 2.5 NE series clutch



**OGURA**  
INDUSTRIAL CORP.

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# Happy Spring

from the staff of

## Ogura Industrial



## OGURA IN THE NEWS

### Busy Winter for ORC Racing

At the end of 2005 the annual drift challenge was held in Okinawa, Japan. Ogura is a major sponsor to the drift car circuit throughout Asia (and now the US). Since this was more of a challenge than a race, it was a chance for the drivers to show off their skills in front of the crowd.

Also at the beginning of December the annual Nismo race at Fuji Speedway, located in the shadow of Mt. Fuji, was held. Over 20,000 spectators came to watch a variety of races. In the drift challenge race two of the cars and drivers that Ogura sponsored made it to the finals and finished 1st and 2nd.

In Mid December the annual Tokyo Auto Salon was held. Ogura had the new carbon clutch on display along with the new single plate clutch. The race car driver's round table discussion was sponsored by Ogura and once again had a good turn out. But the highlight of the show this year was Ogura's modified Nissan Z (The ORC Super Street). It received 1st place in the high performance tuning competition.



Nismo Race near Mt. Fuji



ORC driver in the lead



ORC SuperStreet Z took 1st place at the Tokyo Auto show

## NEW PRODUCT RELEASE

### Small PHT-D Hysteresis Brake

PHT series clutches from Ogura operate via permanent magnets and are designed to deliver constant torque regardless of slip speed. Since there is virtually no wear, these units are ideal for constant tension applications such as wire and film or for precise torque setting applications such as bottle capping and fastener tightening.

The PHTS was redesigned and now functions like the PHT-D. All rotating parts are enclosed within the housing. The overall diameter of the brakes has been reduced because double magnets are being used to cre-



New PHT-D

ate the same amount of flux versus the old single magnet design (each unit still has the flexibility of mechanically setting the magnet position to adjust the torque). The unit still comes with a built in output shaft but since the bearings are larger and spaced further apart than the old style PHTS, the bearing side load capability has been increased. Max operational speed for all three of the models has also been standardized at a maximum of 3600 rpm. For any additional information regarding the new series, please contact your local sales representative or refer to the Ogura website.