

Linear Stage

POSITIONS IN NANOMETER FIELD

The ANT130-L series stages from Aerotech are designed for high performance in speed, accuracy, resolution, repeatability, reliability and travel range. Aerotech offers the stages in two accuracy grades.

A center-driven, non-cogging, non-contact linear motor and encoder drive the stages. The direct drive linear motor performs without backlash or windup that other lead or ball screw drives exhibit. The motor also allows for higher speeds and accelerations; peak unloaded acceleration hits 1 g and maximum velocity is 350 mm/s. The product's design was specifically targeted towards high-performance nanometer applications.

"While other Aerotech linear stages employ some of the same features such as the cross-roller bearings and/or linear motor, everything about the ANT130-L was designed for ultra-high performance positioning in the nanometer realm, including the use of linear amplifiers with the product," says Robert Novotnak, group vice president at Aerotech. "The ANT130-L was designed not just as a component, but as part of a complete system using mechatronic design principles. That is, this level of nanometer performance is achieved through an optimum combination of mechanics, electronics, and software."

The ANT130-L meets the demands of step-to-step resolution necessary for alignment applications with an incremental step size of 1 nm. The stage's linear motor is responsible for making precise, small resolution steps that are critical in alignment applications that require the highest level of step accuracy.

"This level of performance was previously limited to piezo stages that had very limited travel—tens or



hundreds of microns," Novotnak says. "This often required a macro stage to perform load and/or unload operations or other movements that required long travel—tens of hundreds of millimeters—while the piezo stage was used for nanometer-level moves. The ANT130-L performs in both realms, with travels from 35 to 160 mm and fine positioning accuracy measured in nanometers. This saves time, expense and the additional complexity required for a multi-stage coordinated motion solution."

Part of the ANT130-L product design was driven by industry trends reflected by customer use of Aerotech products. "We've found that many high-accuracy alignment, inspection, positioning and measurement stations now require accuracy, repeatability, resolution and in-position stability in the nanometer realm," Novotnak says. "In particular, we've found quite a bit of interest in the ANT130-L and its sister products, ANT95-L and ATN95-XY,

in laboratory research and development products."

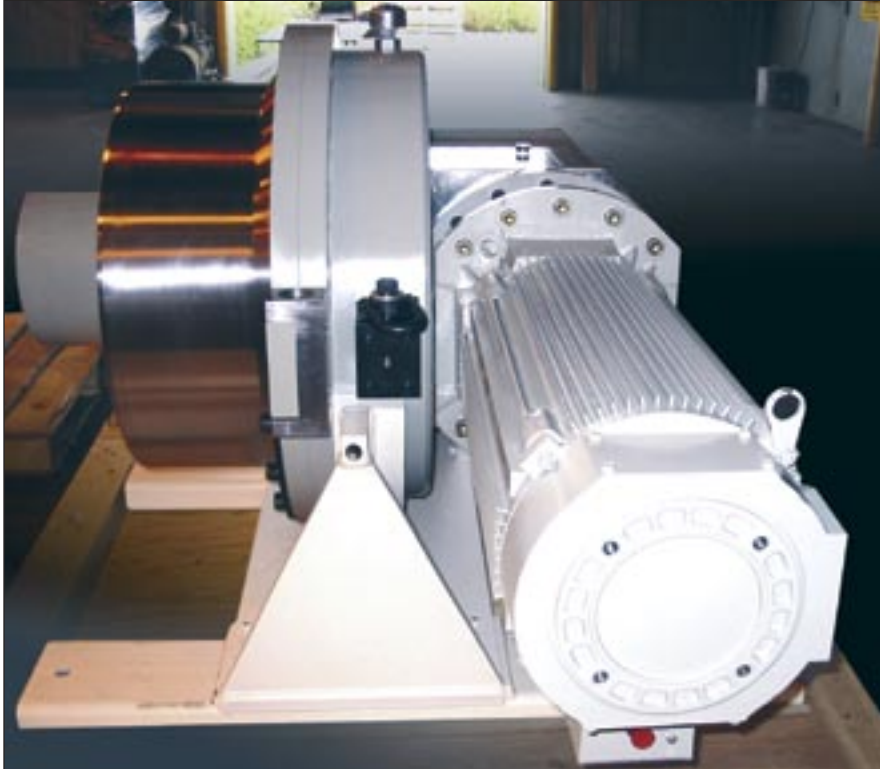
The ANT130-L series stages can be configured as XY assemblies. Optional features include orthogonality alignment to 5 arc seconds and vertical axis solutions.

For more information:

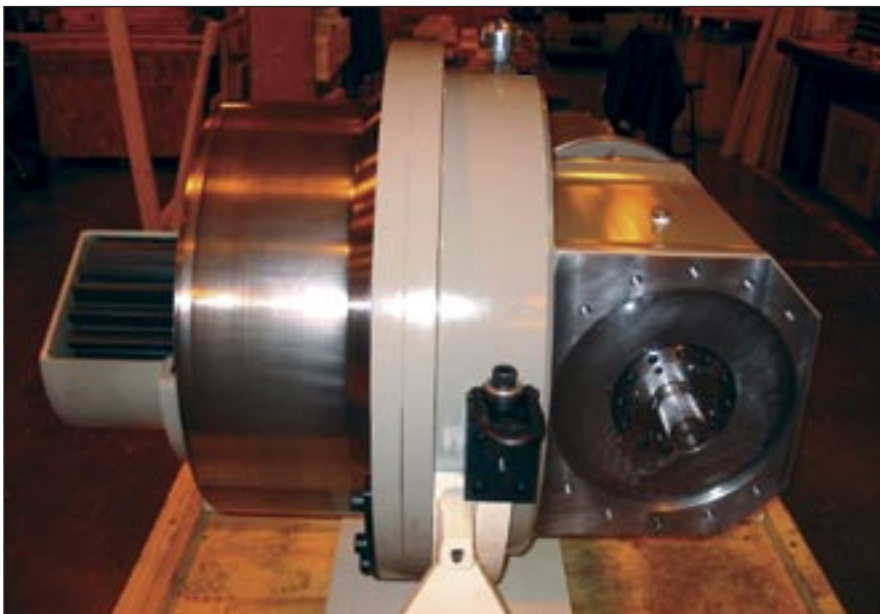
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Excel Gear

DESIGNS, PROTOTYPES
NAVY GUN SYSTEM GEARBOXES



The Excel Gear 38:1 gear ratio gearbox used on the Advanced Gun System (AGS) built by BAE Systems.



An internal view of the gearbox that helps move the 78-ton AGS gun mounts.

Excel Gear has transitioned from prototype to production of 38:1 ratio gearboxes designed for positioning the gun mount in the Advanced Gun System (AGS) used by the U.S. Navy and Marine Corps.

The AGS is used in the DDG 1000 destroyers that support Navy and Marine Corps expeditionary and joint operations in the littorals and deep inland. BAE Systems of Minneapolis develops the AGS as a complete weapons delivery system that uses rapid and virtual prototyping for the gun, magazine, ammunitions and support subsystems. The system produces gunfire for guided and unguided projectiles at targets over 70 nautical miles.

Excel Gear designed and prototyped the gearbox used in the positioning execution of movements on the gun mount. The main gear diameter in the unit measures 17", and overall the gearbox is 46" long with 36" in diameter and weighing 3,740 lbs.

A successful pair of prototypes was produced for evaluation and performance testing prior to the production order.

"This achievement marks a very important milestone in the history of our company, and we all worked very diligently as a team to attain this business and see its successful execution," says N.K. Chinnusamy, president of Excel Gear.

Excel's gearboxes help the rotary and vertical positioning of the gun mount. Testing was performed at the Excel and BAE Systems' facilities. One challenge for Excel in this project was limiting backlash, as Chinnusamy explains. "Backlash in this case is controlled by precision grinding gears to close tolerance and also grinding splines to fit master gages. The gearbox had to meet very precise backlash, lost motion and stiffness criteria. Our two prototype gearboxes met all the criteria without any exceptions."

For more information:

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User-Friendly Non-Contact Torque Sensor

MOUNTS IN MOMENTS

Sensor Technology Inc.'s RWT 350/360 TorqSense is a non-contact digital torque measuring system that features an integral sprocket or pulley to eliminate the engineering required to

mount previous models, which featured an in-line shaft for connecting to equipment. The product is appropriate for any equipment driven by a belt or chain drive, including where space limits or restricted access are a factor.

"Belt and chain drives naturally have a high radial load, which has to be accounted for when mounting a standard TorqSense," says Tony Ingham of Sensor Technology. "It's not rocket science, but it can be fiddly, especially if access is physically difficult or time is limited.

"The new RWT350/360 simply replaces an existing pulley/sprocket, can be fitted in minutes and automatically compensates for the radial load. It's little more than tighten up a few Allen screws and checking alignment."

The control electronics are separate from the sensing head, so the head can be placed in a tight space while the electronics are mounted an appropriate



distance connected by a cable.

TorqSense features piezo-ceramic combs—surface acoustic wave (SAW) devices—that are fixed to a flange. The SAW devices distort proportionally to the instantaneous torque level. This distortion produces RF data signals that transmit to a non-contact radio frequency coupling instead of by clip

continued

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rings or high inertial rotary transformers, which tend to be clumsy. The data signal transmits to a control unit for reading on an alpha-numeric display or moving to a PC for storing and review.

The RWT350/360 is appropriate for use with a range of sensing applications "Our larger sensors are used in many applications at the heavy duty

end of industry, whereas our smaller ones are found in applications such as fine chemical dosing and lab-based research," Ingham says. "Right through this spectrum are applications where mounting is associated with a belt or chain drive. And the new RWT350/360 makes this a simple plug-and-play operation."

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Step Motor Driver

REDUCES DESIGN TIME

The R525 microstepping step motor driver from Lin Engineering helps reduce overall design time and system cost in a range of step motor applications that require high torque, power and smooth motion. Measuring just over 3.3 inches long and 1.3 inches high, the R525 is suitable for most systems.

The R525 outputs up to 5 amps peak current and handles up to 75 volts DC. It is compatible with all NEMA 8, 11 and 17 motors, most NEMA 23 motors and some NEMA 34 motors.

The unit has built-in RS485 communication for connecting to a computer easily, and it is configured using Lin Engineering's graphical user



interface, LinDriver. Configurable settings include step resolution, run current, hold current, damping modes for smoother motion and choice of sensing step pulses on the rising or falling edge.

For more information:

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Gearless Optical Encoders

INSENSITIVE TO MAGNETIC FIELDS

Turck USA's Kubler F36 series absolute optical encoders feature a gearless design and eliminate wear and sensitivity to magnetic fields. With a compact size of 36 mm and a hollow shaft diameter up to 10 mm, the F36 encoders are appropriate for drive and

medical applications.

There are two versions available. The F36 single-turn encoders feature resolution up to 17 bits, and the multi-turn encoders have resolution up to 41 bits with over 16 million revolutions. They handle harsh environmental conditions with an IP 67 protection rating and a temperature range of -40 to 90 degrees Celsius.

The Kubler by Ruck encoders use an OptoASIC technology with high integration density, so there are fewer components and connection points

to increase operational reliability. A patented bearing structure increases the encoders' ability to withstand vibration and does away with installation mistakes.

For more information:

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Machinable Nylon Grade

BROADENS SIZE RANGE



Nylatron NSM, a wear-resistant machinable nylon grade, is available in a wider range of tubular shapes for machining larger bearings, bushings and wear parts. Nylatron manufacturer Quadrant introduced the new sizes in response to engineers and designers looking to reduce material costs and fabrication time in larger bearing applications.

Tubular Nylatron shapes are normally produced with diameters up to 34 inches, but larger diameters are possible as well. Wall cross section is as thin as 1 inch, and the tubes come up 39 inches long. Nylatron NSM has a wear life five times more than other cast nylon materials, and it allows for higher loads and speeds based on an LPV of 15,000.

For more information:

Quadrant Engineering Plastic Products
2120 Fairmont Avenue
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Self-Opening Clamp

SOLVES SHAFT REMOVAL PROBLEM



The R+W Self Opening Clamp feature is a simple solution to a common issue associated with frictional clamping. The Self Opening Clamp uses a pin mounted directly adjacent to the head of the clamping screw, so when the screw is loosened, the screw head is blocked by the pin, which transfers the force back on to the other side of the clamp, forcing the clamp open.

The issue the Self Opening Clamp feature solves involves removing a motor in which the clamping collar bonds to the steel shaft from fretting corrosion. This R+W feature temporarily increases the inside diameter of the clamp, so installation is smoother. It also helps break the bond between the hub and shaft that occurs after extended use, so removing the shaft is easier. The Self Opening Clamp is available for all R+W couplings with clamping collar, and it is standard on larger couplings.

For more information:

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Micromanipulator

FEATURES COMPACT DESIGN,
TWO-AXIS STAGE POSITIONS
PRECISELY



The MP63 three-axis micro manipulator module from Steinmeyer, Inc. is a fully enclosed, three-axis positioner with 25 mm stroke in each direction. All components of the assembly are internal, and they include DC gear motors, rotary encoders, lead screws and non-contact limit switches.

Each direction has accuracy of 5 microns with ± 1 micron repeatability. Standard straightness and flatness is ± 3 microns, with 1 micron as an available option. The assembly weighs approximately 2 kg. Cable connectors are on one end, and the assembly can be manufactured clean-room compatible as an optional feature.

Steinmeyer also released a two-axis system for laser machining and other extended travel applications that require precision positioning. The LT490-450-EDLM is a fully enclosed two-axis stage with 450 mm stroke. Each assembly includes iron-core linear motors, linear



guideways, linear measuring system and E chain cable carriers. Maximum speed capability is 500 mm/s with acceleration of 5 m/s². Accuracy in each direction is 1 micron with ± 0.5 micron repeatability.

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www.steinmeyer.com

Misumi

EXPANDS
SINGLE AXIS ACTUATOR LINE



The Single Axis Robot RS Series Actuators join the Single Axis Actuator line from Misumi USA. They are used in a range of automated machine applications that rely on precise motion control, including part assembly, pick-and-place, stacking, inserting, inspection, alignment and testing.

The Single Axis RS Series Actuators are CE compliant and come in six small sizes and six large sizes, in addition to Clean Room Class 10 versions, which feature a sealed design and high durability stainless steel cover. The smaller RS types are driven by stepper motors while the large types, known as RSH, are driven by AC servo motors. The product line features a rated life span of 10,000 km and higher and a 50

to 1,050 mm configurable stroke with constant load capacity unaffected by speed.

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www.misumiusa.com

Gantry Machine

PROVIDES COMPLETE
AUTOMATION PLATFORM



Techno, Inc. Linear Motion Systems introduces the TechnoMod gantry machine, a multi-axis motion platform complete with controls, cabling, software and enclosure, all fully assembled. The TechnoMod is available in three different sizes and can be used for pick and place, dispensing, assembly, testing, drilling, routing, welding and general automation applications.

Joe Griffin, Techno Linear Motion sales manager says, "The new TechnoMod machine is completely assembled when it arrives. All electronics are wired and software installed, allowing customers the ease of running the machine in any work cell shortly. The only setup customers may

have to perform is the mounting of drill, dispenser, laser or automation tooling required for their application, and in many cases Techno can do this for the customer prior to shipping."

Travel ranges are 650 x 300 x 275 mm for the Model 30, 650 x 450 x 275

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mm for the Model 45 and 650 x 650 x 275 mm for the Model 65. Additionally, a fourth or fifth rotary axis can be added to the machine for more complex operations, while all drive motors are DC brushless servos providing high torque and precision. The TechnoMod can be delivered with or without electronics as well as a sliding front door with safety interlock. It has a built-in industrial computer and rugged swing arm console, which includes a monitor and keyboard.

View CAD drawings, catalog specifications and more information on the TechnoMod gantry at www.techno-isel.com/tic/Catdas/TechnoModGantry.htm.

For more information:

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Fax: (516) 358-2576
www.techno-isel.com/tech_linearsystem.htm

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The series FMAC ECO and FMBC ECO three-phase line filters from

Schurter are less expensive and lighter weight than conventional filters because they are manufactured without potting compounds.

The ECO series filters are designed for use with 480 VAC installations, and they're offered in single- or two-stage versions. The FMAC ECO single-stage filter is offered in 16-150 A versions. The FMBC ECO two-stage filter type demonstrates a broader attenuation band with a leakage current of just 5 mA, so it is appropriate for installations with residual current circuit breakers. They can mount either lengthwise or upright.

The FMAC and FMBC ECO are for drive systems in applications such as material handling and conveyors, medical equipment, electrical or renewable energy equipment installations, uninterruptible power systems for telecommunication and computer and data center systems.

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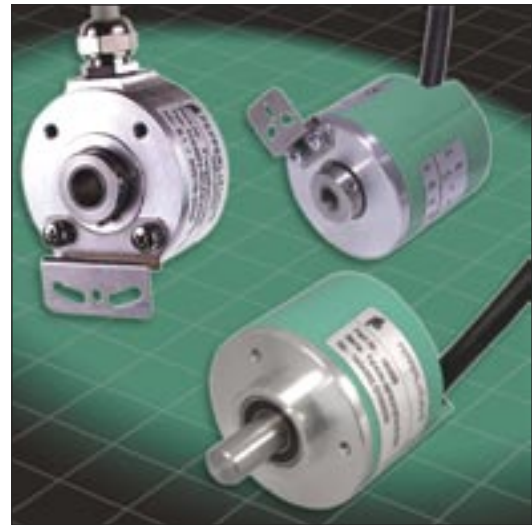
The T-Line 40 mm series incremental rotary encoders from Pepperl+Fuchs is now offered in standard inch shaft and coupling sizes. The 400 mm diameter (1.57 inch) encoders are compact and come standard with an integral 2 meter cable. They provide output resolution up to 1,024 ppr in an IP54-rated housing. They run on a 4.75-30VDC supply voltage, making them suitable as a feedback solution for most light- to medium-duty applications in material

handling, packaging and printing industries.

The TVI40 solid shaft encoders come with 1/8 inch and 1/4 inch shaft sizes. TH140 hollow shaft encoders come with 3/16 inch, 1/4 inch and 5/16 inch shaft coupling sizes. TSI40 recessed hollow shaft encoders come with shaft bore sizes of 3/16 inch, 1/4 inch, 5/16 inch and 3/8 inch shaft couplings. T-Line 400 mm series rotary encoders accommodate 4, 6 or 8 mm shaft applications.

For more information:

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Linear Actuator Drive Mechanism

ELIMINATES OVER-DESIGN

The SCN5 series actuators from Dyadic Systems feature a linear actuator drive mechanism that optimizes the



screw and nut for high accuracy, long life and low cost while providing high speed and peak thrust. The product concept provides engineers with a wider range of options for eliminating over-design.

The SCN5 series actuators are compact, powerful integrated mechatronic cylinders that include a motor, encoder, drive and actuator in the package. They are available in stroke lengths to 300 mm and 100 N maximum thrust. They are made from an extruded aluminum body with 303 stainless for the shaft and rod tip. They operate via 24VDC signals from PLCs or relays, and they connect to networks of up to 16 axes.

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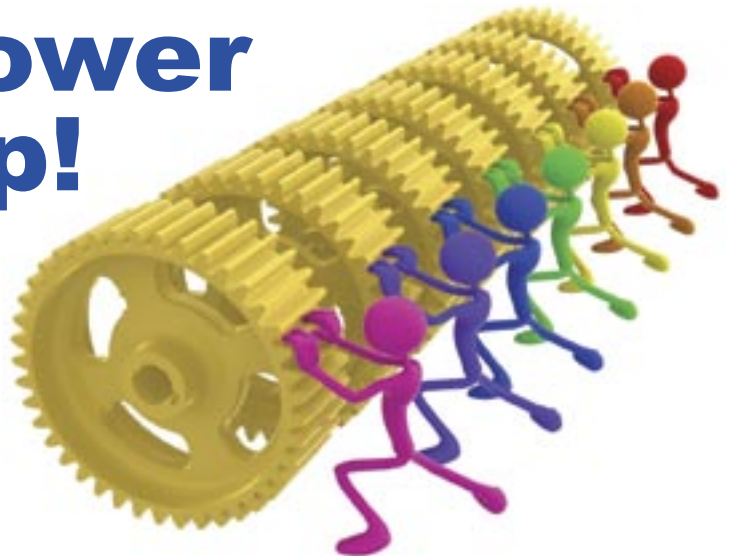


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Power Up!



If you have a background in gears, bearings, motors, belts, couplings, sensors or actuators, we'd like to talk to you. Power Play, the back page feature in *PTE*, is all about your industry. If you've got a funny anecdote, an interesting observation or perhaps a limerick on motion control, feel free to send it our way. This column is dedicated to the stories too radical to make the cut in industry or product news. We need story ideas, and we're confident you can provide them.

The rules are quite simple: submit a story idea about the power transmission industry, make it entertaining as well as informative, and become a *PTE* magazine editor-at-large today (salary not included). Submit your award-winning material to publisher@powertransmission.com.