

Frictionless, Magnetic Gears and Couplings

GAIN TRACTION

The Magnetic Gearing and Turbine Corp. (MGT), founded by Australian inventor Andrew French in 2000, manufactures injection molded gears and couplings based entirely on magnetic technology. The repulsive magnetic forces are used to transmit power without losing any energy, and drive shafts rotate completely independently of each other. The frictionless gearing and coupling systems operate with higher efficiency, much less maintenance and with little

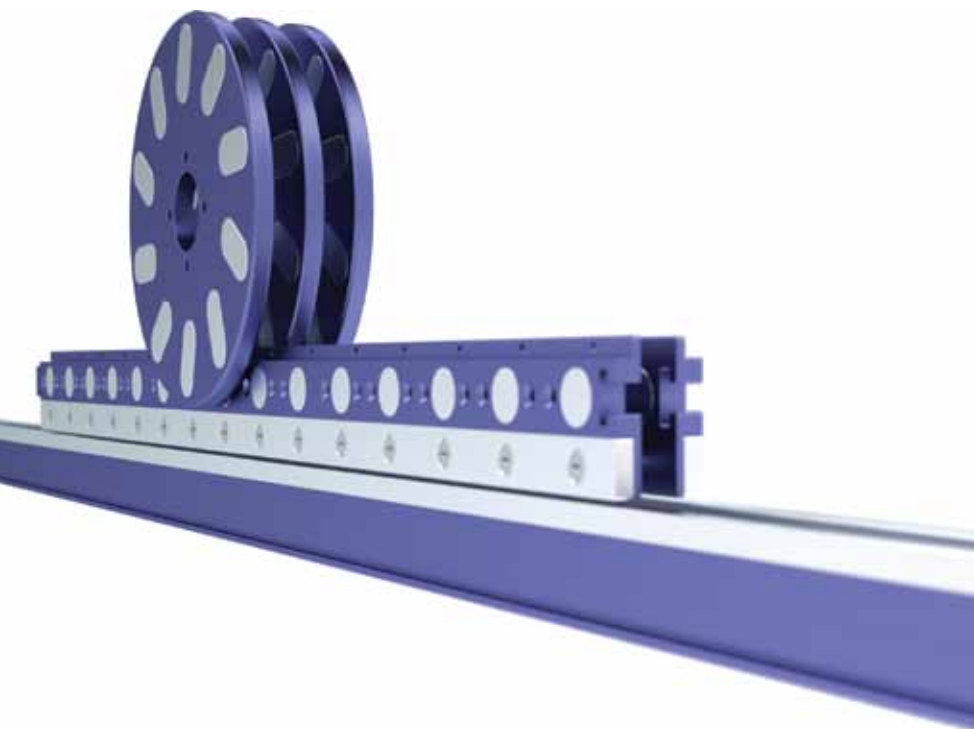
to no risk to the operator, French says.

Lining the circumference of each gear is a series of rare-earth, neodymium magnets, which are stronger than the standard equivalent and more heat-resistant. The gears can be stacked up to transmit large amounts of torque, like having three or four belts on one shaft. The MGT technology has made inroads in various industries including solar water pumps and agricultural machinery, but many other applications are possible.

The latest product from MGT is a DIY (do-it-yourself) range, which does not require installation by trained and authorized MGT agents and suppliers as the other industrial ranges do. This factor makes the DIY range significantly simpler than typical electromagnetic couplers. "They are only 10 mm thick, so they are not too dangerous for people to handle with no experience," French says. "They are the same gears we use on our solar pump range, and they can transmit up to 108 Nm with the 12 disks as a coupling. People can couple or use them as gearing around the farm or in the workshop. Also, a lot of OEMs can use them instead of belts or pulleys or as a coupling in the machines, vehicles, pumping systems, or anything they make."

The industrial range is 20 mm and more in thickness, so they can be dangerous if users don't know what they're handling. The only thing required to use the DIY range of gears and couplings is a basic mechanical understanding. "The DIY market is for farmers, workshops, one-off engineering jobs, water pumps, hydraulics, compressed air, robotics, small production lines and industrial applications; electric boats, electric cars and any other small applications," French says.

Five standard sizes are available, as are custom designs. The standard



magnetic wheels can be used either as gears or couplers. If the system is overloaded, it simply slips, avoiding potentially dangerous situations. Coupler faces don't touch, so no vibrations are transmitted.

The DIY range was tested to consume 22 percent less energy than a belt drive, as assessed by Sydney University and also in South Africa, by using the same MGT Solar Water Pump running with belts and pulleys against magnets. Other tests have been performed by Torque Test, in Holland, which could not define the difference between 99.9 percent and 100 percent efficiency. "This is unheard of, and most people would think it impossible," French says.

"It was believed that losses must occur, but no losses could be found."

The MGT technology has great potential for the mechanical power transmission industry and competition is steep. "We have covered and patented every possible magnetic drive, including linear drives, 90 degree bevel drives, transmitting power through walls, electro-magnetic drives and many more," French says. "We have five

different patents, our first two have been granted in the U.S. and other countries, and three are still pending. We know we have companies copying our technology at present, and we intend on taking action to stop them over the next 12 months as we release our products."

MGT is pursuing other uses of the technology aggressively. Sometime this year French anticipates releasing a magnetic, frictionless gearbox for the electric car industry. MGT is also involved in plans to build an International Solar Showcase in Koh Samui, Thailand, which will demonstrate the best solar technology. Developing future transportation systems are also on MGT's radar, such as small electric taxis, like those common in Bangkok. Planetary gear drives for wind turbines are another possible use for the industrial range, since gearbox reliability issues are so critical in the industry.

In discussing the limitless nature of applications possible with magnetic gear systems, French expresses great passion for his technology and its potential. "There is so much more for mankind to explore."

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Safety-Oriented Rotary Encoders

FEATURE SMALL FOOTPRINT

Heidenhain Corporation's 1000 Series rotary encoders offer IP 64 protection, absolute position-value formation and functional safety in a 35 mm diameter housing size. These encoders are designed for single-encoder measurement feedback systems in safety-oriented applications.

The 1000 Series encoders with functional safety produce two independently formed position values by means of a serial EnDat interface. They

meet EN ISO 13849, EN 61508 and EN 954-1 standards for performance level d, safety integrity level two and category three, respectively. The EnDat 2.2 version with serial data transfer provides a single-turn resolution of 23 bits and a multi-turn resolution of 12 bits. Supply voltage ranges from 3.6 to 14 volts. The 1000 Series is made up of eight rotary encoders.

For more information:

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Schaumburg, IL 60173
info@heidenhain.com
www.heidenhain.com



BLDC Motors

OPERATE SMOOTHLY
REGARDLESS OF
SPEED RANGE

Lin Engineering has improved its NEMA 17 brushless DC motors, the BL17 line. The motors are appropriate for applications that involve high speed and high dynamic torque. The BL17 line provides quiet, smooth operation regardless of speed range. Speeds of up to 4,000 rpm are possible.

The motors are available in four body lengths: 1.7, 2.4, 3.2 and 3.9 inches. They are capable of up to 106 ounce-inches of peak torque depending on stack size. The BL17 motors are useful where velocity control with an analog input is desired, no holding torque is necessary and where there are reliability issues with existing brush DC motors. They can be ordered with custom shaft and winding variations to meet exact speed/torque/voltage points.



For more information:

Lin Engineering
Phone: (408) 919-0200
sales@linengineering.com
www.linengineering.com

Yaw Position Transducers

ENGINEERED FOR
WIND APPLICATIONS



Micronor's MR200W series yaw position transducers monitor position, direction, speed and cable twist while providing feedback to the yaw directional motor drive and brake control system. The transducers were designed specifically for wind turbine applications.

The MR200W position transducer can be multifunctional and integrate any combination of geared limit switches, rotary encoders, resolvers or potentiometers. The unit can be supplied with an external anti-backlash

POM (polymer) pinion gear, which optimizes coupling to a turbine's large yaw bull gear for increased accuracy and repeatability.

Engineering evaluation units can be delivered within four to eight weeks and production units within four weeks thereafter.

For more information:

Micronor Inc.
750 Mitchell Road
Newbury Park, CA 91320
www.micronor.com

J.W. WINCO

OFFERS BALL TRANSFER UNITS



Industrial machine component supplier J.W. Winco Inc. released the series GN 509 steel and stainless steel ball transfer units. The metric sized components are for use on conveyor tracks to enable linear or rotary movement of heavy loads.

Three versions are available: Type SBL, with zinc-plated housing, blue passivated sheet steel and a plain finish steel ball; Type SNI, with zinc-plated housing, blue passivated sheet steel and a stainless steel ball; and Type NNI, with both a stainless steel housing and ball. All types are RoHS compliant. The transfer units have a load capacity of 500 to 2,000 N, depending on size and type.

For more information:

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sales@jwwinco.com
www.jwwinco.com

Electric Cylinders

PROVIDE ALTERNATIVE TO PNEUMATIC, HYDRAULIC SYSTEMS

Kollmorgen's EC1 electric cylinders are a cost-effective, high-performance

linear positioning alternative to pneumatic and hydraulic systems in applications that require continuous thrust of up to 150 pounds (660 N). They provide smooth, controllable speed, up to 0.325 m/s, accurate mid-stroke positioning and position holding without power (with brake option), in a

compact package.

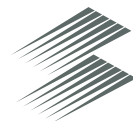
"EC1 electric cylinders fill the market need for a small-thrust electric linear positioner with a low enough price point to make it an attractive and beneficial alternative to pneumatic and hydraulic actuation," says Gene

continued



It's amazing how far you can go with the right travel gear.

You could travel the world and not find a gear manufacturer who combines a range of capabilities, quality and commitment to customer service the way Schafer Gear does. Schafer manufactures gears for many industrial applications including transportation and agricultural equipment. Our gear products range from spur and helical to bevel and worm. And every gear we make comes with one thing standard – prompt, courteous and exceptional service.



SCHAFER
GEAR WORKS, INC.

South Bend, IN/Rockford, IL

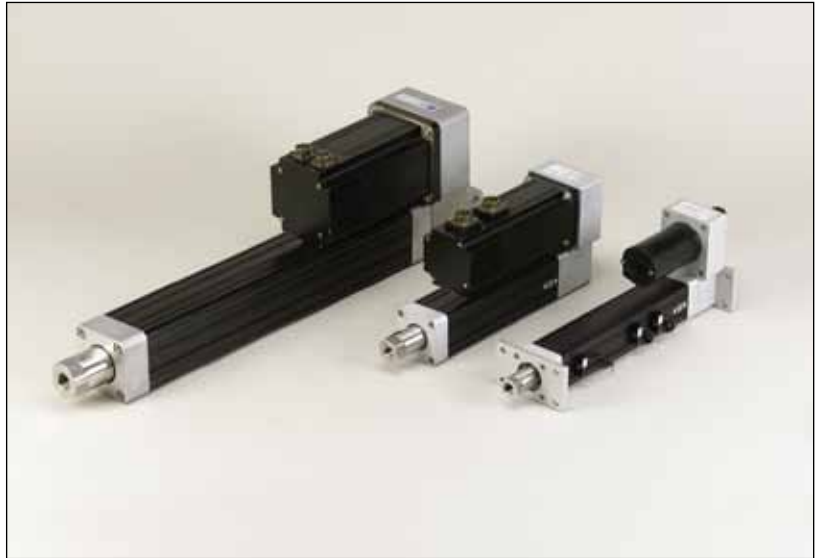
Find out more at schafergear.com
or call us at 574-234-4116.

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product news

Mathews, chief application engineer for Kollmorgen. "They are more accurate, use less energy and provide true controlled motion compared with the simple 'start/stop' limit switch motion of pneumatics. They also reduce parts count and maximize machine uptime by eliminating the valves, pipes and hoses required of pneumatic and hydraulic options."

The EC1 electric cylinders deliver standard stroke lengths from 50 mm up to 200 mm; they handle maximum payload weight of 150 pounds at 100 percent duty cycle. The cylinders deliver repeatability to ± 0.001 inches with lead accuracy to ± 0.004 inches per foot with backlash of 0.015 inches. Performance combined with a compact footprint make the EC1 suitable for use in space-restricted applications, including testing systems, test sample placement in medical applications and general factory automation machines that require precise, repeatable motion.



For more information:

Kollmorgen
203A West Rock Road
Radford, VA 24141
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contactus@kollmorgen.com
www.kollmorgen.com

Right Angle EG Planetary Gearheads

FEATURE LOW-COST SOLUTIONS



A series of right angle EG planetary gearheads from Sterling Instrument, an ISO 9001:2000+AS9100B registered manufacturer, features low cost and is offered in four standard NEMA sizes: 17, 23, 34 and 42. These gearheads, identified as the S91 SREG Series, feature the planetary system, high torsional stiffness, and case-hardened spiral bevel gears, and the units are sealed to extend service life. They offer both single- and double-stage design and include a precision-balanced, clamp-on pinion. Woodruff keys number 404 and motor mounting hardware kits are supplied.

Each of the four NEMA sizes is

offered in 13 gear ratios ranging from 3:1 to 100:1. Their maximum input speed is 5,000 rpm. Their radial and axial shaft loading is 400 pounds. Their single-stage and double-stage minimum efficiencies are 85 percent and 80 percent respectively. Operating temperatures range from -40 degrees Fahrenheit to $+225$ degrees Fahrenheit. The housings are made of gold zinc plated steel. The right-angle housing and mounting flanges are made of black anodized aluminum.

Detailed specifications are contained in Catalog D795, available free upon request from Sterling Instrument.

For more information:

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P.O. Box 5416
New Hyde Park, NY 11042-5416
Phone: (516) 328-3300
Fax: (516) 326-8827
www.sdp-si.com

Tensioner

COMES READY TO MOUNT



Misumi USA's Tensioner is a ready-to-mount mechanism that eliminates design and assembly time and labor for end users. The Tensioner, comes fully assembled, complete with slotted holes and adjustment screws for easy mounting, installation and tension control.

The attachment plates and tension block are constructed from 1018 carbon steel, tension pins are 1045 carbon steel, and the slide plates are 1045 precision cast carbon steel.

Fully assembled Tensioner units come in various sizes and configurations with selection based on application needs, including stroke, load and tension.

For more information:

Misumi USA, Inc.
Phone: (800) 681-7475
inquire@misumiusa.com
www.misumiusa.com



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Clifford-Jacobs custom high-strength forgings work everywhere and for some of the biggest names in mining, aerospace, and energy.

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Steinmeyer

INTRODUCES ULTRA NARROW LINEAR STAGE

The PA 30x40-SM01 precision linear stage from Steinmeyer, Inc. is a single axis system for applications that require extremely narrow positioning tables. Typical applications include miniature robotics, pick and place devices, specimen handling for life sciences and scientific applications where precision positioning is required within a very narrow footprint.

The compact, fully enclosed stage measures 30 mm wide and 40 mm high. Travel ranges between 25 mm and 150 mm. Positioning repeatability is 1 micron, maximum speed is 50 mm/s, and load capacity is 100 newton. Inside



the assembly is a precision preloaded 8 mm diameter Steinmeyer ball screw, miniature size 9 linear guideway, non-contact limit switches and a choice of either stepper motor or DC servo motor with encoder. A separate motion controller is an available option.

For more information:

Steinmeyer, Inc.
56 Middlesex Turnpike, Suite 200
Burlington, MA 01803
Phone: (781) 273-6220
Fax: (781) 273-6602
www.steinmeyer.com

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EMERSON
Industrial Automation

EMERSON. CONSIDER IT SOLVED.™

Automation Direct

OFFERS UNIVERSAL SIGNAL CONDITIONERS



Universal signal conditioners from Automation Direct convert, isolate and transmit scale signals from a range of process sensor and controller I/O. The DIN-rail mountable models (884114 and 84116) come in plastic slim-line housings. They support scalable input signals including mA, VDC, thermocouple with internal

cold junction compensation, two- to four-wire RTDs, linear resistance and potentiometer signals.

Both models feature mA and VDC outputs. The 84116 model adds two individually programmable relays for alarming and control functions. Isolated universal supply voltage input does away with the need for separate transformers or power supplies.

A menu-structured LCD programming/display module, which is sold separately, features automatic scrolling text identifying each menu item. The detachable module stores and transfers configuration parameters from one signal conditioner to another. This reduces setup time with multiple unit applications. The module supports seven programming languages and can be password protected. The display module can be used to show input signal values, engineering units, output signal and relay status when not in use for configuration.

For more information:

Automation Direct
3505 Hutchinson Road
Cummings, GA 30040
Phone: (800) 633-0405
www.automationdirect.com

PDP

REDUCES MESH BACKLASH

As the first range of Preloaded Double Pinion from Redex Andantex for high precision rack and pinion applications, the PDP is made of two ground WMH pinions connected through a patented preload system to reduce mesh backlash. The PDP is a competitive alternative to high performance ball screws.

The gear teeth mesh precisely

when the coupling is engaged. In many applications, it can eliminate the need for two coupled planetary reducers. The PDP is mounted at the output flange of Redex Andantex' SRP high-tech planetary gearhead, where it demonstrates repeatability of less than 0.1 mm, high torsional rigidity, high radial rigidity and tilting moment levels. The sub-assembly SRP-PDP is between 10 and 20 percent higher in rigidity than other units.

The PDP features a high input speed up to 1,200 rpm, maximum acceleration

continued

product news



torque and nominal torque from 1,000 to 2,840 Nm. When mounted on the SRP, other features include four different modules with straight or helical teeth, eight reduction ratios, angle drive version available in all sizes and full solutions with reducer, pinion and rack available in all sizes. The input interface is available throughout the range in an in-line flange version or with a 90 degree angle (associated with a high-quality angle drive).

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info@andantex.com

Linear Actuator

EXTENDS RELIABILITY

The Haydon Kerk Motion Solutions' G4 37000 series can-stack stepper motor linear actuator is a 36 mm version of the G4 line of products. Technical improvements made to this series include optimized stator tooth geometry, high energy neodymium magnets, an oversized output spline, custom engineered plastics and larger ball bearings for improved rotor support and high axial loading capabilities.

The new series provides a high linear force-to-size ratio. It is ideal for precise linear motion in a range of applications including medical equipment, bar code scanning devices, printing equipment, lab instrumentation and other mechanisms that require high force and durability from a small package.



For more information:

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www.haydonkerk.com

Latest Mechatronics Software Version

INSTALLS SIMPLER

ITI GmbH released the latest version of *SimulationX*, its software for physical modeling of mechatronics systems. Version 3.3 provides functional enhancements and will be available with on-demand software licensing for the first time. The palette of ready-to-use, real-time capable models and

physical components was expanded by ten percent. A highlight of the new release is the first independent *SimulationX Modelica* edition. The all-in-one installation package simplifies the installation process by installing all required program components via a single setup automatically according to

the user's particular needs and profile.

SimulationX 3.3 is easily adjusted to the different profiles of users and is now available in two editions, *SimulationX Professional* edition and *SimulationX Modelica* edition. With the *Modelica* edition, *Modelica* experts can now design and exchange individual models by using *Modelica* language inside *SimulationX*. Users benefit from the combination of user friendly simulation software with the flexibility and formalism of a true *Modelica* platform. Delivering this new edition quickly to the market, ITI has responded to the growing demand for an open standard for exchanging models. Manufacturers, OEMs and service providers can now design, exchange and re-use simulation models.

The program handling safeguards the overview of the complete model, even during later changes and enhancements. Thanks to manually editable connections between model components and highlights in colors for dynamic visualizations, the user can immediately detect changes in the model. Quality of models and reliability of modeling results are increased while time for validation is reduced as, for instance, deviations from admissible values are observable at a glance. Another enhancement in ergonomics is achieved by additional views. The structure view and 3-D model view are enhanced with additions of documentation and text view, enabling models to be changed and enhanced directly in the *Modelica* text format.

One of the highlights of the *SimulationX Modelica* edition is the advanced graphic editor that allows the user to set up demanding graphics in a convenient way. The improved model explorer of the *SimulationX StatechartDesigner* displays the different states as well as the transitions between them. This simplifies the navigation within complex state charts. The *SimulationX 3.3 Professional* edition broadens the modeling scope with more than 20 new model types in the power

transmission library, e.g. for combustion engines, clutches, transmission elements, cam disc mechanism and propellers. Other new functions and model types are also available in the libraries signal blocks, actuation, electronics and magnetic. New features in the 1-D Mechanics allows for all elastic elements such as springs and dampers to be switched to rigid. This allows the user to analyze the model's kinematic behavior in a more precise and effective way.

The use of *SimulationX* models in real-time platforms significantly expands the possibilities in design, prototyping and series launch of machines and plants. *SimulationX 3.3* contains interfaces to the NI real-time testing and simulation platforms LabVIEW and NI VeriStand as well as new solvers with constant step size. This facilitates the test and optimization of the model's real-time capabilities without biasing the model itself.

"We are proud to be able to offer our customers real functional innovation across all development areas. It's not in our development plan it's in our new release, and it's available now on schedule. Considering all enhancements connected with a 50 percent reduction in required results storage and increased solver speeds makes *SimulationX* an unbeatable modeling tool," says Thomas Neidhold, ITI manager software development. "*SimulationX 3.3* is a genuine *Modelica* platform. It represents real-time capability, total user friendliness and greatest flexibility."

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Maxon

RELEASES EXTREME HIGH DENSITY DRIVE



The RE 50 from Maxon motor features an ironless rotor, which results in detent-free running and minimized mass inertia. The drive combines a two-pole neodymium permanent magnet with Maxon's patented winding technology for high torque and acceleration.

The drive measures 50 mm diameter x 108 mm length and is available with four windings. It achieves a nominal torque of up to 0.38 Nm, a nominal speed of 2,800 to 5,700 rpm and efficiency of more than 90 percent. Low nominal voltage of 24.70 VDC and high power density make the RE 50 appropriate for use in battery-powered applications, including electric vehicles, transport and logistics equipment, mobile systems, robots, etc. Pre-loaded bearings contribute to low vibration, quieter running and an extended life span.

For more information:

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