

Napoleon Engineering

EXPANDS BEARING AND INSPECTION CAPABILITIES

Napoleon Engineering Services have announced the recent expansion of their bearing manufacturing capabilities to now include back-up bearings for use with active magnetic bearings (AMBs), where they serve as highly reliable secondary fail-safe systems.

AMBs are increasingly used within electrical power generation, petroleum refining, machine tools, and natural gas pipelines. Their design incorporates the use of electromagnets, which magnetically levitate rotating shafts or other moving parts. The lack of contact between the bearings and the loads they support removes the need for lubricating systems and increases the speed at which the moving

parts can operate. To ensure the success of AMB systems, a reliable backup or auxiliary bearing must be in place to enable controlled shutdown, in case of a power or control systems failure.

When using AMB to support a rotating shaft, any reduction or loss of power could cause the shaft to drop. With NES Bearings AMB back-up bearings in place, the shaft will drop 2 to 3 thousandths of an inch onto the back-up bearing system, allowing it to coast to a stop without damage to the shaft or surrounding machinery. The robust design of NES Bearings AMB back-up bearings incorporates specialty heat treatments, wear resistant material combinations, conventional or dry film lubricants and a variety of cage and internal design characteristics, all of which help to effectively manage the safe coast down of the rotating shaft.

Notes Chris Napoleon, NES Bearings president and chief engineer, "Understanding the magnitude and



distribution of radial and axial loads, rotational speeds and lubrication constraints allows us to determine whether a full ball complement or caged bearing design is warranted. In some cases, standard bearings can be highly modified to meet specific application needs, resulting in manufactured AMB back-up bearings with very short lead times."

For more information:

Napoleon Engineering
Phone: (877) 870-3200
sales@nesbearings.com
www.nesbearings.com



Voith Turbo

FLUID COUPLINGS PREVENT DOWNTIME

The Indonesian mining company Bukit Asam expands its operations at Tanjung Enim Coal Mine in Sumatra, Indonesia. For ten new belt conveyors at Tanjung Enim, Bukit Asam deploys 14 TVVS fluid couplings from 55–315 kW. In the past, the mine operator has always been pleased with the reliability of its already installed Voith fluid couplings. They ensure smooth start-ups day after day and a long service life for all components — especially the belts.

"We're all very impressed with the performance of the TVVS constant-fill fluid couplings. They're very easy to maintain — only oil changes are needed — and the reliability is just great," says Kris Tjahjaning Tyas, manager of maintenance planning at Bukit

Asam. The mine operates 24/7, and any equipment downtime means loss of production. In older sections of the mine they've been using TVVS on belt conveyors since 1997 — without any unplanned downtime. "Proven reliability is why we absolutely wanted to have Voith fluid couplings in the new conveyor drives as well," adds Tatra Muis, senior manager of maintenance at Bukit Asam.

The Voith fluid couplings are well suited for use in extreme environments and are completely insensitive to harsh conditions like dust, dirt and humidity. The fine coal dust in Tanjung Enim Coal Mine has no effect on performance. The couplings dampen torsional vibrations in the driveline and



protect it against overload, extending the lifetime of the entire system. Because torque is transmitted by a fluid, the power transmission of the fluid couplings is wear-free, reducing maintenance to a minimum. Bukit Asam's Muis and Tyas are happy with the many benefits that the fluid couplings provide. They also appreciate the useful advice and after-sales support from the local Voith team, along with unmatched know-how on the entire drive system.

The 13 existing belt conveyors in the Tanjung Enim Coal Mine still rely on TVVS fluid couplings (rated from 55 to 500kW) that were installed more than 17 years ago. The mine has two coal handling facilities, with the longest belt conveyor having a length of 4,284 meters and a capacity of 1,700 tons per hour. The drive of this conveyor is equipped with three 315kW motors and three fluid couplings, type 750 TVVS. In addition to the conveyor drives, the bucket wheel excavator drives in the Tanjung Enim Coal Mine are equipped with five 750kW fluid couplings, Type T, that dampen vibrations and protect the driveline from damage also in case of frequently occurring overload.

For more information:

Voith Turbo
Phone: +(49) 7951 32-429
www.voith.com

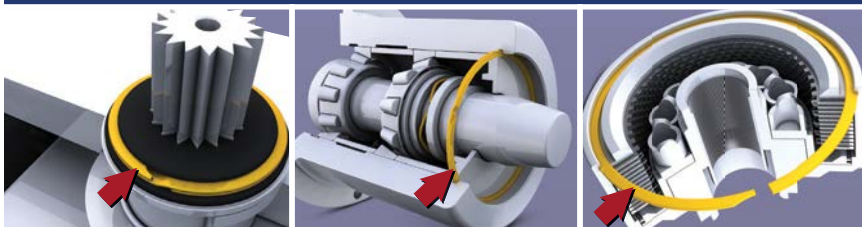


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JVL

MAC402 SERVOMOTOR MAXIMIZES PRODUCTION TIME

Designed for battery powered and low-voltage applications, the MAC402 is now available from JVL. The MAC402 is the VDC version of the popular MAC400 400 W integrated servomotor. The supply range for the MAC402 is from 12 VDC up to 48 VDC, and full power of 400 W (RMS) up to 1200 W (peak) can be reached with 24 to 48 VDC. This powerful, compact motor measures 191 mm (7.52 in.)×60 mm (2.36 in.)×114 mm (4.49 in.). Applications include remotely operated robots, robotic vehicles, portable equipment, tracking devices, antenna mounts and positioning devices.

JVL offers a 400 W continuous (1,200 W peak) integrated servomotor in the supply range of 24–48 VDC operating at 0 to 3,000 rpm. In many applications it is not necessary to choose a 750 W or larger motor as the 400 W (1,200 W peak) motor will be sufficient, thereby reducing cost and saving space. MAC402 options include brake, absolute multi-turn encoder, and planetary & cycloidal gearheads.

A wide selection of communication modules is available for MAC402 mo-

tors: basic modules for pulse-direction (or analog input) or fieldbus modules including Profibus, Devicenet and CANopen, or programmable modules with easy connections to local sensors make integration into new and existing applications easy. Moreover, a wide variety of industrial Ethernet options are available: EtherCAT, EtherNet/IP, Profinet, Powerlink, Modbus TCP and Sercos III. With the VDC supply option the advantages of the MAC400 VAC servos have been expanded to include applications for battery and low voltage operation, from 12 to 48 VDC. With wireless options like WLAN/Wifi, Zigbee or Bluetooth, the MAC402 MAC motor can run completely wireless.

A big advantage of using an integrated MAC motor is that there is no need for a separate servo driver/controller. The advantages are: Space savings in the control cabinet, eliminating expensive motor and encoder cables, RFI/EFI noise is minimized due to internal cabling, and connection errors



between driver and motor are eliminated. Additionally, service is much easier as the motor and controller are replaced as a single integrated unit minimizing downtime and maximizing production.

For more information:

JVL
Phone: +(45) 4582 4440
www.jvl.dk

Bodine

EXPANDS DC MOTORS WITH DYNAMIC BRAKING

Bodine Electric Company expanded its family of DC motor speed controls to include a new enclosed model with forward-brake-reverse switch and dynamic braking. The new control is suitable for use in bi-directional applications such as conveyors, packaging machines, screen-printing equipment, food processing applications, medical devices, lab instrumentation and labeling equipment.

Housed in a NEMA 1/IP-20 enclosure, the new model 0794 provides smooth speed control for PMDC gear motors and motors. Its pulse width modulated (PWM) design provides higher torque and lower motor operating temperatures than typical SCR controls. Filtered DC output to the motor allows cooler operation, longer brush life, lower audible noise, and wider

speed range. The type “WPM” control accepts 115 VAC, 50/60 Hz, 1-phase input. Motor power ratings are 7/16 hp (326 Watts) at 90 VDC, or 5/8 hp (466 Watts) at 130 VDC.

This new stock model features a forward-brake-reverse switch, allowing dynamic braking for applications where the motor needs to be manually and infrequently reversed, or when required as a setup function in an application. Five trim pot adjustments (torque limit, minimum and maximum speed, acceleration/deceleration, and IR compensation) eliminate the computer-like programming required in other drives. DIP switches allow the control to be easily calibrated for different motor sizes. Two Diagnostic LEDs on the PC board indicate when power

AutomationDirect

OFFERS STEPPER GEARBOXES

AutomationDirect's new SureGear PGCN series of stepper gearboxes is a suitable choice for stepper and other motion control applications requiring a NEMA-size input/output interface. Available in NEMA 17, 23, and 34 sizes and gear ratios of 5, 10, 25, 50, and 100:1, SureGear stepper gearboxes are designed with a nominal speed of 3,500 rpm and maximum input speed of 6,000 rpm. Additional features include a low backlash of 30 arc-min or less, and a 20,000 hour service life. The SureGear PGCN series is an accurate, high-performance, and cost-effective solution for applications include material handling, pick and place, automation, packaging, and other motion control applications requiring a NEMA input/output. While SureGear planetary gearboxes can be mounted in any orientation, they are



not designed for back driving. These maintenance-free gearboxes require no additional lubrication for the life of the unit and hardware is included for

mounting to SureStep stepper motors; optional shaft bushings are available for mounting to other motors. SureGear PGCN series prices start at \$209 and are backed by a one-year warranty.

For more information:

AutomationDirect
Phone: (800) 633-0405
www.automationdirect.com

is on and when current output is at limit set by the torque pot.

This new model 0794 is available through Bodine's extensive distributor network, via direct sales to OEMs, or from the Bodine web site. Stock orders typically ship within 2-3 business days.

For more information:

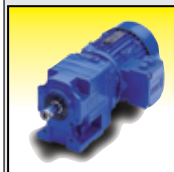
Bodine Electric Company
Phone: (773) 478-3515
www.bodine-electric.com



DieQua offers more gearboxes

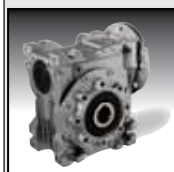
plus application experience to help select the best one for your needs

Helical Gearmotors



- 1-75 HP Capacity
- Motorized or Adapters
- Right Angle or Inline
- Shaft Mount Designs
- Multi-Stage Ratios
- Modular Design

Worm Reducers



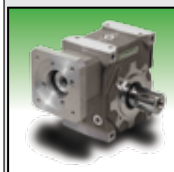
- 7 sizes, 28-110mm CD
- Fret-free Connection
- NEMA or IEC Adapters
- Coupling Input
- Aluminum Housings
- 2-Side Worm Support

Planetary Gearheads



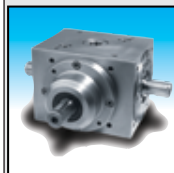
- Precision or Economy
- Inline or Right Angle
- 40-155mm Frames
- Low Backlash
- 1 and 2 Stage Ratios
- Lubricated for Life

Servo Worm Gearheads



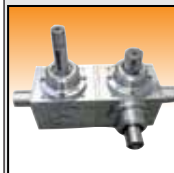
- 3 Backlash Levels
- Shafts or Hollow Bores
- Single or Dual Outputs
- 11 sizes, 25-200mm CD
- Capacity: 10-7000 Nm
- 20,000 Hour Ratings

Spiral Bevel Gearboxes



- 9 Sizes
- 1-250 HP Capacity
- Low Backlash Option
- Ratios from 1:1 to 6:1
- Output Shaft Options
- Machined Housings

Special Designs



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NovaTorque

EXPANDS PREMIUMPLUS MOTOR LINE

NovaTorque, Inc., a Fremont CA based producer of ultra-efficient, cost-effective, electronically commutated permanent magnet motors, introduces 7.5 hp and 10 hp models of its PremiumPlus+ motors. NovaTorque motors use low-cost ferrite magnets in an innovative flux-focusing design to deliver the superior efficiency of rare-earth permanent magnet motors at a price that is competitive with induction motors. "NovaTorque's new 7.5 hp and 10 hp versions, driven by variable frequency drives, boast motor-only rated point efficiency of over 94 percent, a full 3 point advantage over NEMA Premium induction motors. That advantage grows under partial load, as is the case in variable speed fan applications, with typical efficiency improvements ranging from 5 to 15 percent. In a high duty cycle 10 hp fan application in an average cost of power area, annual energy cost savings can exceed \$300," says Scott Johnson, NovaTorque's vice president of sales. "The advantage is even more dramatic when compared to the current installed base of induction motors, where efficiency improvements of 20 percent or more are achievable," continues Johnson.

Importantly, due to its unique patented flux-focusing stator and rotor hub geometry, the NovaTorque motor produces this performance with an all-ferrite (versus rare earth) magnet design. "The cost of rare earth (neodymium) magnet material, the basis of most conventional permanent magnet motors, has risen erratically over the last several years. Further, supply of rare earth magnets is increasingly uncertain. The ability to use ferrite magnets allows NovaTorque to price its motors comparable to induction motors. This means OEMs and HVAC systems builders can now economically deliver superior permanent magnet motor efficiency with modest first cost impact and a rapid payback," explains Jaffer Hussain, NovaTorque's vice president of marketing and product management.



NovaTorque PremiumPlus+ motors are packaged in standard NEMA frame sizes and mounting dimensions for easy substitution of AC induction motors. NovaTorque PremiumPlus+ motors are compatible with readily available variable frequency drives (VFDs) from most leading manufacturers, including ABB, Yaskawa, Mitsubishi, Siemens, Fuji, Hitachi, Toshiba, Delta, Danfoss, Schneider, Vacon and others.

For more information:

NovaTorque
Phone: (510) 933-2700
info@novatorque.com
www.novatorque.com



Klüber Lubrication

INTRODUCES BEARING GREASES

Klüber Lubrication, a worldwide manufacturer of specialty lubricants, has introduced Isoflex Topas NB 52 and Isoflex Topas NB 152, two rolling and plain bearing greases based on a synthetic hydrocarbon oil and a barium complex soap. The products are suited for amusement industry applications, such as roller coaster wheel bearings, in order to optimize operational reliability, cut servicing costs, conserve energy and extend maintenance intervals. The special barium-soap thickener used in the Isoflex Topas NB 52 and 152 greases offers good load-carrying capacity, as well as resistance to water

Zero-Max

OFFERS COUPLINGS FOR PRECISE POSITIONING AT ANY SPEED

ServoClass Couplings are often described as very smooth and quiet during operation. That smooth operating characteristic is a result of several factors, including how consistent the various parts of the coupling are assembled and held together. Maintaining precise and repeatable assemblies is more than having a good torque wrench. For example, it is possible to have several bolts that are all torqued to the same value and still have inconsistent clamping

To ensure that each and every ServoClass coupling is assembled correctly and will grip the shaft precisely, Zero-Max uses a special solid film lubricant treatment on the threads of all the socket head cap screws used in the ServoClass line of couplings. It is this attention to even the smallest details that makes the ServoClass couplings run smooth and perform at the highest level in applications of any speed.

Additional design features of this product line include all high quality materials including precise 304 stainless steel disc members. These are aligned and locked precisely into position onto the high strength aluminum alloy hubs with ISO 4762 XL 12.9 corrosion resistant socket

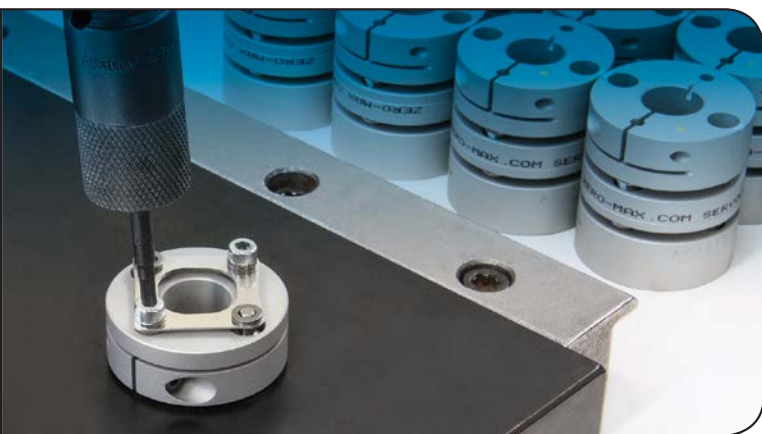
a computerized system for the most precise fit of all components.

Zero-Max ServoClass couplings are suitable for precise positioning requirements and high speed reversing loads common of many AC and DC servo motor systems. These applications include automation of all types, packaging, semi-conductor assembly, laboratory automation and medical equipment, to name just a few. They are designed to provide superior shaft engagement and reliable use with system speeds up to 10,000 rpm. Further, the coupling's increased clamping strength eliminates the need for keyways while providing a clean, balanced design.

Available in 12 sizes with both single and double disc models, ServoClass couplings handle torque ratings ranging from 0.5 to 250 N-m. The ServoClass couplings can also accommodate parallel (radial), axial, and angular misalignments. All ServoClass coupling models are manufactured of RoHS compliant materials.

For more information:

Zero-Max
Phone: (800) 533-1731
www.zero-max.com



forces. This situation would be caused by an inconsistent coefficient of friction in the threaded surfaces.

head cap screws. The coupling assembly process itself is also controlled with

and ambient media. Both products protect against corrosion, as well as oxidation and ageing.

Isoflex Topas NB 52 is suitable for temperatures ranging from -60°F to 250°F and short peak temperatures up to 300°F depending on the application. Isoflex Topas NB 152 can be used in a wide service temperature range of -40°F to 300°F.

Isoflex Topas NB 52 is versatile for many applications, including:

- rolling and plain bearings subject to high speeds and loads, as well as low temperatures – ideal for road, side-guide, and up-stop wheels
- tooth flanks in precision gears, such as bevel gears in milling

machines and electromechanical actuators for valves

- electric contacts and components to reduce insertion forces

Isoflex Topas NB 152 is compatible with many plastics and is used primarily for medium speed rolling and plain bearings, such as coaster wheels, wheel bearings in racing cars, fan bearings and pump bearings. The grease is also suitable for plastic/plastic or steel/plastic friction points.

“Using Isoflex Topas NB 52 and Isoflex Topas NB 152 greases leads to more consistent torque over a wide temperature range as well as longer component life when exposed to water or aqueous media,” said Stephen

Mazzola, director of engineering and technical services for Klüber Lubrication North America L.P.

Mazzola recently conducted two training seminars on lubrication fundamentals and advanced lubrication of gears, bearings, chains at the Amusement Industry Manufacturers and Suppliers (AIMS) International Safety Seminar, Jan. 12-17 in Orlando. The AIMS International Safety Seminar is a comprehensive safety-training experience for individuals responsible for the care and safety of the amusement industry's guests.

For more information:

Klüber Lubrication
Phone: (800) 447-2238
www.klueber.com

Maxon

DEVELOPS SPECIALIZED MOTORS FOR DRILLING OPERATIONS

Deep drilling technology (called “downhole drilling” in the field of oil and gas exploration) makes it possible to recover oil and gas from depths of more than 2,500 m. By combining deep drilling with directional drilling (dynamic position alignment of a bore in the earth), previously unreachable oil reserves are being opened up, with drilling depths of approx. 5,000 m and drill lengths of up to 11,000 m. The development of specialized electronics and drives has made it possible to better monitor and control many functions across the entire drilling process. For instance, it is now possible to dynamically measure and adjust the position of the drill head during the drilling process. Diverse deep drilling tools also use hydraulic valves or flaps that are operated by electromechanical drives. The temperatures and pressures at these depths, combined with the strong vibrations that occur during the drilling work, present unique challenges for the use of electronic drives.

The different versions of the EC-4pole 32 HD are designed for operation in air or in oil (flooded in hydraulic oil). The power rating depends on the surrounding medium and amounts to 220 W in air and, due to the much higher heat flow, 480 W in oil. They are designed for ambient temperatures of more than 200 °C and atmospheric pressures of up to 1700 bar. The Ø 32 mm motors must also be able to withstand vibrations of up to 25 grams as well as impacts of up to 1,000 G (1,000 times the acceleration due to gravity at the earth’s surface). As an example, a Formula 1 vehicle is exposed to approximately 2 G and fighter jets are exposed to approximately 13 G. The motors feature high efficiency (up to 89% in air, more than 80 percent in oil), making them ideal for use in battery-operated applications. With



their detent-free running properties, they have excellent control characteristics and are suitable for high-precision positioning tasks in outer space, even at low speeds.

The EC-4pole 32 HD is suitable for use in environments with extreme temperatures, subject to high vibration, or under ultra-high vacuum. This means the motors can also be used in aerospace applications, e.g. for gas turbine starters, for the generators of jet engines, for regulating combustion engines, or for exploration robots. For the use of the motor in conjunction with a gearhead, Maxon offers the GP 32 HD, a powerful and robust planetary gearhead.

For more information:

Maxon Motors
Phone: (508) 677-0520
www.maxonmotorusa.com

Bell-Everman

SEALED LINEAR STAGES KEEP OUT DEBRIS AND CONTAMINANTS

A new line of ball screw- and linear-motor-driven sealed motion stages has been developed by Bell-Everman, Inc. SLS Sealed Linear Stages feature a novel lip seal design that keeps debris, particulate and liquid contaminants from gumming up the internal drive and bearing components. Made from a ruggedized polyurethane elastomer, the seal integrates seamlessly with the stage’s anodized aluminum housing. Polyurethane is resistant to chemical exposures, temperature extremes and mechanical wear. The seal’s design allows it to be field replaceable in minutes without disassembling the stage—or even removing the payload in most cases.

Available with both linear motor and ballscrew drives, SLS is intended for precision positioning jobs:

- Linear motor configurations can achieve accuracies of $\pm 4 \mu\text{m}$ per meter of travel and bi-directional repeatability of $\pm 2 \mu\text{m}$.
- Ballscrew configurations can achieve accuracies of $\pm 10 \mu\text{m}$ per meter of travel and bi-directional repeatability of $\pm 5 \mu\text{m}$.

Other technical specifications include:

- Standard travel lengths from 100 to 1,000 mm and custom lengths to 2,000 mm.
- Speeds to 4 m/sec for linear motor drives and 0.4 m/sec for ballscrew drives.
- Continuous linear force to 300 N for linear motor drives and 1,540 N for ballscrew drives.

Applications for the SLS Sealed Stages include laser machining, welding, semiconductor, machining and many other contamination-sensitive precision motion jobs.

For more information:

Bell-Everman
Phone: (805) 685-1029
www.bell-everman.com



With multiple awards collected in recent years, Igus has shown the results of using a combination of user-oriented function and advanced design simultaneously in its products. Last month, three Igus products, the chip-proof R4.1 Energy Tube, compact DryLin SLT linear guide, and mounting and transport frame ReadyChain rack were selected after 49 jury members reviewed 4,615 products, communication designs and packaging entered by participants from 55 countries. Since 1987, 31 Igus products have been chosen for the award, which distinguishes products with a high degree of invention, design quality, material, ergonomics, functionality, and environmental compatibility.

R4.1 Light Energy Tube

The R4.1 light provides cable protection in extreme environments, while still making movement and maintenance easy. The lid of the enclosed tube can be flipped open on either side, allowing for easy access to cables and hoses. At the same time, they are designed in a way that virtually no chips can pass to the interior. In a leakage test, only 2.7 grams of chips were found inside the tube after 250,000 motion cycles. The tube is lightweight, about 25 percent lower than comparable systems, but remains highly stable, allowing cable fill of up to 17 pounds per foot thanks to a double-stop system with large contact surfaces, keeping the load optimally distributed.

DryLin SLT Linear Guide

By utilizing a lateral arrangement, with the lead screw next to the linear guide system, the DryLin SLT offers a minimum installation height of just 20 mm, and structural widths of only 45 mm are possible. The compact design is extremely light, weighing in at just over five ounces. The flexible system can be driven manually or with optional

motor, and the smooth operation can move at a maximum speed of 5 ft/minute. The lead screw, mounted on ball bearings, is available with trapezoidal or high-helix threads, and a variety of thread pitches are available from stock. Due to its high efficiency, small size and lubrication-free operation, the DryLin SLT is ideal for automation tasks in food and beverage processing equipment, vending machines, and a variety of other applications.

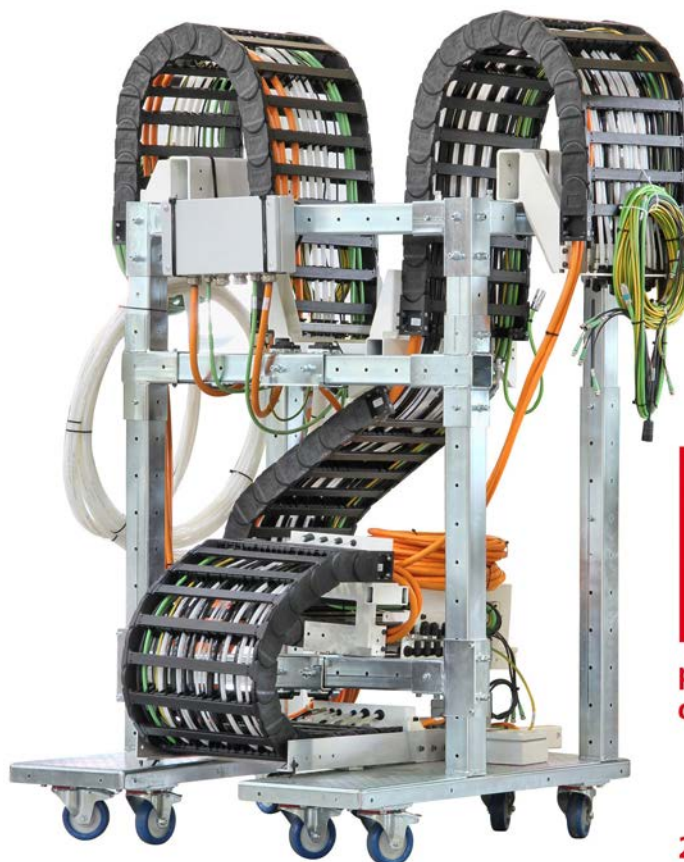
ReadyChain Rack:

For nearly 20 years, Igus has been providing preassembled ReadyChain Energy Chain Systems, reducing purchasing and process costs in a variety of industries. In order to install the harnessed system even more quickly and more easily for the customer, the ReadyChain rack was developed. The transport and mounting frame is comprised of a modular system of supports and braces, which are able to telescope to adjust for length or height at any

given time. Various latching mechanisms are available to ensure the proper mounting of any component. The modular nature of the rack allows for easy adjustments by the customer of alterations become necessary. If the machine happens to be discontinued by the customer, the frame can be broken down into component parts to be reused; a sustainable use of resources and environmentally friendly alternative to waste and disposal of the frame if it were not recycled.

For more information:

Igus Inc.
Phone: (800) 521-2747
www.igus.com



product
design award

2014