phdinc.com **+49 (0)2401 619 77 0**

PNEUMATIC, HYDRAULIC & ELECTRIC PRODUCTS

SOLUTIONS OVERVIEW

- CYLINDERS
- POWERED SLIDES
- ROTARY ACTUATORS
- ESCAPEMENTS
- GRIPPERS
- MULTI-MOTION ACTUATORS
- CLAMPS
- SWITCHES
- PHD PLUS®

phd®
SOLUTIONS FOR INDUSTRIAL AUTOMATION

MIB17-EU

High Precision, Reliable Products

Through 60 years of innovation, PHD has designed and produced high precision, reliable products for the automation industry in Fort Wayne, Indiana, USA. In 1992, PHD established itself in Europe and founded the PHDinEurope corporation.

We offer an extensive line of standard pneumatic actuators that are known for long life and high quality. Using either bolt direct units or transition plates, our actuators can be combined to create millions of application variations. We can help move, turn, slide, lift, grip, reach, rotate, and clamp almost anything to increase your efficiency.

Our products, supported by our strong commitment to delivery, service, and quality have made us a leader in the modular automation industry.

Our facilities include two manufacturing facilities, a Technology & Training Center, and Administration Building located in the U.S.A.

phd® SOLUTIONS FOR INDUSTRIAL AUTOMATION

Our standard pneumatic line of actuators includes a full line of cylinders, grippers, slides, rotary actuators, multi-motion actuators, escapements, and proximity switches and sensors to provide you with the motion you require.

COMPLETE SOLUTIONS

phd PLUS® Electric Automation Solutions

PHD Plus® electric actuators are built on the foundation of proven pneumatic designs and components, but now electrically driven.

phd Unlimited® UNIQUE SOLUTIONS

Nearly every standard unit PHD makes is manufactured to order. That's because PHD has such a wide variety of actuators, options and accessories available. If an application requires a modified component, our Unique Solutions team is ready to help. We welcome special requests for unique products, regardless of quantity or frequency of order.

phd® Plastic Packaging Components

This dedicated division is focused totally on the specific needs of the plastic packaging industry. PPC offers solutions for injection molding, stretch blow molding, continuous extrusion, pre-fill, fill, post-fill, thermoforming and more.

phd® Clamps

PHD Clamps have become the industry standard for handling sheet metal in automotive transfer presses and other workholding/ transfer applications. All PHD Clamps are customer-driven designs with on-site testing.

Total Solutions Backed by Total Delivery & Support

We provide fast delivery to reduce your inventory costs and keep your production schedule on track. Choosing and designing a solution for your specific industrial automation needs has never been easier or faster.

- Local and global distributor support
- Powerful engineering software and web tools simplify and save design time
- Factory-trained application and industry specialists ensure a cost-effective and field-proven solution
- superior delivery

Visit www.phdinc.com/support/mydistributors to find your local distributor.

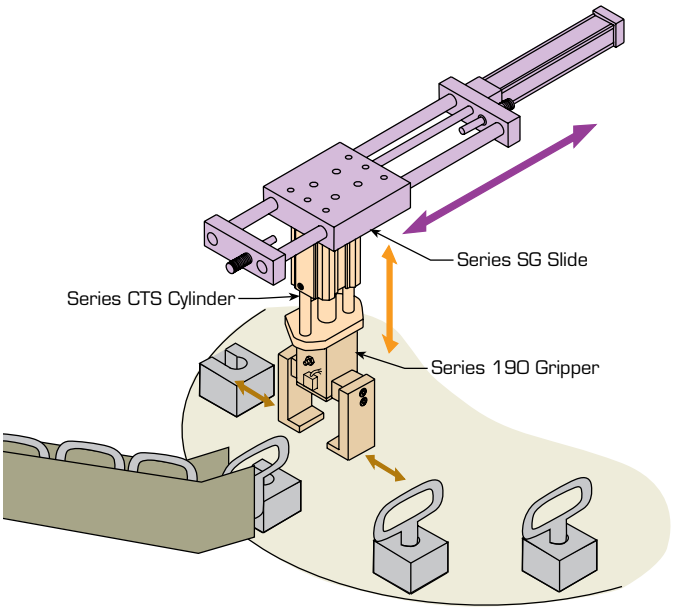
Using our vast array of components, our highly trained application specialists work with you to examine your process, offering you the best solution for your application goals.

Our European Headquarters includes training facilities and is located near Cologne, Germany.

We provide intensive training schools for our distributors - members of a world-wide distribution network, the MDN.

SOLUTIONS FOR INDUSTRIAL AUTOMATION

We offer a broad range of Tom Thumb® Cylinders and linear actuators, known for durability and versatility. NFPA cylinders can be specified with built-in flow controls, adjustable cushions, shock pads, proximity switches, and many other options, making it easy to find the perfect cylinder for your application. One of our specialized models is our heavy duty Tom Thumb® Cylinders. These units can be specified for light duty cycle or high pressure hydraulic service. For applications demanding a medium duty cylinder, we offer air/oil tandems, back to back or three-position models.

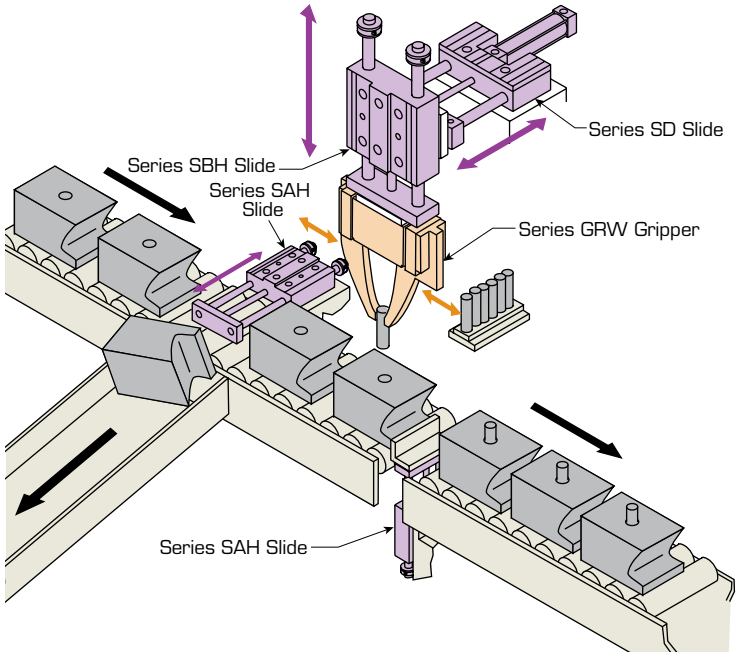


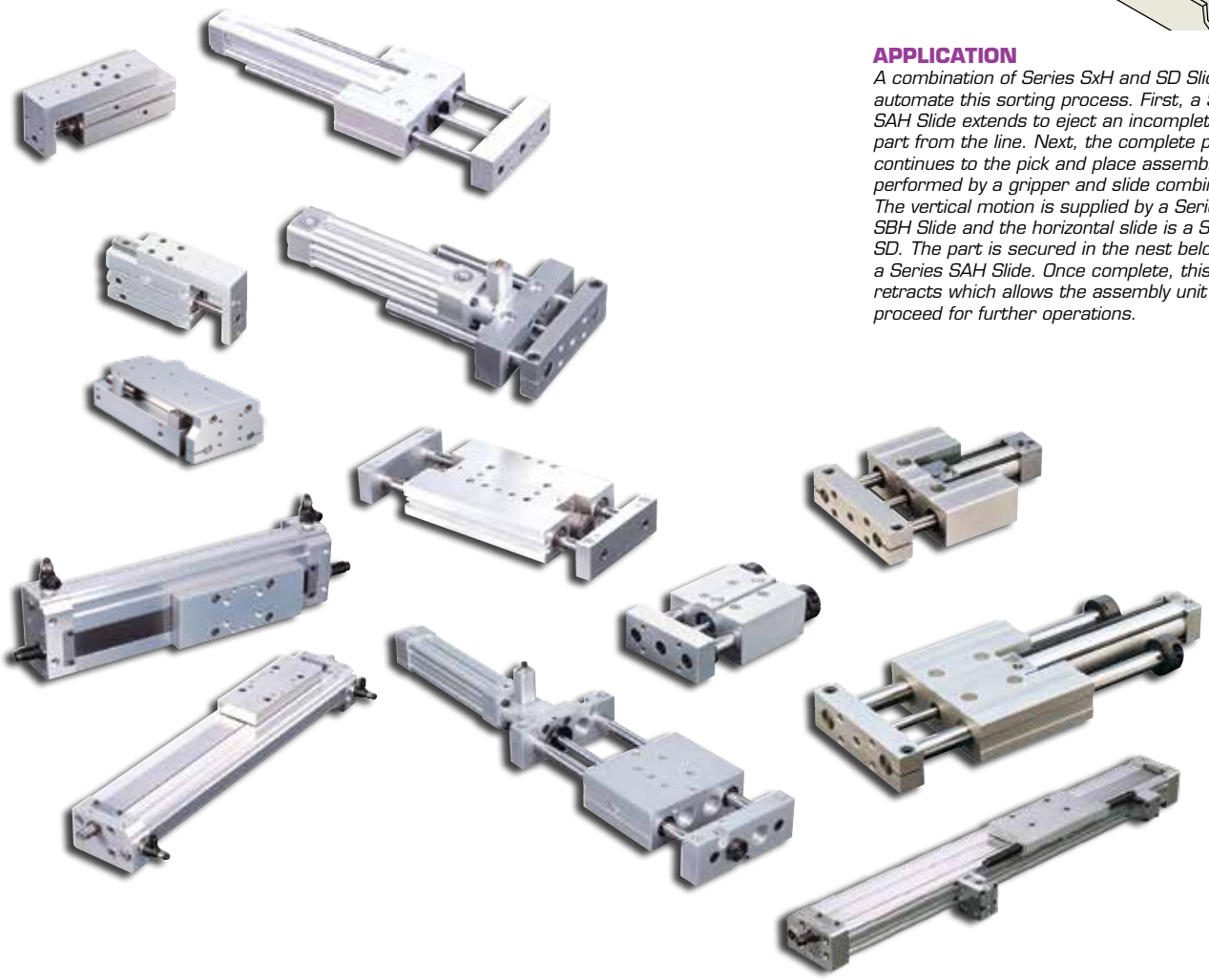
APPLICATION

A cylinder, gripper, and saddle powered slide provide cost effective automation for this assembly and pull test application. First, the part is fed to the work platform using a Series CTS Guide Rod Cylinder as a light duty slide with a gripper affixed to the tool plate. Next, a saddle type slide and another Series CTS Cylinder and gripper perform the final part assembly. The next stage of the application is a pull test to ensure proper part assembly. Finally, the part is ejected into a completed parts bin.

POWERED SLIDES

Our Powered Slides include cantilever and saddle types, and operate using air, air/oil, or electric power sources. We offer over eleven different series of slides designed to handle loads ranging from 0 to 2224N. Linear ball or TC bushings, along with hardened ground shafts, provide precise strokes. Options include: stroke adjustments, shock pads, cushions, magnetic pistons (for PHD hall effect or reed switches), fluoro-elastomer seals, and air/oil tandem cylinders. Slides can be used individually or combined to yield X, Y, and Z axes for pick and place, transfer, and other applications.





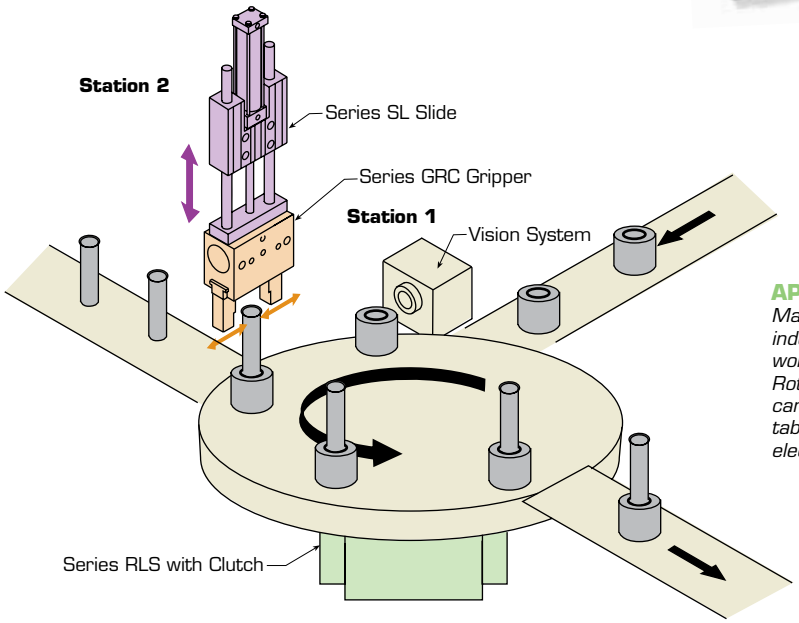
APPLICATION

A combination of Series SxH and SD Slides automate this sorting process. First, a Series SAH Slide extends to eject an incomplete part from the line. Next, the complete part continues to the pick and place assembly performed by a gripper and slide combination. The vertical motion is supplied by a Series SBH Slide and the horizontal slide is a Series SD. The part is secured in the nest below by a Series SAH Slide. Once complete, this slide retracts which allows the assembly unit to proceed for further operations.

SOLUTIONS FOR INDUSTRIAL AUTOMATION

ROTARY ACTUATORS

We offer a complete line of rotary actuators with a wide range of options including built-in speed controls, adjustable cushions and angle adjustments. Our pneumatic and hydraulic rack-and-pinion rotary actuators are available in miniature series for small part orientation, as well as larger series for applications requiring up to 3579Nm of torque. Standard rotations range from 45° to 450°; however, larger degrees of rotations are also available.

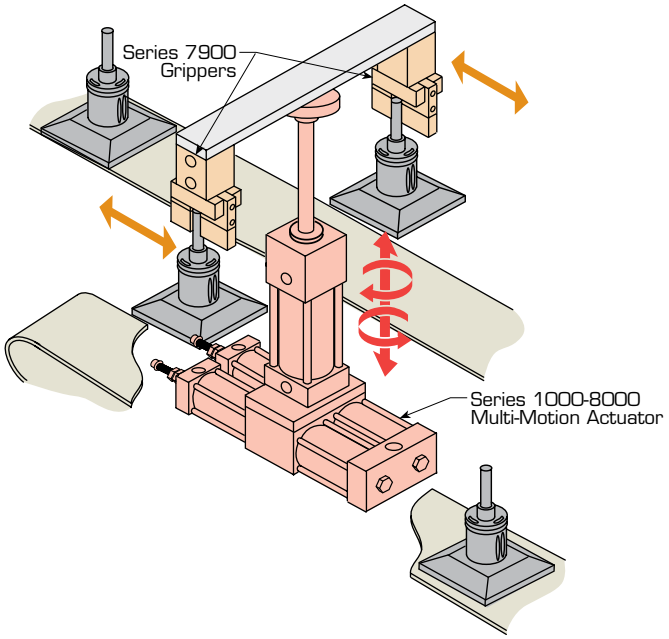


APPLICATION

Many assembly applications require an indexing table to move a part from one work station to the next. The Series RLS Rotary Actuator with unidirectional clutch can achieve the requirements of many tables without the use of high torque electric motors.

MULTI-MOTION ACTUATORS

Our multi-motion actuators provide rotary and linear motion from one output shaft. The reach-and-turn motions are independent from one another, making it easy to sequence the two motions. The multi-motion is ideal for part turnaround, pick and place, transfer, and orientation operations. They are available in four basic series, miniature, standard, air/oil tandem and multi-position. Within each series are several design and size options. Typical rotations are from 45° to 720° with up to 300mm of stroke available. This wide range of strokes, rotations, sizes, and options makes it easy to select the unit to best fit your appllcation.



APPLICATION

A three-position Series 1000-8000 Multi-Motion Actuator is used in this automated inspection station. When a rejected unit is spotted, two grippers are lowered by retracting the multi-motion linear section. One gripper grips the rejected unit while the other gripper grips a replacement. The multi-motion extends, rotates 180° and retracts, setting the replacement unit on the conveyor. It extends and swings back 190° placing the rejected unit into a reject bin. It returns to its original position and waits for the next bad unit.

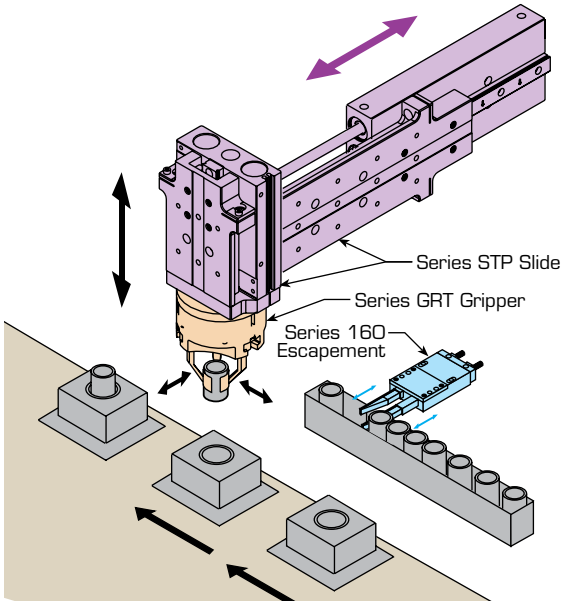
Combined linear and rotary motions in one automation device

SOLUTIONS FOR INDUSTRIAL AUTOMATION

GRIPPERS

Angular and parallel motion grippers are ideal for use on automation devices or industrial robots. These grippers range in size from miniature for small part gripping to heavy duty units capable of more than 2000N of gripping force. Most grippers are available with a built-in sensor and set point module to provide four or more adjustable sensing positions throughout the movement of the jaws. All of our grippers can be used for internal or external gripping and come in a variety of jaw styles to adapt to any application. Our grippers can also be combined with other PHD linear, rotary, and multi-motion actuators for pick and place, part orientation, transfer, and other applications involving repetitive motion. Grippers are available for pneumatic, hydraulic, or electric service to fit your applications needs.

parallel

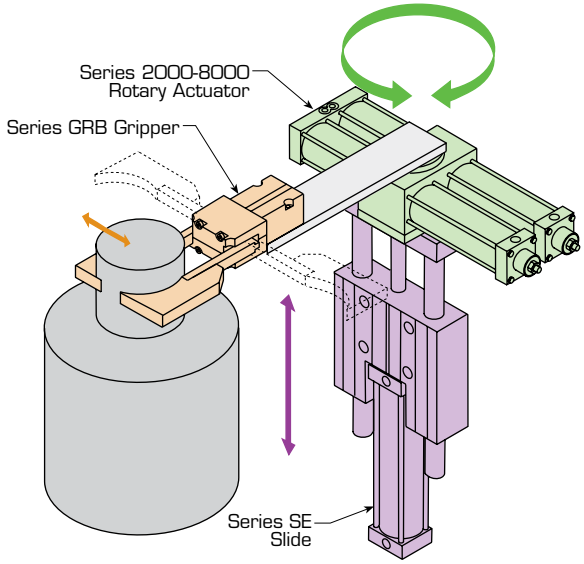


APPLICATION 1

In this application, two slides are combined with a Series GRT Gripper to create this reach and pick style of assembly device. Parts are released one at a time by an escapement from a feeder. The vertical slide extends the GRT gripper which grasps the part. The vertical slide retracts and the horizontal slide extends over the empty nest. The vertical slide then extends the GRT gripper and places the part in the nest.

electric grippers available

angular



APPLICATION 2

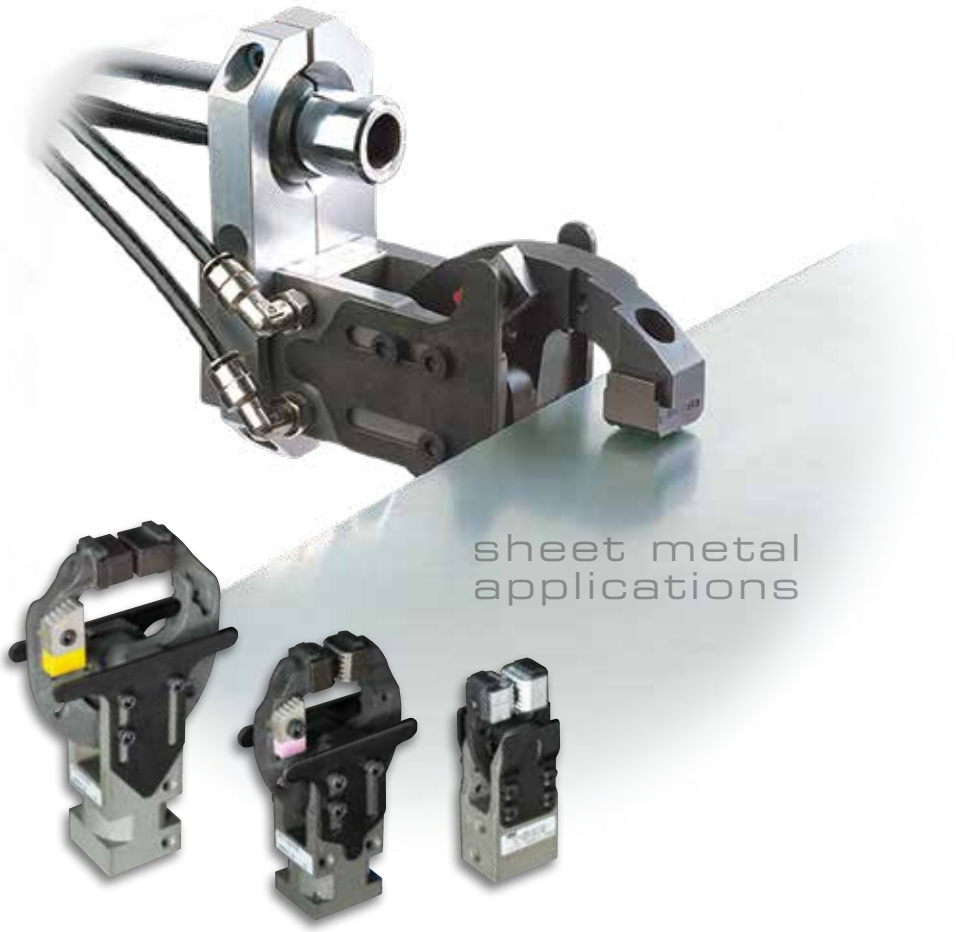
A PHD slide, rotary actuator, and gripper place and hold the shroud onto liquid propane tanks. Once positioned, the shroud is spot welded and released. The Series GRB gripper jaws open 180° allowing clearance for the tank to be released down the conveyor. This eliminates the need for an additional axis of the motion to clear the gripper.

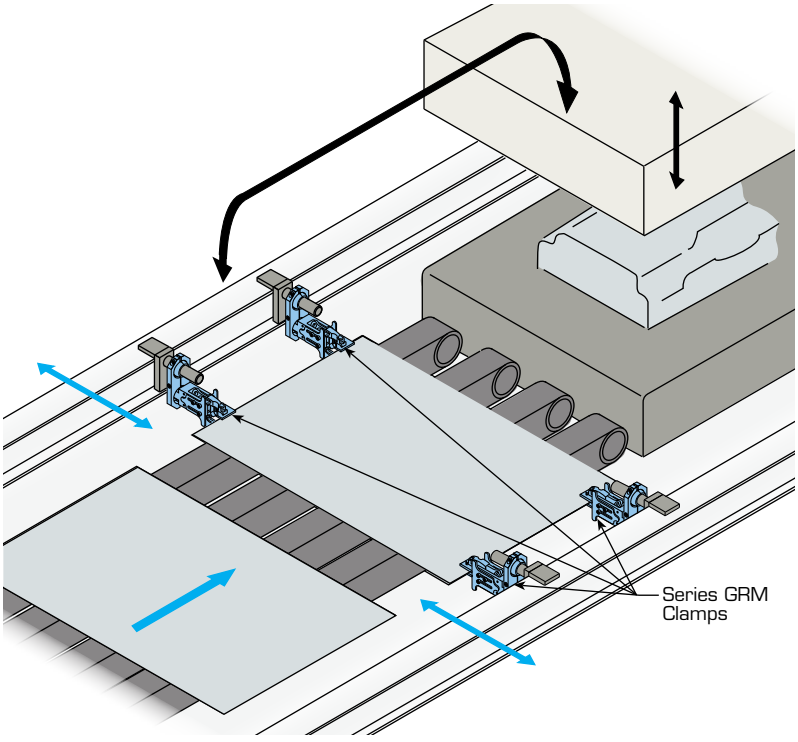
PHD offers 16 different series of grippers

SOLUTIONS FOR INDUSTRIAL AUTOMATION

CLAMPS

Series GRM Clamps are designed specifically for handling sheet metal in stamping/fabricating press applications. Our clamps offer very low cost of ownership, exceptional flexibility, and are unsurpassed in ruggedness. Units are available in three sizes, 13 jaw styles, and 54 jaw opening increments to fit a wide range of applications. The design of the clamp provides for the jaws to mechanically lock on the closed position within a range of 0 - 3mm metal thickness. This ensures part retention even if air pressure is removed or lost. We have developed a wide selection of modular jaw tips for maximum clamping performance over many material and application conditions.





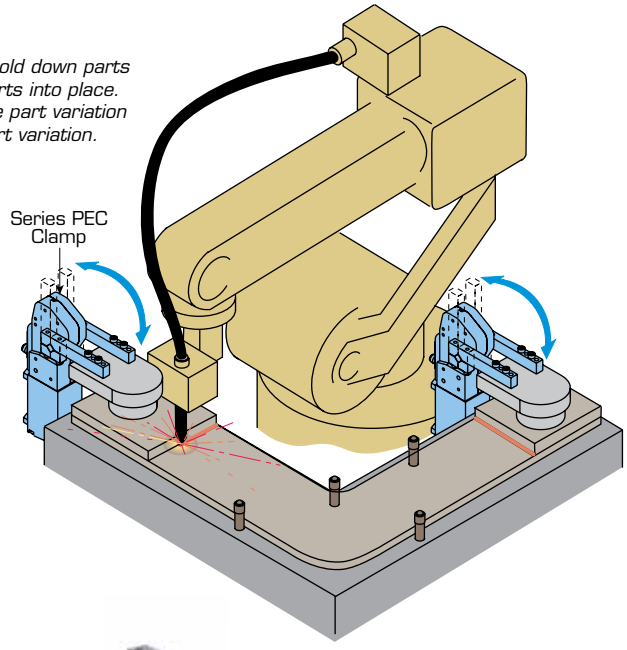
Our wide variety of clamp products provide superior part holding and transferring for your assembly and welding environments.

APPLICATION 1

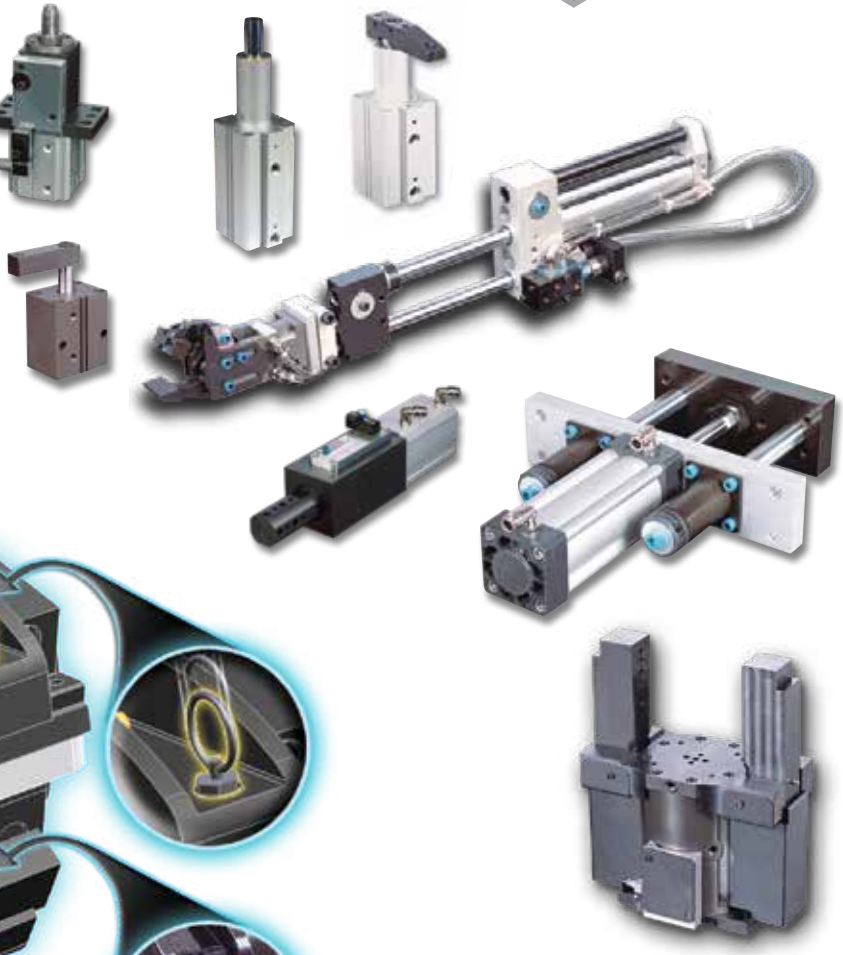
Series GRM Clamps are used in this typical material handling applicationfor the automotive/ metal stamping press. Four clamps are used at each "stamping station" inside the press. The clamps grab onto the material as the transfer rails lift and advance the sheet to each stage of the forming process. The Series GRM Clamp is ideal due to the locking jaw mechanism, which prevents dropping of the part during transfer.

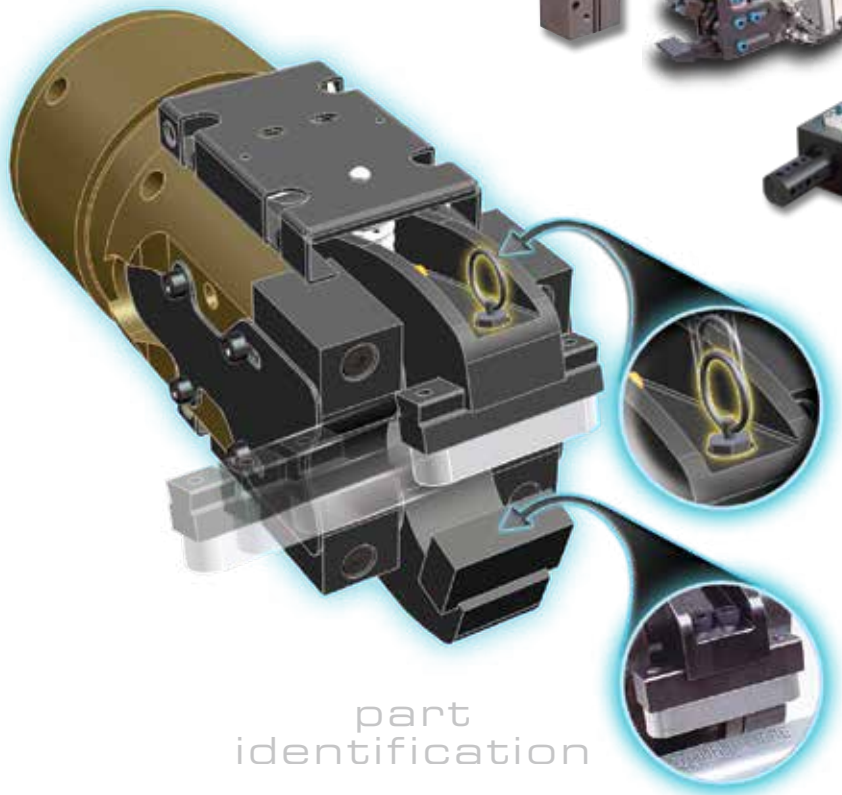
APPLICATION 2

Series PEC arm over clamps hold down parts while a robot welds smaller parts into place. PHD's cam design allows more part variation without having to adjust for part variation.



part holding & transferring



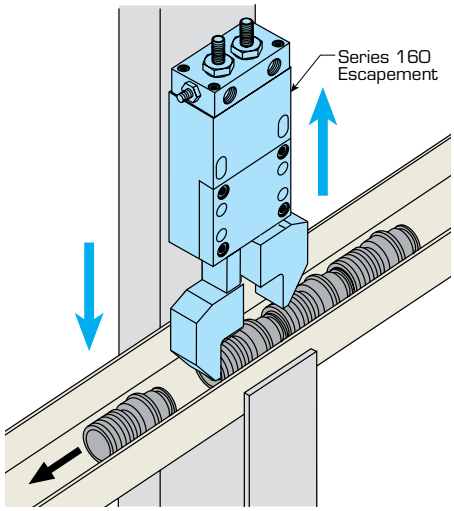


part identification

SOLUTIONS FOR INDUSTRIAL AUTOMATION

ESCAPEMENTS

For applications requiring the individual release of parts from vibratory feeders, hoppers, or magazines, pneumatically-powered escapements are ideal. Escapements save design time, compared to pneumatic cylinders which require external sequencing, valving, and tooling to create non-rotating shafts. PHD twin rod escapements are internally ported allowing both double-acting stroke rods to be operated by a single four-way valve. An internal locking pin ensures both rods are extended before either rod can retract. This sequenced rod motion isolates each part prior to releasing it from a magazine or feeder track.



APPLICATION

This application demonstrates the Series 160 Escapement applied in a vertical orientation over a gravity parts feeder. The tooling attached to the rods of the escapement is offset to separate parts that are wider than the distance between the escapement's rods. This sequencing and part separation ensures that only one part is released at a time.

SWITCHES & SENSORS

There is a wide variety of controllers and logic systems used in industry today. As a result, we provide switches and sensors to create an easy interface between these different systems and our actuators. Our switches and sensors mount directly onto the actuator, eliminating bulky electromechanical proximity switches and mounting hardware.

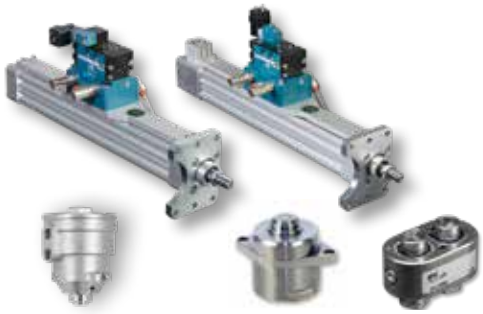
PLASTIC PACKAGING COMPONENTS

We have standard component stretch rods, nozzle and needle cylinders, fillers, transfer arms and a variety of unique solutions. PHD PPC Components are the actuators of choice to keep your blow molding lines running while increasing productivity and reducing downtime and scrap. PHD also offers a complete line of pneumatic and hydraulic cylinders, escapements, grippers, slides, rotary actuators, clamps, multi-motion actuators, and proximity switches which can be combined or used individually to provide the motion your downstream application requires. With millions of component variations, we can help pick, place, twist, turn, lift, grip, reach, rotate, eject, and clamp what you need to increase your productivity. If an application requires a modified component, our Plastic Packaging Components team is ready to help. We welcome special requests for unique products, regardless of quantity or frequency of order. PHD and our local MDN partner will work closely with you to find a solution to your needs.

DIRECT REPLACEMENTS
FOR BLOW MOLDING EQUIPMENT

SIDEL®

KRONES®



OTHER

APPLICATION

In the stretch blow mold machine, Series BCS Stretch Rod Cylinders are used to drive the stretch rod housing and stretch rod to its final position. This stretching action in conjunction with the high pressure blow air will convert the heated preform into the finished container in the mold.

SPECIAL REQUIREMENTS MADE SIMPLE

phd Unlimited® UNIQUE SOLUTIONS

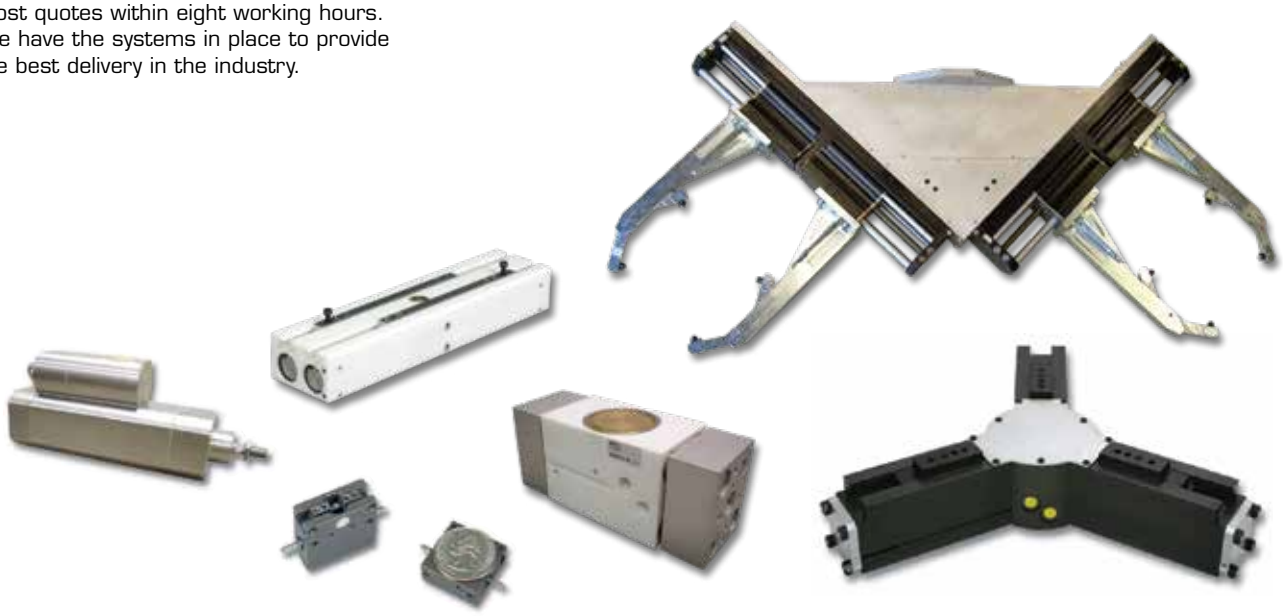
UNIQUE SOLUTIONS®

www.phdinc.com/unlimited/quote/

Nearly every standard unit we make is manufactured to order. That's because we have such a wide variety of actuators, options and accessories available. We have the capabilities built into our factory systems to modify products within our everyday processes. Because of our flexibility, creating Unique Solutions® is simple for PHD.

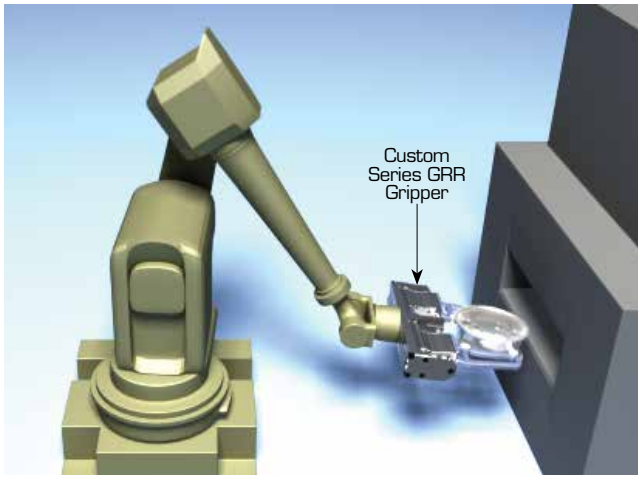
We have dedicated assembly cells, machining centers, and many engineers to design and build unique solutions for our customers. With over 34,000 unique designs and over 100,000 quotes already in our database, we can provide most quotes within eight working hours. We have the systems in place to provide the best delivery in the industry.

Creating unique solutions is simple for us. We can make solutions simple for you!



phd "GRPL" Unique LOW PROFILE GRIPPER

Compact design provides high grip force and large moment capacities with low overall height.



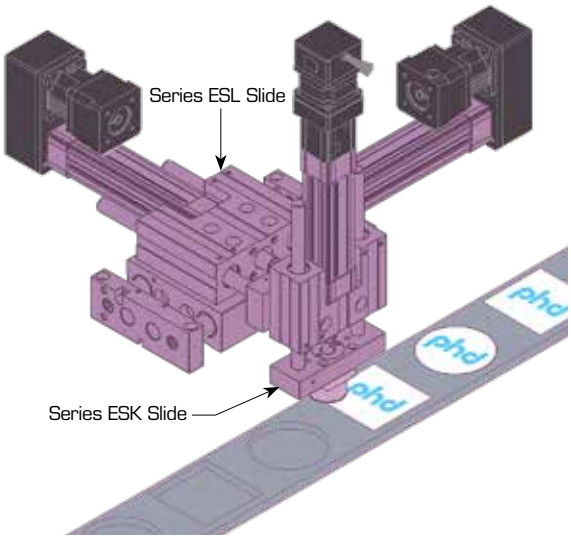
OPEN MOTOR ARCHITECTURE

CONFIGURE FOR YOUR MOTOR BRAND

phd PLUS®
Electric Automation Solutions

Now Available!
Lower Cost
Lead Screw Models

PHD Plus® products are built on the foundation of proven pneumatic designs and components, but now electrically driven. Our new Your Motor, Your Way's simple 3-step process allows users to employ our proven technology operated by the motor and controls of your choice. This saves time and money by eliminating the need to learn or place into service a new motor and controls platform. With Your Motor, Your Way integration into an existing controls system is quick and easy. If you prefer a complete package, your local PHD distributor can provide motors and controls to fit your application needs. This all provides the best offering of electrically-driven linear products with the flexibility to configure Your Motor, Your Way!



APPLICATION
A combination for PHD Plus® Series ESK and ESL Slides is used in this custom trimming application. The rigid support provided by these slides and the precision of the Series ECV Cylinders powering them makes the ideal multi-axis device to automate this process.

Size, Select, & Configure

Refer to our easy 3 step process online at

phdplus.phdinc.com

SOLUTIONS FOR INDUSTRIAL AUTOMATION

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