

Productivity Solutions

from the Automation Experts

CATALOG
2002

Cylinders

Escapements

Rotary Actuators

Multi-Motion Actuators

Powered Slides

Grippers

Switches & Sensors

www.phdinc.com

1-800-624-8511

Language



PHD, Inc. • P.O. Box 9070 • Fort Wayne, IN 46899
www.phdinc.com • phdinfo@phdinc.com

Productivity Solutions Shipped

in as little as one working day.

PHD is known in the industry for quality products and fast delivery. Some units can be shipped in as little as one working day. Use the chart on the right to determine typical shipping time for your unit. Some orders may be expedited for faster delivery. Ask your distributor or customer service representative for details.

1-800-624-8511

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IMPORTANT: This schedule represents the number of working days under normal situations to process, assemble, and ship standard units from the day PHD receives an order from our local distributor. Consult PHD for deliveries on non-stock units, specials, non-standard platings, large quantities, or on specific critical items.

NOTE: Orders containing multiple product types are shipped at one time and are scheduled based on the longest lead time item. Partial shipments of shorter lead time items are made when requested on original order. Most PHD products are built to order. With our extremely quick deliveries, the order may be in production within 1 to 2 days of receiving your order. Please bear this in mind when changing, revising, or canceling an order.

DELIVERY MAY VARY BASED ON CURRENT WORKING CONDITIONS.

SHIPPING SCHEDULE & INDEX

	SERIES	DAYS	QTY
	(Standard Units)		
 Custom Products			
 Cylinders	CV, CR/CT, A, AV, HV TD E, N	2 2-3 3-7	12 12 6-12
 Escapements	LC, 160	1	10
 Rotary Actuators Consult factory for multi-position units	RI RL, RA 0180 1000-8000	2 1 1 3-4	5 5-8 10 8-12
 Multi-Motion Actuators Consult factory for multi-position units	MC 1000-4000 5000-8000	3 4-5 8	5 5 5
 Powered Slides	STP, SHP SD/SE SGxM, SCV, SG, SK/SL SA/SB MS/MT	2 3 4 1 2	5 10 5-10 5-10 10
 Grippers	All Series	1 to 2	5-10
 Proximity Switches And Sensors	All Series	1	100
 Transition Plates & Stanchions	Transition Plates Stanchions	4 8	8 12
 Clamps <small>pages 16 & 17</small>			
 Emax® Electromechanical Actuators <small>pages 18 & 19</small>			

The PHD Advantage



Distributor Support

PHD distributors are factory trained, application oriented, and carry a wide range of supporting product lines. Your local distributor will take the time to thoroughly analyze and assess your specific needs. Backed by PHD's superior service and engineering expertise, you can be assured of a cost-effective, field proven solution. The solution offered will be the best blend of expertise available from the close PHD-distributor partnership.

Contact your local distributor today for the full story including a working product demonstration at your site.



Superior Delivery

Nowhere in our industry is product delivery taken as seriously as it is at PHD. Even with the wide range of options offered on PHD products, shipping time in most cases is one to four working days. In today's fast-paced competitive markets, we understand the need for quick turnaround. With a track record of 98% on-time shipments, you can be assured of prompt delivery. And if you find yourself in an emergency situation, expedited service is also available.



Engineering Software

PHD's engineering software provides powerful design and selection tools at your fingertips. The software eliminates risk and simplifies your design process and component selection, while offering significant time savings.

PARAMETRIC CAD CONFIGURATOR

This dynamic CAD library automatically generates a 2D and 3D CAD drawing in either DXF or IGES file formats of the user-configured actuator. It provides accurate model number selection including option compatibility and travel/rotation increments.

PRODUCT SIZING SOFTWARE

Based on users' input, this software selects the proper size and model of the unit. This ensures the actuator will perform to your specific application requirements. See pages 6 to 9 of this section for complete information.

As new features are added, updates to this software are available at the PHD web site.
www.phdinc.com



Custom Products

Unique application designs require unique components. With over 40 years of experience, our Custom Products team welcomes special requests for unique products, regardless of quantity or frequency of order. For more information, see pages CP-1 to CP-24 or call 1-800-624-8511 to request a quote.

Distributor Support

Superior Delivery

Engineering Software

Custom Products

Industry & Applications

PHD offers more flexibility and options to meet the demands of industries around the world.

Productivity Solutions From PHD

Contact our customer service department for our free 87 page application solution book. The Application Digest is filled with solutions for processes such as assembly, material handling, machine loading/unloading, packaging, material application, welding, and testing/quality control. The applications you see on these facing pages are a few examples of how PHD can simplify your automation process.

Industries

- Automotive
- Medical/Pharmaceutical
- Telecommunication
- Electronic

FREE 87 page
Application Digest



Applications

- Sheet Metal Handling
- Machine Loading /Unloading
- Assembly
- Welding
- Packaging
- Materials Applications
- Testing/Quality Control

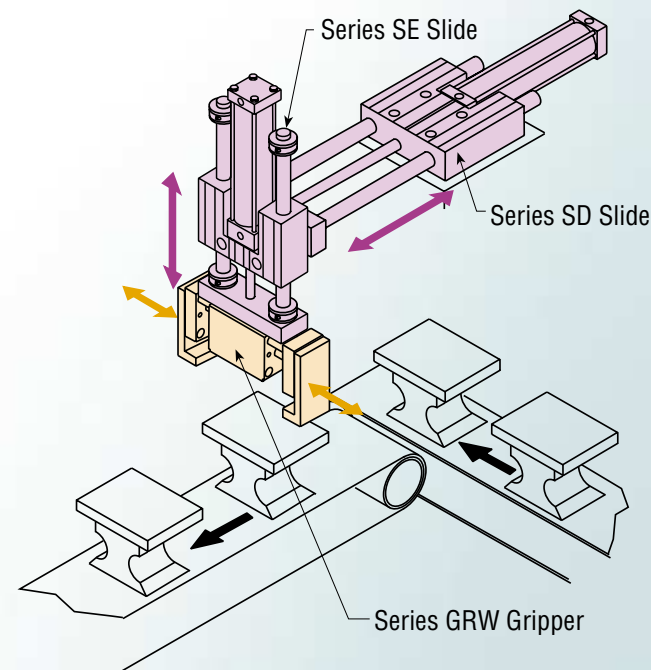
Using transition plates, our units can be combined to create millions of application variations.

PHD offers a full line of automation components. Over 400 million combinations are available.

Products

- Cylinders
- Escapements
- Rotary Actuators
- Multi-Motion Actuators
- Slides
- Grippers
- Switches
- Clamps
- Electromechanical Actuators

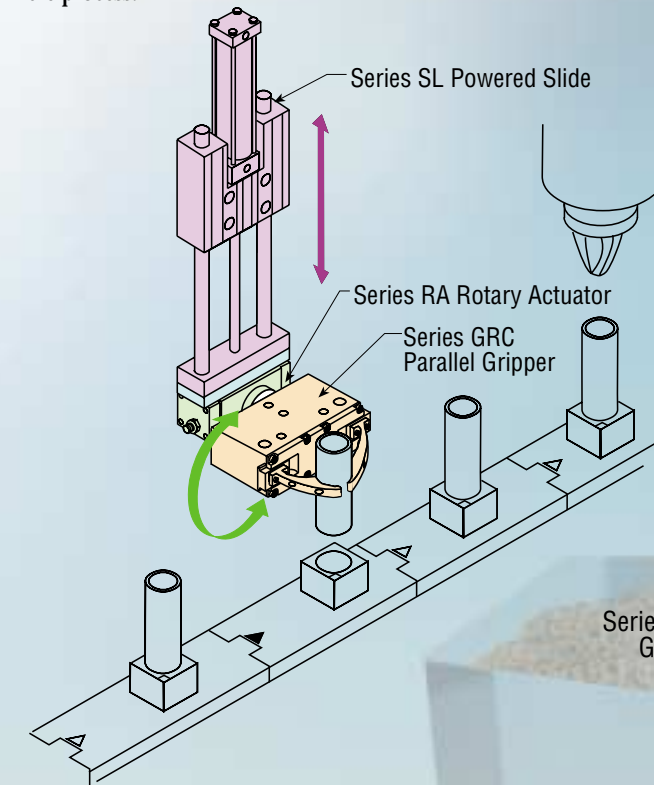
Pick-And-Place



In this simple pick and place application, Series SD and SE Slides are combined for the horizontal and vertical motions providing rigidity, precision, and speed. A Series GRW Gripper, with its long jaw travel and high grip force, is used to grasp the parts to complete the device.

Automated Deburring Process

A Series SL Powered Slide, a Series RA Rotary Actuator, and a Series GRC Parallel Gripper provide the material handling automation in this deburring process. After the first deburring, these PHD components grasp the aluminum tubes from the conveyor line, lift and rotate the part 180° and replace the part onto the conveyor line. This part reorientation allows the other end of the tubing to be deburred in the process.



Sheet Metal Handling

Machine Loading /Unloading

Assembly

Welding

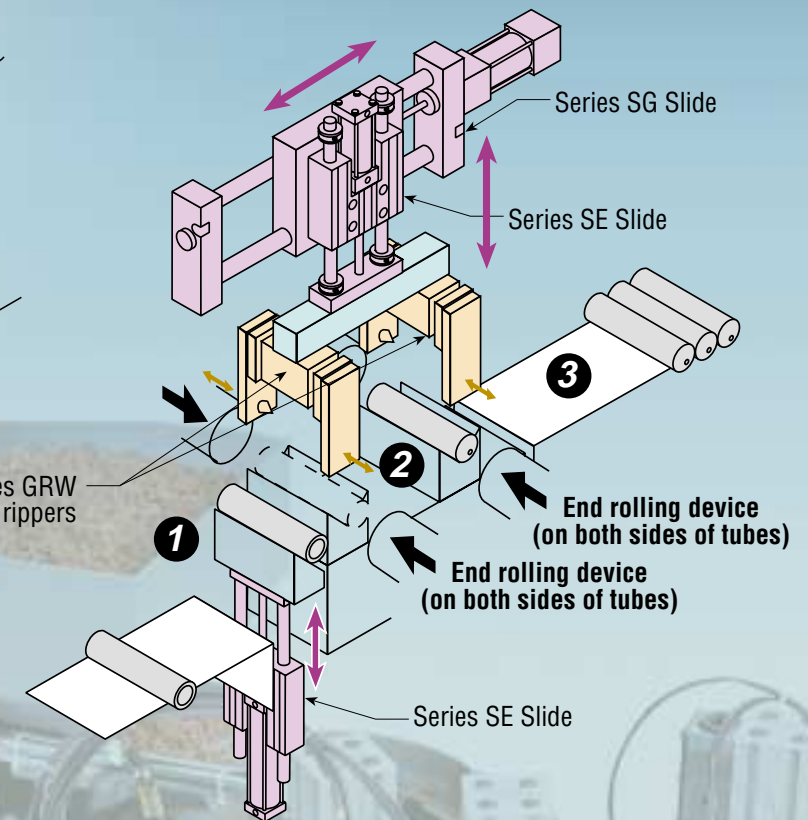
Packaging

Materials Applications

Testing/Quality Control

Loading & Unloading for Tube Finishing Device

PHD Slides and Series GRW Grippers handle the escaping and pick-and-place duties for the loading and unloading of tubing in this finishing application. As a two stage process, the part is first escaped from a loading platform using a PHD Slide (1) to the finishing machine. Next, using a dual Series GRW grippers/slide configuration, parts are loaded (2) and unloaded in unison from one end rolling device to the other. Then, the part is transferred to a conveyor (3). After the process, the tubing is shaped, and finishes completely sealed in the last stage.



Worldwide Distribution

...over 20 countries around the world...

Worldwide Distributor Network

PHD is represented in over 20 countries around the world, so you'll be sure to receive the service, delivery, and support your business deserves.

Contact PHD for the location of your nearest PHD distributor. Or check our web site's distributor location guide. Finding your distributor is as easy as keying in a zip code.

Corporate Offices

To meet the needs of the global market, corporate offices are located in the U.S.A. and Germany. PHD also offers major product catalogs in Spanish, German, French, and Italian.

PHD, Inc.
 9009 Clubridge Drive
 P.O. Box 9070, Fort Wayne, Indiana 46899 U.S.A.
 Phone *(219) 747-6151 • (800) 624-8511 • Fax *(219) 747-6754
 Web Site www.phdinc.com
 E-Mail phdinfo@phdinc.com
 *After January 2002, please use area code 260.

Germany

PHD GmbH
 Arnold-Sommerfeld-Ring 2
 D-52499 Baesweiler GERMANY
 Phone 02401-805 230 • Fax 02401-805 232
 E-Mail info@phd-gmbh.de

France

Italy

United Kingdom

Portugal

Mexico

Spain

Ireland

Denmark

Switzerland

Product Videos

...these programs are ideal for understanding PHD products...

Assistance Videos-VHS & CD-rom

PHD offers a wide range of VHS and CD video programs showing product design, features, benefits, and actual applications. These programs are ideal for understanding PHD products and viewing automation equipment designed with our modular actuators.

PHD Overview DM1-B

This video highlights PHD, our modular approach to automation, and the wide range of services, support, and tools we offer our customers. See how PHD is committed to giving you what you want when you want it!

Application Examples DM2-B

This video will allow you to see how manufacturers utilize PHD automation components to increase their productivity and reduce costs. Showcased are over 50 actual applications involving assembly, packaging, machine loading, material handling, and quality control.

Contact your local distributor to view any of PHD's videos. Or call 1-800-624-8511 for your free copies.

VIDEOS

PHD is ...Service, Support, Value	DM3	Lathe Loading Examples	LL1	MC & ML Multi-Motion Actuators	VT23
Air/Oil Tandem Cylinder Maint.	FM1	Rotary Actuators	VT2A	GRD Parallel Grippers	VT25
Air/Oil Tandem Rotary Actuator Maint.	FM2	Multi-Motion Actuators	VT3A	GRT 3 Jaw Parallel Grippers	VT26
GRM Clamp Field Maint.	FMGRM1	160 Escapements	VT11B	CV ISO/VDMA Cylinders	VT28
GRM Design 2 Clamp Field Maint.	FMGRM2	SD & SE Slides	VT14A	Emax® Actuators (Slides, Grippers, Motors, & Controls -1/99)	VT29
CV Cylinder Maint.	FMCV1	CRS & CTS Compact Cylinders	VT17A	GRM Design 2 Clamps	VT30
New Product CRS, RA, SD/SE, SG	IV1	RA Rotary Actuators	VT18	RI Rotary Actuators	VCD-RI35
New Product 190/191, CRS/CTS, 160, & RL	IV2	SG Slides	VT19	STP Slides	VCD-STP34
		RL Rotary Actuators	VT20		
		GRC-2 Grippers	VT21		

Engineering Software

...a variety of tools to make your automation job easier...

Interactive software saves hours of design time

Your time is valuable! To save you time, PHD offers a variety of tools to make your automation job easier. With PHD's Engineering Software you can quickly specify, select, and design in PHD products to fit your specific automation needs.

PHD has provided a collection of tools to aid engineers and designers in selecting the proper products for their applications and designs. This CD-ROM is perfect for solving automation problems or simply generating application ideas.

What is included on PHD's Designer's Resource® CD-ROM?

PHD's Designer's Resource® CD-ROM is a multi-purpose tool providing easy access to product information, software, and videos saving valuable design time. This powerful engineering software minimizes errors in the selection and sizing of PHD products all on one convenient disk. And best of all, programs and files can be accessed from the CD-ROM without loading them onto your hard drive. This interface works best if you have a sound card, but will still function and be informative if you don't.

All software is designed for today's computers supporting Windows 95/98, and Windows NT 4.0.

Measure the Value

1 Videos - Contains application and product videos. The user can view application videos showing various PHD products being used in automation applications.

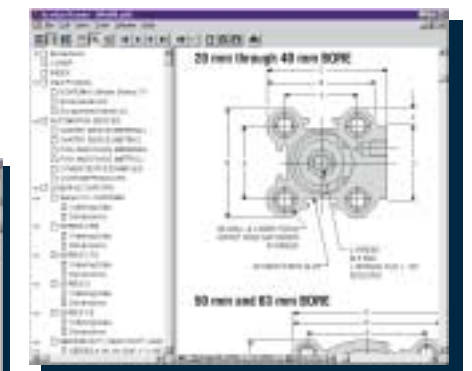
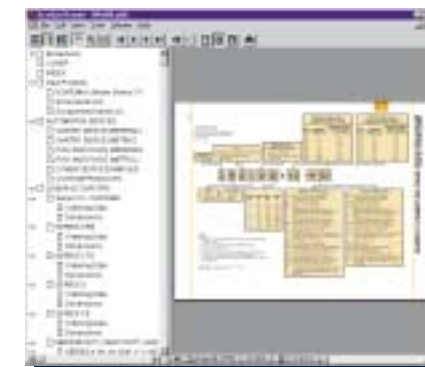
Application examples can be viewed by type or by the products in which users have interest.

Users can view specific product videos showing features and benefits of PHD products.



2 Complete Catalog - PHD's complete product catalogs are available in digital format and multiple languages for reference.

Users can print pages to their printer, saving them the time to make photocopies for their files and documentation.



Continued on next page.

3 Product Sizing Software - Provides accurate sizing of most PHD products. Users can input the application data and the software will aid in finding a product that will meet

their requirements. Saves time when calculating properly sized units. New features such as unit conversions, tool tips, and live help diagrams showing the

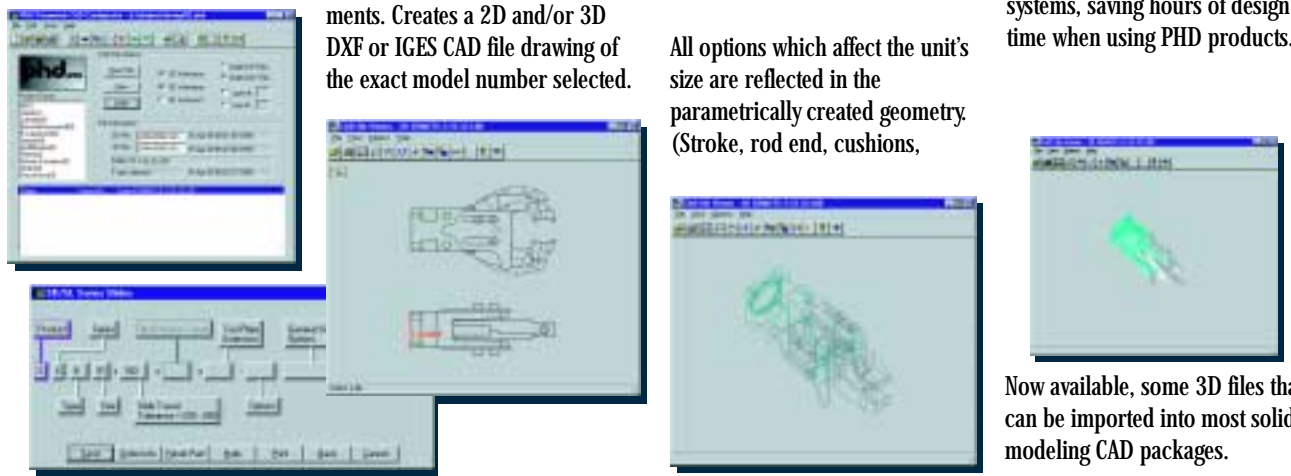
association between variables and the product will make sizing a product easier than ever.



4 CAD Configurator - This dynamic CAD library provides accurate PHD model number selection including option compatibility and travel increments. Creates a 2D and/or 3D DXF or IGES CAD file drawing of the exact model number selected.

PHD's CAD Configurator can save time and reduce the risk of errors by not having to modify a CAD file, which must be done with traditional CAD Library files. All options which affect the unit's size are reflected in the parametrically created geometry. (Stroke, rod end, cushions,

shock pads, shock absorbers, mounting styles, and many more) The DXF or IGES file can be imported into most popular CAD systems, saving hours of design time when using PHD products.

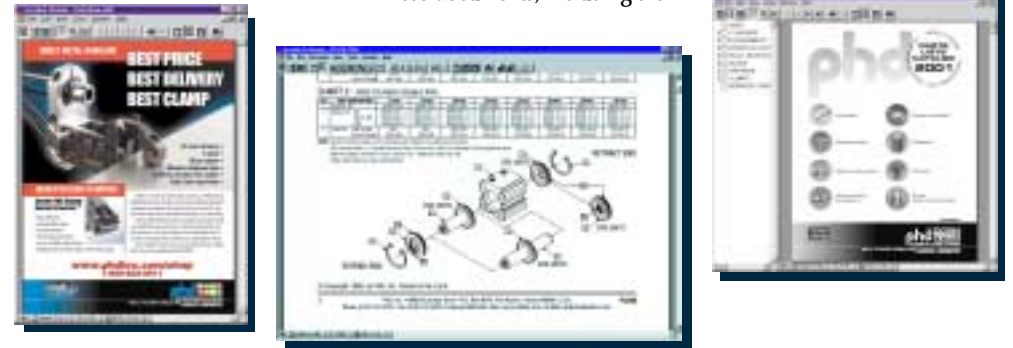


Now available, some 3D files that can be imported into most solid modeling CAD packages.

5 Digital Documents - Acrobat PDF documents for viewing and printing.

Besides the digital product catalogs, several other documents are available in digital format. These documents, including the

parts catalog, can help designers and engineers when documenting their design service manuals.



Web Site

www.phdinc.com

...join our mailing list and receive the latest information...

At the PHD web site you can:

- Request information
- Size on-line
- Search the knowledge base
- Request a custom product quote
- Download software updates
- Learn about products and new developments from PHD
- View catalog & videos on-line
- Communicate with PHD
- View continually updated information
- View application examples
- Find local distributor by zip code search
- Request application assistance



You can access information from our web site 24 hours a day, 7 days a week. By joining our mailing list, you will receive the latest information as it becomes available.

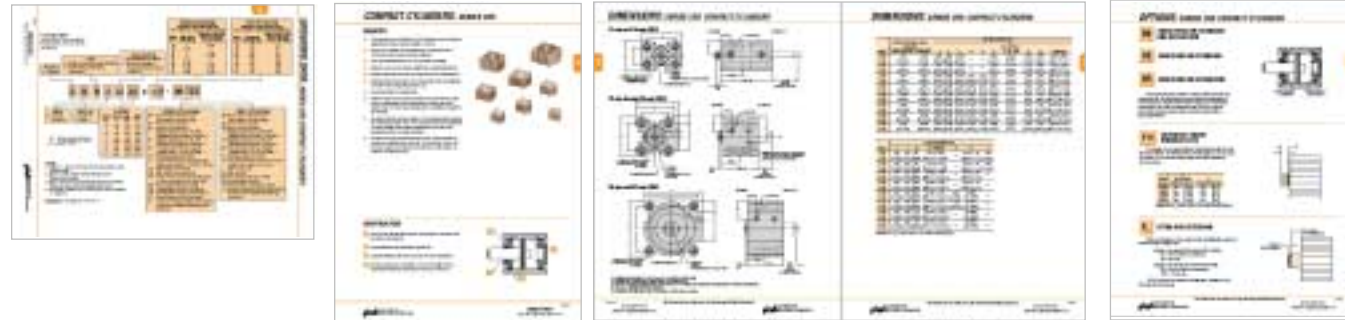
For more information, contact our corporate headquarters at:

PHD, Inc.
 9009 Clubridge Drive
 P.O. Box 9070
 Fort Wayne, Indiana 46899 U.S.A.
 Phone *(219) 747-6151
 (800) 624-8511
 Fax *(219) 747-6754
 *After January 2002, please use area code 260.

Web Site www.phdinc.com
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How to Use this Catalog



Catalog Organization

This catalog is divided into 8 sections according to product group: Cylinders, Escapements, Rotary Actuators, Multi-Motion Actuators, Slides, Grippers, Switches, & Transition Plates. Our Clamps and Electromechanical actuators can be found in other supplemental catalogs shown on pages 16 and 18.

Within each of the eight sections, an index can be used to narrow your search for a particular unit. If you are not sure which unit you need, many sections are preceded by product overview charts, complete with sizes, benefits, and specifications.

Ordering Data

Ordering data is included at the beginning of each product family. The ordering data code is determined based on the series, size, and options of the unit. This code is used to order a component made to your specifications. See page 15 for more information on ordering components. If your application requires a unique design, our Custom Products team is available for special orders. See page CP-1 for more Custom Product information.

Benefits

The benefits pages contain general information about the units. They generally include a chart at the bottom of the page listing the sizes and specifications.

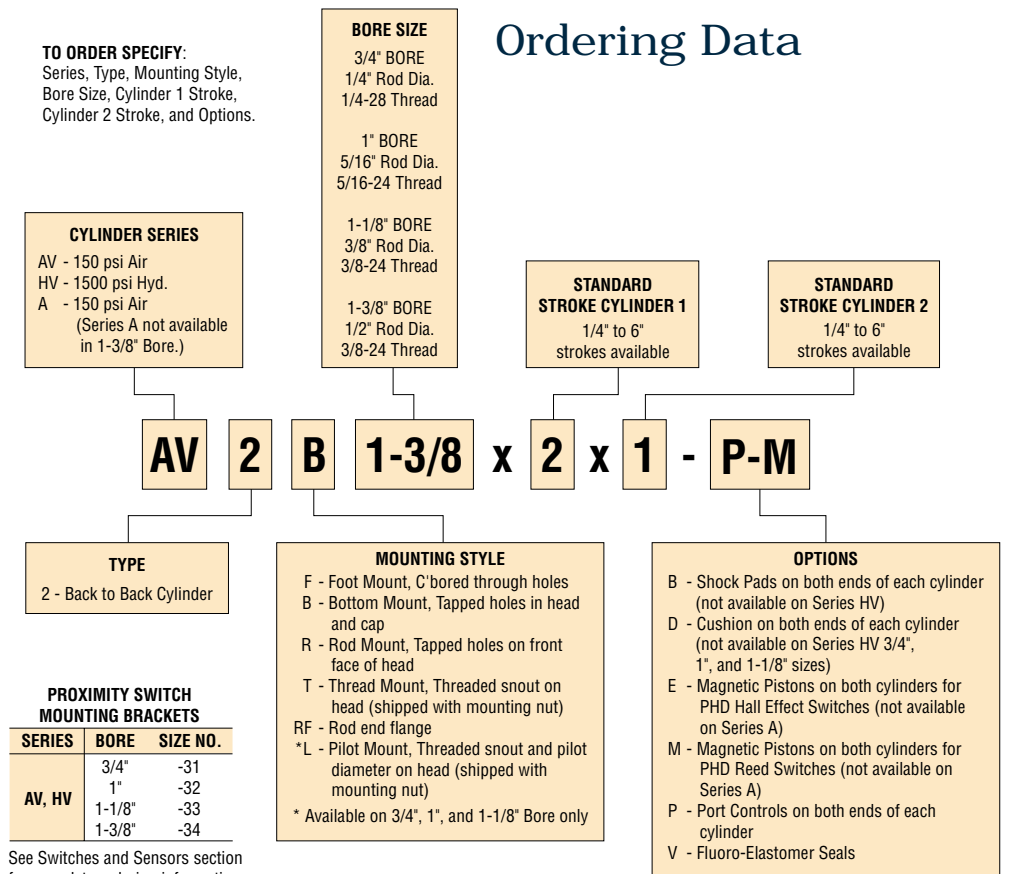
Dimensional Drawings & Engineering Data

Dimensional drawings follow the benefits page. Engineering data including sizing information follows. Most sections include English (imperial) and metric data.

Options

Option information is typically found at the back of each section. The option pages explain each option available for that particular actuator. Some available options are as follows: shock pads, cushions, magnetic pistons, port controls, and fluoro-elastomer seals. Options are specified within the ordering data number listed at the front of each subsection.

How to Order PHD Actuators



Below is an example for ordering a typical PHD component.

AV2B1-3/8x2x1-P-M

Model Number

AV -150 psi air

2 -Back to back cylinder

B -Bottom mount, tapped holes in head and cap

1-3/8 -1-3/8" bore diameter with 3/8" rod diameter and 3/8-24 thread

2 -2" Stroke for cylinder 1

1 -1" Stroke for cylinder 2

P-M -Port controls on both ends of each cylinder and magnetic pistons on both cylinders for PHD reed switches (*Options can be listed in any order e.g. M-P*)

Call PHD at 1-800-624-8511

or find your local distributor at www.phdinc.com

Clamps

Best Price, Best Design, Best Delivery



Series GRM

- 24 hour delivery
- 2 sizes
- 10 jaw styles
- Modular-designed tips
- 5 million trouble-free cycles
- Fully field-repairable



Sheet Metal Stamping/Fabricating Press Applications

When it comes to automated sheet metal handling, PHD's clamps can't be beat. These pneumatically-powered clamps are designed for high grip force, long life, and quick and easy field maintenance to keep your job rolling.



Product Catalogs

PHD Clamps are not included in this catalog. For more information on these products, call our customer service department at

1-800-624-8511 • www.phdinc.com



Series GRM
with jaw tips

Series GRM Clamps have a compact size and provide up to 500 lb of grip force for maximum flexibility and performance. Ten jaw styles are now available with a variety of accessories to meet your application needs.

Series GRM Clamps

Series GRM Clamps are designed specifically for handling sheet metal in stamping/fabricating press applications. PHD clamps offer very low cost of ownership, exceptional flexibility, and are unsurpassed in ruggedness. Units are offered in two sizes, ten jaw styles, and five 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 0-3 mm metal thickness. This ensures part retention even if air pressure is removed or lost. A wide selection of modular jaw tips are offered for maximum clamping performance over many material and application conditions.



Series PNC Clamps

Series PNC Clamps are ideal for stamping identification characters into parts or material. These units are fully field repairable in less than 20 minutes using only 3 metric hex wrenches. A lockout pin is included for safety during tooling changes.

- Cost Effective
- Flexible Mounting
- Quiet Operation
- Eliminates Downtime
- Up to 15,000 lb Grip Force
- Stamps part numbers, dates, shift codes, logos



Electromechanical Actuators

Emax® products can be used individually or combined in a modular configuration with other Emax® or pneumatic actuators.



Complete Motion Package

Our Emax® Electromechanical actuators provide maximum design and application flexibility to fit your industrial automation needs. Whether you're looking for a gripper or a slide, Emax® delivers rugged and precise positioning for a wide range of motion control applications. Emax® products can be used individually or combined in a modular configuration with other Emax® or pneumatic actuators. Best of all, Emax® products are offered at a surprisingly low price.

Product Catalogs

PHD Emax® products are not included in this catalog. For more information on these products, call our customer service department at

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CAT-EMAX01



Series EGP

Series EGP Gripper

This gripper is available in 2 sizes with 2 jaw styles and 2 jaw travels, with mounting options on 3 sides of the gripper for maximum application versatility.

The combined 24 VDC motor and interface module provide a complete, easy-to-interface package for use with your existing PLC or system controller.



Series EC

Series EC Cantilever Slides

Series EC Electric Cantilever Slides as a complete package with motors, controllers, and programming software. Series EC Slides provide programmable, multiple position linear motion. Units move smoothly, while providing rugged, precise movement of tool plate and attached load. Standard travel lengths to 24 in [610 mm]. Series FS motor and controller packages include motor, choice of controller (stepper or servo) and a Windows-based programming software for fast point-and-click programming. The software uses a powerful, yet easy-to-use programming language. To program or edit an existing program, simply select the appropriate icons and respond to prompting dialog boxes. For added flexibility, standard NEMA frames (17, 23, and 34) are also available for mounting other motor brands of your choice.