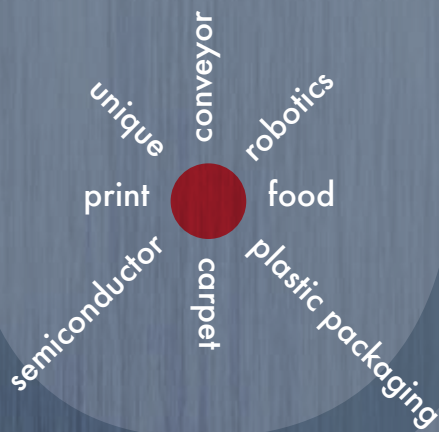


**phd** *Unlimited*<sup>®</sup>  
 UNIQUE SOLUTIONS

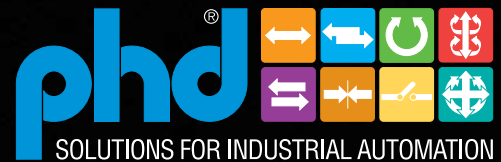
Unique Solutions for Unique Industry Requirements



UNIQESOL10



PHD is a member of the  
 MAC Distributor Network



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 www.phdinc.com • phdinfo@phdinc.com

# Over 50 Years OF DEDICATION

In 2007, PHD celebrated its 50th anniversary. Since 1957, our customers have trusted PHD to produce high quality, reliable products for their automation needs.

We have a full line of components: cylinders, escapements, grippers, slides, rotary actuators, clamps, multi-motion actuators, and proximity switches and sensors to provide the motion you require. With millions of component variations, we can help move, turn, slide, lift, grip, reach, rotate, and clamp almost anything to increase your productivity.

Our components are completely modular. Using either bolt direct units or transition plates, our actuators can be combined to create millions of application variations.

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.

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

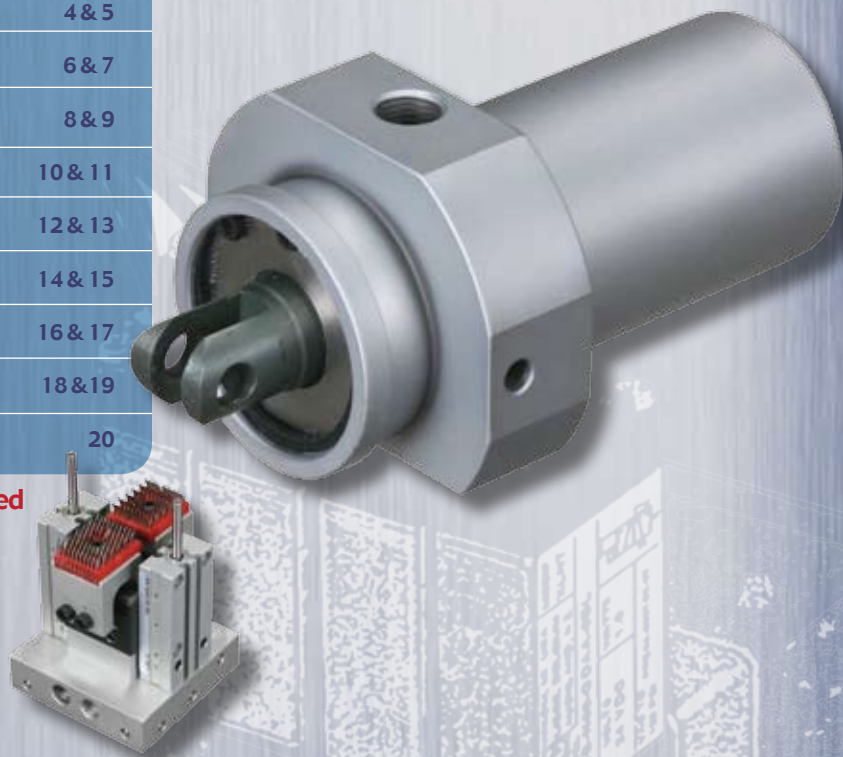


## focused industries

Plastic Packaging Components Industry	4 & 5
Carpet Manufacturing	6 & 7
Food Processing	8 & 9
Semiconductors	10 & 11
Printing Industry	12 & 13
Robotic Systems	14 & 15
Conveyor Systems	16 & 17
Other Applications & Replacements	18 & 19
More PHD Products	20

For more industries, go to [www.phdinc.com/unlimited](http://www.phdinc.com/unlimited)

Unique Solutions for  
Unique Industry  
Requirements





## DISTRIBUTOR SUPPORT

PHD, Inc. is a proud member of MDN. The MAC Distributor Network is a customer focused network of global manufacturers and distributors providing worldwide sales and exceptional service. With partners located worldwide, we are equipped to provide you a wide variety of value-added support and ongoing assistance.



## 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.



## 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.



## UNIQUE SOLUTIONS ARE OUR SPECIALTY

*Not because we have to, but because we want to.*

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. PHD has 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.

### Unique Solutions® Classifications

Our Unique Solutions® designs are divided into classifications used to determine the additional requirements needed to produce your specific actuator. Below are 5 classifications that are used throughout this brochure. Each classification level going from 1 to 5 represent a higher level of modifications.

For example, Class 1 designs require only minor modifications to our standard products, while Class 5 is a unit unlike any of our standard products and is a completely new design.

**Class 1 - Modification to assembly procedure**

**Class 2 - Change of BOM using standard components**

**Class 3 - Modification of standard catalog actuator**

**Class 4 - Modification of standard catalog actuator requiring parts made from scratch**

**Class 5 - Unit made completely from scratch**



**SIMPLE**

**Creating Unique Solutions is simple for PHD. We can make solutions simple for you!**

# PLASTICS

stretch  
filling  
extrusion  
blow molding  
injection



### Replacement Filler Cylinder

CLASS 5  
Directly interface on  
Krones® filling machinery  
Significantly longer life  
High precision

### Needle Cylinders

CLASS 5  
Direct replacement  
Mounts into the same space and bolt patterns  
Provides significantly longer life and reduces  
maintenance and downtime  
Reduces "suckback"  
Improves exhaust

**We understand**  
your unique automation requirements.

1-800-624-8511

Contact the PPC Group for PPC Division assistance.

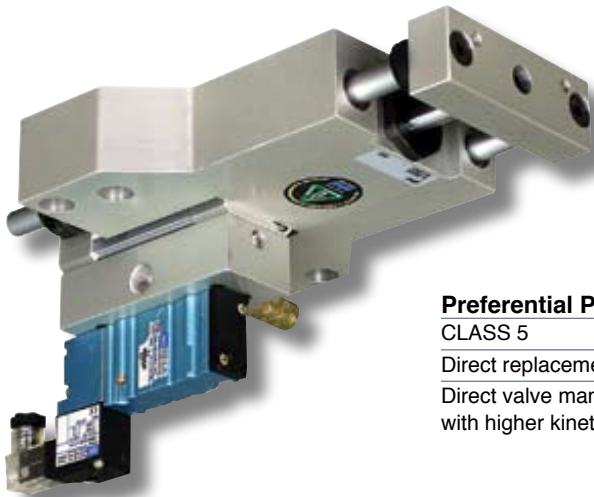
With millions of component variations, we can help pick, place, twist, turn, lift, grip, reach, rotate, eject, and clamp what you need to increase your productivity. If an application requires a modified component, our Plastic Packaging Components team is ready to help. We welcome special requests for unique products, regardless of quantity or frequency of order.



**Series1 Heat Set Nozzle Cylinder**  
 CLASS 5  
 Cylinder built like Series2 Cold Set

**Series1 Pneumatic Nozzle Cylinder (SB02-SB06)**

- CLASS 5
- Mounts into the same space and bolt patterns
- Longer life, less downtime
- Simplified design and maintenance
- Provides energy savings with enhanced sealing technology



**Preferential Preform/Bottle Eject Slide**

- CLASS 5
- Direct replacement for Series2
- Direct valve manifold provides quicker response with higher kinetic energy capacity



**Filler Cam Engagement Slide**

- CLASS 5
- Stainless steel shafts and tool plate make this unit corrosion resistant
- Counterbored tool plate mounting holes recess bolt ends, reducing overall unit length



**Thermoforming Cylinder**

- CLASS 5
- Direct replacement
- Withstands high temps
- Fully field-repairable
- Significantly longer life and reduces downtime

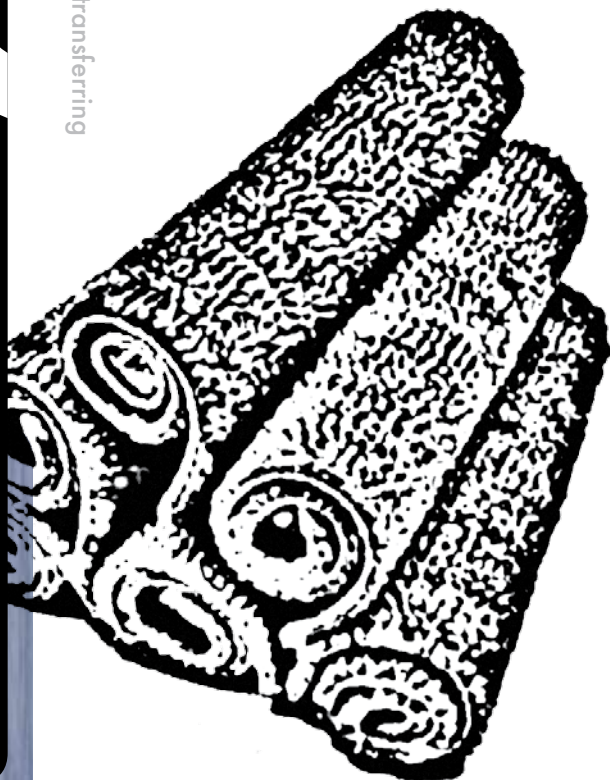


**Replacement Cam Follower Wheels**

- CLASS 4
- Significantly longer life than competitor wheels
- Can be made in a variety of materials and sizes

# CARPET

retention  
tufting  
stretching  
transferring



## ML308345 Cobble Full Repeat Stroke Machine

CLASS 5

Single acting

Manifold of four cylinder bores to replace single cylinders on machine

Hardcoated aluminum body, bronze rod bushings, and 303 stainless steel piston rods

Manifold mounting for MAC

Series 34 valve for lowest response time and highest machine performance

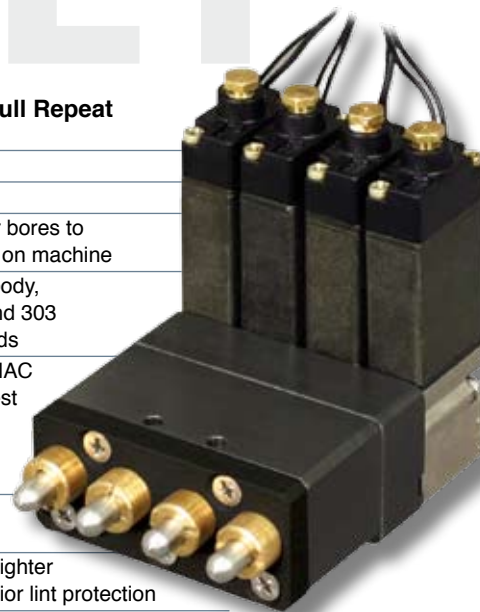
Lubricated air not needed

Sintered filter plug and tighter rod tolerances for superior lint protection

Long life, tested to over 100 million cycles

Easily field repairable

PHD LitStore CP308345



## ML305112 Carpet Gripper

CLASS 4

Modular gripper/cylinder combination



## Carpet Tufters-Level Cut Loop

CLASS 4

Single acting

Direct drop-in replacement of OEM parts

Hardcoated aluminum body, zinc plated steel cap, and 303 stainless steel piston rod

Built-in push to connect fitting for  $\varnothing$  1/8 in tubing for ease of installation

Lubricated air not needed

Sintered filter plug and tighter rod tolerances for superior lint protection

Cylinder is hex-keyed through rear port for easy installation using basic hand tools

Long life design

Easily field repairable

Lowest cost of ownership

PHD LitStore CP307489, CP307835, CP308893, and CP309305





**ML308855**

Dual pinion rotary actuator. Pinions operate independently of each other

Fluoro-Elastomer seals

Stainless Steel Pinions

**ML305315 Modular Device**

CLASS 5

.250 x 1.50 in (x8)

MAC Valve ready

Flange mounted

Compact design

Hardcoated aluminum body

Lubricated air not needed



**C4467 Carpet Stretcher**

CLASS 4

Ensured carpet retention

Simple design, long life, high clamp force, and fast field maintenance.

Multiple jaw configurations and tips are available to fit your application requirements.

Compact envelope size and high clamp force.

Series GRM size 2 generates up to 225 lb [1000 N] of clamp force.

The jaws of the Series GRM Clamp lock in the closed position ensuring part retention if air pressure is lost due to line rupture or power loss.

PHD LitSore CPC4467A



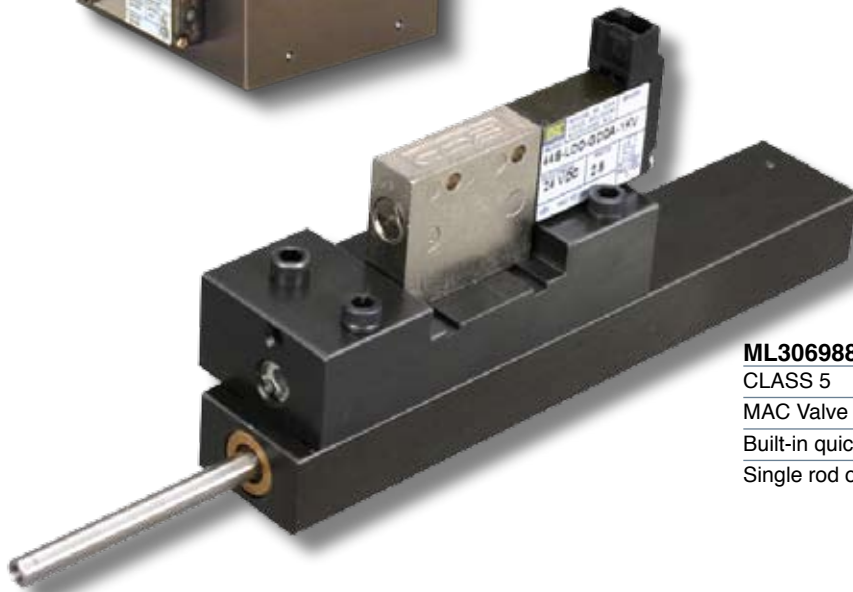
**ML304022 Carpet Gripper**

CLASS 5

MAC Valve ready

Wider jaw configuration

Ejector pins built into body of gripper



**ML306988 High Speed Cylinder**

CLASS 5

MAC Valve ready

Built-in quick exhaust for high speed actuation

Single rod or multi-rod configurations possible

# A Slippage Solution

Our C4467 Carpet Stretcher is outfitted with "tenter pin" jaw tooling and is used to transfer automotive carpeting into position for molding. This unit also used to stretch the carpet prior to molding. The tooling is made up of numerous sharp points that pierce the carpet, thus eliminating any slippage. See above.

# FOOD

PET  
long life  
FDA compliant  
wash down environments  
food grade lubrication



**ML309208**  
**Corrosion Resistant Plastic Rotary**  
CLASS 5

Constructed of PET and stainless steel materials especially for wash down environments.  
Direct drop-in replacement  
Option to repair the actuator if necessary  
Reduced down time due to reliability and long life expectancy of the PHD product  
Reduced product waste



**ML302807 Volumetric Pump**  
CLASS 5

303 stainless steel body, piston, piston rod, adjustment screws, and fasteners  
Adjustment screw for volume adjustment  
Additional Buna-N quad seal for added sealing and protection  
Compact design  
PHD LitStore CP302807A



**ML307562 Polymer PET Long Jaw Travel Gripper**  
CLASS 5

Synchronized jaw travel  
Long jaw travel  
PET plastic body  
Stainless steel jaws



**ML308838 Polymer PET Plastic Cylinder**  
CLASS 5

Designed for part production in a deionized water environment  
Fully field repairable  
Simple design, long life  
Double-acting  
Longer bearing surface when compared to other cylinders  
PHD LitStore CP308838



**ML307784**  
**Plastic Slide**  
CLASS 5

FDA approved plastic  
Rod wipers  
Stainless steel guide shafts



**ML308000**  
**Plastic Cylinder**  
CLASS 5

FDA compliant polymer and stainless components



**ML305001 Plastic Volumetric Pump**  
CLASS 5

FDA approved plastic body for corrosion resistance





**ML310077 3 Jaw Gripper**

- CLASS 5
- Direct drop-in to an existing gripping device
- Three jaw construction
- 0 degree closed/16 degrees open
- PET body/Stainless steel jaws
- Food grade lubrication
- Stainless steel tooling included
- Integrated push to connect fittings
- PHD LitStore CP310077

**ML308978 Tip Gate Replacement Cylinder**

- CLASS 4
- Robust Series CV Cylinder design
- Replaceable shock absorbing bushing
- Direct drop-in to existing competitor's cylinders
- Standard 4" stroke, other strokes are available, consult PHD
- Designed with stainless steel bolt and washers
- PHD LitStore CP308978



**ML307246 Corrosion Resistant Compact Heavy Duty Slide**

- CLASS 4
- 100% corrosion resistant
- Materials used - hardcoat aluminum for maximum corrosion resistance
- Long life and field repairable
- Large guide shafts
- Heavy duty, rugged
- Stainless steel stop collars
- Bumpers
- PHD LitStore CP307246



**ML302550 Slide Gate Cylinder**

- CLASS 4
- Direct drop-in to existing competitor's cylinder. Bore is 32 mm diameter
- Strokes designed are 6, 7, 8, 9, and 11 inches. Other strokes are available.
- All units include a fastener kit which contains all hardware for replacement.
- Incorporates a 12 mm oversized rod for durability.
- Smooth deceleration and quiet operation.
- PHD LitStore CP302550



**ML304096**

- CLASS 5
- Complete Stainless Steel cylinder with Stainless Steel Cover
- Valve attached to cylinder
- Stainless Steel cover protects the valve from caustic wash down

## A Tip for Tip Gates

Customers with vibratory conveyors sometimes experience excessive wear in the mount holes of the fork mount. The high frequency vibrations of the conveyors that feed the product cause this.

Our tip gate cylinder design provides a replaceable shock absorbing wear bushing which extends the life of the cylinder in this demanding application, reducing downtime and inventory costs.

ML308978 can be ordered in the length needed to drop-in and replace the current tip gate actuator to the bagging machines.

# SEMICON

solder  
packaging  
conformal coating  
wet process



### ML306079 Variable Pick Head

CLASS 5

Ideal for final packaging process

Motor driven pitch

Pneumatically driven vertical slides



### ML305289 Dual Gripper

CLASS 5

2 sets of synchronized jaws

Each set of jaws in independently operated

Multi-jaw gripper

Tight positional tolerance



### ML302190 Crown Thruster

CLASS 5

Low breakaway unit

Three, 20 mm diameter bore built cylinders

provide the thruster motion

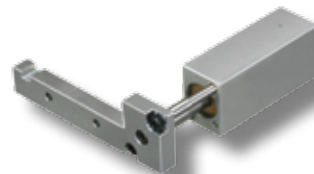
Stroke is 1.12 inches

Piston rods are 3/8 in diameter

Three 8 mm diameter guide shafts for support

Weighs 2.37 lbs.

PHD LitStore CP302190



### ML305422 Replacement Cylinder

CLASS 5

Low breakaway

Customer specified tool plate configuration

.500 bore x 1 1/4 in stroke

Incorporates PHD's CT design attributes

## Making Complex Automation Simple

• Increased Production • Reduced Downtime • Lowest Cost of Ownership



**ML305733 Corrosion Resistant Plastic Slide**

CLASS 5  
 100% corrosion resistant  
 Materials used - PET & stainless steel  
 Rod scrapers  
 No grooves in body - easy to wash down, eliminating areas for bacterial growth  
 Stainless steel mounting inserts  
 Lightweight slide  
 Large guide shafts  
 Dual bore slide  
 PHD LitStore CP305733



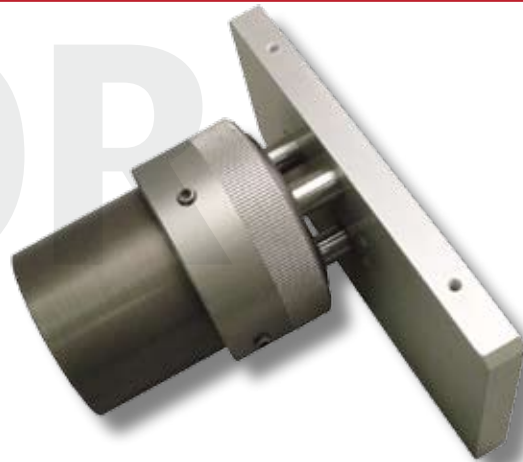
**ML304239 Pick Head Slide**

CLASS 5  
 Manifold ported  
 Precision housing movement  
 Direct drop-in replacement  
 .375 in stroke per rail



**ML303439 Stainless Steel Slide**

CLASS 5  
 316 Stainless Steel  
 Wash down environment  
 Long life



**ML302357 Round Thruster**

CLASS 5  
 20 mm x .625 in stroke  
 12 mm guide shafts  
 Easily accessible retract stroke adjustment



**ML302657 Polymer Series GRW with Stainless Steel Jaws**

CLASS 4  
 PET body and bushing  
 Stainless steel jaws and jaw guides  
 Fluoro-Elastomer seals  
 Jaw guides and seals lubricated with cleanroom compatible grease



**ML303025 PET Replacement Gripper**

CLASS 5  
 Features PET body and cover with stainless steel jaws, jaw driver, and fasteners; providing protection in deionized water applications and eliminates the need for protective jaw boots  
 Compact, lightweight design allows for maximum application flexibility  
 Double-acting for use in both internal and external gripping applications  
 This gripper accepts select competitor switches, saving hours of downtime associated with switch change out. Contact PHD for more information.  
 Other configurations are available  
 Units are fully field repairable  
 PHD LitStore CP303025



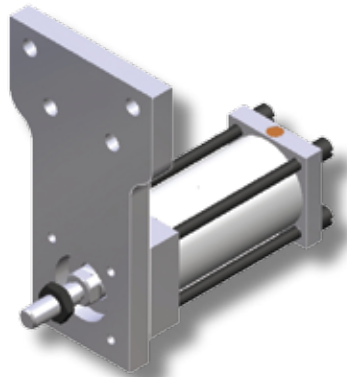
**ML309840 Rotary Actuator for Solar Panel Manufacturing**

CLASS 4  
 High torque, heavy duty  
 Wide variety of options and accessories  
 Free floating aluminum pistons with pressure and wear compensating piston seals provide long life and low friction  
 Heavy duty sealed ball bearings ensure shaft stability under heavy and high impact loading  
 Double rack for increased torque capability and 0° backlash at end of rotation  
 Output torque at 5100 in-lb at 90 psi

Final Packaging  
 Alternative Materials  
 Low Breakaway Units  
 Conformal Coating  
 Automated Circuit Board Routing/Depaneling  
 Wet Processing  
 Solder Paste or Reflow  
 Adhesive Application/Conformal Coating

# PRINT

drying  
press  
palletizing  
mail fulfillment  
bindery



### ML305875 Chock Lock Cylinder

CLASS 4

1-1/8 inch bore 1/4" inch stroke, other bores and strokes are available

Long life design for low maintenance

Cylinder repairable for extended life providing long term savings

Wide range of options for easy application and reduced design time

Custom mount flange

Spring extend - air retract, single acting

Double rod for robust bearing support

PHD LitStore CP305875



### ML308995 Pusher Cylinder on Stacker

CLASS 4

Longer life on actuator. Piston is longer for added stability and to reduce bore wear.

PTFE Wear Ring provides piston support and enhances durability. Dramatically decreased repair kit cost

Bushing PTFE instead of bronze for longer life

Urethane seals for improved durability

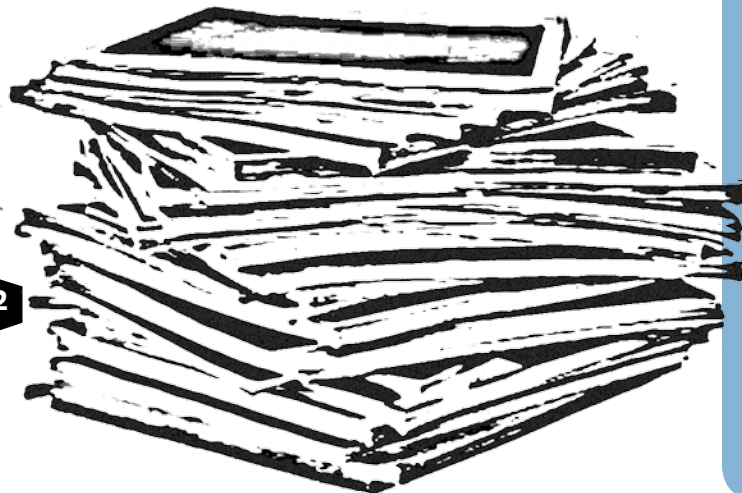
Internal shock pads eliminate metal to metal contact

Includes cushion controls that are easily field repairable maximizing your investment.

Anodized aluminum alloy heads, caps and tube

Longer life on position sensors - Solid state versus Reed

PHD LitStore CP308995



## Stacker Application

**Problem:** There was no space for a slide or similar tool to address the huge side loads encountered. The current cylinder has an enlarged snout with a large nose bearing. The unit fails frequently and requires a rebuild. The current solution is attached by a proprietary cable that undergoes constant flexing.

**Solution:** This cylinder can be located underneath the rotating table in the stacker. Our cylinder is used to extend to push finished, stacked, and banded magazines onto the conveyor, then retracts back to the home position to push the next completed bundle. See ML308995 above.



### ML310053 Press Cylinder

CLASS 5

63 mm x 45 mm stroke

1/8 BSPP ports

Long life bushing and wiper seal

Direct drop-in replacement cylinder for MAN  
Roland press cylinder



### ML310417 Impression Cylinder

CLASS 5

Replacement cylinder for a Speedmaster  
Heidelberg press

100 mm bore x 30 mm stroke

Back to back

MAC Valve ready

Long life and consistent response speed



### ML310456 Blanket Wash Cylinder

CLASS 5

Direct replacement for a Heidelberg blanket  
wash cylinder

Universal - rod can be on either side

40 mm bore x 10.5 mm stroke

16 mm rod

1/8 BSPP ports

Long life seals and bushings



### ML309911 Chain Tension Cylinder

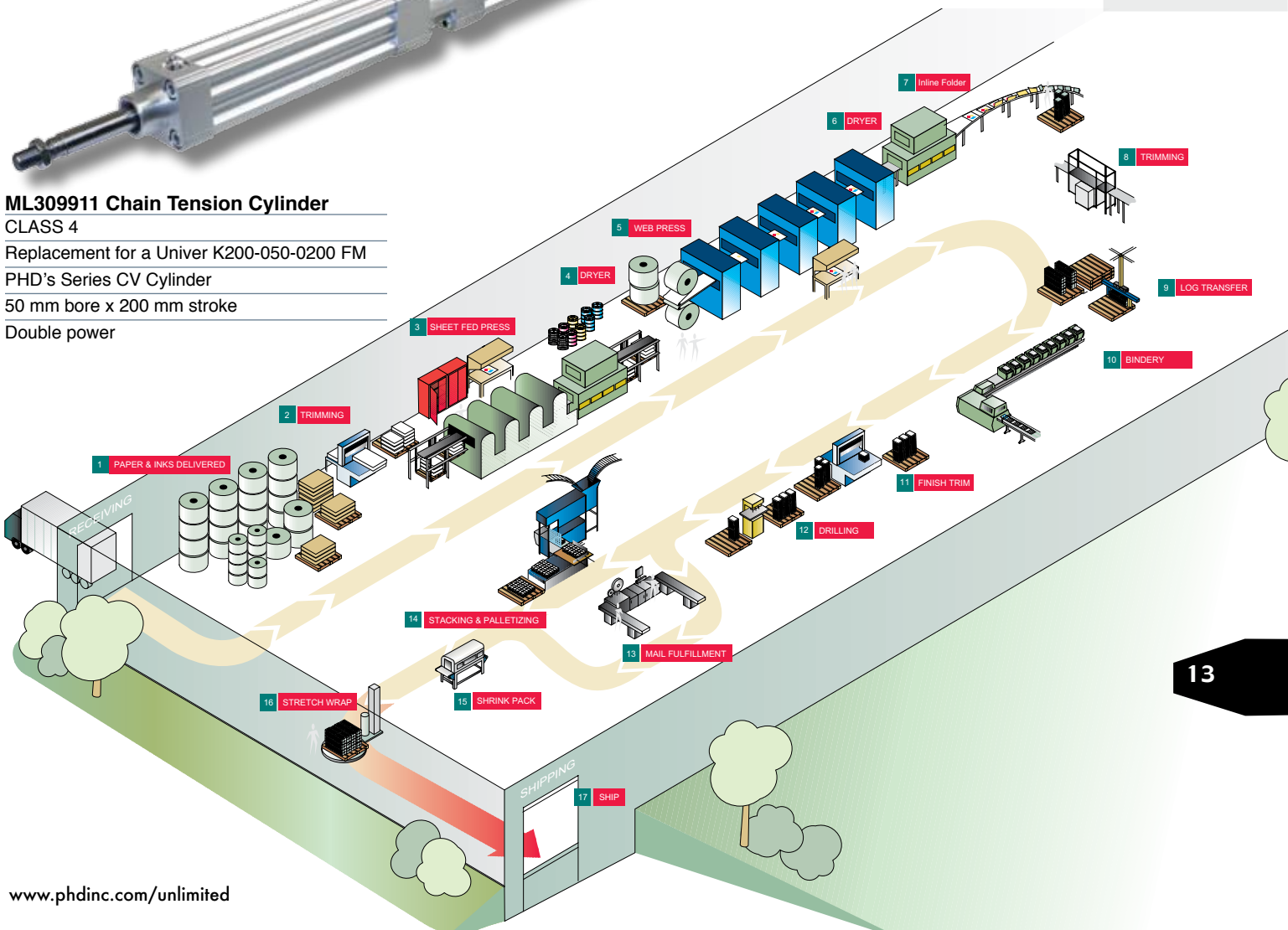
CLASS 4

Replacement for a Univer K200-050-0200 FM

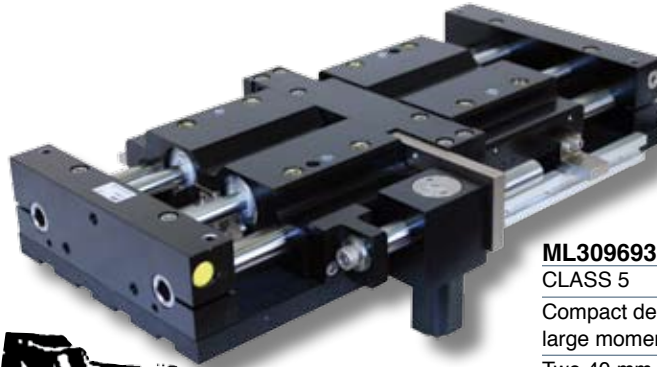
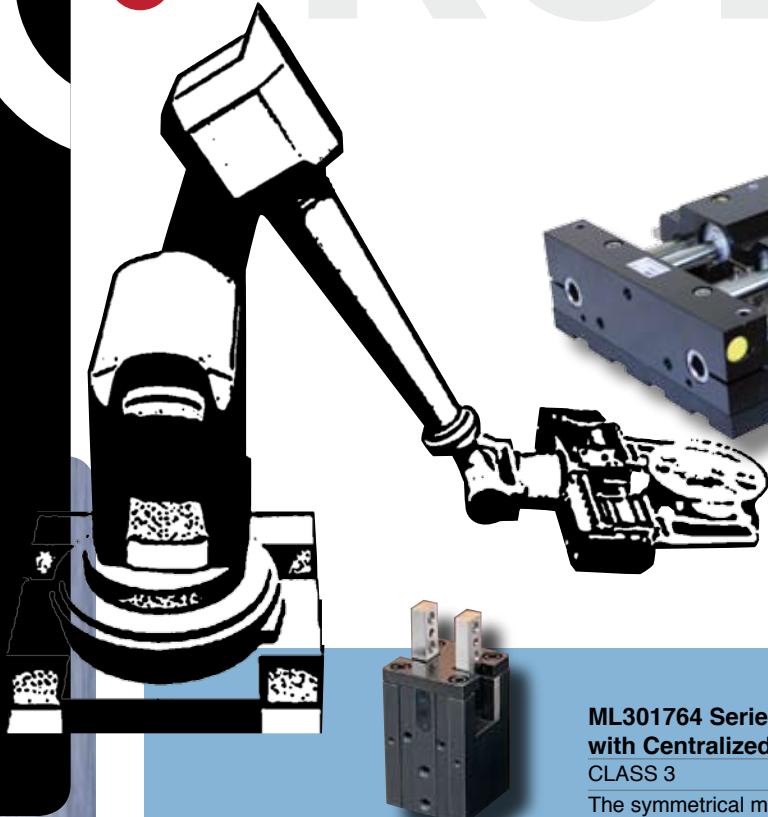
PHD's Series CV Cylinder

50 mm bore x 200 mm stroke

Double power



testing  
loading  
transferring



### ML309693 Low Profile Gripper

CLASS 5

Compact design provides high grip force and large moment capacities with low overall height. Two 40 mm bore cylinders per jaw provide high grip forces.

Rugged design withstands high impact and shock load.

Double acting for use in both internal and external gripping applications.

Rack and pinion jaw synchronization provides minimal backlash.

Synchronizer is enclosed, protecting mechanism from debris.

TC fluoropolymer composite guide shaft bushings provide long life.

Integrated elastomer rod and shaft wipers prolong bushing life in harsh environments.

Multiple port locations provide versatile plumbing capabilities.

PHD LitStore MGRPL01-EC



### ML301764 Series 190 Parallel Gripper with Centralized Manifold Port

CLASS 3

The symmetrical manifold design allows flexibility for any bottom mount orientation.

Eliminates the need for airlines and allows for grippers to be mounted closer together.

Fully field repairable.

Compact size is ideal for handling small parts in confined areas.

Units are specified for maximum grip force for internal or external gripping for optimum unit performance.

Rugged jaw and body construction can withstand high impact and shock loads.

Internal jaw mechanism constructed of hardened steel components for a maintenance-free service life exceeding 10 million cycles.

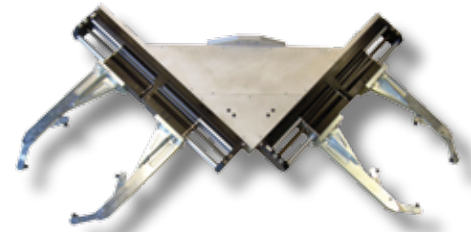
Close tolerance components eliminate jaw play.

Jaws have dowel holes or male keys for precise tooling location.

PHD LitStore CP301764

## Manifold Ported Grippers Load Test Station

Modified for any industry that requires a minimal space array of grippers. In this example, an array of four grippers is manifold mounted to a crossbar of a robotic arm. The grippers pick up the machined tubes and reposition them into a test station. Due to space constraints, the grippers cannot have external air fittings. Each gripper can be rotated to the required positions without re-machining the mounting holes.



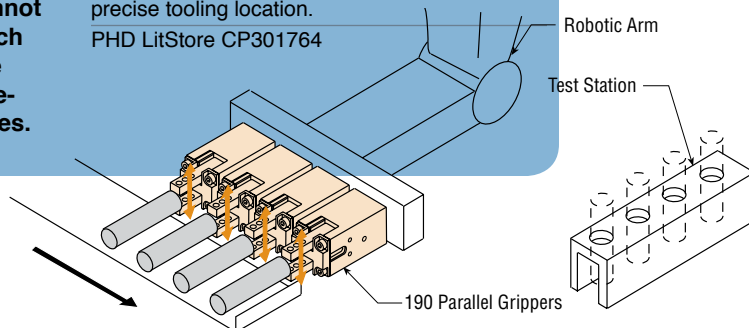
### ML308857 Unique Adaptors

CLASS 4

Modular device

Unique bracket to direct mount to end of robot.

Standard Series GRR Grippers mounted to bracket.





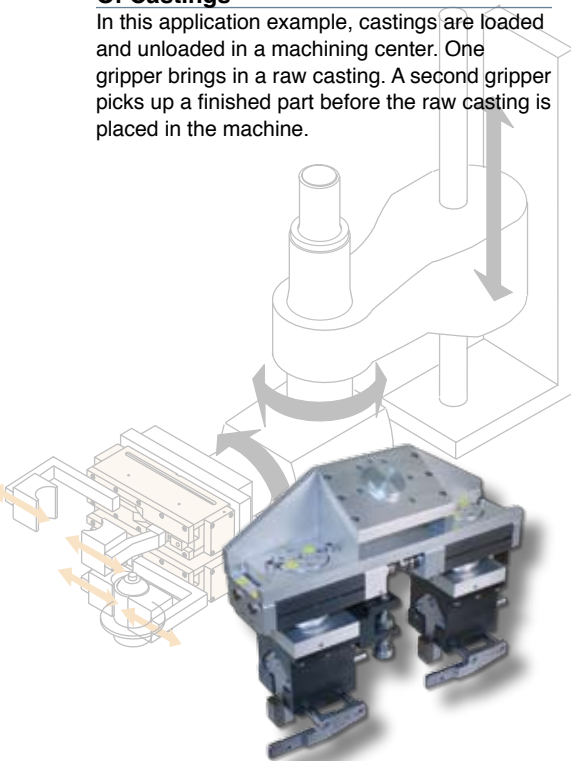
**ML221538 Hydraulic Steel Gripper**  
CLASS 5

Hydraulically driven  
Manifold ported for simplified plumbing  
Long jaw travel in a compact package  
Simple construction allows the grippers to be repaired in the field for extended life and value.  
Steel body and jaw covers with corrosion resistant plating extend life in harsh environments

PHD LitStore CP016

**Machine Loader For Machining Of Castings**

In this application example, castings are loaded and unloaded in a machining center. One gripper brings in a raw casting. A second gripper picks up a finished part before the raw casting is placed in the machine.



**ML309749 Modular Device**  
CLASS 5

Modular device  
Two grip and rotate devices incorporated into one assembly  
Mounting configuration designed to adapt direct to customer's robot



**ML308248 Three Position Synchronized Rail Gripper**  
CLASS 5

Ground rail delivers high precision with minimal deflection  
12 mm bore with 1:1 power to jaw force output  
Jaws are synchronized via common pinion  
Jaw positions at closed 0.00", 1.00", and 2.67"  
Intermediate jaw position repeatable to  $\pm .005$ "  
Air centered intermediate position for use with pressure centered valve-requires only two airlines!  
Switch ready for PHD Series 6790 Switches  
PHD LitStore CP308248



**ML304024 Gripper with Balluff BIL Transducer**  
CLASS 5

PHD's Series GRS and GRL Grippers can be modified to accept the Balluff Series BIL (non-contact analog) position transducer. These custom grippers can grip parts that vary in size while providing continuous position feedback to the controller.  
The Balluff Series BIL position transducer provides a 0 to 10 Volt feedback signal.  
Feedback from the transducer is based on gripper jaw position.  
A sensor cover is provided to protect the PHD magnet from external contaminants (ML# 304024 only).  
Balluff sensor is protected from the environment (IP67).  
PHD LitStore CP304024



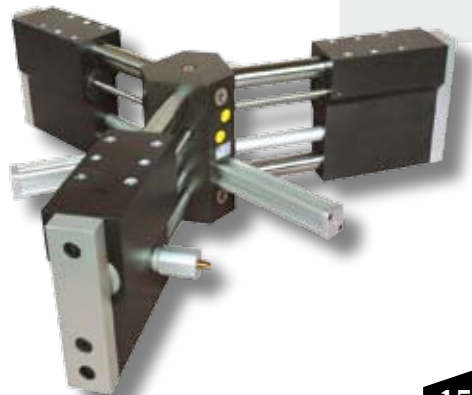
**ML310665 Lightweight Gripper**  
CLASS 4

GRW size 16 design  
PET body and aluminum jaws for lighter weight  
Longer than normal travel



**ML219177 Mono Gripper**  
CLASS 4

Long jaw travel  
Spring assist closed  
One fixed jaw to maintain accurate registration on gripped parts.  
Simple construction allows the gripper to be easily repaired in the field for extended life and value.  
PHD LitStore CP014

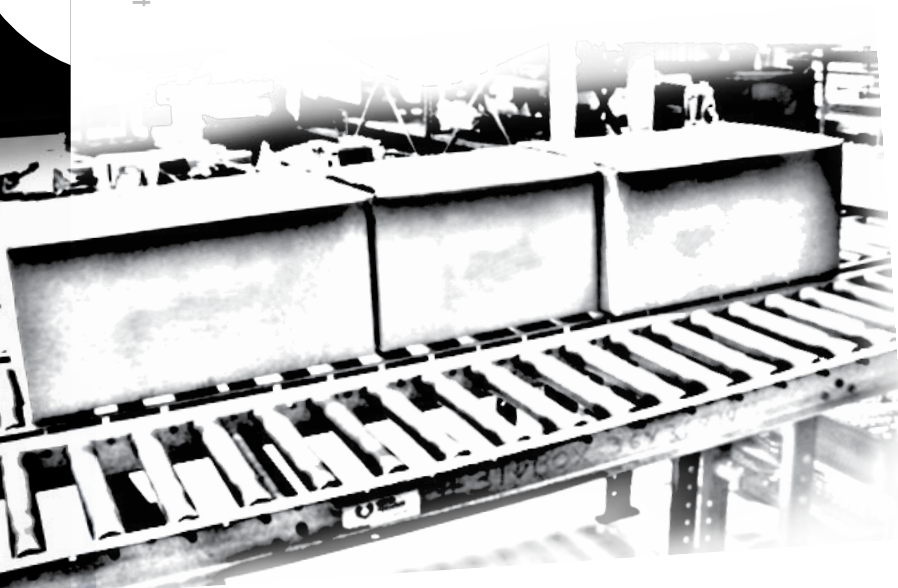


**ML305843 3 Jaw Heavy Duty Rim Gripper**  
CLASS 5

Large 3 jaw gripper  
300 mm diametral travel  
PHD LitStore CP305843

# CONVEYO

stop  
divert  
eject  
reject



### ML307537 Staging Stop

CLASS 5

Direct replacement

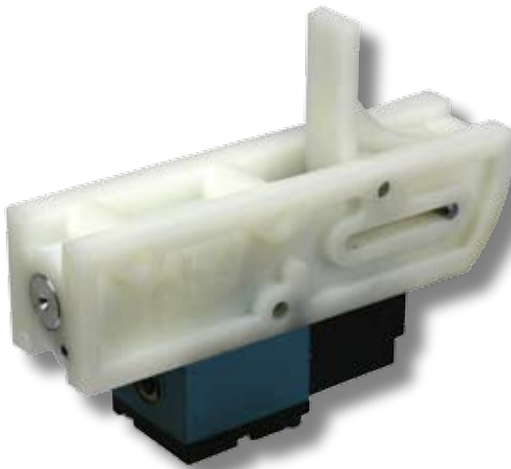
Pawl locks in up position (even with loss of air pressure)

Two sets of switch mounting locations

Field repairable

Rebuild and seal kits available

Rated life: 2 million cycles @ .5 lbf-in kinetic energy absorption



### ML310573 Polymer Staging Stop

CLASS 5

MAC Valve ready

Compact design

12 mm bore

Unique design eliminates the need for linkages

Pawl locks in the up position



### ML309534 Valve Ready Slide

CLASS 4

MAC Valve ready

Valve can mount on either side of slide housing

32 mm bore x 25 mm stroke

Tool plate designed to customer's specifications





**ML300199 Can Style Cylinder**

CLASS 4

Round body with external seals to fit into existing casting

32 mm bore x 1 in stroke

Hardened piston rod



**ML310446 Tray Dumper Slide**

CLASS 5

Modular device

MAC Valve ready

Long life front wheel supplied with unit

25 mm bore x 3 in stroke

Incorporates PHD's Series SAH Slide

Rugged construction



**ML310064 Heavy Duty Non-Rotating Cylinder**

CLASS 5

32 mm x 1-1/2 in stroke

Non-rotating cylinder

MAC Valve ready

Combines PHD Series LCS Escapement and Series CTS Cylinder technology



**ML309548 Cantilever Rail Slide**

CLASS 5

Cantilever slide with rail bearing

32 mm x 250 mm

Shock absorber ready

Switch ready



**ML302796 Conveyor Cylinder**

CLASS 4

Uses PHD's standard Series CV Cylinder components

Designed for high speed with the incorporation of the MAC 400 Series valve

Fully ported

Field repairable

Modular design

This cylinder and valve combination offers the customer a faster response time when compared to the standard Series CV Cylinder. Used as a high speed diverter on a conveyor system.

- Stop
- Divert
- Eject
- Reject
- Snug
- Accumulate
- Flip
- Feed
- Stack
- Turn
- Locate
- Rotate
- Push
- Index

# Unique Applications & Replacements

## Unique Applications



### ML306580 CNC Quick Change Gripper

CLASS 5

Single acting hydraulic gripper, operates using pressurized coolant through the machine's spindle.

Mounting to fit CNC tool holder

Fits into machine's tool carousel

Designs available to fit all styles of tool holders

Reduce machining time by repositioning parts without stopping machine

Automated loading and unloading of parts (lights out operation)

Jaw blanks easily machinable and sold separately. Consult PHD.

PHD LitStore CP306580



### ML308635 Series GRB Fixed Jaw Gripper

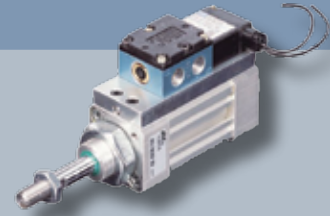
CLASS 4

Series GRB11-2-20 x 180 gripper

Fixed jaw

Rated for 500°F

Unique color jaws



### ML302516 High Speed Cylinder with MAC Valve

CLASS 4

High speed PHD Series CV Cylinder

Manifold mounted valve



### ML306457 2:1 Air Booster with MAC Valve

CLASS 5

Air booster

2:1 ratio

MAC Valve direct mount ready

## Replacements



### ML310089 / ML225070 / ML302658 Replacement Cylinders

CLASS 4

PHD cylinder designed to replace specialized design and manufacturing cylinder SDM-1783

PHD cylinder incorporates many features of the Series CR Cylinder

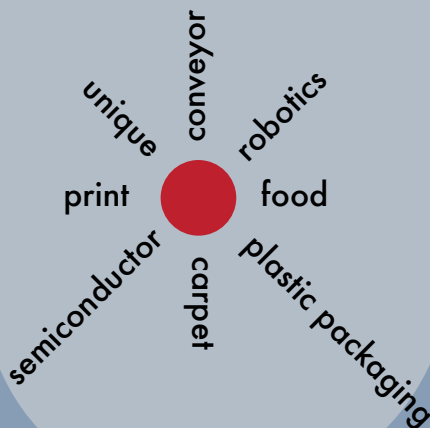
Design incorporates a stronger rod bushing in place of the standard Series CR rod bushing.

Designed for long life

Single acting for simplicity in plumbing

Field repairable for additional savings

PHD LitStore CP310089





**ML306487 Specialty Switch Integration**  
CLASS 4

PHD Series CR Cylinder modified to accept  
Turch transducer



**ML310165 Double Series GRS Gripper**  
CLASS 5

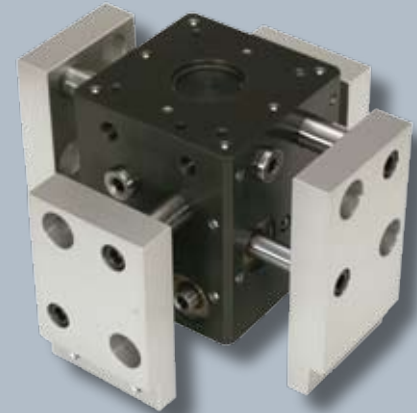
2 Grippers in one body



**ML307749 Long Life Hole  
Punch Cylinder**

CLASS 5

Hole punch cylinder for a Park Air machine  
Ready for a .375 in diameter die  
Spring return



**ML304667 4 Jaw Long Travel Gripper**

CLASS 5

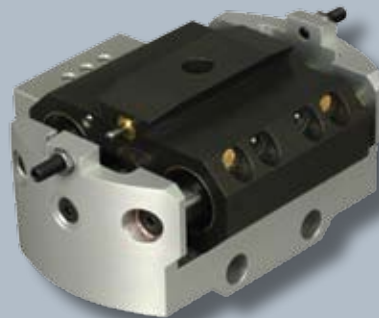
4 jaw synchronized gripper  
25 mm travel per jaw



**ML307584 / ML304302**  
**Angular Replacement Gripper**

CLASS 5

Replacement grippers  
Direct drop-in replacement  
Incorporates PHD's long life internal  
components



**ML309230 Tool Carrier Slide**

CLASS 5

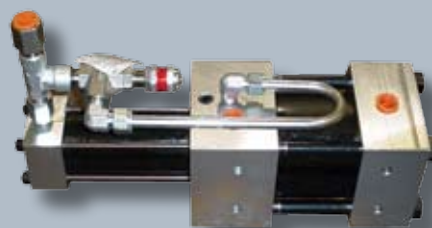
Drop-in replacement  
20 mm bore x .899 in stroke  
Proximity switch ready for Balluff BES switch



**ML303903 High Speed Lamination  
Feed Cylinder**

CLASS 5

Long life seals  
Manifold mounting of MAC valve to cap



**ML308212 Hydraulically Operated  
Lube Dispenser**

CLASS

Drop-in replacement for a Lincoln  
Centro-Matic Pump

# PHD STANDARD

## CLAMPS



**PA Swing Arm Clamp**  
Ideal for a wide variety of automated part holding and transfer applications



**PEC Arm Over Clamp**  
Superior part holding for assembly and welding applications  
Up to 900 in-lb [102 Nm] torque



**PLK Pin Locating Clamp**  
For part holding and positioning in weld areas  
Enclosed finger design keeps weld slag out  
50 mm bore



**PB Swing Arm Clamp**  
Ideal for part holding and transfer welding applications



**GRM Clamp - 13 jaw styles available**  
Standard, Flange, Needlenose, Hammerhead, Single Shovel, Double Shovel, Single Flat Shovel, Double Flat Shovel, Single Chisel, Double Chisel, Hook, G Jaw, and R Jaw  
Sheet metal handling applications

## CYLINDERS



**CR and CT Cylinders**  
Compact size  
8 bore sizes from 12 to 63 mm



**CV Cylinder**  
Conforms to ISO 6432, 6431 and VDMA 24562 specifications  
Available in eight sizes

## ROTARIES



**RA Rotary**  
Retains zero backlash  
5 sizes and 6 standard rotations



**RIS Rotary**  
Eliminates external air lines  
High torque  
High axial load capacity

Two sizes  
Modular designed tips  
Simple design, long life, high clamp force  
Fully field-repairable

For more information, request the PHD Clamp Binder.



## SLIDES



**SFM Slide**  
Multiple midstops  
Space saving rodless slide design  
Lowest deflection and highest moment capacity combination in the industry



**SIP Slide**  
Low profile design utilizes rail bearing technology for smooth precision movement  
Multiple mounting surfaces  
3 sizes with up to 2.953" [75 mm] of travel  
Typical loads up to 4.5 lb [20 N]



**SHP Slide**  
Compact design utilizes rail bearing technology for smooth precision movement  
Multiple mounting surfaces  
3 sizes with up to 2.17" [55 mm] of travel  
Typical loads up to 2.53 lb [11.25 N]



**SD/SE Slide**  
Thruster style slides with up to 28" [700 mm] of standard travel  
Typical loads up to 50 lb [223 N]  
High performance, many options and low price



**SFP Slide**  
Space saving rodless slide design  
Lowest deflection and highest moment capacity combination in the industry  
2 bore sizes with standard travel lengths to 3400 mm



**SM Slide**  
Precision ball or polymer bushings  
Smooth linear motion at twice the thrust of a single bore cylinder  
5 bore sizes with travel lengths up to 6" [150 mm]  
Typical loads up to 70 lb [311 N]  
Long life

## GRIPPERS



**GRW Gripper**  
Large tooling surfaces and precision dowel holes for accurate tooling attachment  
Long tooling lengths and high moment capabilities  
Reduced deflection



**GRS Gripper**  
Low profile, high force  
Rugged jaw support, hardened jaws and hardcoated bearing surfaces  
5 sizes  
2 jaw travels each size



**GRB Gripper**  
Three total jaw rotations are available 60°, 90°, and 180°  
6 sizes  
Grip forces up to 549 lb [2443 N] at 1.90" [48.3 mm] from pivot



**GRF Gripper**  
Low profile to fit limited space applications  
Jaw covers help prevent contamination  
Rugged jaw support, hardened jaws, and hardcoated bearing surfaces for long life  
4 sizes with grip forces up to 116 lb [516 N]



**GRK Gripper**  
Highest grip force in its class  
Precision jaw movement wear compensating over life of unit  
High moment capacity for longer tooling and greater part weights



**EGRK Gripper**  
Electric parallel gripper with long or short jaw travels with high force or high speed  
Precision jaw movement wear compensating over life of unit

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