

FOCUSED INDUSTRY SOLUTIONS

UNLIMITED UNIQUE SOLUTIONS



UNIQUE SOLUTIONS ARE OUR SPECIALTY



- Aluminum Smelting
- Automotive Manufacturing
- Battery Manufacturing
- Food & Beverage Manufacturing
- Industrial Laundry
- Industrial Printing
- Medical Manufacturing
- Packaging
- Robotics
- Semiconductor Manufacturing
- Stretch Blow Molding & Container Filling
- Tire Manufacturing
- Workholding

UNIQUESOL18

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. 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.



PHD, Inc. has ISO 9001 certification for Quality Management systems.

TABLE OF CONTENTS

PHD Complete Solutions	3
Industry Specific Solutions	4
Cylinders	6
Grippers	8
Linear Slides	10
Rotary Actuators	11
Rebuild Program	12

Complete Modular Solutions

PHD offers an extensive line of standard pneumatic actuators that are known for long life and high quality. Over the 60 years of innovation, PHD has extended their product offerings to include built-to-need components, price alternative components, electric actuators, specialty workholding clamps, and motion control robots. From single actuator solutions to multi-unit systems, PHD and YRG can provide total solution flexibility for practically any application requirement.



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.



Built on the foundation of long-life products for industrial automation, PHD Optimax® products are designed to meet machine builders' performance requirements at a competitive price.



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



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.



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 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.



Pneu-Connect™ is a cost-effective pneumatic end-effector system providing seamless integration for Universal Robots. Pneu-Connect™ features embedded directional control valves for control of an end-effector through the robot's tool port. The system easily attaches to the robot arm and is intuitively operated from the Universal Robot interface via the Pneu-Connect™ UR-CAP software package.



YRG is the Master Distributor for Yamaha robots in North America. Since 1976, Yamaha has provided assembly robots to the industrial manufacturing market that are unsurpassed for payload, speed, and dependability. From single axis robots to the broadest selection of Cartesian and SCARA robots available anywhere, YRG and PHD can supply the best solution for nearly any automated assembly requirement.

COMPLETE SOLUTIONS

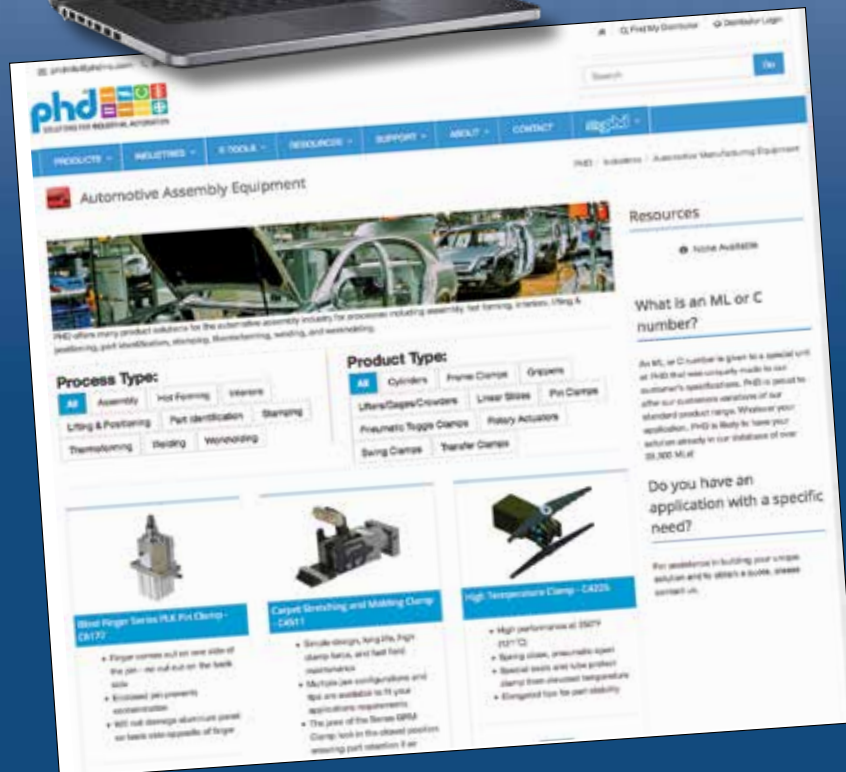
FOCUSED

on the specific needs of many industry applications



Do you have an application for a specific need? Browse our always-growing industry segments to discover your specific industrial automation solution at www.phdinc.com/industries. There you will find industry-specific solutions displayed according to application use. View our many field-tested components by process or product type. If your industry is listed, we may already have a solution designed specifically to your needs!

VISIT US ONLINE!
www.phdinc.com/industries



- Aluminum Smelting
- Automotive Manufacturing
- Battery Manufacturing
- Food & Beverage Manufacturing
- Industrial Laundry
- Industrial Printing
- Medical Manufacturing
- Packaging
- Robotics
- Semiconductor Manufacturing
- Stretch Blow Molding & Container Filling
- Tire Manufacturing
- Workholding



***Experiencing machine downtime
due to an actuator failure or
poor performance?***

DOWNTIME

**POOR
PERFORMANCE**

**MACHINE
FAILURE**

phd *Unlimited*[®]
UNIQUE
SOLUTIONS

**Application-
Specific
Needs**

Cylinders



ML311080 PVC Cylinder

All PVC construction
Fluoropolymer seals
Used in semiconductor industry



ML310600 Plastic Cylinder with Hollow Rod

Double hollow rod for vacuum
Chrome-plated piston rod
Light weight
Used in food industry



ML307798 Drain Cylinder

Direct replacement for Ellis drain cylinder
Unique corrosion resistant coating
Used in commercial laundry application



ML306345 Replacement Cylinder

OEM direct replacement for most discharge cylinders
12 mm bore x 10 mm stroke
Used in commercial laundry application



ML310898 PET Body with Stainless Steel Piston Rod

Switch ready
Fluoropolymer seals
Used in semiconductor industry



ML308838 Polymer PET Plastic Cylinder

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
Used in semiconductor industry



ML307675 Drain Cylinder

OEM replacement for most LaVatec drain cylinders
Spring extend
Used in commercial laundry application



ML306554 Replacement Cylinder with Spring and Button Kit Attached as Shown

OEM direct replacement for most stopper cylinders
12 mm bore x 10 mm stroke
Optional button and spring kit available
Used in commercial laundry application



ML312857 Quick Change Volumetric Pump

Adjustable volume
Clear pump for visual confirmation
Easy 90° turn of the pump to remove
Slide off piston design
Corrosion resistant and designed for autoclave
Size based on your requirements - Consult: PHD



ML310955 6 Cylinder Manifold

Common extend and retract ports
Incorporates extremely long life rod seals for durable wear requirements
Used in conveyor application



ML311558 Replacement for Braun Industrial Washer

Drop in replacement
Unique plating for longer life
Flexible 3 or 4 inch stroke internal adjustment for lower cost of ownership
Used in commercial laundry application



ML302550 Slide Gate Cylinder

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.
Used in food industry



ML308775 Cylinder

Large bore cylinder
Aluminum smelting



ML313638 Cylinder

160 mm bore
Larger than standard bore OCV
Used in conveyor application



ML310064 Heavy Duty Non-Rotating Cylinder

32 mm bore x 1-1/2 in stroke
Non-rotating cylinder
MAC Valve ready
Combines PHD Series LCS Escapement and Series CTS Cylinder technology
Used in conveyor application



**ML310417
Impression Cylinder**

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
Used in commercial printing industry



ML309911 Chain Tension Cylinder

Replacement for a Univer K200-050-0200 FM
PHD's Series CV Cylinder
50 mm bore x 200 mm stroke
Double power
Used in commercial printing industry



ML307067 CV Cylinder with Trunnion Mount

Front or rear trunnion mounting available on all CV sizes
Built in shock pads
Cushions available
Corrosion resistance available
Used in tire industry



**ML310456
Blanket Wash Cylinder**

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
Used in commercial printing industry



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
Used in commercial printing industry



ML309773 CV Cylinder with CNOMO Mounting

Available for 20 - 100 mm bores
Available with stud mounting on both ends
Longer life than other CNOMO cylinders
Used in tire industry

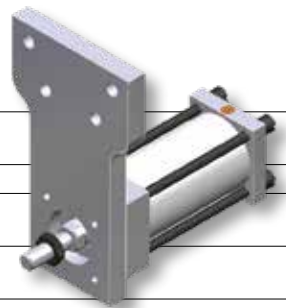


ML310053 Press Cylinder

63 mm bore x 45 mm stroke
1/8 BSPP ports
Long life bushing and wiper seal
Direct drop-in replacement cylinder for MAN Roland press cylinder
Used in commercial printing industry

ML305875 Chock Lock Cylinder

1-1/8 in bore x 1/4 in 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
Used in commercial printing industry



ML310107 Cylinder with Adjustable Center Trunnion Mount

Adjustable and fixed trunnions available for 32 - 100 mm bores
Built in shock pads
Cushions available
Corrosion resistance available
Used in tire industry

ELECTRIC



phdplus.phdinc.com

ML311179 Electric Cylinder

2.250 in total stroke
Stainless steel cover for motor
Unique heavy duty rod seal to protect from harsh environments

Grippers



ML309749 Modular Device

Modular device

Two grip and rotate devices incorporated into one assembly

Mounting configuration designed to adapt direct to customer's robot



ML308793 6 Jaw Angular Gripper

75° jaw rotation

Designed for end of arm robotic tooling

Used in a robotic application



ML308248 3 Position Gripper

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 ± .005"

Air centered intermediate position for use with pressure centered valve-requires only two air lines!

Switch ready for PHD Series 6790 Switches

Used in a robotic application



ML310419 4 Jaw Gripper

Food grade grease

Unique FDA compliant plating and materials

Used in food industry



ML305843 3 Jaw Heavy Duty Rim Gripper

Large 3 jaw gripper

300 mm diametral travel

Used in a robotic application



ML309693 Low Profile Gripper

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

Used in a robotic application



ML311176 Series GRA Gripper with Stainless Steel Jaws

Food grade stainless steel jaws in place of standard GRA jaws

Incorporates food grade lubricants

Used in food industry



ML311181 Modular Device

Unique mounting plate configuration mounts to other new PHD components

Flexibility on changing part pick up points with precision

Used in a robotic application



ML306079 Electric Variable Pick Head

Ideal for final packaging process

Motor driven pitch

Pneumatically driven vertical slides

Used in semiconductor industry



ML311515 and ML307748 Gripper and Unique Tooling

Replaces triple buck gripper on Unipress pressing machine

Long life

Used in a conveyor application



ML311152 Unique Jaw Pads

Stationary tooling stand

Multiple uses

Modified to adapt to your jaw tooling configuration

Used in a robotic application



ML314143 CNC Machine Gripper

Manifold mount

Coolant powered operation

130 - 1000 psi high pressure unit

Customer specific jaws

Used in robotic application



ML302657 Polymer Series GRW with Stainless Steel Jaws

PET body and bushing

Stainless steel jaws and jaw guides

Fluoro-Elastomer seals

Jaw guides and seals lubricated with cleanroom compatible grease

Used in a robotic application



ML312786 Magnetic Gripper

No expensive tooling

One less axis of motion

Variability of part pickup

Compact size

Stainless steel cap improves durability

Multiple sizes available based on customer application

No electric lines required

**ML311161 Bottle Gripper**

10° Jaw opening with 3 point contact

Used to grip glass bottles of all types

Used in food industry

**ML313047 Spring Close Series GRH**

Non-standard stroke - 60 mm total

Spring close unit

7.15 lb spring force (60 psi min)

Used in robotic application

**ML311876 Pepperoni Gripper**

Based on Series GRW 16 mm unit

Stainless steel metallic components

PET plastic components

Viton shaft wipers and seals

Food grade lube

Used in food industry

**ML303025 PET Replacement Gripper**

Designed for deionized water applications

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

Used in semiconductor industry

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

PET body and bushing

Stainless steel jaws and jaw guides

Fluoro-Elastomer seals

Jaw guides and seals lubricated with cleanroom compatible grease

Used in semiconductor industry

**ML313700 Gripper**

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

Used in food industry

**ML310665 Lightweight Gripper**

Series GRW size 16 design

PET body and aluminum jaws for lighter weight

Longer than normal travel

Used in a robotic application

**ML307562 Polymer PET Long Jaw Travel Gripper**

Synchronized jaw travel

Long jaw travel

PET plastic body

Stainless steel jaws

Used in food industry

ELECTRIC



Electric Automation Solutions



phdplus.phdinc.com

PHD Plus Your Motor, Your Way, a simple 3-step process, allows users to employ PHD's proven technology operated by the motor and controls of their choice. This saves time and money by eliminating the need to learn or place into service a new motor and controls platform. If you prefer a complete package, PHD and your local distributor can provide motors and controls to fit your application needs.

**ML310629 Electric Gripper with Rail System**

Open motor architecture - Your Motor, Your Way

Switch ready

Grip force = 30 lbf at surface of jaw

**ML309746 Electric Long Travel Gripper**

2.750 mm total jaw travel

Open motor architecture - Your Motor, Your Way

**ML313640 Electric Series GRM**

Electromechanical Clamp

Based on GRM1TF-6-60-00

Motor and Controller integrated

280 N clamp force

Used in Automotive Industry

**ML311373 Electric Ball Screw Driven Parallel Gripper**

Internal bearing rail support

Synchronized jaw motion

25 mm total jaw travel

Stainless steel cover

Open motor architecture - Your Motor, Your Way

**ML311257 All Plastic and Stainless Steel Parallel Gripper**

Plastic body with stainless steel jaws, internal parts and fasteners

Synchronized jaw movement

Used in a robotic application

Linear Slides



ML305733 Corrosion Resistant Plastic Slide

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
 Used in semiconductor application



ML309534 Valve Ready Slide

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
 Used in conveyor application



ML309548 Cantilever Rail Slide

Cantilever slide with rail bearing
 32 mm x 250 mm
 Shock absorber ready
 Switch ready
 Used in conveyor application



ML310870 Lift Table

Rigid construction for long life
 Stainless steel piston rod and guide shafts
 Used in semiconductor application



ML303439 Stainless Steel Slide

316 Stainless Steel
 Wash down environment
 Long life
 Used in semiconductor application



ML310446 Tray Dumper Slide

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
 Used in conveyor application



ML307246 Corrosion Resistant Compact Heavy Duty Slide

100% corrosion resistant
 Long life and field repairable
 One size guide shafts
 Heavy duty, rugged
 Stainless steel stop collars
 Bumpers
 Used in food industry



ML310551 Air Spring Slide

Three guide shafts for additional support
 Direct mount to robot
 Tool plate can be modified to adapt to your tooling
 Used in robotic application



ML313252 Conveyor Stop

Customer specified toolplate geometry
 Reverse acting (pivot up with spring)
 Used in conveyor applications



ML310717 All Stainless Steel with Unique Tool Plate

Food grade stainless components
 Incorporates food grade lubricants
 Used in food industry



ML313108 SFP Pneumatic Variable Pick Head

Pneumatically changes pitch
 Lower cost than electric pick head
 Easy installation
 Customer specified pitch and number of heads
 Contact PHD for additional solutions or request to see a video
 Used in semiconductor application

ELECTRIC



ML310393 Electric Slide with Washdown

Meets IP67 guidelines
 AC servo with resolver
 All stainless steel construction



ML220914 Electric SA Slide

Open motor architecture - Your Motor, Your Way
 Numerous switch options
 Numerous configurations can be quoted



phdplus.phdinc.com

Rotary Actuators



ML309208 Corrosion Resistant Plastic Rotary

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
 Used in food industry



ML315060

Custom angle adjustments
 Customer supplied sprocket geometry
 Anti-washout food grade lubes
 Bearing covers with corrosion resistant unit
 Used in food industry



ML309840 Rotary Actuator for Solar Panel Manufacturing

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
 Used in semiconductor industry



ML308855

Dual pinion rotary actuator. Pinions operate independently of each other
 Fluoro-Elastomer seals
 Stainless steel pinions
 Used in carpet industry

ML313598

Drop in competitor replacement
 All stainless steel unit
 3 position rotary
 Used in food industry

UNIQUE APPLICATIONS



ML314318

Electric escapement
 Stepper motor driven
 PHD designed and supplied internal controller
 Used in conveyor application



ML315988

Drop in replacement for Emhart and BDF Improved pin design (main failure mode of competition)
 Fewer moving parts than competition
 High temperature seals and lubes to maximize life
 Lightweight design



ML306457 2:1 Air Booster with MAC Valve

CLASS 5
 Air booster
 2:1 ratio
 MAC Valve direct mount ready



ML313008 Air Docking Station

Fully field-repairable providing cost savings
 Internal parts are enclosed bushings for wear resistance providing longer life
 Black oxide finish for corrosion resistance
 Fast delivery



ML312930

8 mm bore x 4 mm stroke
 MAC bullet valve integrated
 High speed actuator



ML312726 Retention Cylinder

Drop-in replacement
 50 to 4,000 psi operating pressure range- hydraulic
 Field repairable, increases value and provides longer life
 PHD offers rebuild program providing same warranty as new unit
 Spring extend for ease of setup

REPLACEMENTS



ML311286 Replacement Cylinder with Long Life Rod Seal

Incorporates the PHD Series CR Cylinder
 Long life design



ML310933 Sealed Angular Gripper

GRB style gripper with sealed jaws and drive mechanism



ML307584 / ML304302 Angular Replacement Gripper

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

Rebuild Program

REBUILD REPAIR RECYCLE

Most PHD units can be rebuilt to save maintenance costs!

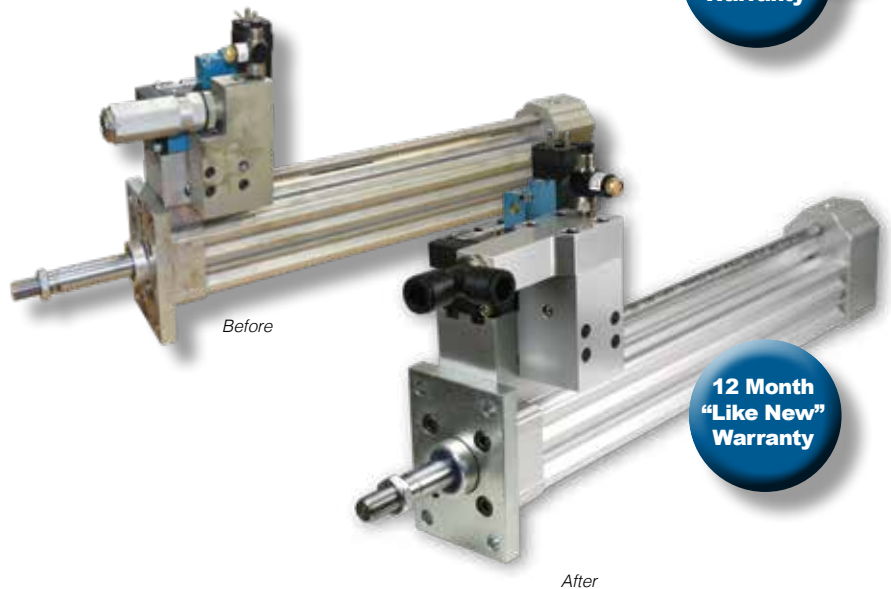
With over 60 years experience in customer satisfaction, our trained factory personnel can help you decrease your costs of maintaining and protecting your PHD investment. The PHD Rebuild Program is not just an ordinary repair process, but a state-of-the-art system that can help you save time and money.

- Provide no charge evaluations and quote for the repair
- Create a preventative maintenance program tailored to fit your needs
- Evaluate performance of your PHD product to provide you better life and performance that meets your expectations
- Conduct normal repairs of PHD products and components

PHD's rebuild program can save your facility training, additional work load, possible tool requirements, and facility space to perform the repairs. In addition, you will receive a 12 month "like new" warranty.

- PHD's Rebuild Program refurbishes your existing PHD products with all new wear items.
- Rebuilt units offer the same PHD quality that you're used to, but for a fraction of the cost of a new unit, reducing your total cost of ownership.
- Rebuilt units are placed back into service, thus reducing your total cost and saving valuable components from scrap.
- All PHD factory rebuilt units receive a 12 month "like new" warranty.

- ➔ Replacement parts
- ➔ Distributor assistance
- ➔ Online support
- ➔ Fast in-house rebuilds
- ➔ All new wear items
- ➔ Receive "like new" warranty



PHD, Inc.
9009 Clubridge Drive
P.O. Box 9070, Fort Wayne, Indiana 46899 U.S.A.
Phone (260) 747-6151 • Fax (260) 747-6754
www.phdinc.com • phdinfo@phdinc.com

UNIQUESOL 1 B

PHDinEurope GmbH
Zum Carl-Alexander-Park 6
52499 Baesweiler, Germany
Tel. +49 (0)2401-619 77 0 • Fax. +49 (0)2401-619 77 99
www.phdinc.com • info@PHDinEurope.de

5M 6/18 10666