

CUSTOM DESIGNS to fit your needs



CP

*These are just a few of the Custom Products available.
Contact PHD for more examples.*



**Balluff
Micropulse®
Linear Transducer**
page CP-8



**Large
Escapement**
page CP-16



**Series GRW
Gripper: with
Long Jaw Travel**
page CP-18

**Polymer (PET)
Gripper**
page CP-4



INDEX:
Introduction
Pages CP-2 and CP-3

Polymer (PET) Gripper
Pages CP-4 and CP-5

Encoder Gripper
Pages CP-6 and CP-7

**Balluff Micropulse®
Linear Transducer**
Pages CP-8 and CP-9

Mono Gripper
Pages CP-10 and CP-11

Low Profile Gripper
Pages CP-12 and CP-13

Compact Grippers
Pages CP-14 and CP-15

**Large Escapement
35 mm Bore**
Pages CP-16 and CP-17

**Series GRW Gripper: with
Long Jaw Travel**
Pages CP-18 and CP-19

**Personal Application
Assistance Request**
Pages CP-21 and CP-22



**Low Profile
Gripper**
page CP-12



CUSTOM DESIGNS

to fit your needs

For over 30 years, PHD has designed and manufactured custom products to fit the unique requirements of our customers. We welcome and encourage requests for specialized products, regardless of quantity or frequency of order. Our custom products range from one-time-only units to high quantity requirements.

- Designs that fit the unique requirements of our customers.
- Separate custom products engineering and manufacturing areas ensure prompt quotes and dependable delivery dates.

- No minimum quantities are required.
- Most quotes are processed within three to ten working days.
- All units receive a custom products number when ordered. This number, along with all specifications, is kept on permanent record at PHD for future reference and reorders.
- Over 70 million combinations beyond the wide range of standard catalog units to meet your specific requirements and specifications.

**Contact your local distributor or PHD at
1-800-624-8511 to request a quote.**



CYLINDER
3000 psi hydraulic cylinder with no exposed tie rods was designed for a character animation application.



GRIPPER
Mechanically actuated gripper gives exceptional jaw mechanism precision and repeatability.



SLIDE
Expander slide provides independent operation of dual tool plates.

Custom Product Examples

The following is a list of commonly produced features and products to fit specific customer requirements.



ALL PRODUCTS

- Construction materials
- Platings & coatings
- Seal composition
- Lubrication
- Rod and shaft scrapers
- Specialized labeling
- Units for harsh or critical environments

CYLINDERS

- Multiple or special mounting
- Oversize piston rods
- Low breakaway units
- Multiple port configurations
- Extra length stroke adjustments
- Specific spring return rates
- Rod end configurations
- Hollow rod

ESCAPEMENTS

- Double acting, non-sequenced
- Single rod units
- Specialized rod threads
- Long strokes
- Noise absorbing bumpers

ROTARY ACTUATORS

- High torque units
- Pinion shaft configurations
- Special hollow shafts
- Extra length rotation adjustments
- Spring centered rotation
- Long shaft extensions
- Extended rotations

MULTI-MOTION ACTUATORS

- Specialized rod ends
- Multiple or special mountings
- Multi-position miniature units
- Extra length rotation adjustments
- Port and control locations
- Extra length strokes
- Extended rotations

POWERED SLIDES

- Dual saddle units
- Rodless cylinder construction
- Dual tool plate units
- Specialized shock mounting
- Multiple positions
- Linear bearing material
- Oversized cylinders
- Long shaft extensions
- Pressurized bearings
- Fully custom fitted to application

GRIPPERS

- Port locations
- Single jaw units
- Long jaw travel
- Spring open/spring close
- Close tolerance jaw travel
- Customized jaw tooling
- Fully custom fitted to part

SWITCHES AND SENSORS

- Without indicator lights
- Special length cable
- High temperature use
- Special cable for flexing and critical environments

MODULAR AUTOMATION

- Customized Transition Plates
- Alloy steel Hub Adaptors
- Assembled subsystems to customer's application

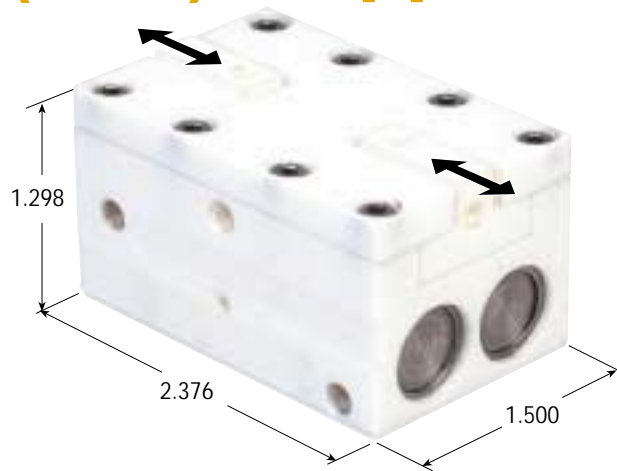


Polymer (PET) Gripper

ML# 213853

BENEFITS

- Compact size with long jaw travel. This gripper is constructed of PET plastic and passivated stainless steel with nitrile piston seals for harsh environments.
- Designed for part production in a deionized water environment.
- Ported body allows for the connection of pressure or vacuum to the jaw area.
- Fully field repairable.
- Simple design, long life.
- Double-acting for either internal or external gripper applications.
- Parallel motion is ideal for gripping parts of varying sizes while maintaining the parallel relationship of the jaws to the part.
- Additional sizes available, consult PHD, Inc.



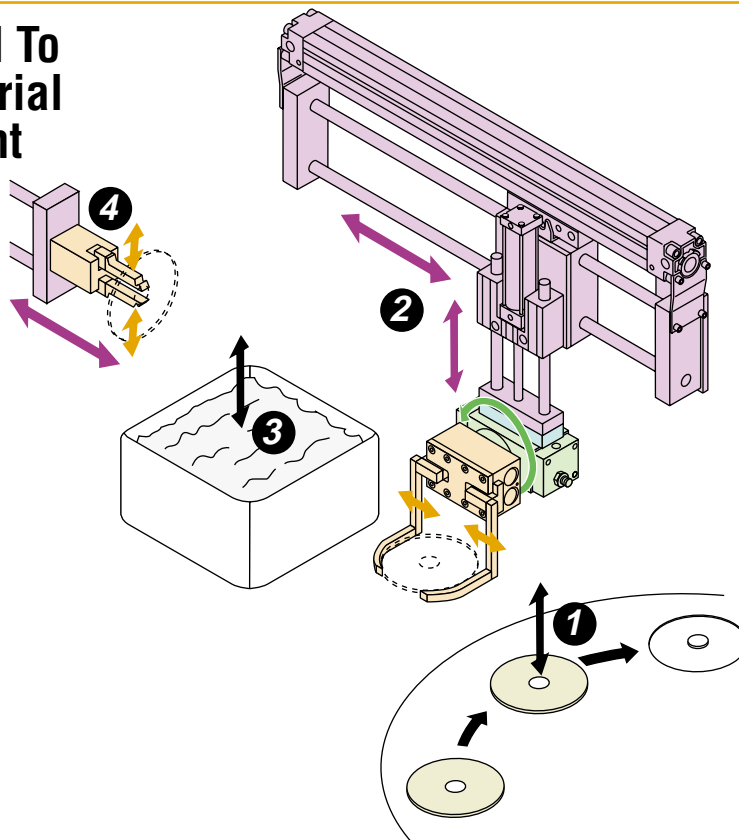
SPECIFICATIONS

Minimum Working Pressure:	30 psi	[2 bar]
Maximum Working Pressure:	80 psi	[5.5 bar]
Total Grip Force at 60 psi [4.1 bar]	20 lb	[89 N]
Total Jaw Travel:	.5 inch	[12.7 mm]
Bore:	.472 inch	[12 mm]

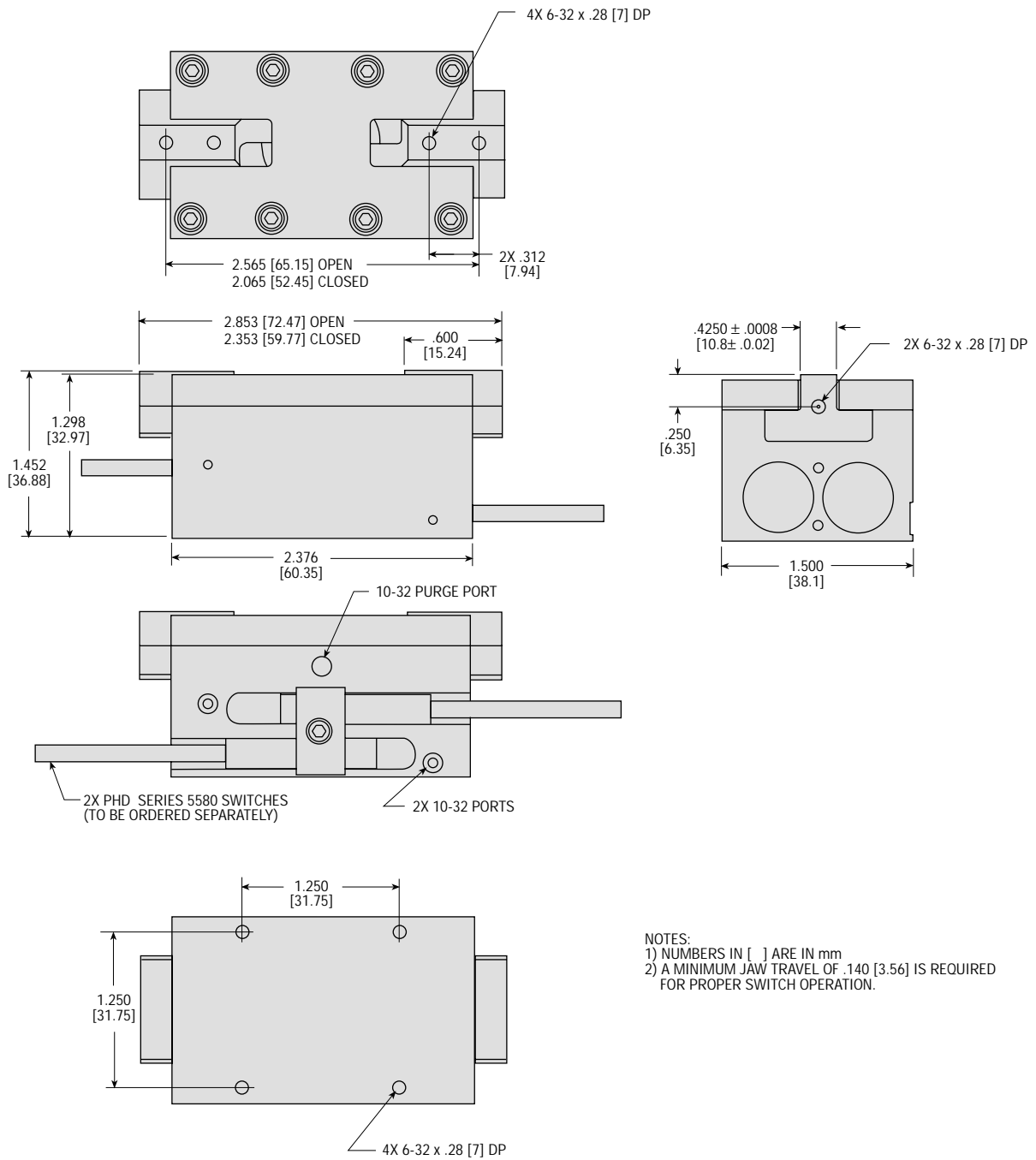
Plastic Gripper Used To Rinse/Transfer Material in Harsh Environment

After a polishing operation on a turntable (1) is completed, the (PET) plastic gripper picks up the part by its outside diameter. The part is transferred (2) to a deionized water bath (3) to rinse off the abrasive slurry.

After the rinsing process, the first gripper positions the part into the vertical axis to the second ID gripper (4). This ID gripper transfers the part onto a stack.



DIMENSIONS: POLYMER (PET) GRIPPER ML# 213853





Encoder Gripper

ML# 215082

BENEFITS

- An integral encoder provides feedback throughout the entire jaw travel.
- The encoder cover is sealed for protection from the environment.
- Simple construction allows the grippers to be easily repaired in the field for extended life and value.
- Double-acting for either internal or external gripping/gauging applications.
- Close tolerance jaw mechanism eliminates jaw play.



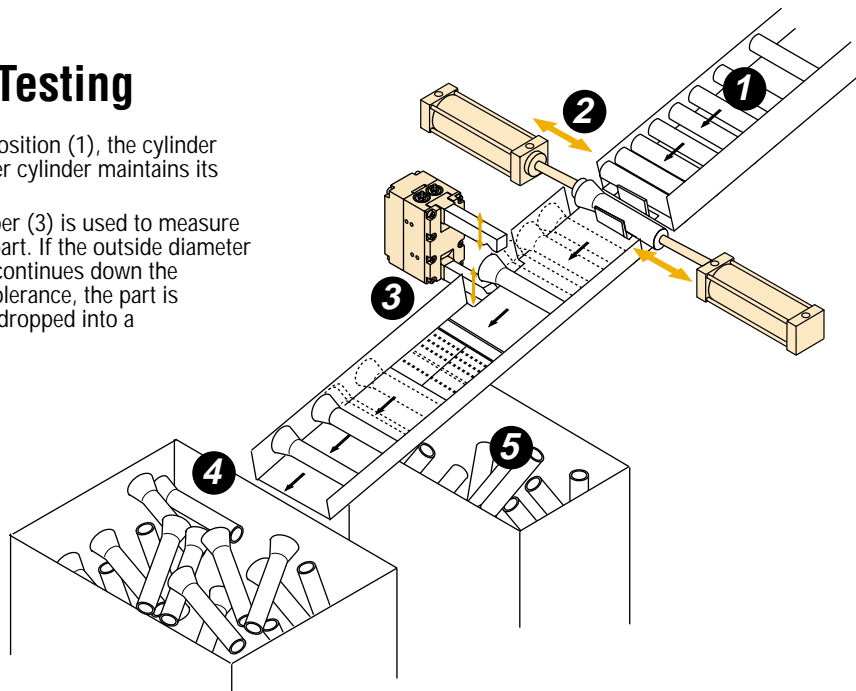
SPECIFICATIONS

Maximum Air Pressure:	100 psi [7 bar]
Minimum Air Pressure:	30 psi [2 bar]
Total Grip Force:	14.5 lbs. at 87 psi [64.5 N at 6 bar]
Weight:	1.25 lb [.57 Kg]
Total Jaw Travel:	.600 inch [15.2 mm]
Displacement:	.066 cu. in. [1.08 cc]
Lubrication:	Permanent for non lube air
Bore:	3/8 inch
Resolution:	.002 inch [0.05 mm]
	Total jaw travel per encoder pulse
Encoder:	5 VDC w/differential cable driver
Output Signal Frequency:	Approx. 25 kHz. w/100 psi air

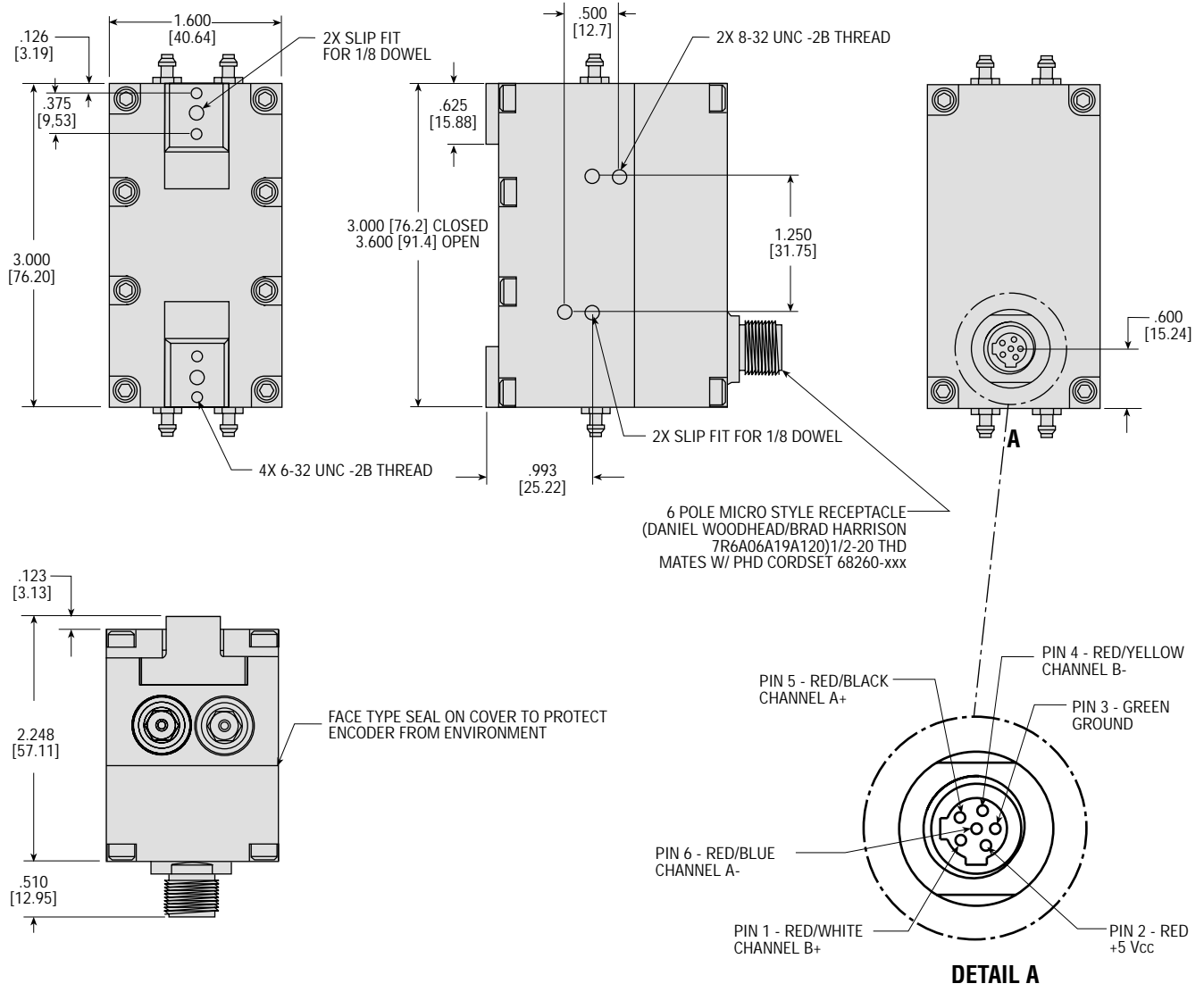
Gripper for Measurement and Testing

As a conveyor indexes each tube into position (1), the cylinder flares one end of the part while the other cylinder maintains its position (2).

At the next operation the Encoder Gripper (3) is used to measure the outside diameter size of the flared part. If the outside diameter size is within tolerance, the flared part continues down the conveyor (4). If the flare is not within tolerance, the part is rejected. A chute opens and the part is dropped into a rejection bin (5).



DIMENSIONS: ENCODER GRIPPER ML# 215082



NOTES:
1) NUMBERS IN [] ARE IN mm

All dimensions are reference only unless specifically tolerated.



BALLUFF MICROPULSE® LINEAR TRANSDUCER

ML# 224014

BENEFITS (FOR TRANSDUCER)

- Suitable for a wide range of applications. The Balluff Micropulse® Transducer may be used on slides, cylinders, rotaries, and multi-motions.
- Non-contact absolute positioning
- IP 67, highly resistant to contamination
- Wear free
- Never needs re-homing
- Resolution:
 - Analog: Infinite
 - Digital: Controller-dependent
- Three to four times better shock and noise immunity, resulting in proven enhanced accuracy, better performance, and longer-life feedback characteristics than other devices.

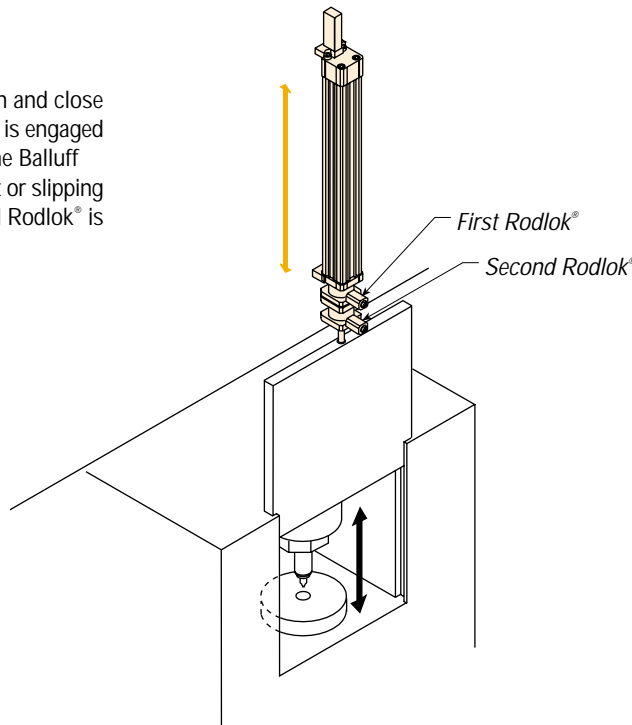


BENEFITS (FOR APPLICATION)

- Cylinder is field repairable.
- Mounting brackets are designed to achieve transducer mounting in position 2, position 3, and position 4.
- Piston rods have hard chrome plating for maximum life and durability.
- Double Rodlok® offers an extra safety factor to help prevent injury or damage to tooling.
- The threat of air leakage due to an internal linear transducer is eliminated.

APPLICATION ILLUSTRATION

In this application a Series CV Cylinder is used to open and close a vertical door on a machining center. The first Rodlok® is engaged when the door is fully opened to hold it in position. The Balluff Micropulse® Transducer is used to sense any movement or slipping of the cylinder rod. If movement is sensed, the second Rodlok® is engaged to ensure the door remains safely open.



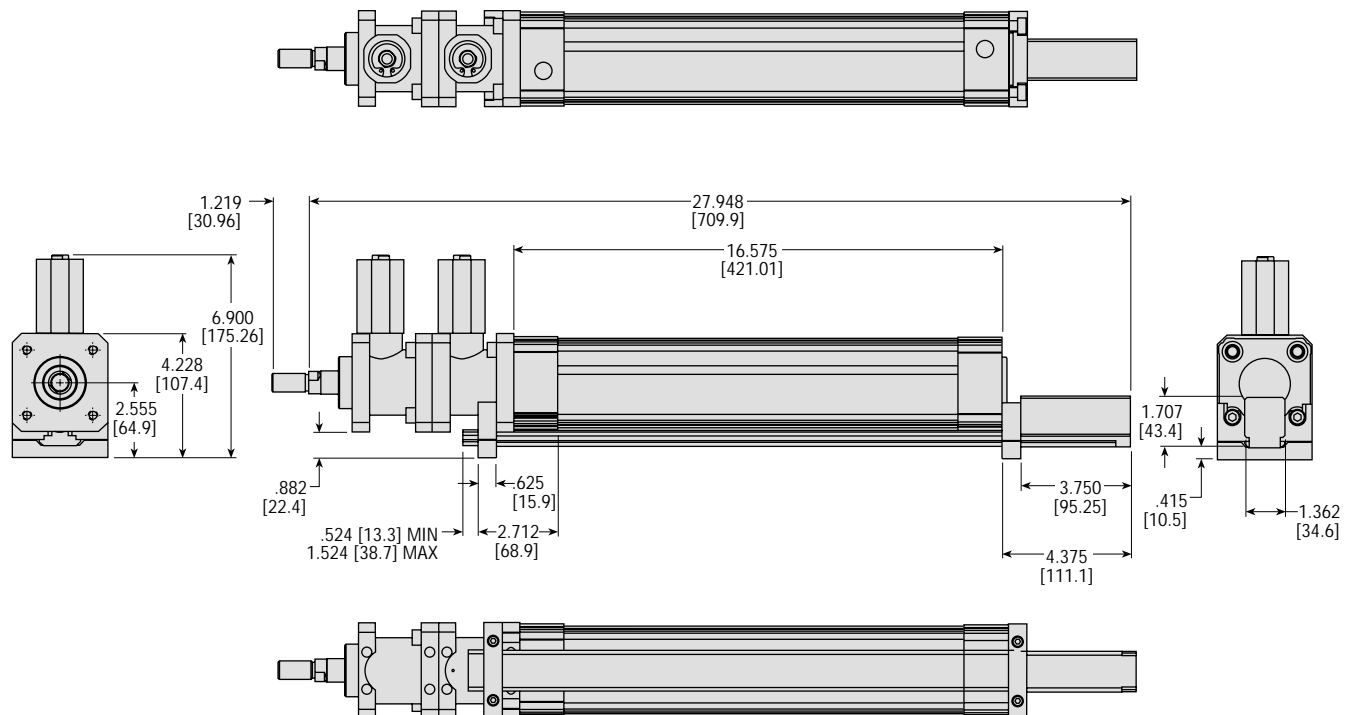
DIMENSIONS: LINEAR TRANSDUCER

ML# 224014

CP

TRANSDUCER SPECIFICATIONS

Output Current:	4 to 20 mA or 20 to 4 mA	Operating Voltage:	24VDC+/-20% (opt+/-15VDC P hsg)
Load Resistance:	<500 ohm	Current Draw:	<150 mA
System Resolution:	<0.2 mu.A	Polarity Reversal Protected:	Yes
Hysteresis:	<4 mu.m	Overvoltage Protected:	Transzorb protection diodes
Output Update Rate:	1 ms < 1400 mm	Dielectric Constant:	500V (Ground to Housing)
Max. Non-Linearity:	+/-100 mu.m to 500 mm stroke +/-0.02% 501 ...3606 mm stroke	Operating Temperature:	-40 to 185°F
Temperature Coefficient Voltage Output:	[150mu. V/C + (5ppm/CxPxV/LO)]xdT	Storage Temperature:	-40 to 212°F
Temperature Coefficient Current Output:	[0.6muA/C + 910ppm/CxPxI/L)]xdT	Output Signals:	4 to 20mA or 20 to 4mA output signal GND 10 to 0V or 0 to 10V
Shock Loading:	100g/11 ms per IEC 68-2-27	Supply Voltage:	GND +24VDC (GND)
Vibration:	12g, 10...2000Hz per IEC 68-2-6	Note:	
Traverse Velocity of Magnet	Any	1) x = 0 Increasing	
		2) x = 7 Decreasing C and E.	



NOTES:

- 1) ALL DIMENSIONS ARE REFERENCE ONLY UNLESS SPECIFICALLY TOLERANCED
- 2) NUMBERS IN [] ARE IN mm.

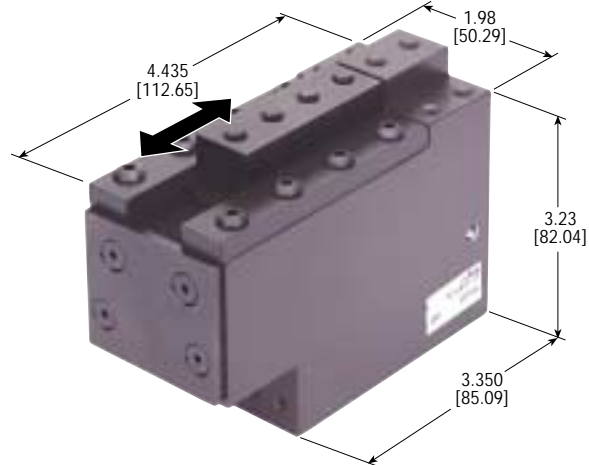


Mono Gripper

ML# 219177

BENEFITS

- 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.

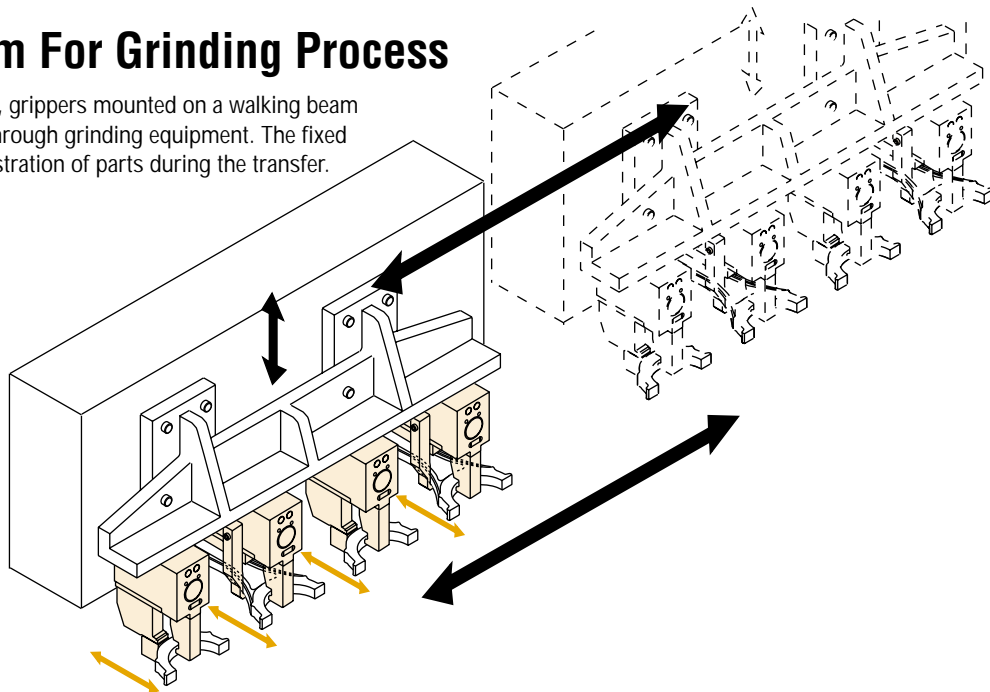


SPECIFICATIONS

Maximum Air Pressure:	100 psi [7 bar]
Minimum Air Pressure:	60 psi [4 bar]
Minimum Grip Force:	81 lbs [360 N] @ 100 psi [7 bar]
Minimum Grip Force From Spring Only:	12 lbs [53 N]
Weight:	2.55 lbs [1.16 kg]
Jaw Travel:	1 in [25.4 mm]
Displacement:	.761 cu in [12.5 cc]
Bore:	.984 in [25 mm]

Walking Beam For Grinding Process

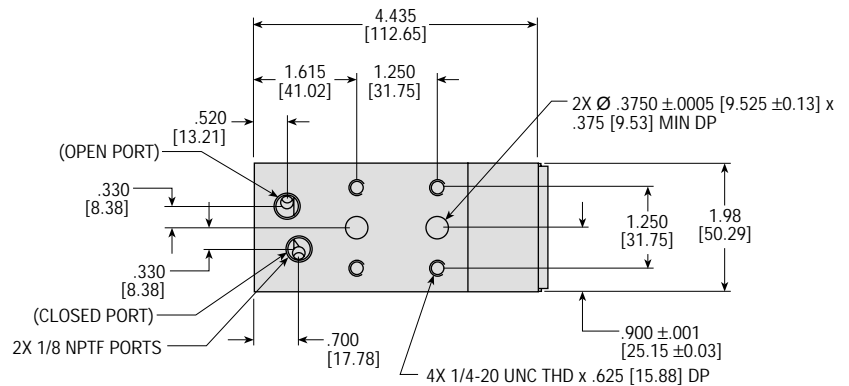
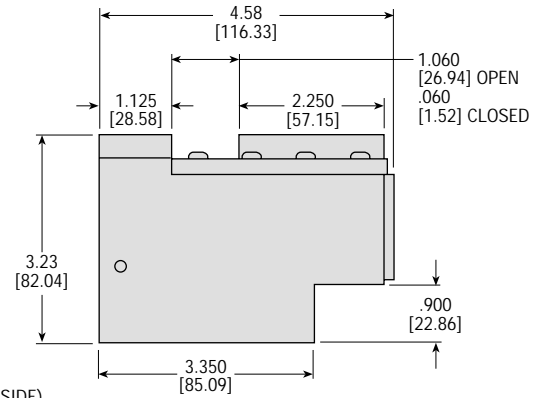
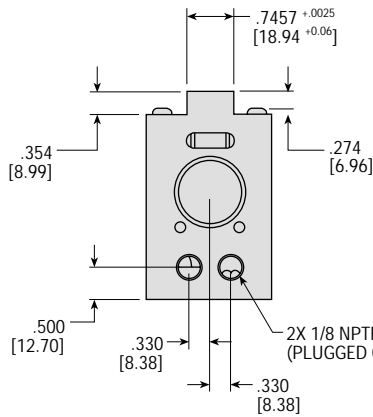
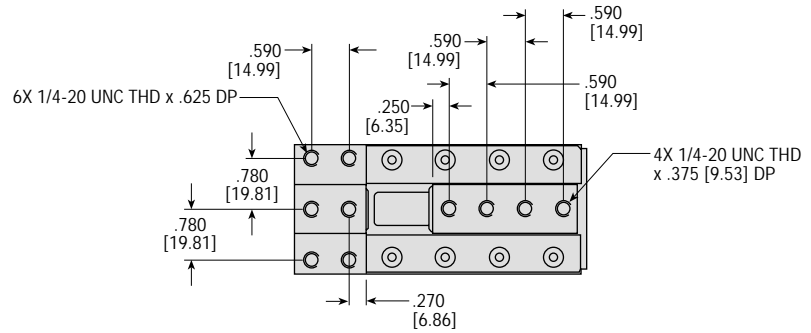
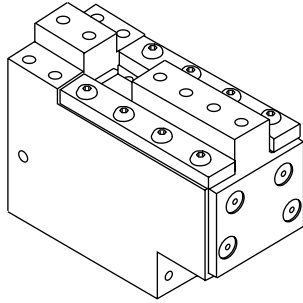
In this application example, grippers mounted on a walking beam transfer connecting rods through grinding equipment. The fixed jaw provides accurate registration of parts during the transfer.



DIMENSIONS: MONO GRIPPER

ML# 219177

CP



NOTES:

- 1) ALL DIMENSIONS ARE REFERENCE ONLY UNLESS SPECIFICALLY TOLERANCED
- 2) NUMBERS IN [] ARE IN mm.



Low Profile Gripper

ML#212539

BENEFITS

- Lightweight, compact, slim profile allows close manifold mounting of multiple grippers.
- Double-acting for either internal or external gripping applications.
- Simple construction allows the grippers to be easily repaired in the field for extended life and value.

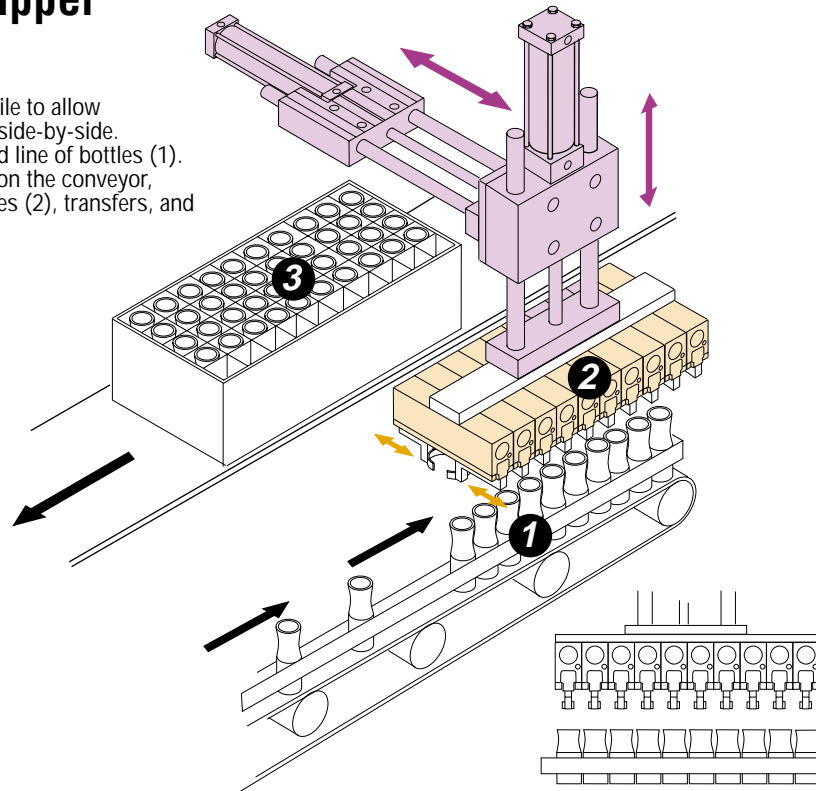


SPECIFICATIONS

Maximum Air Pressure:	100 psi	[7 bar]
Gripping Force at 80 psi [5.5 bar]	26.7 lb	[119 N]
Weight:	6.8 Oz	[193 g]
Jaw Travel:	1 inch	[25 mm]
Displacement:	.175 cu. in.	[2.87 cc]
Bore:	12 mm	

Slim, Low Profile Gripper for Packaging

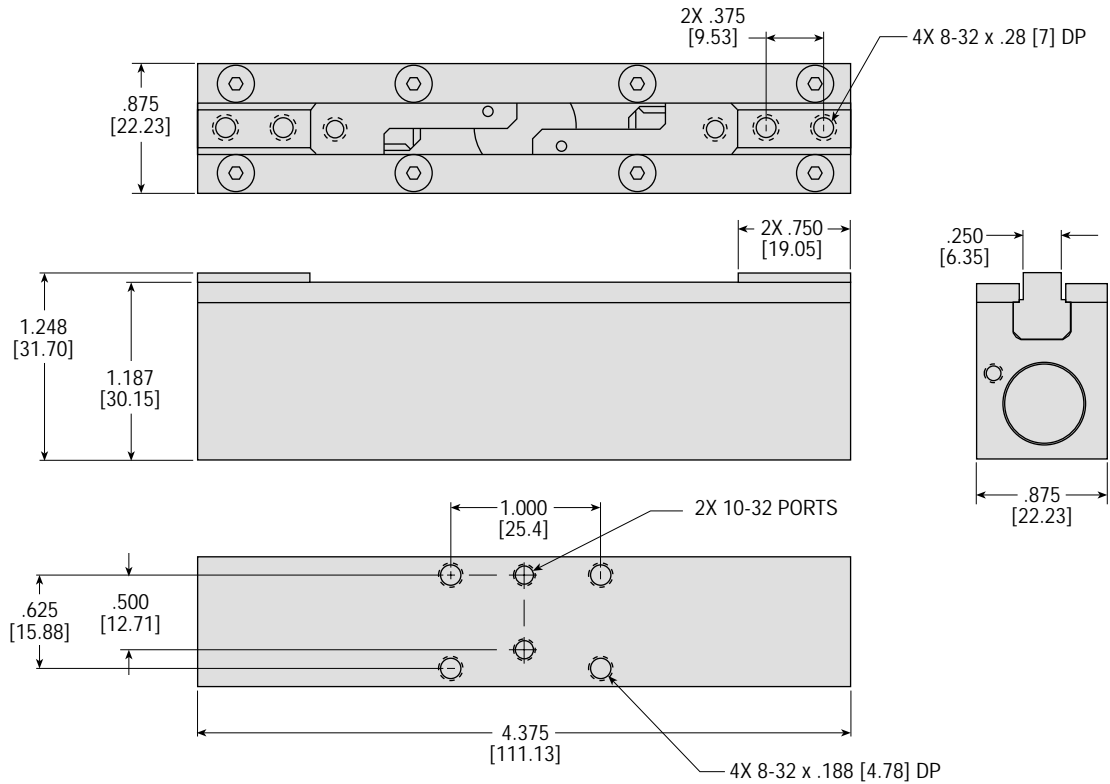
The gripper is designed with a narrow profile to allow for manifold mounting of several grippers side-by-side. The conveyor indexes with a closely spaced line of bottles (1). When there is a full line of bottles present on the conveyor, the grouping of grippers picks up the bottles (2), transfers, and inserts them into a carton (3) for shipping.



DIMENSIONS: LOW PROFILE GRIPPER

ML# 212539

CP



NOTES:

1) NUMBERS IN [] ARE IN mm

All dimensions are reference only unless specifically tolerated.



Compact Grippers

2, 3, and 4 Jaw Styles

COMMON BENEFITS

- Very low profile relative to grip force and jaw travel makes these grippers ideal for applications in confined work areas.
- Available in both imperial and metric versions for maximum application versatility.
- Pneumatically powered units are double-acting for use in both internal or external gripping applications.
- True parallel and synchronous jaw travel for easy design of jaw tooling.
- Close tolerance, hardened steel jaw mechanism minimizes play and is totally enclosed for long life.
- Jaws with standard male and female key features allow precise location of jaw tooling.
- Units are fully field repairable.

COMMON SPECIFICATIONS: SIZE 2

Total Grip Force at 87 psi*: 112 lbs [499 N]

Jaw Travel Total : .314in [7.97mm]

Jaw Travel per Jaw: .157in [3.98mm]

Lubrication: Permanent for non-lube air

* Grip Force per jaw = Force / Number of Jaws

2 JAW STYLE

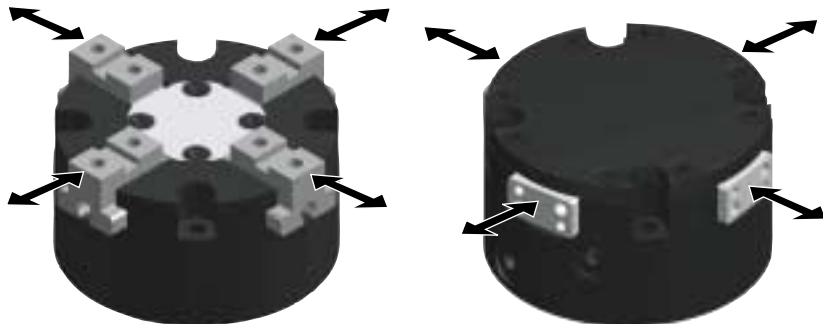


3 JAW STYLE



Three jaw design provides self-centering and maximizes contact between part and jaw tooling.

4 JAW STYLE

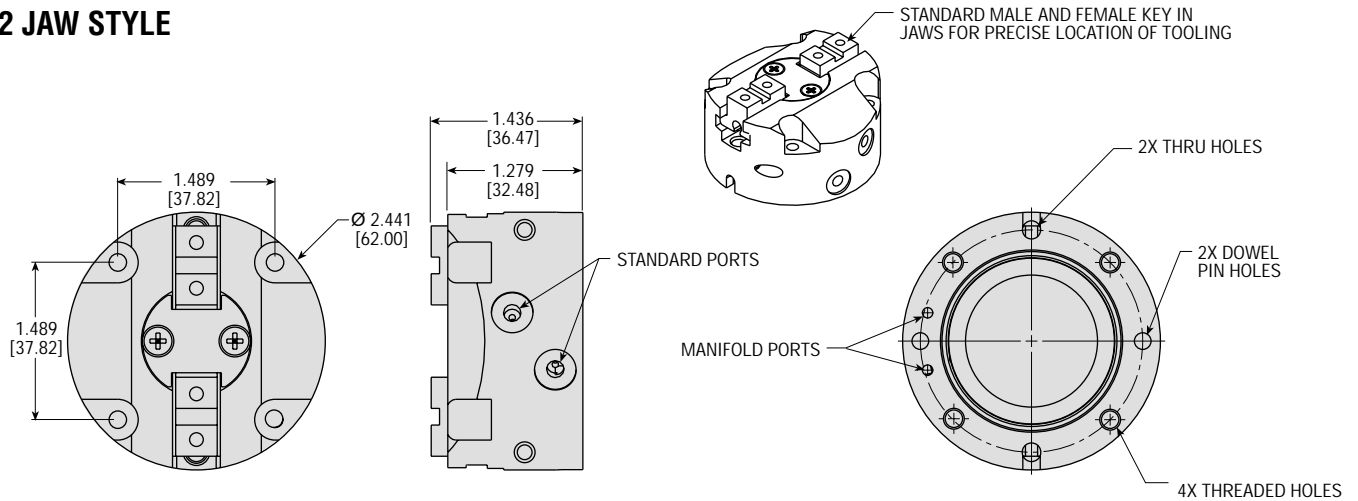


Optional Closed Cover Style, please consult PHD for details.

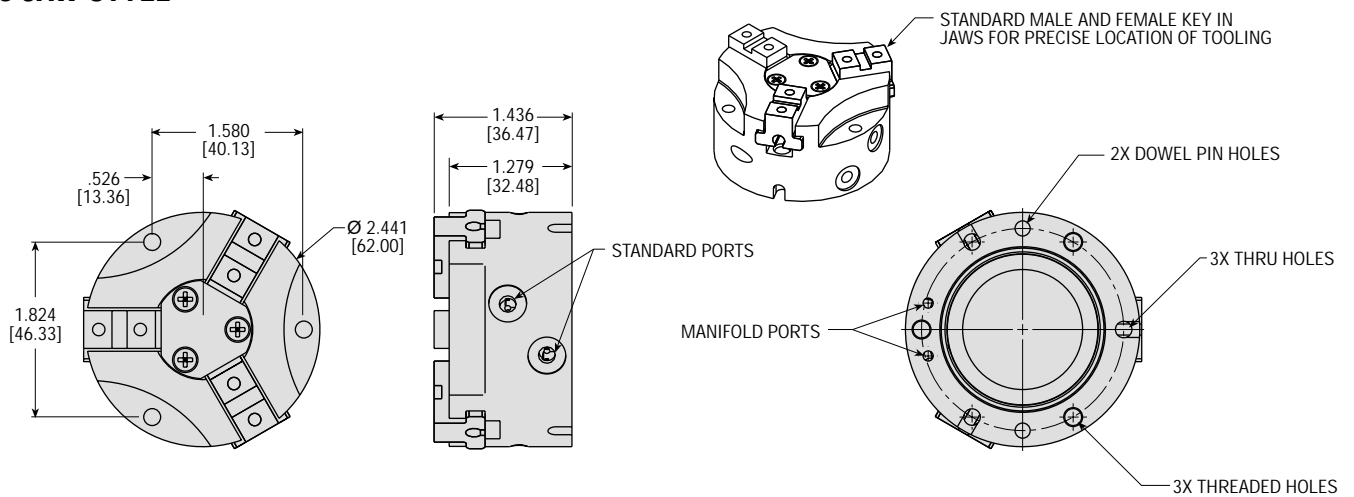
Four jaw design provides self-centering, ideal for parts with four equally spaced gripping points.

DIMENSIONS: COMPACT GRIPPERS, 2, 3, AND 4 JAW STYLES

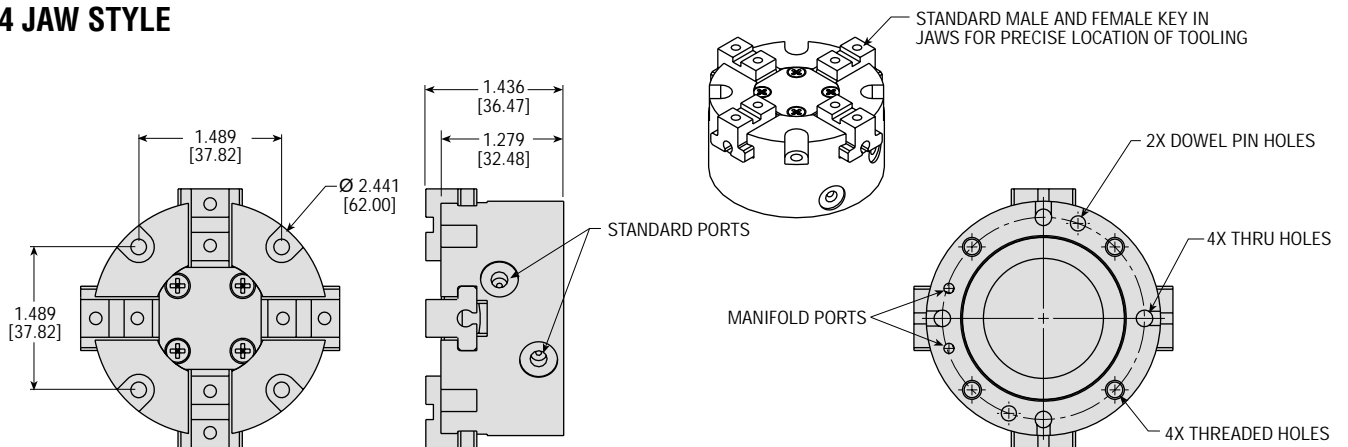
2 JAW STYLE



3 JAW STYLE



4 JAW STYLE



NOTE: NUMBERS IN [] ARE IN mm.

All dimensions are reference only unless specifically tolerated.

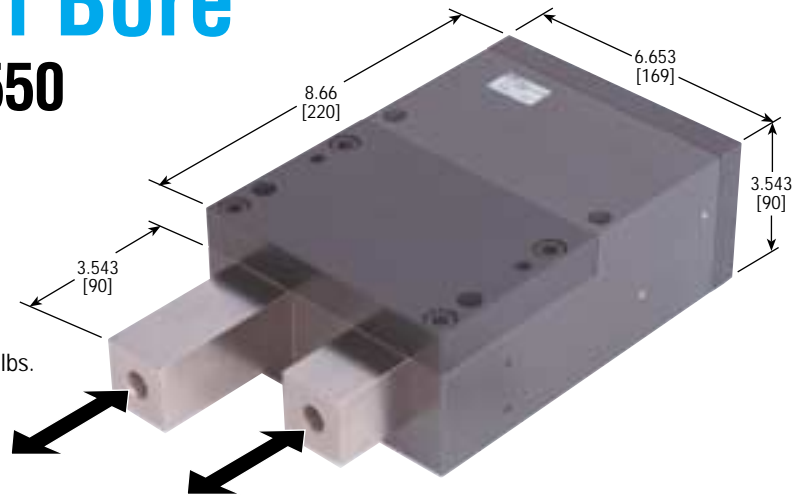


Large Escapement 35 mm Bore

ML# 187550

BENEFITS

- Rugged design and oversized shafts for higher load capability.
- Designed for a maximum static breakaway load of 60 lbs.
- Fully field repairable.
- Internal shock pads for quieter operation.
- Escapements are ideal for isolating and feeding of individual parts from vibratory feeders, magazines, or hoppers.
- Internal sequence mechanism ensures that both rods are extended before either rod can retract for positive part feeding.
- Internally ported design requires only one 4-way air valve for convenience and cost savings.



U.S. QUARTER

SPECIFICATIONS

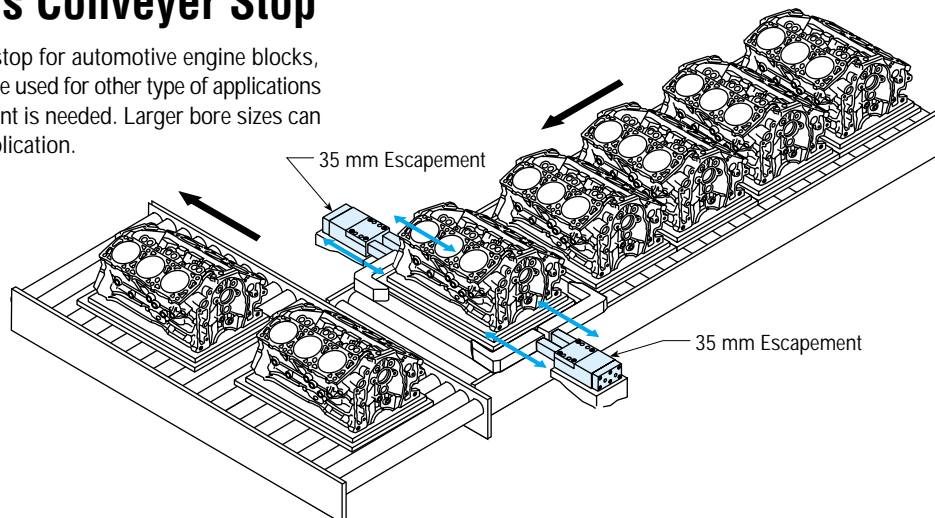
Unit Weight:	28 lbs [12.7 kg]
Extend Force:	1.48 lb per psi [97 N/bar]
Retract Force:	.878 lb per psi [57 N/bar]
Maximum Air Pressure:	150 psi [10 bar]
Minimum Air Pressure:	30 psi (no load) [2 bar]
Bore:	1.375 [35 mm]
Stroke:	1.575 [40 mm]
Bearing Material:	TC Fluoropolymer composite

INDUSTRY FOCUS

INDUSTRY	SIC
Material Handling	3535
Automotive	3714

Escapements as Conveyor Stop

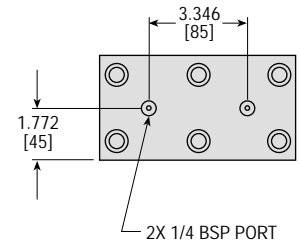
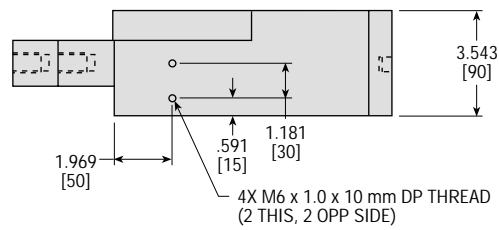
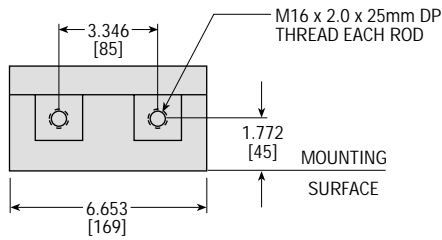
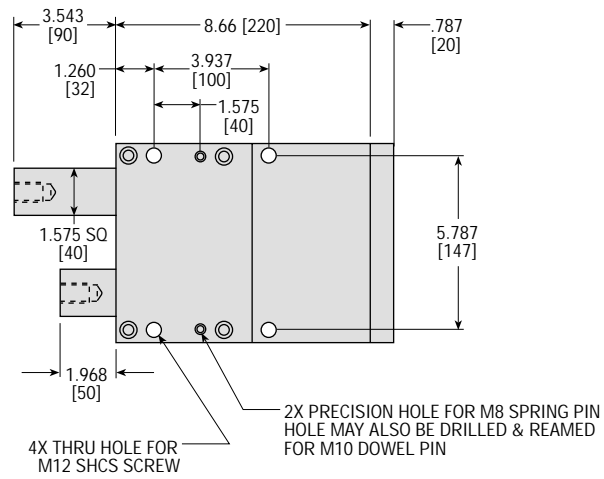
Originally used as a conveyor stop for automotive engine blocks, this oversized escapement can be used for other type of applications where a more robust escapement application is needed. Larger bore sizes can be quoted for your specific application.



DIMENSIONS: ENGINE BLOCK ESCAPEMENT

ML# 187550

CP



NOTES:

- 1) ALL DIMENSIONS ARE REFERENCE ONLY UNLESS SPECIFICALLY TOLERANCED
- 2) NUMBERS IN [] ARE IN mm
- 3) BORE SIZE IS Ø 1-3/8 [35 mm]
- 4) STROKE OF EACH ROD IS 1.575 [40 mm]

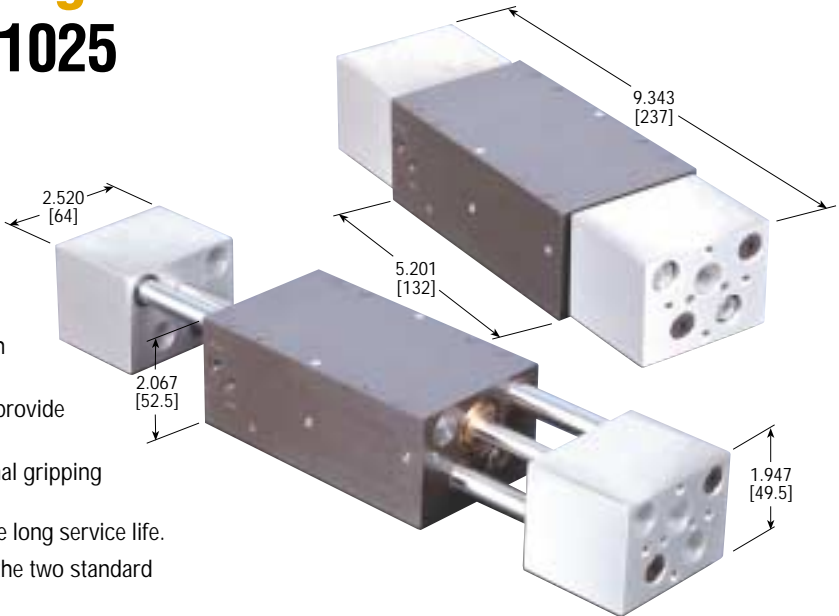


Series GRW Gripper: with Long Jaw Travel

ML# 301025

BENEFITS

- Longer than standard jaw travel for increased range of applications. (4 in [100 mm] total)
- True parallel synchronous jaw motion simplifies jaw tooling design.
- Large diameter jaw guides supported through the length of the body provide superior jaw stability, long allowable tooling lengths, and high moment capability.
- Standard shock pads at both ends of jaw travel provide quiet operation and absorb impact.
- Double acting for use in both internal and external gripping applications.
- Specially formulated piston and rod seals provide long service life.
- Optional manifold porting available on either of the two standard mounting surfaces.
- Units can be field converted to a non-synchronous version.
- Units are fully field repairable.
- Other jaw travels available, consult PHD.



INDUSTRY FOCUS

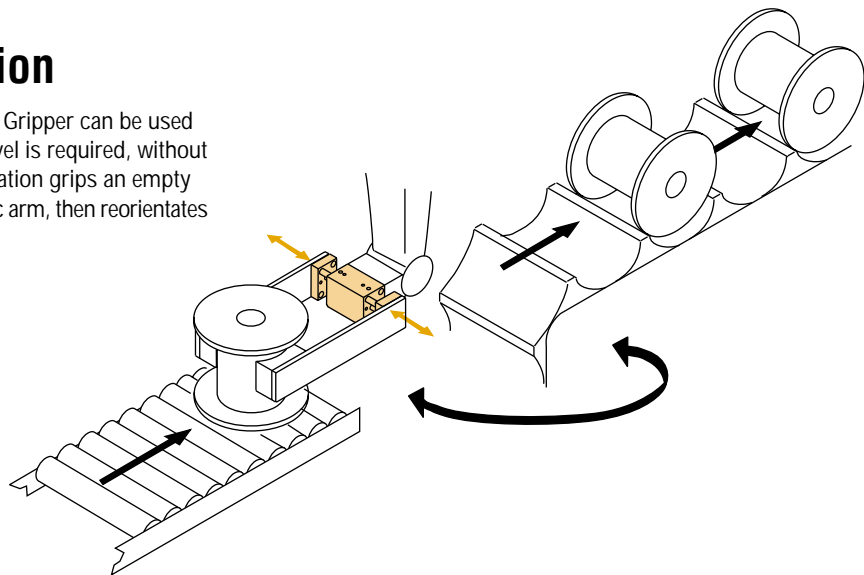
INDUSTRY	SIC
Assembly Machine Builders	3549
General Machine Builders	3569
Automotive	3714

SPECIFICATIONS

Unit Weight:	5.7 lb [2.7 kg]
Maximum Air Pressure:	100 psi [7 bar]
Minimum Air Pressure:	40 psi [3 bar]
Total Grip Force @ 87 psi [6 bar]:	90 lb [400 N]
Bore:	.472 in [12 mm]
Total Jaw Travel:	4 in [100 mm]

Long Travel Application

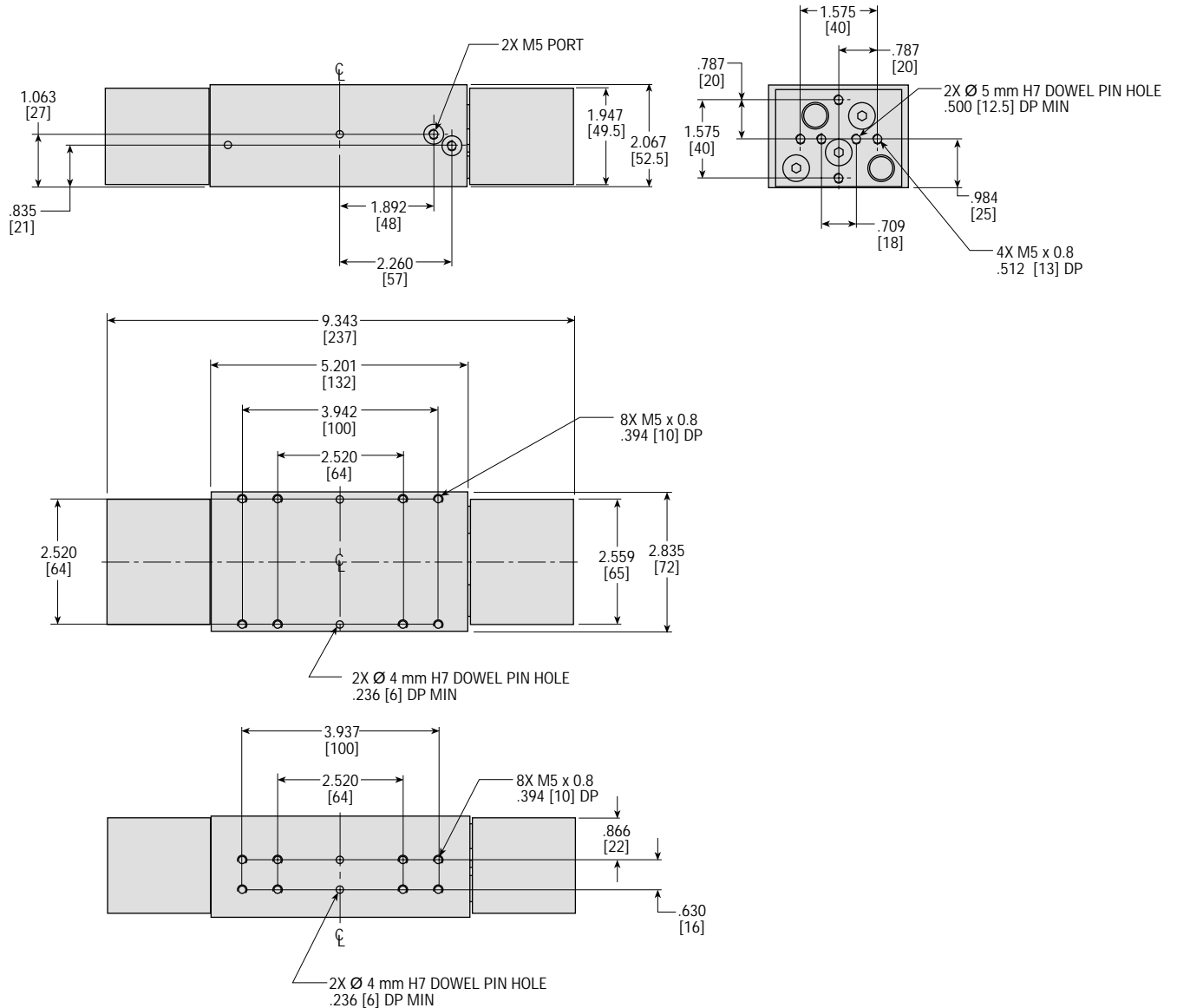
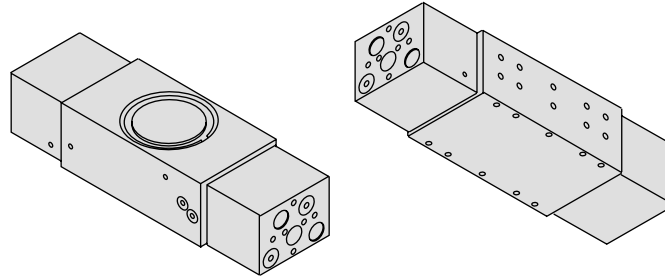
The long travel of this custom Series GRW Gripper can be used in numerous applications where longer travel is required, without a major increase in unit weight. One application grips an empty wire spool off one conveyor line, via a robotic arm, then reorientates and places the spool on a new conveyor.



DIMENSIONS: GRW GRIPPER WITH LONG JAW TRAVEL

ML# 301025

CP



NOTES:

- 1) ALL DIMENSIONS ARE FOR REFERENCE ONLY
- 2) DESIGNATED CENTERLINE IS CENTERLINE OF UNIT

PERSONAL APPLICATION ASSISTANCE REQUEST

Use this form to request prompt, personal assistance from your local factory-trained PHD representative. We welcome the opportunity to assist you in selecting the proper PHD components and evaluating your automation needs.

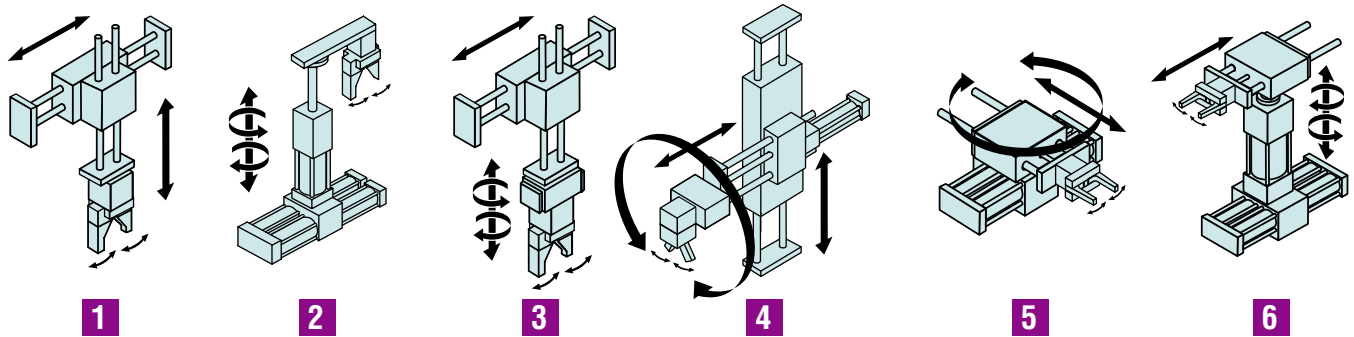
Your Name: _____

Company Name: _____

Job Function: _____

Address: _____

Phone #: _____ Fax #: _____



1. Type of motion required – Choose the motion most like your application from the above examples (1 through 6) or describe your requirements in questions 2 and 3 (over). _____

SKETCH YOUR APPLICATION HERE.



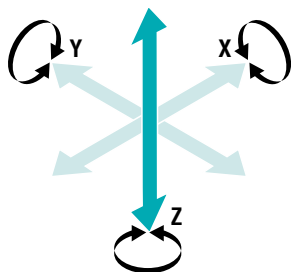
PERSONAL APPLICATION ASSISTANCE REQUEST

CP

2. Briefly describe your application. _____

3. Describe the sequence of the required motion. _____

4. Linear Travel:
X axis _____ inches
Y axis _____ inches
Z axis _____ inches
Linear accuracy ± _____ degrees



5. Rotary Motion (if required):
_____ degrees of rotation about the X axis
_____ degrees of rotation about the Y axis
_____ degrees of rotation about the Z axis
Angular accuracy ± _____ degrees

6. Part weight _____

Describe the size and shape of the part. (Include sketch, if possible.) _____

7. Part presentation: Feeder Bowl Magazine Track Other _____

8. Weight of the tooling and/or end effector: _____

9. Environment: Temperature range(min-max) °C or °F _____
Material Exposure: Material: _____
Particle Exposure: Material: _____
Size of Particles: _____

Fluid Exposure: Fluid: _____
 drip
 spray
 splash

10. This is a: New machine Retrofit of existing equipment

11. Number of devices required: _____

12. Positional accuracy required: pick-up ± _____ placement ± _____

13. Cycle time required: _____ seconds
Dwell time for pick up: _____ seconds
Dwell time for placement: _____ seconds

14. Actuator power source desired: Air _____ psi Hydraulic _____ psi Electric _____ voltage

15. Electrical interface to a controller: 110 VAC 12 VAC 24 DVC Other _____

16. Project completion target time: 3 months or less 3 to 6 months 6 to 9 months No particular project

98