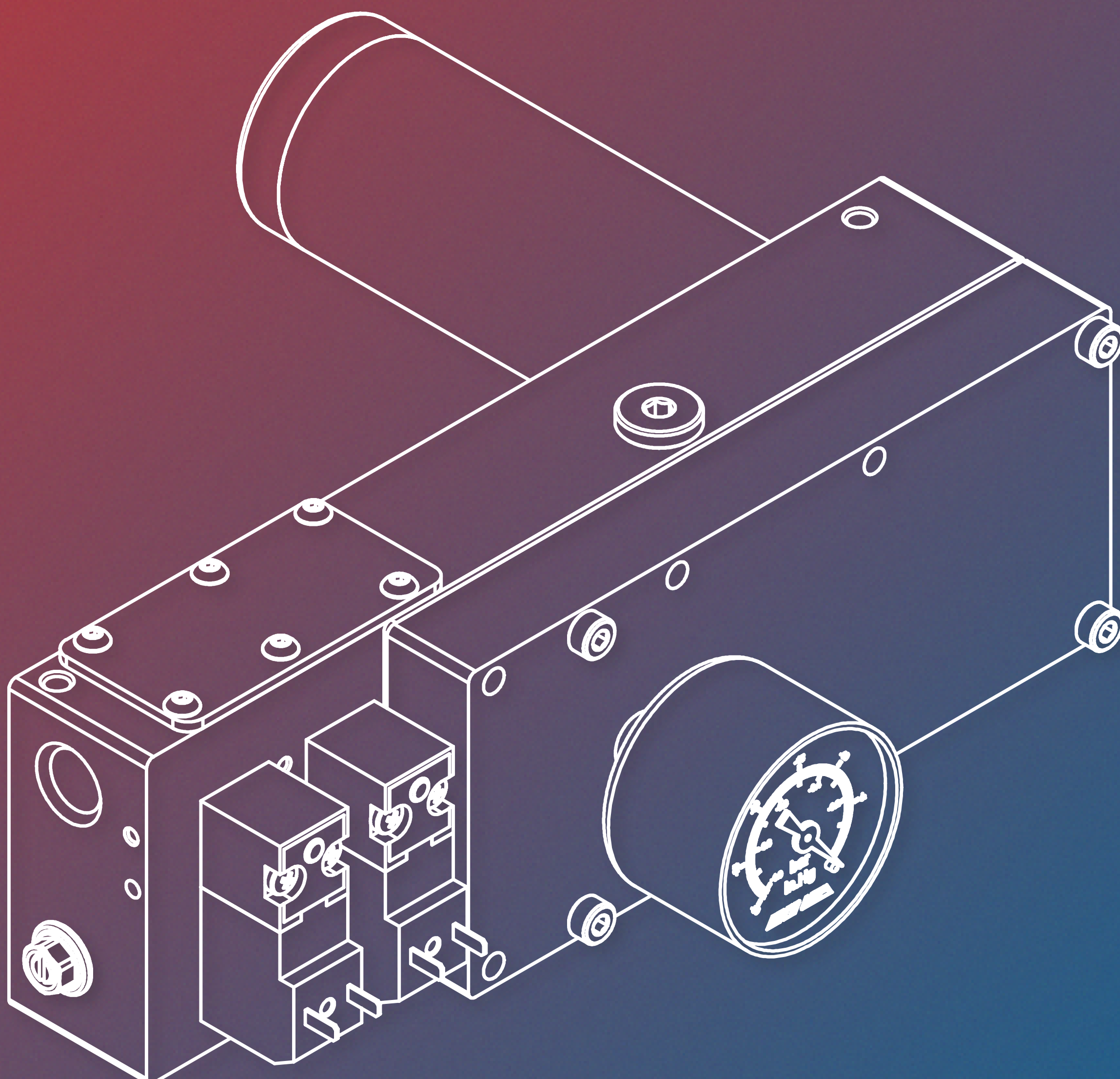
Updated 08/30/22

# EDCO USA®
## Product Catalog



WWW.EDCOUSA.NET | +1 (636) 349-2632

*Section numbers may have changed from previous catalogs.*

## Quality, Performance, & Value

Founded in 1994, EDCO USA designs and markets well-made and cost-effective vacuum related automation devices that are manufactured in the USA. Over the years, EDCO has developed a wide range of rugged vacuum components such as: Vacuum Cups, Vacuum Pads, Level Compensators, Multi-Stage / Multi-Ejector Vacuum Pumps, Single-Stage / Mono-Stage Vacuum Pumps, Vacuum Check Valves, Vacuum Grippers, and Rail Systems.

In addition to standard catalog products, EDCO designs customized or made-for-purpose products for customers where a standard product doesn't quite fit the task. Quantities required for "special" products can be surprisingly low. Call us to discuss your project.

EDCO is the industry leader in vacuum technology. We provide engineered solutions to vacuum system problems. Modular pump design allows for field expansion of pump capacity and simplified, cost-effective pump renewal. To make our design process simpler, EDCO has the widest range of integrated pump control options and system accessories of any manufacturer.

High quality, superior performance, fast delivery, and lower prices means VALUE by any definition. Our business structure doesn't require layers of management or other expensive overhead and that translates to lower prices.

EDCO markets through a network of fluid power distributors so that knowledgeable sales engineers can provide prompt local support for your design projects and offer OEM pricing that is as good as factory-direct.

Private Labeling is available for OEM customers at no extra charge. Simply provide us with your DXF or vector file with your logo, part number, and any additional information desired. Initial orders must be for at least 5 units while additional orders can be for any quantity.

## Reliable & Verifiable

We don't believe that wild marketing claims provide any benefit to our customers. We leave that to our competitors. We'll be glad to prove that EDCO products provide the best solution for your application.

We continually develop new products and custom designs that may not yet appear in our catalog. If you don't find what you are looking for, call us. We may already have the solution for you.

Please contact your local EDCO distributor for assistance with any vacuum component or system. While we prefer having our distributors involved from the start, call us if you need immediate assistance and we will have our distributor follow up.

## Five Year Warranty

EDCO USA products are warranted to be free of defects in workmanship and materials for a period of 5 years from the date of purchase.

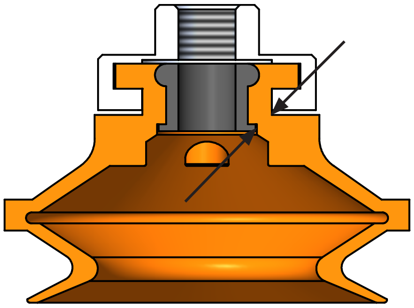
While products found by EDCO USA to be defective will be replaced, no liability is assumed beyond such replacement and there are no other warranties of any sort expressed or implied.

EDCO USA is not responsible for damage done to products through neglect.

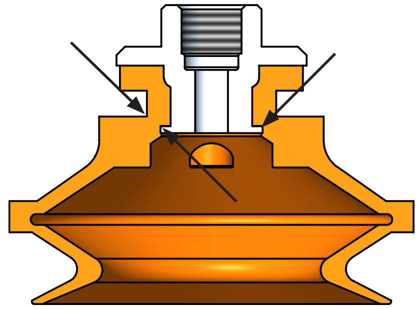
*The specifications in this catalog are believed to be accurate and reliable. However, it is the responsibility of the purchaser / user to determine the suitability of EDCO USA's products for specific use and to apply those products safely.*

*All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.*

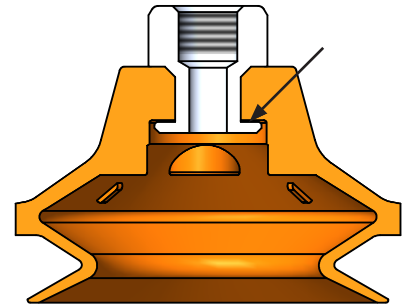
## Vacuum Cups & Fittings



**Competitor, 2-Piece**
The full load must be carried by this thin section which stretches and reduces cup capability. Over stressing causes the rubber to fatigue and crack.



**Competitor, 1-Piece**
Small fitting flange poorly distributes the load to rubber and pull-out can occur unless a strengthening ring is used.



**EDCO USA, 1-Piece**
Larger flange has 2.5 times the area of the competitor's flange. Load is evenly distributed to a reinforced cup top for lower stress, longer life, and increased stability.

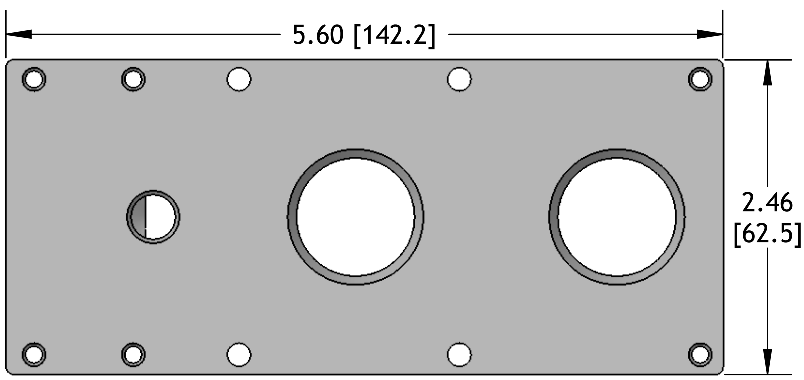
## Vacuum Pumps

EDCO offers six ejector series in eight pump capacities. (A, E, L, M, ML & X)

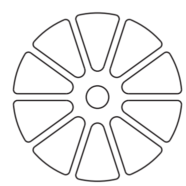
EDCO offers twice the capacity in only 70% of the footprint area.

EDCO's stainless steel valve has 128% more flow area than the competitor plastic valve.

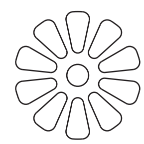
**EDCO USA, Classic Pumps**



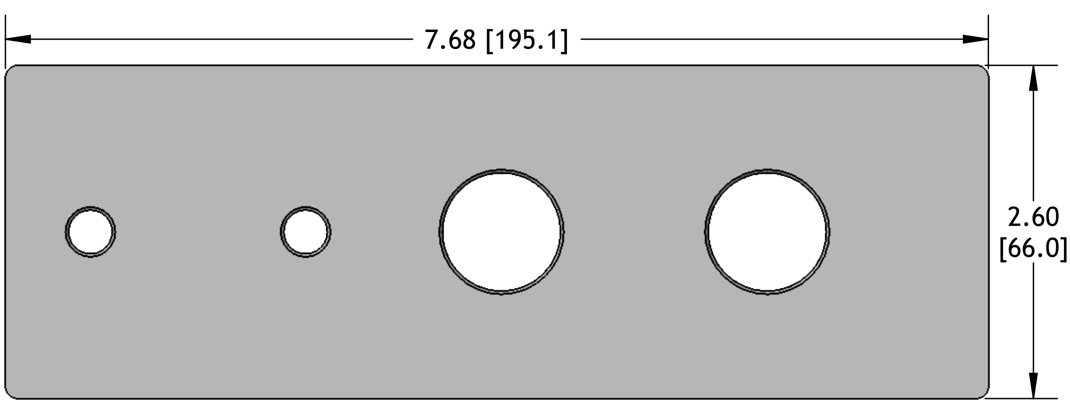

**EDCO USA Valve**



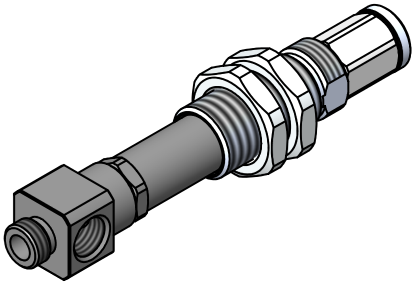
**Competitor Valve**



**Competitor, Classic Style Pumps**

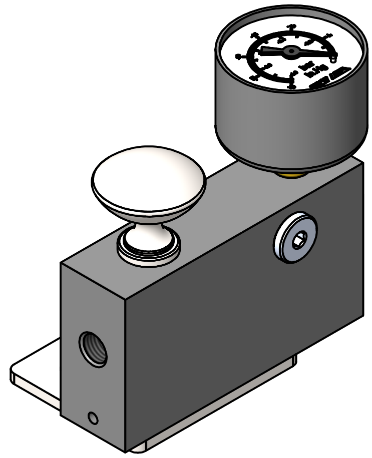


### LC18 Side-Port Option



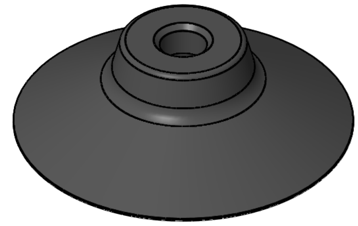
*Side Port Options for LC18 Level Compensators*

### Manual Valve ER Pumps



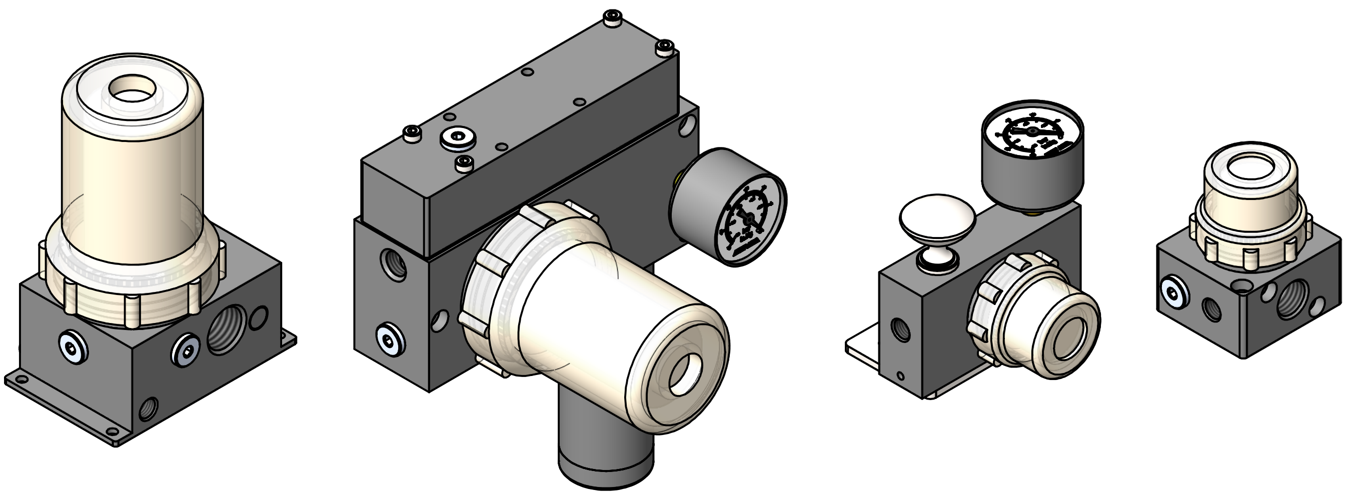
*For Use with Vacuum Fixtures and Chucks*

### Ø 90 mm Flat Cups



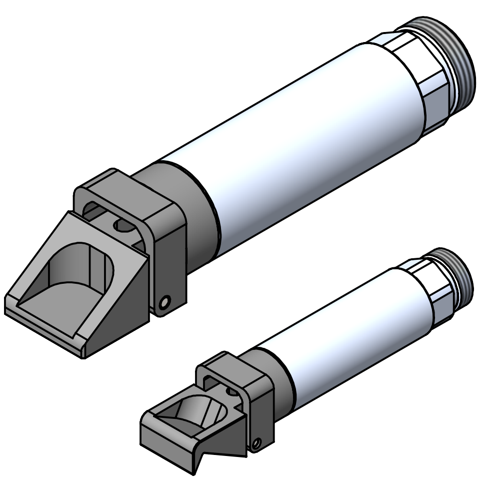
*XP-F90 has a lower list price than XP-F110 by utilizing snap-in cup fittings.*

### Pumps w/ Integrated Filters



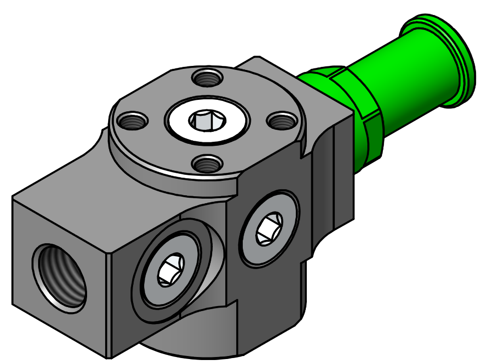
*Integrated Filter Bases for Classic Pumps, Vacuum Grippers, and ER Pumps*

### Gripper Fingers



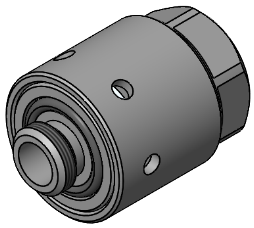
*20 mm & 30 mm Gripper Fingers*
*Replaces: EMI, ASS, Gimatic*

### VGP Style Vacuum Gripper



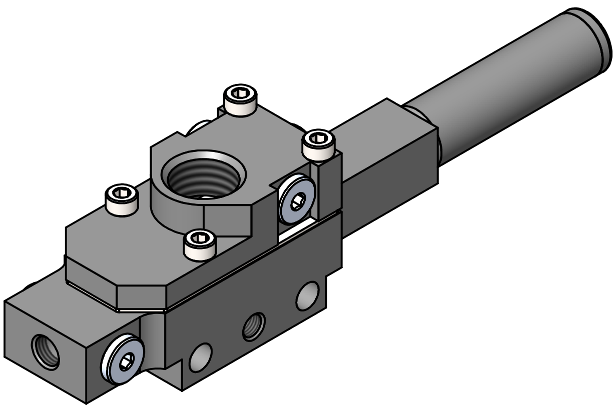
*Replaces Piab VGS3010 Pumps*

## Atmospheric Quick-Release



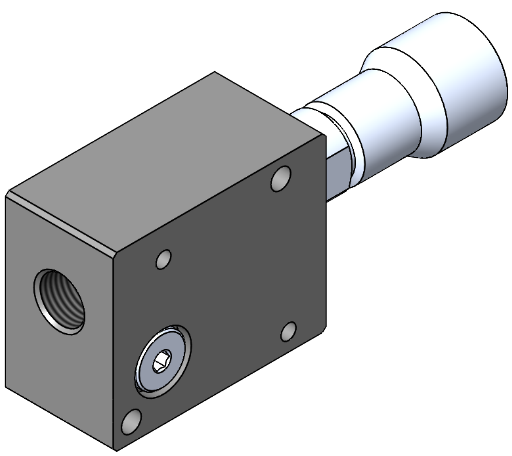
*Replaces Piab AQR 0111236 & AQR 020119721*

## VG-G12 Style Vacuum Gripper



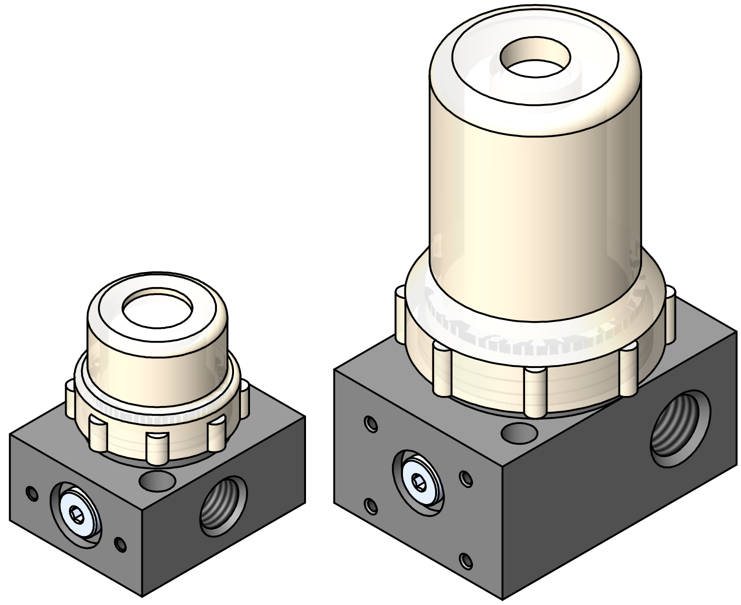
*Replaces Piab VGS 5010 Pumps*

## J-Series Vacuum Pumps



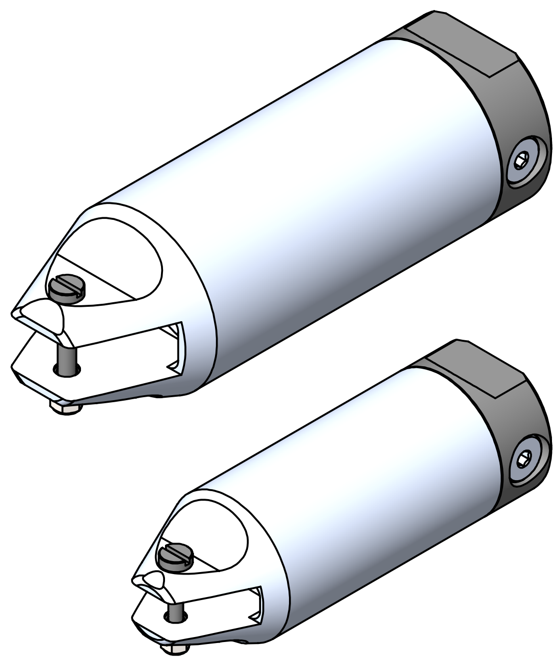
*Replaces Anver JB-Series or Coval GVP-Series*

## Aluminum Base Vacuum Filters



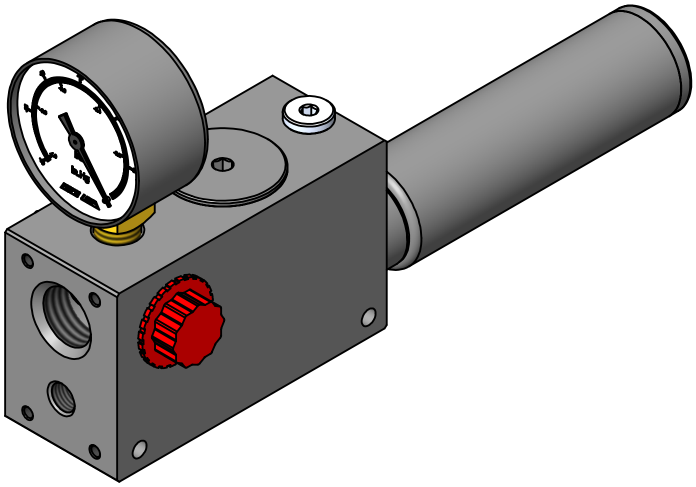
*Easier to Mount than Tee-Style Filters*

## Nipper Bodies



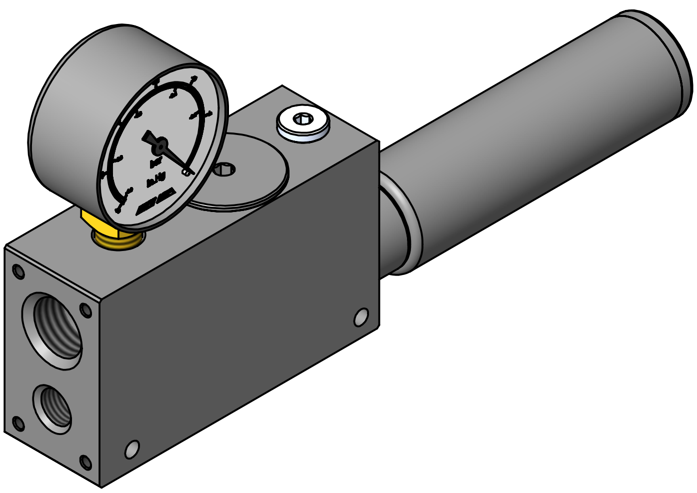
*20 mm & 30 mm Nipper Bodies*
*Accepts Vessel, Gimatic, or Swanstrom Blades*

## VG-Series Pumps



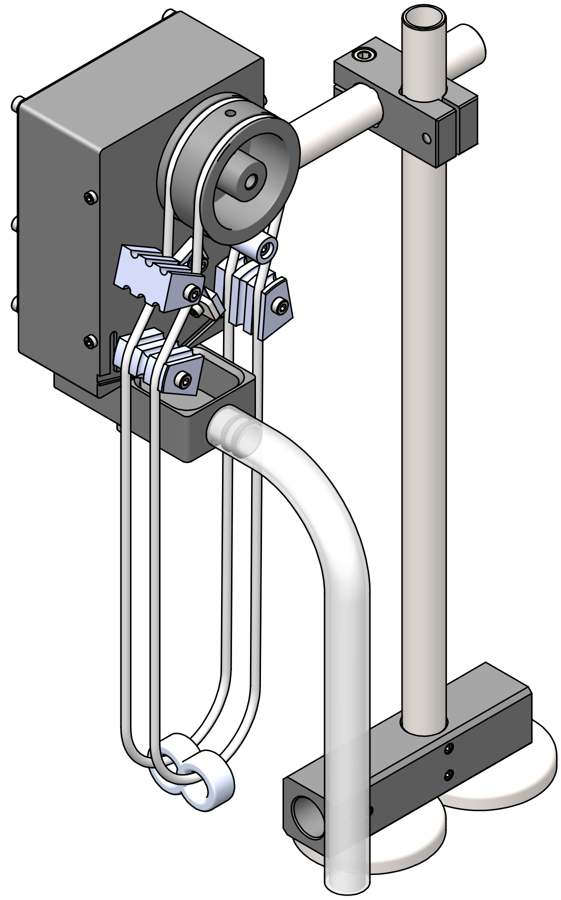
*Replaces Gast Multi-Stage Pumps*

## VQ-Series Pumps



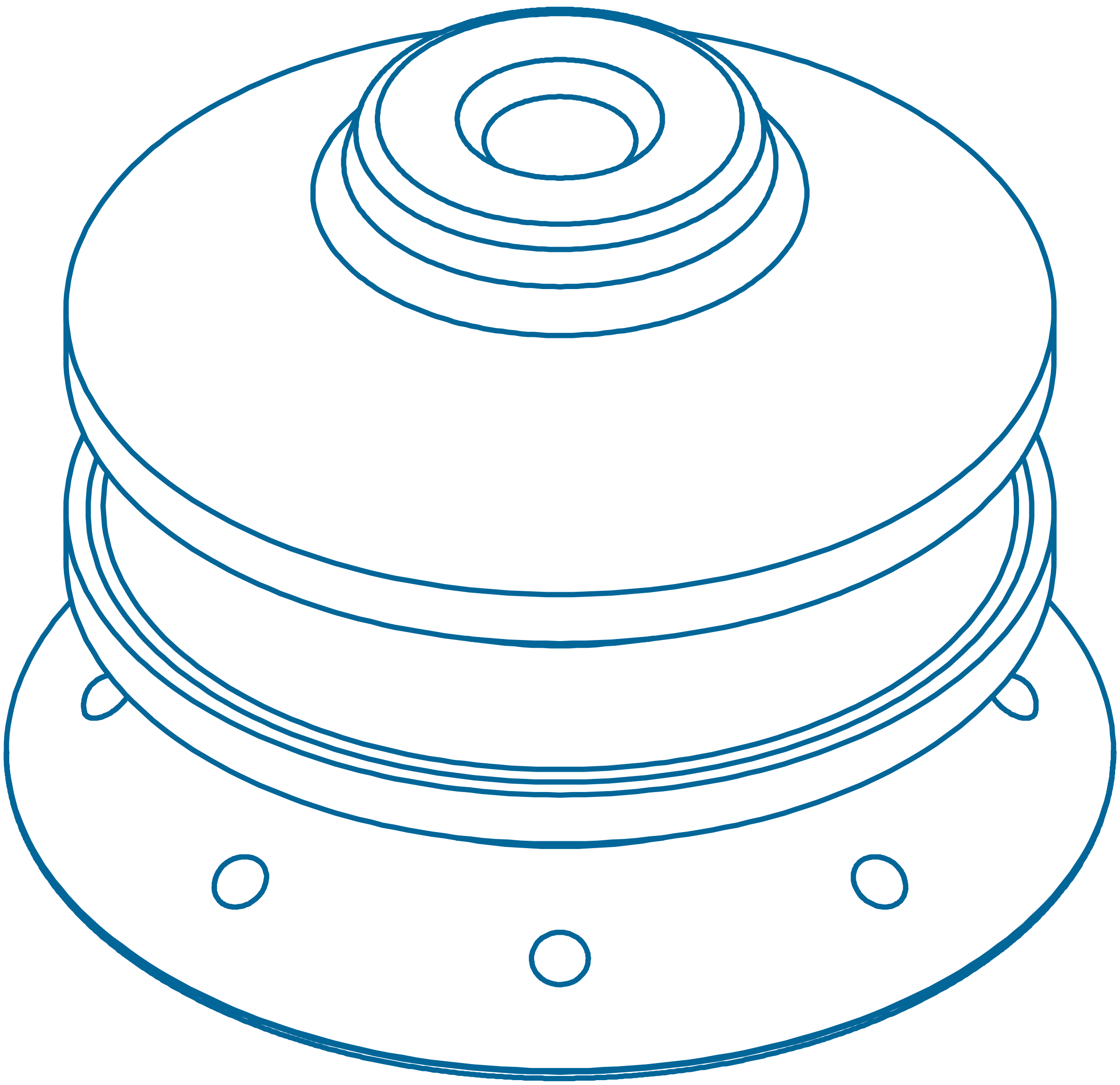
*Replaces Vac-Cubes Multi-Stage Pumps*

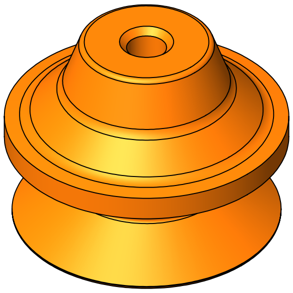
## E-Skim



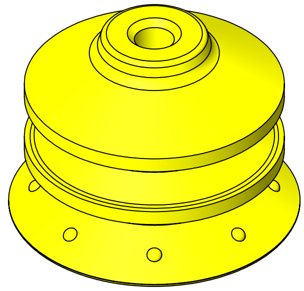
*Coolant Oil Skimmer for CNC Machines*

# Vacuum Cups
## Section 2

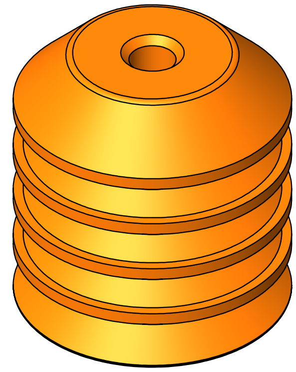




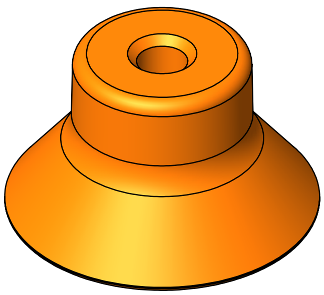
Bellows



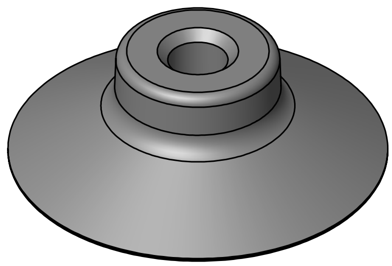
Double Bellows



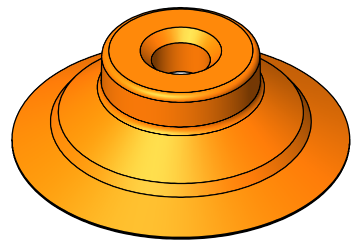
Multi-Bellows



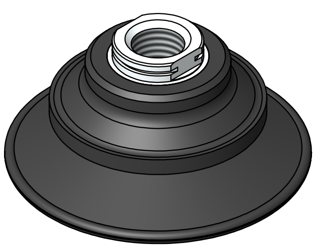
Deep



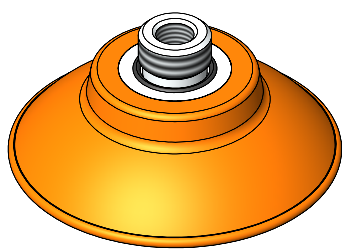
Flat



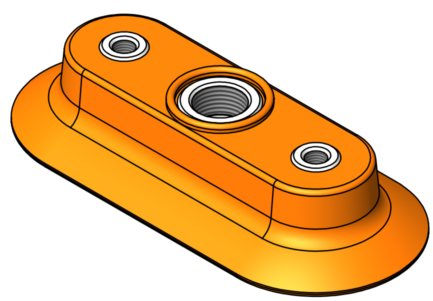
Universal



Bellows Flat

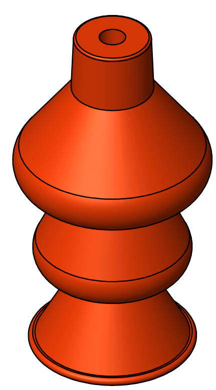


Flat-Concave



Oval





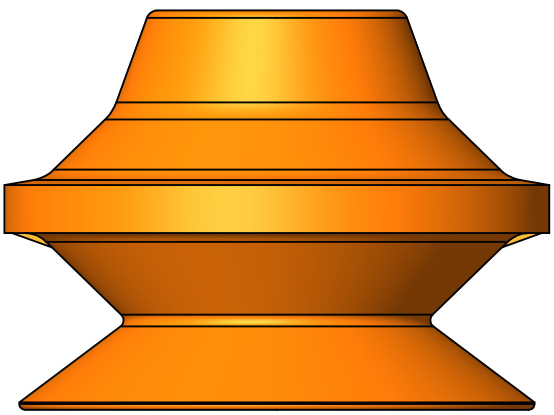
Egg

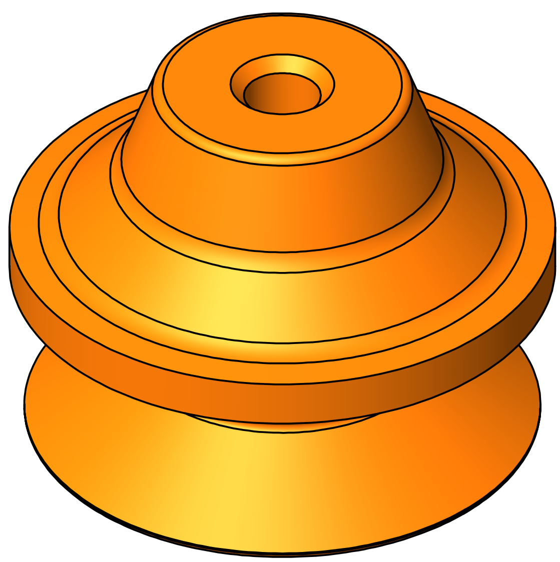
## Bellows Vacuum Cups

Bellows vacuum cups are used when it is necessary to compensate for varying workpiece heights, to handle parts with uneven (concave, convex, or textured) surfaces, or easily damaged parts. A lifting effect during evacuation can be used to help separate a top sheet from those stacked below. Bellows vacuum cups can conform to curved or uneven workpieces such as pipes, bottles, containers, cylinders, car body components, flexing cardboard boxes, etc. Bellows vacuum cups provide height compensation and a ball-join motion through a limited angular range.

Suitable Workpiece Surface:

- Flat
- Slightly Concave
- Convex
- Compound
- Spherical
- Cylindrical
- Flexible
- Shear Loads

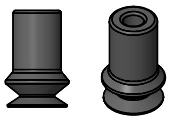




# Bellows Vacuum Cups

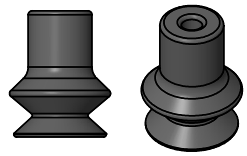
| | Cup Size | | Cup Material | | Cup Fitting | |
|---|---|---|---|---|---|---|
| XP-B | 15 | | CS | | -10M | |
| | 5 | Ø 5 mm | A | Ameriflex[2] | (Blank) | None |
| | 8 | Ø 8 mm | CS | Conductive Silicone[1] | *See cup fittings for available threads.* | |
| | 10 | Ø 10 mm | D | Duramax[2] | | |
| | 15 | Ø 15 mm | N | Nitrile / TPV | | |
| | 20 | Ø 20 mm | S | Silicone | | |
| | | | V | Viton | | |

*[1]Not available on XP-B15 or XP-B20.*
*[2]Not available on XP-B5, XP-B8, or XP-B10.*



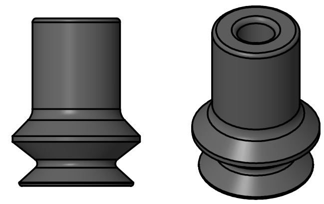
**XP-B5**

| | |
|---|---|
| Cup Diameter: in [mm] | 5 mm |
| Outer Diameter: in [mm] | 0.24 [6.1] |
| Cup Height: in [mm] | 0.37 [9.3] |
| Thru Hole: in [mm] | 0.08 [2.0] |
| Stroke: in [mm] | 0.06 [1.5] |
| Cup Weight: oz [g] | 0.004 [0.11] |
| Internal Volume: cu in [cc] | 0.01 [0.2] |
| Force @ 6 inHG: lb [n] | 0.07 [0.3] |
| Force @ 18 inHG: lb [n] | 0.10 [0.4] |
| Minimum Radius: in [mm] | 0.06 [1.5] |
| Shear Load*: lb [n] | 0.05 [0.2] |



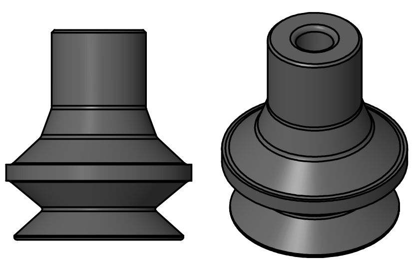
**XP-B8**

| | |
|---|---|
| Cup Diameter: in [mm] | 8 mm |
| Outer Diameter: in [mm] | 0.38 [9.6] |
| Cup Height: in [mm] | 0.47 [12.0] |
| Thru Hole: in [mm] | 0.08 [2.0] |
| Stroke: in [mm] | 0.13 [3.3] |
| Cup Weight: oz [g] | 0.01 [0.3] |
| Internal Volume: cu in [cc] | 0.01 [0.2] |
| Force @ 6 inHG: lb [n] | 0.18 [0.8] |
| Force @ 18 inHG: lb [n] | 0.36 [1.6] |
| Minimum Radius: in [mm] | 0.07 [1.8] |
| Shear Load*: lb [n] | 0.18 [0.8] |



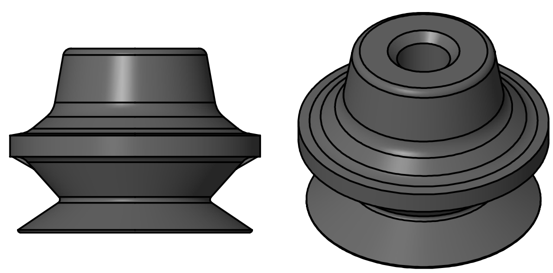
**XP-B10**

| | |
|---|---|
| Cup Diameter: in [mm] | 10 mm |
| Outer Diameter: in [mm] | 0.48 [12.2] |
| Cup Height: in [mm] | 0.63 [16.0] |
| Thru Hole: in [mm] | 0.14 [3.7] |
| Stroke: in [mm] | 0.18 [4.5] |
| Cup Weight: oz [g] | 0.03 [0.9] |
| Internal Volume: cu in [cc] | 0.03 [0.5] |
| Force @ 6 inHG: lb [n] | 0.3 [1.3] |
| Force @ 18 inHG: lb [n] | 0.8 [3.6] |
| Minimum Radius: in [mm] | 0.16 [4.1] |
| Shear Load*: lb [n] | 0.4 [1.7] |



**XP-B15**

| | |
|---|---|
| Cup Diameter: in [mm] | 15 mm |
| Outer Diameter: in [mm] | 0.70 [17.7] |
| Cup Height: in [mm] | 0.79 [20.0] |
| Thru Hole: in [mm] | 0.14 [3.7] |
| Stroke: in [mm] | 0.26 [6.6] |
| Cup Weight: oz [g] | 0.04 [1.1] |
| Internal Volume: cu in [cc] | 0.07 [1.2] |
| Force @ 6 inHG: lb [n] | 0.70 [3.1] |
| Force @ 18 inHG: lb [n] | 1.30 [5.8] |
| Minimum Radius: in [mm] | 0.20 [5.1] |
| Shear Load*: lb [n] | 0.70 [3.1] |



**XP-B20**

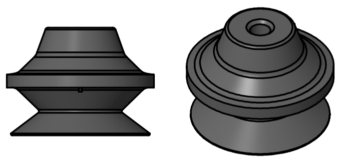
| | |
|---|---|
| Cup Diameter: in [mm] | 20 mm |
| Outer Diameter: in [mm] | 0.94 [23.9] |
| Cup Height: in [mm] | 0.69 [17.6] |
| Thru Hole: in [mm] | 0.20 [5.1] |
| Stroke: in [mm] | 0.39 [9.9] |
| Cup Weight: oz [g] | 0.08 [2.3] |
| Internal Volume: cu in [cc] | 0.16 [2.6] |
| Force @ 6 inHG: lb [n] | 1.30 [5.8] |
| Force @ 18 inHG: lb [n] | 2.20 [9.8] |
| Minimum Radius: in [mm] | 0.39 [9.9] |
| Shear Load*: lb [n] | 1.10 [4.8] |

**All figures for shear load are 18 inHg using a 0.5 coefficient of friction.*
*Adjust coefficient of friction to suit your conditions, then apply a generous factor of safety (3:1 or greater) to shear loads.*

# Bellows Vacuum Cups

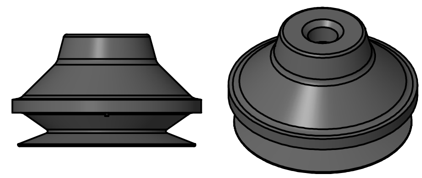
| | Cup Size | | Cup Material | | Cup Fitting | |
|---|---|---|---|---|---|---|
| XP-B | 50 | | V | | -38F | |
| | 30 | Ø 30 mm | A | Ameriflex | (Blank) | None |
| | 40 | Ø 40 mm | D | Duramax | *See cup fittings for available threads.* | |
| | 50 | Ø 50 mm | N | Nitrile / TPV | | |
| | 65 | Ø 65 mm | S | Silicone[1] | | |
| | | | V | Viton[1] | | |

*[1]Not available on XP-B65.*



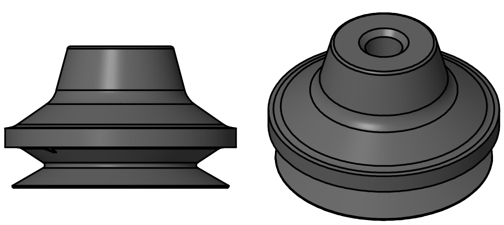
**XP-B30**

| | |
|---|---|
| Cup Diameter: in [mm] | 30 mm |
| Outer Diameter: in [mm] | 1.42 [36.1] |
| Cup Height: in [mm] | 1.04 [26.4] |
| Thru Hole: in [mm] | 0.20 [5.1] |
| Stroke: in [mm] | 0.59 [14.9] |
| Cup Weight: oz [g] | 0.25 [7.1] |
| Internal Volume: cu in [cc] | 0.61 [10.0] |
| Force @ 6 inHG: lb [n] | 2.70 [12.0] |
| Force @ 18 inHG: lb [n] | 4.90 [21.8] |
| Minimum Radius: in [mm] | 0.59 [15.0] |
| Shear Load*: lb [n] | 2.50 [11.1] |



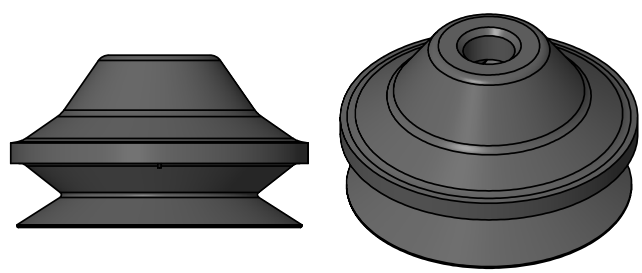
**XP-B40**

| | |
|---|---|
| Cup Diameter: in [mm] | 40 mm |
| Outer Diameter: in [mm] | 1.82 [46.2] |
| Cup Height: in [mm] | 1.08 [27.4] |
| Thru Hole: in [mm] | 0.29 [7.4] |
| Stroke: in [mm] | 0.59 [14.9] |
| Cup Weight: oz [g] | 0.35 [9.9] |
| Internal Volume: cu in [cc] | 0.90 [14.7] |
| Force @ 6 inHG: lb [n] | 4.90 [21.8] |
| Force @ 18 inHG: lb [n] | 8.80 [39.1] |
| Minimum Radius: in [mm] | 0.79 [20.1] |
| Shear Load*: lb [n] | 4.40 [19.5] |



**XP-B50**

| | |
|---|---|
| Cup Diameter: in [mm] | 50 mm |
| Outer Diameter: in [mm] | 2.23 [56.6] |
| Cup Height: in [mm] | 1.36 [34.7] |
| Thru Hole: in [mm] | 0.36 [9.1] |
| Stroke: in [mm] | 0.79 [20.0] |
| Cup Weight: oz [g] | 0.66 [18.8] |
| Internal Volume: cu in [cc] | 2.00 [32.8] |
| Force @ 6 inHG: lb [n] | 7.40 [32.9] |
| Force @ 18 inHG: lb [n] | 14.60 [64.9] |
| Minimum Radius: in [mm] | 0.98 [24.9] |
| Shear Load*: lb [n] | 7.30 [32.4] |



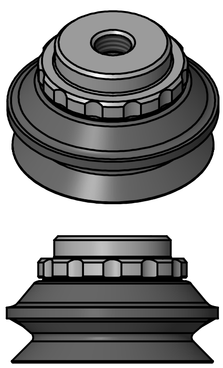
**XP-B65**

| | |
|---|---|
| Cup Diameter: in [mm] | 65 mm |
| Outer Diameter: in [mm] | 2.87 [72.9] |
| Cup Height: in [mm] | 1.66 [42.2] |
| Thru Hole: in [mm] | 0.50 [12.7] |
| Stroke: in [mm] | 0.90 [22.9] |
| Cup Weight: oz [g] | 1.30 [36.9] |
| Internal Volume: cu in [cc] | 3.90 [63.9] |
| Force @ 6 inHG: lb [n] | 13.30 [59.2] |
| Force @ 18 inHG: lb [n] | 26.30 [117.0] |
| Minimum Radius: in [mm] | 1.22 [31.0] |
| Shear Load*: lb [n] | 13.1 [58.3] |

**All figures for shear load are 18 inHg using a 0.5 coefficient of friction.*
*Adjust coefficient of friction to suit your conditions, then apply a generous factor of safety (3:1 or greater) to shear loads.*

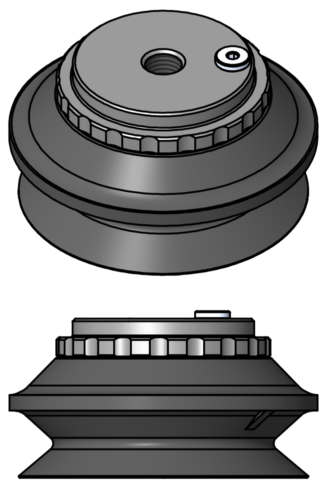
## Bellows Vacuum Cups

| | Cup Size | | Cup Material | | Cup Fitting | |
|---|---|---|---|---|---|---|
| XP-B | 75 | | S | | -12F | |
| | 75 | Ø 75 mm | N | Nitrile / TPV | (Blank) | None |
| | 110 | Ø 110 mm | S | Silicone | See cup fittings for available threads. | |
| | 150 | Ø 150 mm | V | Viton | | |



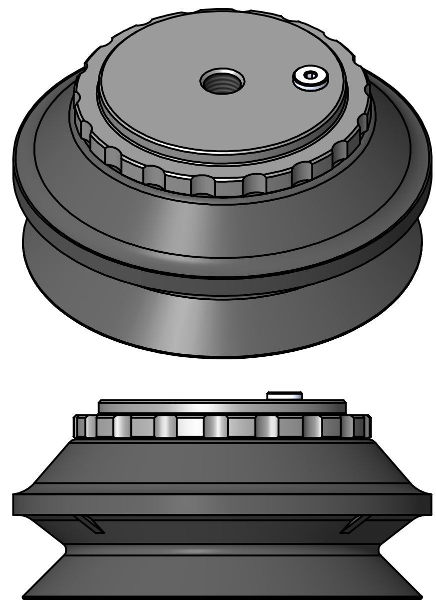
**XP-B75**

| | |
|---|---|
| Cup Diameter: in [mm] | 75 mm |
| Outer Diameter: in [mm] | 3.30 [83.8] |
| Cup Height*: in [mm] | 1.98 [50.3] |
| Stroke: in [mm] | 0.79 [20.0] |
| Cup Weight: oz [g] | 1.80 [51.0] |
| Internal Volume: cu in [cc] | 6.70 [110.0] |
| Force @ 6 inHG: lb [n] | 16.00 [71.2] |
| Force @ 18 inHG: lb [n] | 37.00 [164.0] |
| Minimum Radius: in [mm] | 1.60 [40.6] |
| Shear Load*: lb [n] | 19.00 [84.5] |



**XP-B110**

| | |
|---|---|
| Cup Diameter: in [mm] | 110 mm |
| Outer Diameter: in [mm] | 4.82 [122.4] |
| Cup Height*: in [mm] | 2.49 [63.1] |
| Stroke: in [mm] | 1.32 [33.2] |
| Cup Weight: oz [g] | 5.10 [145.0] |
| Internal Volume: cu in [cc] | 19.00 [311.0] |
| Force @ 6 inHG: lb [n] | 30.00 [133.0] |
| Force @ 18 inHG: lb [n] | 77.00 [342.0] |
| Minimum Radius: in [mm] | 2.40 [61.0] |
| Shear Load*: lb [n] | 39.00 [173.5] |



**XP-B150**

| | |
|---|---|
| Cup Diameter: in [mm] | 150 mm |
| Outer Diameter: in [mm] | 6.54 [166.1] |
| Cup Height*: in [mm] | 3.10 [78.8] |
| Stroke: in [mm] | 1.75 [44.4] |
| Cup Weight: oz [g] | 13.00 [369.0] |
| Internal Volume: cu in [cc] | 40.00 [656.0] |
| Force @ 6 inHG: lb [n] | 66.00 [294.0] |
| Force @ 18 inHG: lb [n] | 154.00 [685.0] |
| Minimum Radius: in [mm] | 3.00 [76.2] |
| Shear Load*: lb [n] | 77.00 [342.0] |

**All figures for shear load are 18 inHg using a 0.5 coefficient of friction.*
*Adjust coefficient of friction to suit your conditions, then apply a generous factor of safety (3:1 or greater) to shear loads.*

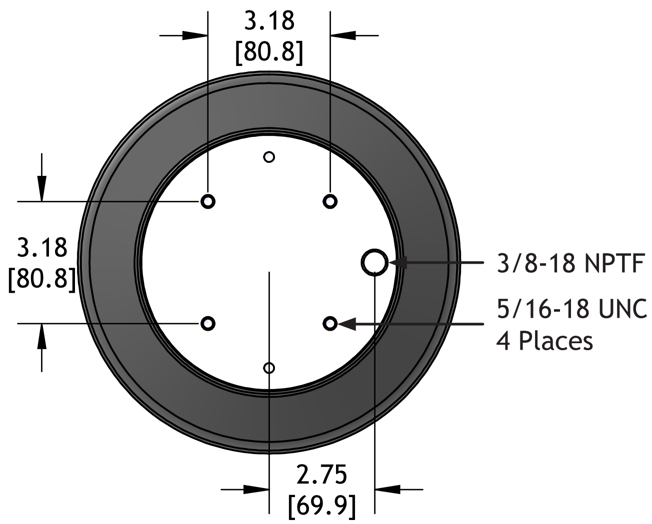
## Bellows Vacuum Cups

| | Cup Material | | Mount |
|---|---|---|---|
| XP-B250 | S | - | AQ |

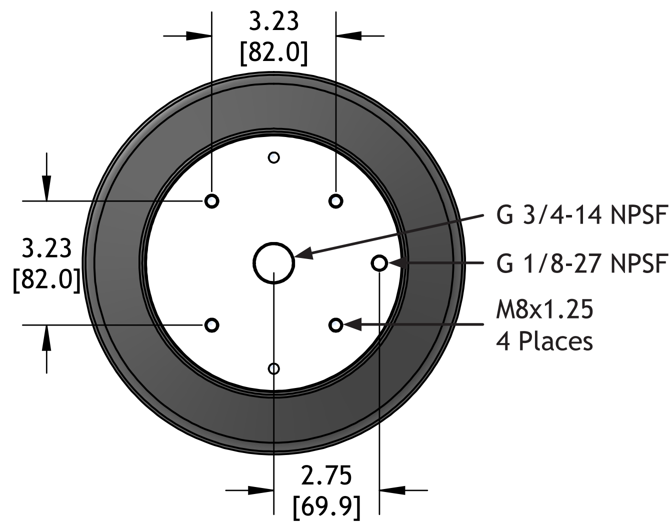
| Cup Material | |
|---|---|
| N | Nitrile / TPV |
| S | Silicone |

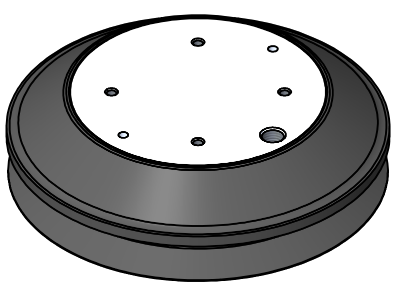
| Mount | |
|---|---|
| AQ | Quad Mount, Side Port |
| P | Quad Mount, Centered Port |

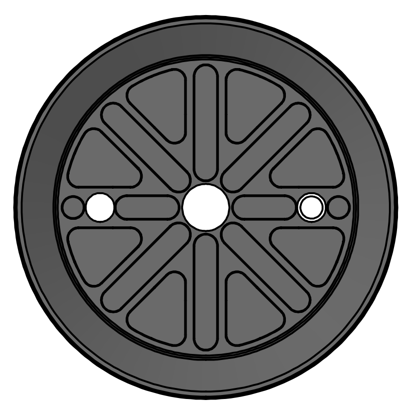
**AQ Mount**




**P Mount**





**XP-B250**

| | |
|---|---|
| Cup Diameter: in [mm] | 250 mm |
| Outer Diameter: in [mm] | 9.96 [253.0] |
| Cup Height: in [mm] | 2.56 [65.0] |
| Stroke: in [mm] | 1.44 [36.6] |
| Cup Weight: oz [g] | 3.57 [1.62] |
| Internal Volume: cu in [cc] | 85.40 [1400.0] |
| Force @ 18 inHG: lb [n] | 450.00 [2002.0] |
| Minimum Radius: in [mm] | 10.00 [254.0] |
| Shear Load*: lb [n] | 225.00 [1001.0] |

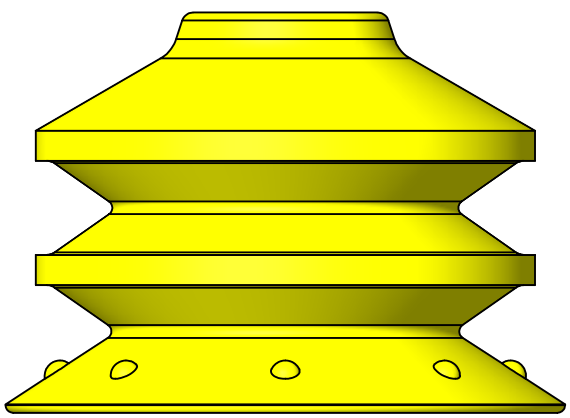
**All figures for shear load are 18 inHg using a 0.5 coefficient of friction.*
*Adjust coefficient of friction to suit your conditions, then apply a generous factor of safety (3:1 or greater) to shear loads.*

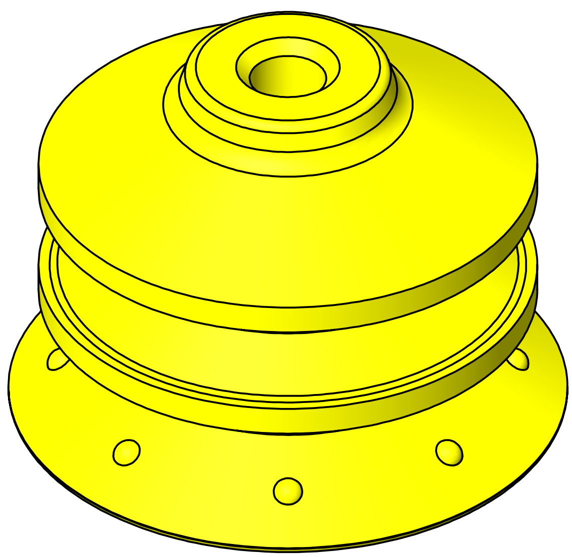
## Double-Bellows Vacuum Cups

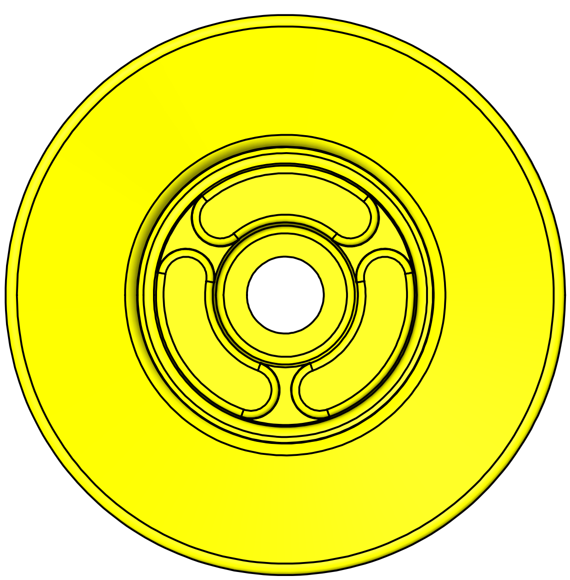
Double-bellows vacuum cups provide a longer stroke than single-bellows vacuum cups for greater ability to compensate for varying workpiece heights. This increased ability to compensate for varying heights does come at the cost of stability.

Our double-bellows vacuum cups include bottom cleats to help stabilize the cup when collapsed against a workpiece. The added traction surface increases the ability to withstand lateral shear loads. The cleats also help prevent flexible workpieces from deforming into the center of the cup when subjected to deep vacuum.

Suitable Workpiece Surface:
- Flat
- Slightly Concave
- Convex
- Compound
- Spherical
- Cylindrical
- Flexible
- Shear Loads

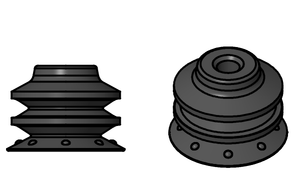






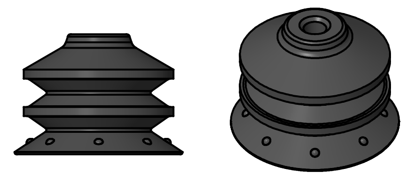
# Double-Bellows Vacuum Cups

| | Cup Size | | Cup Material | | Cup Fitting | |
|---|---|---|---|---|---|---|
| XP-2B | 65 | | A | | -18MS | |
| | 25 | Ø 25 mm | A | Ameriflex | (Blank) | None |
| | 35 | Ø 35 mm | D | Duramax | See cup fittings for available threads. | |
| | 50 | Ø 50 mm | N | Nitrile / TPV | | |
| | 65 | Ø 65 mm | | | | |



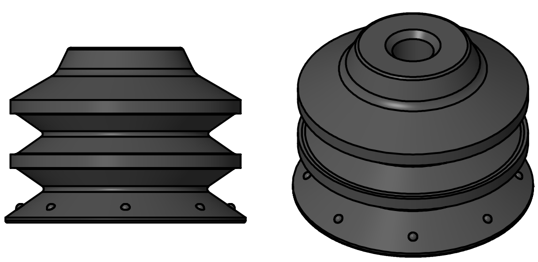
## XP-2B25

| | |
|---|---|
| Cup Diameter: in [mm] | 25 mm |
| Outer Diameter: in [mm] | 1.02 [25.9] |
| Cup Height: in [mm] | 0.74 [18.8] |
| Thru Hole: in [mm] | 0.20 [5.1] |
| Stroke: in [mm] | 0.38 [9.7] |
| Cup Weight: oz [g] | 0.11 [3.1] |
| Internal Volume: cu in [cc] | 0.18 [3.0] |
| Force @ 6 inHG: lb [n] | 2.02 [9.0] |
| Force @ 18 inHG: lb [n] | 3.15 [14.0] |
| Minimum Radius: in [mm] | 0.31 [7.9] |



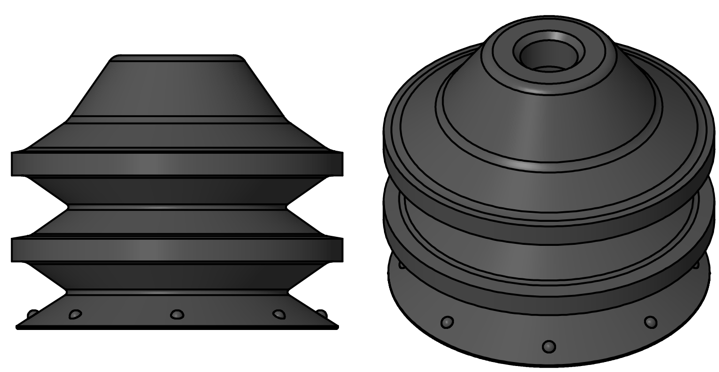
## XP-2B35

| | |
|---|---|
| Cup Diameter: in [mm] | 35 mm |
| Outer Diameter: in [mm] | 1.46 [37.0] |
| Cup Height: in [mm] | 1.04 [26.4] |
| Thru Hole: in [mm] | 0.20 [5.1] |
| Stroke: in [mm] | 0.59 [15.0] |
| Cup Weight: oz [g] | 0.28 [7.9] |
| Internal Volume: cu in [cc] | 0.61 [10.0] |
| Force @ 6 inHG: lb [n] | 3.37 [15.0] |
| Force @ 18 inHG: lb [n] | 5.62 [25.0] |
| Minimum Radius: in [mm] | 0.39 [9.9] |



## XP-2B50

| | |
|---|---|
| Cup Diameter: in [mm] | 50 mm |
| Outer Diameter: in [mm] | 2.09 [53.0] |
| Cup Height: in [mm] | 1.52 [38.6] |
| Thru Hole: in [mm] | 0.36 [9.1] |
| Stroke: in [mm] | 0.82 [20.8] |
| Cup Weight: oz [g] | 0.85 [24.1] |
| Internal Volume: cu in [cc] | 1.83 [30.0] |
| Force @ 6 inHG: lb [n] | 8.32 [37.0] |
| Force @ 18 inHG: lb [n] | 13.30 [59.2] |
| Minimum Radius: in [mm] | 1.26 [32.0] |



## XP-2B65

| | |
|---|---|
| Cup Diameter: in [mm] | 65 mm |
| Outer Diameter: in [mm] | 2.87 [72.9] |
| Cup Height: in [mm] | 2.37 [60.3] |
| Thru Hole: in [mm] | 0.50 [12.7] |
| Stroke: in [mm] | 1.30 [33.0] |
| Cup Weight: oz [g] | 2.20 [63.0] |
| Internal Volume: cu in [cc] | 5.85 [95.9] |
| Force @ 6 inHG: lb [n] | 8.40 [37.4] |
| Force @ 18 inHG: lb [n] | 21.00 [93.4] |
| Minimum Radius: in [mm] | 1.22 [31.0] |

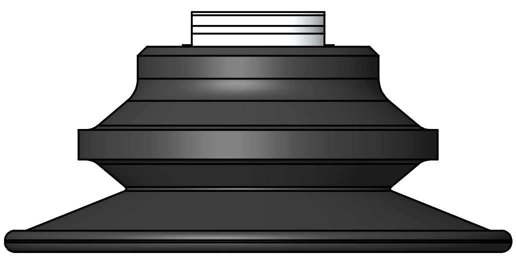
**All figures for shear load are 18 inHg using a 0.5 coefficient of friction.*
*Adjust coefficient of friction to suit your conditions, then apply a generous factor of safety (3:1 or greater) to shear loads.*

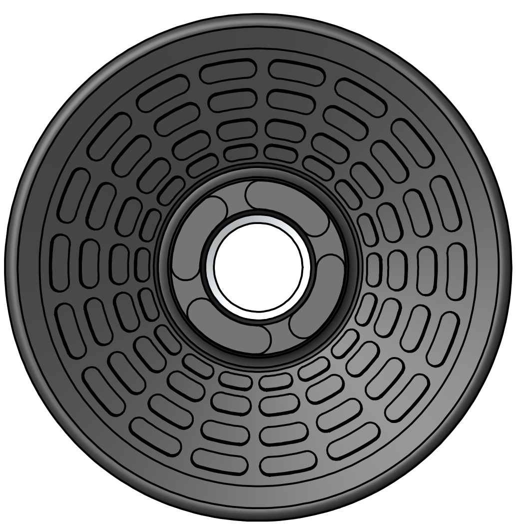
## Bellows Flat Vacuum Cups

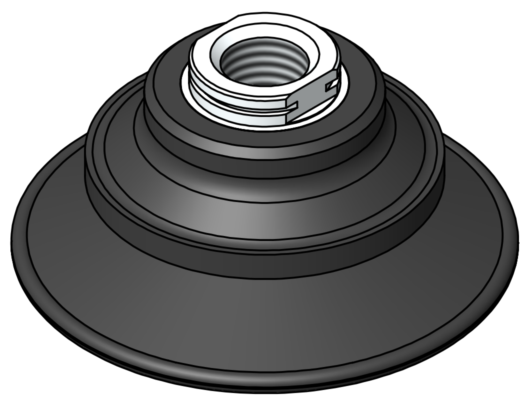
The Bellows flat style vacuum cups combine the versatility of a Bellows cup with a large anti-skid tread pattern to provide maximum holding power and high resistance to shear loads even when lubrication is present. BF Cups are ideal for feeding sheet metal blanks to stamping presses or other robotic applications where it is necessary to resist loads caused by rapid acceleration and deceleration. Mounting bellows flat vacuum cups using the 22 mm wrench flats is quick and easy.

Suitable Workpiece Surface:

- Flat
- Slightly Concave
- Convex
- Compound
- Shear Loads

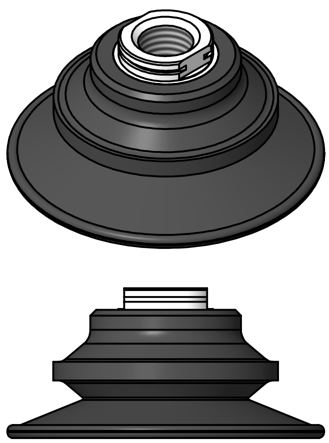






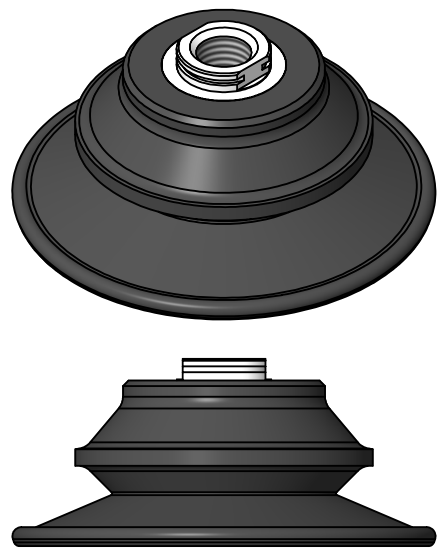
# Bellows Flat Vacuum Cups

| | Cup Size | | Cup Material | | Fitting | |
|---|---|---|---|---|---|---|
| XP-BF | 80 | | N | | -38F | |
| | 80 | Ø 80 mm | N | Nitrile / TPV | -38F | 3/8 NPSF Female |
| | 100 | Ø 100 mm | | | | |



**XP-BF80**

| | |
|---|---|
| Cup Diameter: in [mm] | 80 mm |
| Outer Diameter: in [mm] | 3.30 [83.8] |
| Cup Height: in [mm]* | 1.56 [39.7] |
| Stroke: in [mm] | 0.58 [14.7] |
| Cup Weight: oz [g] | 1.70 [48.2] |
| Internal Volume: cu in [cc] | 1.80 [29.5] |
| Force @ 6 inHG: lb [n] | 17.00 [75.6] |
| Force @ 18 inHG: lb [n] | 42.00 [187.0] |
| Minimum Radius: in [mm] | 2.80 [71.1] |
| Shear Load[2]: lb [n] | 45.00 [200.0] |



**XP-BF100**

| | |
|---|---|
| Cup Diameter: in [mm] | 100 mm |
| Outer Diameter: in [mm] | 4.41 [112.1] |
| Cup Height: in [mm]* | 1.95 [49.6] |
| Stroke: in [mm] | 0.95 [24.1] |
| Cup Weight: oz [g] | 2.40 [68.0] |
| Internal Volume: cu in [cc] | 4.90 [80.3] |
| Force @ 6 inHG: lb [n] | 28.00 [125.0] |
| Force @ 18 inHG: lb [n] | 78.00 [347.0] |
| Minimum Radius: in [mm] | 3.60 [91.5] |
| Shear Load[2]: lb [n] | 53.00 [236.0] |

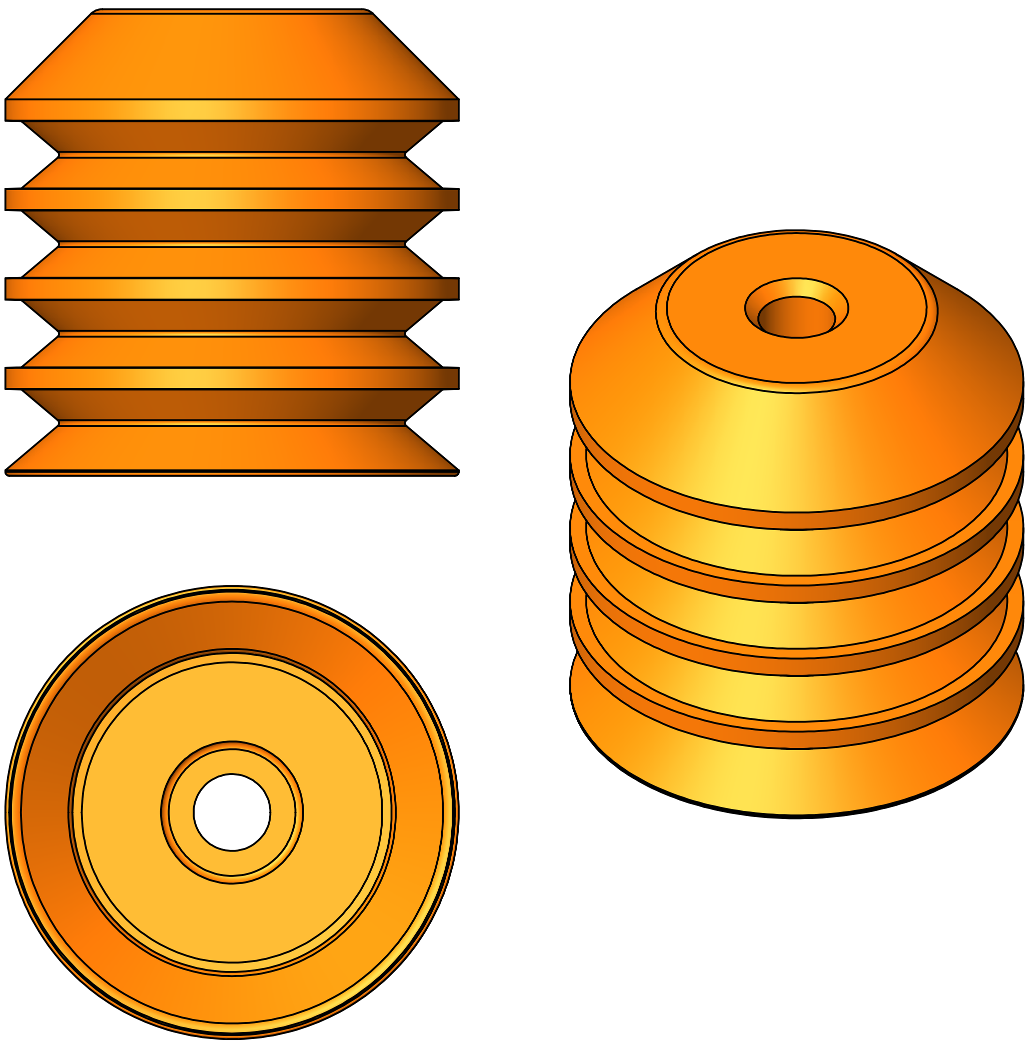
**All figures for shear load are 18 inHg using a 0.5 coefficient of friction.*
*Adjust coefficient of friction to suit your conditions, then apply a generous factor of safety (3:1 or greater) to shear loads.*

## Multi-Bellows Vacuum Cups

Multi-bellows vacuum cups are made with shallow-fold bellows plus a thin, shallow sealing lip that allows it to conform to flexible packaging and other thin workpieces. The shallow-fold bellows cannot withstand deep vacuum unless it is fully collapsed. Do not try to use the bellows movement to lift a workpiece or the cup can collapse radially inward. Our multi-bellows vacuum cups include both internal and external stiffening ring features to reduce the possibility of radial collapse where other brands do not. The stiffening ring also provides stability when the cup is fully collapsed.

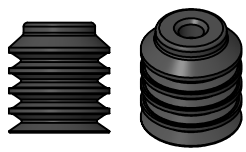
Suitable Workpiece Surface:

- Flat
- Convex
- Compound
- Cylindrical
- Flexible
- Plastic Film



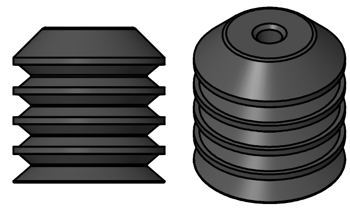
## Multi-Bellows Vacuum Cups

| | Cup Size | | Cup Material | | Cup Fitting | |
|---|---|---|---|---|---|---|
| XP-BL | 30 | | A | | -G14F | |
| | 20 | Ø 20 mm | A | Ameriflex | (Blank) | None |
| | 30 | Ø 30 mm | D | Duramax | See cup fittings for available threads. | |
| | 40 | Ø 40 mm | N | Nitrile / TPV | | |
| | 50 | Ø 50 mm | S | Silicone | | |



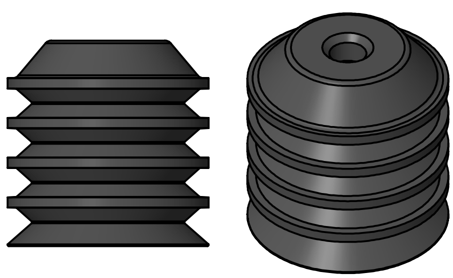
**XP-BL20**

| Cup Diameter: in [mm] | 20 mm |
|---|---|
| Outer Diameter: in [mm] | 0.79 [20.0] |
| Cup Height: in [mm] | 0.86 [21.8] |
| Thru Hole: in [mm] | 0.20 [5.1] |
| Stroke: in [mm] | 0.51 [13.0] |
| Cup Weight: oz [g] | 0.07 [2.0] |
| Internal Volume: cu in [cc] | 0.24 [3.9] |
| Force @ 6 inHG: lb [n] | 0.70 [3.1] |
| Force @ 18 inHG: lb [n] | 1.40 [6.2] |
| Minimum Radius: in [mm] | 0.16 [4.1] |



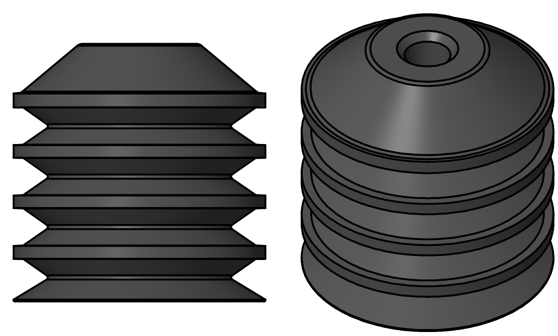
**XP-BL30**

| Cup Diameter: in [mm] | 30 mm |
|---|---|
| Outer Diameter: in [mm] | 1.18 [30.0] |
| Cup Height: in [mm] | 1.22 [30.9] |
| Thru Hole: in [mm] | 0.20 [5.1] |
| Stroke: in [mm] | 0.79 [20.1] |
| Cup Weight: oz [g] | 0.21 [6.0] |
| Internal Volume: cu in [cc] | 0.80 [13.1] |
| Force @ 6 inHG: lb [n] | 1.40 [6.2] |
| Force @ 18 inHG: lb [n] | 3.60 [16.0] |
| Minimum Radius: in [mm] | 0.31 [7.9] |



**XP-BL40**

| Cup Diameter: in [mm] | 40 mm |
|---|---|
| Outer Diameter: in [mm] | 1.57 [39.9] |
| Cup Height: in [mm] | 1.61 [40.8] |
| Thru Hole: in [mm] | 0.29 [7.4] |
| Stroke: in [mm] | 0.98 [24.9] |
| Cup Weight: oz [g] | 0.43 [12.2] |
| Internal Volume: cu in [cc] | 1.6 [26.2] |
| Force @ 6 inHG: lb [n] | 2.50 [11.1] |
| Force @ 18 inHG: lb [n] | 4.90 [21.8] |
| Minimum Radius: in [mm] | 0.60 [15.2] |



**XP-BL50**

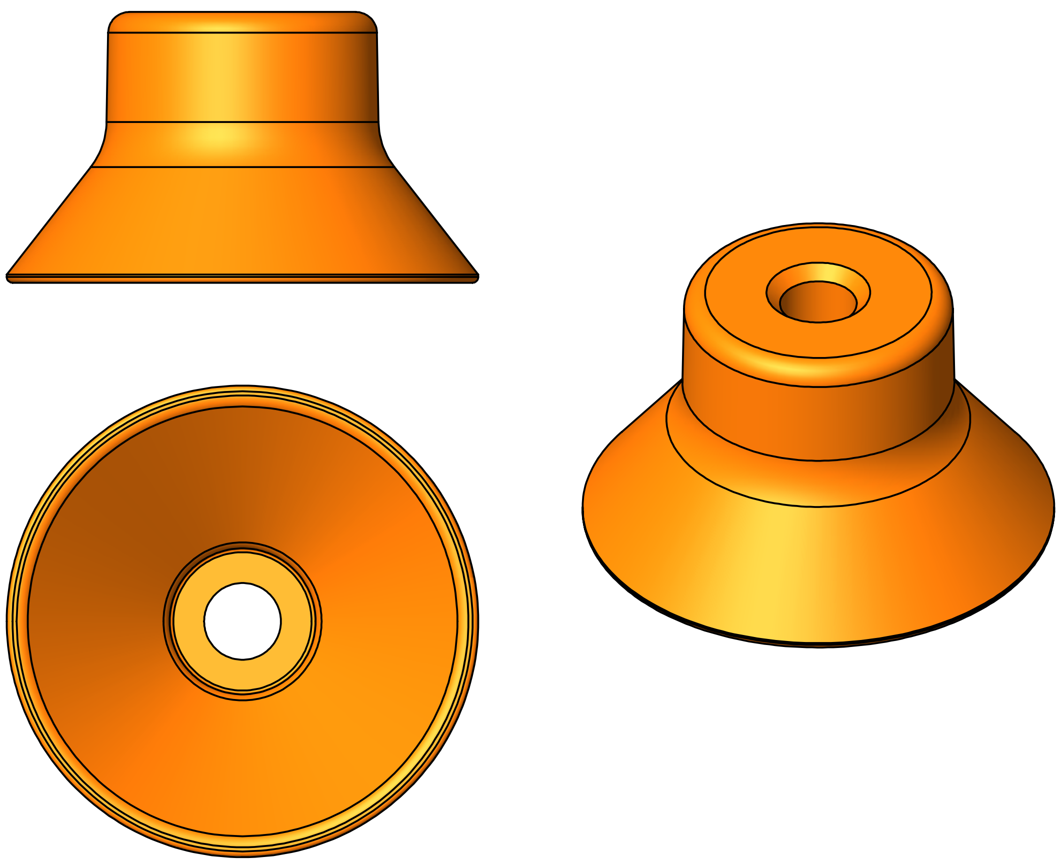
| Cup Diameter: in [mm] | 50 mm |
|---|---|
| Outer Diameter: in [mm] | 1.97 [50.0] |
| Cup Height: in [mm] | 2.01 [51.1] |
| Thru Hole: in [mm] | 0.36 [9.1] |
| Stroke: in [mm] | 1.10 [27.9] |
| Cup Weight: oz [g] | 0.82 [23.2] |
| Internal Volume: cu in [cc] | 3.40 [55.7] |
| Force @ 6 inHG: lb [n] | 3.80 [16.9] |
| Force @ 18 inHG: lb [n] | 9.60 [42.7] |
| Minimum Radius: in [mm] | 0.60 [15.2] |

## Deep Vacuum Cups

Deep vacuum cups are used for highly curved or irregular surfaces and can even seal against corners, edges, and spherical workpiece. Deep vacuum cups are unsuitable for use on flat surfaces because the lip will be overstretched and the resultant scrubbing could leave marks on the workpiece.

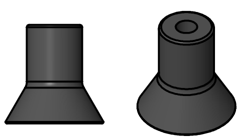
Suitable Workpiece Surface:

- Convex
- Spherical
- Cylindrical



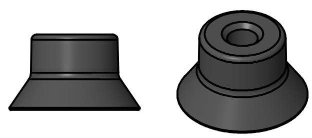
## Deep Vacuum Cups

| | Cup Size | | Cup Material | | Cup Fitting | |
|---|---|---|---|---|---|---|
| XP-D | 15 | | S | | -5F | |
| | 15 | Ø 15 mm | N | Nitrile / TPV | (Blank) | None |
| | 20 | Ø 20 mm | S | Silicone | See cup fittings for available threads. | |
| | 30 | Ø 30 mm | | | | |
| | 40 | Ø 40 mm | | | | |
| | 50 | Ø 50 mm | | | | |



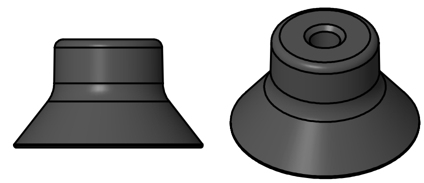
### XP-D15

| | |
|---|---|
| Cup Diameter: in [mm] | 15 mm |
| Outer Diameter: in [mm] | 0.64 [16.2] |
| Cup Height: in [mm] | 0.64 [16.3] |
| Thru Hole: in [mm] | 0.14 [3.6] |
| Stroke: in [mm] | 0.12 [3.0] |
| Cup Weight: oz [g] | 0.03 [0.9] |
| Internal Volume: cu in [cc] | 0.06 [1.0] |
| Force @ 6 inHG: lb [n] | 0.65 [2.8] |
| Force @ 18 inHG: lb [n] | 1.70 [7.5] |
| Minimum Radius: in [mm] | 0.24 [6.1] |



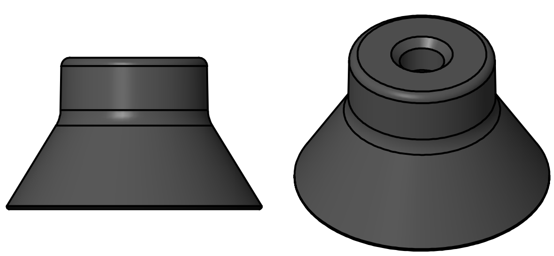
### XP-D20

| | |
|---|---|
| Cup Diameter: in [mm] | 20 mm |
| Outer Diameter: in [mm] | 0.85 [21.5] |
| Cup Height: in [mm] | 0.49 [12.4] |
| Thru Hole: in [mm] | 0.20 [5.1] |
| Stroke: in [mm] | 0.18 [4.6] |
| Cup Weight: oz [g] | 0.05 [1.4] |
| Internal Volume: cu in [cc] | 0.12 [2.0] |
| Force @ 6 inHG: lb [n] | 1.30 [5.7] |
| Force @ 18 inHG: lb [n] | 3.30 [14.6] |
| Minimum Radius: in [mm] | 0.32 [8.1] |



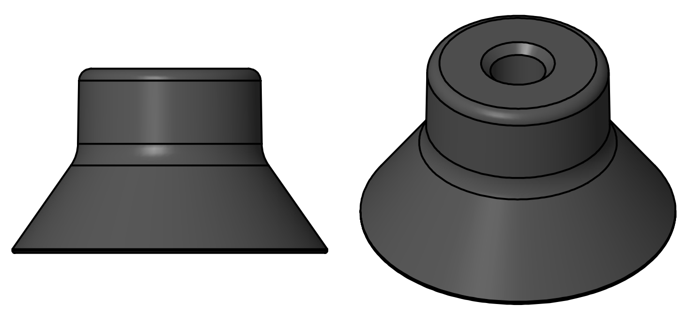
### XP-D30

| | |
|---|---|
| Cup Diameter: in [mm] | 30 mm |
| Outer Diameter: in [mm] | 1.23 [31.2] |
| Cup Height: in [mm] | 0.71 [17.9] |
| Thru Hole: in [mm] | 0.20 [5.1] |
| Stroke: in [mm] | 0.20 [5.1] |
| Cup Weight: oz [g] | 0.11 [3.1] |
| Internal Volume: cu in [cc] | 0.30 [5.0] |
| Force @ 6 inHG: lb [n] | 3.10 [13.8] |
| Force @ 18 inHG: lb [n] | 5.80 [25.8] |
| Minimum Radius: in [mm] | 0.51 [13.0] |



### XP-D40

| | |
|---|---|
| Cup Diameter: in [mm] | 40 mm |
| Outer Diameter: in [mm] | 1.66 [42.1] |
| Cup Height: in [mm] | 0.98 [25.0] |
| Thru Hole: in [mm] | 0.29 [7.4] |
| Stroke: in [mm] | 0.31 [7.9] |
| Cup Weight: oz [g] | 0.30 [8.5] |
| Internal Volume: cu in [cc] | 0.80 [13.0] |
| Force @ 6 inHG: lb [n] | 5.40 [24.0] |
| Force @ 18 inHG: lb [n] | 11.30 [50.3] |
| Minimum Radius: in [mm] | 0.65 [16.5] |



### XP-D50

| | |
|---|---|
| Cup Diameter: in [mm] | 50 mm |
| Outer Diameter: in [mm] | 2.05 [52.1] |
| Cup Height: in [mm] | 1.20 [30.5] |
| Thru Hole: in [mm] | 0.36 [9.1] |
| Stroke: in [mm] | 0.39 [9.9] |
| Cup Weight: oz [g] | 0.54 [15.3] |
| Internal Volume: cu in [cc] | 1.40 [23.0] |
| Force @ 6 inHG: lb [n] | 8.10 [36.0] |
| Force @ 18 inHG: lb [n] | 17.00 [75.6] |
| Minimum Radius: in [mm] | 0.98 [24.9] |

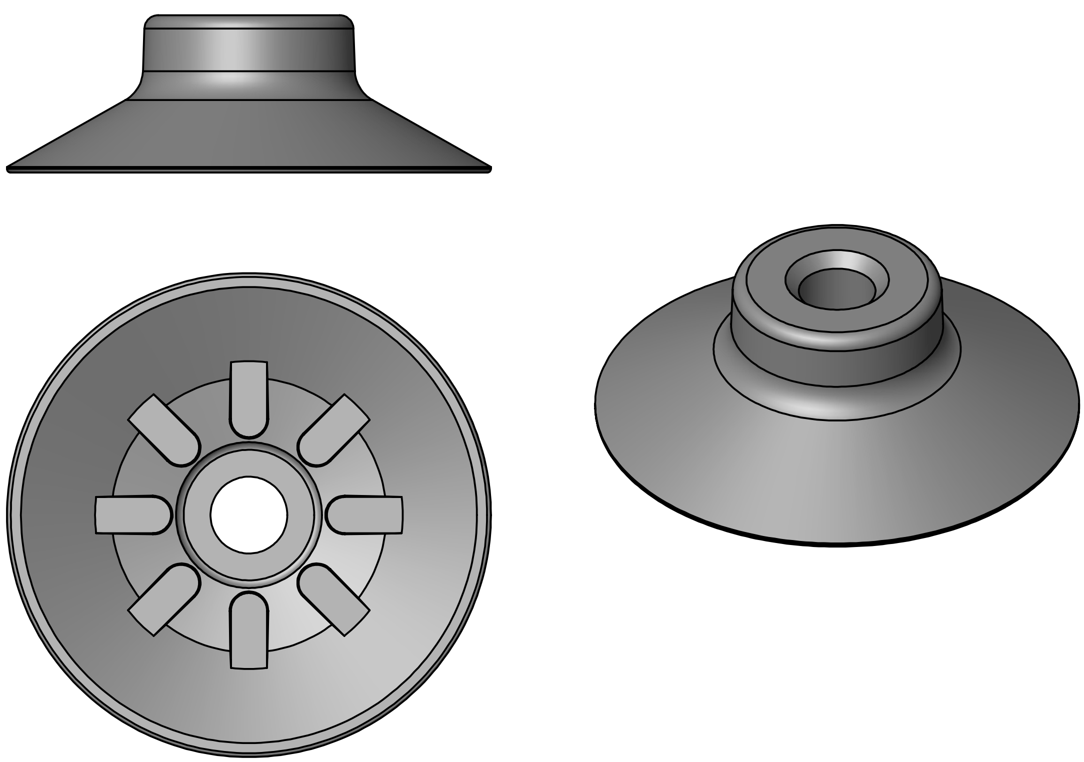
## Flat Vacuum Cups

Flat vacuum cups are like universal cups except they have cleats on the bottom which serve as traction surfaces and support the workpiece being lifted to prevent or limit deformation. The cleats limit deflection and maintain a larger exposed area to vacuum for a firm grip on the workpiece.

Flat vacuum cups have high stability and traction but a very short stroke. They should be used primarily for flat workpieces or sheet goods such as cardboard, corrugated board, and dry sheet metal. Flat vacuum cups will not work well with thin workpieces such as plastic sheet goods or flexible packaging.

Flat vacuum cups have very little angular compensation ability so they should always pick up perpendicular to a flat workpiece surface.

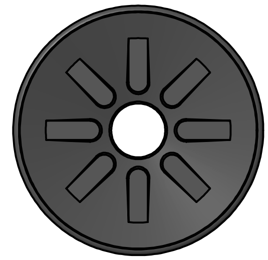
Suitable Workpiece Surface:
- Flat
- Shear Loads



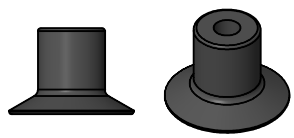
# Flat Vacuum Cups

| | Cup Size | | Cup Material | | Cup Fitting | |
|---|---|---|---|---|---|---|
| XP-F | 20 | | A | | -14M | |
| | 15 | Ø 15 mm | A | Ameriflex[1] | (Blank) | None |
| | 20 | Ø 20 mm | D | Duramax[1] | See cup fittings for available threads. | |
| | 25 | Ø 25 mm | N | Nitrile / TPV | | |
| | 30 | Ø 30 mm | S | Silicone | | |
| | | | V | Viton | | |

[1]Not available on XP-F15.

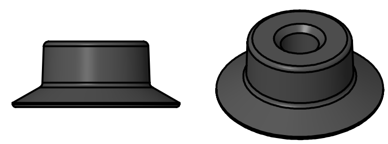


*All Flat Cups have cleats.*



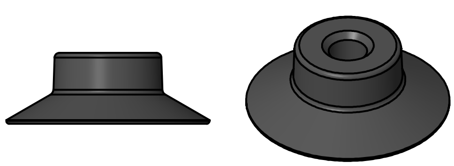
**XP-F15**

| | |
|---|---|
| Cup Diameter: in [mm] | 15 mm |
| Outer Diameter: in [mm] | 0.65 [16.5] |
| Cup Height: in [mm] | 0.45 [11.4] |
| Thru Hole: in [mm] | 0.14 [3.6] |
| Stroke: in [mm] | 0.03 [0.8] |
| Cup Weight: oz [g] | 0.03 [0.85] |
| Internal Volume: cu in [cc] | 0.20 [0.3] |
| Force @ 6 inHG: lb [n] | 0.80 [3.6] |
| Force @ 18 inHG: lb [n] | 1.90 [8.5] |
| Minimum Radius: in [mm] | 0.51 [13.0] |
| Shear Load*: lb [n] | 0.90 [4.0] |



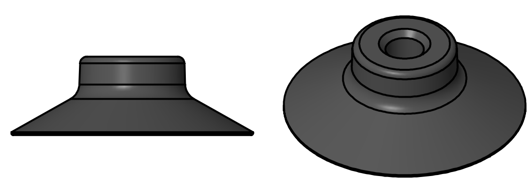
**XP-F20**

| | |
|---|---|
| Cup Diameter: in [mm] | 20 mm |
| Outer Diameter: in [mm] | 0.87 [22.1] |
| Cup Height: in [mm] | 0.34 [8.7] |
| Thru Hole: in [mm] | 0.20 [5.1] |
| Stroke: in [mm] | 0.06 [1.5] |
| Cup Weight: oz [g] | 0.05 [1.4] |
| Internal Volume: cu in [cc] | 0.06 [1.0] |
| Force @ 6 inHG: lb [n] | 1.30 [5.8] |
| Force @ 18 inHG: lb [n] | 3.30 [14.7] |
| Minimum Radius: in [mm] | 0.71 [7.6] |
| Shear Load*: lb [n] | 1.70 [7.6] |



**XP-F25**

| | |
|---|---|
| Cup Diameter: in [mm] | 25 mm |
| Outer Diameter: in [mm] | 1.06 [26.9] |
| Cup Height: in [mm] | 0.37 [9.4] |
| Thru Hole: in [mm] | 0.20 [5.1] |
| Stroke: in [mm] | 0.06 [1.5] |
| Cup Weight: oz [g] | 0.06 [1.7] |
| Internal Volume: cu in [cc] | 0.07 [1.2] |
| Force @ 6 inHG: lb [n] | 2.00 [8.9] |
| Force @ 18 inHG: lb [n] | 4.30 [19.1] |
| Minimum Radius: in [mm] | 0.98 [24.9] |
| Shear Load*: lb [n] | 2.10 [9.3] |



**XP-F30**

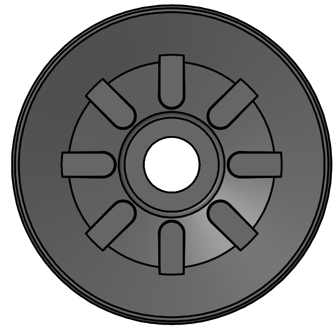
| | |
|---|---|
| Cup Diameter: in [mm] | 30 mm |
| Outer Diameter: in [mm] | 1.26 [32.0] |
| Cup Height: in [mm] | 0.41 [10.4] |
| Thru Hole: in [mm] | 0.20 [5.1] |
| Stroke: in [mm] | 0.09 [2.3] |
| Cup Weight: oz [g] | 0.08 [2.3] |
| Internal Volume: cu in [cc] | 0.12 [2.0] |
| Force @ 6 inHG: lb [n] | 2.70 [12.0] |
| Force @ 18 inHG: lb [n] | 5.60 [24.9] |
| Minimum Radius: in [mm] | 0.98 [24.9] |
| Shear Load*: lb [n] | 2.80 [12.5] |

**All figures for shear load are 18 inHg using a 0.5 coefficient of friction.
Adjust coefficient of friction to suit your conditions, then apply a generous factor of safety (3:1 or greater) to shear loads.*

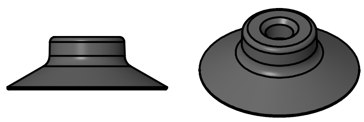
## Flat Vacuum Cups

| | Cup Size | | Cup Material[1] | | Cup Fitting | |
|---|---|---|---|---|---|---|
| XP-F | 50 | | D | | -38M | |
| | 40 | Ø 40 mm | A | Ameriflex | (Blank) | None |
| | 50 | Ø 50 mm | D | Duramax | See cup fittings for available threads. | |
| | 65 | Ø 65 mm | N | Nitrile / TPV | | |
| | 90 | Ø 90 mm[2] | S | Silicone[1] | | |
| | | | V | Viton[1] | | |

*[1]Not available on XP-F65 or XP-F90.*
*[2]Uses 65 mm Cup Fittings.*

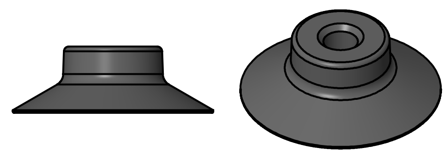


*All Flat Cups have cleats.*



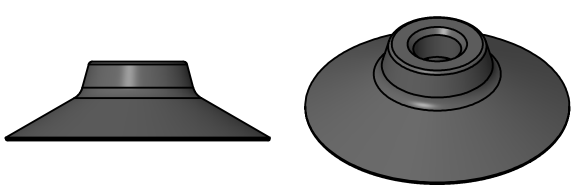
### XP-F40

| | |
|---|---|
| Cup Diameter: in [mm] | 40 mm |
| Outer Diameter: in [mm] | 1.66 [42.2] |
| Cup Height: in [mm] | 0.55 [13.9] |
| Thru Hole: in [mm] | 0.30 [7.6] |
| Stroke: in [mm] | 0.10 [2.5] |
| Cup Weight: oz [g] | 0.18 [5.1] |
| Internal Volume: cu in [cc] | 0.29 [4.8] |
| Force @ 6 inHG: lb [n] | 4.50 [20.0] |
| Force @ 18 inHG: lb [n] | 9.00 [40.0] |
| Minimum Radius: in [mm] | 2.05 [52.1] |
| Shear Load*: lb [n] | 4.50 [20.0] |



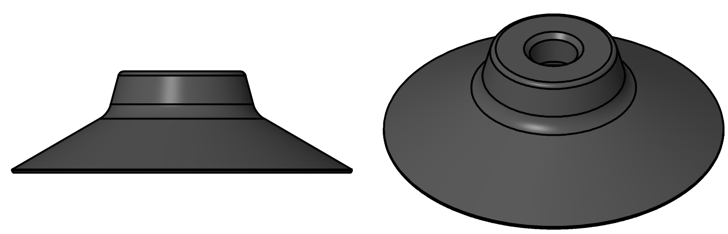
### XP-F50

| | |
|---|---|
| Cup Diameter: in [mm] | 50 mm |
| Outer Diameter: in [mm] | 2.09 [53.1] |
| Cup Height: in [mm] | 0.69 [17.5] |
| Thru Hole: in [mm] | 0.36 [9.1] |
| Stroke: in [mm] | 0.12 [3.0] |
| Cup Weight: oz [g] | 0.40 [11.3] |
| Internal Volume: cu in [cc] | 0.61 [10.0] |
| Force @ 6 inHG: lb [n] | 8.10 [36.0] |
| Force @ 18 inHG: lb [n] | 16.6 [73.8] |
| Minimum Radius: in [mm] | 2.17 [55.1] |
| Shear Load*: lb [n] | 8.30 [36.9] |



### XP-F65

| | |
|---|---|
| Cup Diameter: in [mm] | 65 mm |
| Outer Diameter: in [mm] | 2.75 [69.9] |
| Cup Height: in [mm] | 0.82 [20.9] |
| Thru Hole: in [mm] | 0.50 [12.7] |
| Stroke: in [mm] | 0.15 [2.5] |
| Cup Weight: oz [g] | 0.51 [14.5] |
| Internal Volume: cu in [cc] | 1.46 [24.0] |
| Force @ 6 inHG: lb [n] | 9.00 [40.0] |
| Force @ 18 inHG: lb [n] | 22.00 [98.0] |
| Minimum Radius: in [mm] | 5.50 [140.0] |
| Shear Load*: lb [n] | 11.00 [49.0] |



### XP-F90

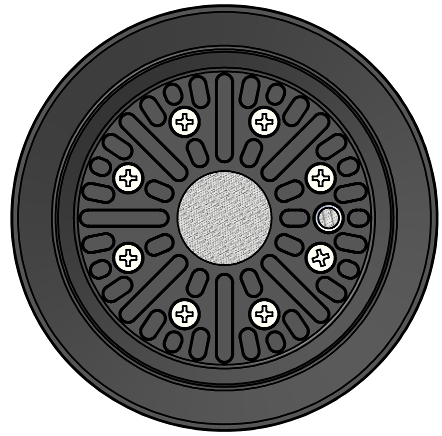
| | |
|---|---|
| Cup Diameter: in [mm] | 90 mm |
| Outer Diameter: in [mm] | 3.54 [89.9] |
| Cup Height: in [mm] | 1.06 [26.9] |
| Thru Hole: in [mm] | 0.50 [12.7] |
| Stroke: in [mm] | 0.20 [5.2] |
| Cup Weight: oz [g] | 1.10 [31.0] |
| Internal Volume: cu in [cc] | 2.93 [48.0] |
| Force @ 6 inHG: lb [n] | 24.00 [106.8] |
| Force @ 18 inHG: lb [n] | 60.00 [266.9] |
| Minimum Radius: in [mm] | 7.20 [183.0] |
| Shear Load*: lb [n] | 30.00 [133.4] |

**All figures for shear load are 18 inHg using a 0.5 coefficient of friction.*
*Adjust coefficient of friction to suit your conditions, then apply a generous factor of safety (3:1 or greater) to shear loads.*

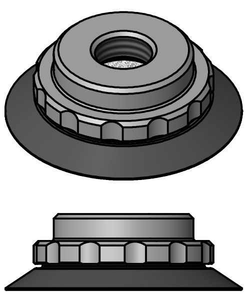
## Flat Vacuum Cups

| | Cup Size | Cup Material | Cup Fitting |
|---|---|---|---|
| XP-F | 110 | S | -38F |

| Cup Size | | Cup Material | | Cup Fitting | |
|---|---|---|---|---|---|
| 75 | Ø 75 mm | A | Ameriflex | (Blank) | None |
| 110 | Ø 110 mm | N | Nitrile / TPV | See cup fittings for available threads. | |
| 150 | Ø 150 mm | S | Silicone | | |
| | | V | Viton | | |

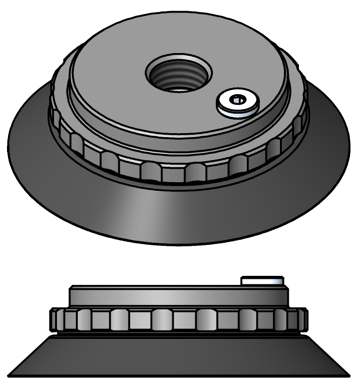


*All Flat Cups have cleats.*



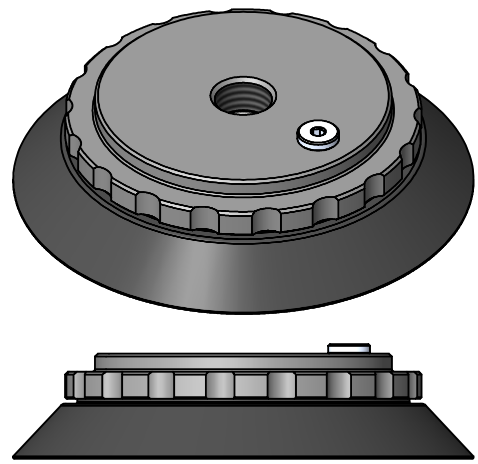
**XP-F75**

| | |
|---|---|
| Cup Diameter: in [mm] | 75 mm |
| Outer Diameter: in [mm] | 3.08 [78.2] |
| Cup Height*: in [mm] | 0.99 [25.1] |
| Stroke: in [mm] | 0.09 [2.3] |
| Cup Weight: oz [g] | 1.00 [28.3] |
| Internal Volume: cu in [cc] | 1.20 [19.7] |
| Force @ 6 inHG: lb [n] | 18.00 [80.1] |
| Force @ 18 inHG: lb [n] | 45.00 [20.0] |
| Minimum Radius: in [mm] | 5.90 [150.0] |
| Shear Load*: lb [n] | 23.00 [102.0] |



**XP-F110**

| | |
|---|---|
| Cup Diameter: in [mm] | 110 mm |
| Outer Diameter: in [mm] | 4.44 [112.8] |
| Cup Height*: in [mm] | 1.30 [33.0] |
| Stroke: in [mm] | 0.21 [5.3] |
| Cup Weight: oz [g] | 3.10 [87.9] |
| Internal Volume: cu in [cc] | 4.30 [70.5] |
| Force @ 6 inHG: lb [n] | 32.00 [142.0] |
| Force @ 18 inHG: lb [n] | 94.00 [418.0] |
| Minimum Radius: in [mm] | 9.80 [249.0] |
| Shear Load*: lb [n] | 47.00 [209.0] |



**XP-F150**

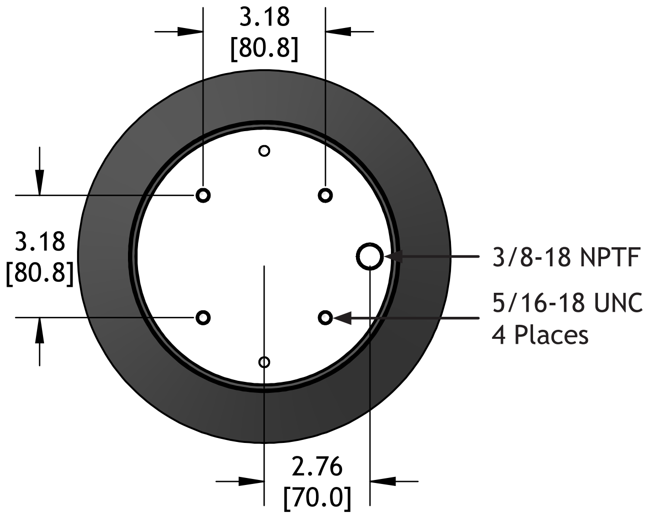
| | |
|---|---|
| Cup Diameter: in [mm] | 150 mm |
| Outer Diameter: in [mm] | 6.00 [152.4] |
| Cup Height*: in [mm] | 1.49 [37.9] |
| Stroke: in [mm] | 0.33 [8.4] |
| Cup Weight: oz [g] | 7.30 [207.0] |
| Internal Volume: cu in [cc] | 9.80 [161.0] |
| Force @ 6 inHG: lb [n] | 67.00 [298.0] |
| Force @ 18 inHG: lb [n] | 191.00 [850.0] |
| Minimum Radius: in [mm] | 19.70 [500.0] |
| Shear Load*: lb [n] | 95.00 [422.0] |

**All figures for shear load are 18 inHg using a 0.5 coefficient of friction.*
*Adjust coefficient of friction to suit your conditions, then apply a generous factor of safety (3:1 or greater) to shear loads.*

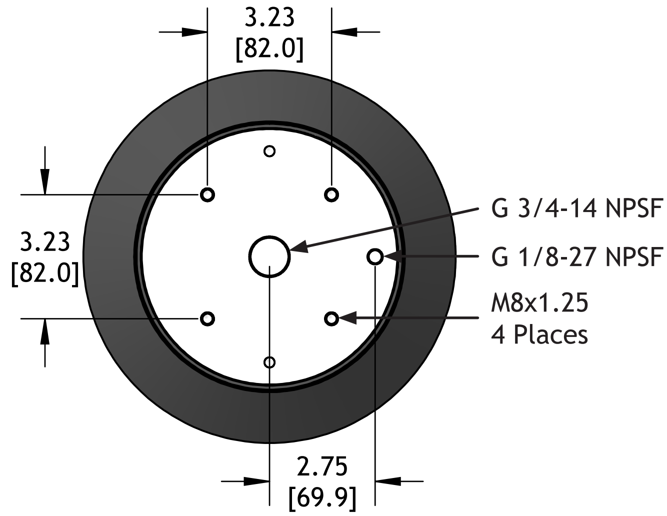
# Flat Vacuum Cups

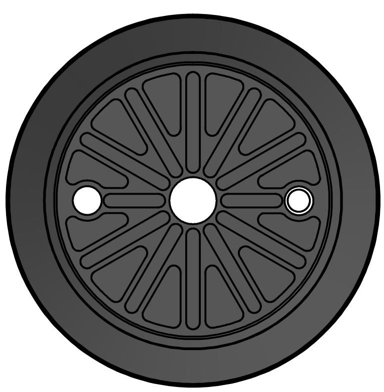
| | Cup Material | | | Mount | |
|---|---|---|---|---|---|
| XP-F240 | S | | - | P | |
| | NP | Neoprene | | AQ | Quad Mount, Side Port |
| | S | Silicone | | P | Quad Mount, Center Port |

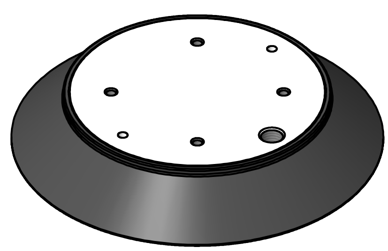
**AQ Mount**




**P Mount**





**XP-F240**

| | |
|---|---|
| Cup Diameter: in [mm] | 240 mm |
| Outer Diameter: in [mm] | 9.70 [246.4] |
| Cup Height: in [mm] | 1.50 [38.2] |
| Stroke: in [mm] | 0.62 [15.7] |
| Cup Weight: oz [g] | 2.80 [1.3] |
| Internal Volume: cu in [cc] | 33.00 [541.0] |
| Force @ 18 inHG: lb [n] | 450.00 [2002.0] |
| Minimum Radius: in [mm] | 20.00 [508.0] |
| Shear Load*: lb [n] | 225.00 [1001.0] |

**All figures for shear load are 18 inHg using a 0.5 coefficient of friction.*
*Adjust coefficient of friction to suit your conditions, then apply a generous factor of safety (3:1 or greater) to shear loads.*

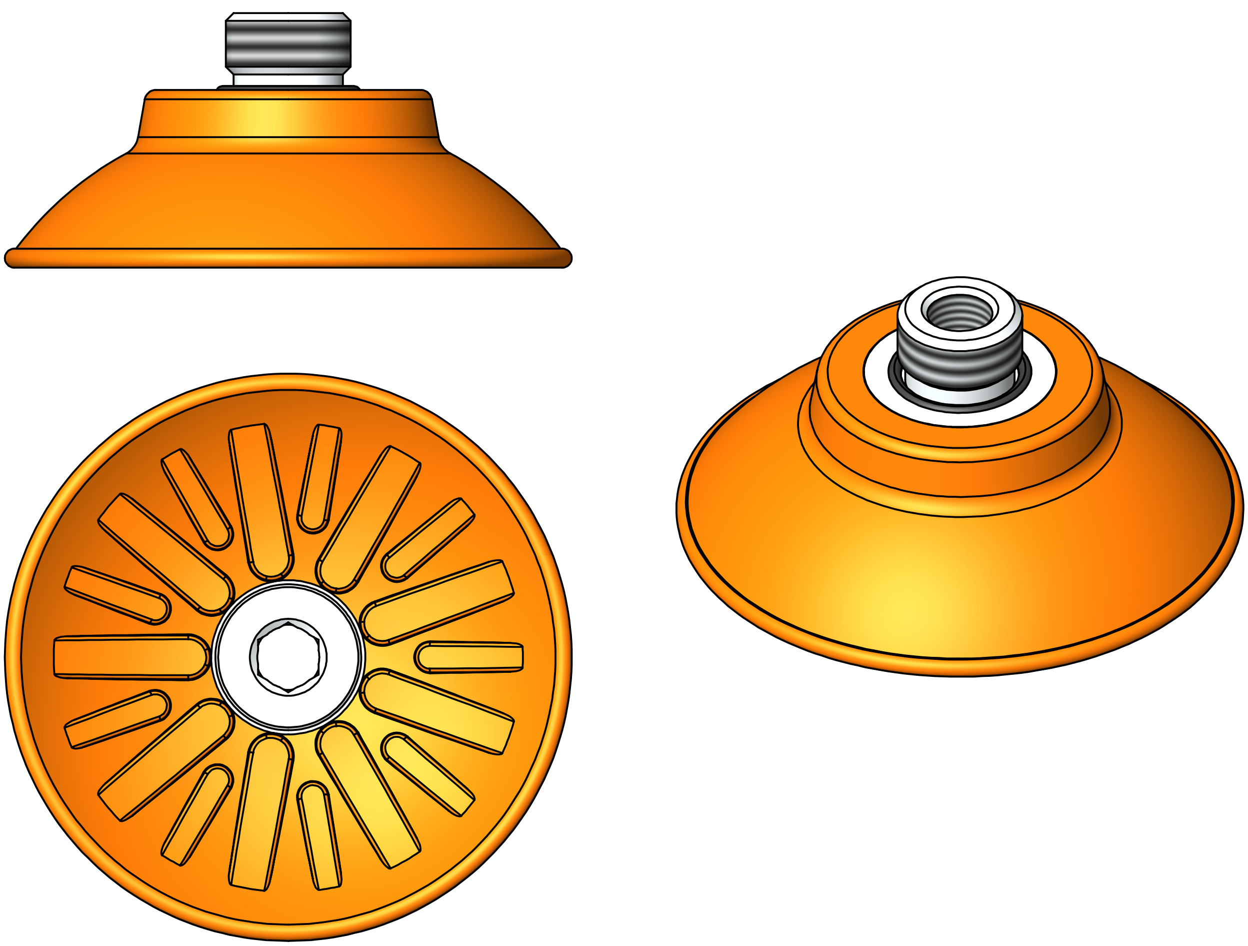
## Flat-Concave Vacuum Cups

Flat-concave vacuum cups have a dished bottom plus conforming cleats for use with flat or slightly domed or convex workpieces. The outer lip is reinforced for extra strength and extended life while the cleats provide superior traction to resist later shear loads.

Flat-concave vacuum cups have slight angular compensation ability so they should always be picked up perpendicular to a flat workpiece surface.

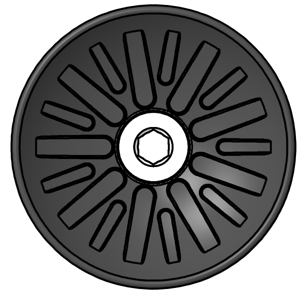
Suitable Workpiece Surface:

- Convex
- Spherical
- Shear Loads

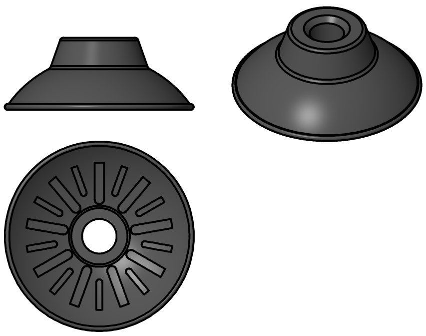


# Flat-Concave Vacuum Cups

| | | Cup Material | Cup Fitting | |
|---|---|---|---|---|
| XP-FC50 | A | | -14F | |
| | A | Ameriflex | (Blank) | None |
| | N | Nitrile / TPV | See cup fittings for available threads. | |



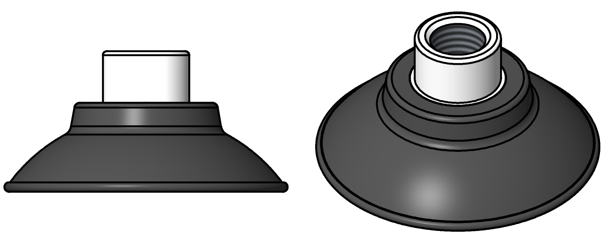
*All Flat-Concave Cups have cleats.*



### XP-FC50

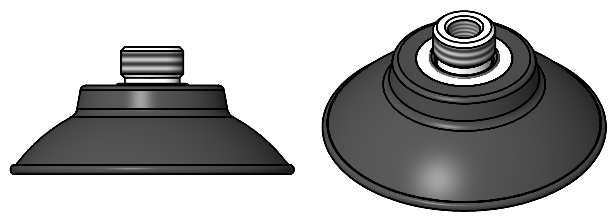
| | |
|---|---|
| Cup Diameter: in [mm] | 50 mm |
| Outer Diameter: in [mm] | 1.97 [50.0] |
| Cup Height: in [mm] | 0.75 [19.1] |
| Thru Hole: in [mm] | 0.36 [9.1] |
| Stroke: in [mm] | 0.25 [6.4] |
| Cup Weight: oz [g] | 0.30 [7.9] |
| Internal Volume: cu in [cc] | 0.70 [11.5] |
| Force @ 6 inHG: lb [n] | 7.80 [34.7] |
| Force @ 18 inHG: lb [n] | 19.00 [84.5] |
| Minimum Radius: in [mm] | 2.09 [53.1] |
| Shear Load*: lb [n] | 10.00 [44.5] |

| | | Cup Material | | | Fitting |
|---|---|---|---|---|---|
| XP-FC75 | S | | - | 38F | |
| | N | Nitrile / TPV | | 38F | 3/8 NPSF Female |
| | S | Silicone | | G38M | G 3/8 Male |



### XP-FC75-38F

| | |
|---|---|
| Cup Diameter: in [mm] | 75 mm |
| Outer Diameter: in [mm] | 2.95 [75.0] |
| Cup Height: in [mm]* | 1.46 [37.1] |
| Stroke: in [mm] | 0.36 [9.1] |
| Cup Weight: oz [g] | 1.70 [48.2] |
| Internal Volume: cu in [cc] | 1.80 [29.5] |
| Force @ 6 inHG: lb [n] | 17.00 [75.6] |
| Force @ 18 inHG: lb [n] | 35.00 [154.0] |
| Minimum Radius: in [mm] | 2.80 [71.1] |
| Shear Load*: lb [n] | 45.00 [200.0] |



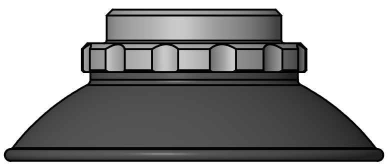
### XP-FC75-G38M

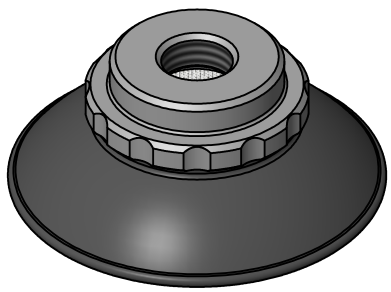
| | |
|---|---|
| Cup Diameter: in [mm] | 75 mm |
| Outer Diameter: in [mm] | 2.95 [75.0] |
| Cup Height: in [mm] | 1.33 [33.7] |
| Stroke: in [mm] | 0.36 [9.1] |
| Cup Weight: oz [g] | 1.70 [48.2] |
| Internal Volume: cu in [cc] | 1.80 [29.5] |
| Force @ 6 inHG: lb [n] | 17.00 [75.6] |
| Force @ 18 inHG: lb [n] | 35.00 [154.0] |
| Minimum Radius: in [mm] | 2.80 [71.1] |
| Shear Load*: lb [n] | 45.00 [200.0] |

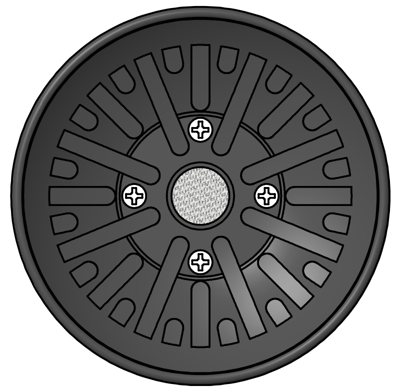
**All figures for shear load are 18 inHg using a 0.5 coefficient of friction.*
*Adjust coefficient of friction to suit your conditions, then apply a generous factor of safety (3:1 or greater) to shear loads.*

# Flat-Concave Vacuum Cups

| | Cup Material | | Cup Fitting | |
|---|---|---|---|---|
| XP-FC100 | N | | -18F | |
| | N | Nitrile / TPV | (Blank) | None |
| | S | Silicone | See 75 mm cup fittings for available threads. | |







*All Flat-Concave Cups have cleats.*

**XP-FC100**

| | |
|---|---|
| Cup Diameter: in [mm] | 100 mm |
| Outer Diameter: in [mm] | 3.94 [100.1] |
| Cup Height: in [mm]* | 1.57 [40.0] |
| Stroke: in [mm] | 0.48 [12.2] |
| Cup Weight: oz [g] | 1.90 [54.0] |
| Internal Volume: cu in [cc] | 4.90 [80.3] |
| Force @ 6 inHG: lb [n] | 31.00 [138.0] |
| Force @ 18 inHG: lb [n] | 64.00 [285.0] |
| Minimum Radius: in [mm] | 4.30 [109.0] |
| Shear Load*: lb [n] | 53.00 [236.0] |

**All figures for shear load are 18 inHg using a 0.5 coefficient of friction.*
*Adjust coefficient of friction to suit your conditions, then apply a generous factor of safety (3:1 or greater) to shear loads.*

## Oval Vacuum Cups

Oval vacuum cups come in two styles. Oval concave (OC) vacuum cups are like universal cups except the cup is elongated to provide a larger surface area and thus a stronger grip. Oval flat (OF) vacuum cups have bottom cleats to maintain a larger area exposed to vacuum. Because of this, the cleats reduce the stroke by almost half. They should only be used on flat or very slightly curved surfaces.

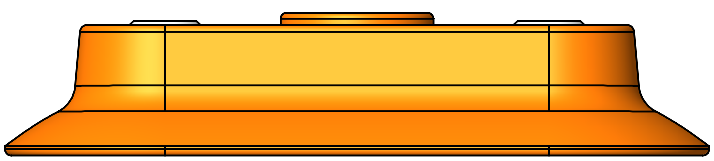
Oval vacuum cups can seal to cylindrical object but only along the cup long axis (be mindful of minimum radius). Whenever possible, use several round vacuum cups instead of oval vacuum cups as round vacuum cups are more forgiving of mounting misalignment and workpiece deflection.

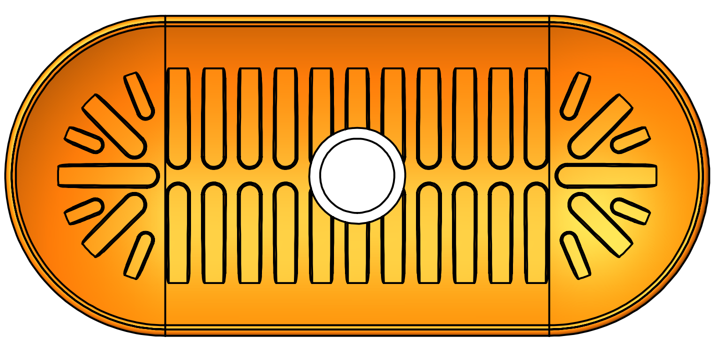
OC Suitable Workpiece Surface:

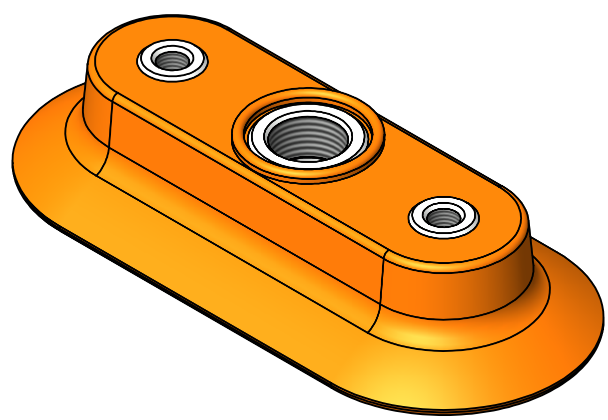
- Flat
- Convex
- Cylindrical

OF Suitable Workpiece Surface:

- Flat
- Cylindrical
- Shear Loads

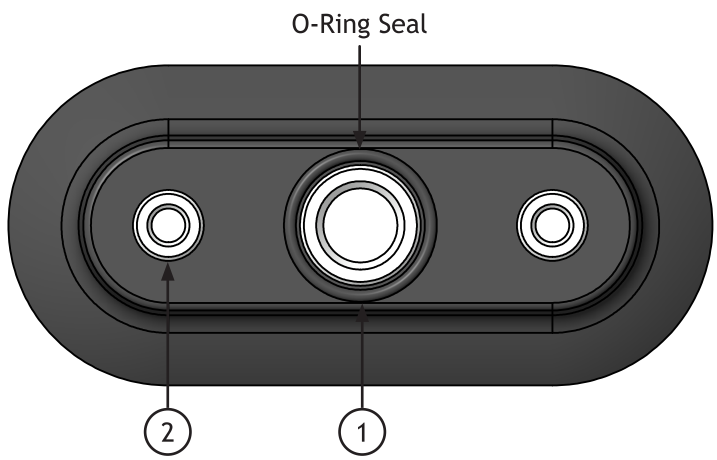


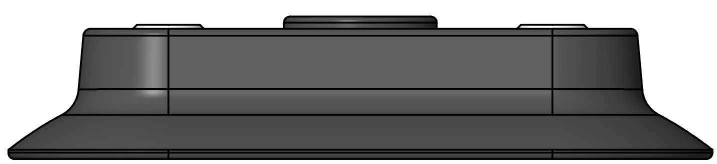


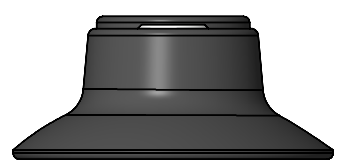


# Oval Vacuum Cups

| Cup Style | | | Cup Material | | Threads | |
|---|---|---|---|---|---|---|
| OC | | -60X140- | S | | -G | |
| OC | Concave | | N | Nitrile / TPV | (Blank) | NPTF Threads |
| OF | Flat | | S | Silicone | -G | G Threads |

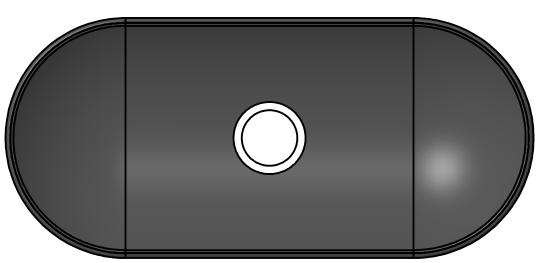


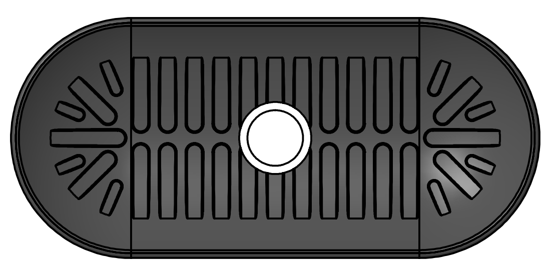


| | OC | OF |
|---|---|---|
| Cup Dimensions: in [mm] | 60 mm X 140 mm | |
| Cup Height: in [mm]* | 1.57 [40.0] | |
| Stroke: in [mm] | 0.29 [7.4] | 0.18 [4.6] |
| Cup Weight: oz [g] | 4.10 [116.0] | 4.20 [119.0] |
| Internal Volume: cu in [cc] | 3.20 [52.4] | 3.00 [49.2] |
| Force @ 6 inHG: lb [n] | 29.00 [129.0] | |
| Force @ 18 inHG: lb [n] | 83.00 [369.0] | |
| Minimum Radius: in [mm] | 1.50 [38.1] | 3.00 [76.2] |
| Shear Load*: lb [n] | 41.00 [182.0] | |

| Code | Function | NPTF | G |
|---|---|---|---|
| 1 | Vacuum Port | 3/8-18 NPTF | G 3/8 |
| 2 | Mounting Holes | 5/16-18 UNC | M8x1.25 |



**OC-60X140**



**OF-60X140**

**All figures for shear load are 18 inHg using a 0.5 coefficient of friction.*
*Adjust coefficient of friction to suit your conditions, then apply a generous factor of safety (3:1 or greater) to shear loads.*

## Universal Vacuum Cups

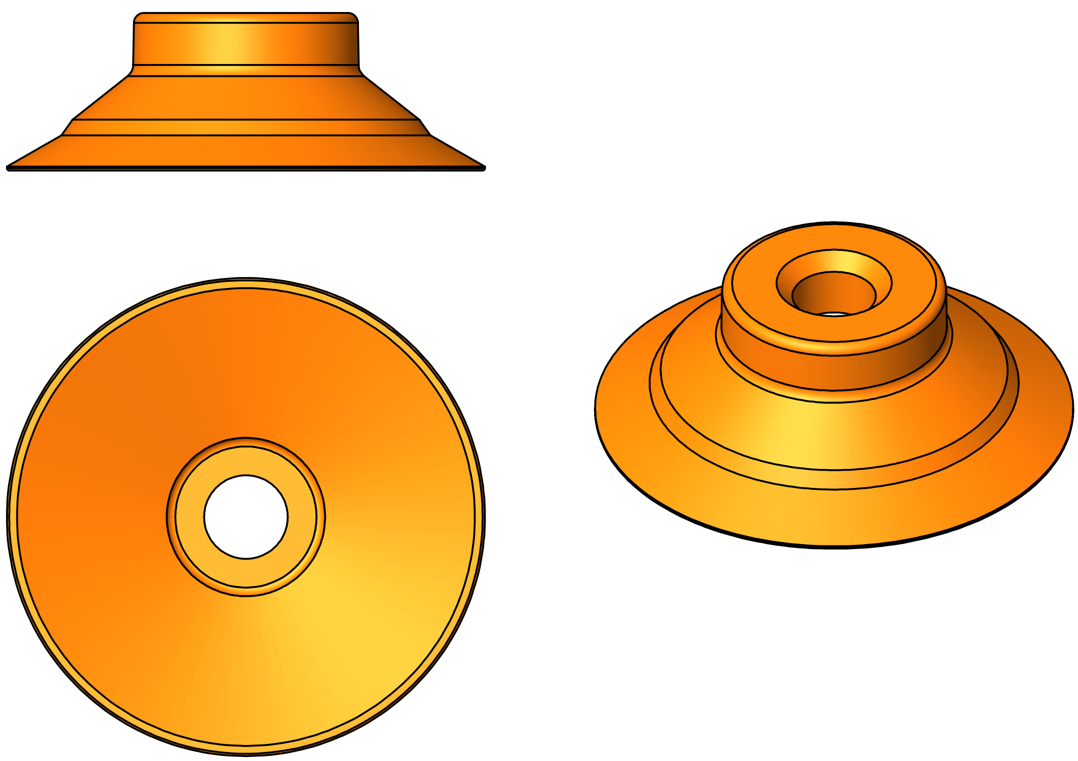
Universal vacuum cups are like flat vacuum cups except they have no bottom cleats. As a result, deflection is higher than flat vacuum cups and the cup area exposed to vacuum becomes smaller as vacuum level deepens and the cup lips flatten out. Under a heavy pull, a universal vacuum cup will “tent” up and the effective vacuum area will increase until it equals that of a flat vacuum cup, at which point, it will have similar load capacity.

Thin workpiece materials can be drawn in toward the cup center and essentially seal of vacuum from the universal vacuum cup lips so that the effective area becomes so small that the cup cannot pick up the workpiece safely.

Universal vacuum cups have very little angular compensation ability so they should always pick up perpendicular to a flat workpiece surface.

Suitable Workpiece Surface:

- Flat
- Slightly Concave
- Convex
- Compound
- Cylindrical
- Flexible

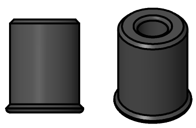


**All figures for shear load are 18 inHg using a 0.5 coefficient of friction.*
*Adjust coefficient of friction to suit your conditions, then apply a generous factor of safety (3:1 or greater) to shear loads.*

# Universal Vacuum Cups

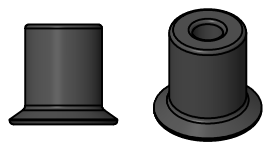
| | Cup Size | | Cup Material | | Cup Fitting | |
|---|---|---|---|---|---|---|
| XP-U | 8 | | S | | -10M | |
| | 4 | Ø 4 mm | N | Nitrile / TPV | (Blank) | None |
| | 6 | Ø 6 mm | S | Silicone | See cup fittings for available threads. | |
| | 8 | Ø 8 mm | V | Viton[1] | | |
| | 10 | Ø 10 mm | | | | |
| | 15 | Ø 15 mm | | | | |

[1]*Only available for XP-U4 and XP-U10*



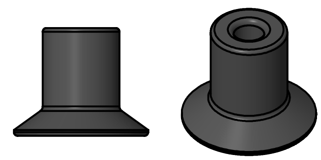
**XP-U4**

| | |
|---|---|
| Cup Diameter: in [mm] | 4 mm |
| Outer Diameter: in [mm] | 0.20 [5.1] |
| Cup Height: in [mm] | 0.24 [6.1 |
| Thru Hole: in [mm] | 0.08 [2.0] |
| Stroke: in [mm] | 0.008 [0.2] |
| Cup Weight: oz [g] | 0.003 [0.09] |
| Internal Volume: cu in [cc] | 0.002 [0.03] |
| Force @ 6 inHG: lb [n] | 0.04 [0.2] |
| Force @ 18 inHG: lb [n] | 0.20 [0.9] |
| Minimum Radius: in [mm] | 0.12 [3.0] |



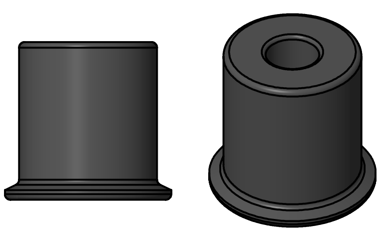
**XP-U6**

| | |
|---|---|
| Cup Diameter: in [mm] | 6 mm |
| Outer Diameter: in [mm] | 0.28 [7.1] |
| Cup Height: in [mm] | 0.26 [6.6] |
| Thru Hole: in [mm] | 0.08 [2.0] |
| Stroke: in [mm] | 0.012 [0.3] |
| Cup Weight: oz [g] | 0.005 [0.14] |
| Internal Volume: cu in [cc] | 0.003 [0.5] |
| Force @ 6 inHG: lb [n] | 0.11 [0.5] |
| Force @ 18 inHG: lb [n] | 0.38 [1.7] |
| Minimum Radius: in [mm] | 0.20 [5.1] |



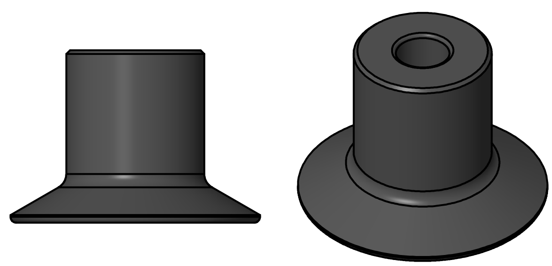
**XP-U8**

| | |
|---|---|
| Cup Diameter: in [mm] | 8 mm |
| Outer Diameter: in [mm] | 0.35 [8.9] |
| Cup Height: in [mm] | 0.28 [7.1] |
| Thru Hole: in [mm] | 0.8 [2.0] |
| Stroke: in [mm] | 0.02 [0.5] |
| Cup Weight: oz [g] | 0.005 [0.14] |
| Internal Volume: cu in [cc] | 0.006 [0.1] |
| Force @ 6 inHG: lb [n] | 0.22 [1.0] |
| Force @ 18 inHG: lb [n] | 0.65 [2.9] |
| Minimum Radius: in [mm] | 0.24 [6.1] |



**XP-U10**

| | |
|---|---|
| Cup Diameter: in [mm] | 10 mm |
| Outer Diameter: in [mm] | 0.43 [11.0] |
| Cup Height: in [mm] | 0.41 [10.4] |
| Thru Hole: in [mm] | 0.14 [3.6] |
| Stroke: in [mm] | 0.02 [0.5] |
| Cup Weight: oz [g] | 0.03 [10.9] |
| Internal Volume: cu in [cc] | 0.01 [0.2] |
| Force @ 6 inHG: lb [n] | 0.34 [0.5] |
| Force @ 18 inHG: lb [n] | 1.00 [4.5] |
| Minimum Radius: in [mm] | 0.31 [7.9] |

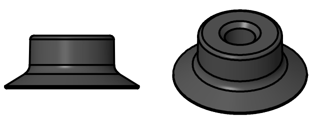


**XP-U15**

| | |
|---|---|
| Cup Diameter: in [mm] | 15 mm |
| Outer Diameter: in [mm] | 0.65 [16.5] |
| Cup Height: in [mm] | 0.45 [11.4] |
| Thru Hole: in [mm] | 0.14 [3.6] |
| Stroke: in [mm] | 0.06 [1.5] |
| Cup Weight: oz [g] | 0.03 [0.9] |
| Internal Volume: cu in [cc] | 0.03 [0.5] |
| Force @ 6 inHG: lb [n] | 0.80 [3.6] |
| Force @ 18 inHG: lb [n] | 1.90 [8.5] |
| Minimum Radius: in [mm] | 0.31 [7.9] |

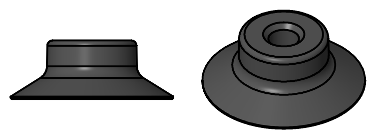
## Universal Vacuum Cups

| | Cup Size | | Cup Material | | Cup Fitting | |
|---|---|---|---|---|---|---|
| XP-U | 25 | | N | | -14M | |
| | 20 | Ø 20 mm | N | Nitrile / TPV | (Blank) | None |
| | 25 | Ø 25 mm | S | Silicone | See cup fittings for available threads. | |
| | 30 | Ø 30 mm | | | | |
| | 40 | Ø 40 mm | | | | |
| | 50 | Ø 50 mm | | | | |



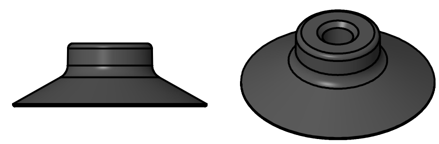
**XP-U20**

| | |
|---|---|
| Cup Diameter: in [mm] | 20 mm |
| Outer Diameter: in [mm] | 0.87 [22.1] |
| Cup Height: in [mm] | 0.34 [8.7] |
| Thru Hole: in [mm] | 0.20 [5.1] |
| Stroke: in [mm] | 0.10 [2.5] |
| Cup Weight: oz [g] | 0.04 [1.1] |
| Internal Volume: cu in [cc] | 0.06 [1.0] |
| Force @ 6 inHG: lb [n] | 1.30 [5.8] |
| Force @ 18 inHG: lb [n] | 2.70 [12.0] |
| Minimum Radius: in [mm] | 0.51 [13.0] |



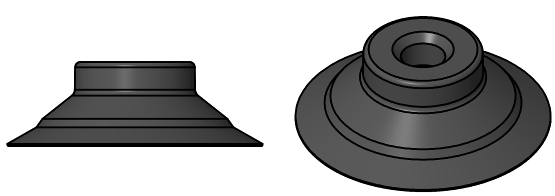
**XP-U25**

| | |
|---|---|
| Cup Diameter: in [mm] | 25 mm |
| Outer Diameter: in [mm] | 1.06 [26.9] |
| Cup Height: in [mm] | 0.38 [9.6] |
| Thru Hole: in [mm] | 0.20 [5.1] |
| Stroke: in [mm] | 0.10 [2.5] |
| Cup Weight: oz [g] | 0.06 [1.7] |
| Internal Volume: cu in [cc] | 0.07 [1.1] |
| Force @ 6 inHG: lb [n] | 2.00 [8.9] |
| Force @ 18 inHG: lb [n] | 4.40 [19.6] |
| Minimum Radius: in [mm] | 0.65 [16.5] |



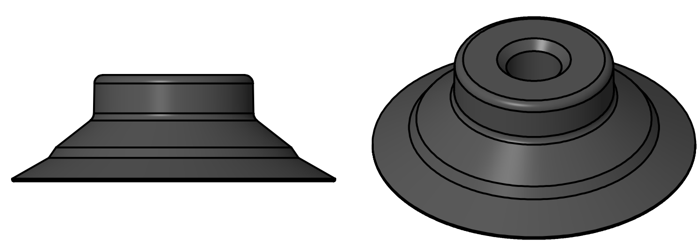
**XP-U30**

| | |
|---|---|
| Cup Diameter: in [mm] | 30 mm |
| Outer Diameter: in [mm] | 1.26 [32.0] |
| Cup Height: in [mm] | 0.41 [10.4] |
| Thru Hole: in [mm] | 0.20 [5.1] |
| Stroke: in [mm] | 0.14 [3.6] |
| Cup Weight: oz [g] | 0.07 [2.0] |
| Internal Volume: cu in [cc] | 0.12 [2.0] |
| Force @ 6 inHG: lb [n] | 2.70 [12.0] |
| Force @ 18 inHG: lb [n] | 5.60 [24.9] |
| Minimum Radius: in [mm] | 0.79 [20.1] |



**XP-U40**

| | |
|---|---|
| Cup Diameter: in [mm] | 40 mm |
| Outer Diameter: in [mm] | 1.66 [42.2] |
| Cup Height: in [mm] | 0.55 [13.9] |
| Thru Hole: in [mm] | 0.29 [7.4] |
| Stroke: in [mm] | 0.18 [4.6] |
| Cup Weight: oz [g] | 0.17 [4.8] |
| Internal Volume: cu in [cc] | 0.34 [5.6] |
| Force @ 6 inHG: lb [n] | 4.50 [20.0] |
| Force @ 18 inHG: lb [n] | 8.80 [39.1] |
| Minimum Radius: in [mm] | 1.18 [30.0] |

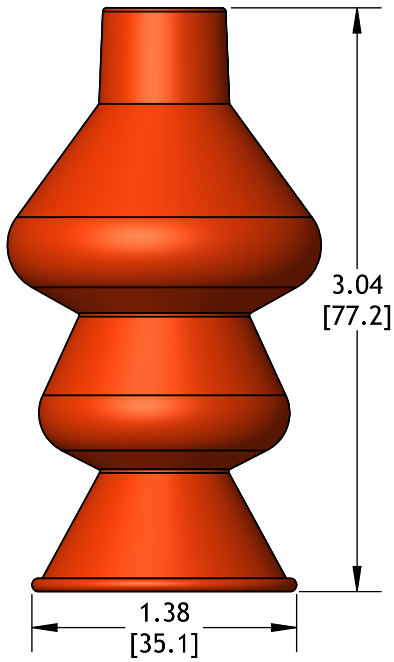


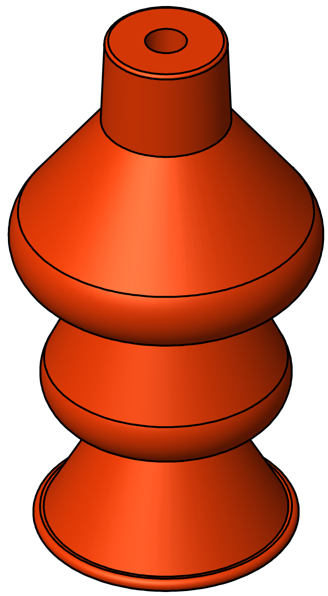
**XP-U50**

| | |
|---|---|
| Cup Diameter: in [mm] | 50 mm |
| Outer Diameter: in [mm] | 2.10 [53.3] |
| Cup Height: in [mm] | 0.69 [17.6] |
| Thru Hole: in [mm] | 0.36 [9.1] |
| Stroke: in [mm] | 0.24 [6.1] |
| Cup Weight: oz [g] | 0.35 [9.9] |
| Internal Volume: cu in [cc] | 0.73 [12.0] |
| Force @ 6 inHG: lb [n] | 7.90 [35.1] |
| Force @ 18 inHG: lb [n] | 16.40 [73.0] |
| Minimum Radius: in [mm] | 1.38 [35.1] |

## EC34S-30R: Egg Picking Vacuum Cup

Egg picking vacuum cups are double-bellows cups with a conical lower lip designed to gently grip eggs in a wide range of sizes. The lower bellows and lip collapse and nest inside the larger upper lip to provide stability under shallow vacuum levels that will not harm the egg shell. Common applications are sorting, incubation, rejection, or inoculation of eggs. Egg vacuum cups come in one material: brick-red, 30 Shore-A silicone rubber.

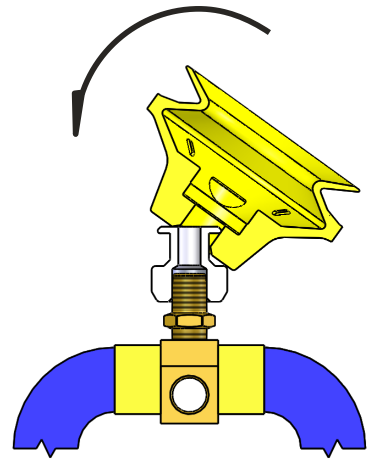


*Weight: 0.56 oz [16.0 g]*

## Vacuum Cup Fittings Assembly



Secure a block tee or other suitable pipe fitting in a vise to make a simple fixture as shown in the illustration.

Screw the cup fitting onto the fixture about 2 thread turns, by hand.

Dip your finger into a small container of water and wipe a few drops onto the fitting flange and into the top chamfer and bore of the vacuum cup. Use only water. Do not use any soap or oil. Water will quickly evaporate and leave no residue which could later affect performance.

Invert the vacuum cup and place it onto the flange as shown. Grasp the far side of the cup and pull it over the flange while apply downward pressure. After the cup snaps over the flange, rotate the cup on the fitting about 1/2 turn to make sure it is properly seated.

## Elastomer Properties

**Ameriflex (A)**
For general-purpose, normal ambient temperature applications as a replacement for competitors' PVC vinyl cups.

**Duramax (D)**[4]
Softer, non-staining, non-marking, general-purpose material for high visibility surfaces at normal ambient temperatures.

**Nitrile / TPV (N)**
For general-purpose, normal ambient temperature applications. Some cups are Nitrile while others are TPV. If this specification is important for your application, contact us and we can let you know which material each cup is made of.

**Silicone (S)**
For either cold or high-temperature applications or where greater flexibility will improve conformance to a part.

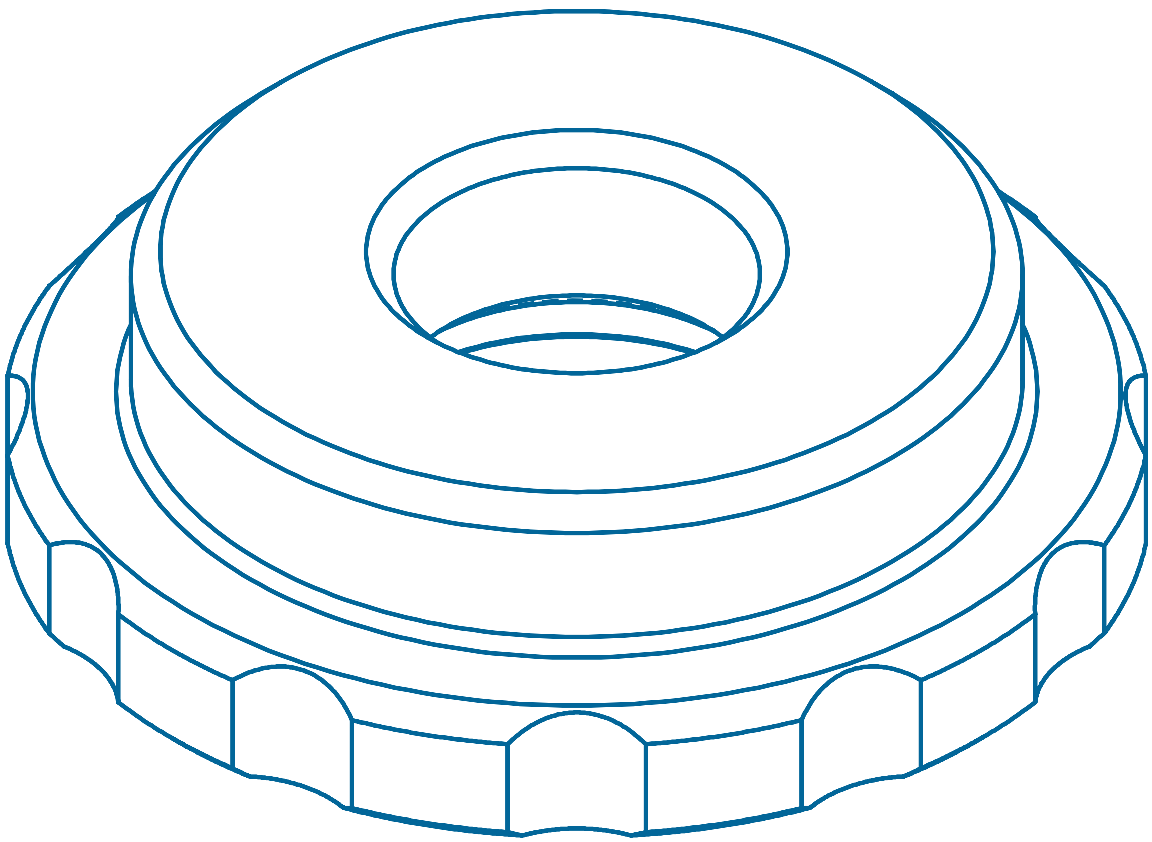
**Conductive Silicone (CS)**
For grounding parts such as electronic chips to eliminate static electricity.

**Viton (V)**[1]
For extremely high-temperature applications in automotive, appliance, or other applications where silicone is not allowed.

| Code | Elastomer | Wear Resistance | Working Temperature[2] | Weight Ratio[3] | Color | Durometer Shore-A |
|---|---|---|---|---|---|---|
| A | Ameriflex | Excellent | -4°to 230° F<br>-20° to 110°C | 0.85 | Yellow | 50 |
| D | Duramax | Excellent | -4°to 230° F<br>-20° to 110°C | 0.85 | White | 45 |
| N | Nitrile / TPV | Excellent | -4°to 230° F<br>-20° to 110°C | 1.0 | Black | 50 |
| S | Silicone | Good | -100°to 400° F<br>-70° to 205°C | 1.06 | Orange | 50 |
| CS | Conductive Silicone | Good | -100°to 400° F<br>-70° to 205°C | 1.06 | Black | 50 |
| V | Fluorocarbon (Viton[1]) | Excellent | 40°to 450° F<br>4° to 230°C | 1.78 | Gray | 60 |

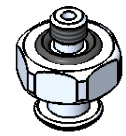
*[1]Viton is a registered trademark of DuPont Dow.*
*[2]Continous service temperature. Intermittent service may possibly be higher. Determine via testing under actual conditions.*
*[3]Weight of Nitrile cup without fitting is tabulated. Use the ratio multiplier for other materials.*
*[4]The terms non-staining and non-marking refer only to the cup material. Airborne aerosols that attach to the cup surface or direct cup contact with dirty surfaces can result in residue transfer marks. Proper maintenance is important. Use only soap and water to wipe cups clean after installation and periodically afterward to remove airborne contaminants.*
*[5]EDCO products are made with synthetic, rubber-like materials. As such, EDCO products do not contain latex.*
*[6]All figures for shear load are 18 inHg using a 0.5 coefficient of friction. Adjust coefficient of friction to suit your conditions, then apply a generous factor of safety (3:1 or greater) to shear loads.*

# Vacuum Cup Fittings
## Section 3

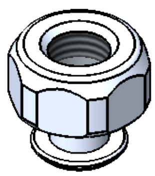


Ø 4-8 mm Cups

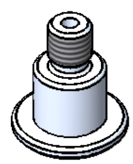
Ø 10-15 mm Cups



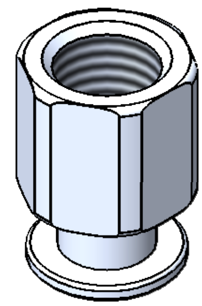
Ø 20-35 mm Cups



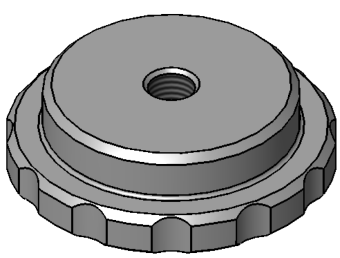
Ø 40 mm Cups



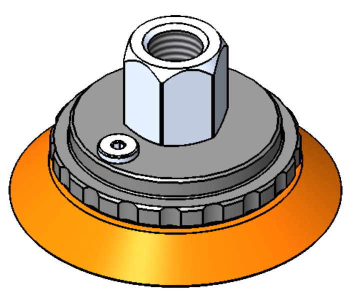
Ø 50 mm Cups



Ø 65 mm Cups

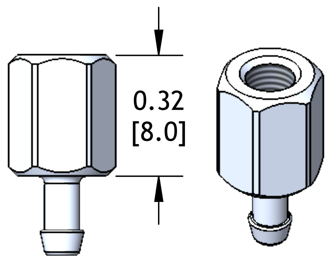


Ø 75 - 150 mm Cups



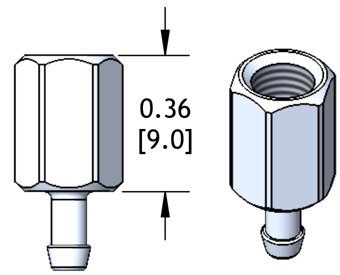
Accessories

## Ø 4-8 mm Cup Fittings - Standard



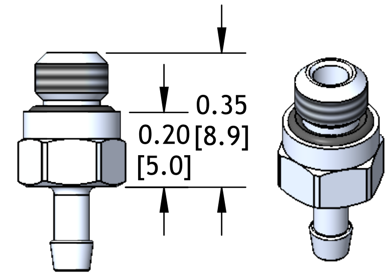

**8-4F**

| Assembly Suffix: | -4F |
|---|---|
| Threads: | M4x0.7 |
| Thread Depth: in [mm] | 0.23 [5.8] |
| Weight: oz [g] | 0.04 [1.1] |
| Thru Hole: in [mm] | 0.05 [1.3] |
| Hex Size: in [mm] | 0.25 [6.4] |




**8-5F**

| Assembly Suffix: | -5F |
|---|---|
| Threads: | M5x0.8 |
| Thread Depth: in [mm] | 0.25 [6.4] |
| Weight: oz [g] | 0.04 [1.1] |
| Thru Hole: in [mm] | 0.06 [1.5] |
| Hex Size: in [mm] | 0.31 [8.0] |

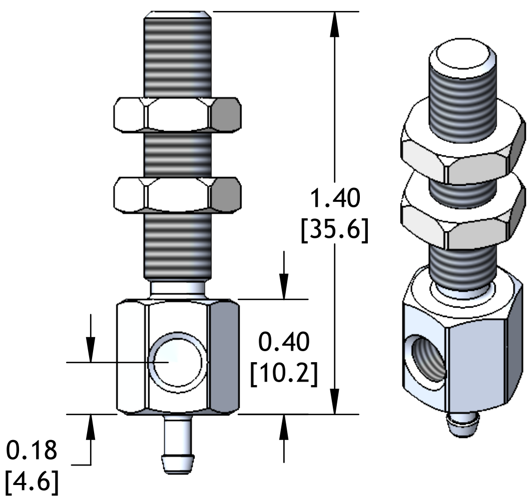



**8-10M**

| Assembly Suffix: | -10M |
|---|---|
| Threads: | 10-32 UNF (M5) |
| Weight: oz [g] | 0.08 [2.3] |
| Thru Hole: in [mm] | 0.06 [1.4] |
| Hex Size: in [mm] | 0.25 [6.4] |

## Ø 4-8 mm Cup Fittings - Side Vacuum Port w/ Male Post

*JN-M6X1.0 (2) jam nuts included.*

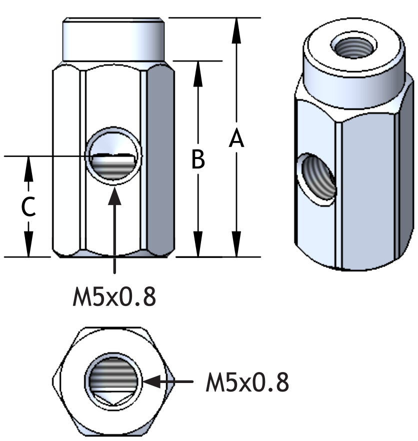



**8-S5F-6M**

| Assembly Suffix: | -S5F-6M |
|---|---|
| Port Threads: | M5x0.8 |
| Post Threads: | M6x1.0 |
| Weight: oz [g] | 0.22 [6.1] |
| Thru Hole: in [mm] | 0.04 [1.0] |
| Hex Size: in [mm] | 0.38 [9.5] |

## Ø 4-8 mm Cup Fittings - Side Vacuum Port w/ Female Port

*For use with 8-10M and 10-10M cup fittings*



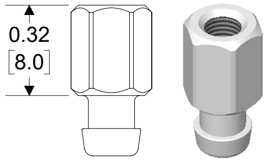

Technical Data

| Fitting | Assembly Suffix | Weight oz [g] | Hex Size in [mm] |
|---|---|---|---|
| 5F-S5F-5F | -S5F-5F | 0.13 [3.7] | 0.38 [9.5] |
| 5F-S5F-6F | -S5F-8F | 0.18 [5.0] | 0.44 [11.1] |

Dimensions

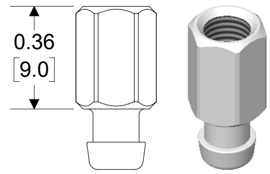
| Fitting | A in [mm] | B in [mm] | C in [mm] | Thread | Thread Depth in [mm] |
|---|---|---|---|---|---|
| 5F-S5F-5F | 0.83 [21.0] | 0.68 [17.3] | 0.35 [8.9] | M5x0.8 | 0.22 [5.6] |
| 5F-S5F-6F | 0.86 [22.0] | 0.63 [16.0] | 0.33 [8.4] | M6x1.0 | 0.33 [8.4] |

# Ø 10-15 mm Cup Fittings - Standard



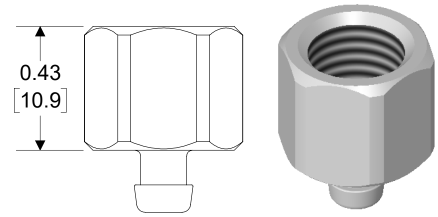

**10-4F**

| | |
|---|---|
| Assembly Suffix: | -4F |
| Threads: | M4x0.7 |
| Thread Depth: in [mm] | 0.23 [5.8] |
| Weight: oz [g] | 0.05 [1.4] |
| Thru Hole: in [mm] | 0.10 [2.5] |
| Hex Size: in [mm] | 0.25 [6.4] |



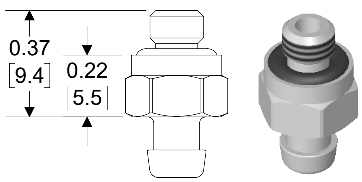

**10-5F**

| | |
|---|---|
| Assembly Suffix: | -5F |
| Threads: | M5x0.8 |
| Thread Depth: in [mm] | 0.20 [5.1] |
| Weight: oz [g] | 0.05 [1.4] |
| Thru Hole: in [mm] | 0.10 [2.5] |
| Hex Size: in [mm] | 0.25 [6.4] |



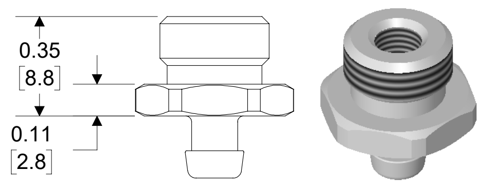

**10-18F**

| | |
|---|---|
| Assembly Suffix: | -10M |
| Threads: | G 1/8 NPSF |
| Thread Depth: in [mm] | 0.28 [7.1] |
| Weight: oz [g] | 0.10 [2.8] |
| Thru Hole: in [mm] | 0.10 [2.5] |
| Hex Size: in [mm] | 0.5 [13.0] |




**10-10M**

| | |
|---|---|
| Assembly Suffix: | -10M |
| Threads: | 10-32 UNF (M5) |
| Weight: oz [g] | 0.10 [2.8] |
| Thru Hole: in [mm] | 0.10 [2.5] |
| Hex Size: in [mm] | 0.31 [8.0] |

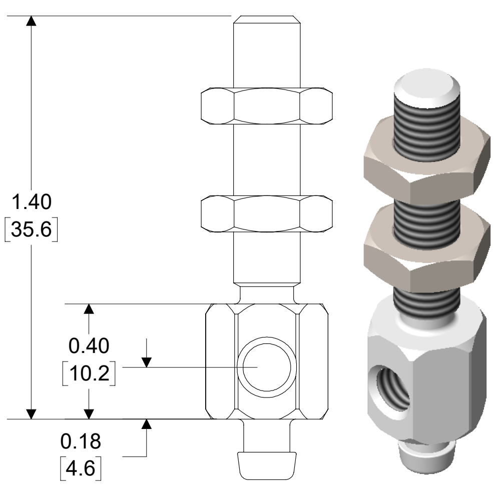



**10-18M**

| | |
|---|---|
| Assembly Suffix: | -18M |
| Male Threads: | G 1/8 |
| Female Threads: | M5x0.8 |
| Thread Depth: in [mm] | 0.21 [5.3] |
| Weight: oz [g] | 0.08 [2.3] |
| Thru Hole: in [mm] | 0.10 [2.5] |
| Hex Size: in [mm] | 0.50 [13.0] |

# Ø 10-15 mm Cup Fittings - Side Vacuum Port w/ Male Post

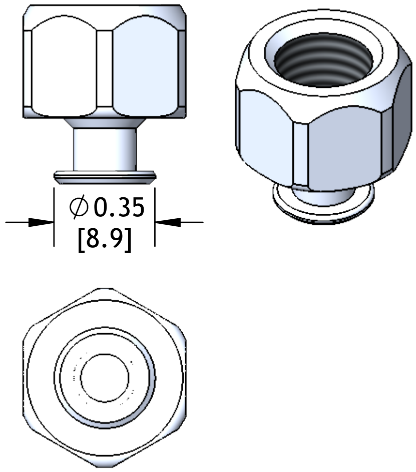
*JN-M6X1.0 (2) jam nuts included.*




**10-S5F-6M**

| | |
|---|---|
| Assembly Suffix: | -S5F-6M |
| Port Threads: | M5x0.8 |
| Post Threads: | M6x1.0 |
| Weight: oz [g] | 0.24 [6.8] |
| Thru Hole: in [mm] | 0.10 [2.5] |
| Hex Size: in [mm] | 0.38 [9.5] |

## Ø 20-35 mm Cup Fittings - Female



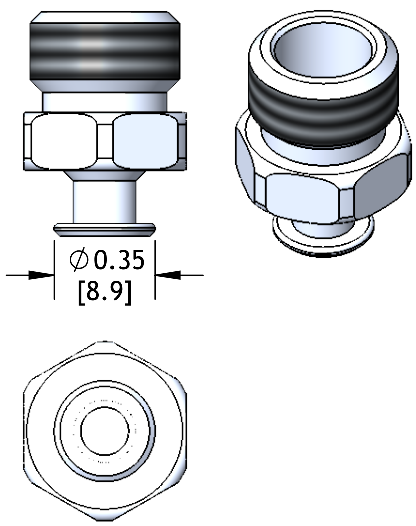

Technical Data

| Fitting | Assembly Suffix | Weight oz [g] |
|---|---|---|
| 32-5F | -5F | 0.09 [2.6] |
| 32-6F | -6F | 0.23 [6.5] |
| 32-8F | -8F | 0.20 [5.7] |
| 32-18F | -18F | 0.12 [3.4] |
| 32-G14F | -G14F | 0.26 [7.3] |

Dimensions

| Fitting | Hex Height in [mm] | Hex Size in [mm] | Thru Hole in [mm] | Thread | Thread Depth in [mm] |
|---|---|---|---|---|---|
| 32-5F | 0.25 [6.4] | 0.50 [12.7] | 0.17 [4.2] | M5x0.8 | 0.20 [5.1] |
| 32-6F | 0.55 [14.0] | 0.56 [14.5] | 0.14 [3.6] | M6x1.0 | 0.25 [6.4] |
| 32-8F | 0.55 [14.0] | 0.56 [14.5] | 0.14 [3.6] | M8x1.25 | 0.32 [8.1] |
| 32-18F | 0.40 [10.0] | 0.56 [14.5] | 0.17 [4.2] | G 1/8 NPSF | 0.25 [8.4] |
| 32-G14F | 0.65 [16.4] | 0.69 [17.5] | 0.17 [4.2] | G 1/4 | 0.45 [11.4] |

## Ø 20-35 mm Cup Fittings - Male




Technical Data

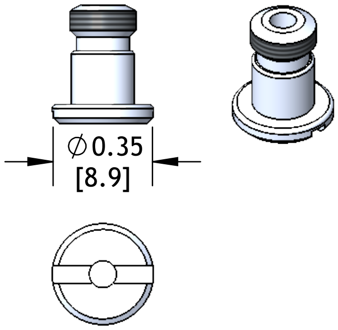
| Fitting | Assembly Suffix | Weight oz [g] |
|---|---|---|
| 32-5M | -5M | 0.09 [2.6] |
| 32-6M | -6M | 0.11 [3.2] |
| 32-8M | -8M | 0.12 [3.4] |
| 32-18M[1] | -18M | 0.08 [2.3] |
| 32-14M | -14M | 0.18 [5.1] |
| 32-G14M | -G14M | 0.16 [4.5] |
| 32-G38M | -G38M | 0.34 [9.5] |

Dimensions

| Fitting | Hex Height in [mm] | Hex Size in [mm] | Thru Hole in [mm] | Thread | Thread Length in [mm] |
|---|---|---|---|---|---|
| 32-5M | 0.20 [5.1] | 0.50 [12.7] | 0.08 [2.0] | M5x0.8 | 0.19 [4.8] |
| 32-6M | 0.20 [5.1] | 0.56 [14.2] | 0.10 [2.5] | M6x1.0 | 0.23 [5.9] |
| 32-8M | 0.20 [5.1] | 0.56 [14.2] | 0.14 [3.6] | M8x1.25 | 0.32 [8.1] |
| 32-18M[1] | 0.11 [2.8] | 0.56 [14.2] | 0.16 [4.1] | G 1/8 NPSF | 0.24 [6.1] |
| 32-14M | 0.20 [5.1] | 0.69 [17.5] | 0.17 [4.2] | 1/4 NPTF | 0.35 [9.0] |
| 32-G14M | 0.20 [5.1] | 0.69 [17.5] | 0.17 [4.2] | G 1/4 | 0.35 [9.0] |
| 32-G38M | 0.25 [6.4] | 0.88 [22.2] | 0.17 [4.2] | G 3/8 | 0.26 [6.6] |

*[1]32-18M also has M5x0.8 Female threads 0.22 [5.7] deep.*

## Ø 20-35 mm Cup Fittings - Male Stud



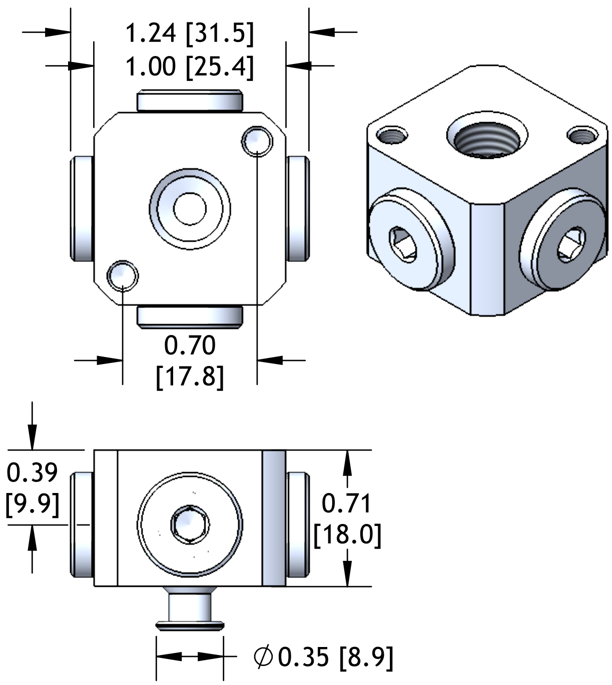

Technical Data

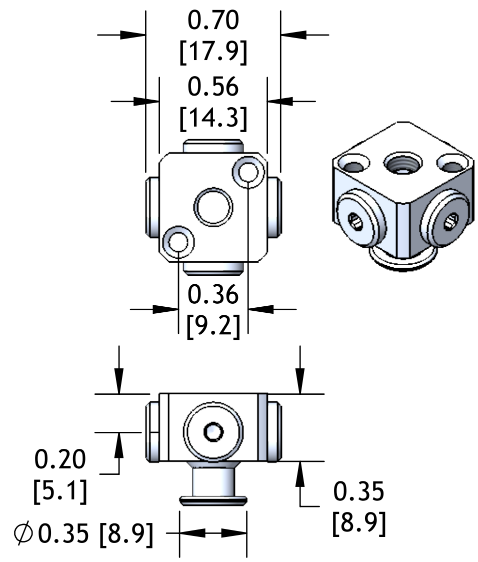
| Fitting | Assembly Suffix | Weight oz [g] |
|---|---|---|
| 32-6MS | -6MS | 0.02 [0.7] |
| 32-10MS | -10MS | 0.02 [0.7] |

Dimensions

| Fitting | Slot Width in [mm] | Thru Hole in [mm] | Thread | Thread Length in [mm] | Total Height in [mm] |
|---|---|---|---|---|---|
| 32-6MS | 0.06 [1.5] | 0.09 [2.3] | M6x1.0 | 0.16 [4.1] | 0.41 [10.4] |
| 32-10MS | 0.06 [1.5] | 0.09 [2.3] | 10-32 UNF (M5) | 0.16 [4.1] | 0.41 [10.4] |

## Ø 20-35 mm Cup Fittings - Cross Fittings



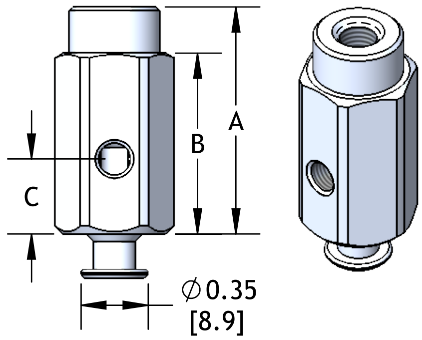

**32-5X18F**

| | |
|---|---|
| Assembly Suffix: | -5X18F |
| Threads: | G 1/8 NPSF (5) |
| Mount Threads: | M4x0.7 (2) |
| Weight: oz [g] | 1.00 [28.3] |
| Thru Hole: in [mm] | 0.17 [4.2] |

**32-5X5F**

| | |
|---|---|
| Assembly Suffix: | -5X5F |
| Threads: | M5x0.8 (5) |
| Mount Threads: | M3x0.5 (2) |
| Weight: oz [g] | 0.18 [5.0] |
| Thru Hole: in [mm] | 0.17 [4.2] |

## Ø 20-35 mm Cup Fittings - M5 Female Side Vacuum Port w/ Female Mount




Technical Data

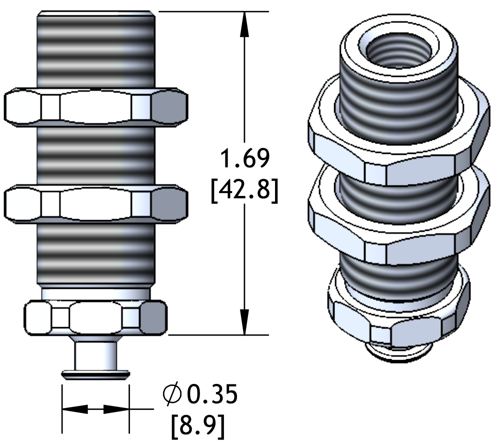
| Fitting | Assembly Suffix | Weight oz [g] | Hex Size in [mm] |
|---|---|---|---|
| 32-S5F-5F | -S5F-5F | 0.34 [9.6] | 0.56 [14.3] |
| 32-S5F-6F | -S5F-6F | 0.43 [12.8] | 0.56 [14.3] |
| 32-S5F-8F | -S5F-8F | 0.41 [11.0] | 0.56 [14.3] |

Dimensions

| Fitting | A in [mm] | B in [mm] | C in [mm] | Mount Thread | Thread Depth in [mm] |
|---|---|---|---|---|---|
| 32-S5F-5F | 0.89 [22.1] | 0.69 [17.5] | 0.35 [8.9] | M5x0.8 | 0.30 [7.6] |
| 32-S5F-6F | 1.18 [30.0] | 0.94 [23.9] | 0.39 [9.9] | M6x1.0 | 0.25 [6.3] |
| 32-S5F-8F | 1.18 [30.0] | 0.87 [22.0] | 0.39 [9.9] | M8x1.25 | 0.32 [8.1] |

## Ø 20-35 mm Cup Fittings - Tool Mount

*JN-M16X1 (2) jam nuts included.*

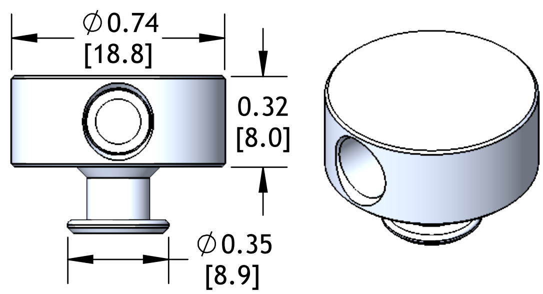



**32-18FX40**

| | |
|---|---|
| Assembly Suffix: | -18FX40 |
| Female Threads: | G 1/8 NPSF |
| Thread Depth: in [mm] | 0.38 [9.7] |
| Post Threads: | M16x1.0 |
| Hex Size: in [mm] | 0.69 [17.5] |
| Hex Height: in [mm] | 0.18 [4.6] |
| Weight: oz [g] | 0.78 [22.1] |
| Thru Hole: in [mm] | 0.16 [4.1] |

## Ø 20-35 mm Cup Fittings - Die Cutting

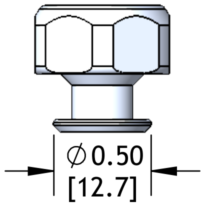
*Contains push-in bore (2) for Ø 6 mm tubing.*

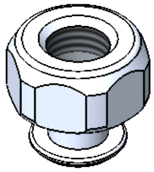


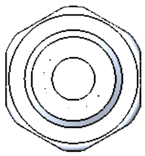

**32-DC75X31**

| | |
|---|---|
| Assembly Suffix: | -DC75X31 |
| Weight: oz [g] | 0.18 [5.2] |
| Thru Hole: in [mm] | 0.16 [4.1] |

## Ø 40 mm Cup Fittings - Female





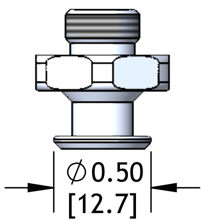
Technical Data

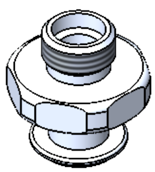
| Fitting | Assembly Suffix | Weight oz [g] |
|---|---|---|
| 40-6F | -6F | 0.38 [10.8] |
| 40-8F | -8F | 0.34 [9.6] |
| 40-18F | -18F | 0.20 [5.7] |
| 40-38F | -38F | 0.46 [13.2] |
| 40-G14F | -G14F | 0.26 [7.3] |

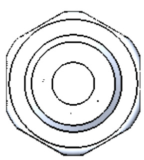
Dimensions

| Fitting | Hex Height in [mm] | Hex Size in [mm] | Thru Hole in [mm] | Thread | Thread Depth in [mm] |
|---|---|---|---|---|---|
| 40-6F | 0.55 [14.0] | 0.69 [17.5] | 0.14 [3.6] | M6x1.0 | 0.25 [6.4] |
| 40-8F | 0.55 [14.0] | 0.69 [17.5] | 0.14 [3.6] | M8x1.25 | 0.32 [8.1] |
| 40-18F | 0.35 [8.8] | 0.69 [17.5] | 0.22 [5.6] | G 1/8 NPSF | 0.25 [6.4] |
| 40-38F | 0.70 [17.8] | 0.88 [22.2] | 0.22 [5.6] | 3/8 NPTF | 0.55 [14.0] |
| 40-G14F | 0.63 [15.9] | 0.75 [19.0] | 0.22 [5.6] | G 1/4 | 0.45 [11.4] |

## Ø 40 mm Cup Fittings - Male





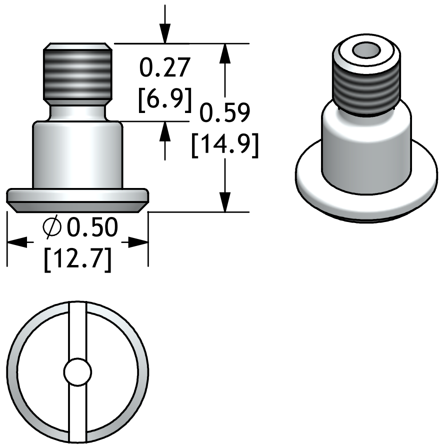
Technical Data

| Fitting | Assembly Suffix | Weight oz [g] |
|---|---|---|
| 40-6M | -6M | 0.38 [10.8] |
| 40-8M | -8M | 0.19 [5.4] |
| 40-18M | -18M | 0.16 [4.5] |
| 40-14M | -14M | 0.19 [5.4] |
| 40-38M | -38M | 0.27 [7.7] |
| 40-G14M | -G14M | 0.21 [5.9] |
| 40-G38M | -G38M | 0.27 [7.7] |

Dimensions

| Fitting | Hex Height in [mm] | Hex Size in [mm] | Thru Hole in [mm] | Thread | Thread Length in [mm] |
|---|---|---|---|---|---|
| 40-6M | 0.20 [5.1] | 0.69 [17.5] | 0.14 [3.6] | M6x1.0 | 0.32 [8.1] |
| 40-8M | 0.20 [5.1] | 0.69 [17.5] | 0.14 [3.6] | M8x1.25 | 0.32 [8.1] |
| 40-18M | 0.19 [4.9] | 0.69 [17.5] | 0.22 [5.6] | G 1/8 NPSF | 0.23 [5.9] |
| 40-14M | 0.20 [5.1] | 0.69 [17.5] | 0.22 [5.6] | 1/4 NPT | 0.36 [9.0] |
| 40-38M | 0.20 [5.1] | 0.75 [19.0] | 0.22 [5.6] | 3/8 NPT | 0.36 [9.0] |
| 40-G14M | 0.20 [5.1] | 0.69 [17.5] | 0.22 [5.6] | G 1/4 | 0.36 [9.0] |
| 40-G38M | 0.20 [5.1] | 0.75 [19.0] | 0.22 [5.6] | G 3/8 | 0.36 [9.0] |

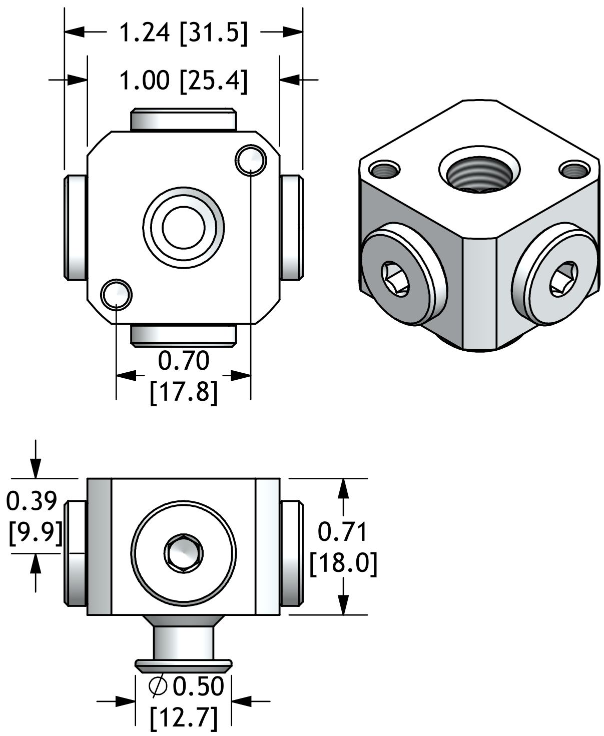
## Ø 40 mm Cup Fittings - Male Stud




**40-6MS**

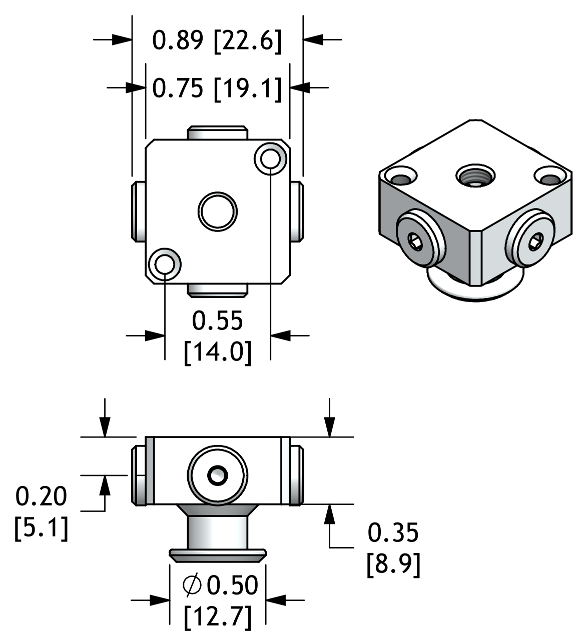
| | |
|---|---|
| Assembly Suffix: | -6MS |
| Thread: | M6x1.0 |
| Weight: oz [g] | 0.07 [1.9] |
| Thru Hole: in [mm] | 0.09 [2.4] |

## Ø 40 mm Cup Fittings - Cross Fittings




**40-5X18F**

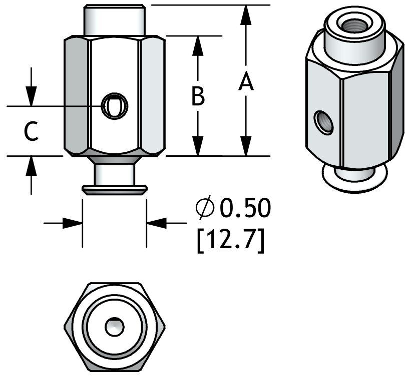
| | |
|---|---|
| Assembly Suffix: | -5X18F |
| Threads: | G 1/8 NPSF (5) |
| Mount Threads: | M4x0.7 (2) |
| Weight: oz [g] | 1.00 [28.3] |
| Thru Hole: in [mm] | 0.22 [5.6] |




**40-5X5F**

| | |
|---|---|
| Assembly Suffix: | -5X5F |
| Threads: | M5x0.8 (5) |
| Mount Threads: | M3x0.5 (2) |
| Weight: oz [g] | 0.32 [9.0] |
| Thru Hole: in [mm] | 0.16 [4.1] |

# Ø 40 mm Cup Fittings - M5 Female Side Vacuum Port w/ Female Mount




Technical Data

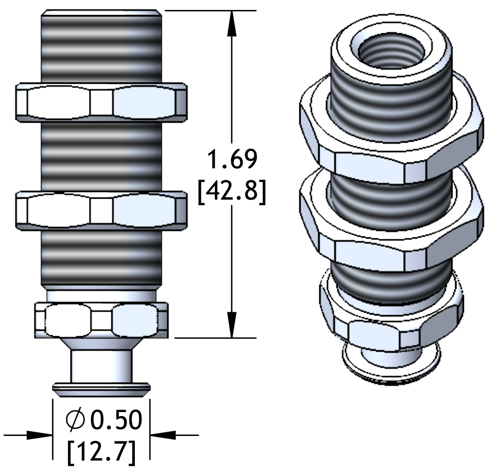
| Fitting | Assembly Suffix | Weight oz [g] | Hex Size in [mm] |
|---|---|---|---|
| 40-S5F-6F | -S5F-6F | 0.69 [19.6] | 0.69 [17.5] |
| 40-S5F-8F | -S5F-8F | 0.63 [17.9] | 0.69 [17.5] |

Dimensions

| Fitting | A in [mm] | B in [mm] | C in [mm] | Mount Thread | Thread Depth in [mm] |
|---|---|---|---|---|---|
| 40-S5F-6F | 1.18 [30.0] | 0.94 [23.9] | 0.39 [9.9] | M6x1.0 | 0.25 [6.3] |
| 40-S5F-8F | 1.18 [30.0] | 0.87 [22.0] | 0.39 [9.9] | M8x1.25 | 0.32 [8.1] |

# Ø 40 mm Cup Fittings - Tool Mount

*JN-M16X1 (2) jam nuts included.*

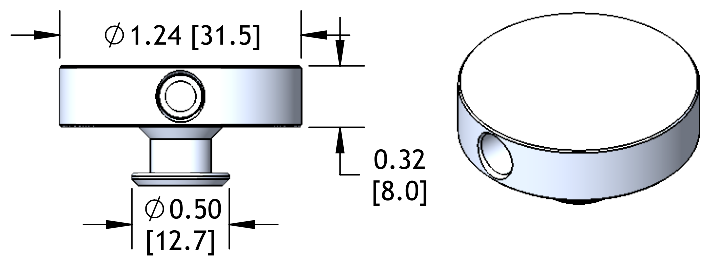



**40-18FX40**

| | |
|---|---|
| Assembly Suffix: | -18FX40 |
| Female Threads: | G 1/8 NPSF |
| Thread Depth: in [mm] | 0.38 [9.7] |
| Post Threads: | M16x1.0 |
| Hex Size: in [mm] | 0.69 [17.5] |
| Hex Height: in [mm] | 0.18 [4.6] |
| Weight: oz [g] | 0.80 [22.7] |
| Thru Hole: in [mm] | 0.22 [5.5] |

# Ø 40 mm Cup Fittings - Die Cutting

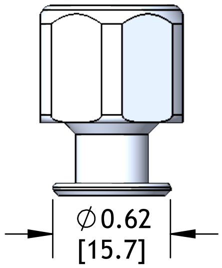
*Contains push-in bore (2) for Ø 6 mm tubing.*

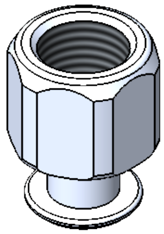



**40-DC125X31**

| | |
|---|---|
| Assembly Suffix: | -DC125X31 |
| Weight: oz [g] | 0.58 [16.3] |
| Thru Hole: in [mm] | 0.16 [4.0] |

## Ø 50 mm Cup Fittings - Female



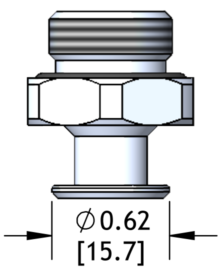
Technical Data

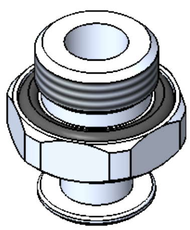
| Fitting | Assembly Suffix | Weight oz [g] |
|---|---|---|
| 50-6F | -6F | 0.42 [11.9] |
| 50-8F | -8F | 0.38 [10.8] |
| 50-18F | -18F | 0.23 [6.5] |
| 50-14F | -14F | 0.36 [10.2] |
| 50-38F | -38F | 0.51 [14.5] |
| 50-G14F | -G14F | 0.37 [10.5] |

Dimensions

| Fitting | Hex Height in [mm] | Hex Size in [mm] | Thru Hole in [mm] | Thread | Thread Depth in [mm] |
|---|---|---|---|---|---|
| 50-6F | 0.55 [14.0] | 0.69 [17.5] | 0.14 [3.6] | M6x1.0 | 0.25 [6.4] |
| 50-8F | 0.55 [14.0] | 0.69 [17.5] | 0.14 [3.6] | M8x1.25 | 0.32 [8.1] |
| 50-18F | 0.35 [8.8] | 0.69 [17.5] | 0.22 [5.6] | G 1/8 NPSF | 0.25 [6.4] |
| 50-14F | 0.62 [15.6] | 0.75 [19.0] | 0.22 [5.6] | 1/4 NPTF | 0.40 [10.0] |
| 50-38F | 0.70 [17.8] | 0.88 [22.2] | 0.22 [5.6] | 3/8 NPSF | 0.45 [11.4] |
| 50-G14F | 0.63 [15.9] | 0.75 [19.0] | 0.22 [5.6] | G 1/4 | 0.45 [11.4] |

## Ø 50 mm Cup Fittings - Male



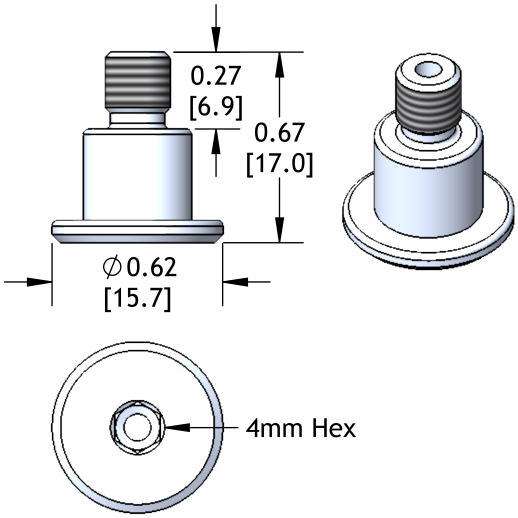
Technical Data

| Fitting | Assembly Suffix | Weight oz [g] |
|---|---|---|
| 50-6M | -6M | 0.23 [6.5] |
| 50-8M | -8M | 0.23 [6.5] |
| 50-18M | -18M | 0.20 [5.7] |
| 50-14M | -14M | 0.23 [6.5] |
| 50-38M | -38M | 0.31 [8.8] |
| 50-G14M | -G14M | 0.25 [7.1] |
| 50-G38M | -G38M | 0.31 [8.8] |
| 50-N18M | -N18M | 0.20 [5.7] |

Dimensions

| Fitting | Hex Height in [mm] | Hex Size in [mm] | Thru Hole in [mm] | Thread | Thread Length in [mm] |
|---|---|---|---|---|---|
| 50-6M | 0.20 [5.1] | 0.69 [17.5] | 0.14 [3.6] | M6x1.0 | 0.32 [8.1] |
| 50-8M | 0.20 [5.1] | 0.69 [17.5] | 0.14 [3.6] | M8x1.25 | 0.32 [8.1] |
| 50-18M | 0.20 [5.1] | 0.69 [17.5] | 0.22 [5.6] | G 1/8 NPSF | 0.23 [5.9] |
| 50-14M | 0.20 [5.1] | 0.69 [17.5] | 0.22 [5.6] | 1/4 NPT | 0.35 [9.0] |
| 50-38M | 0.20 [5.1] | 0.75 [19.0] | 0.22 [5.6] | 3/8 NPSF | 0.35 [9.0] |
| 50-G14M | 0.20 [5.1] | 0.69 [17.5] | 0.22 [5.6] | G 1/4 | 0.35 [9.0] |
| 50-G38M | 0.20 [5.1] | 0.75 [19.0] | 0.22 [5.6] | G 3/8 | 0.35 [9.0] |
| 50-N18M | 0.20 [5.1] | 0.69 [17.5] | 0.22 [5.6] | 1/8 NPT | 0.39 [9.9] |

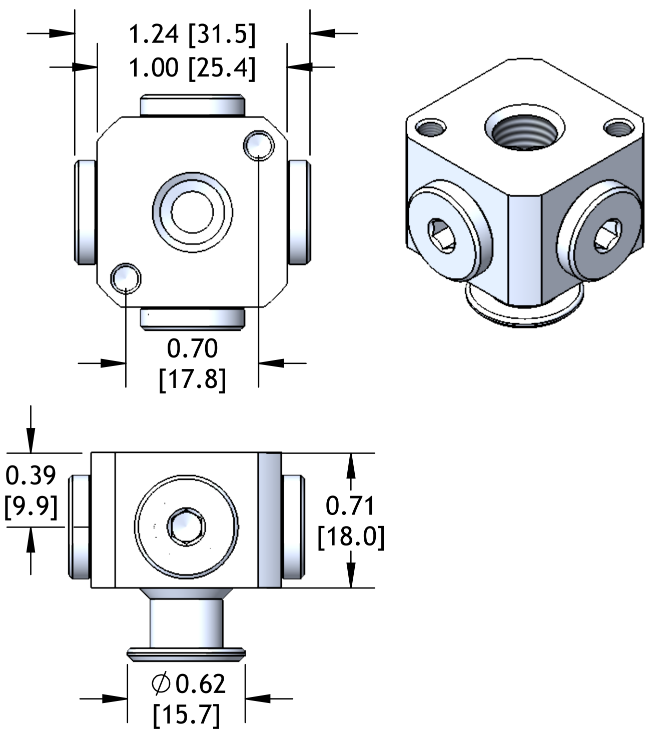
# Ø 50 mm Cup Fittings - Male Stud

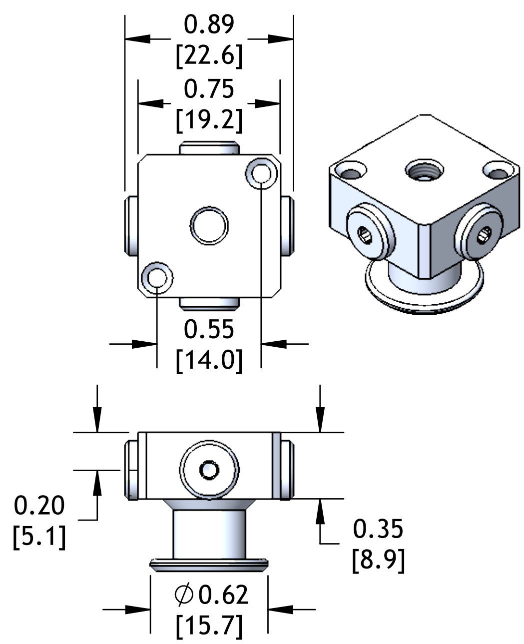



**50-6MS**

| | |
|---|---|
| Assembly Suffix: | -6MS |
| Thread: | M6x1.0 |
| Weight: oz [g] | 0.12 [3.4] |
| Thru Hole: in [mm] | 0.02 [2.5] |

# Ø 50 mm Cup Fittings - Cross Fittings



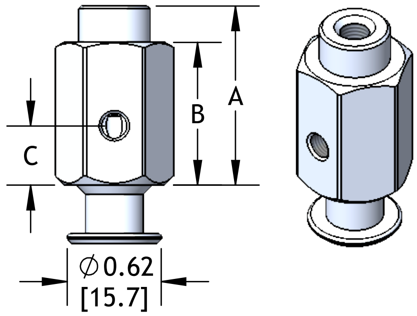

**50-5X18F**

| | |
|---|---|
| Assembly Suffix: | -5X18F |
| Threads: | G 1/8 NPSF (5) |
| Mount Threads: | M4x0.7 (2) |
| Weight: oz [g] | 1.00 [29.7] |
| Thru Hole: in [mm] | 0.22 [5.6] |

**50-5X5F**

| | |
|---|---|
| Assembly Suffix: | -5X5F |
| Threads: | M5x0.8 (5) |
| Mount Threads: | M3x0.5 (2) |
| Weight: oz [g] | 0.36 [10.1] |
| Thru Hole: in [mm] | 0.16 [4.1] |

## Ø 50 mm Cup Fittings - M5 Female Side Vacuum w/ Female Port




Technical Data

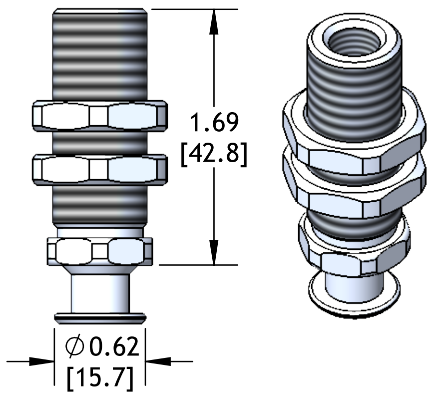
| Fitting | Assembly Suffix | Weight oz [g] | Hex Size in [mm] |
|---|---|---|---|
| 50-S5F-6F | -S5F-6F | 0.74 [21.0] | 0.69 [17.5] |
| 50-S5F-8F | -S5F-8F | 0.68 [19.3] | 0.69 [17.5] |

Dimensions

| Fitting | A in [mm] | B in [mm] | C in [mm] | Mount Thread | Thread Depth in [mm] |
|---|---|---|---|---|---|
| 50-S5F-6F | 1.18 [30.0] | 0.94 [23.9] | 0.39 [9.9] | M6x1.0 | 0.25 [6.3] |
| 50-S5F-8F | 1.18 [30.0] | 0.87 [22.0] | 0.39 [9.9] | M8x1.25 | 0.32 [8.1] |

## Ø 50 mm Cup Fittings - Tool Mount

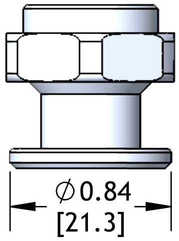
*JN-M16X1 (2) jam nuts included.*

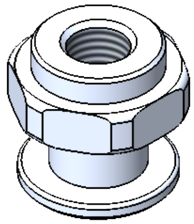



**50-18FX40**

| | |
|---|---|
| Assembly Suffix: | -18FX40 |
| Female Threads: | G 1/8 NPSF |
| Thread Depth: in [mm] | 0.38 [9.7] |
| Post Threads: | M16x1.0 |
| Hex Size: in [mm] | 0.69 [17.5] |
| Hex Height: in [mm] | 0.18 [4.6] |
| Weight: oz [g] | 0.83 [23.5] |
| Thru Hole: in [mm] | 0.21 [5.3] |

## Ø 65 mm Cup Fittings - Female



Technical Data

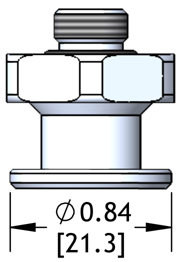
| Fitting | Assembly Suffix | Weight oz [g] |
|---|---|---|
| 65-18F | -18F | 0.43 [12.2] |
| 65-38F | -38F | 0.66 [18.6] |
| 65-G14F | -G14F | 0.45 [12.7] |

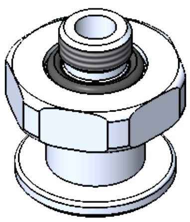
Dimensions

| Fitting | Hex Height in [mm] | Offset Height in [mm] | Thru Hole in [mm] | Thread | Thread Depth in [mm] |
|---|---|---|---|---|---|
| 65-18F | 0.25 [6.4] | 0.15 [3.8] | 0.34 [8.6] | G 1/8 NPSF | 0.38 [7.1] |
| 65-38F | 0.82 [20.8] | N/A | 0.34 [8.6] | 3/8 NPSF | 0.55 [14.0] |
| 65-G14F | 0.25 [6.4] | 0.34 [8.5] | 0.34 [8.6] | G 1/4 | 0.45 [11.4] |

*Hex Size = 0.88 [22.4] for all 65 mm Cup Fittings*

## Ø 65 mm Cup Fittings - Male



Technical Data

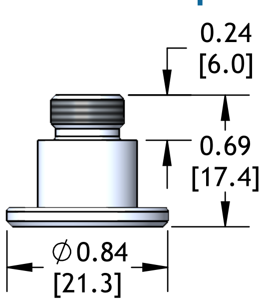
| Fitting | Assembly Suffix | Weight oz [g] |
|---|---|---|
| 65-18M | -18M | 0.43 [12.3] |
| 65-14M | -14M | 0.45 [12.7] |
| 65-38M | -38M | 0.45 [12.7] |
| 65-G14M | -G14M | 0.45 [12.7] |
| 65-G38M | -G38M | 0.45 [12.7] |

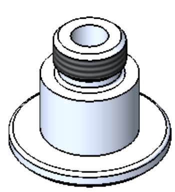
Dimensions

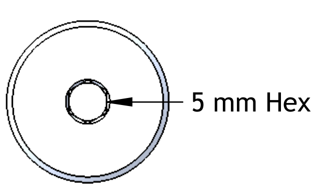
| Fitting | Hex Height in [mm] | Thru Hole in [mm] | Thread | Thread Length in [mm] |
|---|---|---|---|---|
| 65-18M | 0.25 [6.4] | 0.22 [5.6] | G 1/8 NPSF | 0.24 [6.1] |
| 65-14M | 0.29 [7.4] | 0.28 [7.1] | 1/4 NPT | 0.27 [6.9] |
| 65-38M | 0.25 [6.4] | 0.34 [8.6] | 3/8 NPSF | 0.35 [8.9] |
| 65-G14M | 0.29 [7.4] | 0.28 [7.1] | G 1/4 | 0.27 [6.9] |
| 65-G38M | 0.25 [6.4] | 0.34 [8.6] | G 3/8 | 0.35 [8.9] |

*65-38M and 65-G38M also have G 1/8 NPSF Female Threads*
*Hex Size = 0.88 [22.4] on all 65 mm Cup Fittings*

## Ø 65 mm Cup Fittings - Male Stud



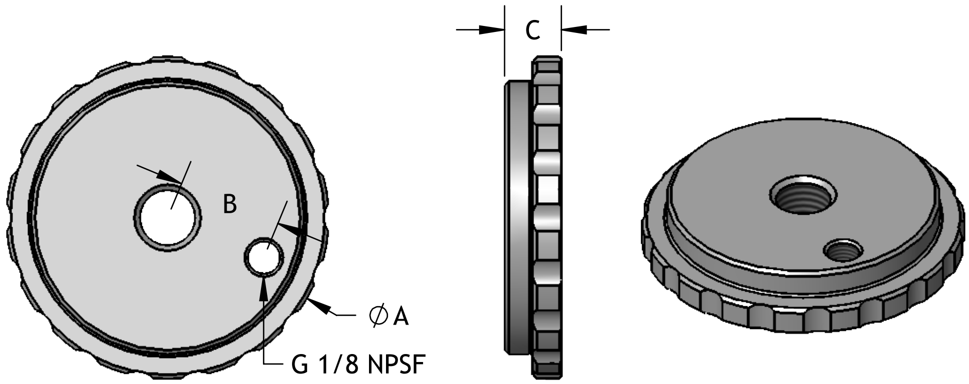






**65-18MS**

| | |
|---|---|
| Assembly Suffix: | -18MS |
| Thread: | G 1/8 NPT |
| Weight: oz [g] | 0.21 [5.9] |
| Thru Hole: in [mm] | 0.20 [5.0] |

## Ø 75-150 mm Cup Fittings



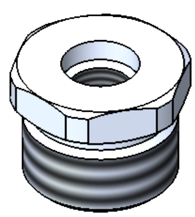

| Fitting | Assembly Suffix | Weight oz [g] | A in [mm] | B in [mm] | C in [mm] | Thread |
|---|---|---|---|---|---|---|
| 75-18F | -18F | 2.80 [79.4] | 2.36 [60.0] | N/A | 0.68 [17.3] | G 1/8 NPSF |
| 75-14F | -14F | 2.70 [76.5] | 2.36 [60.0] | N/A | 0.68 [17.3] | 1/4 NPSF |
| 75-G14F | -G14F | 2.70 [76.5] | 2.36 [60.0] | N/A | 0.68 [17.3] | G 1/4 |
| 75-38F | -38F | 2.70 [76.5] | 2.36 [60.0] | N/A | 0.68 [17.3] | 3/8 NPSF |
| 75-G38F | -G38F | 2.70 [76.5] | 2.36 [60.0] | N/A | 0.68 [17.3] | G 3/8 |
| 75-12F | -12F | 2.60 [73.7] | 2.36 [60.0] | N/A | 0.68 [17.3] | G 1/2 NPSF |
| 110-38F | -38F | 5.10 [145.0] | 3.35 [85.1] | 1.10 [27.9] | 0.59 [15.0] | 3/8 NPSF |
| 110-12F | -12F | 5.10 [145.0] | 3.35 [85.1] | 1.10 [27.9] | 0.59 [15.0] | G 1/2 NPSF |
| 150-38F | -38F | 8.50 [241.0] | 4.72 [120.0] | 1.38 [25.0] | 0.56 [14.2] | 3/8 NPSF |
| 150-12F | -12F | 8.50 [241.0] | 4.72 [120.0] | 1.38 [25.0] | 0.56 [14.2] | G 1/2 NPSF |

*All 75 - 150 fittings include M4X10-965A Stainless Steel Screws and SS Filter Screen.*
*Sizes 110 and 150 fittings also include an FS21 Filter Screen and P18 Plug for Auxiliary Port.*

## Metric Bushings

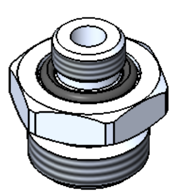
*For use with 75-12F, 110-12F, and 150-12F fittings.*

| Bushing | Female Thread | Weight oz [g] |
|---|---|---|
| G12M-M8X1.25F | M8x1.25 | 0.49 [13.8] |
| G12M-M10X1.25F | M10x1.25 | 0.45 [12.7] |
| G12M-M10X1.5F | M10x1.5 | 0.45 [12.7] |
| G12M-M12X1.75F | M12x1.75 | 0.40 [11.3] |
| G12M-M16X1.5F | M16x1.5 | 0.24 [6.8] |



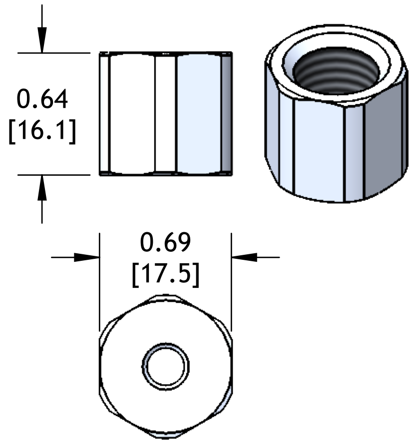
## Cup Fitting Adapters

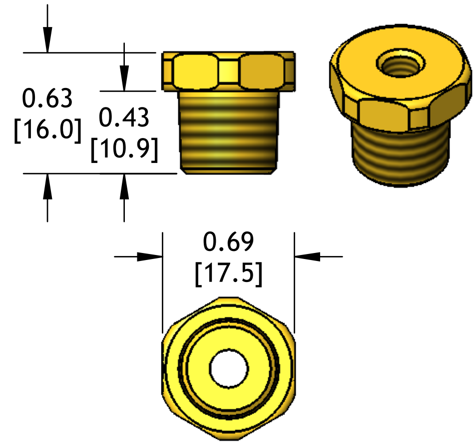
| Adapter | Thread 1 | Thread 2 | Weight oz [g] |
|---|---|---|---|
| 38MX18M | G 3/8 NPT | G 1/8 NPT | 0.26 [7.3] |
| 38MX38M | G 3/8 NPT | G 3/8 NPT | 0.31 [8.9] |
| 38MX12M | G 3/8 NPT | G 1/2 NPT | 0.59 [16.8] |
| 12MX12M | G 1/2 NPT | G 1/2 NPT | 0.77 [21.7] |



## Male Stud Adapters

*For use with 32-6MS, 40-6MS, and 50-6MS fittings.*




**6F-G14F**

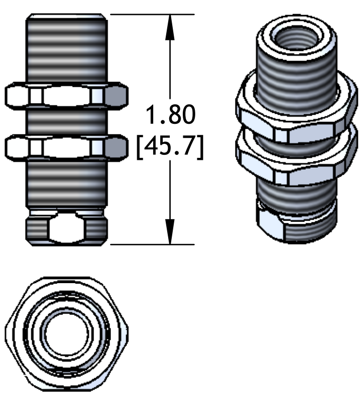
| | |
|---|---|
| Thread 1: | G 1/4 |
| Thread 2: | M6x1.0 |
| Weight: oz [g] | 0.28 [7.9] |

**6F-14M**

| | |
|---|---|
| Thread 1: | 1/4 NPTF |
| Thread 2: | M6x1.0 |
| Weight: oz [g] | 0.68 [19.3] |

## Tool Mount Adapters

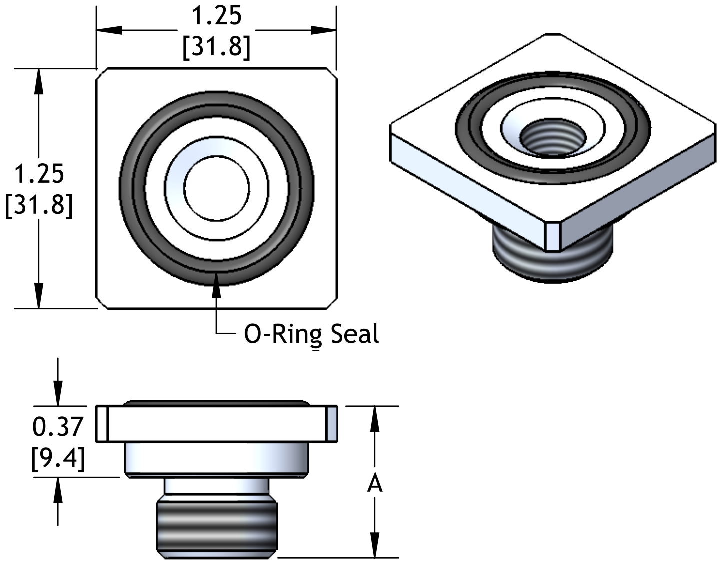
*For use with -18M fittings. JN-M16X1 (2) jam nuts included.*




**18F-16X40**

| | |
|---|---|
| Port Threads: | G 1/8 NPSF |
| Post Threads: | M16x1.0 |
| Weight: oz [g] | 1.10 [31.2] |

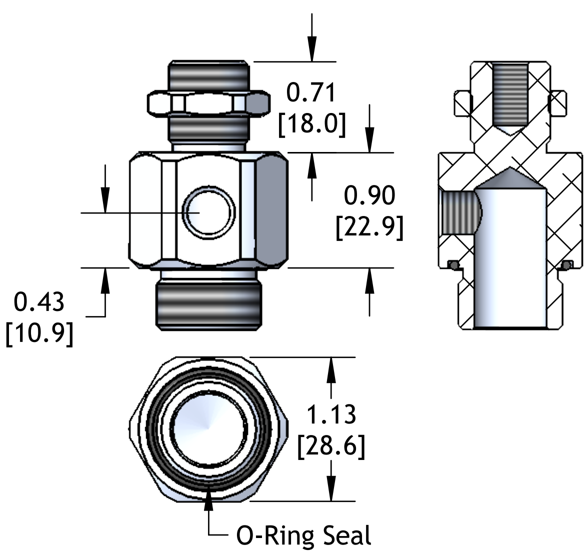
## T-Slot Adapters

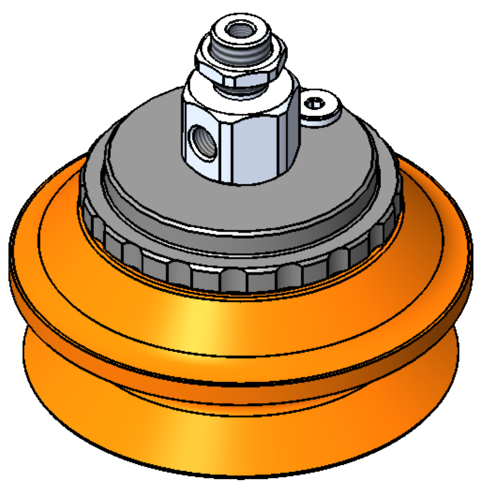



| Adapter | A<br>in [mm] | Thread | Weight<br>oz [g] |
|---|---|---|---|
| TSA-18M | 0.61 [15.5] | G 1/8 NPS | 0.75 [21.3] |
| TSA-38M | 0.79 [20.0] | 3/8 NPSF | 0.68 [19.3] |
| TSA-12M | 0.79 [20.0] | G 1/2 NPS | 0.59 [16.7] |

## Side Vacuum Port Adapter

*For use with 75-12F, 110-12F, and 150-12F fittings. JN-M16X1 (1) jam nut included.*



**12M-S18F-16M**

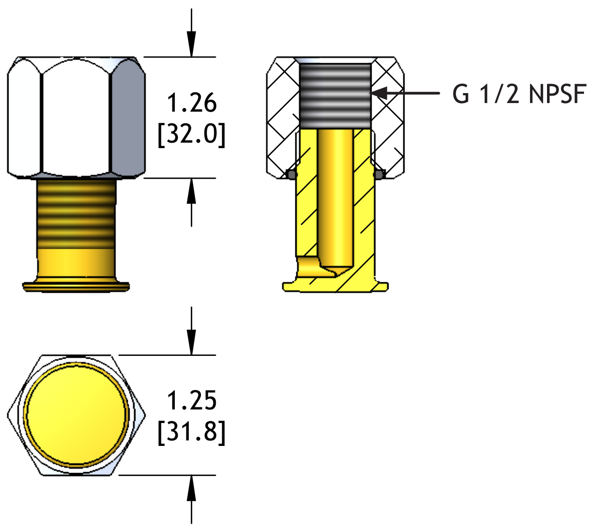
| | |
|---|---|
| Port Threads: | G 1/8 NPSF |
| Post Threads: | M16x1.0 |
| Female Post Threads: | M8x1.25 |
| Connection Threads: | G 1/2 NPSF |
| Weight: oz [g] | 1.80 [50.8] |

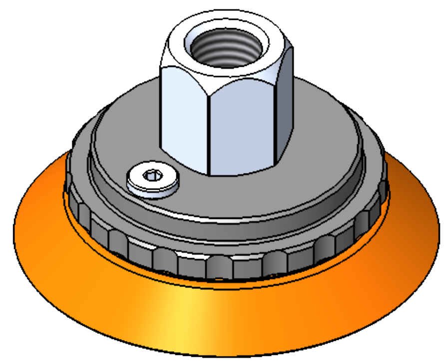
## SS12: Sheet Separator

Used to warp the edges of sheet goods to promote separation from the next sheet in a stack. As vacuum is applied to the vacuum cup, the cup pulls the sheet against a crowned brass center post and warps it slightly to produce a small air passage under the sheet edge which facilitates sheet separation. One separator per corner is recommended. Depending on the size and thickness of sheet material, more units may be required. The degree of the warp can be adjusted by changing the projection distance of the center post from the cup cleats or the amount of vacuum applied to the vacuum cup. A 150 mm size cup produces a very large force and should only be used with thicker materials to prevent marking the product.

*Sheet Separators can be ordered on their own to add to your cup by using the SS-12 part number. To order a sheet separator with a cup already attached, use the chart below. Sheet Separators are compatible with XP-F110 and XP-F150 cups using 12F fittings.*

| | Cup Size & Style | | Cup Material | | |
|---|---|---|---|---|---|
| XP- | F110 | | N | | -12F-SS |
| | F110 | Flat Cup, 110 mm | N | Nitrile | |
| | F150 | Flat Cup, 150 mm | S | Silicone | |
| | | | V | Viton | |



## Cup Fitting Adapters

**38MX12M**

*Weight: 0.03 lbs [15.4 g]*

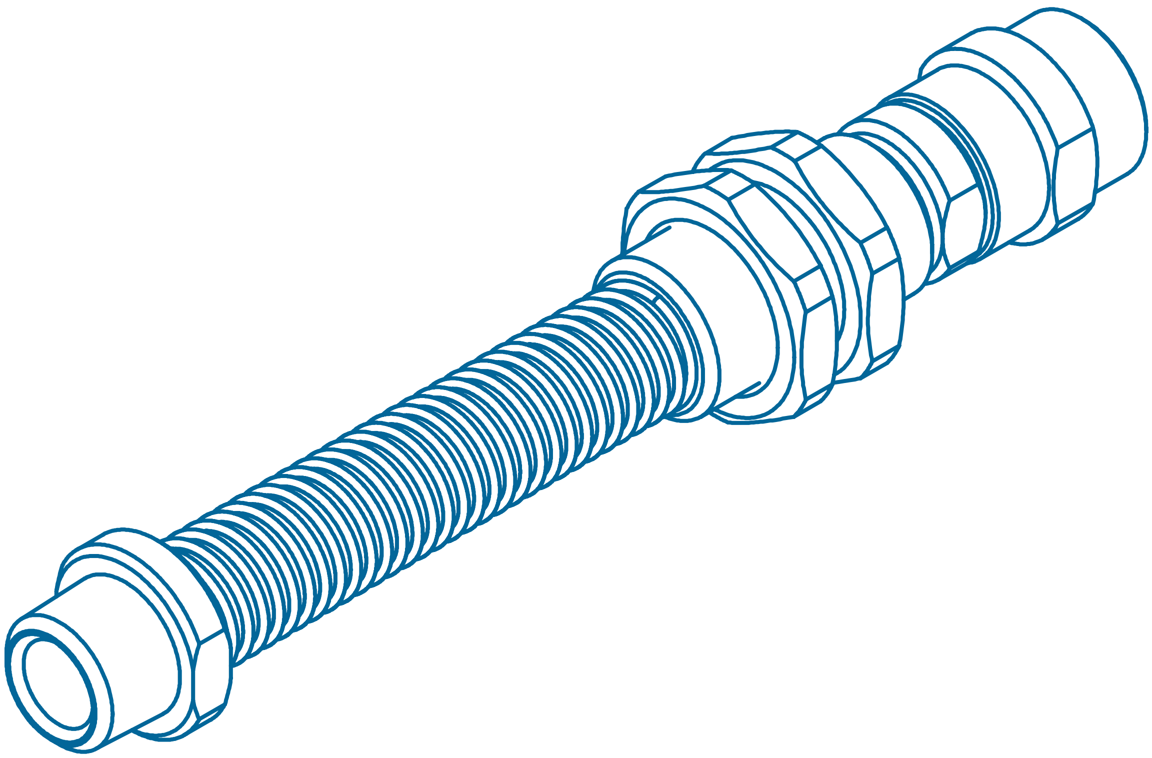
**38MX38M**

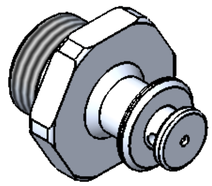
*Weight: 0.02 lbs [9.1 g]*

**38MX18M**

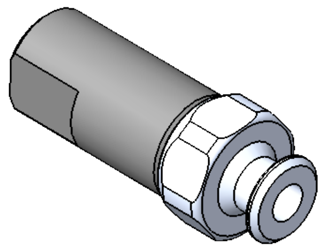
*Weight: 0.02 lbs [7.7 g]*

# Vacuum Cup Accessories
## Section 4

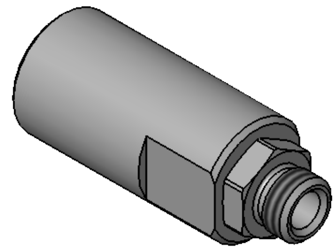




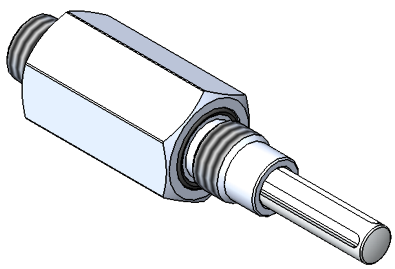
Dual-Flow Valves



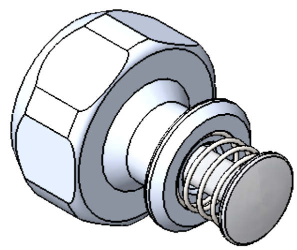
Tri-Flow Valves



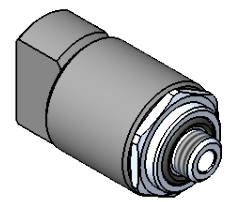
Flow-Sensor-Valves



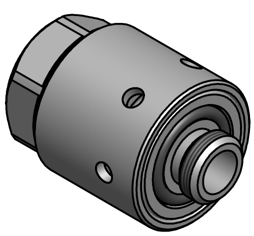
Mechanical Valves



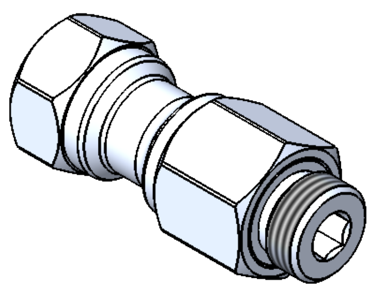
Cone Valves



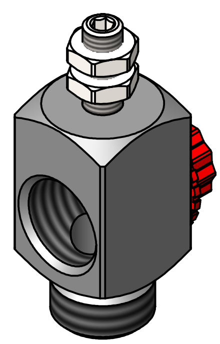
Check Valves



Atmospheric Quick Release

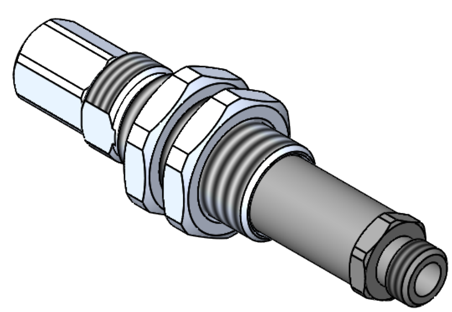


Swivel Joints



Tee Adapters





Level Compensators

## Dual-Flow Valves

Dual-Flow Valves limit vacuum leakage in a system where some of the vacuum cups may not be in sealing contact with the work piece. Since vacuum flow is limited by a small orifice, Dual-Flow Valves are only recommended for non-porous parts or for slightly porous, light-weight parts.

There are two main ways to apply Dual-Flow Valves. The first is to bring Dual-Flow Valve equipped vacuum cups into contact with the work piece and then turn on the vacuum source. Non-sealing cups will leak and cause the associated Dual-Flow Valves to close to orifice flow only.
The second way is to turn on the vacuum source to close all Dual-Flow Valves before the vacuum cups contact the work piece and then allow the Dual-Flow Valve orifice flow to establish vacuum within the cups once contact is made.

In either case, part release is accomplished by removing the vacuum source and allow atmospheric air to open the Dual-Flow Valves. For a faster cycle time, use a blow-off pulse of compressed air to break the vacuum and release the part more quickly.

### Ø 20-35 mm Cups

| Dual-Flow Fitting | Assembly Suffix | Weight oz [g] | Flow & 18 inHg [81 kPa] SCFM [Nl/m] | Connection Threads |
|---|---|---|---|---|
| 32-18FDF | -18FDF | 0.13 [3.7] | 0.20 [5.7] | G 1/8 NPS (F) |
| 32-18MDF | -18MDF | 0.13 [3.7] | 0.20 [5.7] | G 1/8 NPS (M) |
| 32-14MDF | -14MDF | 0.19 [5.4] | 0.20 [5.7] | 1/4 NPT (M) |
| 32-G14FDF | -G14FDF | 0.27 [7.7] | 0.20 [5.7] | G 1/4 (F) |
| 32-G14MDF | -G14MDF | 0.17 [4.8] | 0.20 [5.7] | G 1/4 (M) |
| 32-5X5FDF | -5X5FDF | 0.9 [5.4] | 0.20 [5.7] | M5x0.8 (F) |
| 32-5X18FDF | -5X18FDF | 1.01 [28.6] | 0.20 [5.7] | G 1/8 NPS (F) |

### Ø 40 mm Cups

| Dual-Flow Fitting | Assembly Suffix | Weight oz [g] | Flow & 18 inHg [81 kPa] SCFM [Nl/m] | Connection Threads |
|---|---|---|---|---|
| 40-18FDF | -18FDF | 0.22 [6.2] | 0.50 [14.2] | G 1/8 NPS (F) |
| 40-18MDF | -18MDF | 0.22 [6.2] | 0.50 [14.2] | G 1/8 NPS (M) |
| 40-14MDF | -14MDF | 0.23 [6.5] | 0.50 [14.2] | 1/4 NPT (M) |
| 40-38FDF | -38FDF | 0.47 [13.3] | 0.50 [14.2] | 3/8 NPT (F) |
| 40-38MDF | -38MDF | 0.29 [8.2] | 0.50 [14.2] | 3/8 NPSF (F) |
| 40-G14FDF | -G14FDF | 0.27 [7.7] | 0.50 [14.2] | G 1/4 (F) |
| 40-G14MDF | -G14MDF | 0.23 [6.5] | 0.50 [14.2] | G 1/4 (M) |
| 40-G38MDF | -G38MDF | 0.29 [8.2] | 0.50 [14.2] | G 3/8 (M) |
| 40-5X5FDF | -5X5FDF | 0.33 [9.4] | 0.50 [14.2] | M5x0.8 (F) |
| 40-5X18FDF | -5X18FDF | 1.01 [28.6] | 0.50 [14.2] | G 1/8 NPS (F) |

### Ø 50 mm Cups

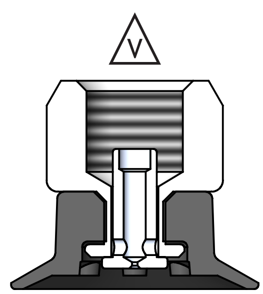
| Dual-Flow Fitting | Assembly Suffix | Weight oz [g] | Flow & 18 inHg [81 kPa] SCFM [Nl/m] | Connection Threads |
|---|---|---|---|---|
| 50-18FDF | -18FDF | 0.25 [7.1] | 0.60 [17.0] | G 1/8 NPS (F) |
| 50-18MDF | -18MDF | 0.20 [5.7] | 0.60 [17.0] | G 1/8 NPS (M) |
| 50-14MDF | -14MDF | 0.25 [7.1] | 0.60 [17.0] | 1/4 NPT (M) |
| 50-38FDF | -38FDF | 0.51 [14.5] | 0.60 [17.0] | 3/8 NPT (F) |
| 50-38MDF | -38MDF | 0.34 [9.6] | 0.60 [17.0] | 3/8 NPSF (F) |
| 50-G14FDF | -G14FDF | 0.39 [11.1] | 0.60 [17.0] | G 1/4 (F) |
| 50-G14MDF | -G14MDF | 0.28 [7.9] | 0.60 [17.0] | G 1/4 (M) |
| 50-G38MDF | -G38MDF | 0.34 [9.6] | 0.60 [17.0] | G 3/8 (M) |
| 50-5X5FDF | -5X5FDF | 0.36 [10.2] | 0.60 [17.0] | M5x0.8 (F) |
| 50-5X18FDF | -5X18FDF | 1.01 [28.6] | 0.60 [17.0] | G 1/8 NPS (F) |

### Sizing a Vacuum Pump

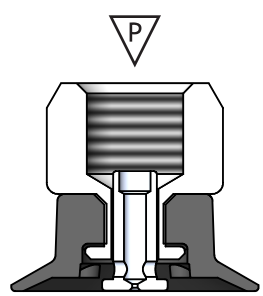
Using the tables, determine the orifice flow at your system's maximum vacuum operating level. Multiply this by the maximum number of non-sealing cups in the system. Select a pump that will give this total flow-rate at the system vacuum level with an additional factor of safety.

### Caution

If Dual-Flow Valves are used with a heavy porous part, the part may be dropped suddenly due to porosity flow through the part being greater than the available orifice flow. This can occur even if there is excess vacuum pump capacity. For this type of system, use Flow Senor Valves.




Orifice Flow




Reverse Flow

# Tri-Flow Valves

Tri-Flow Valves limit vacuum leakage in a system where some of the vacuum cups may not be in sealing contact with the work piece.

Tri-Flow Valves are a cross between Flow Sensor Valves and Dual-Flow Valves because they are fully open until the Flow Sensor section closes at the factory preset vacuum flow-rate, then a bypass orifice meters vacuum flow to limit leakage to a manageable rate. Part release is accomplished by removing the vacuum source and admitting atmospheric air which will also reset any closed Tri-Flow Valves to the open position. For a faster cycle time, use a blow-off pulse of compressed air to break the vacuum and release the part more quickly.

Tri-Flow Valves can handle greater porosity flow than Dual-Flow Valves due to the fact that they're initially held open. Another advantage is the Tri-Flow metering orifice is protected by an integral filter for greater tolerance for contamination.

The normal way to set up a vacuum system using Tri-Flow Valve equipped vacuum cups is to bring them into contact with the work piece and then turn on the vacuum source. Non-sealing cups will leak and cause the associated Tri-Flow Valves to close to orifice flow only. Tri-Flow Valves on cups in sealing contact with the work piece will remain fully open to handle higher porosity flow-rates (normal leakage through the part) then Dual-Flow Valves can.

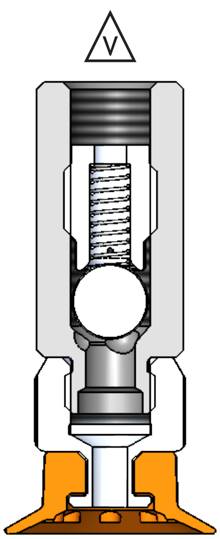
For a system handling non-porous parts, operation can be as described above or the vacuum source may be turned on before the vacuum cups are in sealing contact with the work piece. Tri-Flow Valves will reset to fully open. This feature is also convenient for use in vacuum holding fixtures. This capability is the only advantage that Tri-Flow Valves have over Flow Sensor Valves.

For mid to high porosity parts, we recommend using Flow Sensor Valves where the closing set point can be adjusted to suit the application.

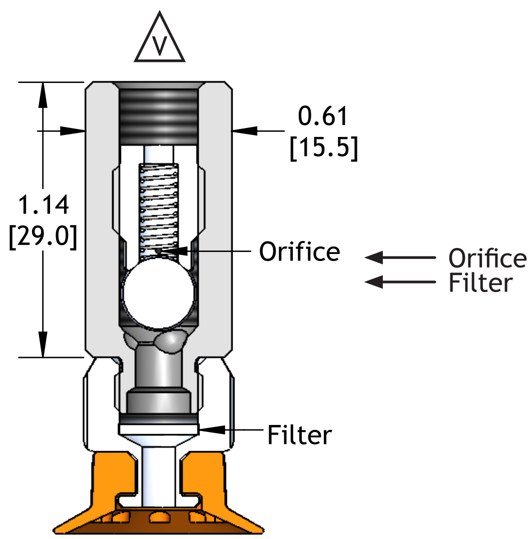
To order a cup assembled with a Tri-Flow Valve, add suffix -18TFT to the part number.

Example: **XP-B50N-18TFT**

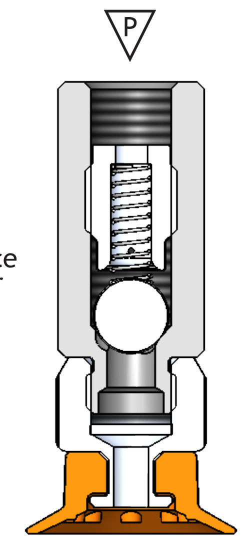
To order for use in-line, order T18F-XX. (Specify flow.)




**Fully Open**
Flow-Rate: 0.5 SCFM




**Orifice Flow**
Check valve will reopen if porosity flow is below about half of closing set-point.




**Reverse Flow**

| Tri-Flow Valve In-line | Weight oz [g] | Connection Threads | Tri-Flow Valve w/ Cup Fitting | Weight oz [g] | Flow @ 18 inHg | Closing Flow |
|---|---|---|---|---|---|---|
| TF18F-0.4 | 0.43 [12.2] | G 1/8 NPSF | 32-18FTF | 0.55 [15.7] | 0.2 SCFM | 0.4 SCFM |
| TF18F-0.5 | 0.43 [12.2] | G 1/8 NPSF | 40-18FTF | 0.63 [17.2] | 0.4 SCFM | 0.5 SCFM |
| TF18F-0.6 | 0.43 [12.2] | G 1/8 NPSF | 50-18FTF | 0.66 [18.8] | 0.5 SCFM | 0.6 SCFM |

## Flow Sensor Valves (PATENTED)

Flow Sensor Valves (FSV) are normally open valves that snap closed when the factory preset flow-rate is exceeded. Our FSV is insensitive to acceleration forces and may be used in any physical orientation. System vacuum level has no affect on the FSV set-point. However, higher system vacuum levels will cause greater flow-rates through a porous work piece.

Flow Sensor Valves eliminate the problem of vacuum loss through non-working standard cups or through valved cups overhanging the work piece edge. These are especially useful where work piece size and orientation will vary. For maximum effectiveness, each vacuum cup in the system should be equipped with a Flow Sensor Valve.

Flow Sensor Valves may be manifold or located in-line rather than at the vacuum cup. Piping integrity is important since the FSV will sense a fitting leak as easily as a leakage at a vacuum cup. Wherever installed, a suitable filter must be used upstream of the FSV. When used with EDCO fittings, a filter screen nests inside the fitting bore.

The optimum flow-rate set-point is best determined by testing the porosity of sample work pieces with a flow meter using the same vacuum cup size and style as will be used in the actual system. Porosity of items such as corrugated board can vary greatly from lot to lot so it is important to find the most porous part to be handled by the system.

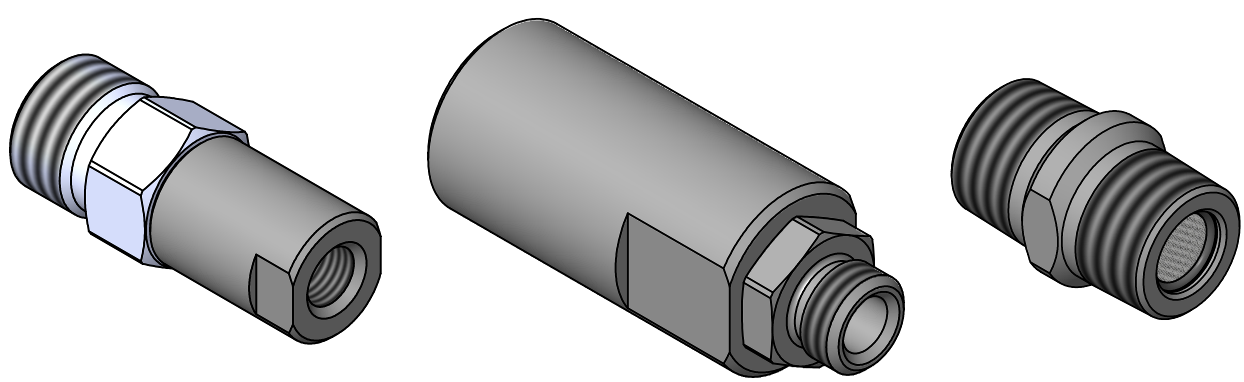
A factor of safety must be added to the highest porosity test value to allow for variations in work piece porosity, system vacuum level, increased leakage due to wear, and other factors. For porous work pieces such as paper or corrugated cases, the factor of safety should probably be in the 50% range. For non-porous work pieces such as plastic or metal, the factor or safety may be reduced.
It is necessary to size the vacuum pump to have enough capacity to close all Flow Sensor Valves where cups are not sealed against a work piece plus the total “porosity” flow through the sealed cups. EDCO air powered multi-stage vacuum pumps are ideally suited since they produce large vacuum flow-rates at low vacuum levels (0-10 inHG) and can provide the flow necessary to close a large number of Flow Sensor Valves.

When used with large, bellows style vacuum cups, the cup should be pressed against the work piece to collapse the bellows before turning on the vacuum. This prevents accidentally activating the FSV by the high, instantaneous flow-rate caused by the bellows collapsing under the vacuum.

The FSV will automatically reset when the vacuum is turned off for a short period of time. If desired, a pressure pulse can be used to back flow the FSV to clean off the inlet filter. This blow-off pulse will reset the FSV and will quickly release the work piece.

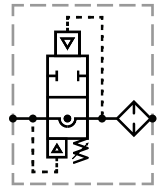
The FSVM version includes a monitor port where a vacuum sensor can be used to monitor whether the FSV is open or closed.

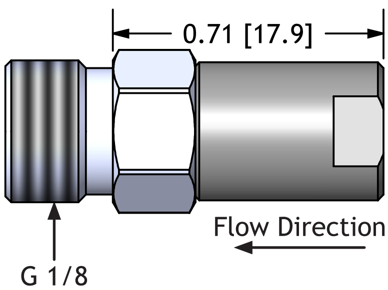
Note: Flow Sensor Valves are calibrated using a flow meter. Field adjustment is not practical or suggested.

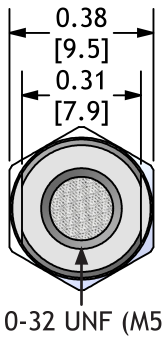


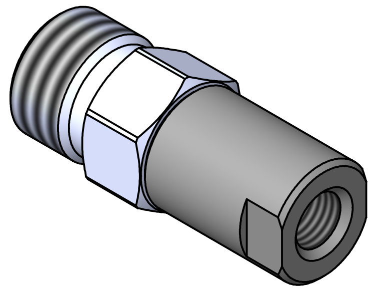
# FSV-10: Flow Sensor Valve, 10-32 UNF (M5)

| | Set Point[1] | Connection Type | |
|---|---|---|---|
| FSV-10- | 0.1 | | |
| | 0.1 - 0.6 SCFM | (Blank) | 10-32 UNF (M5) Female |
| | [1]0.1 Increments | -8 | 4-8 mm Cup Size |
| | | -10 | 10-15 mm Cup Size |
| | | -32MS | 25-35 mm Cup Size |

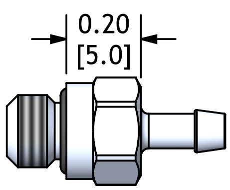




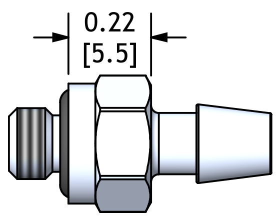



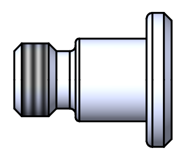
*Weight: 0.16 oz [4.4 g]*




**Ø 4-8 mm Cup Size**
*8-10M Cup Fitting*



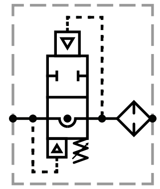

**Ø 10-15 mm Cup Size**
*10-10M Cup Fitting*

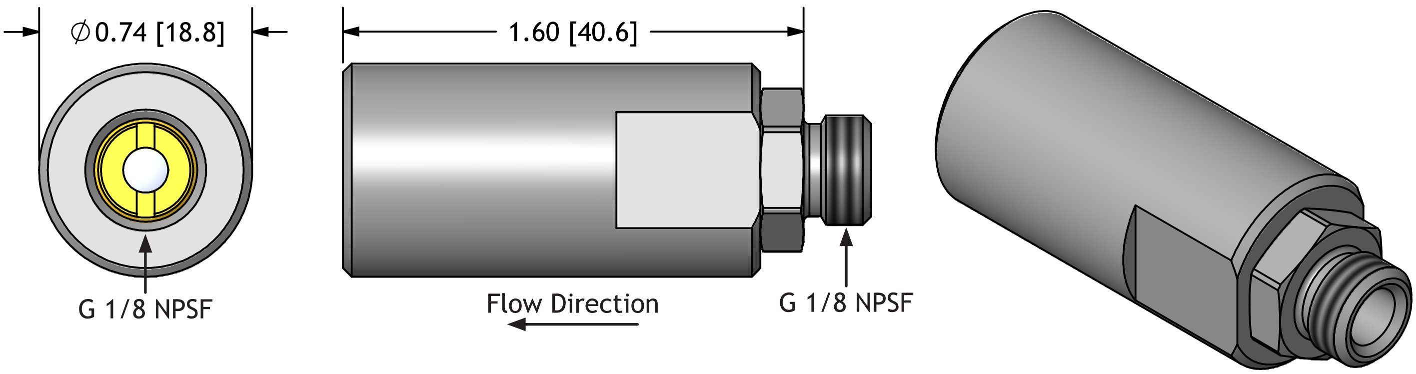


**Ø 25-35 mm Cup Size**
*32-10MS Cup Fitting*

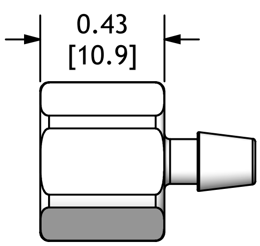
# FSV-18: Flow Sensor Valve, G 1/8 NPSF

| | Set Point[1] | Connection Type | |
|---|---|---|---|
| FSV-18- | 0.3 | | |
| | 0.3 - 2.3 SCFM | (Blank) | G 1/8 NPSF Male |
| | [1]0.1 Increments | -18M | 1/8 NPT Male |
| | | -10 | 10-15 mm Cup Size |
| | | -32 | 25-35 mm Cup Size |
| | | -40 | 40 mm Cup Size |
| | | -50 | 50 mm Cup Size |

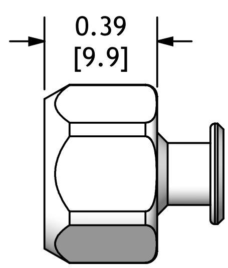




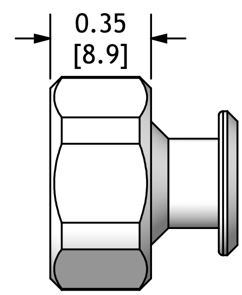

*Weight: 0.99 oz [28.2 g]*



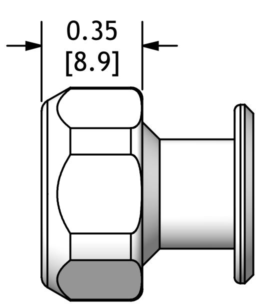

**-10**
*10-18F Cup Fitting*



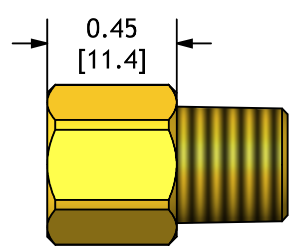

**-32**
*32-18F Cup Fitting*




**-40**
*40-18F Cup Fitting*




**-50**
*50-18F Cup Fitting*

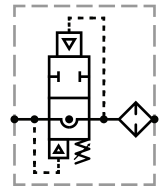


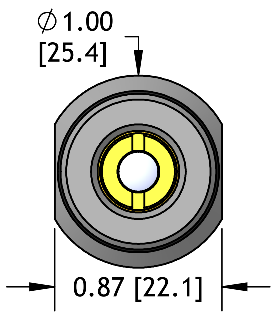

**-18M**
*1/8 NPT Male Fitting*

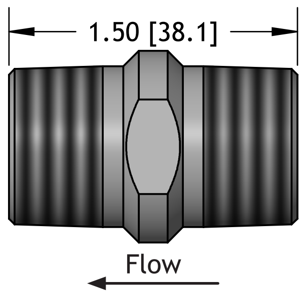
## FSV-12: Flow Sensor Valve, 1/2 NPT

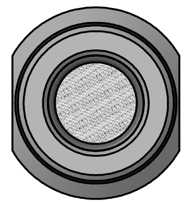
| | Set Point[1] |
|---|---|
| FSV-12- | 0.5 |
| | 0.5 - 6.0 SCFM |

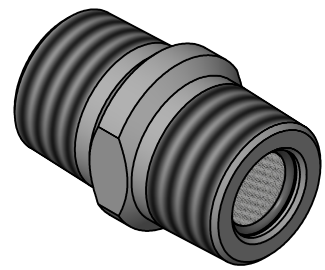
[1]0.1 Increments







*Weight: 3.26 oz [92.6 g]*

# Mechanical Valves

Mechanical valves are used with a vacuum cup in systems having a central vacuum pump and an array of vacuum cups to pick up a family of workpieces that vary by known values of width or length. Mechanical valves are used to seal off cups that are not directly over a workpiece to limit leakage into the vacuum system since these cups are not sealing. If the workpiece edge positions vary randomly, a mechanical valve could be opened by the workpiece but with a portion of the vacuum cup overhanging the edge causing leaking which would defeat the purpose of using mechanical valves.

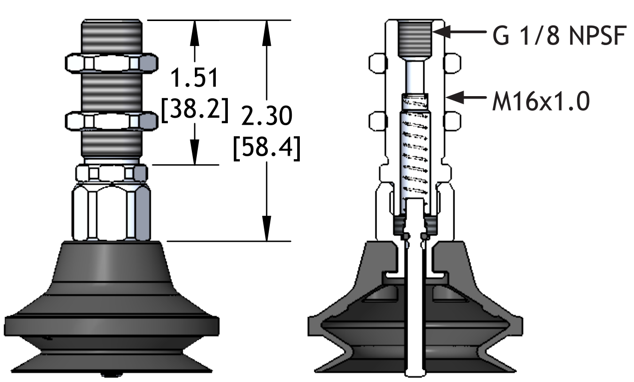
Mechanical valves are closed until the valve stem contacts a workpiece to open the valve and admit vacuum to the vacuum cup to allow gripping the workpiece. Since mechanical valves are mechanically operated by contact with a workpiece, there is a possibility for the valve stem to leave a mark if there is any relative movement. It is good practice to avoid using mechanical valves for delicate or highly polished surfaces and to make sure that vacuum cup movement is perpendicular to the workpiece surface.

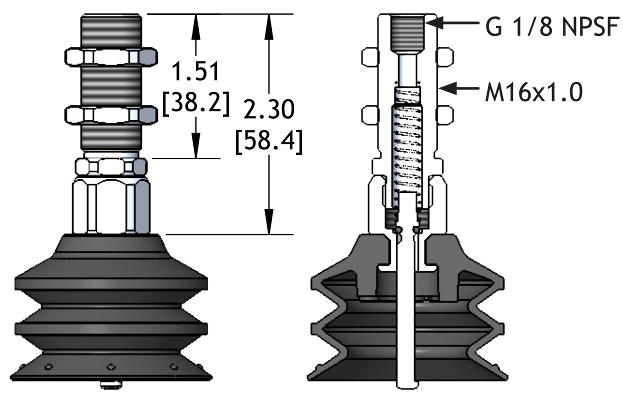
### MV-B50 & MV-2B50: Mechanical Valve for XP-B50 & XP-2B50

To order full assembly with vacuum cup:

| | Cup Size | | Cup Material | | |
|---|---|---|---|---|---|
| XP- | B50 | | N | | -16X40MV |
| | B50 | XP-B50 | A | Ameriflex[1] | |
| | 2B50 | XP-2B50 | D | Duramax[1] | |
| | | | N | Nitrile | |
| | | | S | Silicone | |
| | | | V | Viton | |

[1]*Not available on 2B50.*

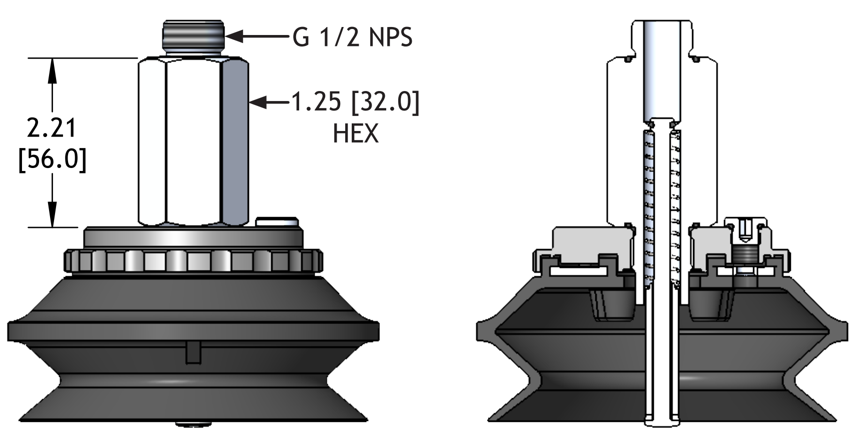



### MV-B110: Mechanical Valve for XP-B110

To order full assembly with vacuum cup:

| | Cup Material | | |
|---|---|---|---|
| XP-B110 | N | | -12F-MV |
| | N | Nitrile | |
| | S | Silicone | |
| | V | Viton | |

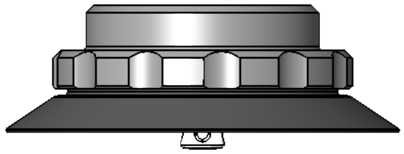


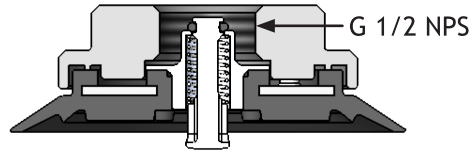
## Mechanical Valves

**MV-F75: Mechanical Valve for XP-F75**

To order full assembly with vacuum cup:

| | Cup Material | |
|---|---|---|
| XP-F75 | N | -12F-MV |
| | N — Nitrile | |
| | S — Silicone | |
| | V — Viton | |

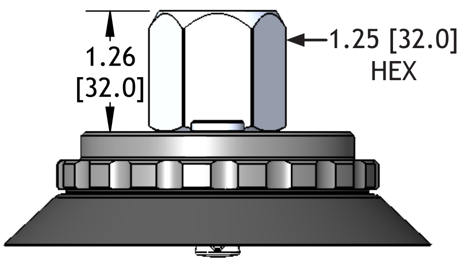


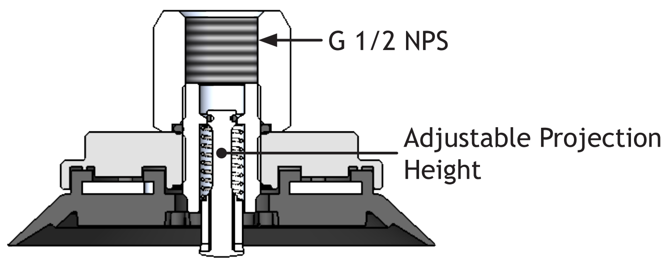


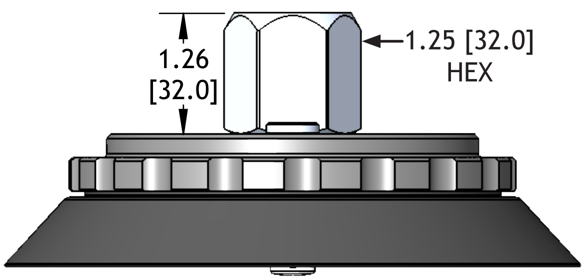

**MV-F110 & MV-F150: Mechanical Valve for XP-F110 & XP-F150**

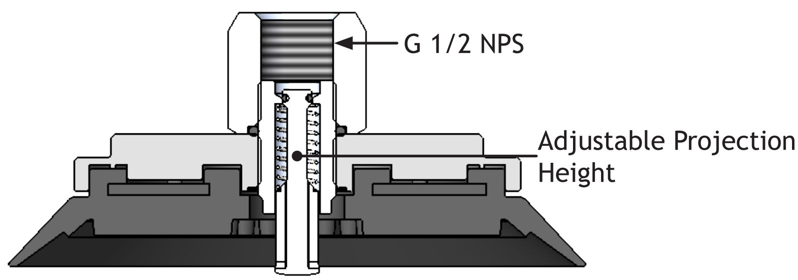
To order full assembly with vacuum cup:

| | Cup Size | Cup Material | |
|---|---|---|---|
| XP- | F110 | N | -12F-MV |
| | F110 — XP-F110 | N — Nitrile | |
| | F150 — XP-F150 | S — Silicone | |
| | | V — Viton | |



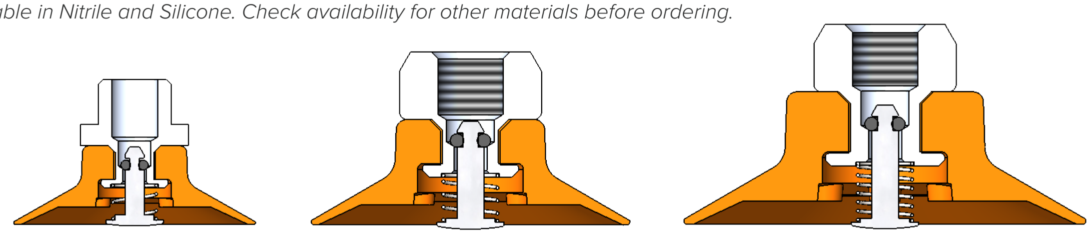




## Low-Profile Cone Valve w/ Vacuum Cups

| | Cup Size | Cup Material[1] | | Cup Fitting | |
|---|---|---|---|---|---|
| XP-F | 50 | A | - | 18M | -CV |
| | 30 — Ø 30 mm | A — Ameriflex | | 18M — G 1/8 NPSF Male, 30 mm Cup Only | |
| | 40 — Ø 40 mm | D — Duramax | | 18F — G 1/8 NPSF Female, 40 & 50 mm Cup Only | |
| | 50 — Ø 50 mm | N — Nitrile | | | |
| | | S — Silicone | | | |
| | | V — Viton | | | |

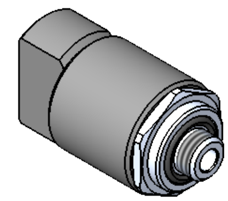
*[1]All cups are available in Nitrile and Silicone. Check availability for other materials before ordering.*



# Release Check Valves

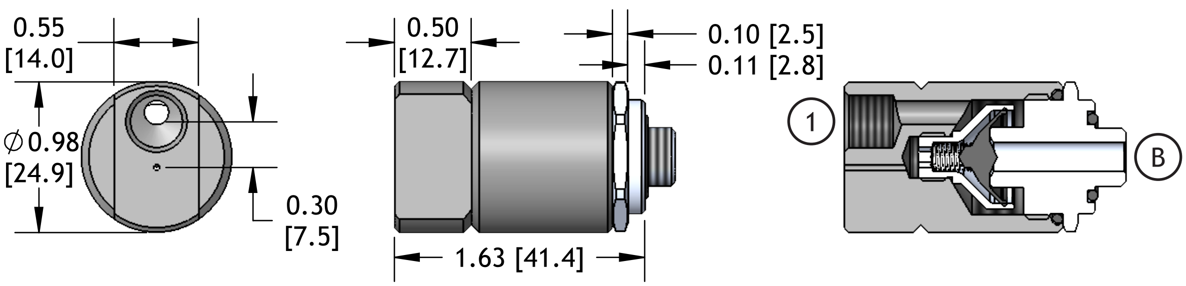
## RC18: Release Check Valve

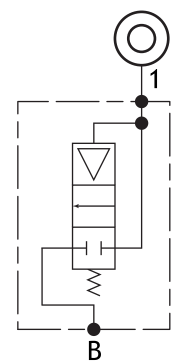
The RC18A release check valve employs a normally closed valve to seal against pump vacuum without leaking. When a compressed air supply is applied, the release valve shifts to open at only 5 psi (0.3 bar) so that a full-flow burst of air can quickly dissipate (blow-off) system vacuum (minimum 5 psi air supply required). Once shifted, the valve doesn't try to close, but remains open. Once the compressed air source is removed, the valve automatically resets to a closed position. The RC18A should be used for high-flow vacuum release applications such as those involving vacuum reservoirs or larger, single-stage or multi-stage vacuum pumps.



*50 psi Max Air Pressure*
*Weight: lbs [g]*
*0.11 [48.5]*

Competitive products are simply check valves with a 30-40 psi (2-3 bar) cracking pressure. The high cracking pressure is necessary to insure a tight seal against vacuum developed by the pump. When a compressed air supply is applied to open the valve for blow-off, the internal spring immediately tries to close the valve as soon as flow begins. This has the effect of subtracting the valve cracking pressure from the blow-off air pressure. Because of this, these systems normally have to operate at above 50 psi (3.5 bar), which wastes compressed air.

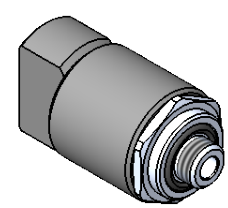


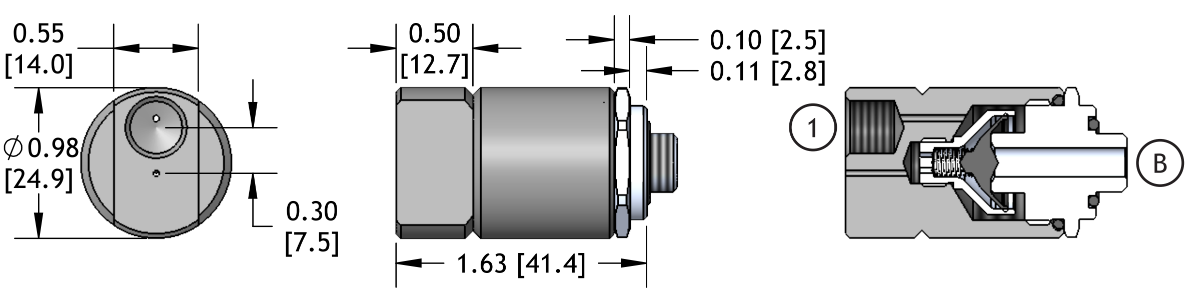

| Code | Function | Ports |
|---|---|---|
| B | Blow-Off | G 1/8 NPSF |
| 1 | Blow-Off Air Pulse | G 1/8 NPSF |

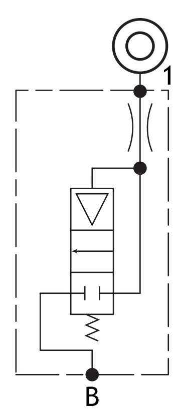
## RC18-040A: Release Check Valve w/ Balancing Orifice

The RC18-040A operates the same as the RC18A but includes a 0.040 in (1 mm) balancing orifice to meter the air-flow when multiple release check valves are supplied air from the same blow-off control valves. Without the balancing orifice in each release check valve, the air would follow the path of least resistance. This would starve some release check valves of air while others would have a flow many times greater than necessary.



*50 psi Max Air Pressure*
*Weight: lbs [g]*
*0.11 [48.5]*




| Code | Function | Ports |
|---|---|---|
| B | Blow-Off | G 1/8 NPSF |
| 1 | Blow-Off Air Pulse | G 1/8 NPSF |

## Vacuum Check Valves

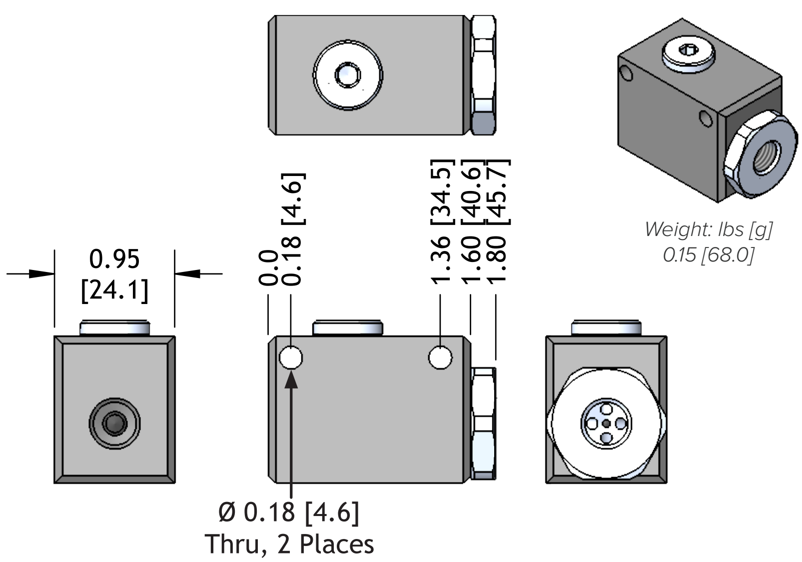
The Vacuum Check valve is designed to prevent the reverse flow of ambient air into a vacuum system. Vacuum Check valves are used to hold vacuum downstream whenever the vacuum source is removed or lost. Internally, a normally closed valve allows vacuum flow in the pump direction but seals off when vacuum flow ceases. When a Vacuum Check valve is used in a system, some provision must be made to release the trapped vacuum in order to release the work piece. The RC18 and RC18-040 Release Check valves are designed for this purpose.

One application for the Vacuum Check valve is for energy saver circuits using a vacuum storage tank to accumulate and store vacuum for high-volume, short duration flow rate requirements.

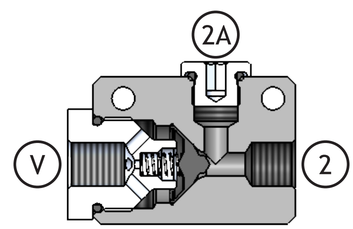
More commonly, a Vacuum Check valve with Release Check valve would be used with a single suction cup so a non-porous, high-value work piece would not be immediately dropped if the system vacuum source is lost. The vacuum trapped by the Vacuum Check valve will eventually leak down. The rate at which the vacuum diminishes will depend on the condition of all the components in the vacuum system. To increase the time delay interval, a volume chamber can be added to the auxiliary port. If the volume chamber is equal to twice the cup internal volume, the time delay interval will be approximately tripled, and so forth.

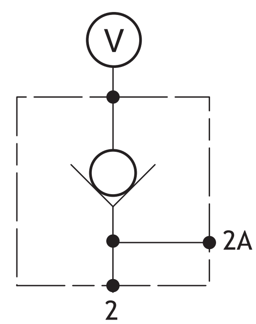
The VC18 should be used with cup diameters of 50 MM and smaller. The VC12 should be used with cup diameters of 75 MM and larger that are available with G1/2 NPS female fittings.

### VC18: Vacuum Check Valve, G 1/8 NPSF



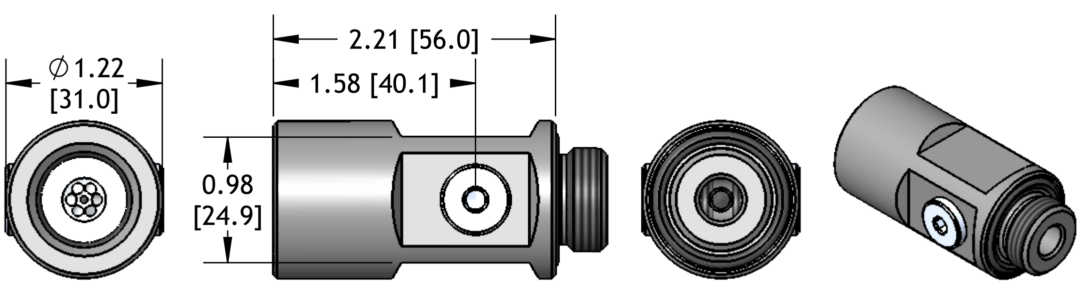

*Weight: lbs [g]*
*0.15 [68.0]*



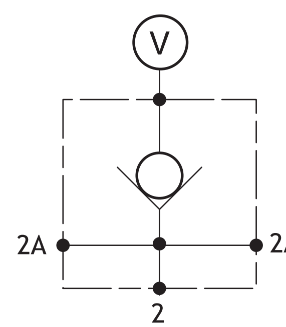



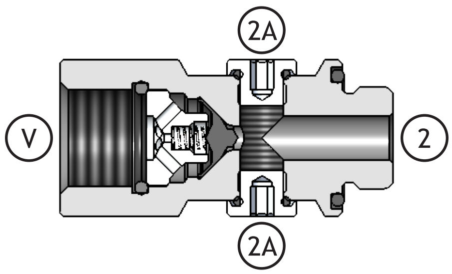

| Code | Function | Ports |
|---|---|---|
| V | Vacuum Source | G 1/8 NPSF |
| 2 | Vacuum | G 1/8 NPSF |
| 2A | Alternate Vacuum | G 1/8 NPSF |

### VC12: Vacuum Check Valve, G 1/2 NPSF




*Weight: lbs [g]*
*0.19 [86.0]*




| Code | Function | Ports |
|---|---|---|
| V | Vacuum Source | G 1/2 NPSF |
| 2 | Vacuum | G 1/2 NPSF |
| 2A | Alternate Vacuum | G 1/8 NPSF |

# Vacuum Check Valves

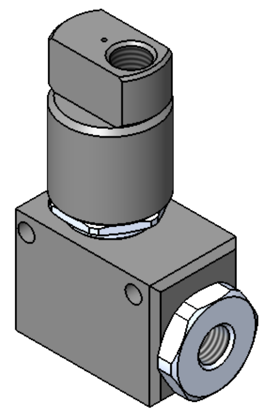
### VC18-RCA: Vacuum Check Valve w/ Release Check Valve, G 1/8 NPSF

The vacuum check valve with release check valve is used with a single vacuum cup so a non-porous, high value work piece won't be immediately dropped if the system vacuum source is lost. The vacuum trapped by the vacuum check valve will eventually leak down. The rate at which the vacuum diminishes will depend on the condition of all of the components in the vacuum system.

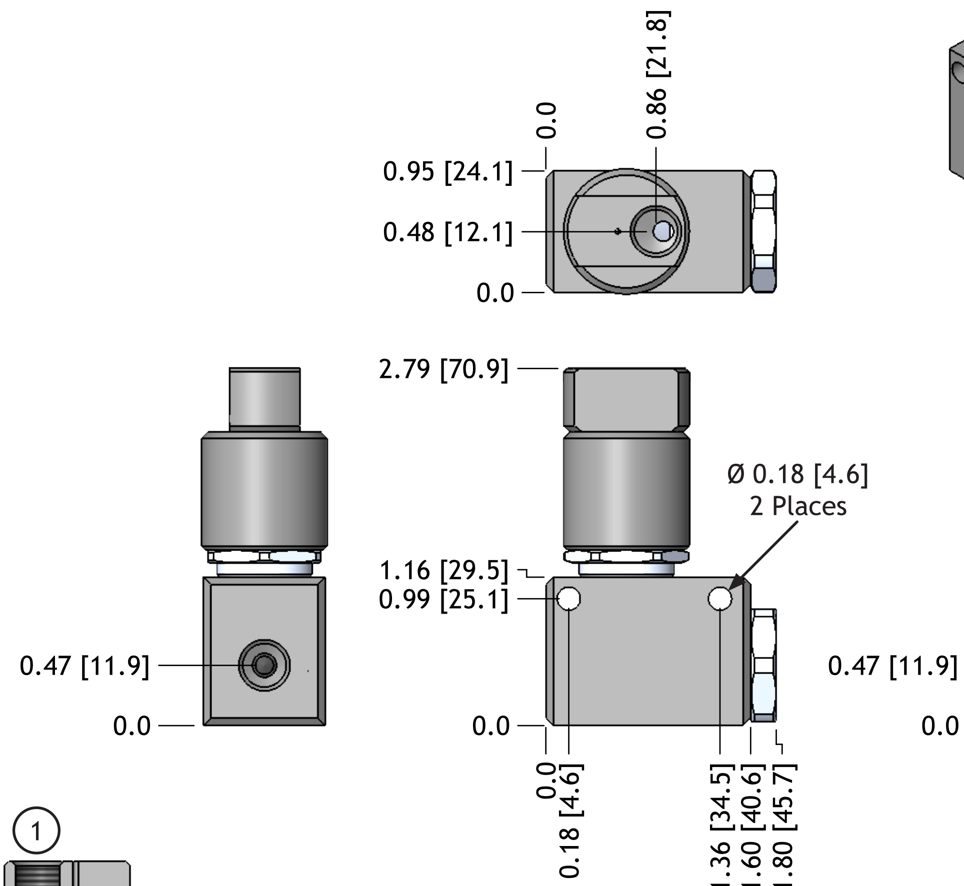
To increase the time delay interval, a volume chamber can be added to the auxiliary port. If the volume of the chamber is twice that of the internal cup volume, the time delay interval will be approximately tripled and so forth.

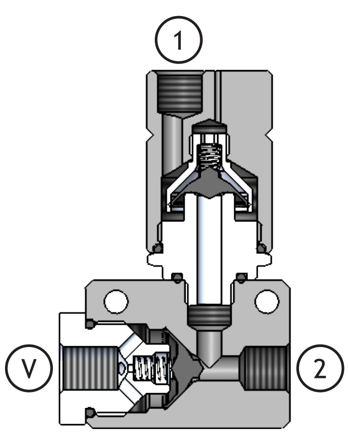
See previous pages about release check valves for more information.

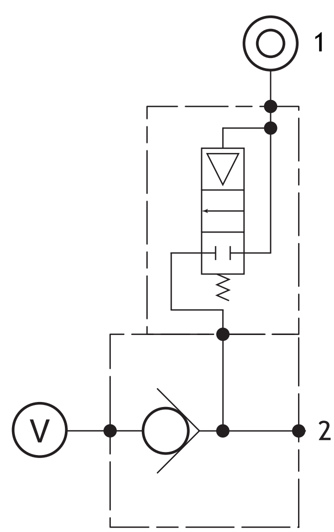
| | Release Check Valve | |
|---|---|---|
| VC18- | RCA | |
| | RCA | RC18A |
| | RC040A | RC18-040A |



*Weight: lbs [g]*
*0.28 [126.0]*



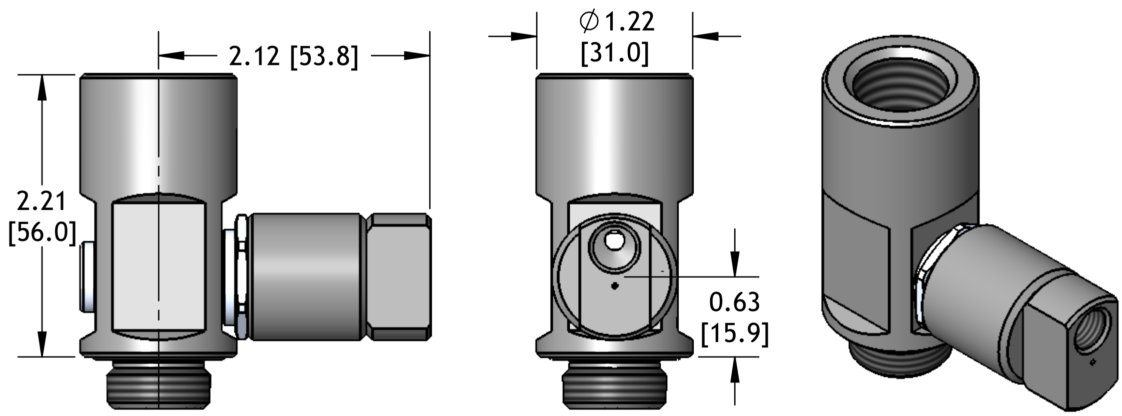



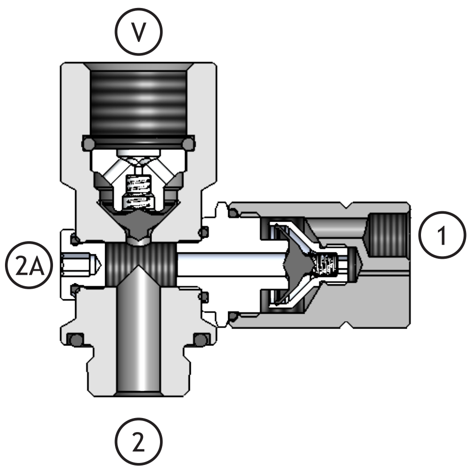

| Code | Function | Ports |
|---|---|---|
| 1 | Blow-Off Air Pulse | G 1/8 NPSF |
| V | Vacuum Source | G 1/8 NPSF |
| 2 | Vacuum | G 1/8 NPSF |

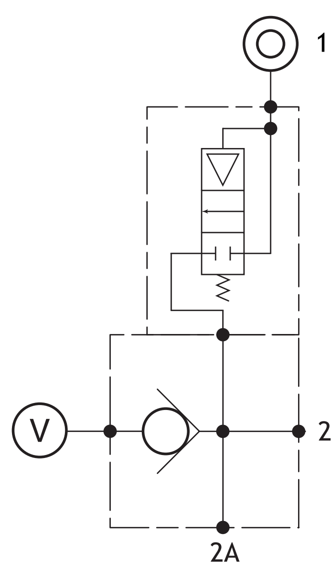
# Vacuum Check Valves

**VC12-RCA: Vacuum Check Valve w/ Release Check Valve, G 1/2 NPSF**

| | Release Check Valve | |
|---|---|---|
| VC12- | RCA | |
| | RCA | RC18A |
| | RC040A | RC18-040A |



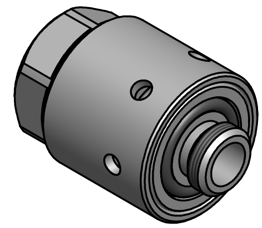




| Code | Function | Ports |
|---|---|---|
| V | Vacuum Source | G 1/2 NPSF |
| 1 | Blow-Off Air Pulse | G 1/8 NPSF |
| 2 | Vacuum | G 1/2 NPSF |
| 2A | Alternate Vacuum | G 1/8 NPSF |

# Atmospheric Quick Release

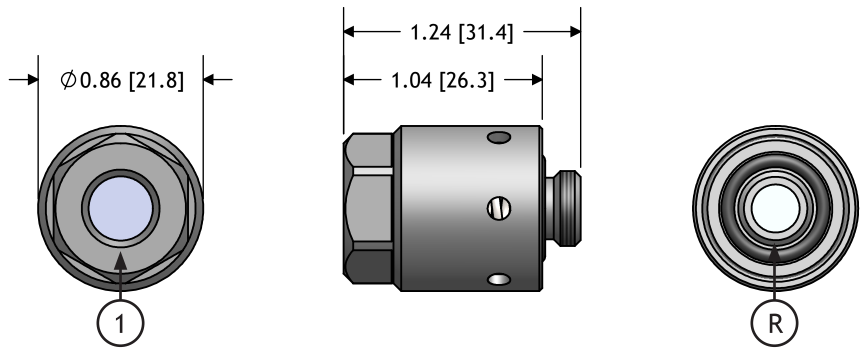
### AQR-18M

Vacuum generators, or vacuum pumps, are powered by compressed air to create vacuum. When the air source is turned off, vacuum is dissipated by atmospheric air entering the exhaust port and reverse flowing through the last venturi nozzle. This works well for slow cycle speeds and small cups but when relatively large cups are used with small vacuum generators then reverse air flow may not be sufficient to dissipate residual vacuum fast enough.

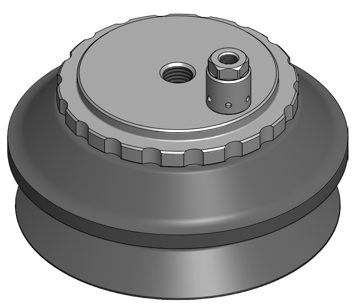


*Weight: 0.64 oz [18.1 g]*

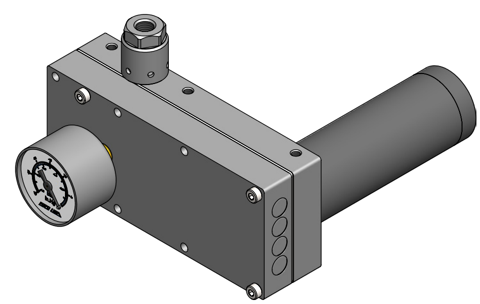
The AQR valve is spring-biased open but is held closed by air pressure supplied to the vacuum generator. When the air supply is turned off, vacuum is no longer generated and the AQR valve opens a large passage to atmosphere so that vacuum is quickly dissipated to release the work object.




**Examples**

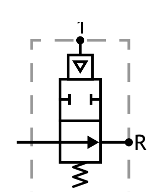


*AQR-18M + XP-B110N-12F*



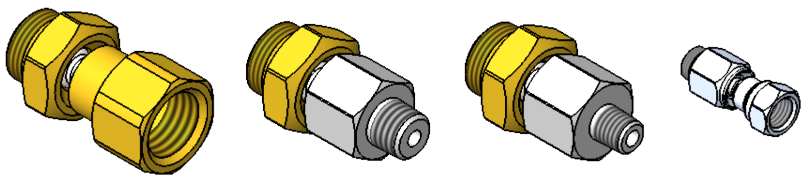
*AQR-18M + ML100N*

| Code | Function | Ports |
|---|---|---|
| 1 | Air Supply (Common w/ Pump) | G 1/8 NPSF |
| R | Release (Connect to Vacuum) | G 1/8 |

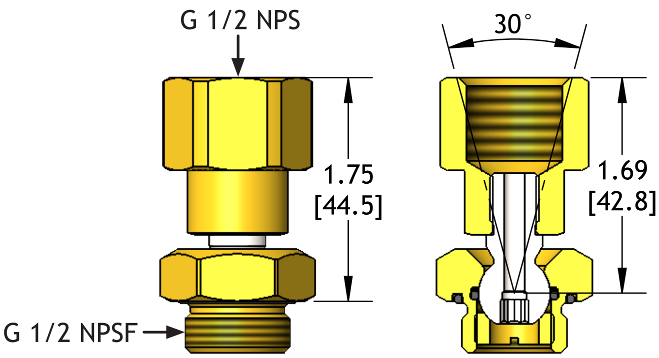


## Swivel Joints

Swivel joints are recommended for applications where a vacuum cup is used to lift rounded or rotating products. Our swivel joints use a brass body, stainless steel shaft, and Nitrile seals. We offer a range of sizes and connections while each swivel joint operates in the same way. A coaxial connection between the vacuum source and vacuum cup are given 30 degrees of total movement while also being free to rotate on its axis.

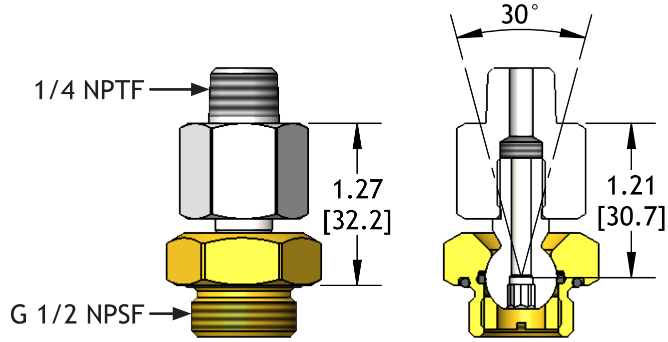


**SJ12**



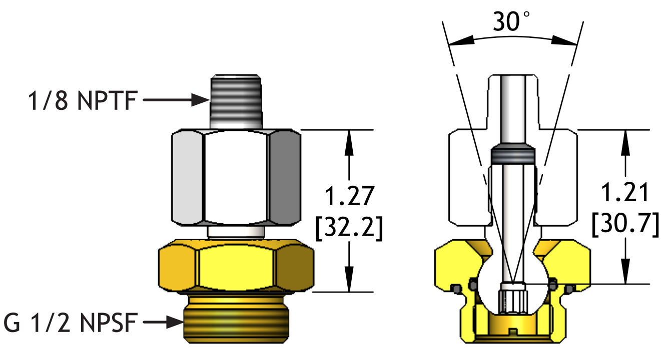

*Weight: 0.34 lbs [5.4 g]*

**SJ12-14M**



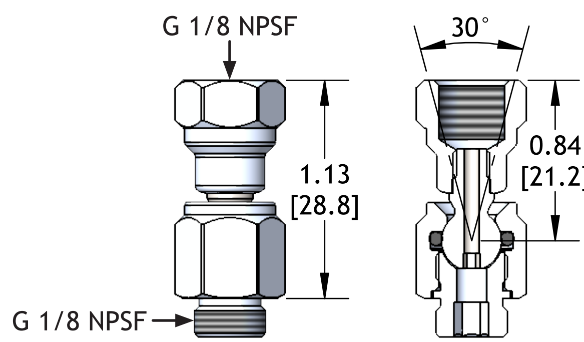

*Weight: 0.31 lbs [5.0 g]*

**SJ12-18M**




*Weight: 0.30 lbs [4.8 g]*

**SJ18**



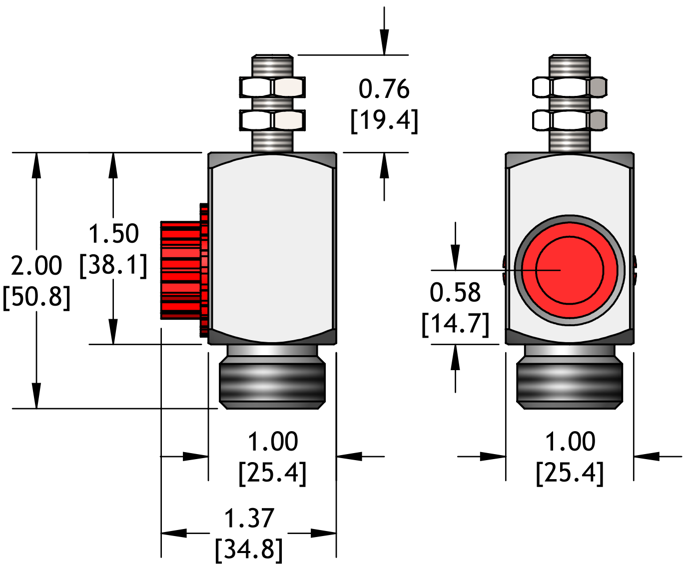

*Weight: 0.02 lbs [0.3 g]*

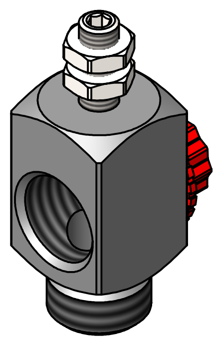
## Tee Adapters

Tee adapters can be used in a similar way as side vacuum port vacuum cup fittings. The provided plug allows the tee adapter to be used as an angle adapter. Tee adapters can also be used to daisy chain vacuum tubing from one cup to the next. By simply removing the plug, tubing can be daisy chained from a vacuum source to several vacuum cups.

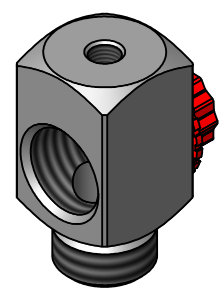
### TA12: Tee Adapter, G 1/2 NPS

| | | Connection Type |
|---|---|---|
| TA12- | | 8M |
| | 8F | M8x1.25 Female |
| | 8M | M8x1.25 Male Post |



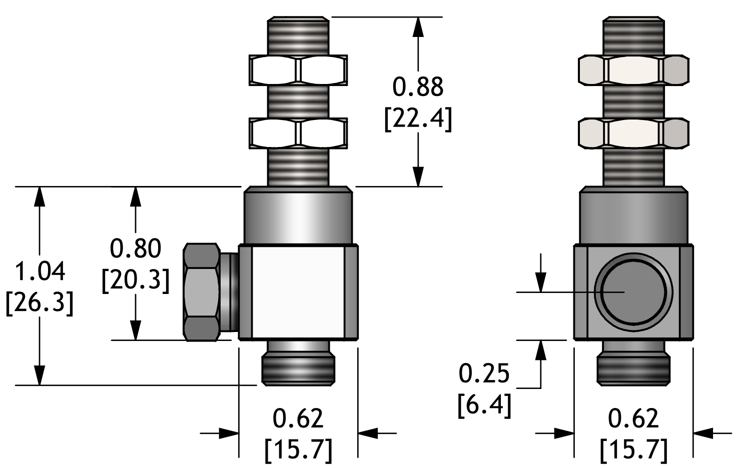
**TA12-8M**
*Weight: 2.51 oz [71.0 g]*

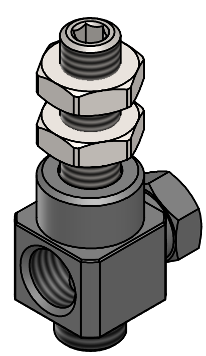


**TA12-8F**
*Weight: 1.89 oz [53.6 g]*

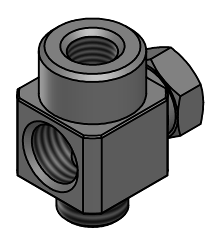
### TA18: Tee Adapter, G 1/8 NPSF

| | | Connection Type |
|---|---|---|
| TA18- | | 8M |
| | 8F | M8x1.25 Female |
| | 8M | M8x1.25 Male Post |



**TA18-8M**
*Weight: 0.99 oz [28.1 g]*



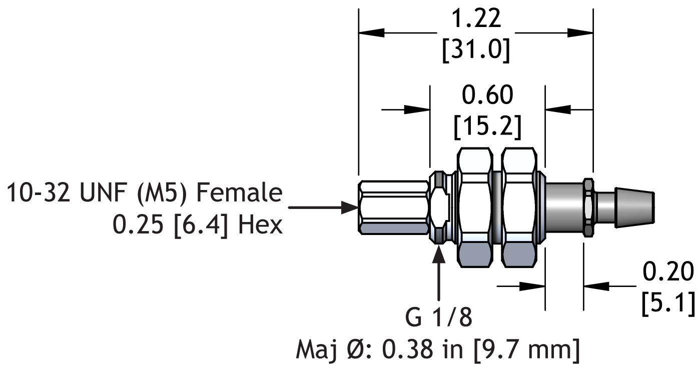
**TA18-8F**
*Weight: 0.38 oz [10.7 g]*

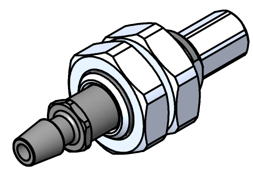
## Level Compensators

Level compensators are primarily used to compensate for height differences on a work-piece surface. Installation should be done in a manner that allows all of the level compensators to be fully extended while supported the load. For special applications, such as sheet feeding, level compensators can be staggered so lifting begin at the edge or corner to assist in sheet separation.

Level compensators also serve as shock absorbers to prevent damage to work-pieces and allow greater positioning latitude for robotic applications. Extensive use of aluminum reduces the weight of EDCO USA level compensators by as much as 60%.

## LC10: Level Compensator, 10-32 UNF (M5) w/ Ø 10-15 mm Vacuum Cup Mount



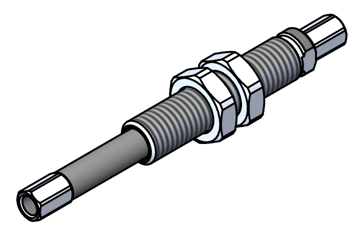



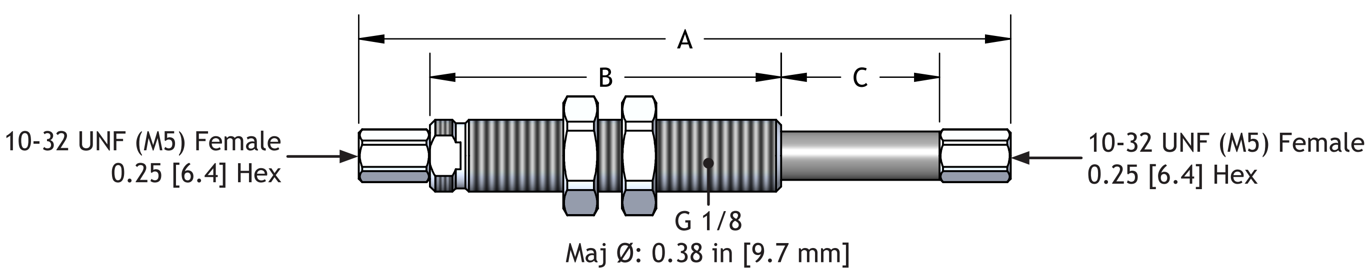
*Weight: 0.23 oz [6.4 g]*

## LC10: Level Compensator, 10-32 UNF (M5)

| | Stroke Length | | Options[1] | |
|---|---|---|---|---|
| LC10 | X20 | | | |
| | (Blank) | 8 mm | (Blank) | Standard |
| | X20 | 20 mm | -NR | Non-Rotating |
| | X30 | 30 mm | | |
| | X50 | 50 mm | | |

*[1]Non-Rotating option only available for 8 mm and 50 mm stroke length.*



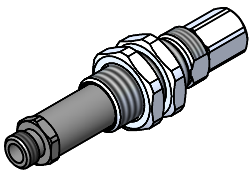


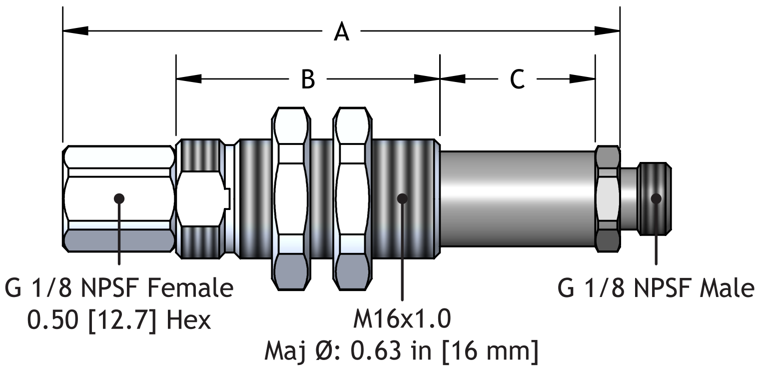

| Part Number | A in [mm] | B in [mm] | C in [mm] | Weight oz [g] |
|---|---|---|---|---|
| LC10 | 1.70 [43.2] | 0.76 [19.3] | 0.30 [7.6] | 0.25 [7.2] |
| LC10-NR | 1.95 [49.5] | 0.91 [23.1] | 0.30 [7.6] | 0.28 [7.9] |
| LC10X20 | 3.40 [86.4] | 1.83 [46.5] | 0.83 [21.0] | 0.44 [12.5] |
| LC10X30 | 4.17 [106.0] | 2.23 [56.6] | 1.20 [30.5] | 0.51 [14.6] |

# LC18: Level Compensator, G 1/8 NPSF

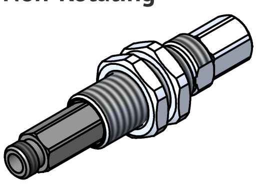
| | Stroke Length | | Options | | Side-Port Option | |
|---|---|---|---|---|---|---|
| LC18 | X35 | | | | | |
| | (Blank) | 20 mm | (Blank) | Standard | (Blank) | None |
| | X35 | 35 mm | -NR | Non-Rotating | -SP | Side-Port |
| | X50 | 50 mm | -20 | 20 mm Clamp Mount | | |

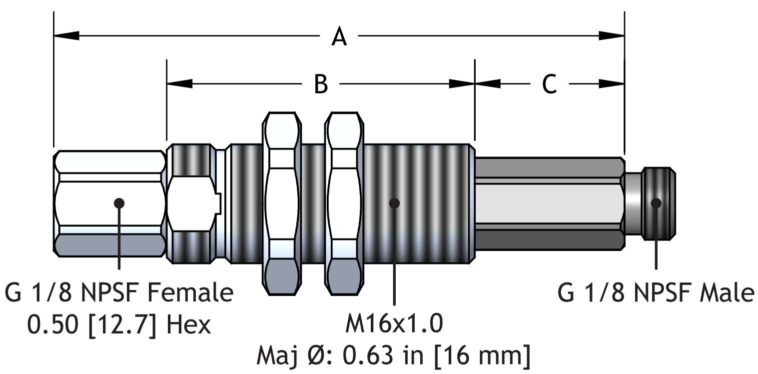
## Standard



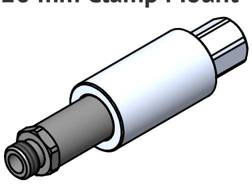


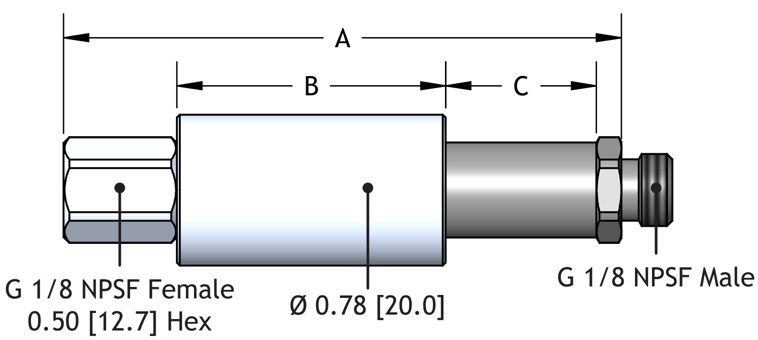

## Non-Rotating






## 20 mm Clamp Mount





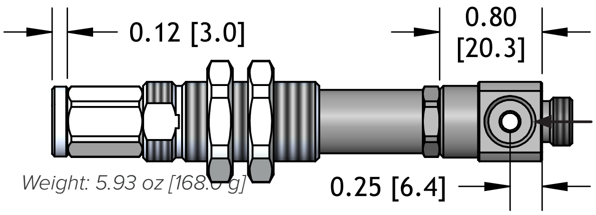

| Part Number | A in [mm] | B in [mm] | C in [mm] | Weight oz [g] |
|---|---|---|---|---|
| LC18 | 2.89 [73.4] | 1.38 [35.1] | 0.79 [20.1] | 1.06 [30.1] |
| LC18-NR | 2.98 [75.6] | 1.61 [40.8] | 0.78 [19.8] | 1.06 [30.1] |
| LC18-20 | 2.89 [73.4] | 1.38 [35.1] | 0.79 [20.1] | 1.15 [32.6] |
| LC18X35 | 4.47 [114.0] | 2.33 [59.2] | 1.40 [35.6] | 1.49 [42.2] |
| LC18X35-NR | 4.54 [115.2] | 2.56 [64.9] | 1.39 [35.3] | 1.46 [41.5] |
| LC18X35-20 | 4.47 [114.0] | 2.33 [59.2] | 1.40 [35.6] | 1.94 [55.1] |
| LC18X50 | 5.75 [146.0] | 2.97 [75.4] | 2.00 [50.8] | 1.83 [52.0] |
| LC18X50-NR | 5.84 [148.3] | 3.21 [81.5] | 2.04 [51.8] | 1.78 [50.5] |
| LC18X50-20 | 5.75 [146.0] | 2.97 [75.4] | 2.00 [50.8] | 2.48 [70.1] |

## LC18: Level Compensator, G 1/8 NPSF

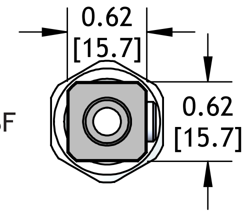
**-SP: Side-Port Option**

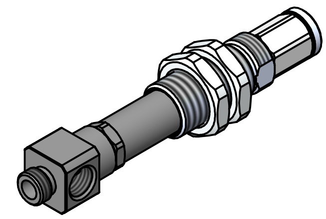
The side-port option for the LC18 family of level compensators is perfect when you need a side port for your vacuum supply rather than the standard in-line. A P18 is inserted into the vacuum port and an adapter is installed on the cup end of the level compensator. Both the side port and cup end connection threads are G 1/8 NPSF. An M5 port has been added opposite of the vacuum supply connection for monitoring purposes.

For full dimensions, simply add the provided specifications to the base specifications for the level compensator selected.

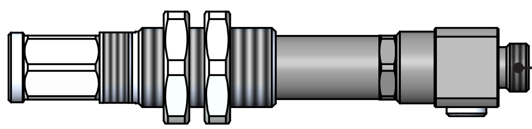


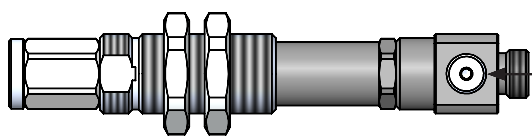

*Weight: 5.93 oz [168.0 g]*



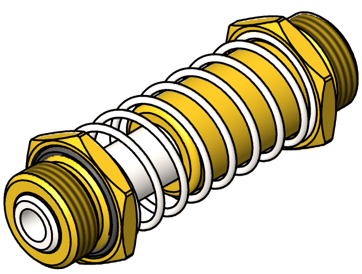



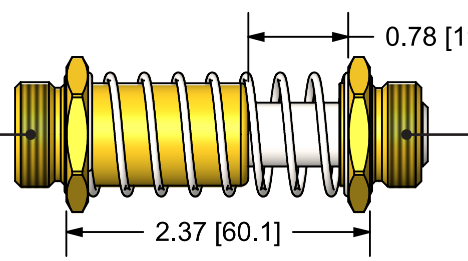
*Additional Weight: 0.38 oz [10.9 g]*




## LC12: Level Compensator, G 1/2 NPSF





## Heavy-Duty Level Compensators

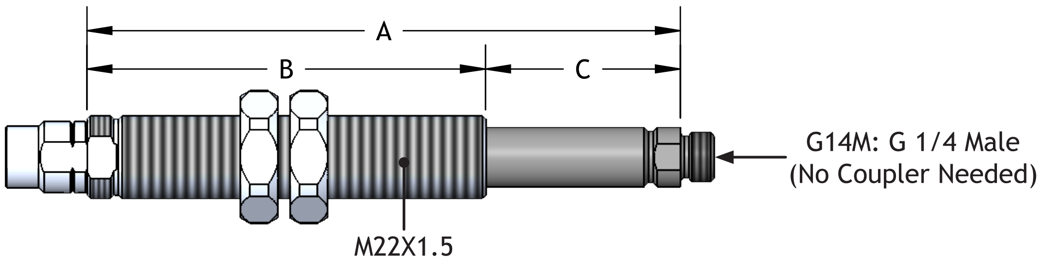
Heavy-Duty Level Compensators have the strength necessary for loads associated with larger vacuum cup diameters. Widely spaced shaft bearings all mounting in either vertical or horizontal shaft orientations.It? Alarissum di sederfeciem

| | Inlet Thread | Stroke Length | | Cup End Thread |
|---|---|---|---|---|
| LC | 14F | X25 | - | 38M |

| Inlet Thread | |
|---|---|
| 14F | 1/4 NPSF Female |
| 38M | 3/8 NPTF Male |
| 12M | 1/2 NPTF Male |
| G14F | G 1/4 Female |
| G38M | G 3/8 Male |
| G12M | G 1/2 Male |

| Stroke Length | |
|---|---|
| X25 | 25 mm |
| X50 | 50 mm |

| Cup End Thread | |
|---|---|
| 14F | 1/4 NPSF Female |
| 38M | 3/8 NPTF Male |
| 12M | 1/2 NPTF Male |
| G14F | G 1/4 Female |
| G14M | G 1/4 Male |
| G38M | G 3/8 Male |
| G12M | G 1/2 Male |

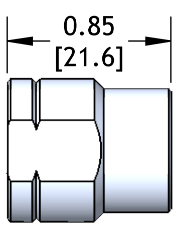



| Stroke | A in [mm] | B in [mm] | C in [mm] | Weight oz [g] |
|---|---|---|---|---|
| 25 mm | 3.43 [87.1] | 2.40 [61.0] | 1.03 [25.0] | 3.35 [94.9] |
| 50 mm | 6.18 [157] | 4.15 [105.0] | 2.03 [51.6] | 5.13 [145.5] |

*Base weight calculated without couplers.*

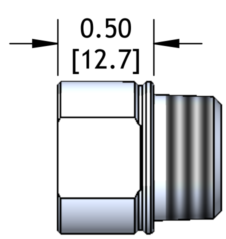
### Couplers

*After picking an inlet and cup end thread, see the below couplers for additional dimensions.*



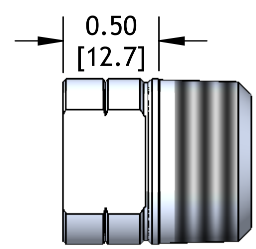

**-14F**

| Threads: | 1/4 NPT Female |
|---|---|
| Weight: oz [g] | 0.27 [7.8] |



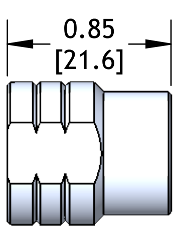

**-38M**

| Threads: | 3/8 NPTF Male |
|---|---|
| Weight: oz [g] | 0.30 [8.6] |



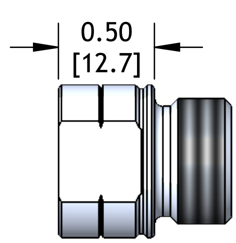

**-12M**

| Threads: | 1/2 NPTF Male |
|---|---|
| Weight: oz [g] | 0.54 [15.3] |



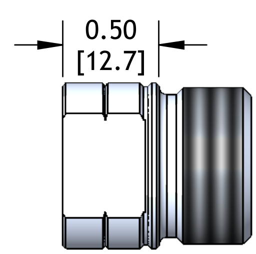

**-G14F**

| Threads: | G 1/4 Female |
|---|---|
| Weight: oz [g] | 0.26 [7.5] |




**-G38M**

| Threads: | G 3/8 Male |
|---|---|
| Weight: oz [g] | 0.31 [8.7] |




**-G12M**

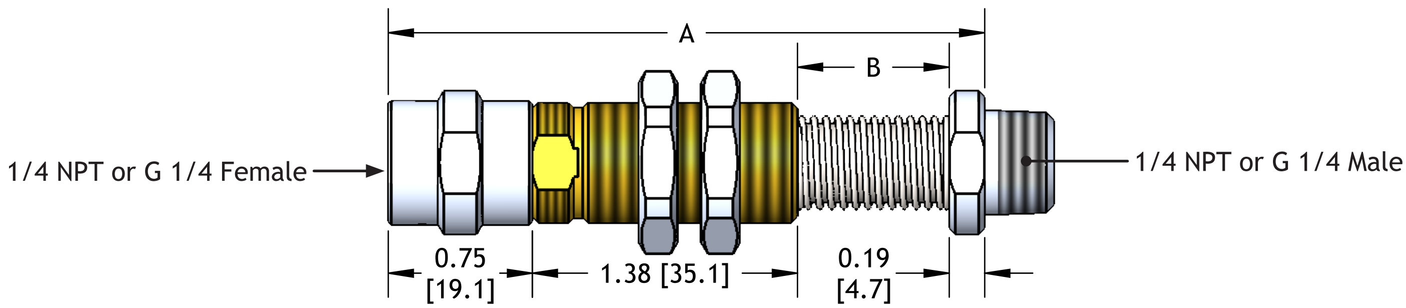
| Threads: | G 1/2 Male |
|---|---|
| Weight: oz [g] | 0.51 [14.4] |

# External Spring Level Compensators

LCE level compensators are only suitable for vertical mount applications where low cost is the primary concern. The short bearing length dictates a vertical shaft mounting orientation and care should be taken to avoid shear loads which will cause premature shaft and bearing wear.

### LCE w/ Male Connection

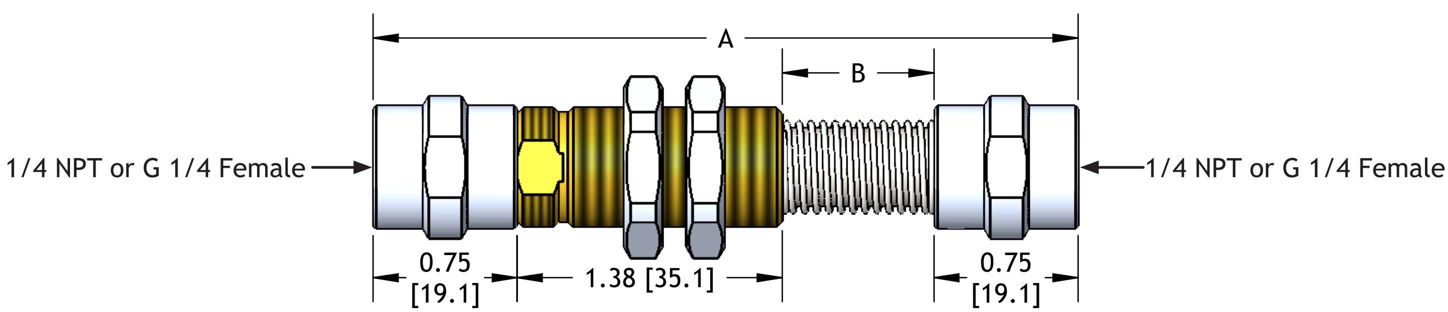
| | Sleeve Threads | | | Stroke Length | | Connection Threads | |
|---|---|---|---|---|---|---|---|
| LCE | | F | 14X | | 10 | | |
| | F | Fine - M16X1.0 | | 10 | 10 mm | (Blank) | NPT Threads |
| | C | Coarse - M16X1.5 | | 30 | 30 mm | -G | G Threads |
| | | | | 50 | 50 mm | | |
| | | | | 70 | 70 mm | | |




| Sleeve Threads | | A | B | Weight |
|---|---|---|---|---|
| Fine - M16X1.0 | Coarse - M16X1.5 | in [mm] | in [mm] | oz [g] |
| LCEF14X10 | LCEC14X10 | 3.11 [79.0] | 0.39 [10.0] | 2.83 [80.2] |
| LCEF14X30 | LCEC14X30 | 4.69 [119.0] | 1.18 [30.0] | 3.66 [103.8] |
| LCEF14X50 | LCEC14X50 | 6.26 [159.0] | 1.97 [50.0] | 4.50 [127.7] |
| LCEF14X70 | LCEC14X70 | 7.85 [199.0] | 2.76 [70.0] | 5.40 [153.1] |

### LCE w/ Female Connection

| | Sleeve Threads | | | Stroke Length | | | Conection Threads | |
|---|---|---|---|---|---|---|---|---|
| LCE | | F | 14X | | 10 | -14F | | |
| | F | Fine - M16X1.0 | | 10 | 10 mm | | (Blank) | NPT Threads |
| | C | Coarse - M16X1.5 | | 30 | 30 mm | | -G | G Threads |
| | | | | 50 | 50 mm | | | |
| | | | | 70 | 70 mm | | | |




| Sleeve Threads | | A | B | Weight |
|---|---|---|---|---|
| Fine - M16X1.0 | Coarse - M16X1.5 | in [mm] | in [mm] | oz [g] |
| LCEF14X10-14F | LCEC14X10-14F | 3.67 [93.2] | 0.39 [10.0] | 2.92 [82.7] |
| LCEF14X30-14F | LCEC14X30-14F | 5.25 [133.0] | 1.18 [30.0] | 3.75 [106.2] |
| LCEF14X50-14F | LCEC14X50-14F | 6.82 [173.0] | 1.97 [50.0] | 4.59 [130.2] |
| LCEF14X70-14F | LCEC14X70-14F | 8.41 [214.0] | 2.76 [70.0] | 5.49 [155.5] |

# External Spring Level Compensators

## LCE w/ Integral Cup Fitting

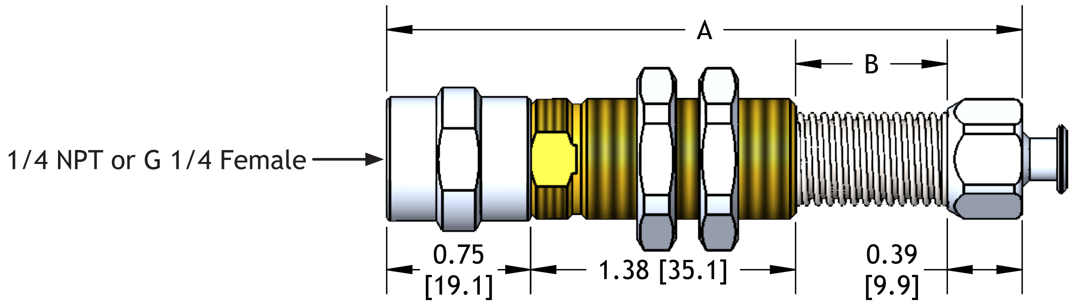
| | Sleeve Threads | 14X | Stroke Length | - | Cup Size | Connection Threads |
|---|---|---|---|---|---|---|
| LCE | F | 14X | 10 | - | 32 | |

| Sleeve Threads | |
|---|---|
| F | Fine - M16X1.0 |
| C | Coarse - M16X1.5 |

| Stroke Length | |
|---|---|
| 10 | 10 mm |
| 30 | 30 mm |
| 50 | 50 mm |
| 70 | 70 mm |

| Cup Size | |
|---|---|
| 32 | Ø 20-30 mm |
| 40 | Ø 40 mm |
| 50 | Ø 50 mm |

| Connection Threads | |
|---|---|
| (Blank) | NPT Threads |
| -G | G Threads |




| Part Number | | A in [mm] | B in [mm] | Weight oz [g] |
|---|---|---|---|---|
| Fine - M16X1.0 | Coarse - M16X1.5 | | | |
| LCEF14X10-___ | LCEC14X10-___ | 3.31 [84.1] | 0.39 [10.0] | 2.79 [79.2] |
| LCEF14X30-___ | LCEC14X30-___ | 4.89 [124.0] | 1.18 [30.0] | 3.62 [102.7] |
| LCEF14X50-___ | LCEC14X50-___ | 6.46 [164.0] | 1.97 [50.0] | 4.47 [126.6] |
| LCEF14X70-___ | LCEC14X70-___ | 8.05 [204.0] | 2.76 [70.0] | 5.36 [152.0] |

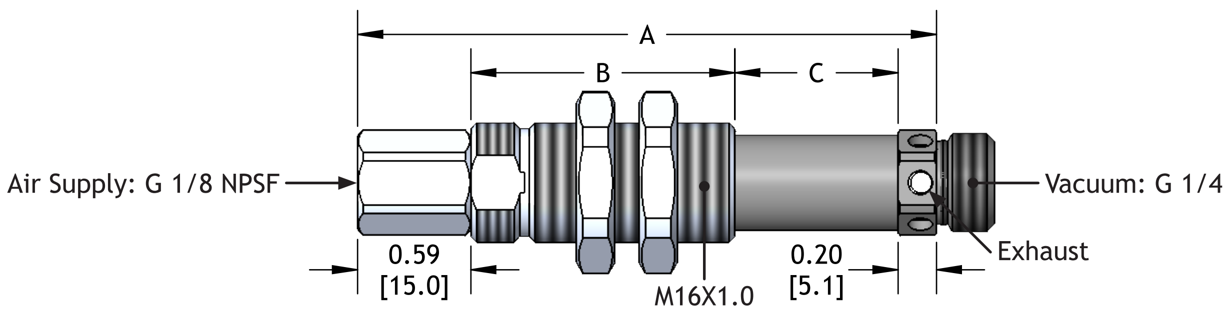
*Weights and dimensions calculated using -32 cup fitting.*

## LCP: Level Compensators w/ Integral Pump

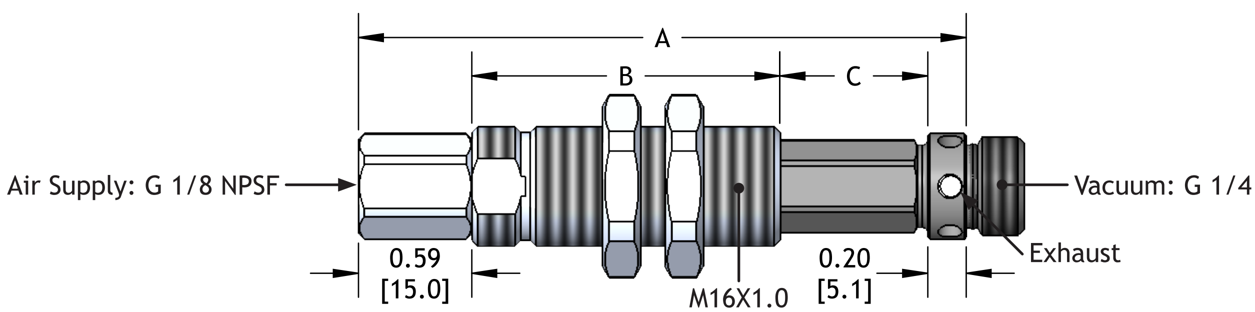
A vacuum pump integrated within a level compensator provides a simple point-of-use system that is easier to apply than two components separately. While the level compensator provides compliance, vacuum is generated directly at the vacuum cup, improving response time for both attaching to and detaching from a work-piece.

| | Venturi Series | | | Stroke Length | | Non-Rotating Option | |
|---|---|---|---|---|---|---|---|
| LCP- | 10L | | -14X | 20 | | | |
| | 07 | ER07 | | 20 | 20 mm | (Blank) | Standard (Rotating) |
| | 09 | ER09 | | 35 | 35 mm | NR | Non-Rotating |
| | 10 | ER10 | | 50 | 50 mm | | |
| | 10L | ER10L | | | | | |

**Standard**



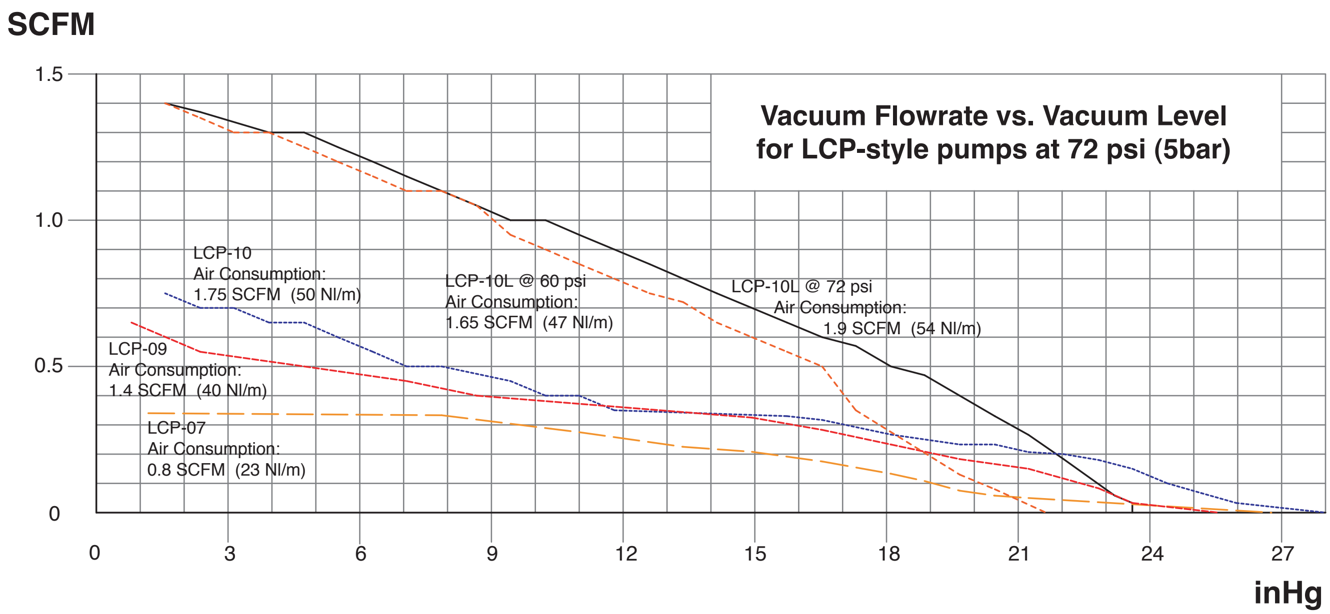

**Non-Rotating**




| Part Number | A in [mm] | B in [mm] | C in [mm] | Weight oz [g] |
|---|---|---|---|---|
| LCP-__-14X20 | 3.02 [76.6] | 1.38 [34.9] | 0.85 [21.6] | 1.12 [31.8] |
| LCP-__-14X35 | 4.31 [109.3] | 2.33 [59.1] | 1.19 [30.2] | 1.51 [42.9] |
| LCP-__-14X50 | 5.57 [141.4] | 2.98 [75.7] | 2.00 [50.7] | 1.85 [52.3] |
| LCP-__-14X20NR | 3.17 [80.4] | 1.61 [40.8] | 0.77 [19.6] | 1.16 [32.8] |
| LCP-__-14X35NR | 4.47 [113.4] | 2.56 [64.9] | 1.32 [33.5] | 1.52 [43.1] |
| LCP-__-14X50NR | 5.73 [ 145.4] | 3.21 [81.5] | 1.93 [48.9] | 1.83 [51.8] |

# LCP: Level Compensators w/ Integral Pump

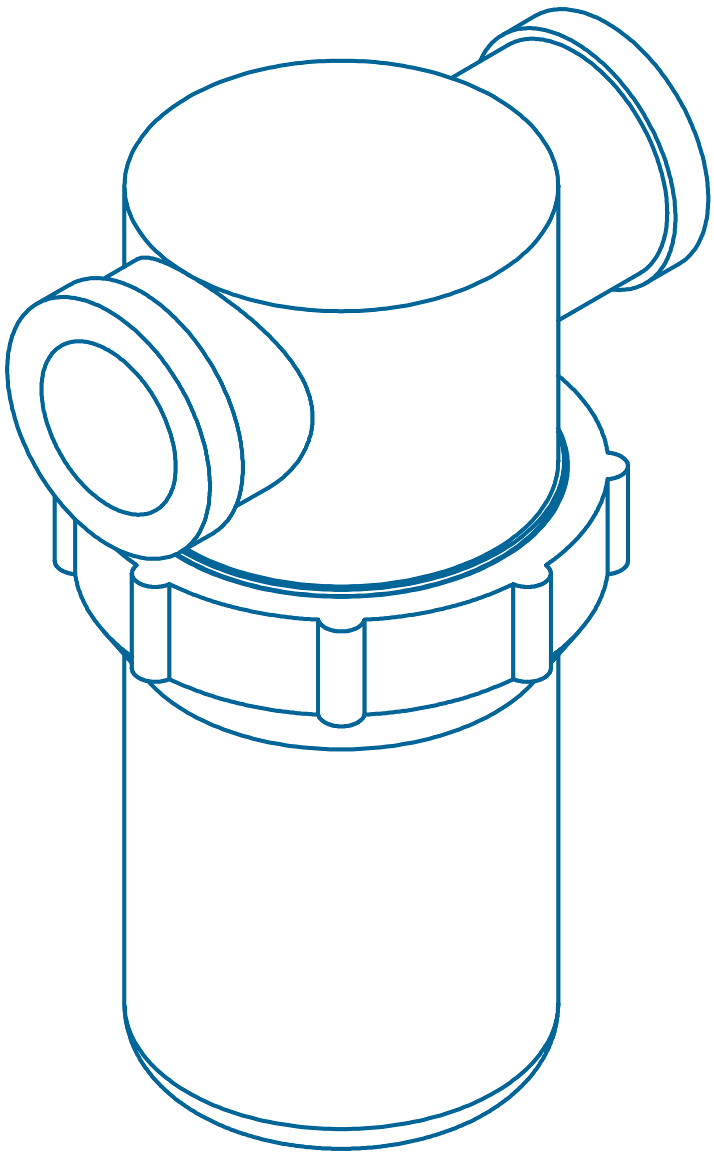
## Performance

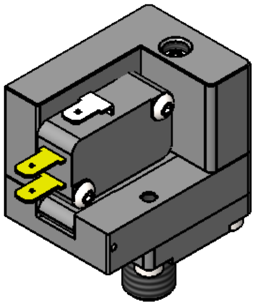



## Level Compensator Spring Data

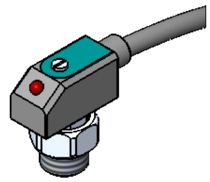
| Level Compensator | Force Exerted (Extended) | Force Exerted (Collapsed) | Spring Force |
|---|---|---|---|
| LC10X50-10 | 0.18 lbs | 0.23 lbs | 1.30 lbs/in |
| LC10 | 0.18 lbs | 0.23 lbs | 1.30 lbs/in |
| LC10X20 | 0.20 lbs | 0.32 lbs | 0.15 lbs/in |
| LC10X30 | 0.20 lbs | 0.38 lbs | 0.15 lbs/in |
| LC10X50 | 0.20 lbs | 0.50 lbs | 0.15 lbs/in |
| LC18 | 0.82 lbs | 2.40 lbs | 2.00 lbs/in |
| LC18X35 | 0.20 lbs | 0.90 lbs | 0.50 lbs/in |
| LC18X50 | 0.20 lbs | 1.20 lbs | 0.50 lbs/in |
| LC12 | 5.22 lbs | 7.65 lbs | 3.47 lbs/in |
| Heavy Duty (25 mm Stroke) | 3.00 lbs | 4.50 lbs | 1.50 lbs/in |
| Heavy Duty (50 mm Stroke) | 3.00 lbs | 4.50 lbs | 0.75 lbs/in |
| Ext Spring (10 mm Stroke) | 1.10 lbs | 1.36 lbs | 0.67 lbs/in |
| Ext Spring (30 mm Stroke) | 1.10 lbs | 1.90 lbs | 0.68 lbs/in |
| Ext Spring (50 mm Stroke) | 1.10 lbs | 2.44 lbs | 0.68 lbs/in |
| Ext Spring (70 mm Stroke) | 1.10 lbs | 2.91 lbs | 0.66 lbs/in |
| LCP (20 mm Stroke) | 0.82 lbs | 2.40 lbs | 2.00 lbs/in |
| LCP (35 mm Stroke) | 0.20 lbs | 0.90 lbs | 0.50 lbs/in |
| LCP (50 mm Stroke) | 0.20 lbs | 1.20 lbs | 0.50 lbs/in |

# System Accessories
## Section 5

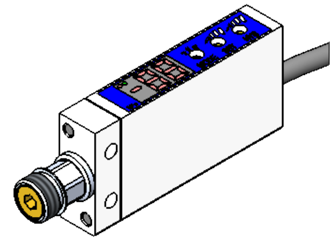




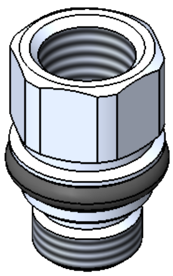
Mechanical Switches



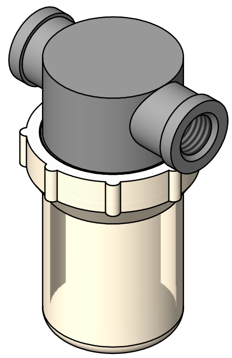
Electronic Sensors



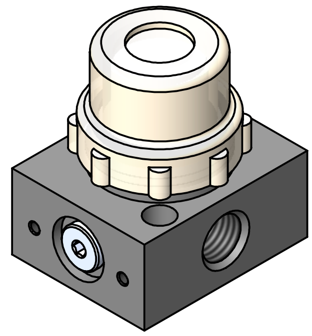
Digital Sensors



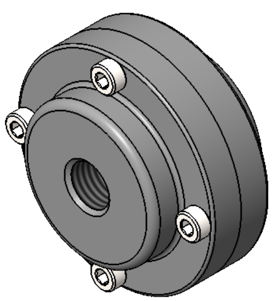
Vacuum Switch Protector



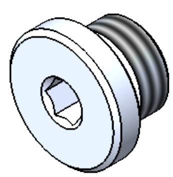
T-Style Filters



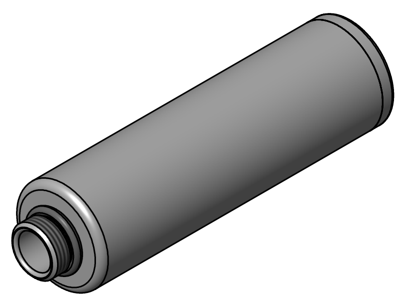
Aluminum Base Filters



Inline Filter



Pipe Plugs



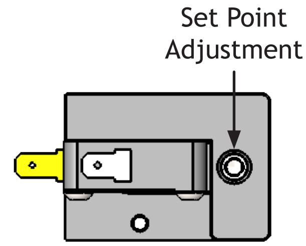
Silencers

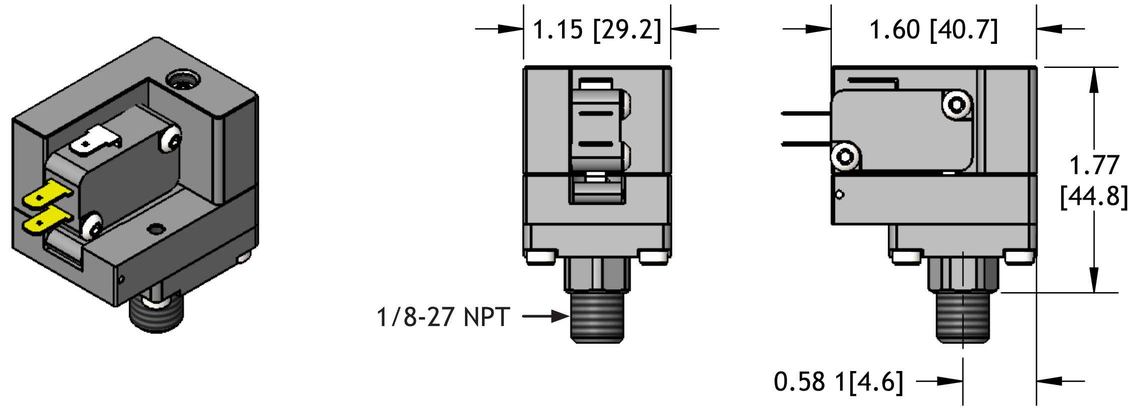
# Mechanical Pressure Switches

### PSA18-E: Electrical Output

Electrical Pressure Sensors come with UL and CSA snap action, silver contact, SPDT (Single Pole Double Throw) switch with 0.187 in (4.75 mm) spade terminals. Triple terminal electrical connector and insulator kit for attaching wires is included.

Construction: aluminum housing, stainless steel spring and fasteners, Kapton® type HN film diaphragm



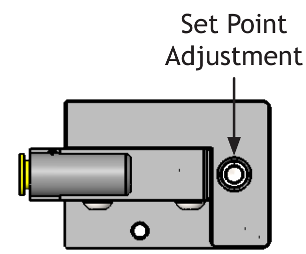



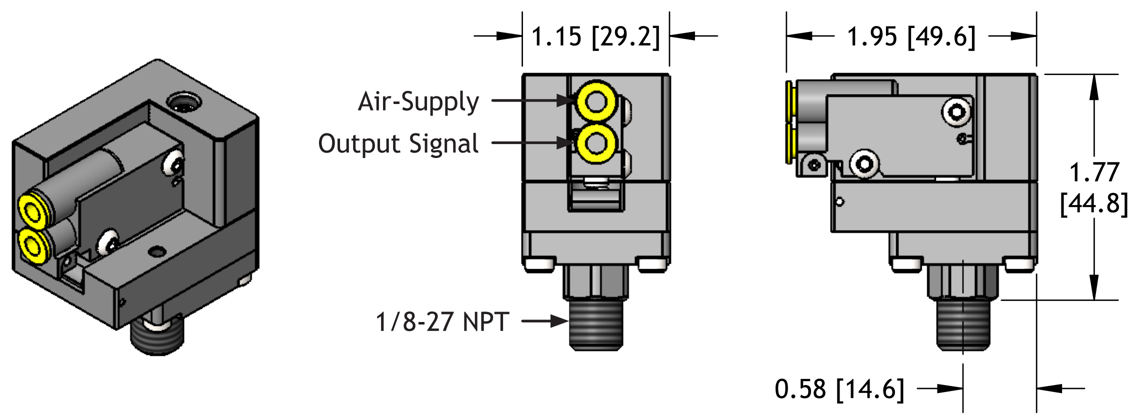

### PSA18-NOP / PSA18-NCL: Pneumatic Output

Pneumatic Pressure Sensors are available in normally-closed (NCL) and normally-open (NOP) versions. Normally-closed (NCL) sensors open to pass air when the desired set point is achieved. Normally-open (NOP) sensors close to block air when the desired set point is achieved. Both versions have integral 5/32 in (4 mm) tube connectors.

Construction: aluminum housing, stainless steel spring and fasteners, Kapton® type HN film diaphragm

Port 1- Air Supply
Port 2 - Output Signal



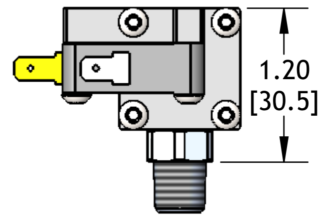




| | |
|---|---|
| Presure Adjustment Range: | 22 to 110 psi [1.5 to 8.0 bar] |
| Temperature Range: | 14°F to 140°F [-10°C to 60°C] |
| Electrical: | 5 Amp @ 125 V AC, 250 V AC Max |
| Air Valve: | 20 to 115 psi [1.4 to 7.9 bar]; Cv = 0.06; 2.5 SCFM [71 Nl/m] |
| Weight: | 3.20 oz [90.7 g] |

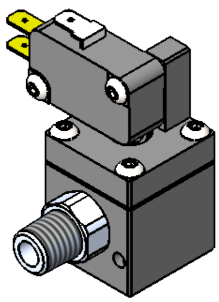
## Mechanical Vacuum Switches

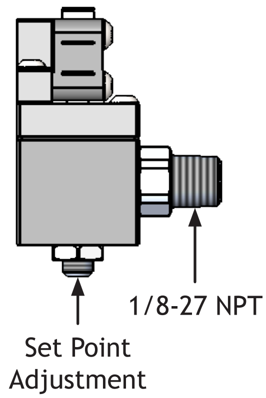
### VSA18-E: Electrical Output

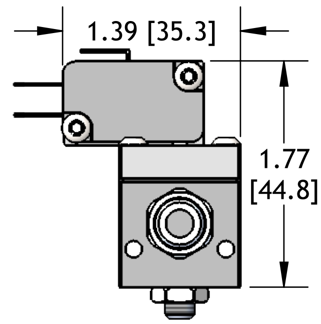
Electrical Pressure Sensors come with UL and CSA snap action, silver contact, SPDT (Single Pole Double Throw) switch with 0.187 in (4.75 mm) spade terminals. Triple terminal electrical connector and insulator kit for attaching wires is included.




Construction: aluminum housing, stainless steel spring and fasteners, nylon reinforced Nitrile diaphragm

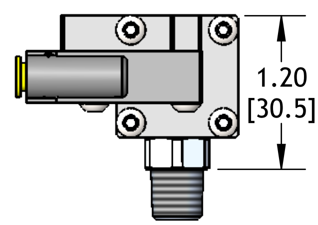




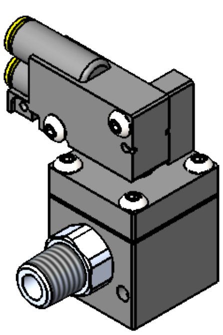

### VSA18-NOP / VSA18-NCL: Pneumatic Output

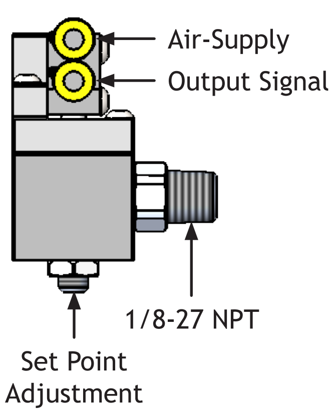
Pneumatic Vacuum Sensors are available in normally-closed (NCL) and normally-open (NOP) versions. Normally-closed (NCL) sensors open to pass air when the desired set point is achieved. Normally-open (NOP) sensors close to block air when the desired set point is achieved. Both versions have integral 5/32 in (4 mm) tube connectors.

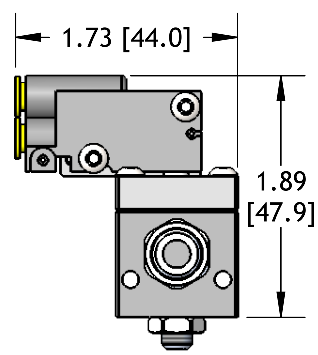



Construction: aluminum housing, stainless steel spring and fasteners, nylon reinforced Nitrile diaphragm

Port 1- Air Supply
Port 2 - Output Signal






| | |
|---|---|
| Vacuum Adjustment Range: | -8 to -28 inHG [-27.1 to 94.8 kPa] |
| Temperature Range: | -20°F to 140°F [-29°C to 60°C] |
| Electrical: | 5 Amp @ 125 V AC, 250 V AC Max |
| Air Valve: | 20 to 100 psi [1.4 to 6.9 bar]; Cv = 0.06; 2.5 SCFM [71 Nl/m] |
| Weight: | 2.10 oz [59.0 g] |

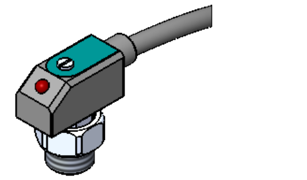
# V-Style Electronic Sensors

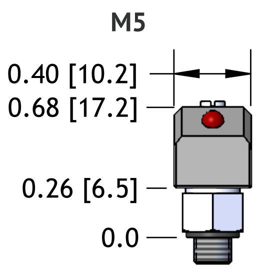
| | Output | | Connector | Mounting Thread |
|---|---|---|---|---|
| V | P | - | 4 | -18M |

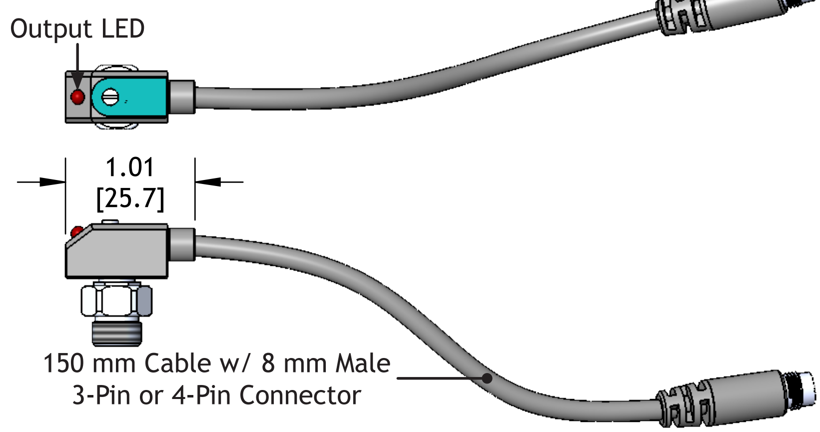
| Output | |
|---|---|
| A[1] | Analog |
| N | NPN |
| P | PNP |

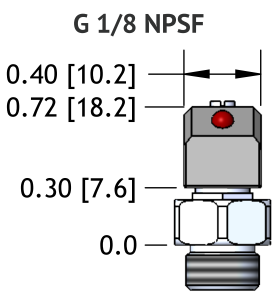
[1]3-Pin Only

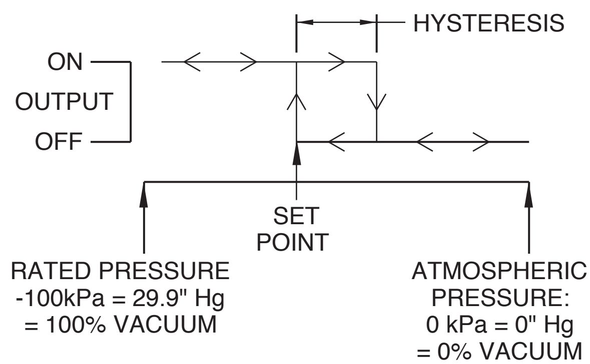
| Connector | | Mounting Thread | |
|---|---|---|---|
| 3 | 3-Pin | (Blank) | M5X0.8 Male (10-32) |
| 4 | 4-Pin | -18M | G 1/8-27 NPSF Male |



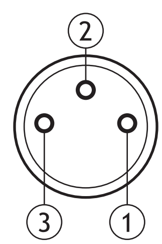


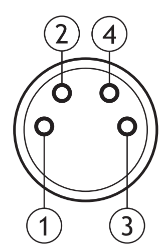




| | |
|---|---|
| Media: | Non-Lubricated Air, Non-Corrosive Gas |
| Maximum Pressure: | 29 psi [200 kPa] |
| Rated Pressure Range: | 0 to -29.5 inHG [0 to 100 kPa] |
| Operating Pressure: | 14°F to 122°F [-10°C to 60°C] |
| Storage Temperature: | -4°F to 158°F [-20°C to 70°C] |
| Humidity: | 35% to 85% RH |
| Electrical Connection: | -3 = 3-Pin Pico 8 mm Connector<br>-4 = 4-Pin Pico 8 mm Connector |
| Operating Voltage: | 10.8 to 30 V DC (including ripple) |
| Current Consumption: | 20 mA Max |
| Display: | Red LED |
| Circuit: | Analog, NPN, PNP |
| Setting Accuracy: | ±3% F.S. Max |
| Hysteresis: | Fixed, 2% F.S. Max |
| Switching Capacity: | 30 V DC, 80 mA Max |
| Response Time: | Approximately 1 ms |
| Vibration: | 10 to 55 Hz 1.5 mm Max, XYZ for 2 hours |
| Shock: | 1,000 m/s², XYZ |
| Insulation Resistance: | 100 M Ω Min |
| Dielectric Strength: | 500 V AC for 1 Minute |
| Analog Output Voltage: | 0 inHG [0 kPa] = 1 ± 0.04 V DC<br>-29.5 inHG [-100 kPa] = 5 ± 0.04 V DC |
| NPN Output Voltage | 0.8 V DC Max |
| PNP Output Voltage: | 1.8 V DC Max |




1. Brown (+)
2. Black (OUT)
3. Blue (-)




1. Brown (+)
2. White (not used)
3. Blue (-)
4. Black (OUT)

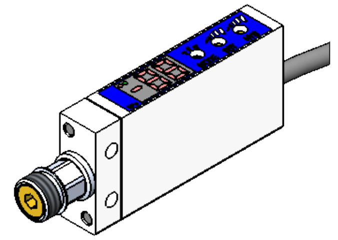
**Order Cables Separately**

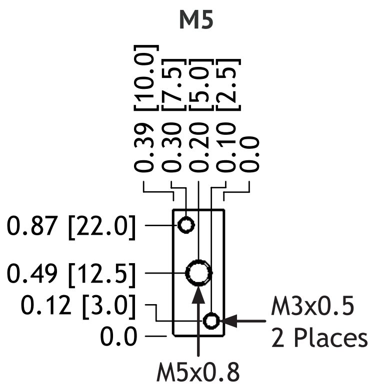
| Part Number | Description |
|---|---|
| 3QD2 | 3-Pin Quick Disconnect, 2 M |
| 3QD5 | 3-Pin Quick Disconnect, 5 M |
| 4QD2 | 4-Pin Quick Disconnect, 2 M |
| 4QD5 | 4-Pin Quick Disconnect, 5 M |

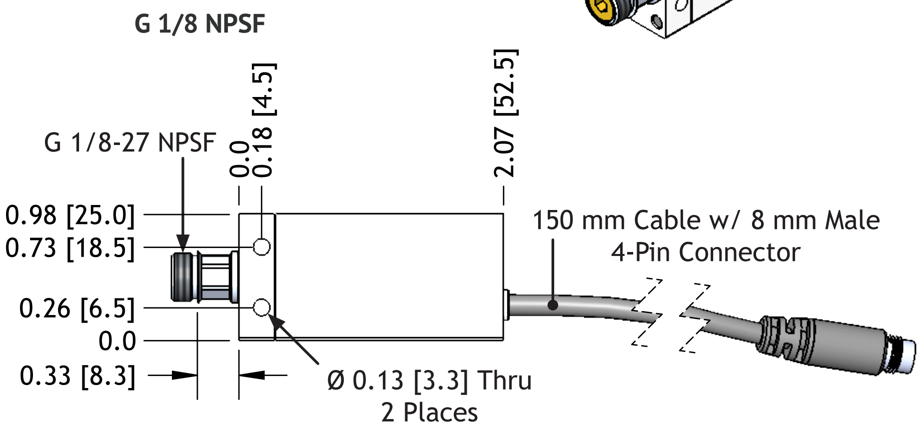
*Full data sheet with specs, wiring diagram, and operation procedures available at www.edcousa.net.*

# 61 Series Electronic Sensors

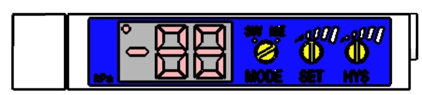
| Output | | Output | Mounting Thread |
|---|---|---|---|
| DV | P | - 61 - | 18M |
| N | NPN | 61 - 1 Output + Analog | 5F - M5x0.8 Female (10-32) |
| P | PNP | | 18M - G 1/8-27 NPSF Male |



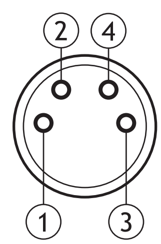



| | |
|---|---|
| Media: | non-lubricated air, non-corrosive gas |
| Maximum Pressure: | 29 psi [200 kPa] |
| Rated Pressure Range: | 0 to -29.5 inHG [0 to 100 kPa] |
| Operating Pressure: | 14°F to 140°F [-10°C to 60°C] |
| Storage Temperature: | -4°F to 158°F [-20°C to 70°C] |
| Humidity: | 35% to 85% RH |
| Electrical Connection: | 4-Pin Pico 8 mm Male Connector |
| Operating Voltage: | 10.8 to 26.4 V DC (including ripple) |
| Current Consumption: | 35 mA Max |
| Display: | 2 Digit, 7 Segment Red LED |
| Rated Display: | 0 to 99 |
| Units: | Percent Vacuum [kPa] |
| Output Display: | Set (1) - Red LED; Set 2 - Green LED |
| Display Cycle: | 4 Hz |
| Resolution: | ±1 Count |
| Setting Accuracy: | ±3% F.S. Max |
| Hysteresis: | 61 - Adjustable Approx 0% to 15% F.S.<br>62 - Fixed 2% F.S. Max |
| Switching Capacity: | 30 V DC, 80 mA Max |
| Response Time: | Approximately 2 ms |
| Vibration: | 10 to 55 Hz 1.5 mm Max, XYZ for 2 hours |
| Shock: | 196 m/s², XYZ |
| Insulation Resistance: | 100 M Ω Min |
| Dielectric Strength: | 500 V AC for 1 Minute |
| Analog Output Voltage: | 0 inHG [0 kPa] = 1 ± 0.1 V DC<br>-29.5 inHG [-100 kPa] = 5 ± 0.2 V DC |
| Analog Output Current: | 1 mA Max |
| Analog Hysteresis / Linearity: | ±0.5% F.S. |
| NPN Output Voltage | 0.8 V DC Max |
| PNP Output Voltage: | 1.2 V DC Max |
| Thermal Error: | ±0.1% F.S. / °C Max in range of 32°F to 122°F [0°C to 50°C] |




Red LED Output




1. Brown (+)
2. White (OUT ANALOG)
3. Blue (-)
4. Black (OUT1)

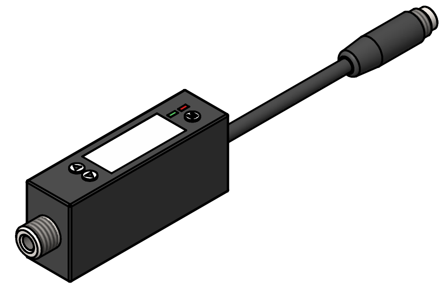
### Order Cables Separately

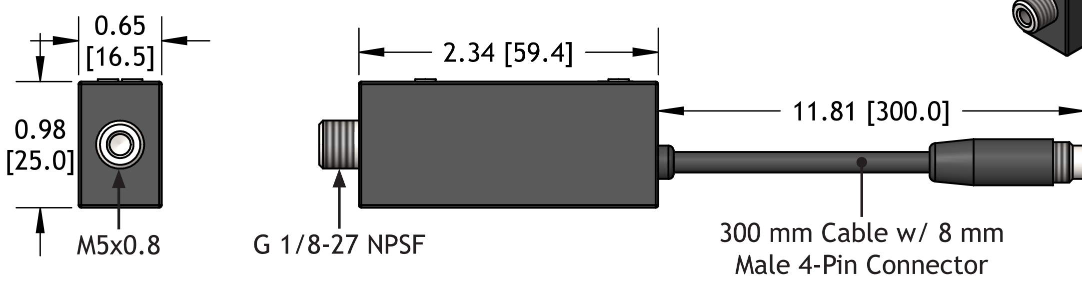
| Part Number | Description |
|---|---|
| 4QD2 | 4-Pin Quick Disconnect, 2 M |
| 4QD5 | 4-Pin Quick Disconnect, 5 M |

*Full data sheet with specs, wiring diagram, and operation procedures available at www.edcousa.net.*

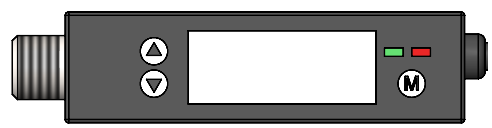
# 100 Series Digital Sensors

| | Output | |
|---|---|---|
| DV | N | -100 |
| | N | NPN |
| | P | PNP |

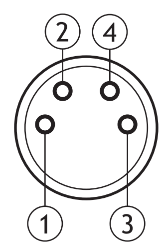





| | | DVN-100 | DVP-100 |
|---|---|---|---|
| Rated Pressure Range: | | -29.5 ~ 29.5 inHG | |
| Setting Pressure Range: | | -29.5 ~ 29.5 inHG | |
| Withstand Pressure: | | 88.6 inHG | |
| Fluid: | | filtered air, non-corrosive / non-flammable gases | |
| Set Pressure Resolution: | kPa | 0.1 | |
| | kgf/cm$^2$ | 0.001 | |
| | bar | 0.001 | |
| | psi | 0.01 | |
| | inHg | 0.1 | |
| | mmHg | 1 | |
| | mmH$_2$O | 0.1 | |
| Power Supply Voltage: | | 12 to 24 V DC ± 10%, ripple (P-P) 10% or less | |
| Current Consumption: | | ≤ 55mA | |
| Switch Output: | | NPN: open collector 2 outputs<br>max. load current: 100mA<br>max. supply voltage: 30 V DC<br>residual voltage: ≤ 1V | PNP: open collector 2 outputs<br>max. load current: 100mA<br>max. supply voltage: 24 V DC<br>residual voltage: ≤ 1V |
| Repeatability (Switch Output): | | ± 0.2% F.S. ± 1 digit | |
| Hysteresis: | Hysteresis Mode: | adjustable | |
| | Window Comparator Mode: | fixed (3 digits) | |
| Response Time: | | ≤ 2.5 ms (chattering-proof function: 24 ms, 192 ms and 768ms selections) | |
| Output Short Circuit Protection: | | yes | |
| 7 Segment LED Display: | | 3 1/2 digit LED display (sampling rate: 5 times / 1 sec) | |
| Indicator Accuracy: | | ± 2% F.S. ± 1 digit (ambient temperature 25 ± 3° C) | |
| Indicator: | | OUT 1 = green, OUT 2 = red | |
| Environment: | Enclosure: | IP40 | |
| | Ambient Temp. Range: | operation: 0 ~ 50° C, storage: -20 ~ 60° C (no condensation or freezing) | |
| | Ambient Humidity Range: | operation / storage: 35 ~ 85% RH (no condensation) | |
| | Withstand Voltage: | 1,000 V AC in 1-min (between case and lead wire) | |
| | Insulation Resistance: | 50 MΩ (at 500 v DC, between case and lead wire) | |
| | Vibration: | total amplitude 1.5mm, 10 Hz scan for 1 minute,<br>2 hours each direction of x, y, and z | |
| | Shock: | 980m/s$^2$ (100 G), 3 times each in direction of x, y, and z | |
| Temperature Characteristic: | | ± 2% F.S. of detected pressure (25°C) at temp. rang of 0 ~ 50°C | |
| Port Size: | | G 1/8-27 NPS male, M5 female | |
| Lead Wire: | | oil-restistant cable (0.15mm$^2$) | |
| Weight: | | approximately 35g (with M8, 4-pin male connector) | |




Switch OUT1 (Green LED)
Switch OUT2 (Red LED)




1. Brown (+)
2. White (OUT2)
3. Blue (-)
4. Black (OUT1)

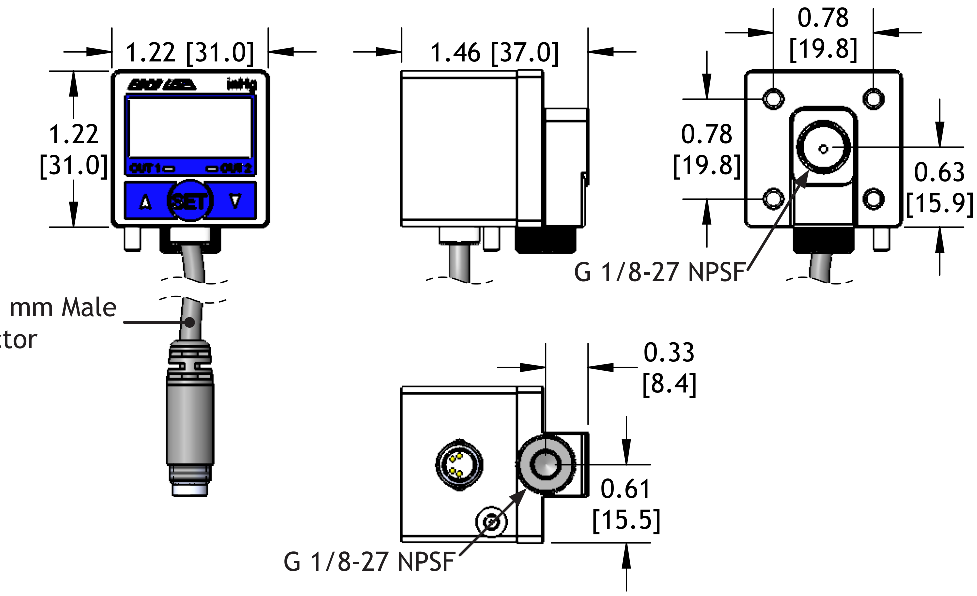
**Order Cables Separately**

| Part Number | Description |
|---|---|
| 4QD2 | 4-Pin Quick Disconnect, 2 M |
| 4QD5 | 4-Pin Quick Disconnect, 5 M |

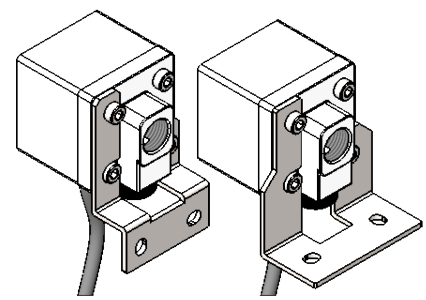
*Full data sheet with specs, wiring diagram, and operation procedures available at www.edcousa.net.*

# 200 Series Digital Sensors

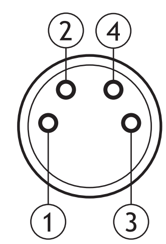
| | Style | | Output | |
|---|---|---|---|---|
| D | V | | N | -200 |
| | V | Vacuum | N | NPN |
| | P | Pressure | P | PNP |




| | | DV_-200 | DP_-200 |
|---|---|---|---|
| Rated Pressure Range: | | 0 ~ 29.5 inHg | 0 ~ 145.0 psi |
| Setting Pressure Range: | | 3.0 ~ 29.9 inHg | -14.5 ~ 145.0 psi |
| Withstand Pressure: | | 29.0 psi | 200.0 psi |
| Fluid: | | filtered air, non-corrosive / non-flammable gases | |
| Set Pressure Resolution: | kPa | 0.1 | - |
| | mPa | - | 0.001 |
| | $kgf/cm^2$ | 0.001 | 0.01 |
| | bar | 0.001 | 0.01 |
| | psi | 0.01 | 0.1 |
| | inHg | 0.1 | - |
| | mmHg | 1 | - |
| | $mmH_2O$ | 0.1 | - |
| Power Supply Voltage: | | 12 to 24 V DC ± 10%, ripple (P-P) 10% or less | |
| Current Consumption: | | ≤ 55mA | |
| Switch Output: | | NPN: open collector 2 outputs<br>max. load current: 80mA<br>max. supply voltage: 30 V DC<br>residual voltage: ≤ 1V | PNP: open collector 2 outputs<br>max. load current: 80mA<br>max. supply voltage: 24 V DC<br>residual voltage: ≤ 1V |
| Repeatability (Switch Output): | | ± 0.2% F.S. ± 1 digit | |
| Hysteresis: | Hysteresis Mode: | adjustable | |
| | Window Comparator Mode: | fixed (3 digits) | |
| Response Time: | | ≤ 2.5 ms (chattering-proof function: 24 ms, 192 ms and 768ms selections) | |
| Output Short Circuit Protection: | | yes | |
| 7 Segment LED Display: | | 3 1/2 digit LED display (sampling rate: 5 times / 1 sec) | |
| Indicator Accuracy: | | ± 2% F.S. ± 1 digit (ambient temperature 25 ± 3° C) | |
| Indicator: | | OUT 1 = green, OUT 2 = red | |
| Environment: | Enclosure: | IP65 | |
| | Ambient Temp. Range: | operation: 0 ~ 50°C, storage: -20 ~ 60°C (no condensation or freezing) | |
| | Ambient Humidity Range: | operation / storage: 35 ~ 85% RH (no condensation) | |
| | Withstand Voltage: | 1,000 V AC in 1-min (between case and lead wire) | |
| | Insulation Resistance: | 50 MΩ (at 500 V DC, between case and lead wire) | |
| | Vibration: | total amplitude 1.5mm, 10 Hz - 55 Hz - 10 Hz scan for 1 minute, 2 hours each direction of x, y, and z | |
| | Shock: | $980m/s^2$ (100 G), 3 times each in direction of x, y, and z | |
| Temperature Characteristic: | | ± 2% F.S. of detected pressure (25°C) at temp. rang of 0 ~ 50°C | |
| Port Size: | | G 1/8-27 NPS female | |
| Lead Wire: | | oil-restistant cable ($0.15mm^2$) | |
| Weight: | | approximately 71 g (with M8, 4-pin male connector) | |



BT200-A
Optional Mounting Brackets




1. Brown (+)
2. White (OUT2)
3. Blue (-)
4. Black (OUT1)

### Order Cables Separately

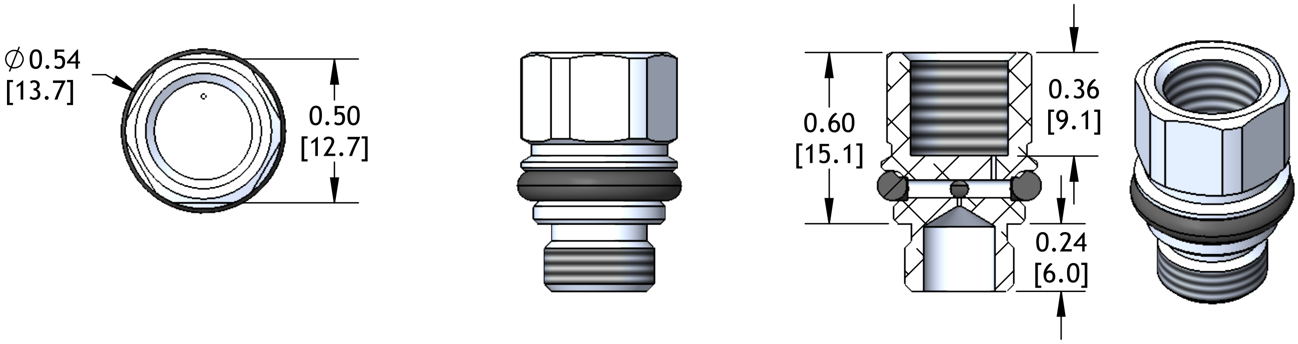
| Part Number | Description |
|---|---|
| 4QD2 | 4-Pin Quick Disconnect, 2 M |
| 4QD5 | 4-Pin Quick Disconnect, 5 M |

*Full data sheet with specs, wiring diagram, and operation procedures available at www.edcousa.net.*

## VSP-18: Vacuum Switch Protector

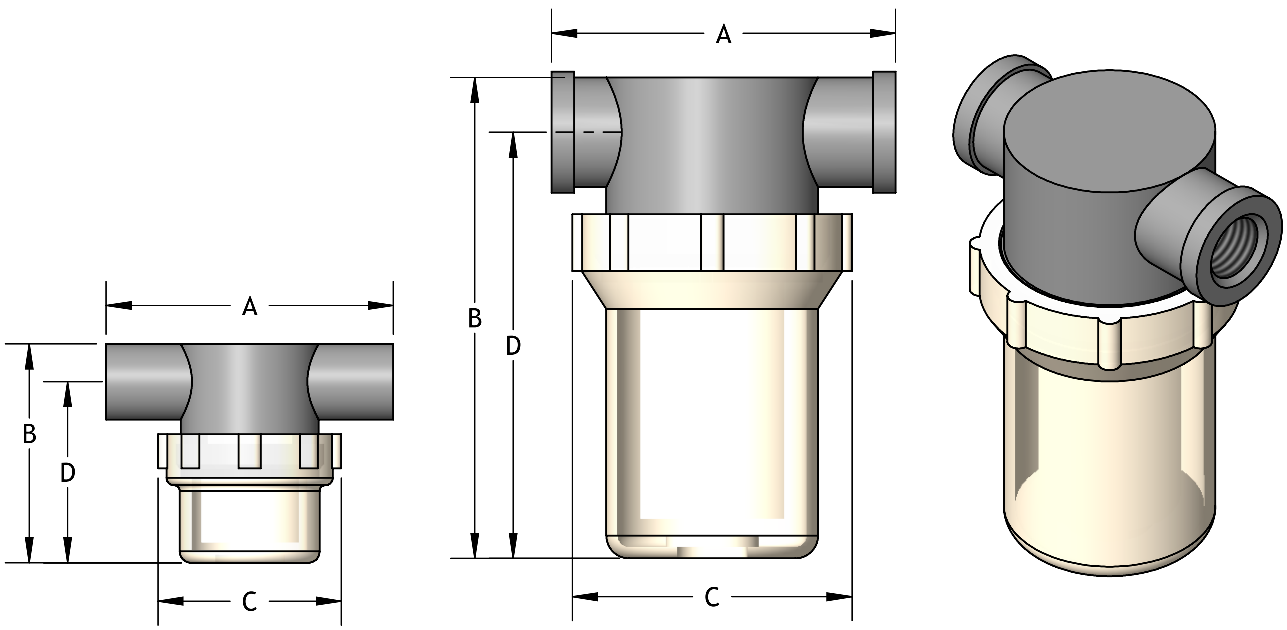
Bi-directional VSP-18 protects vacuum switches or gauges from positive pressure spikes by relieving pressure in excess of 10 psi [0.7 bar] to atmosphere.

Connects to 1/8-27 NPSF or G 1/8-28 threads.




## T-Style Vacuum Filters

Our T-Style Vacuum Filters are made of rugged nylon body with a transparent nylon bowl for checking the condition of the filter at a glance. HDPE filter elements can be easily and quickly replaced without disturbing the system plumbing. T-Style Vacuum Filters are rated for full vacuum or pressure up to 150 psi.




| Part Number | Ports | A in [mm] | B in [mm] | C in [mm] | D in [mm] | Weight lb [g] | Filter Element (3 Pack) |
|---|---|---|---|---|---|---|---|
| PPSF125X10 | 1/8 NPT Female | 3.06 [77.7] | 2.42 [61.5] | 1.86 [47.2] | 1.98 [50.3] | 0.13 [59.0] | PPX10RE3 |
| PPSF250X10 | 1/4 NPT Female | 3.06 [77.7] | 2.42 [61.5] | 1.86 [47.2] | 1.98 [50.3] | 0.11 [49.9 | PPX10RE3 |
| PPSF250MX10 | 1/4 NPT Male | 3.06 [77.7] | 2.42 [61.5] | 1.86 [47.2] | 1.98 [50.3] | 0.11 [49.9] | PPX10RE3 |
| PPSF375X10 | 3/8 NPT Female | 3.06 [77.7] | 2.42 [61.5] | 1.86 [47.2] | 1.98 [50.3] | 0.16 [72.6] | PPX10RE3 |
| PPSF500X35 | 1/2 NPT Female | 3.64 [92.5] | 5.35 [136.0] | 2.95 [74.9] | 4.80 [122.0] | 0.37 [168.0] | PPX35RE3 |
| PPSF750X35[1] | 3/4 NPT Female | 3.60 [91.4] | 5.40 [137.2] | 2.93 [74.4] | 4.68 [118.7] | 0.40 [181.0] | PPX35RE3 |
| PPSF100X50[1] | 1 NPT Female | 4.62 [117.0] | 6.36 [162.0] | 4.00 [102.0] | 5.60 [146.0] | 0.94 [426.0] | PPX50RE3 |
| PPSF150X75 | 1-1/2 NPT Female | 5.16 [131.0] | 8.10 [206.0] | 4.00 [102.0] | 6.93 [176.0] | 1.18 [535.0] | PPX75RE3 |

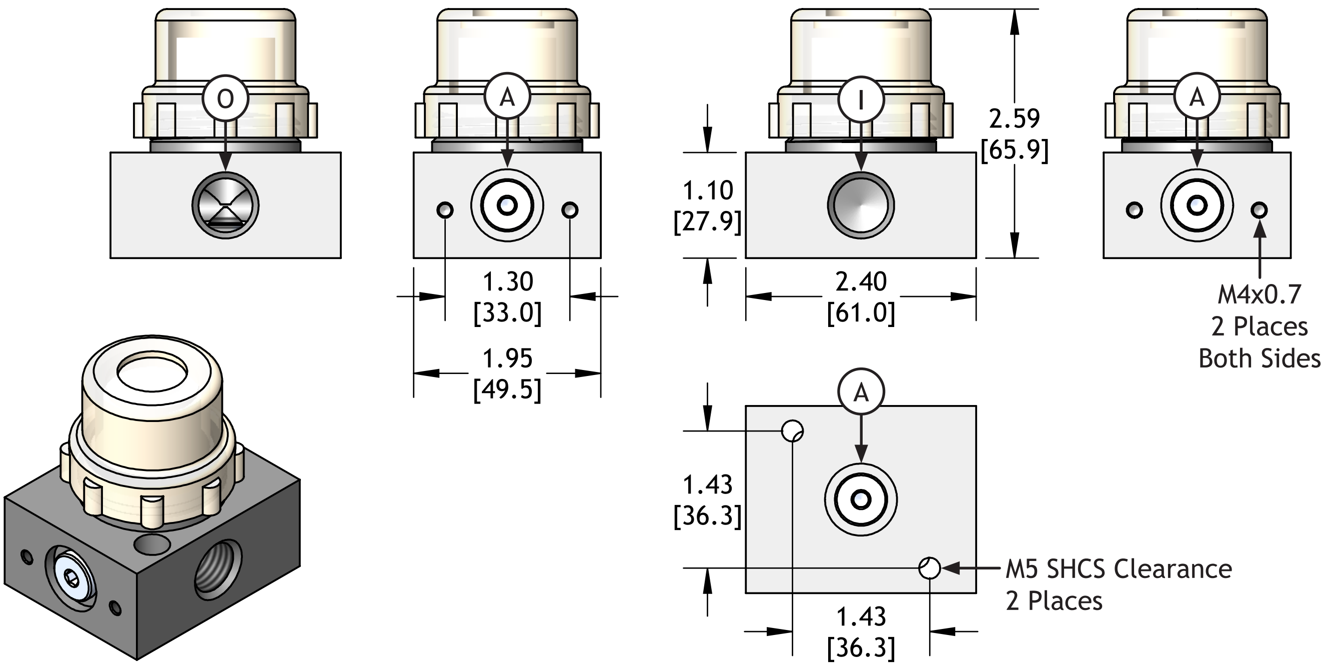
*[1]These sizes are available in polypropylene. Add suffix -PP for polypropylene body and bowl. Bowl will be opaque, NOT transparent.*

## Aluminum Base Filters

EDCO aluminum base filters work in the same way as our t-style filters. An aluminum base allows for easy mounting of the filter. A clear, nylon bowl allows for quick inspection of the HDPE filter element. When it’s time to change the element, the bowl can easily be removed to replace the filter very quickly. We stock standard replacement bowls, gaskets, and filter elements. Optional mounting plates are offered for applications where mounting via the bottom face is not desired.

### ASF375X10: Aluminum Base Filter, 3/8 NPTF

Replacement Filter Elements: PPX10RE3

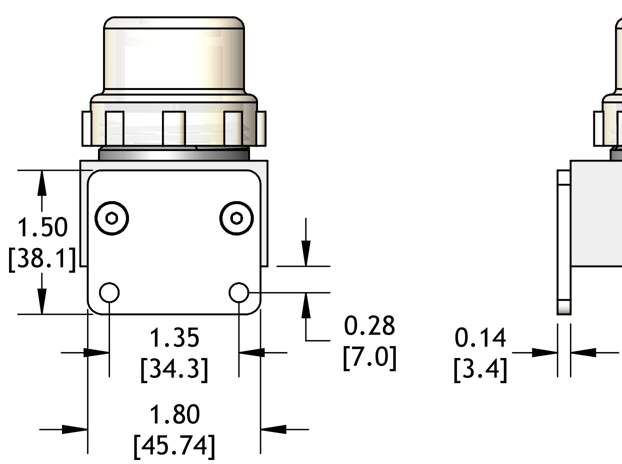


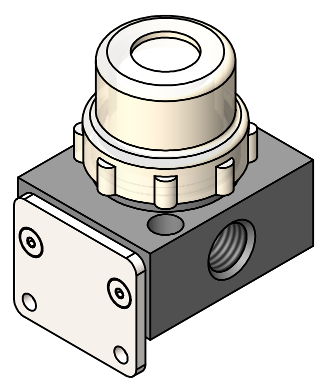

*Weight: 8.22 oz [233.0 g]*

| Code | Function | Ports |
|---|---|---|
| I | Flow In | 3/8 NPTF |
| O | Flow Out | 3/8 NPTF |
| A | Auxiliary / Monitor | G 1/8 NPSF |

### ASF-X10-K: Mounting Kit

Optional mounting kit includes a steel bracket and two flat head cap screws.



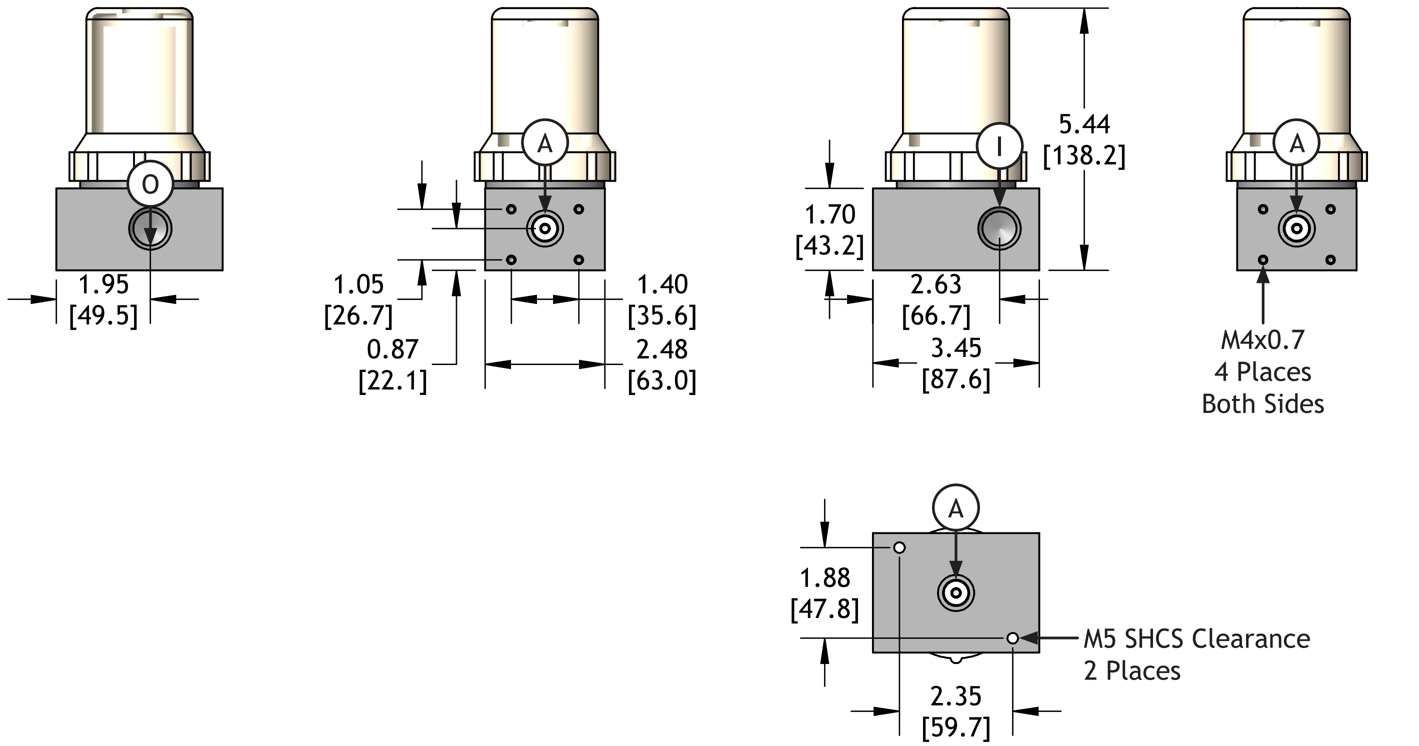
*Additional Weight: 1.64 oz [46.4 g]*

# Aluminum Base Filters

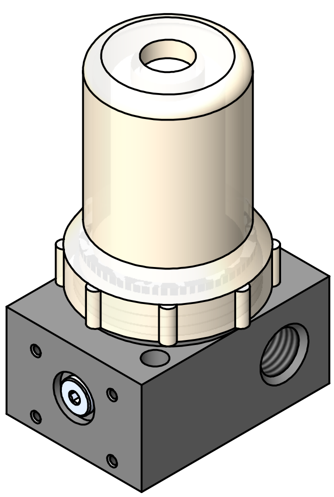
### Aluminum Base Filter w/ 1/2" & 3/4" Ports

| | Size | | | Threads | |
|---|---|---|---|---|---|
| ASF | 500 | | X35 | | |
| | 500 | 1/2" Ports | | (Blank) | NPT Threads |
| | 750 | 3/4" Ports | | -G | G Threads |

*Replacement Filter Elements: PPX35RE3*

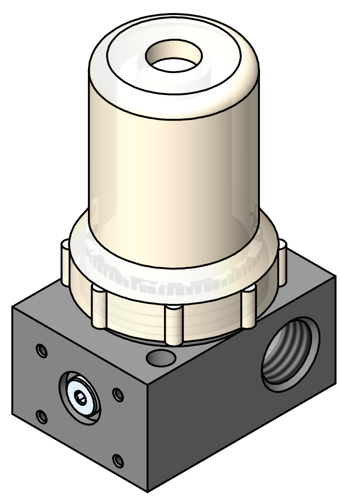



**ASF500X35**



*Weight: 25.70 oz [728.6 g]*

**ASF750X35**



*Weight: 24.38 oz [691.1 g]*

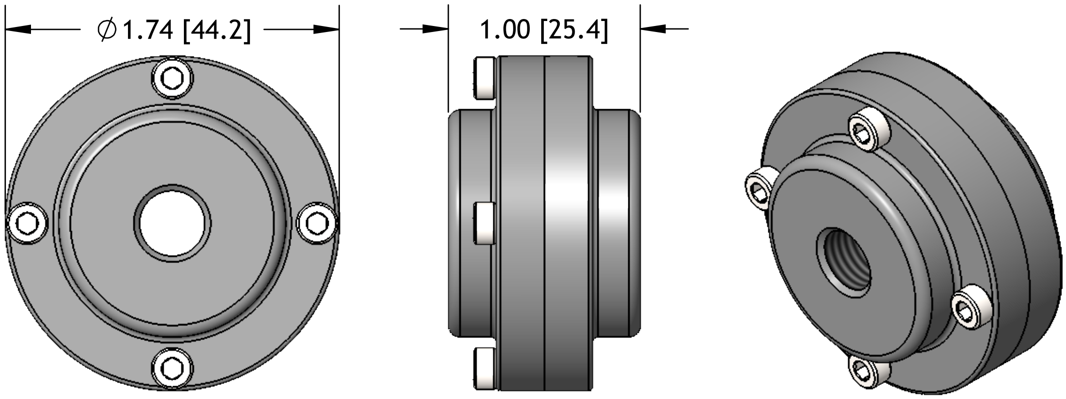
| Code | Function | ASF500X35 | ASF500X35-G | ASF75X35 | ASF75X35-G |
|---|---|---|---|---|---|
| I | Flow In | 1/2 NPTF | G 1/2 | 3/4 NPTF | G 3/4 |
| O | Flow Out | 1/2 NPTF | G 1/2 | 3/4 NPTF | G 3/4 |
| A | Auxiliary / Monitor | G 1/8 NPSF | | | |

## F10-18F: In-Line Filter

The rugged F10-18F in-line filter is designed to carry the full load of 50 mm and smaller vacuum cups. The in-line filter is ideal for use with Flow Sensor or Tri-Flow Valves in extremely dusty environments such as woodworking shops. The F10-18F provides more than 10 times the surface area of a standard FSV filter disk, providing a longer life. A quick-release (blow-off) may be used to momentarily back-flow the filters to help keep them clean.

Construction: anodized aluminum body, polyethylene element, and stainless steel fasteners

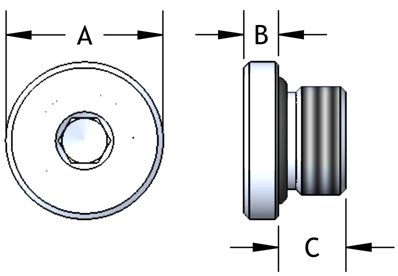
*Replacement Filter Disk: FD-116*




*Weight: 0.14 lb [61.3 g]*

## Pipe Plugs

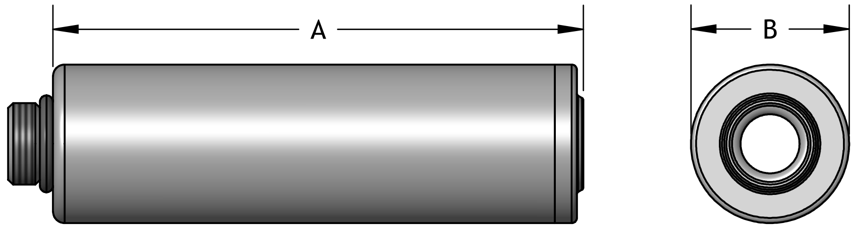
All pipe plugs are nickel plated aluminum with a Nitrile o-ring seal.




| Part Number | Fits Threads | A in [mm] | B in [mm] | C in [mm] | Hex Wrench | Weight oz [g] |
|---|---|---|---|---|---|---|
| P10 | M5x0.8<br>10-32 UNF | 0.31 [7.9] | 0.07 [1.8] | 0.12 [3.0] | 2 mm | 0.01 [0.3] |
| P18 | 1/8-27 NPSF<br>G 1/8-28 | 0.47 [12.0] | 0.12 [3.0] | 0.24 [6.0] | 4 mm | 0.07 [2.0] |
| P14 | 1/4-18 NPT<br>G 1/4-19 | 0.56 [14.0] | 0.08 [2.0] | 0.26 [6.6] | 6 mm | 0.10 [2.9] |
| P38 | 3/8-18 NPSF<br>G 3/8-19 | 0.71 [18.0] | 0.12 [3.0] | 0.27 [6.9] | 5 mm | 0.18 [5.2] |
| P12 | 1/2-14 NPSF<br>G 1/2-14 | 0.95 [24.0] | 0.12 [3.0] | 0.43 [11.0] | 10 mm | 0.98 [28.0] |

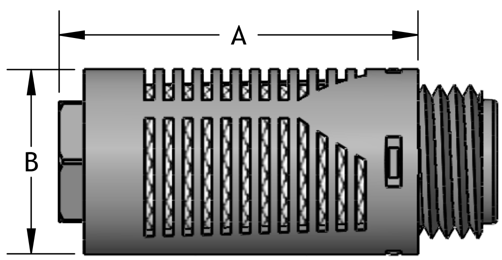
# Silencers

### Straight Thru Silencers (ST)




| Part Number | Threads | A in [mm] | B in [mm] | Weight oz [g] |
|---|---|---|---|---|
| STA18M | G 1/8 NPS | 2.65 [67.3] | 0.74 [18.8] | 0.25 [7.1] |
| STA14M | G 1/4 NPT | 2.65 [67.3] | 0.74 [18.8] | 0.25 [7.1] |
| STB38M | G 3/8 NPT | 4.14 [105.2] | 1.24 [31.5] | 0.74 [2.10] |
| STB12M | G 1/2 NPS | 4.14 [105.2] | 1.24 [31.5] | 0.78 [22.1] |
| STC12M | G 1/2 NPS | 4.12 [104.6] | 1.48 [37.6] | 1.09 [30.9] |
| STC34M | G 3/4 NPT | 4.12 [104.6] | 1.48 [37.6] | 1.16 [32.9] |
| STC10M | G 1 NPT | 4.12 [104.6] | 1.48 [37.6] | 1.31 [37.1] |
| STC12M-6 | G 1/2 NPS | 6.00 [152.4] | 1.48 [37.6] | 1.59 [45.1] |
| STC34M-6 | G 3/4 NPT | 6.00 [152.4] | 1.48 [37.6] | 1.66 [47.1] |
| STC10M-6 | G 1 NPT | 6.00 [152.4] | 1.48 [37.6] | 1.76 [49.9] |

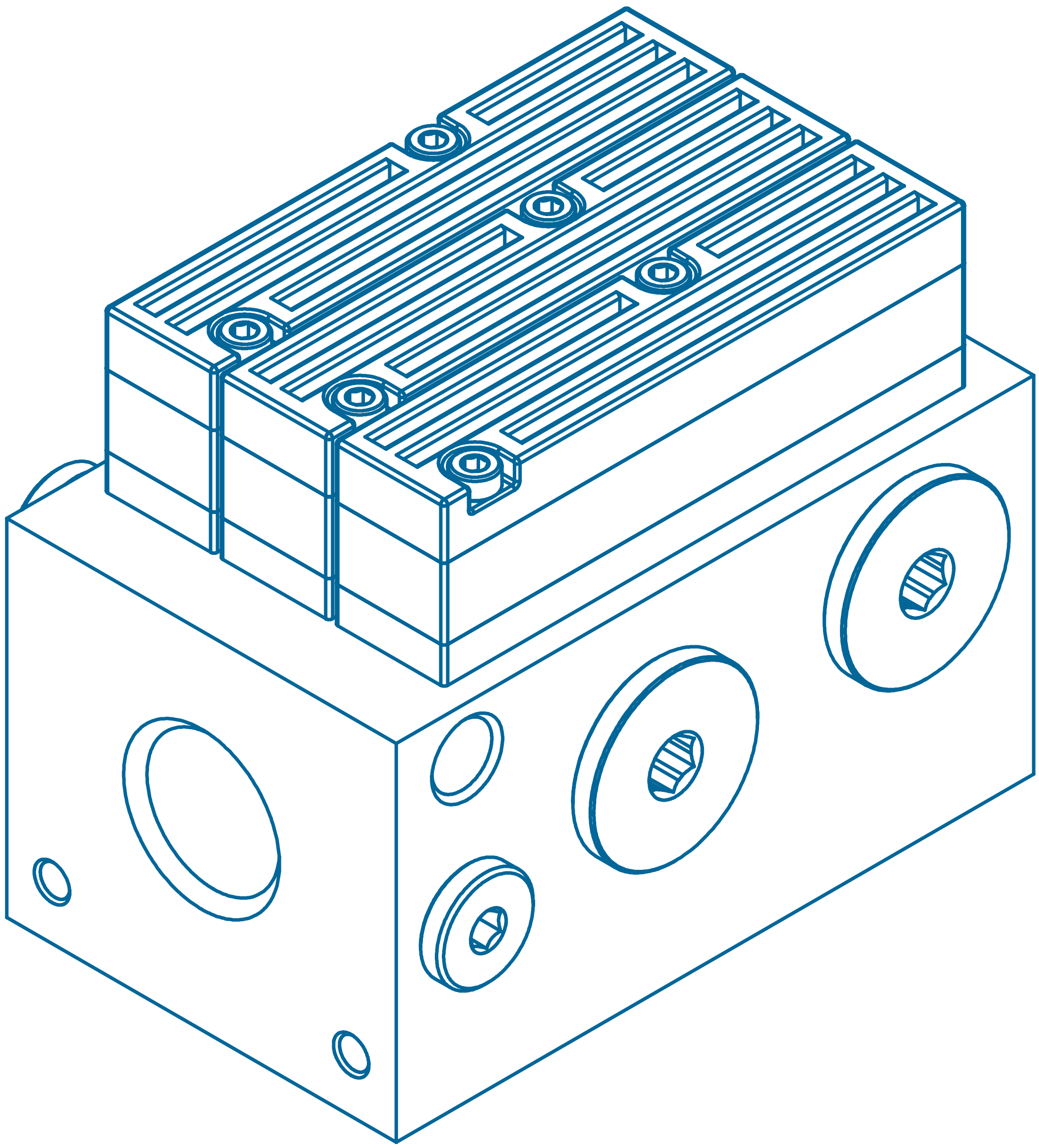
### Side Discharge Silencers (AA)

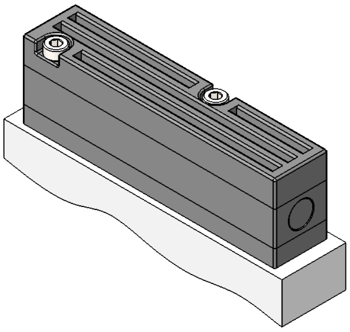



| Part Number | Threads | A in [mm] | B in [mm] | Weight oz [g] |
|---|---|---|---|---|
| AA18M | 1/8 NPT | 1.18 [30.1] | 0.60 [15.2] | 0.11 [3.1] |
| AA14M | 1/4 NPT | 1.18 [30.1] | 0.60 [15.2] | 0.14 [4.0] |
| AA38M | 3/8 NPT | 1.87 [47.5] | 0.96 [24.3] | 0.21 [6.0] |
| AA12M | 1/2 NPT | 1.87 [47.5] | 0.96 [24.3] | 0.46 [13.0] |

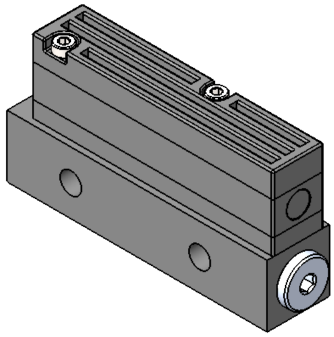
# AX Series Vacuum Pumps

## Section 6

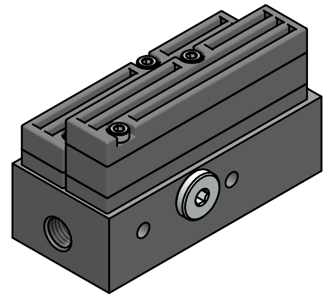




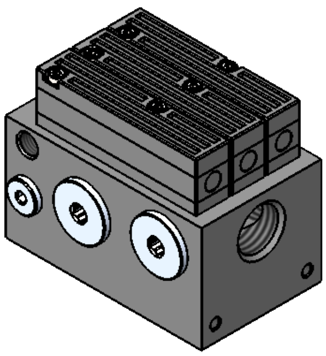
**Z Option**



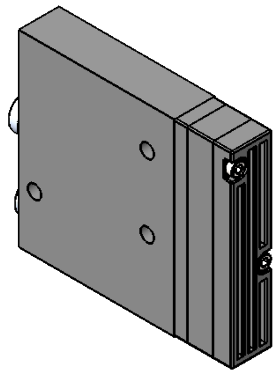
**G 1/8 NPSF Bases**



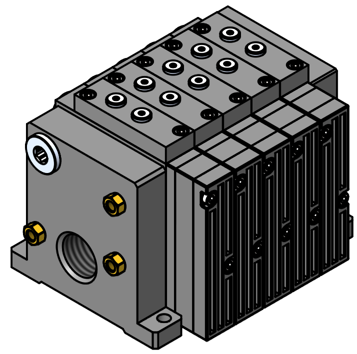
**G 1/2 NPSF Bases**



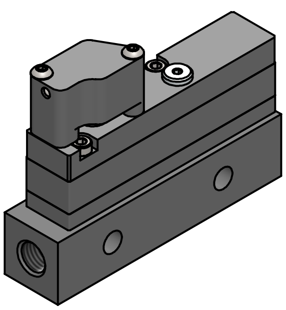
**G 1/2 NPSF Bases
Large Capacity**



**G 1/8 NPSF Bases
w/ Integral Filter**



**Pump Manifolds**



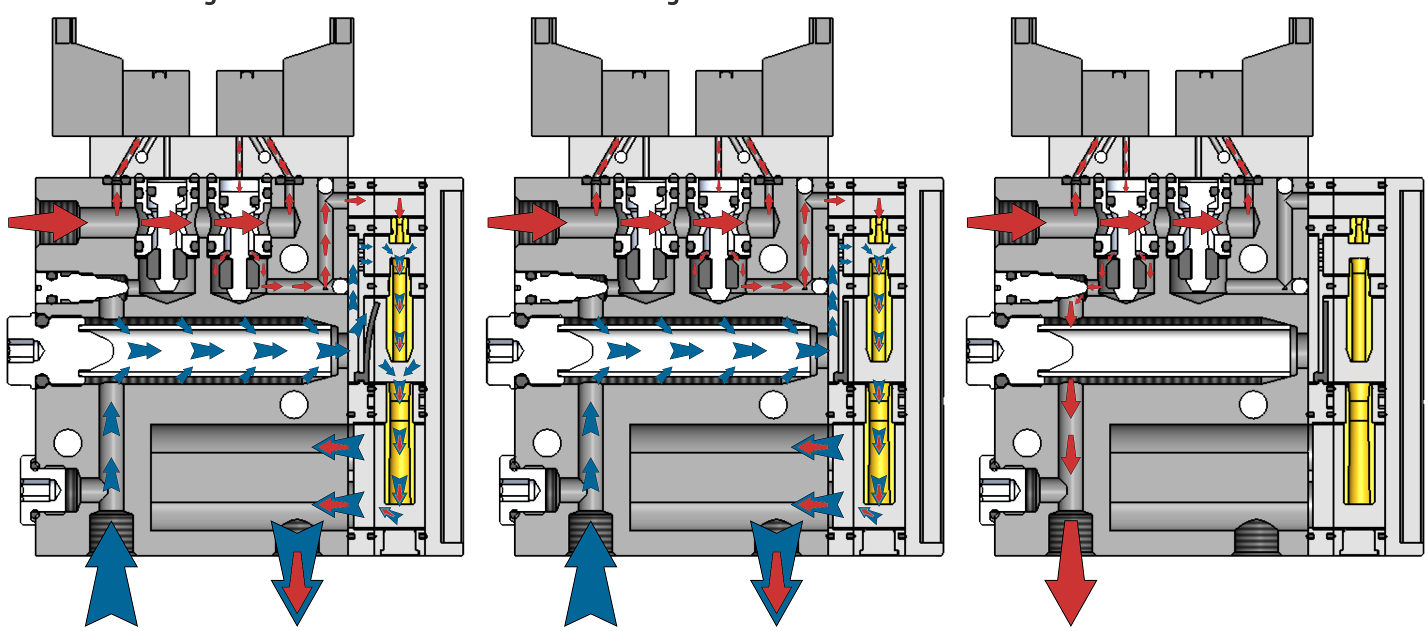
**Options**

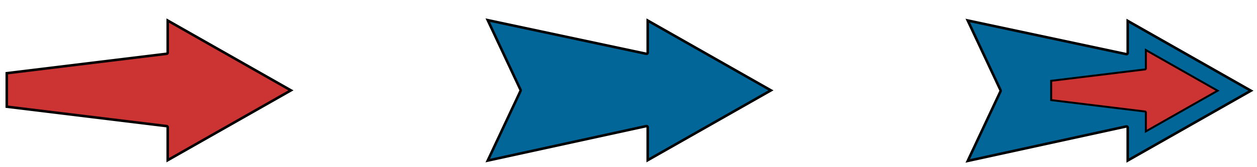
## Basic Information

EDCO USA AX Series multi-stage vacuum pumps provide a wide array of styles and configurations to meet your system requirements.

- Modular design allows for stacking up to four pump capacities.
- Wide-range ejector nozzles can operate from 45 to 87 psi [3 to 6 bar].
- Proven coaxial technology provides greater efficiency than conventional ejectors.
- M-Series ejectors may be operated at low air feed pressure for protection from fluctuating factory air-supply pressures.
- L-Series ejectors produce high-vacuum flow suitable for handling porous objects or overcoming other system leakage.
- AX pumps operate at a lower air-pressure so fluctuations in plant air pressure will not affect vacuum pump performance.
- Multi-stage pump modules allow for fast evacuation and greater efficiency.
- Integrated solenoid valves eliminate extra plumbing. Low-power 24 V DC, 1.3 W coils are employed to reduce loads on PLC controllers.
- Choose from solenoid controlled, air-pilot controlled, or simple air-supply controls.
- Integrated solenoid valves control blow-off with adjustable flow controls are available.
- Automatic blow-off modules for single-input controls are available.
- Choose from a variety of different vacuum switches for system monitoring.
- Vacuum filters are replaceable.
- Manifold versions with 1 to 10 stations in common or separate air-supply configurations with control and sensing options are available.
- Manifolds include piped exhaust. Exhaust silencers are optional.
- High-quality finish includes anodizing or electroless nickel plating, stainless steel fasteners, stainless steel tie-rods, and glass-reinforced PPS pump modules and valve plates.
- Choose from many standard EDCO pump bases or selection the Z Base option for integration into your custom design.
- AX series vacuum pumps come fully factory assembled and ready for installation.

**High Flow** | **High Vacuum** | **Blow-Off**





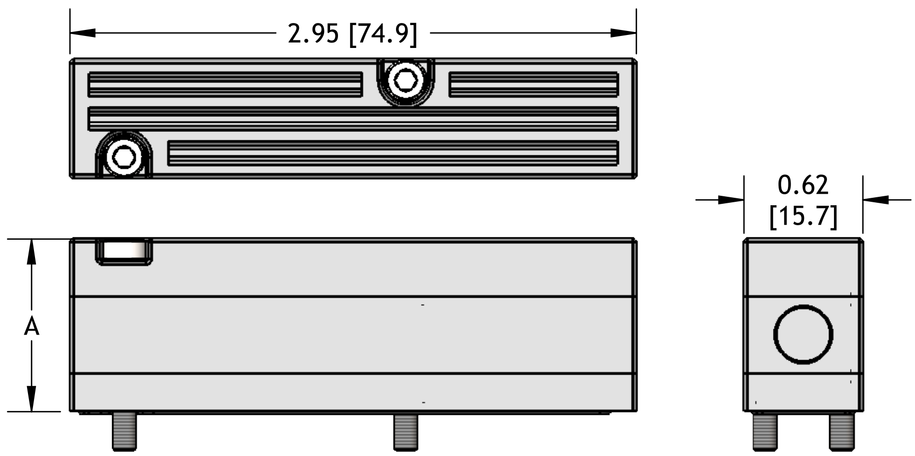
**Compressed Air Flow** | **Induced Vacuum Flow** | **Exhaust Flow**

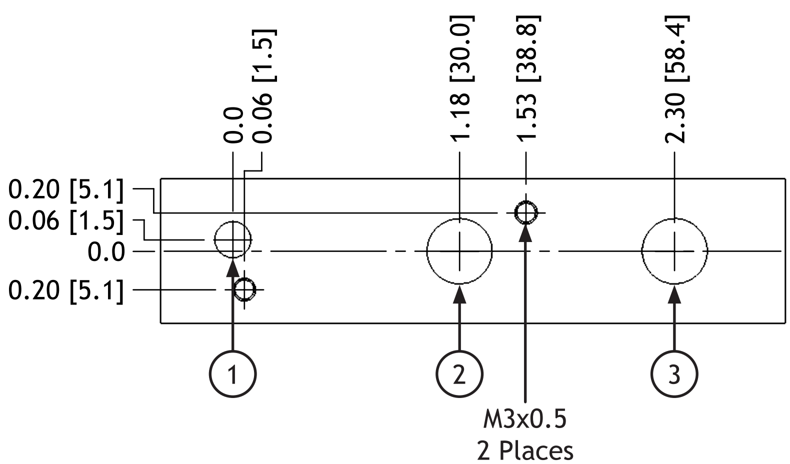
## Z Option (Zero / No Base)

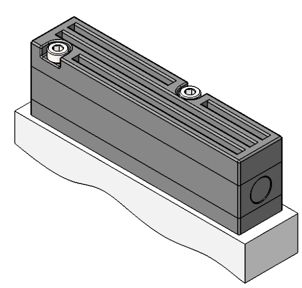
- Complete pump module ready for integration into your custom design.
- M3 mounting screws and pump seals are included.
- Can be configured with one or two pump modules for more vacuum flow capacity.

| | Series | Capacity | | Non-Return Option | | Quick Release Option[1] | Sensor Port Option[1] |
|---|---|---|---|---|---|---|---|
| AX | L | 1 | N | | -Z | | |
| | L — L-Series | 1 — 1 Ejector | | (Blank) — No | | (Blank) — None | (Blank) — None |
| | M — M-Series | 2 — 2 Ejectors | | R — Non-Return | | -AQR — Atmospheric | -PA5F — M5 Port |
| | | | | | | | -PA18F — G 1/8 NPSF Port |

*[1]Sensor Port Options cannot be used with a Quick Release Option.*
*The AQR option comes standard with an M5x0.8 monitor port.*

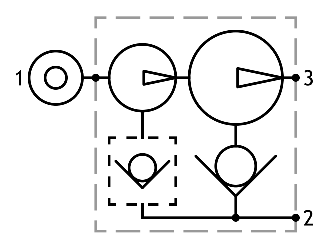


| Capacity | A in [mm] | Weight oz [g] |
|---|---|---|
| 1 | 0.90 [22.9] | 1.71 [48.4] |
| 2 | 1.30 [33.1] | 2.44 [69.3] |

| Code | Function | Hole Ø in [mm] |
|---|---|---|
| 1 | Air Supply | 0.19 [4.8] |
| 2 | Vacuum | 0.34 [8.6] |
| 3 | Exhaust | 0.34 [8.6] |

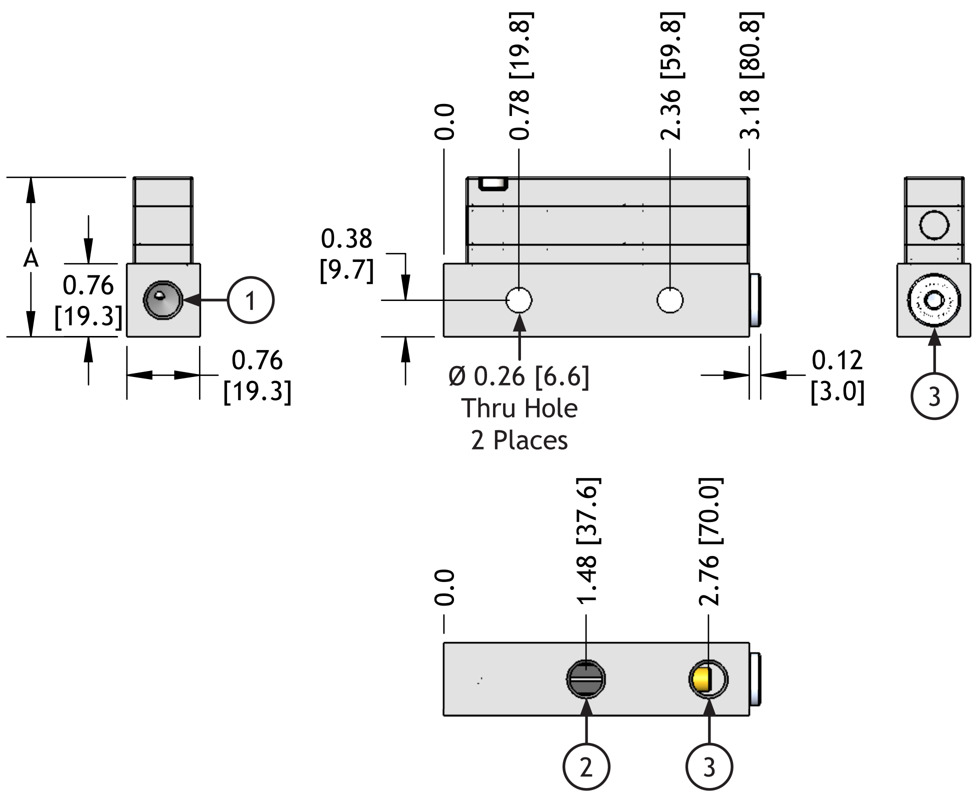


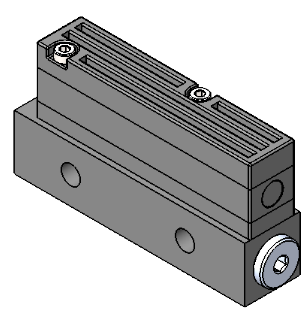
## G 1/8 NPSF Base

- Basic pump with two exhaust ports at 90° - use the one most suitable for your application.
- Can be configured with one or two pump modules for more vacuum flow capacity.

| | Series | | Capacity | | Non-Return Option | | Quick Release Option[1] | | Sensor Port Option[1] | | Silencer Option | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AX | L | | 1 | | N | -18 | | | | | | |
| | L | L-Series | 1 | 1 Ejector | (Blank) | No | (Blank) | None | (Blank) | None | (Blank) | None |
| | M | M-Series | 2 | 2 Ejectors | R | Non-Return | -AQR | Atmospheric | -PA5F | M5 Port | -ST | STA18M |
| | | | | | | | | | -PA18F | G 1/8 NPSF Port | | |

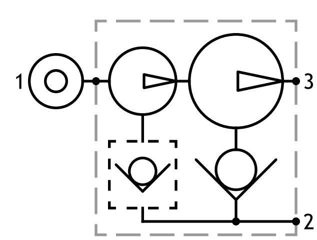
*[1]Sensor Port Options cannot be used with a Quick Release Option.*
*The AQR option comes standard with an M5x0.8 monitor port.*



| Capacity | A in [mm] | Weight oz [g] |
|---|---|---|
| 1 | 1.66 [42.2] | 4.19 [118.7] |
| 2 | 2.06 [52.4] | 4.92 [139.6] |

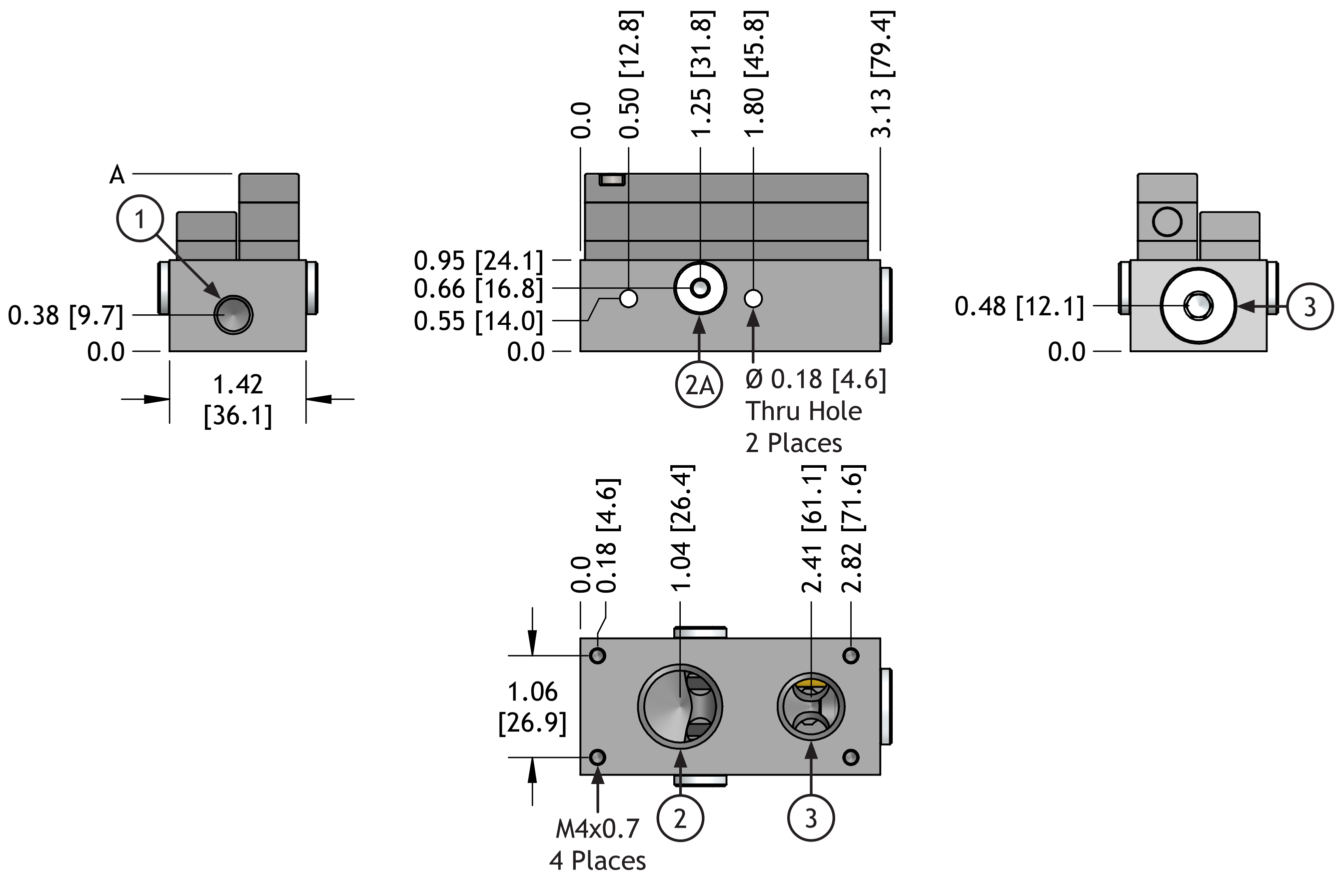
| Code | Function | Ports |
|---|---|---|
| 1 | Air Supply | G 1/8 NPSF |
| 2 | Vacuum | G 1/8 NPSF |
| 3 | Exhaust | G 1/8 NPSF |

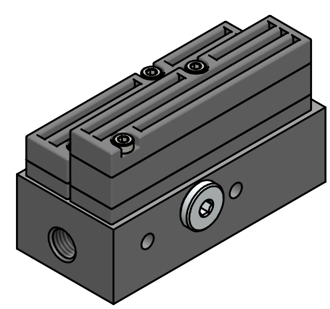


## G 1/2 NPSF Base

- Basic pump includes two exhaust ports at 90° - use the port most suitable for your application.
- Configurable with one to four pump modules for more vacuum flow capacity.
- Two side auxiliary vacuum ports are included.

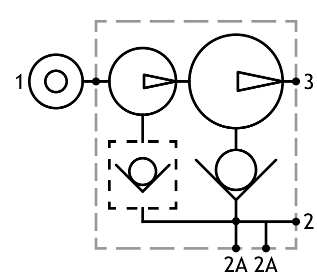
| | Series | | Capacity | | | Non-Return Option | | | Quick Release Option | | Silencer Option | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AX | L | | 2 | | N | | | -12 | | | | |
| | L | L-Series | 1 | 1 Ejectors | | (Blank) | None | | (Blank) | None | (Blank) | None |
| | M | M-Series | 2 | 2 Ejectors | | R | Non-Return | | -AQR | Atmospheric | -ST | STB38M |
| | | | 3 | 3 Ejectors | | | | | | | | |
| | | | 4 | 4 Ejectors | | | | | | | | |



| Capacity | A in [mm] | Weight oz [g] |
|---|---|---|
| 1 | 1.85 [47.0] | 8.03 [227.8] |
| 2 | 1.85 [47.0] | 8.73 [247.6] |
| 3 | 2.25 [57.2] | 9.43 [267.4] |
| 4 | 2.25 [57.2] | 10.13 [287.2] |

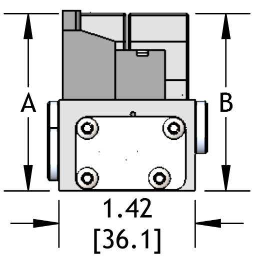
| Code | Function | Ports |
|---|---|---|
| 1 | Air Supply | G 1/8 NPSF |
| 2 | Vacuum - Main | G 1/2 NPSF |
| 2A | Vacuum - Alternate | G 1/8 NPSF |
| 3 | Exhaust | 3/8 NPSF |

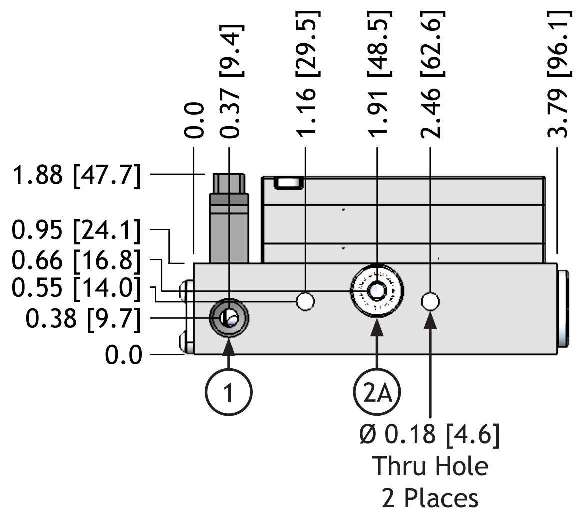


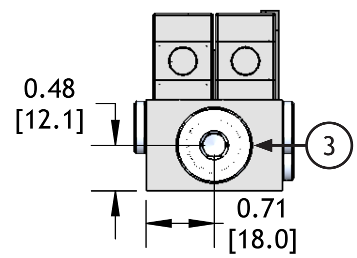
## G 1/2 NPSF Base w/ Solenoid Controlled Air-Supply

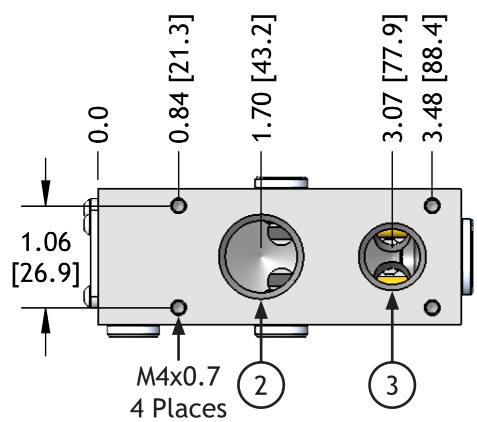
- Normally-closed solenoid valve controls vacuum-on, 24V DC, 1.3 W coil.
- Order solenoid cables separately. SV10-QD-1M (See system accessories.)
- Basic pump includes two exhaust ports at 90º - use the port most suitable for your application.
- Configurable with one to four pump modules for more vacuum flow capacity.
- Two side auxiliary vacuum ports are included.

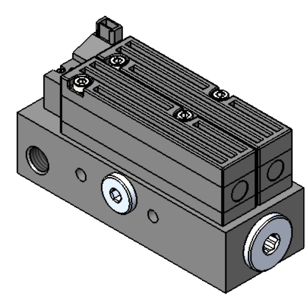
| | Series | | Capacity | | | Non-Return | | | Quick Release | | Silencer | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AX | L | | 2 | | N | | | -12S24D | | | | |
| | L | L-Series | 1 | 1 Ejectors | | (Blank) | None | | (Blank) | None | (Blank) | None |
| | M | M-Series | 2 | 2 Ejectors | | R | Non-Return | | -AQR | Atmospheric | -ST | STB38M |
| | | | 3 | 3 Ejectors | | | | | | | | |
| | | | 4 | 4 Ejectors | | | | | | | | |



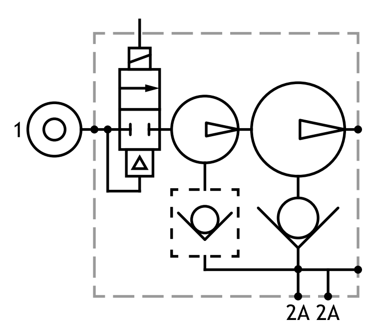



| Capacity | A in [mm] | Weight oz [g] |
|---|---|---|
| 1 | 1.85 [47.0] | 9.78 [277.4] |
| 2 | 1.85 [47.0] | 10.48 [297.2] |
| 3 | 2.25 [57.2] | 11.18 [316.9] |
| 4 | 2.25 [57.2] | 11.88 [336.7] |

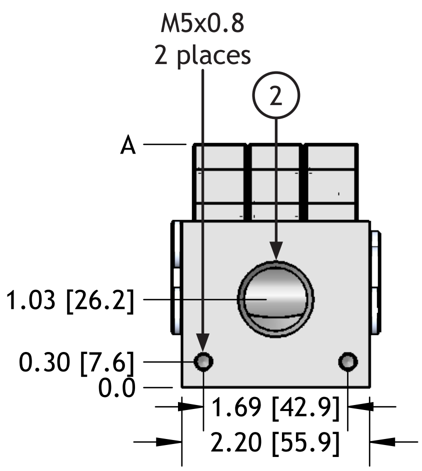
| Code | Function | Ports |
|---|---|---|
| 1 | Air Supply | G 1/8 NPSF |
| 2 | Vacuum - Main | G 1/2 NPSF |
| 2A | Vacuum - Alternate | G 1/8 NPSF |
| 3 | Exhaust | 3/8 NPSF |

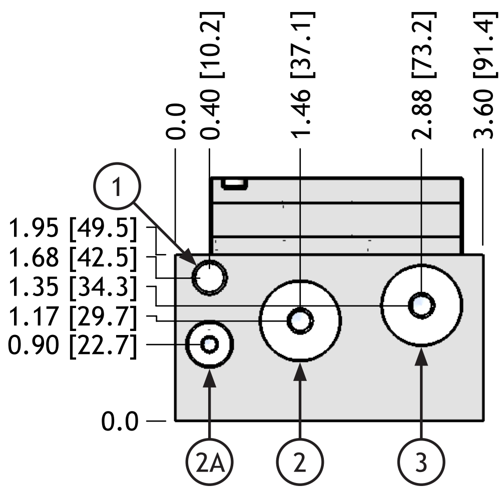


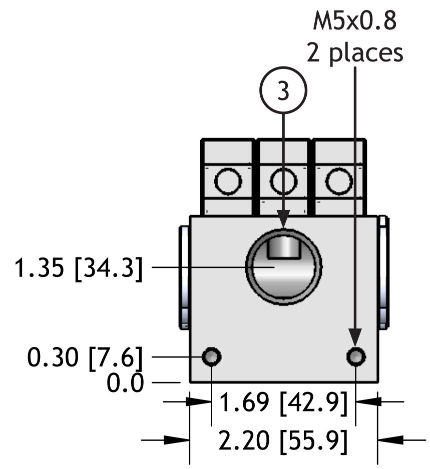
# G 1/2 NPSF Base (Large Capacity)

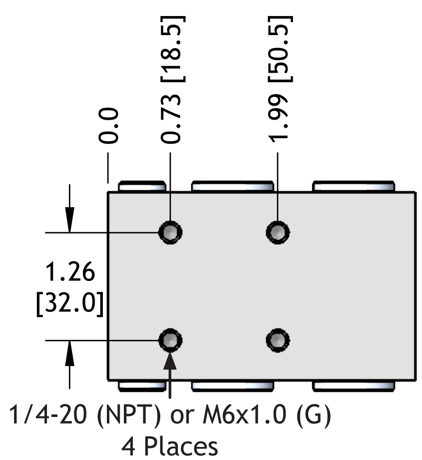
- Modular design includes rugged aluminum base for ease of installation and servicing.
- Three 1/2” pump vacuum ports simplify vacuum system plumbing - use the most convenient ports and plug the rest.
- Low noise level and fast evacuation times.
- Optional vacuum gauge, exhaust silencer, and foot-mount brackets are available.

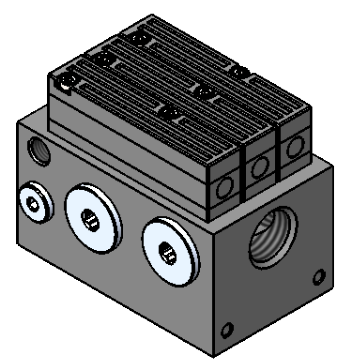
| | Series | | Capacity | | | Non-Return | | | Port Threads | | Quick Release | | Silencer | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AX | L | | 3 | | N | | | -312 | | | | | | |
| | L | L-Series | 2 | 2 Ejectors | | (Blank) | None | | (Blank) | NPT | (Blank) | None | (Blank) | None |
| | M | M-Series | 3 | 3 Ejectors | | R | Non-Return | | -G | G Threads | -AQR | Atmospheric | -ST | STC12M |
| | | | 4 | 4 Ejectors | | | | | | | | | | |
| | | | 5 | 5 Ejectors | | | | | | | | | | |
| | | | 6 | 5 Ejectors | | | | | | | | | | |



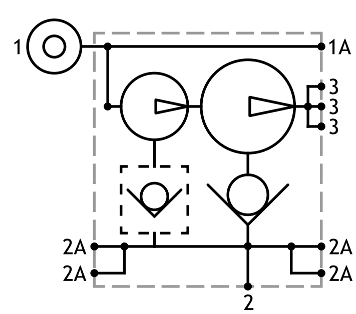



| Capacity | A in [mm] | Weight oz [g] |
|---|---|---|
| 2 | 1.85 [47.0] | 686.11 [24.2] |
| 3 | 1.85 [47.0] | 705.9 [24.9] |
| 4 | 2.25 [57.2] | 725.68 [25.6] |
| 5 | 2.25 [57.2] | 745.47 [26.3] |
| 6 | 2.25 [57.2] | 765.25 [27.0] |

| Code | Function | NPT | G |
|---|---|---|---|
| 1 | Air Supply | G 1/8 NPSF | |
| 2 | Vacuum - Main | 1/2 NPTF | G 1/2 |
| 2A | Vacuum - Alternate | G 1/8 NPSF | |
| 3 | Exhaust | 1/2 NPTF | G 1/2 |



## Mounting Brackets for AX-312 Pumps

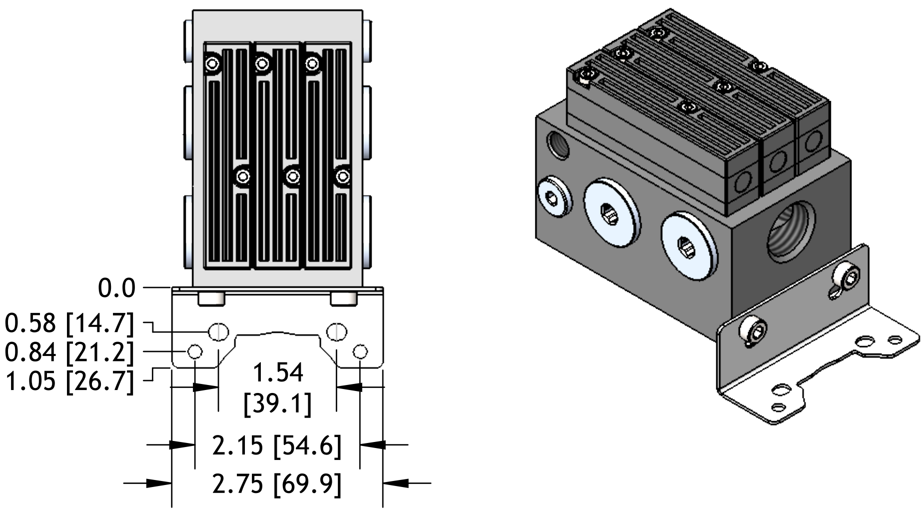
Stainless steel mounting brackets attach to the ends of the base. Straight and right angle versions are available.

M5 SHCS (qty 2) Included for easy mounting.

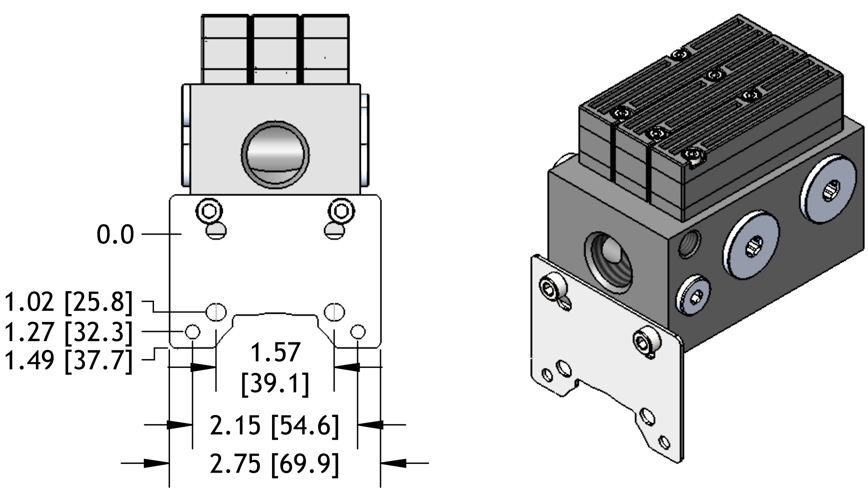
*Additional Weight: 1.29 oz [36.4 g]*

| | | Style |
|---|---|---|
| AX-312-BKT- | | 90 |
| | 90 | 90° Bracket |
| | 180 | 180° Bracket |

**AX-312-BKT-90**




**AX-312-BKT-180**

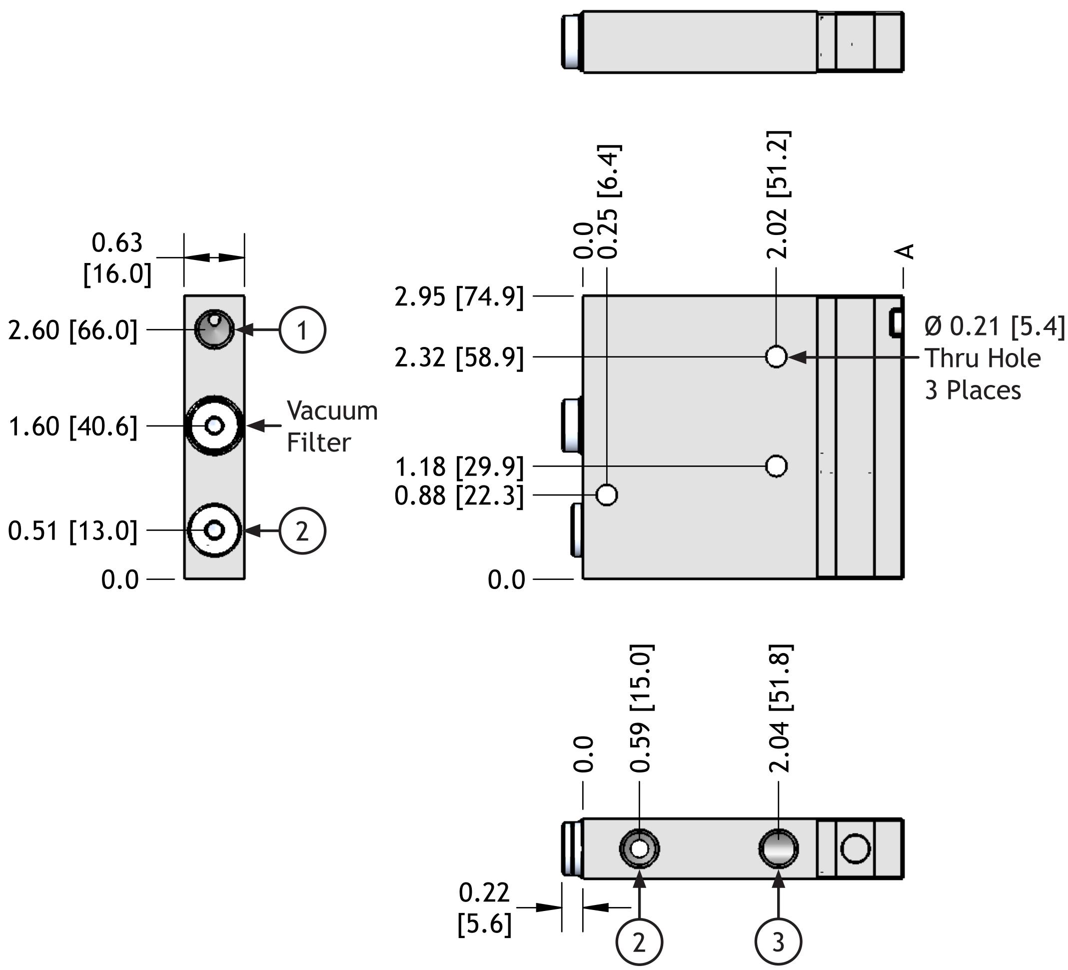


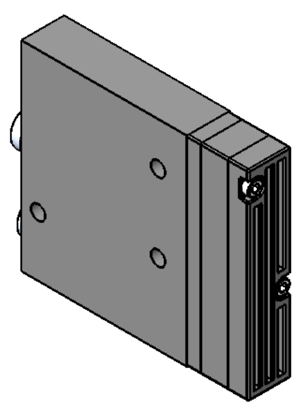
## G 1/8 NPSF Base w/ Integral Filter

- Pump with filter and two vacuum ports at 90° - use the most convenient port.
- Configurable with one or two pump modules for more vacuum flow capacity.
- RE10X50 filter element included.

| | Series | | Capacity | | | Non-Return Option | | | Quick Release Option[1] | | Sensor Port Option[1] | | Silencer Option | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AX | L | | 1 | | N | | | -F18 | | | | | | |
| | L | L-Series | 1 | 1 Ejector | | (Blank) | None | | (Blank) | None | (Blank) | None | (Blank) | None |
| | M | M-Series | 2 | 2 Ejectors | | R | Non-Return | | -AQR | Atmospheric | -PA5F | M5 Port | -ST | STA18M |
| | | | | | | | | | | | -PA18F | G 1/8 NPSF Port | | |

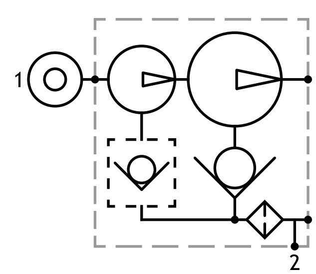
*[1]Sensor Port Options cannot be used with a Quick Release Option.*
*The AQR option comes standard with an M5x0.8 monitor port.*



| Capacity | A in [mm] | Weight oz [g] |
|---|---|---|
| 1 | 3.34 [84.8] | 7.00 [198.7] |
| 2 | 3.74 [95.0] | 7.71 [218.5] |

| Code | Function | Ports |
|---|---|---|
| 1 | Air Supply | G 1/8 NPSF |
| 2 | Vacuum | G 1/8 NPSF |
| 3 | Exhaust | G 1/8 NPSF |

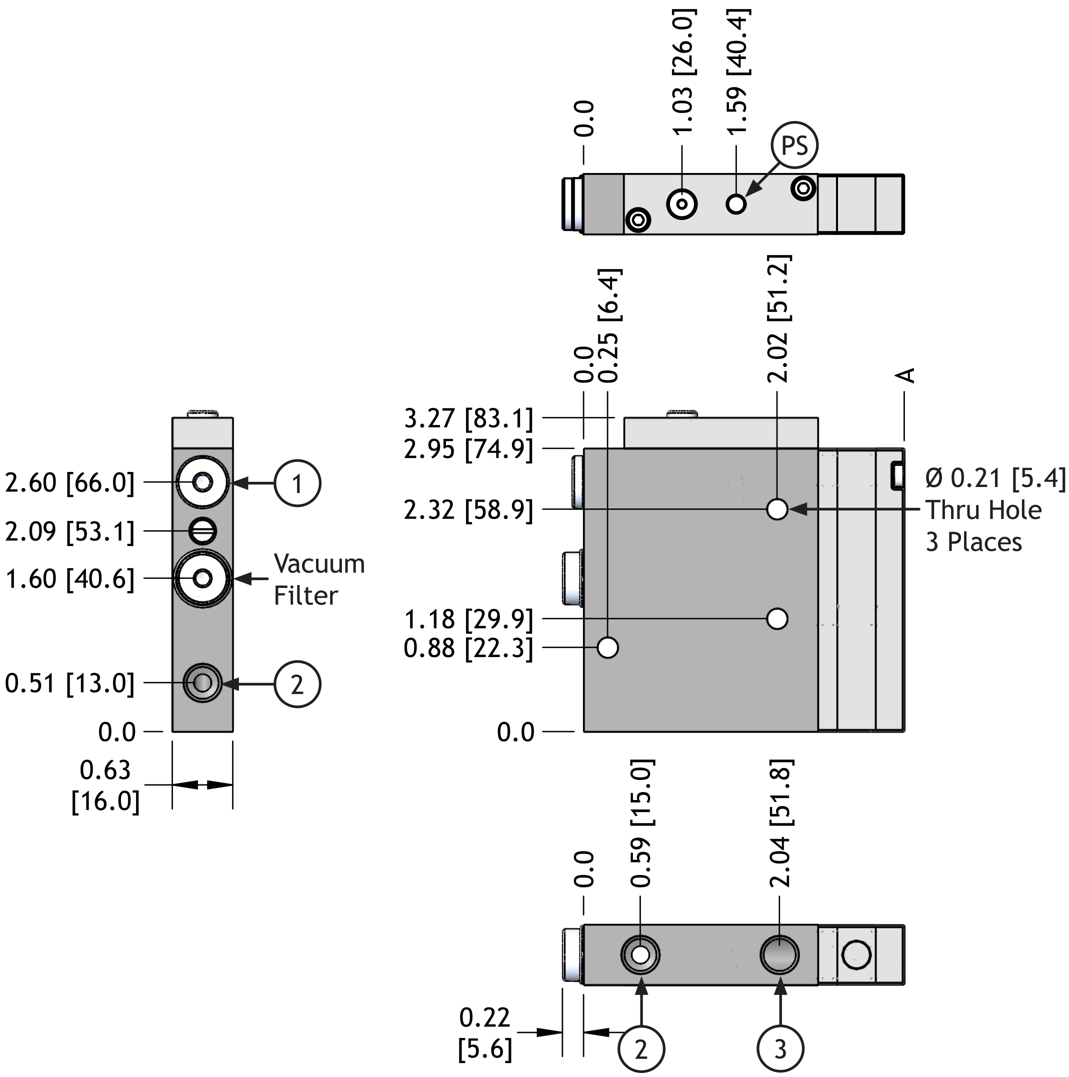


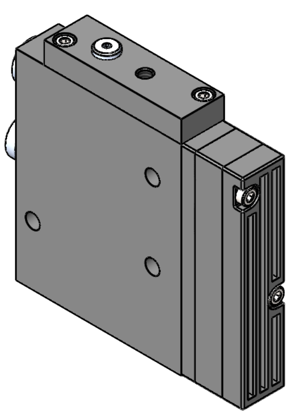
## G 1/8 NPSF Base w/ Integral Filter & Pilot Controlled Air-Supply

- Pump with filter and two vacuum ports at 90° - use the most convenient port.
- Includes internal, air-piloted air supply control valve.
- Configurable with one or two pump modules for more vacuum flow capacity.
- RE10X50 filter element included.

| | Series | Capacity | | Non-Return Option | | Quick Release Option[1] | Sensor Port Option[1] | Silencer Option |
|---|---|---|---|---|---|---|---|---|
| AX | L | 1 | N | | -F18PS | | | |
| | L — L-Series | 1 — 1 Ejector | | (Blank) — None | | (Blank) — None | (Blank) — None | (Blank) — None |
| | M — M-Series | 2 — 2 Ejectors | | R — Non-Return | | -AQR — Atmospheric | -PA5F — M5 Port | -ST — STA18M |
| | | | | | | | -PA18F — G 1/8 NPSF Port | |

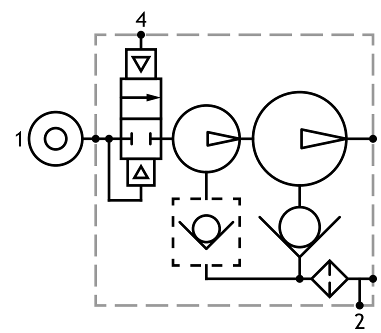
*[1]Sensor Port Options cannot be used with a Quick Release Option. The AQR option comes standard with an M5x0.8 monitor port.*



| Capacity | A in [mm] | Weight oz [g] |
|---|---|---|
| 1 | 3.34 [84.8] | 7.44 [211.0] |
| 2 | 3.74 [95.0] | 8.14 [230.8] |

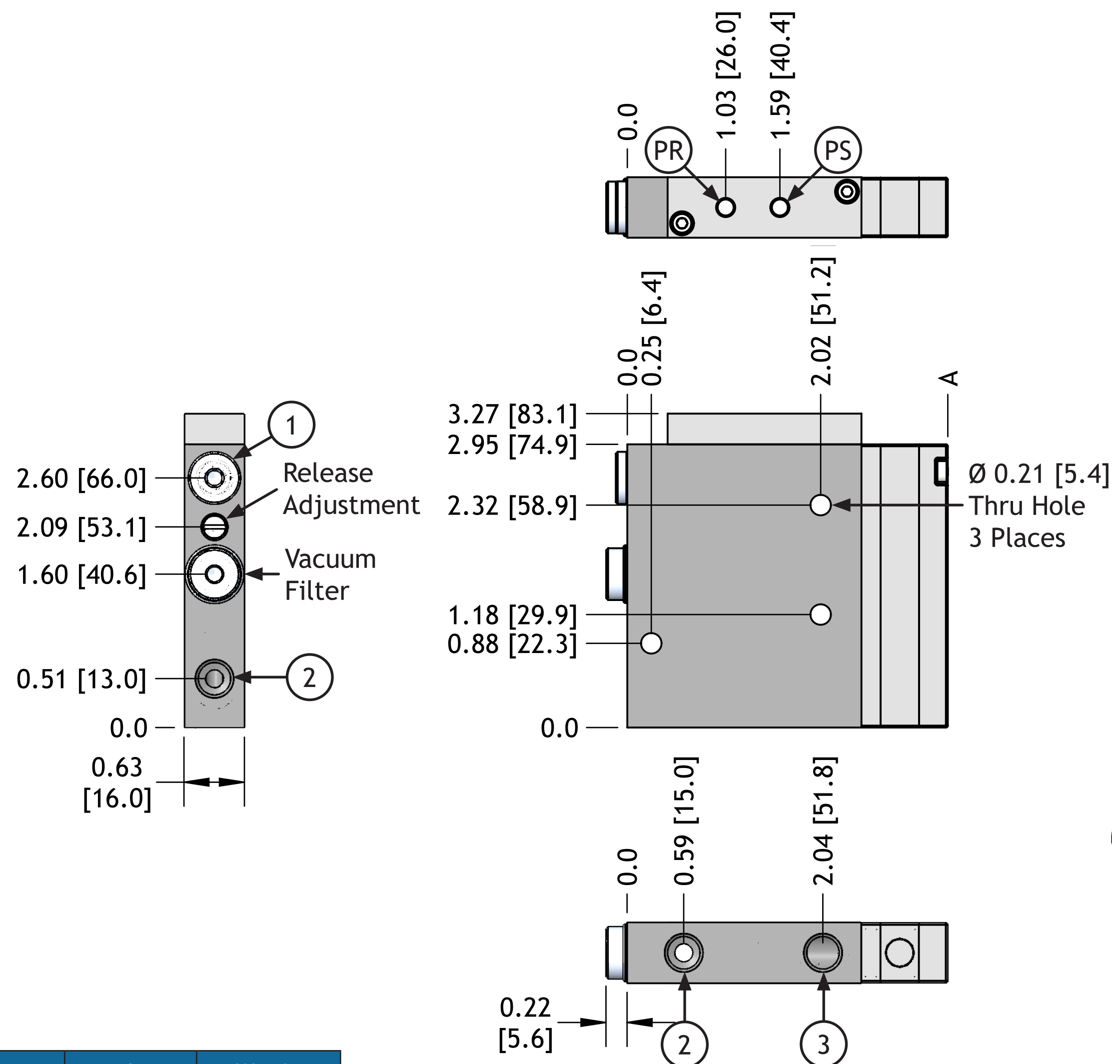
| Code | Function | Ports |
|---|---|---|
| 1 | Air Supply | G 1/8 NPSF |
| 2 | Vacuum | G 1/8 NPSF |
| 3 | Exhaust | G 1/8 NPSF |
| PS | Pilot, Air-Supply | M5x0.8 (10-32 UNF) |

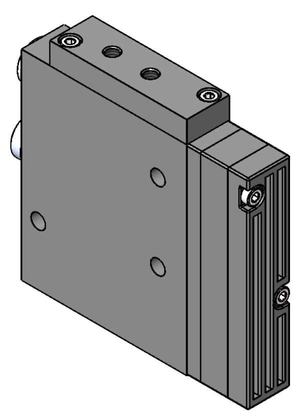


## G 1/8 NPSF Base w/ Integral Filter & Pilot Controlled Air-Supply & Release

- Pump with filter and two vacuum ports at 90° - use the most convenient port.
- Includes internal, air-piloted air supply control valve and internal, air-piloted blow-off control valve with adjustable flow control.
- Configurable with one or two pump modules for more vacuum flow capacity.
- RE10X50 filter element included.

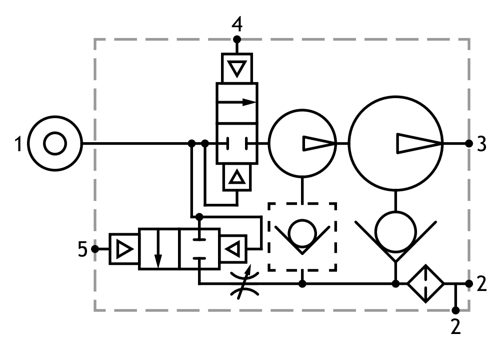
| Series | | Capacity | | Non-Return Option | | Sensor Port Option | | Silencer Option | |
|---|---|---|---|---|---|---|---|---|---|
| AX | L | 1 | N | | -F18PSB | | | | |
| L | L-Series | 1 | 1 Ejector | (Blank) | None | (Blank) | None | (Blank) | None |
| M | M-Series | 2 | 2 Ejectors | R | Non-Return | -PA5F | M5 Port | -ST | STA18M |
| | | | | | | -PA18F | G 1/8 NPSF Port | | |



| Capacity | A in [mm] | Weight oz [g] |
|---|---|---|
| 1 | 3.34 [84.8] | 7.43 [210.8] |
| 2 | 3.74 [95.0] | 8.13 [230.6] |

| Code | Function | Ports |
|---|---|---|
| 1 | Air Supply | G 1/8 NPSF |
| 2 | Vacuum | G 1/8 NPSF |
| 3 | Exhaust | G 1/8 NPSF |
| 4 | Pilot, Air-Supply | M5x0.8 (10-32 UNF) |
| 5 | Pilot, Release | M5x0.8 (10-32 UNF) |

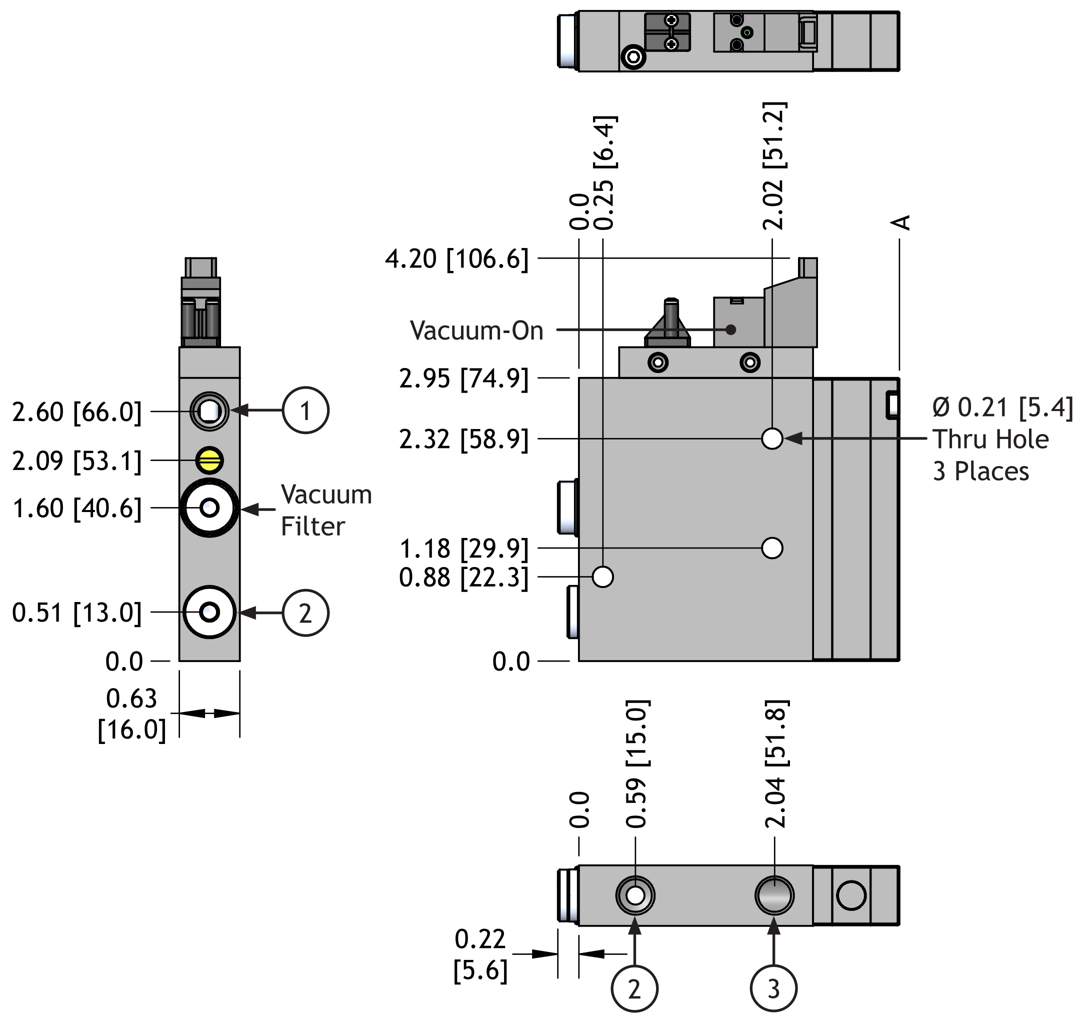


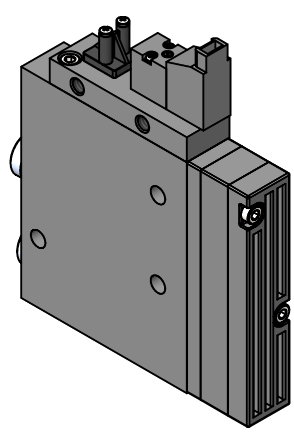
## G 1/8 NPSF Base w/ Integral Filter & Solenoid Controlled Air-Supply

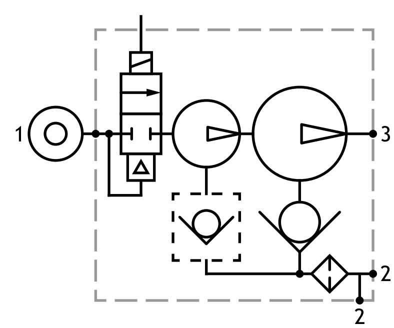
- Pump with filter and two vacuum ports at 90° - use the most convenient port.
- Normally-closed solenoid valve (24V DC, 1.3W coil) controls vacuum-on. (Order cable separately. SV10-QD-1M)
- Configurable with one or two pump modules for more vacuum flow capacity.
- RE10X50 filter element included.

| AX | Series | | Capacity | | Non-Return Option | | -F18S24D | Quick Release Option[1] | | Sensor Port Option[1] | | Silencer Option | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | L | | 1 | | N | | | | | | | | |
| | L | L-Series | 1 | 1 Ejector | (Blank) | None | | (Blank) | None | (Blank) | None | (Blank) | None |
| | M | M-Series | 2 | 2 Ejectors | R | Non-Return | | -AQR | Atmospheric | -PA5F | M5 Port | -ST | STA18M |
| | | | | | | | | | | -PA18F | G 1/8 NPSF Port | | |

*[1]Sensor Port Options cannot be used with a Quick Release Option.*
*The AQR option comes standard with an M5x0.8 monitor port.*





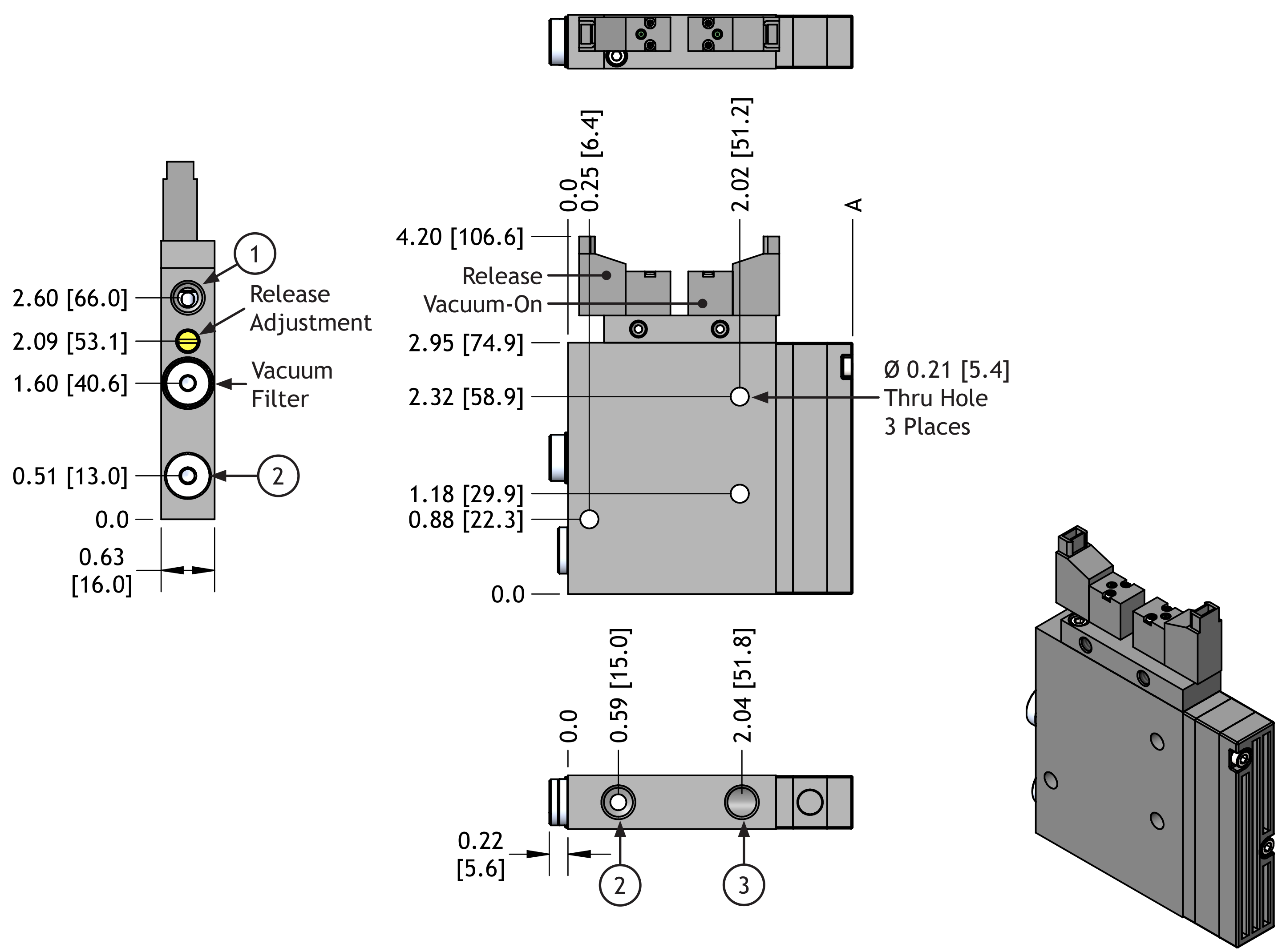

| Capacity | A in [mm] | Weight oz [g] |
|---|---|---|
| 1 | 3.34 [84.8] | 7.58 [214.9] |
| 2 | 3.74 [95.0] | 8.28 [234.7] |

| Code | Function | Ports |
|---|---|---|
| 1 | Air Supply | G 1/8 NPSF |
| 2 | Vacuum | G 1/8 NPSF |
| 3 | Exhaust | G 1/8 NPSF |

# G 1/8 NPSF Base w/ Integral Filter & Solenoid Controlled Air-Supply & Release

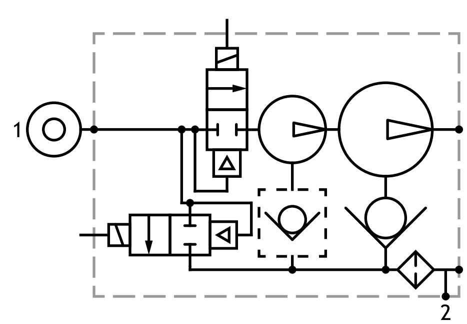
- Pump with filter and two vacuum ports at 90° - use the most convenient port.
- Normally-closed solenoid valve (24V DC, 1.3W coil) controls vacuum-on.
- Normally-closed solenoid valve (24V DC, 1.3W coil) controls release (with adjustable flow control).
- Order solenoid cables separately. SV10-QD-1M
- Configurable with one or two pump modules for more vacuum flow capacity.
- RE10X50 filter element included.

| | Series | Capacity | Non-Return Option | | Sensor Port Option | Silencer Option |
|---|---|---|---|---|---|---|
| AX | L | 1 | N | -F18SB24D | | |
| | L: L-Series | 1: 1 Ejector | (Blank): None | | (Blank): None | (Blank): None |
| | M: M-Series | 2: 2 Ejectors | R: Non-Return | | -PA5F: M5 Port | -ST: STA18M |
| | | | | | -PA18F: G 1/8 NPSF Port | |




| Capacity | A in [mm] | Weight oz [g] |
|---|---|---|
| 1 | 3.34 [84.8] | 7.71 [218.6] |
| 2 | 3.74 [95.0] | 8.41 [238.4] |

| Code | Function | Ports |
|---|---|---|
| 1 | Air Supply | G 1/8 NPSF |
| 2 | Vacuum | G 1/8 NPSF |
| 3 | Exhaust | G 1/8 NPSF |

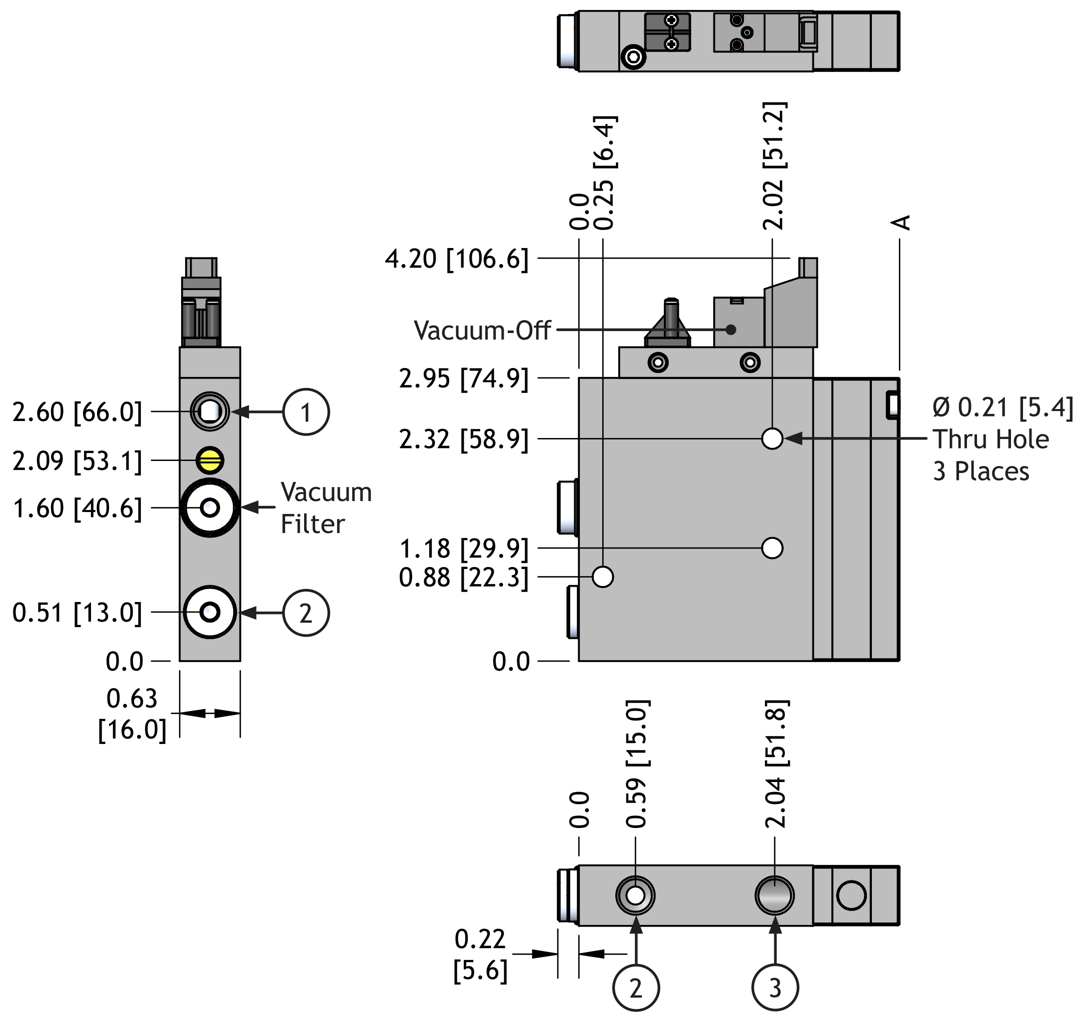


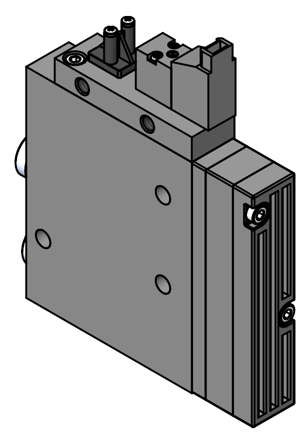
## G 1/8 NPSF Base w/ Integral Filter & N.O. Solenoid Controlled Air-Supply

- Pump with filter and two vacuum ports at 90° - use the most convenient port.
- Normally-opened solenoid valve (24V DC, 1.3W coil) controls vacuum-off. (Order cable separately. SV10-QD-1M)
- Normally-on vacuum retains parts in the event of a power failure.
- Configurable with one or two pump modules for more vacuum flow capacity.
- RE10X50 filter element included.

| AX | Series | | Capacity | | N | Non-Return Option | | -F18OS24D | Quick Release Option[1] | | Sensor Port Option[1] | | Silencer Option | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | L | L-Series | 1 | 1 Ejector | | (Blank) | None | | (Blank) | None | (Blank) | None | (Blank) | None |
| | M | M-Series | 2 | 2 Ejectors | | R | Non-Return | | -AQR | Atmospheric | -PA5F | M5 Port | -ST | STA18M |
| | | | | | | | | | | | -PA18F | G 1/8 NPSF Port | | |

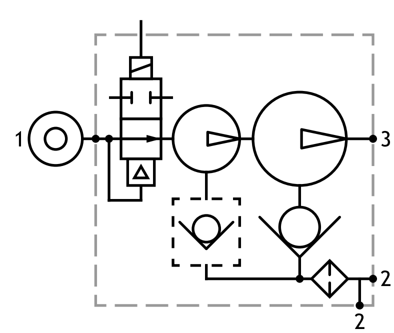
*[1]Sensor Port Options cannot be used with a Quick Release Option.*
*The AQR option comes standard with an M5x0.8 monitor port.*



| Capacity | A in [mm] | Weight oz [g] |
|---|---|---|
| 1 | 3.34 [84.8] | 7.58 [214.9] |
| 2 | 3.74 [95.0] | 8.28 [234.7] |

| Code | Function | Ports |
|---|---|---|
| 1 | Air Supply | G 1/8 NPSF |
| 2 | Vacuum | G 1/8 NPSF |
| 3 | Exhaust | G 1/8 NPSF |



# G 1/8 NPSF Base w/ Integral Filter & N.O. Solenoid Controlled Air-Supply & Release

- Pump with filter and two vacuum ports at 90° - use the most convenient port.
- Normally-opened solenoid valve (24V DC, 1.3W coil) controls vacuum-off.
- Normally-on vacuum retains parts in the event of a power failure.
- Normally-closed solenoid valve (24V DC, 1.3W coil) controls blow-off (with adjustable flow control).
- Order solenoid cables separately. SV10-QD-1M
- Configurable with one or two pump modules for more vacuum flow capacity.
- RE10X50 filter element included.

| | Series | Capacity | Non-Return Option | | Sensor Port Option | Silencer Option |
|---|---|---|---|---|---|---|
| AX | L | 1 | N | -F18OSB24D | | |

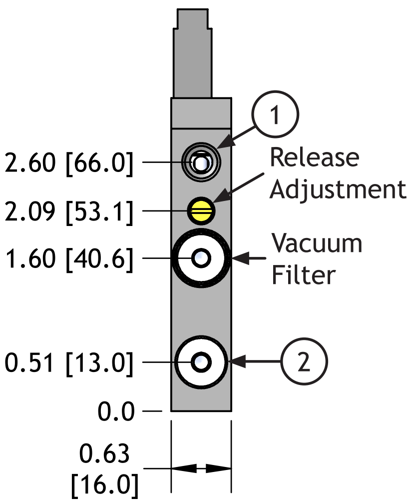
| Series | |
|---|---|
| L | L-Series |
| M | M-Series |

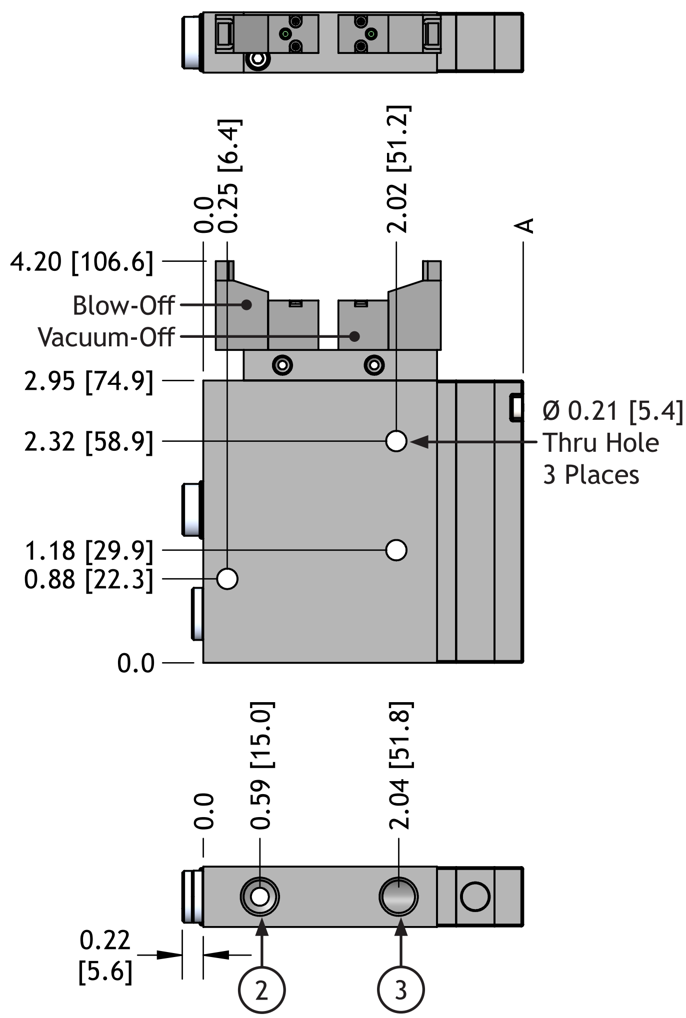
| Capacity | |
|---|---|
| 1 | 1 Ejector |
| 2 | 2 Ejectors |

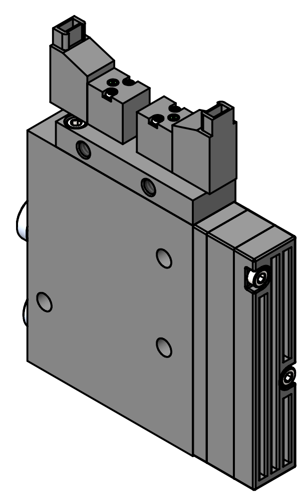
| Non-Return Option | |
|---|---|
| (Blank) | None |
| R | Non-Return |

| Sensor Port Option | |
|---|---|
| (Blank) | None |
| -PA5F | M5 Port |
| -PA18F | G 1/8 NPSF Port |

| Silencer Option | |
|---|---|
| (Blank) | None |
| -ST | STA18M |

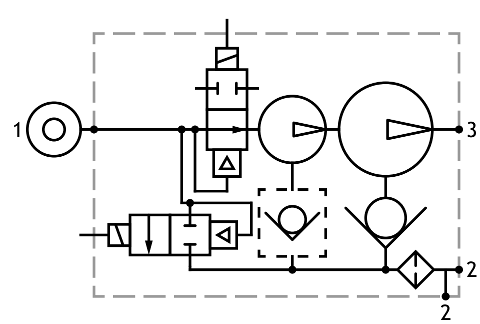


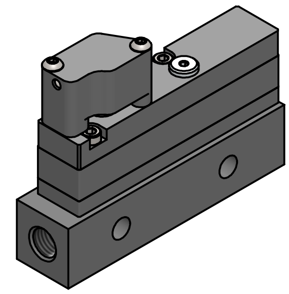
| Capacity | A in [mm] | Weight oz [g] |
|---|---|---|
| 1 | 3.34 [84.8] | 7.71 [218.6] |
| 2 | 3.74 [95.0] | 8.41 [238.4] |

| Code | Function | Ports |
|---|---|---|
| 1 | Air Supply | G 1/8 NPSF |
| 2 | Vacuum | G 1/8 NPSF |
| 3 | Exhaust | G 1/8 NPSF |



## Release Options

**-AQR: Atmospheric Quick Release**

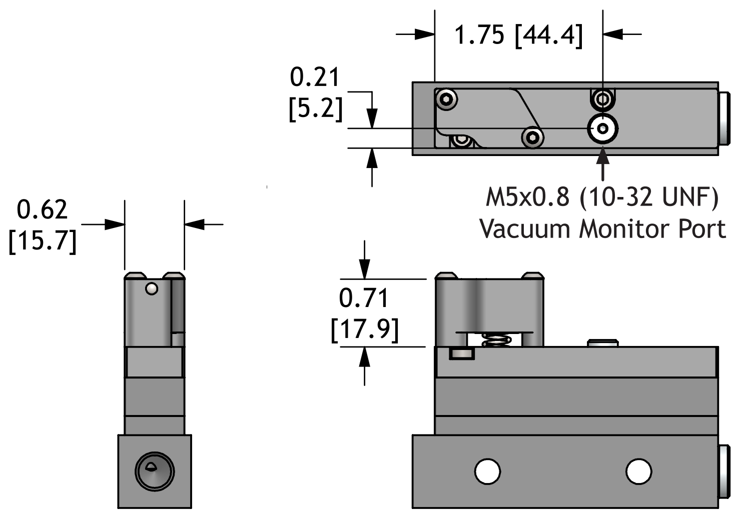


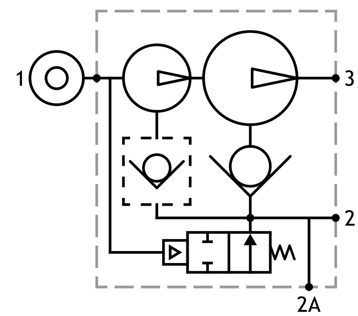
*Additional Weight: 0.98 oz [27.8 g]*

Vacuum generators, or vacuum pumps, are powered by compressed air to create vacuum. When the air source is turned off, vacuum is dissipated by atmospheric air entering the exhaust port and reverse flowing through the last venturi nozzle. This works well for slow cycle speeds and small cups but when relatively large cups are used with small vacuum generators then reverse air flow may not be sufficient to dissipate residual vacuum fast enough.

The AQR valve is spring-biased open but is held closed by air pressure supplied to the vacuum generator. When the air supply is turned off, vacuum is no longer generated and the AQR valve opens a large passage to atmosphere so that vacuum is quickly dissipated to release the work object.

The AQR module uses the same cap as the PA5F monitor port option. An M5x0.8 auxiliary vacuum port can be used with the AQR without adding a sensor port option.



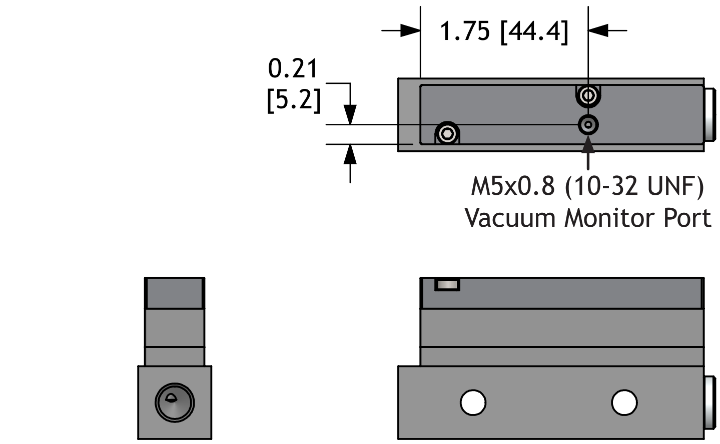



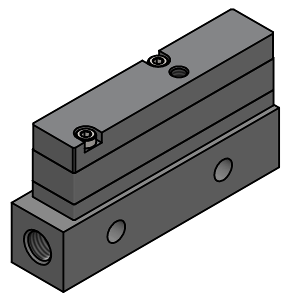

*Shown using AXL1N-18 schematic.*

## Sensor Port Options

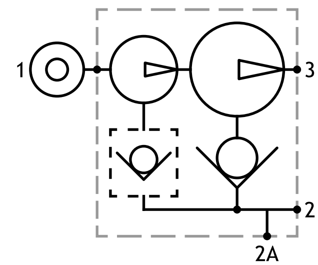
**-PA5F: M5 Female Monitor Port**

For use with sensors with M5x0.8 male connection threads.



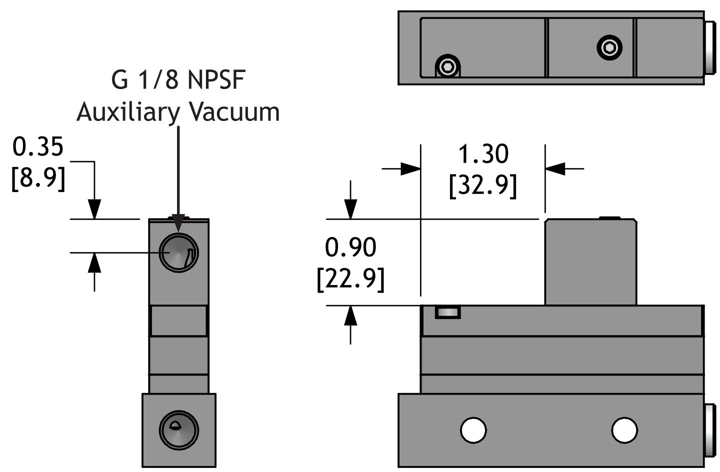
*Additional Weight: 0.49 oz [13.9 g]*

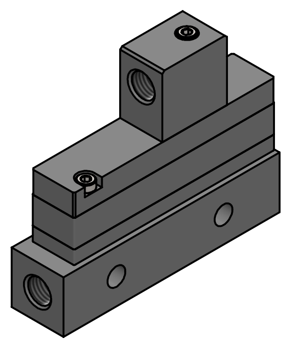



*Shown using AXL1N-18 schematic.*

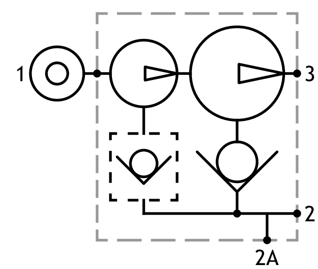
**-PA18F: G 1/8 NPSF Monitor Port**

For use with sensors with G 1/8 NPSF male connection threads.



*Additional Weight: 1.29 oz [36.6 g]*

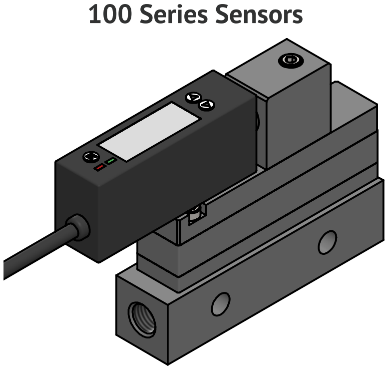



*Shown using AXL1N-18 schematic.*

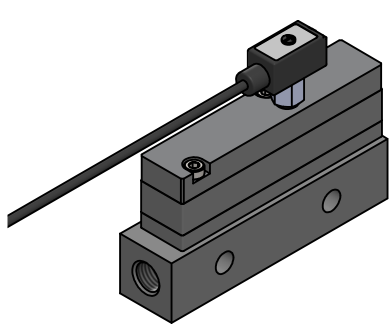
**Examples:**

*Please note, the 100 series sensors don't use the same swivel connectors as the 61 / 62 series sensors. As such, these are unable to be removed or rotated without removing the adapter block.*

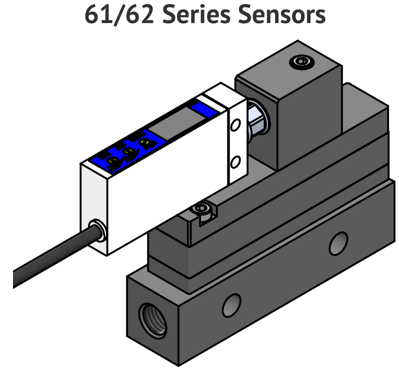
**100 Series Sensors**



**V Series Sensors**



**61/62 Series Sensors**



## Manifolds

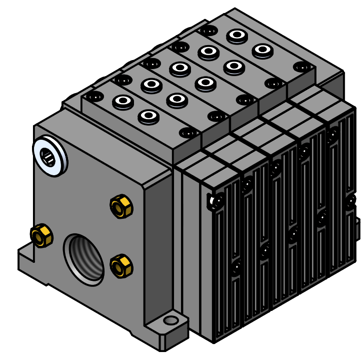
AX Series Vacuum Pumps can be used as a multi pump module manifold. All of our G 1/8 NPSF bases with integral filters (F18 models) can be used in these manifolds. To order a manifold, first, select your AX Manifold End Plate assembly. Next, decide which AX Manifold Pump Module(s) you'd like to use. Order each module as a separate line item and provide instructions for the order in which you'd like your manifold to be assembled.

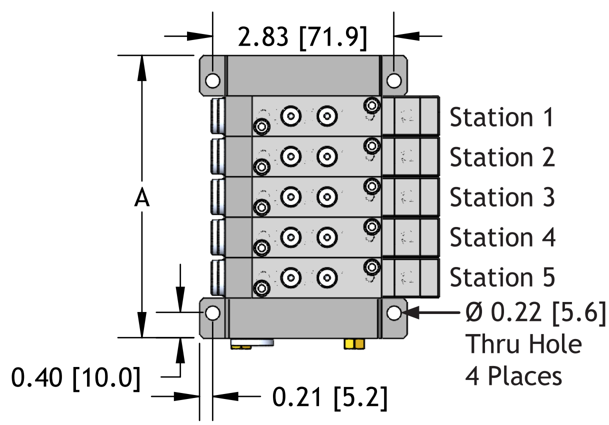
*See page 6:20 for silencer options details.*

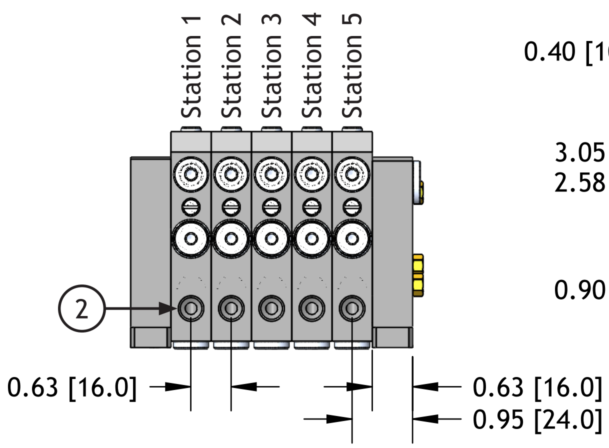
## Manifold End Plates

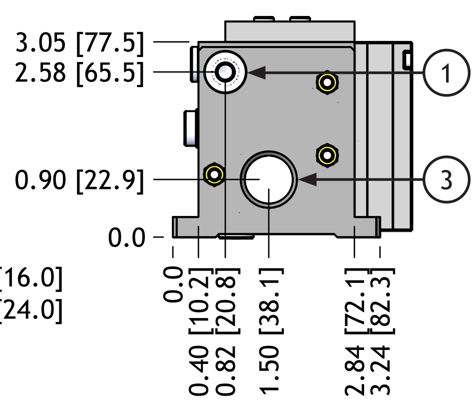
| | Threads | | Number of Modules | | Silencer Options[1] | |
|---|---|---|---|---|---|---|
| AX-E | N | | 5 | | -2ST90 | |
| | N | NPTF | 1 | 1 Station | (Blank) | None |
| | G | G | 2 | 2 Stations | -ST | 1 STC12M |
| | | | 3 | 3 Stations | -2ST[1] | 2 STC12M |
| | | | 4 | 4 Stations | -ST90 | 1 STB38M w/ 90° Adapter |
| | | | 5 | 5 Stations | -2ST90[1] | 2 STB38M w/ 90° Adapter |
| | | | 6 | 6 Stations | | |
| | | | 7 | 7 Stations | | |
| | | | 8 | 8 Stations | | |
| | | | 9 | 9 Stations | | |
| | | | 10 | 10 Stations | | |

[1]Use two silencers for 5+ stations.






| Capacity | A in [mm] | Weight oz [g] |
|---|---|---|
| 1 | 1.98 [48.0] | 9.96 [282.3] |
| 2 | 2.52 [64.0] | 10.22 [289.6] |
| 3 | 3.15 [80.0] | 10.48 [297.0] |
| 4 | 3.78 [96.0] | 10.74 [304.4] |
| 5 | 4.41 [112.0] | 10.65 [301.9] |
| 6 | 5.04 [128.0] | 10.91 [309.3] |
| 7 | 5.67 [144.0] | 11.17 [316.6] |
| 8 | 6.30 [160.0] | 11.43 [324.0] |
| 9 | 6.93 [176.0] | 11.69 [331.4] |
| 10 | 7.56 [192.0] | 11.95 [338.7] |

| Code | Function | NPT | G |
|---|---|---|---|
| 1C | Main Air Supply - Common | 1/4 NPTF | G 1/4 |
| 1S | Main Air Supply - Separate | G 1/8 NPSF | |
| 2 | Vacuum | G 1/8 NPSF | |
| 3 | Exhaust - Common | G 1/2 NPSF | |

# Manifold Vacuum Pump Modules

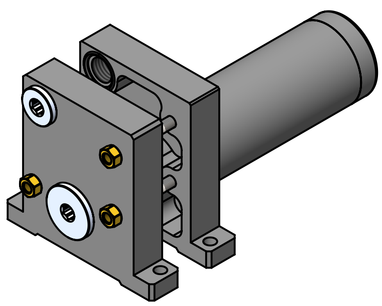
| | Series | | Capacity | | Non-Return | | | Pump Module Style | | Quick Release[1] | | Sensor Port Adapter[2] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AX | L | | 1 | | N | | - | 18 | | | | | |
| | L | L Series | 1 | 1 Ejector | (Blank) | Standard | | C18 | Standard | (Blank) | Standard | (Blank) | Standard |
| | M | M Series | 2 | 2 Ejectors | R | Non-Return | | C18PS | Pilot Controlled Air-Supply | -AQR | Atmospheric | -PA5F | M5x.08 |
| | | | | | | | | C18PSB | Pilot Controlled Air-Supply & Release | | | -PA18F | G 1/8 NPSF |
| | | | | | | | | C18S24D | Solenoid Controlled Air-Supply | | | | |
| | | | | | | | | C18SB24D | Solenoid Controlled Air-Supply & Release | | | | |
| | | | | | | | | C18OS24D | Solenoid Controlled Air-Supply (N.O.) | | | | |
| | | | | | | | | C18OSB24D | Solenoid Controlled Air-Supply & Release (N.O.) | | | | |

*[1]AQR option not available on PSB, SB24D, OSB24D pump module styles.*
*[2]Sensor Port Adapters cannot be used with a Quick Release Option. The AQR option comes standard with an M5x0.8 auxiliary vacuum port.*

### Manifold End Plate Silencer Options

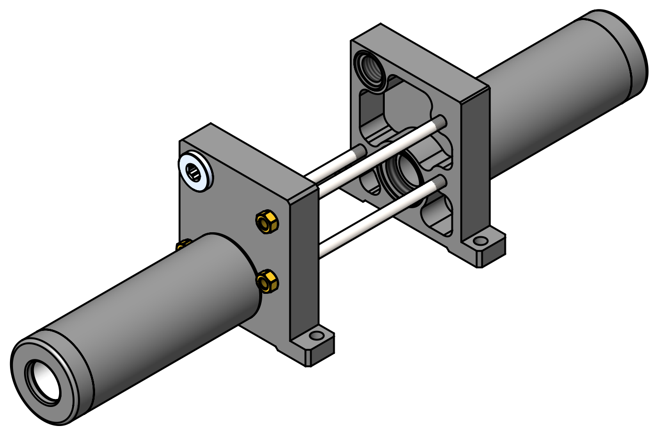
*Use two silencers when building manifolds with 5+ stations.*

**-ST**



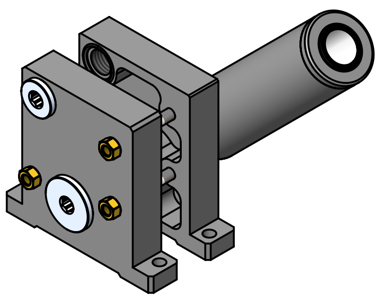
*Additional Weight: 3.36 oz [95.3 g]*

**-2ST**



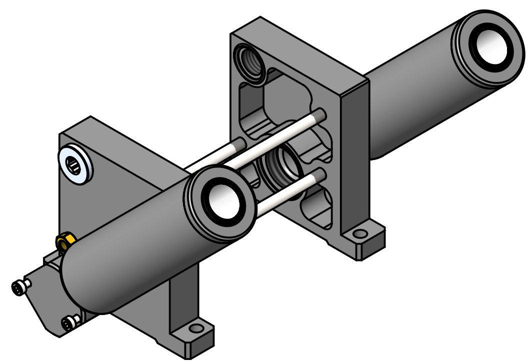
*Additional Weight: 6.72 oz [190.6 g]*

**-ST90**



*Additional Weight: 4.03 oz [114.4 g]*

**-2ST90**

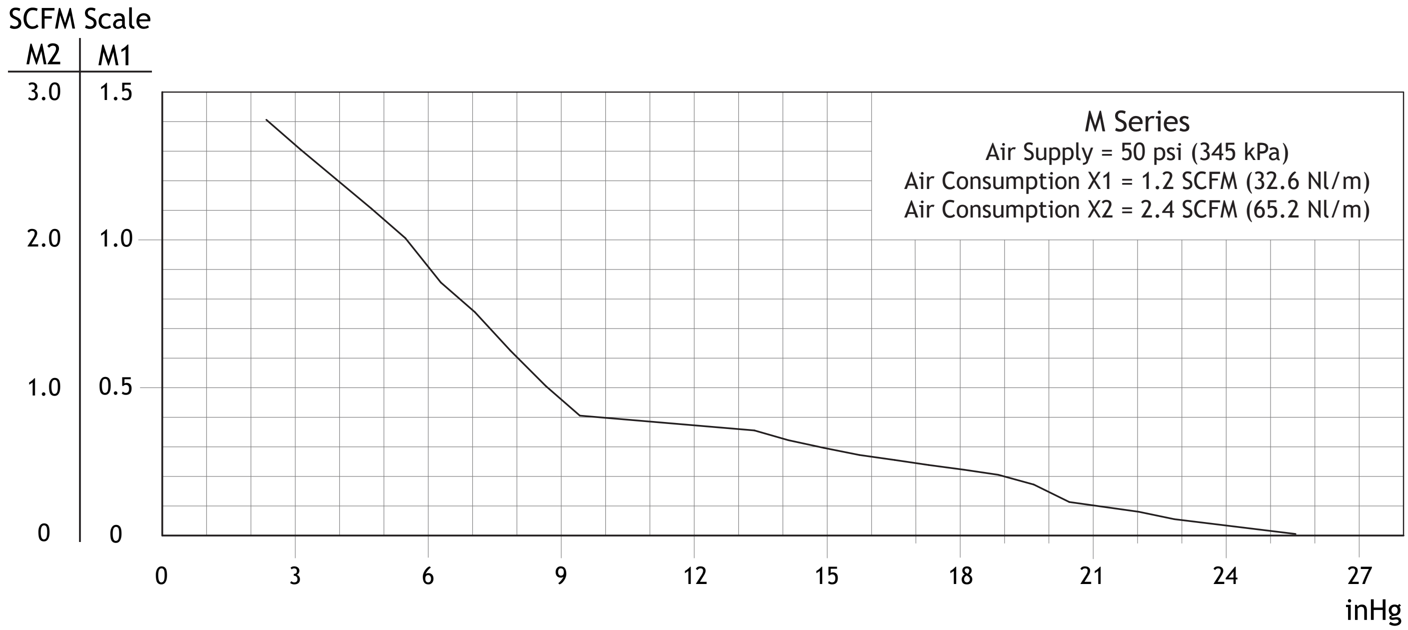


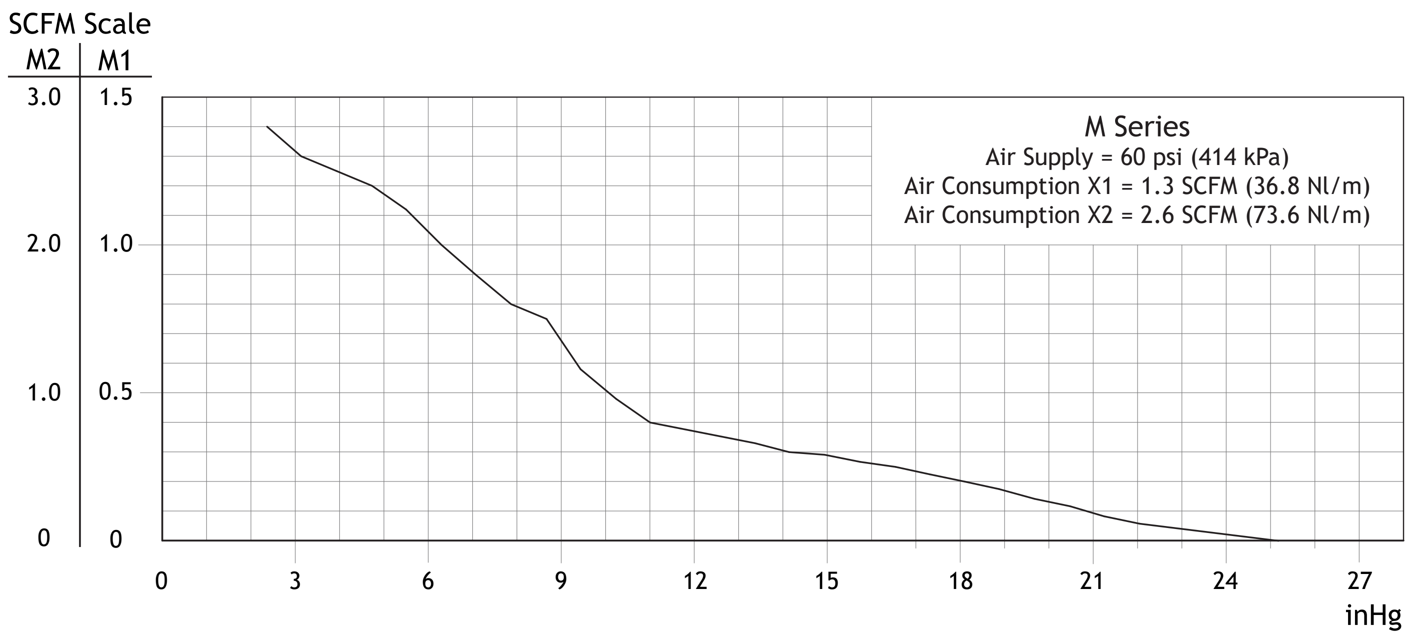
*Additional Weight: 8.06 oz [228.8 g]*

## Performance Data: M Series

AX-M series pumps are optimized for operation at 50 psi (3.5 bar) air-supply pressure. Performance data at any other air pressure is shown solely for reference and serves only to demonstrate the affect of operation at non-optimal air pressures. Do not expect identical performance to tabulated data.

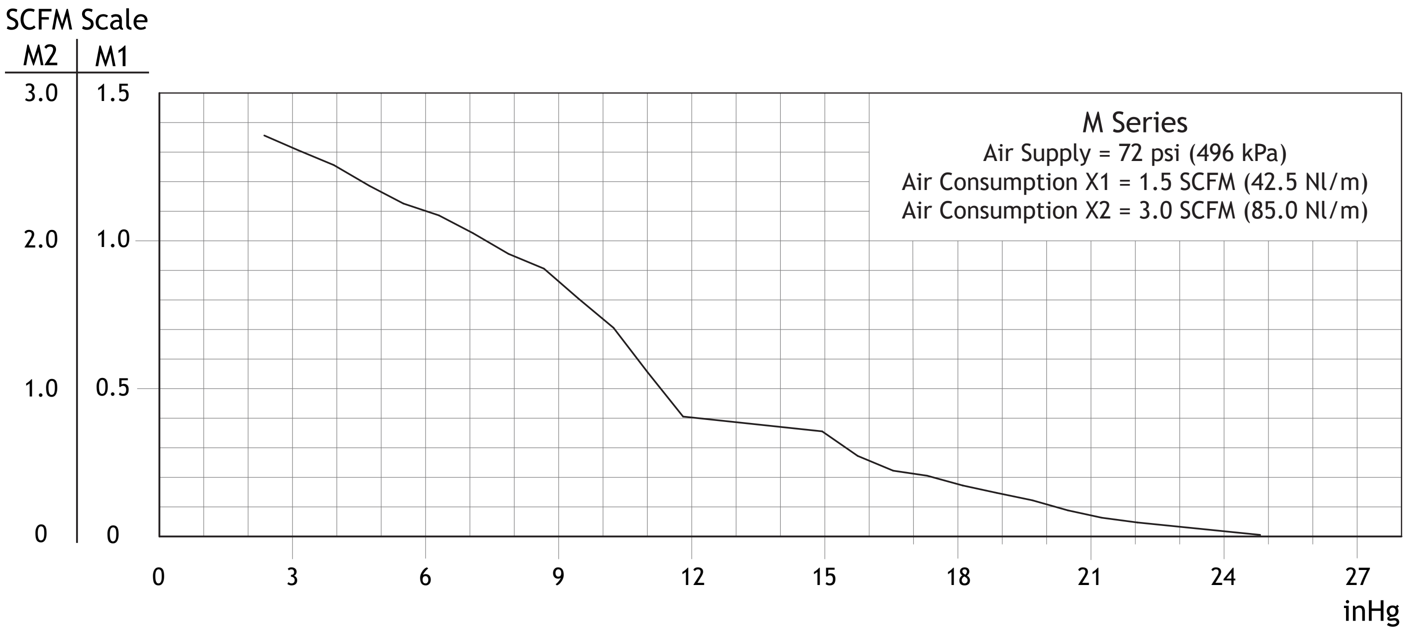
Graphs and tables show performance data at standard atmospheric conditions of 59° F (15° C) and 29.92 inHg (760 mmHg). Attainable vacuum levels will decrease with an increase in elevation or temperature.

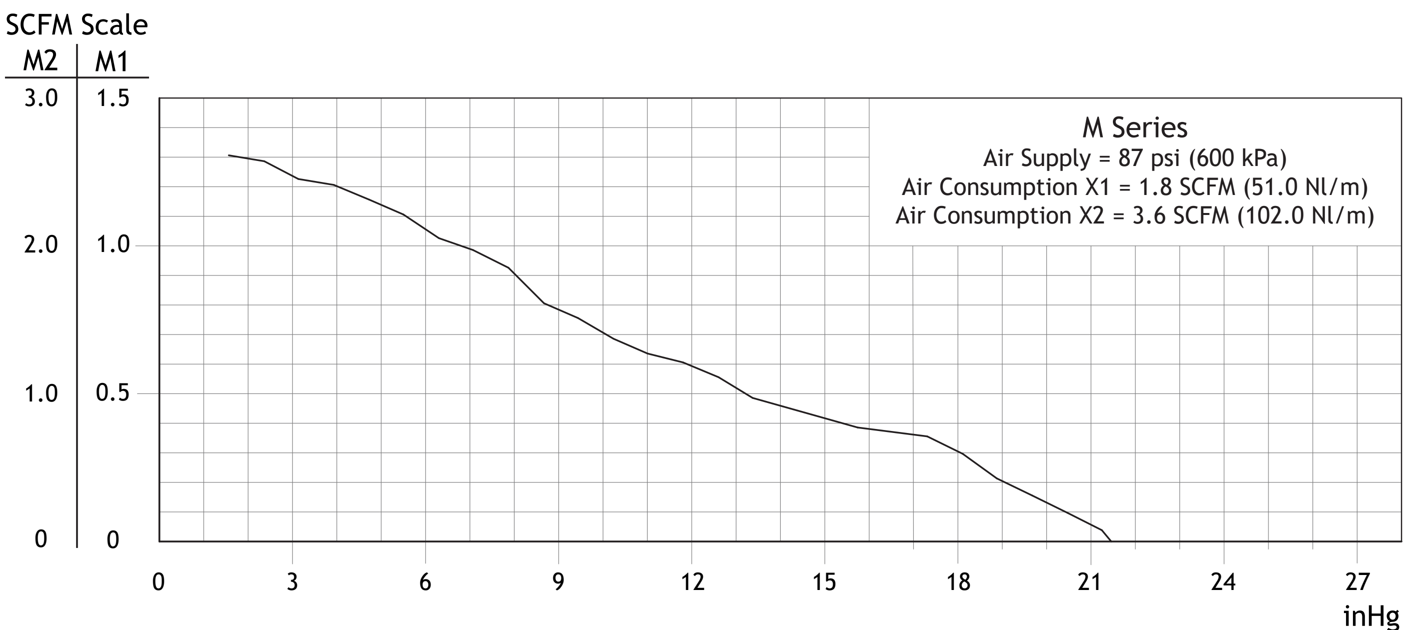



*All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.*

## Performance Data: M Series



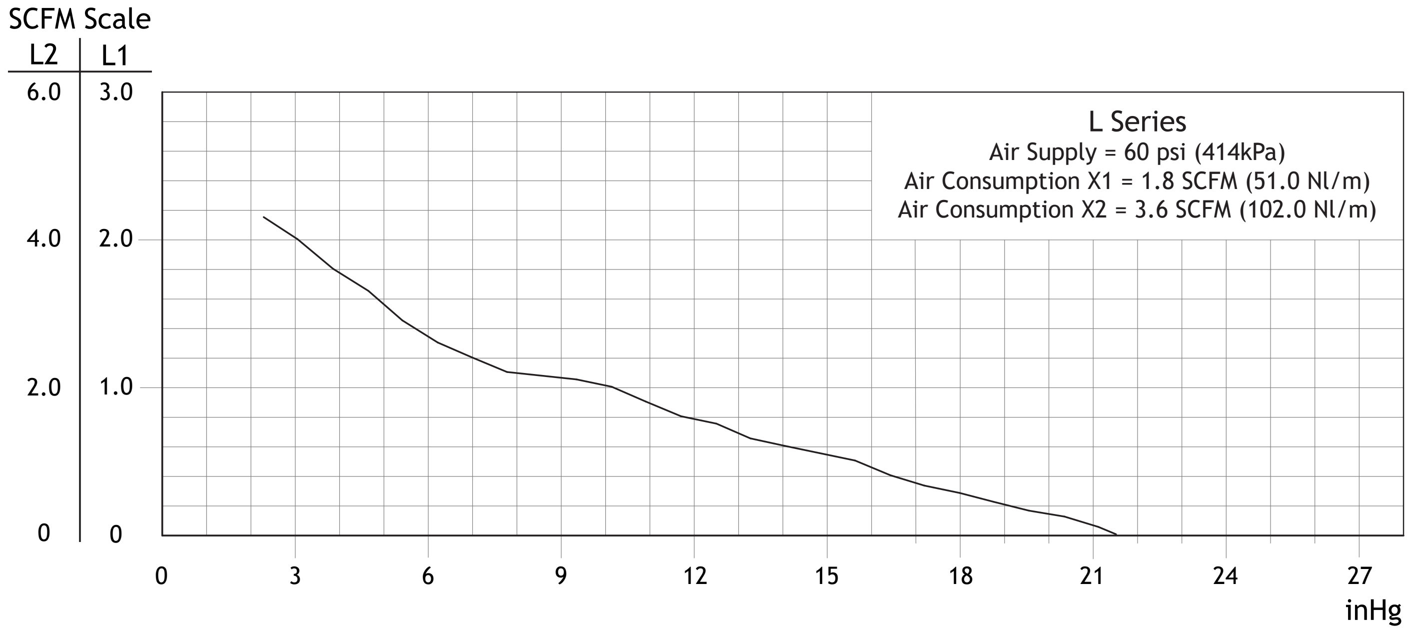



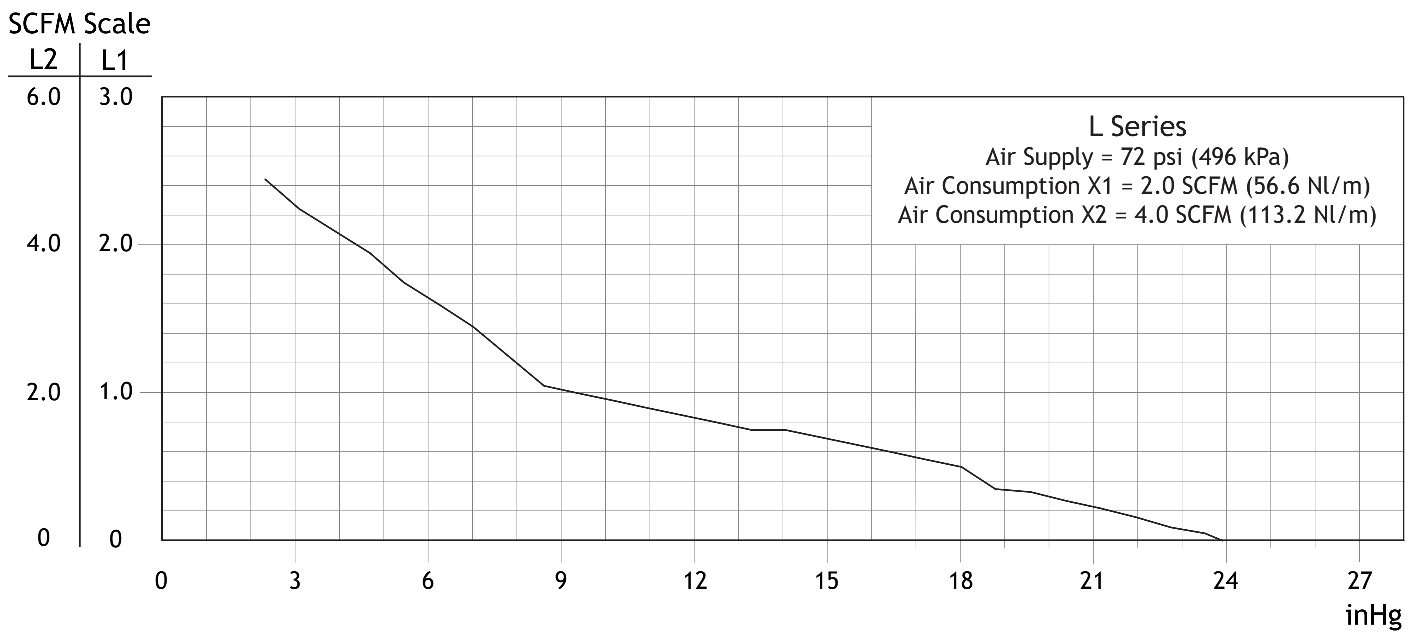

*All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.*

## Performance Data: L Series

AX-L series pumps are optimized for operation at 87 psi (6.0 bar) air-supply pressure. Performance data at any other air pressure is shown solely for reference and serves only to demonstrate the affect of operation at non-optimal air pressures. Do not expect identical performance to tabulated data.

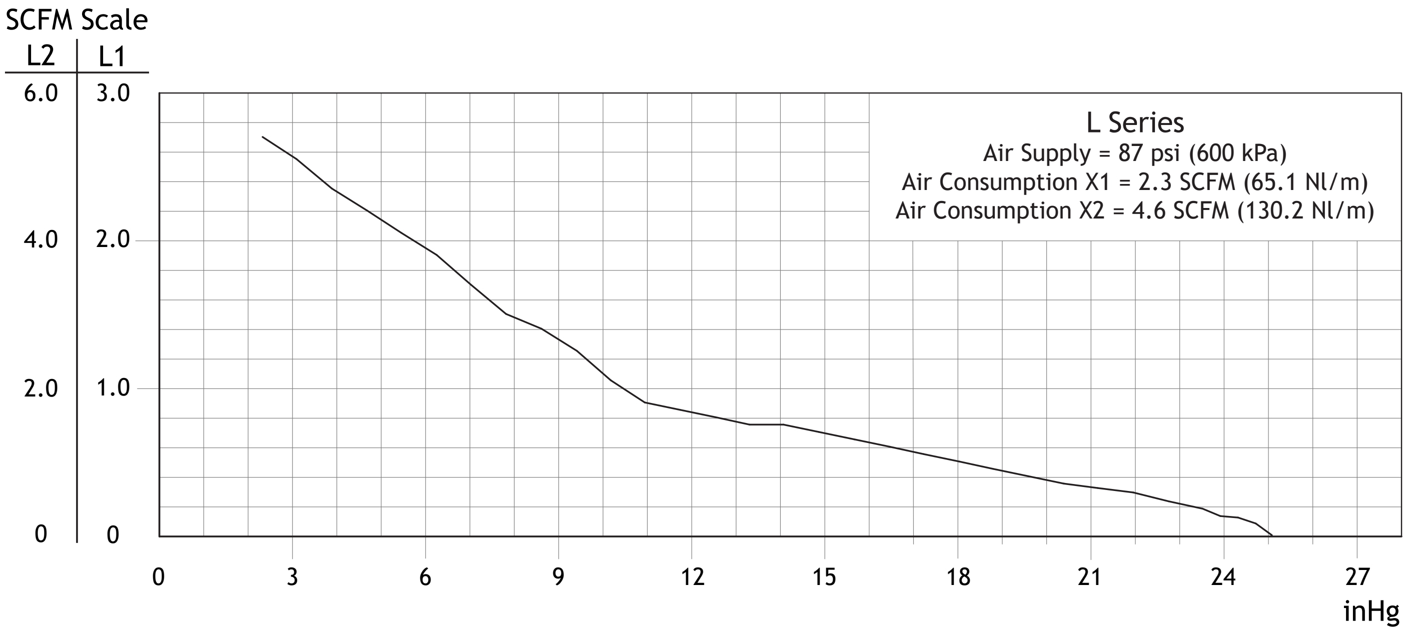
Graphs and tables show performance data at standard atmospheric conditions of 59° F (15° C) and 29.92 inHg (760 mmHg). Attainable vacuum levels will decrease with an increase in elevation or temperature.




*All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.*

## Performance Data: L Series




## Performance Data: Both Series

### Vacuum Flow - SCFM

| Model | Air Supply PSI | Air Cons. SCFM | Max Vacuum inHG | SCFM at Vacuum Level | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 3 inHG | 6 inHG | 9 inHG | 12 inHG | 15 inHG | 18 inHG | 21 inHG | 24 inHG |
| AXM1N | 50 | 1.2 | 25.5 | 1.30 | 0.91 | 0.46 | 0.37 | 0.29 | 0.22 | 0.10 | 0.03 |
| AXM1N | 60 | 1.3 | 25.1 | 1.32 | 1.00 | 0.67 | 0.37 | 0.29 | 0.20 | 0.10 | 0.02 |
| AXM1N | 72 | 1.5 | 24.8 | 1.31 | 1.10 | 0.86 | 0.40 | 0.34 | 0.17 | 0.06 | 0.01 |
| AXM1N | 87 | 1.8 | 21.4 | 1.23 | 1.05 | 0.78 | 0.59 | 0.41 | 0.30 | 0.05 | 0.004 |
| AXL1N | 60 | 1.8 | 21.6 | 2.03 | 1.35 | 1.06 | 0.79 | 0.55 | 0.29 | 0.07 | - |
| AXL1N | 72 | 2.0 | 24.0 | 2.28 | 1.65 | 1.03 | 0.84 | 0.70 | 0.51 | 0.24 | - |
| AXL1N | 87 | 2.3 | 25.1 | 2.57 | 1.95 | 1.30 | 0.84 | 0.70 | 0.51 | 0.33 | 0.13 |

*SCFM X 28.32 = nl / m*

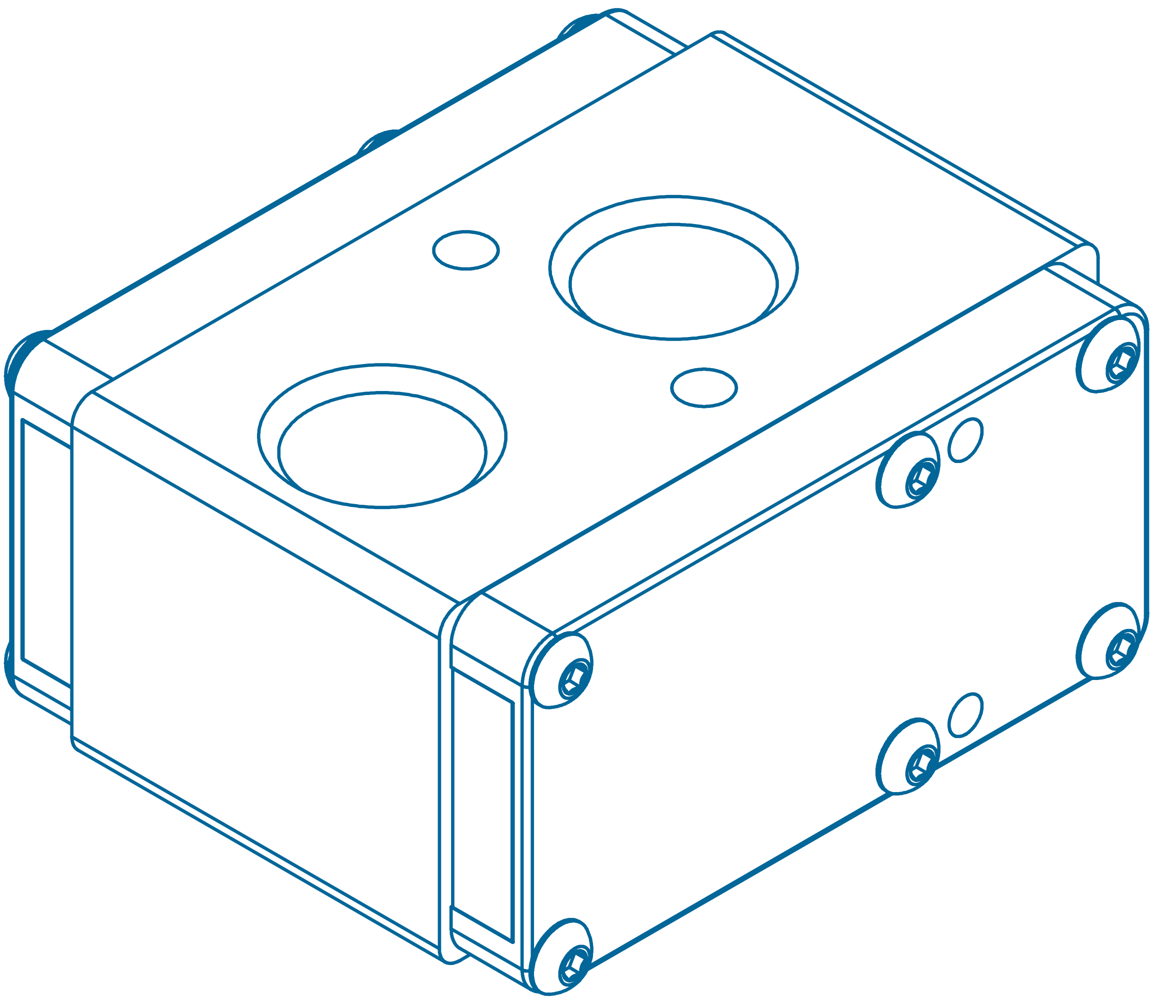
### Evacuation Time (sec / 100 in$^3$)

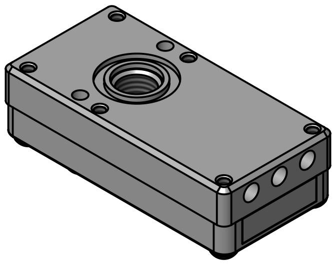
| Model | Air Supply PSI | Air Cons. SCFM | Max Vacuum inHG | Seconds to Vacuum Level | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 3 inHG | 6 inHG | 9 inHG | 12 inHG | 15 inHG | 18 inHG | 21 inHG | 24 inHG |
| AXM1N | 50 | 1.2 | 25.5 | 0.43 | 0.50 | 0.57 | 1.82 | 3.1 | 5.3 | 9.3 | 18.3 |
| AXM1N | 60 | 1.3 | 25.1 | 0.43 | 0.47 | 0.91 | 1.67 | 2.9 | 4.9 | 8.7 | 16.9 |
| AXM1N | 72 | 1.5 | 24.8 | 0.20 | 0.48 | 0.89 | 1.57 | 2.7 | 4.6 | 8.3 | 16.1 |
| AXM1N | 87 | 1.8 | 21.4 | 0.15 | 0.50 | 0.94 | 1.62 | 2.7 | 4.5 | 8.0 | 15.7 |
| AXL1N | 60 | 1.8 | 21.6 | 0.12 | 0.31 | 0.61 | 1.07 | 1.8 | 3.1 | 5.5 | - |
| AXL1N | 72 | 2.0 | 24.0 | 0.11 | 0.27 | 0.53 | 0.96 | 1.6 | 2.7 | 4.7 | 9.2 |
| AXL1N | 87 | 2.3 | 25.1 | 0.10 | 0.24 | 0.47 | 0.84 | 1.5 | 2.4 | 4.3 | 8.1 |

*sec / 100 in$^3$ X 0.61 = sec / l*

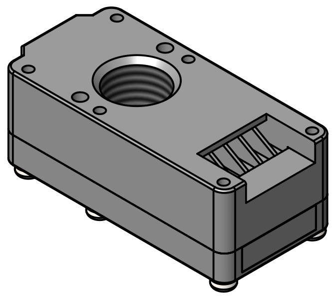
*All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.*

# Chip Series Vacuum Pumps
## Section 7

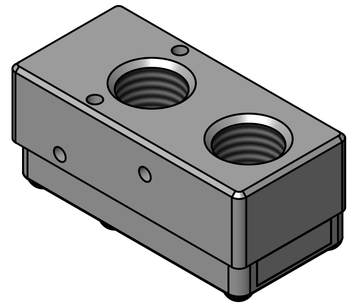




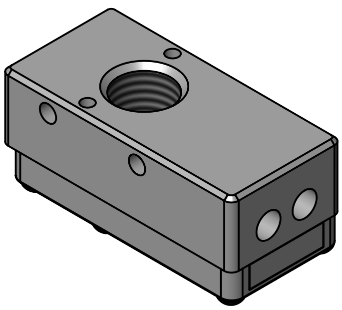
AA Base



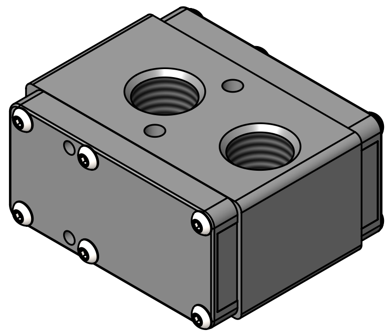
A & B Base



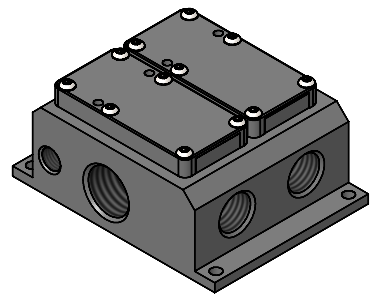
C Base



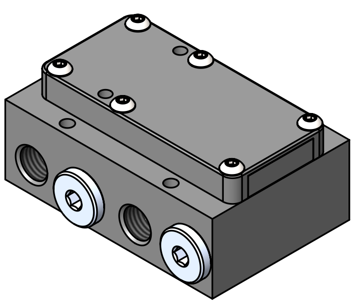
D Base



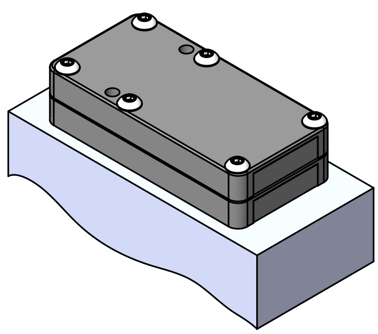
G Base



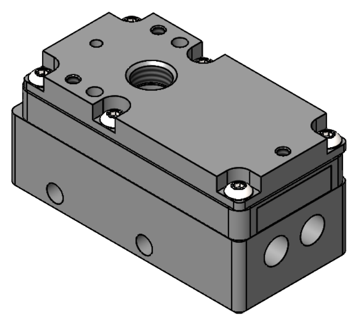
K Base



M Base



Z & ZS Option



Options

## Basic Information

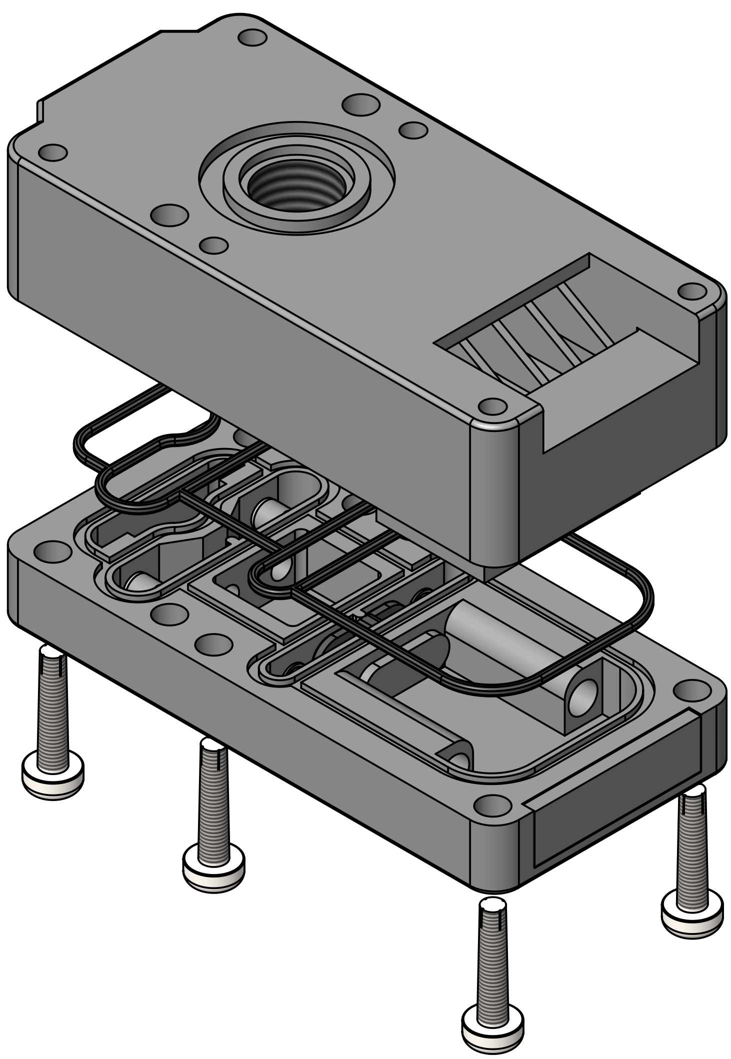
EDCO Vacuum Chip Pumps were named after electronic circuit chips whose small size and versatility have made modern products more efficient, compact, and affordable. Our low-cost Chip Pumps will do the same thing for your vacuum systems.

Chip Pumps provide the performance you expect from a multi-stage, multi-ejector, air-powered vacuum pump. To increase pump capacity, we simply add another pump module to the assembly stack. Our standard seal and valve elastomer is Nitrile, but we also offer Viton[1] and EPDM seal materials at a reasonable price. To make our systems easier to design and install, we offer non-return valves and direct mounted electronic sensors. We are always open to suggestions, so contact us if you need an accessory that you don't see in our catalog.

EDCO Chip Pumps are offered with seven standard base configurations and a "Z" option for no base at all. This allows a designer complete freedom to integrate a Chip Pump module into a proprietary assembly. However, it is more common to select an EDCO Vacuum Pump having one of the eleven standard bases that best suits your application needs. EDCO USA will design and manufacture custom bases and pump assemblies for OEMs that have special needs which are not satisfied by our standard products. Fill out the Application Worksheet in the resources available on our website.

We have selected 40% glass-filled Polyphenylene Sulphide (PPS, Ryton) for its extremely high strength, light weight, and chemical resistance. The pump bodies and ejectors are all made of PPS to eliminate chemical compatibility problems caused when different materials are used for parts within the same vacuum pump. A and B bases are also PPS for the same reason. All other bases are made of anodized aluminum for applications requiring maximum ruggedness or a larger capacity vacuum pump. All fasteners used are 303/304 series stainless steel.

*[1]Viton is a registered trademark of DuPont Dow.*



## Venturi Selection

| Code | Air Pressure | | Max Vacuum inHg [-kPa] |
|---|---|---|---|
| | psi | bar | |
| 4M | 60 | 4 | 25.50 [86.4] |
| 5L | 72 | 5 | 22.80 [77.2] |
| 6E | 87 | 6 | 25.50 [86.4] |
| 6M | 87 | 6 | 22.50 [86.4] |

## Seal Material Selection

| Code | Description |
|---|---|
| N | Nitrile |
| E | EPDM |
| V | Viton[1] |

[1]Viton is a registered trademark of DuPont Dow.

## Chemical Compatibility

| Medium | Material | | | | |
|---|---|---|---|---|---|
| | PPS | Aluminum | Nitrile | EPDM | Viton[1] |
| Weather, Ozone | E | G | L | E | E |
| Heat, Aging | E | E | G | G | E |
| Oil, Petrol | E | L | E | U | E |
| Hydrolysis | E | E | G | G | G |
| Acid, Alkali | E | U | G | E | G |
| Acetone | E | E | U | E | U |
| Ammonia | G | G | L | E | U |
| Amyl Alcohol | E | G | G | E | G |
| Benzene | E | G | U | U | E |
| Butanol | E | G | G | G | E |
| Cyclohexane | E | E | G | U | E |
| Ethanol | E | G | L | E | E |
| Ethyl Acetate | E | G | U | G | U |
| Hexane | E | E | E | U | E |
| Carbone Tetrachloride | E | U | U | U | E |
| Chlora Benzene | E | E | U | U | E |
| Chloroform | E | L | U | U | E |
| Methanol | E | G | E | E | L |
| Methylene Chloride | E | L | U | G | E |
| Methyl Ethyl Ketone | E | G | U | E | U |
| NaOH | E | U | G | E | G |
| Propanol | E | G | E | E | E |
| Sulphuric Acid | E | U | L | G | E |
| Tetrahydrofuran | E | U | U | G | U |
| Tetrachlorethelene | E | U | U | U | E |
| Toulene | E | E | U | U | E |
| Trichlorethane | E | U | U | U | E |
| Trichlorethylene | E | U | U | U | E |
| Xylene | E | G | U | U | E |
| Acetic Acid | E | L | E | E | G |

*E = Excellent | G = Good | L = Limited | U = Unsuited*

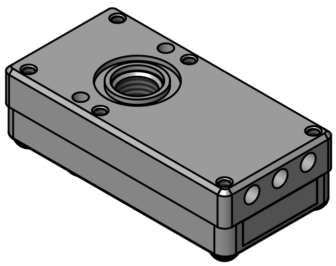
[1]*Viton is a registered trademark of DuPont Dow.*

## AA Base

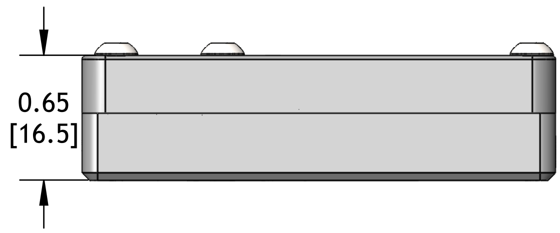
PPS Pump Module w/ Aluminum Base

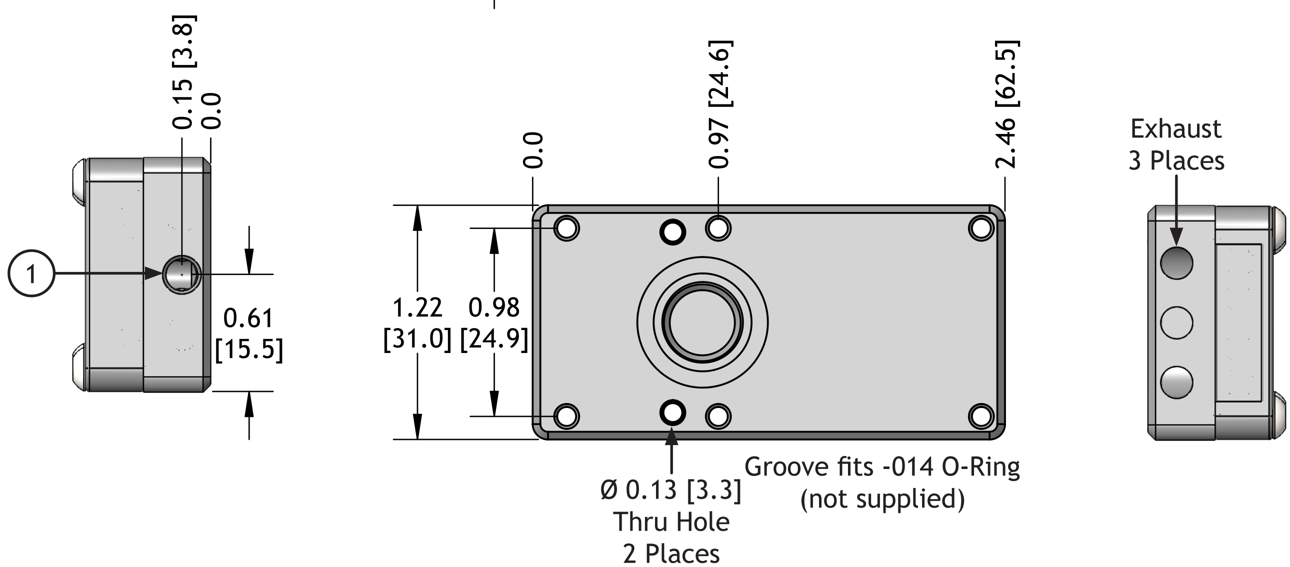
| | Series | Capacity | Seal Material | | Non-Return Option | | Options | |
|---|---|---|---|---|---|---|---|---|
| C | 6M | 10 | N | | | | -AA | |
| | 4M | M Series | E | EPDM | (Blank) | None | (Blank) | None |
| | 6M | 10 | N | Nitrile | R | Non-Return | -PA5F | Port Adapter, M5X0.8 |
| | 5L | E & L Series | V | Viton[1] | | | -PA18F | Port Adapter, G 1/8 NPSF |
| | 6E | 14 | | | | | | |

*[1]Viton is a registered trademark of DuPont Dow.*

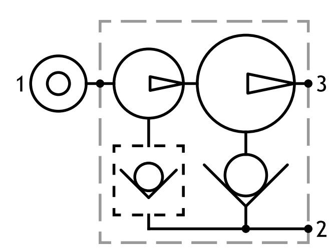


*Weight: 2.36 oz [66.8 g]*




| Code | Function | Ports |
|---|---|---|
| 1 | Air Supply | M5x0.8 (10-32 UNF) |
| 2 | Vacuum | G 1/8 NPSF |



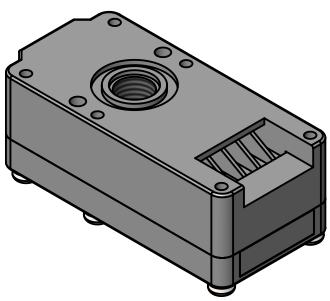
# A & B Bases

PPS Pump Module & Base

| | Series | Capacity | Seal | | Non-Return Option | | Base | | Threads | | Options | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | 5L | 14 | V | | | | -A | | | | | |
| | 4M | M Series | E | EPDM | (Blank) | None | -A | A Base | (Blank) | NPSF | (Blank) | None |
| | 6M | 10 | N | Nitrile | R | Non-Return | -B | B Base | -G | G Threads[2] | -PA5F | Port Adapter, M5X0.8 |
| | 5L | 20 | V | Viton[1] | | | | | | | -PA18F | Port Adapter, G 1/8 NPSF |
| | 6E | E & L Series | | | | | | | | | | |
| | | 14 | | | | | | | | | | |
| | | 28 | | | | | | | | | | |

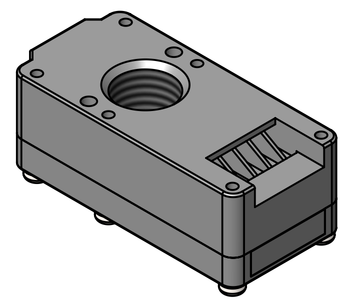
*[1]Viton is a registered trademark of DuPont Dow.*
*[2]Only available on B Base.*

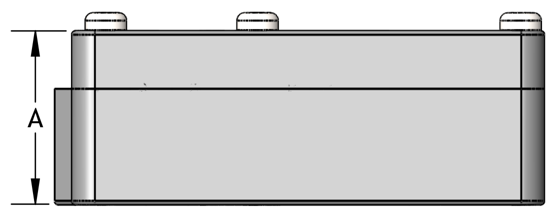
**A Base**

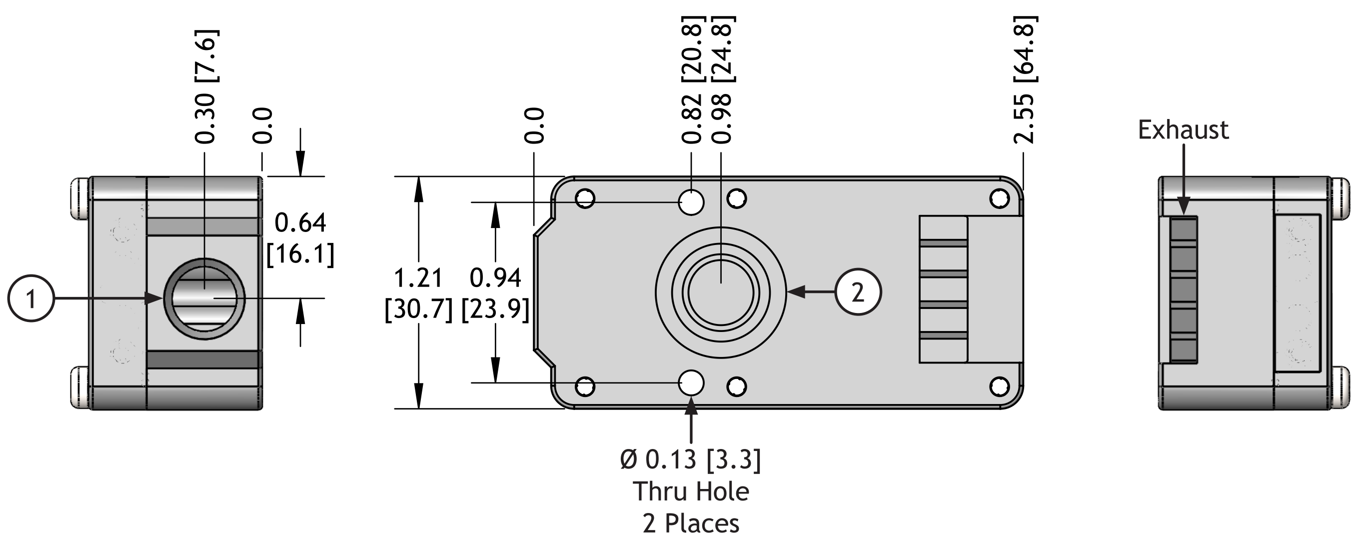


*Groove fits -014 O-Ring (not supplied)*

**B Base**

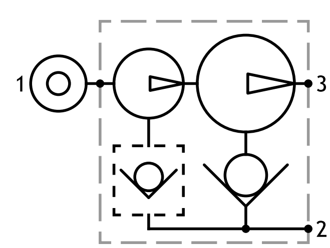





| Capacity | | A in [mm] | A - Weight oz [g] | B - Weight oz [g] |
|---|---|---|---|---|
| M | E & L | | | |
| 14 | 10 | 0.90 [22.9] | 3.00 [85.0] | 2.88 [81.6] |
| 28 | 20 | 1.20 [30.5] | 3.85 [109.1] | 3.73 [105.7] |

| Code | Function | A | B - NPSF | B - G |
|---|---|---|---|---|
| 1 | Air Supply | G 1/8 NPSF | | |
| 2 | Vacuum | G 1/8 NPSF | 3/8 NPSF | G 3/8 |

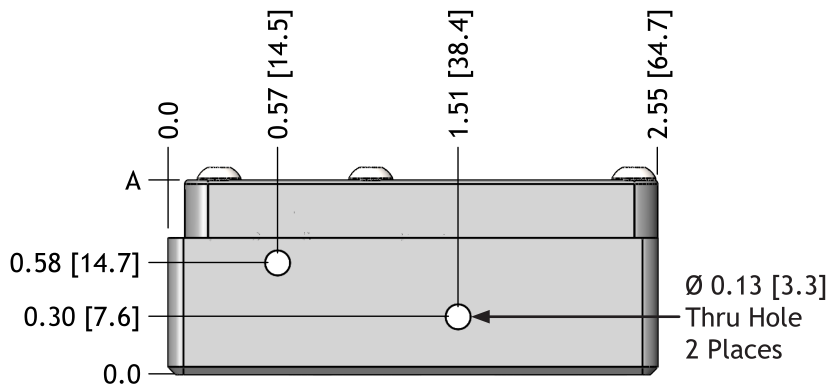


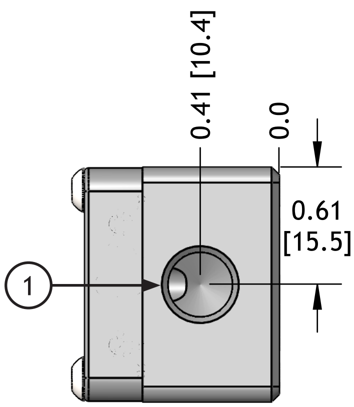
# C Base

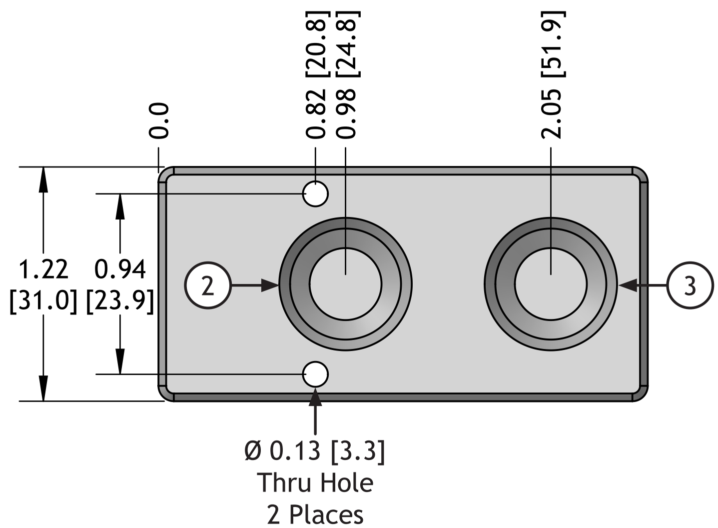
PPS Pump Module w/ Aluminum Base

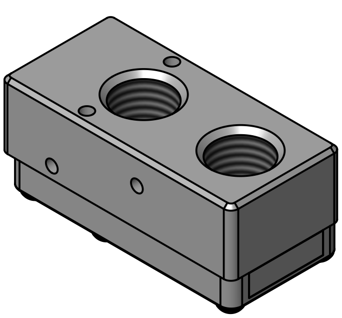
| | Series | Capacity | Seal | | Non-Return Option | | | Options | | Silencer | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C | 6E | 14 | E | | R | | -C | | | | |
| | 4M | M Series | E | EPDM | (Blank) | None | | (Blank) | None | (Blank) | None |
| | 6M | 10 | N | Nitrile | R | Non-Return | | -PA5F | Port Adapter, M5X0.8 | -ST | STB38M |
| | 5L | 20 | V | Viton[1] | | | | -PA18F | Port Adapter, G 1/8 NPSF | | |
| | 6E | 30 | | | | | | | | | |
| | | 40 | | | | | | | | | |
| | | E & L Series | | | | | | | | | |
| | | 14 | | | | | | | | | |
| | | 28 | | | | | | | | | |
| | | 42 | | | | | | | | | |
| | | 56 | | | | | | | | | |

*[1]Viton is a registered trademark of DuPont Dow.*



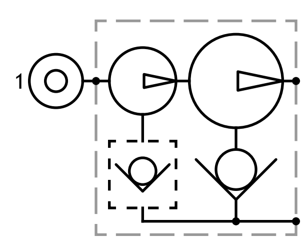



| Capacity | | A | Weight |
|---|---|---|---|
| M | E & L | in [mm] | oz [g] |
| 10 | 14 | 1.01 [25.7] | 3.73 [105.8] |
| 20 | 28 | 1.31 [33.3] | 4.58 [130.0] |
| 30 | 42 | 1.61 [40.9] | 5.44 [154.1] |
| 40 | 56 | 1.91 [48.5] | 6.29 [178.2] |

| Code | Function | Ports |
|---|---|---|
| 1 | Air Supply | G 1/8 NPSF |
| 2 | Vacuum | 3/8 NPSF |
| 3 | Exhaust | 3/8 NPSF |

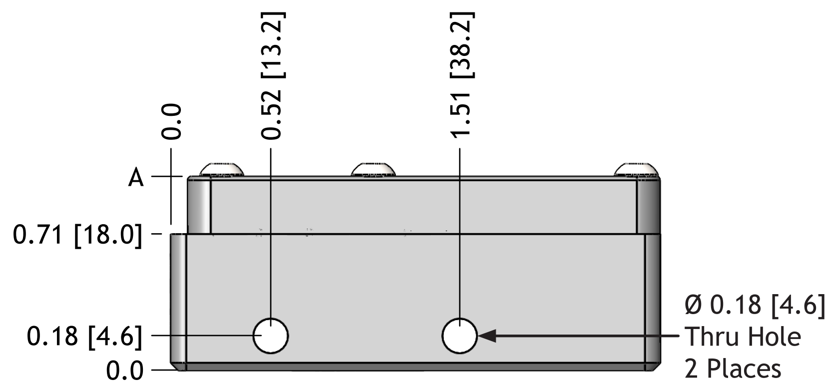


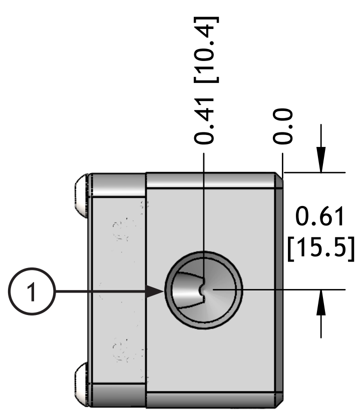
## D Base

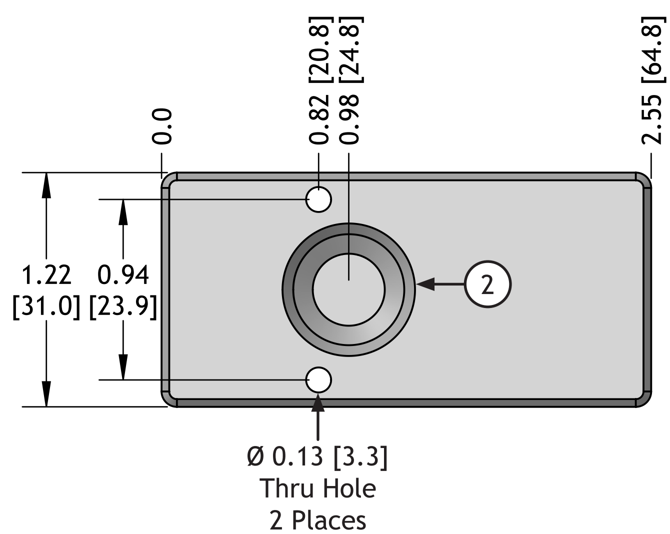
PPS Pump Module w/ Aluminum Base

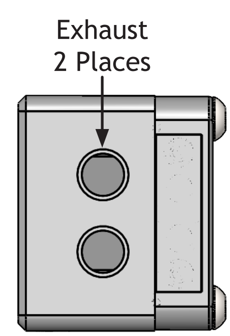
| | Series | Capacity | Seal | | Non-Return Option | | | Options | | Threads | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C | 5L | 14 | N | | | | -D | | | | |
| | 4M | M Series | E | EPDM | (Blank) | None | | (Blank) | None | (Blank) | NPSF |
| | 6M | 10 | N | Nitrile | R | Non-Return | | -PA5F | Port Adapter, M5X0.8 | -G | G Threads |
| | 5L | 20 | V | Viton[1] | | | | -PA18F | Port Adapter, G 1/8 NPSF | | |
| | 6E | 30 | | | | | | | | | |
| | | E & L Series | | | | | | | | | |
| | | 14 | | | | | | | | | |
| | | 28 | | | | | | | | | |
| | | 42 | | | | | | | | | |

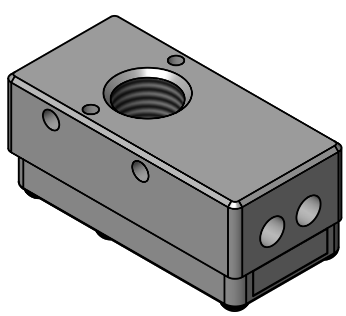
[1] *Viton is a registered trademark of DuPont Dow.*



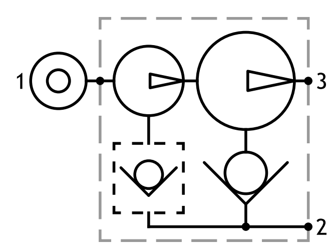



| Capacity | | A in [mm] | Weight oz [g] |
|---|---|---|---|
| M | E & L | | |
| 10 | 14 | 1.01 [25.7] | 3.58 [101.6] |
| 20 | 28 | 1.31 [33.3] | 4.44 [125.7] |
| 30 | 42 | 1.61 [40.9] | 5.29 [149.9] |

| Code | Function | NPSF | G |
|---|---|---|---|
| 1 | Air Supply | G 1/8 NPSF | |
| 2 | Vacuum | 3/8 NPSF | G 3/8 |

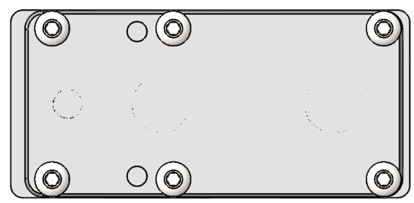


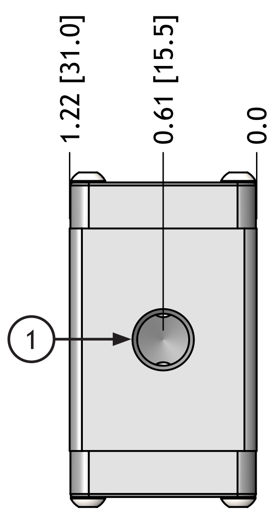
# G Base

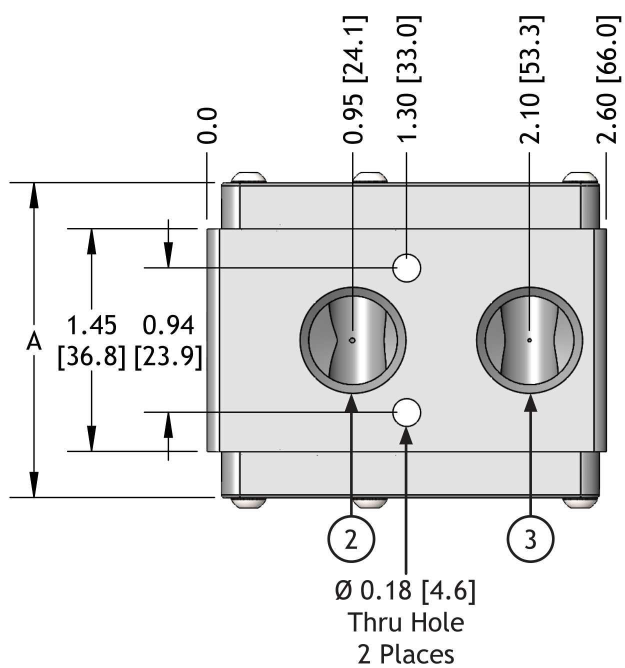
PPS Pump Module w/ Aluminum Base

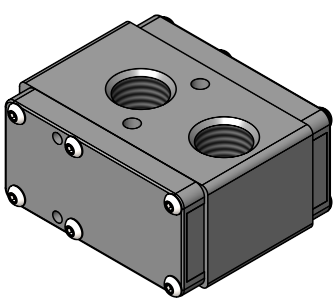
| | Series | Capacity | Seal | | Non-Return Option | | | Silencer | | Options | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C | 4M | 20 | N | | | | -G | | | | |
| | 4M | M Series | E | EPDM | (Blank) | None | | (Blank) | None | (Blank) | None |
| | 6M | 20 | N | Nitrile | R | Non-Return | | -ST | STB38M | -PA5F | Port Adapter, M5X0.8 |
| | 5L | 40 | V | Viton[1] | | | | | | -PA18F | Port Adapter, G 1/8 NPSF |
| | 6E | 60 | | | | | | | | | |
| | | E & L Series | | | | | | | | | |
| | | 28 | | | | | | | | | |
| | | 56 | | | | | | | | | |
| | | 84 | | | | | | | | | |

*[1]Viton is a registered trademark of DuPont Dow.*
*[2]Includes a t-style vacuum filter and replacement filter elements (qty 3).*



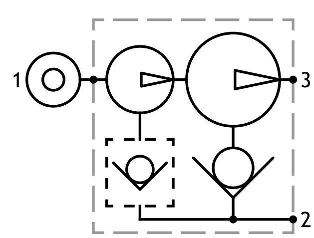


| Capacity | | A in [mm] | Weight oz [g] |
|---|---|---|---|
| M | E & L | | |
| 20 | 28 | 1.82 [46.2] | 8.06 [228.4] |
| 30 | 42 | 2.12 [53.8] | 8.91 [252.5] |
| 40 | 56 | 2.42 [61.5] | 9.76 [276.6] |
| 50 | 70 | 2.72 [69.1] | 10.61 [300.7] |
| 60 | 84 | 3.02 [76.7] | 11.46 [324.8] |

| Code | Function | Ports |
|---|---|---|
| 1 | Air Supply | G 1/8 NPSF |
| 2 | Vacuum | 3/8 NPSF |
| 3 | Exhaust | 3/8 NPSF |

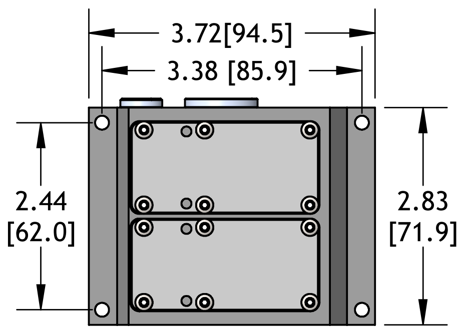


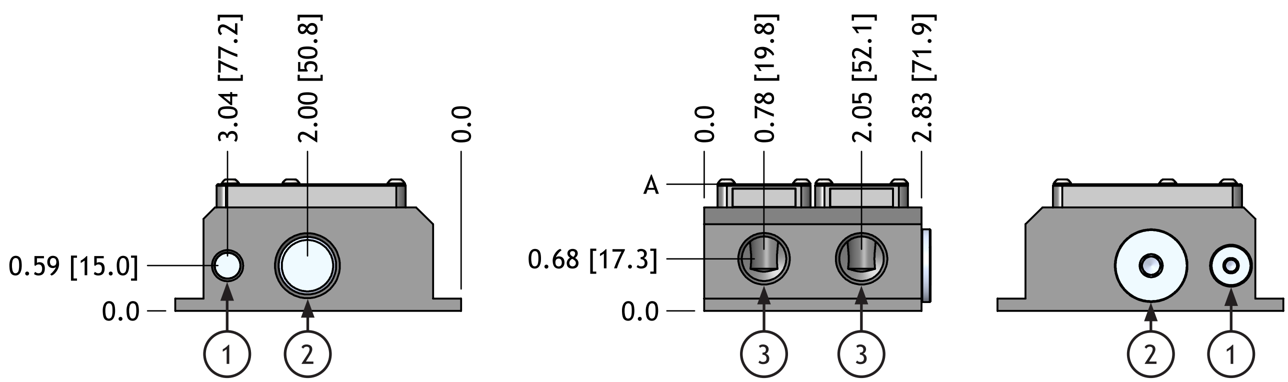
# K Base

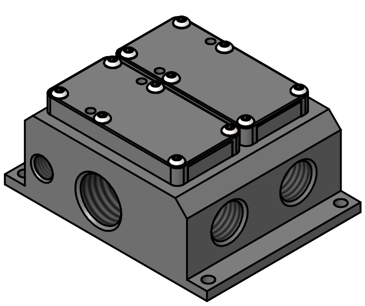
PPS Pump Module w/ Aluminum Base

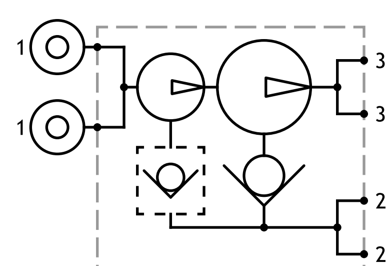
| | Series | Capacity | Seal | | Non-Return Option | | | Silencer | | Options | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C | 4M | 20 | N | | | | -K | | | | |
| | 4M | M Series | E | EPDM | (Blank) | None | | (Blank) | None | (Blank) | None |
| | 6M | 20 | N | Nitrile | R | Non-Return | | -ST | STB38M | -PA5F | Port Adapter, M5X0.8 |
| | 5L | 40 | V | Viton[1] | | | | | | -PA18F | Port Adapter, G 1/8 NPSF |
| | 6E | 60 | | | | | | | | | |
| | | E & L Series | | | | | | | | | |
| | | 28 | | | | | | | | | |
| | | 56 | | | | | | | | | |
| | | 84 | | | | | | | | | |

*[1]Viton is a registered trademark of DuPont Dow.*
*[2]Includes a t-style vacuum filter and replacement filter elements (qty 3).*






| Capacity | | A in [mm] | Weight oz [g] |
|---|---|---|---|
| M | E & L | | |
| 20 | 28 | 1.65 [41.9] | 17.14 [485.8] |
| 40 | 56 | 1.95 [49.5] | 18.73 [531.0] |
| 60 | 84 | 2.25 [57.2] | 20.32 [576.2] |

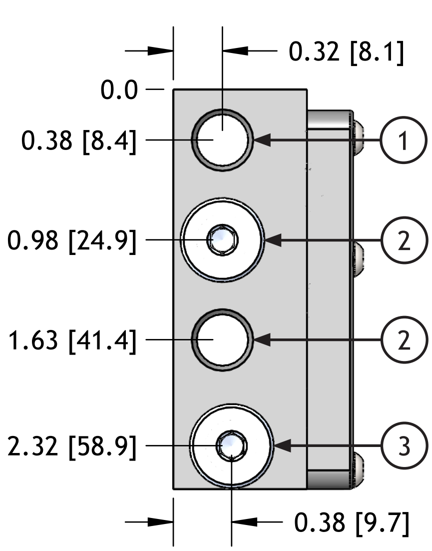
| Code | Function | Ports |
|---|---|---|
| 1 | Air Supply | G 1/8 NPSF |
| 2 | Vacuum | G 1/2 NPSF |
| 3 | Exhaust | 3/8 NPSF |

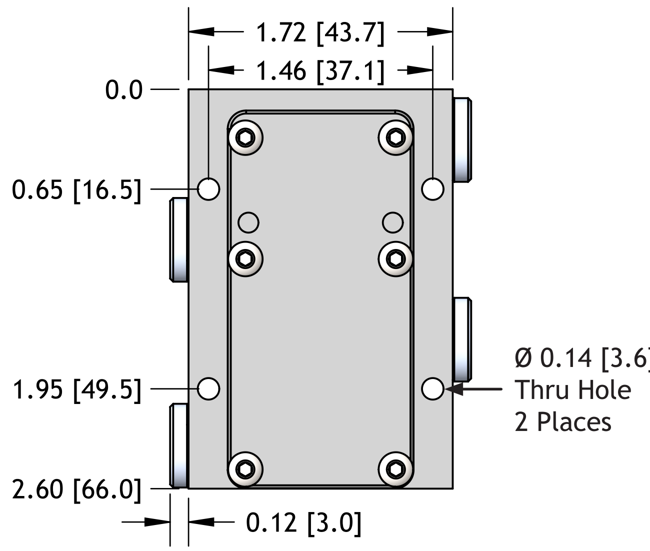
# M Base

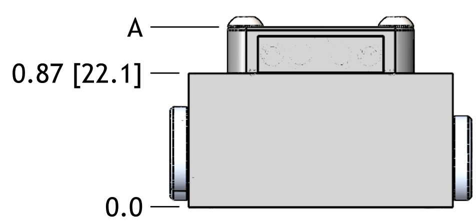
PPS Pump Module w/ Aluminum Base

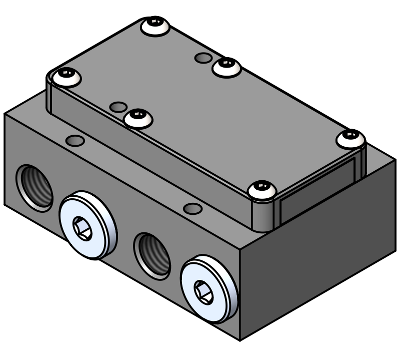
| | Series | Capacity | Seal | | Non-Return Option | | | Silencer | | Options | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C | 4M | 20 | N | | | | -M | | | | |
| | 4M | M Series | E | EPDM | (Blank) | None | | (Blank) | None | (Blank) | None |
| | 6M | 10 | N | Nitrile | R | Non-Return | | -ST | STA18M | -PA5F | Port Adapter, M5X0.8 |
| | 5L | 20 | V | Viton[1] | | | | | | -PA18F | Port Adapter, G 1/8 NPSF |
| | 6E | E & L Series | | | | | | | | | |
| | | 14 | | | | | | | | | |
| | | 28 | | | | | | | | | |

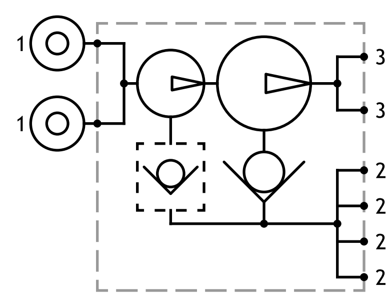
*[1]Viton is a registered trademark of DuPont Dow.*
*[2]Includes a t-style vacuum filter and replacement filter elements (qty 3).*






| Capacity | | A in [mm] | Weight oz [g] |
|---|---|---|---|
| M | E & L | | |
| 10 | 14 | 1.17 [29.7] | 6.09 [172.7] |
| 20 | 28 | 1.47 [37.3] | 6.94 [196.9] |

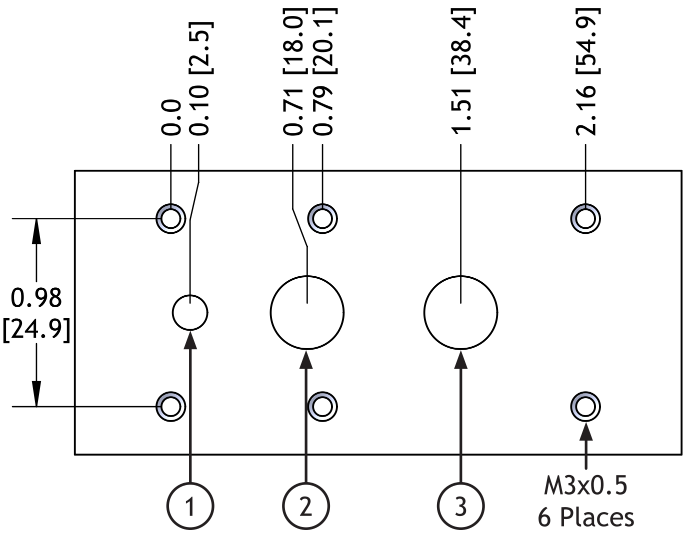
| Code | Function | Ports |
|---|---|---|
| 1 | Air Supply | G 1/8 NPSF |
| 2 | Vacuum | G 1/8 NPSF |
| 3 | Exhaust | G 1/8 NPSF |

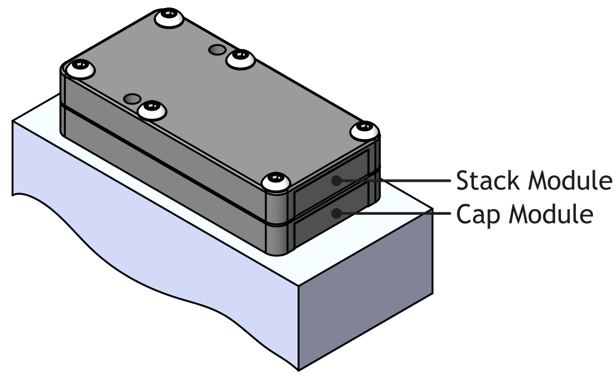
## Z Option (Zero / No Base)

PPS pump module ready for integration into your custom design.

| | Series | Capacity | Seal | | Non-Return Option | | Module Type | |
|---|---|---|---|---|---|---|---|---|
| C | 5L | 14 | E | | R | | -Z | |
| | 4M | M Series | E | EPDM | (Blank) | None | -Z | Cap |
| | 6M | 10 | N | Nitrile | R | Non-Return | -ZS | Stack |
| | 5L | E & L Series | V | Viton[1] | | | | |
| | 6E | 14 | | | | | | |

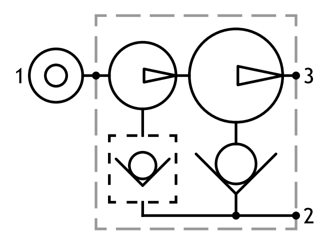
*[1]Viton is a registered trademark of DuPont Dow.*



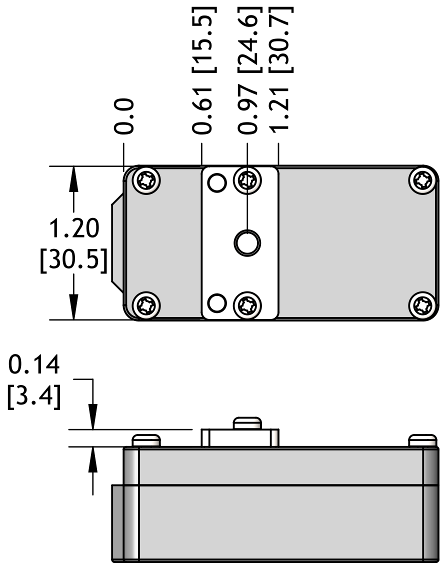

*Weight: 0.86 oz [24.3 g]*

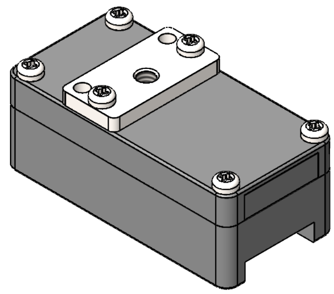
| Code | Function | Hole Ø in [mm] |
|---|---|---|
| 1 | Air Supply | 0.18 [4.6] |
| 2 | Vacuum | 0.38 [9.7] |
| 3 | Exhaust | 0.38 [9.7] |

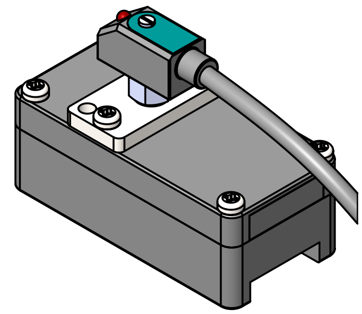


## PA5F Option: M5 Monitor Port

An additional vacuum port allows for vacuum monitoring.



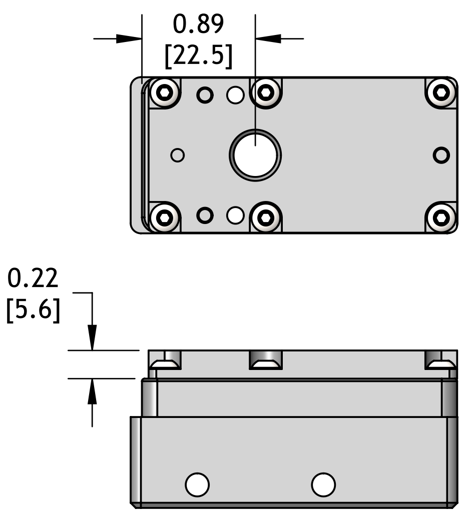



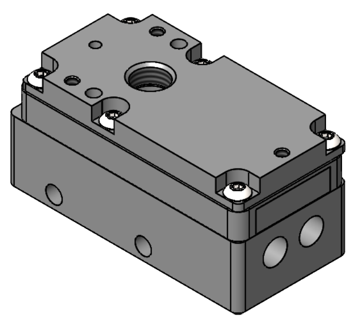


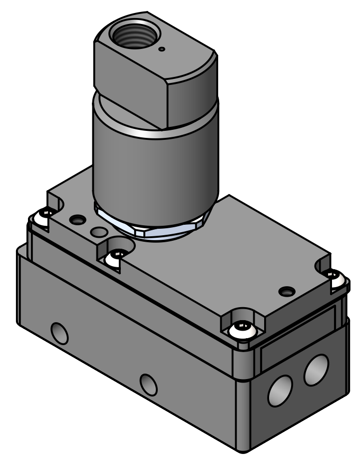
*Additional Weight: 0.38 oz [10.7 g]*

## PA18F Option: G 1/8 NPSF Port

An additional vacuum port allows for mounting a vacuum switch or release check valve directly to the pump.



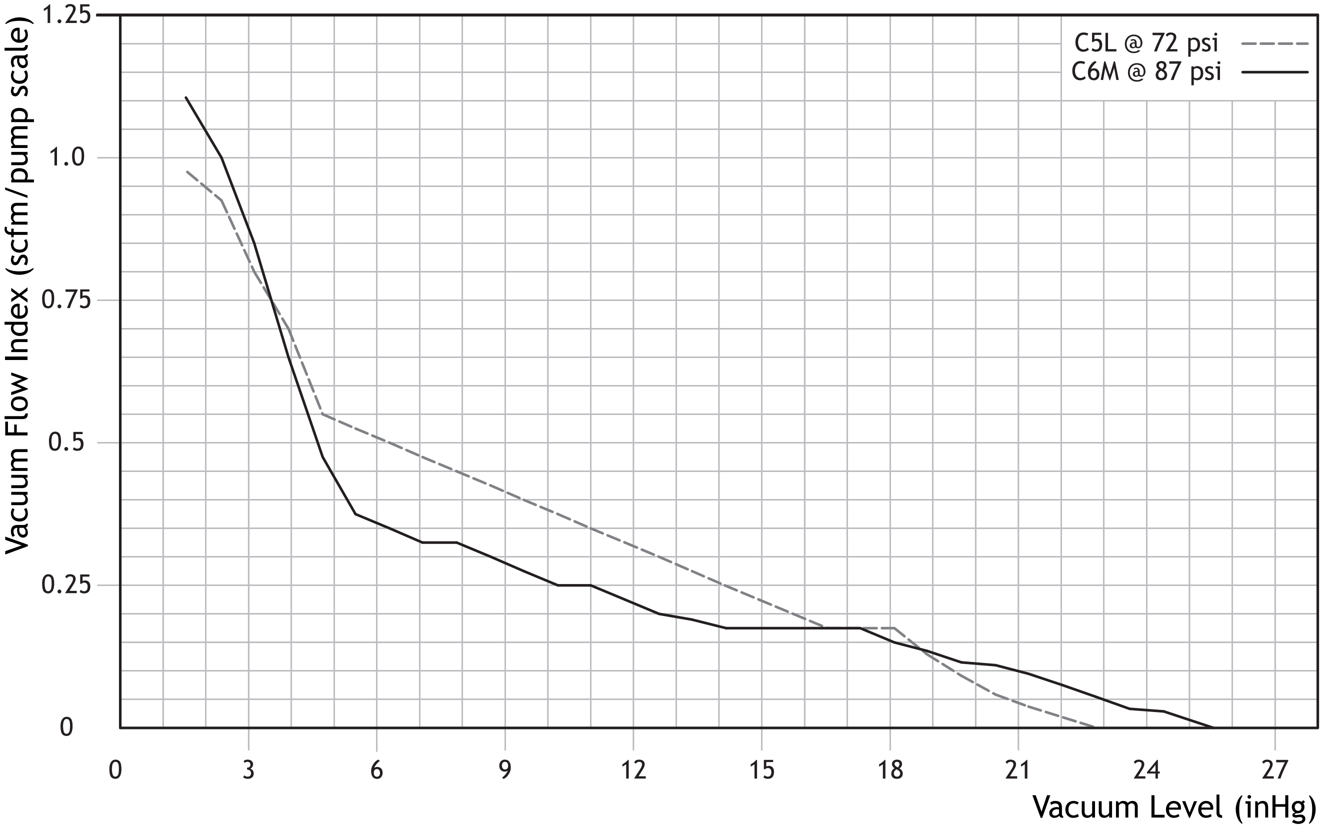


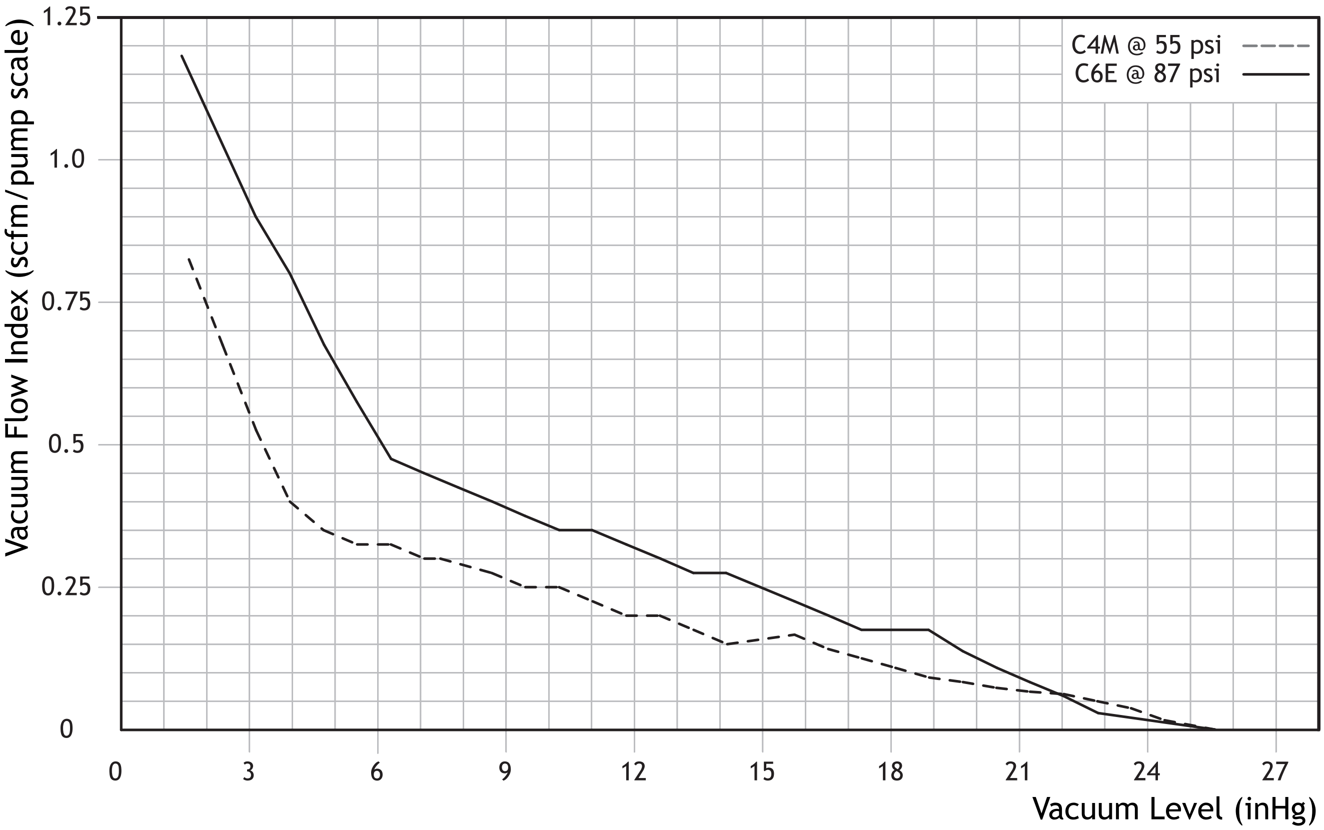
*Additional Weight: 0.88 oz [25.0 g]*

## Performance

| C5I & C6E | 7 | 14 | 28 | 42 | 58 | 70 | 84 | 98 | 112 |
|---|---|---|---|---|---|---|---|---|---|
| Scale | 1 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 |

| C4M & C6M | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|---|---|---|---|---|---|---|---|---|---|
| Scale | 1 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 |




*All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.*

# Performance

## Vacuum Flow - SCFM

| Model | Air Supply PSI | Air Consu SCFM | Max Vacuum inHg | SCFM at Vacuum Level | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 3 inHg | 6 inHg | 9 inHg | 12 inHg | 15 inHg | 18 inHg | 21 inHg | 24 inHg |
| C5L14 | 72 | 2.0 | 23.6 | 1.6 | 1.0 | 0.83 | 0.64 | 0.45 | 0.35 | 0.09 | - |
| C5L28 | 72 | 4.0 | 23.6 | 3.3 | 2.0 | 1.7 | 1.30 | 0.9 | 0.7 | 0.18 | - |
| C5L42 | 72 | 6.0 | 23.6 | 4.9 | 3.1 | 2.5 | 1.9 | 1.4 | 1.1 | 0.27 | - |
| C5L56 | 72 | 8.0 | 23.6 | 6.6 | 4.1 | 3.3 | 2.6 | 1.8 | 1.4 | 0.36 | - |
| C5L70 | 72 | 10.0 | 23.6 | 8.2 | 5.1 | 4.2 | 3.2 | 2.3 | 1.8 | 0.45 | - |
| C5L84 | 72 | 12.0 | 23.6 | 9.8 | 6.1 | 5.0 | 3.8 | 2.7 | 2.1 | 0.54 | - |
| C6E14 | 87 | 2.3 | 25.6 | 1.8 | 1.0 | 0.78 | 0.64 | 0.5 | 0.35 | 0.18 | 0.03 |
| C6E28 | 87 | 4.6 | 25.6 | 3.7 | 2.1 | 1.6 | 1.30 | 1.0 | 0.7 | 0.36 | 0.06 |
| C6E42 | 87 | 6.9 | 25.6 | 5.5 | 3.1 | 2.3 | 1.9 | 1.5 | 1.1 | 0.54 | 0.09 |
| C6E56 | 87 | 9.2 | 25.6 | 7.4 | 4.1 | 3.1 | 2.6 | 2.0 | 1.4 | 0.72 | 0.12 |
| C6E70 | 87 | 11.5 | 25.6 | 9.2 | 5.2 | 3.9 | 3.2 | 2.5 | 1.8 | 0.9 | 0.15 |
| C6E84 | 87 | 13.8 | 25.6 | 11.0 | 6.2 | 4.7 | 3.8 | 3.0 | 2.1 | 1.1 | 0.18 |
| C4M10 | 55 | 1.6 | 25.5 | 1.1 | 0.65 | 0.53 | 0.40 | 0.32 | 0.22 | 0.14 | 0.05 |
| C4M20 | 55 | 3.2 | 25.5 | 2.2 | 1.3 | 1.1 | 0.80 | 0.64 | 0.44 | 0.28 | 0.11 |
| C4M30 | 55 | 4.8 | 25.5 | 3.3 | 2.0 | 1.6 | 1.2 | 1.0 | 0.66 | 0.42 | 0.33 |
| C4M40 | 55 | 6.4 | 25.5 | 4.4 | 2.6 | 2.1 | 1.6 | 1.3 | 0.88 | 0.56 | 0.44 |
| C4M50 | 55 | 8.0 | 25.5 | 5.5 | 3.3 | 2.7 | 2.0 | 1.6 | 1.1 | 0.70 | 0.27 |
| C4M60 | 55 | 9.6 | 25.5 | 6.6 | 3.9 | 3.2 | 2.4 | 1.9 | 1.3 | 0.84 | 0.66 |
| C6M10 | 87 | 1.6 | 25.5 | 1.8 | 0.72 | 0.44 | 0.35 | 0.31 | 0.2 | 0.2 | 0.06 |
| C6M20 | 87 | 3.2 | 25.5 | 3.5 | 1.4 | 0.88 | 0.7 | 0.62 | 0.4 | 0.4 | 0.12 |
| C6M30 | 87 | 4.8 | 25.5 | 5.2 | 2.2 | 1.3 | 1.0 | 0.93 | 0.6 | 0.6 | 0.18 |
| C6M40 | 87 | 6.4 | 25.5 | 7.0 | 2.9 | 1.8 | 1.4 | 1.2 | 0.80 | 0.8 | 0.24 |
| C6M50 | 87 | 8.0 | 25.5 | 8.8 | 3.6 | 2.2 | 1.8 | 1.6 | 1.0 | 1.0 | 0.3 |
| C6M60 | 87 | 9.6 | 25.5 | 10.5 | 4.3 | 2.6 | 2.1 | 1.9 | 1.2 | 1.2 | 0.36 |

*SCFM X 28.32 = nl / m*

## Evacuation Time - sec / 100 in$^3$

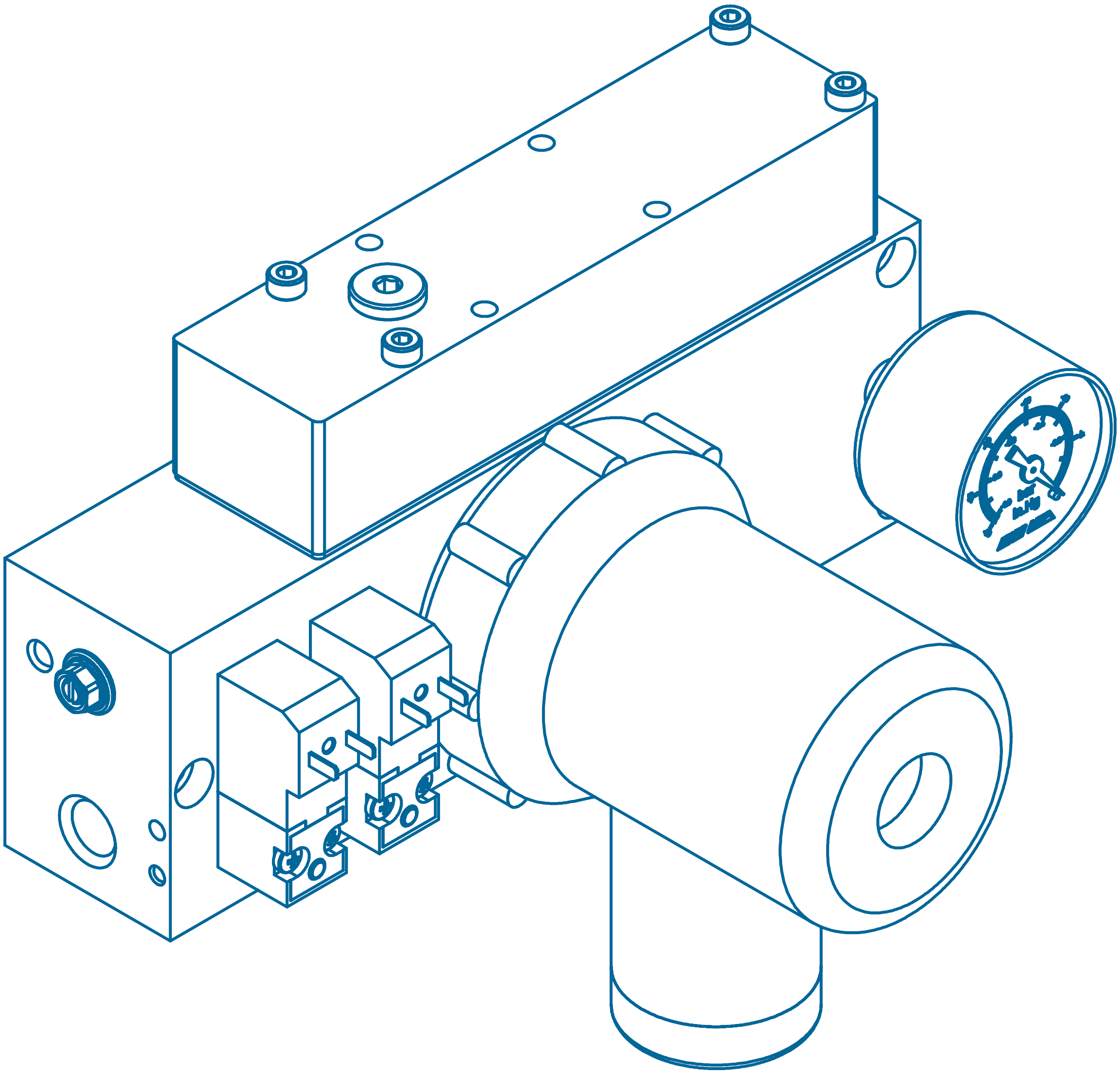
| Model | Air Supply PSI | Air Consum SCFM | Max Vacuum inHg | SCFM at Vacuum Level | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 3 inHg | 6 inHg | 9 inHg | 12 inHg | 15 inHg | 18 inHg | 21 inHg | 24 inHg |
| C5L14 | 72 | 2.0 | 23.6 | 0.14 | 0.39 | 0.77 | 1.4 | 2.3 | 3.9 | 6.8 | - |
| C5L28 | 72 | 4.0 | 23.6 | 0.07 | 0.2 | 0.39 | 0.68 | 1.2 | 1.9 | 3.4 | - |
| C5L42 | 72 | 6.0 | 23.6 | 0.05 | 0.13 | 0.26 | 0.45 | 0.76 | 1.3 | 2.3 | - |
| C5L56 | 72 | 8.0 | 23.6 | 0.04 | 0.1 | 0.19 | 0.34 | 0.57 | 0.97 | 1.7 | - |
| C5L70 | 72 | 10.0 | 23.6 | 0.03 | 0.08 | 0.15 | 0.27 | 0.46 | 0.77 | 1.4 | - |
| C5L84 | 72 | 12.0 | 23.6 | 0.02 | 0.07 | 0.13 | 0.23 | 0.38 | 0.64 | 1.1 | - |
| C6E14 | 87 | 2.3 | 25.6 | 0.13 | 0.34 | 0.71 | 1.3 | 2.2 | 3.6 | 6.3 | 7.1 |
| C6E28 | 87 | 4.6 | 25.6 | 0.07 | 0.17 | 0.36 | 0.64 | 1.1 | 1.8 | 3.2 | 3.6 |
| C6E42 | 87 | 6.9 | 25.6 | 0.04 | 0.11 | 0.24 | 0.42 | 0.72 | 1.2 | 2.1 | 2.4 |
| C6E56 | 87 | 9.2 | 25.6 | 0.03 | 0.09 | 0.18 | 0.32 | 0.54 | 0.91 | 1.6 | 1.8 |
| C6E70 | 87 | 11.5 | 25.6 | 0.03 | 0.07 | 0.14 | 0.25 | 0.43 | 0.73 | 1.3 | 1.4 |
| C6E84 | 87 | 13.8 | 25.6 | 0.02 | 0.06 | 0.12 | 0.21 | 0.36 | 0.61 | 1.1 | 1.2 |
| C4M10 | 55 | 1.6 | 25.5 | 0.16 | 0.50 | 1.0 | 1.9 | 3.2 | 5.4 | 9.3 | 18.2 |
| C4M20 | 55 | 3.2 | 25.5 | 0.08 | 0.25 | 0.50 | 1.0 | 1.6 | 2.7 | 4.7 | 9.1 |
| C4M30 | 55 | 4.8 | 25.5 | 0.05 | 0.17 | 0.33 | 0.63 | 1.1 | 1.8 | 3.1 | 6.1 |
| C4M40 | 55 | 6.4 | 25.5 | 0.04 | 0.13 | 0.25 | 0.48 | 0.8 | 1.4 | 2.3 | 4.6 |
| C4M50 | 55 | 8.0 | 25.5 | 0.03 | 0.1 | 0.2 | 0.38 | 0.64 | 1.1 | 1.9 | 3.6 |
| C4M60 | 55 | 9.6 | 25.5 | 0.03 | 0.08 | 0.17 | 0.32 | 0.53 | 0.9 | 1.6 | 3.1 |
| C6M10 | 87 | 1.6 | 25.5 | 0.12 | 0.37 | 0.79 | 1.5 | 2.5 | 4.3 | 7.5 | 14.5 |
| C6M20 | 87 | 3.2 | 25.5 | 0.06 | 0.19 | 0.40 | 0.74 | 1.3 | 2.2 | 3.8 | 7.3 |
| C6M30 | 87 | 4.8 | 25.5 | 0.04 | 0.17 | 0.26 | 0.49 | 0.83 | 1.4 | 2.5 | 4.8 |
| C6M40 | 87 | 6.4 | 25.5 | 0.03 | 0.09 | 0.2 | 0.37 | 0.63 | 1.1 | 1.9 | 3.6 |
| C6M50 | 87 | 8.0 | 25.5 | 0.02 | 0.07 | 0.16 | 0.3 | 0.5 | 0.86 | 1.5 | 2.9 |
| C6M60 | 87 | 9.6 | 25.5 | 0.02 | 0.06 | 0.13 | 0.25 | 0.42 | 0.72 | 1.3 | 2.4 |

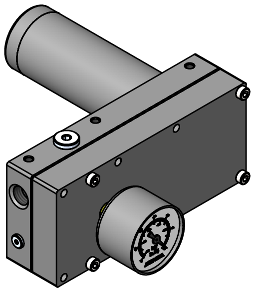
*sec / 100 in$^3$ X 0.61 = sec / l*

*All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.*

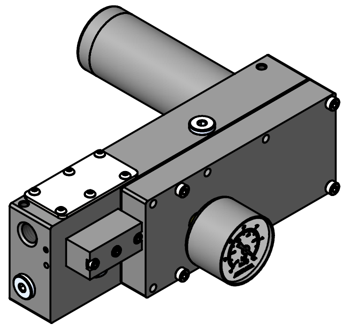
# Classic Series Vacum Pumps

## Section 8

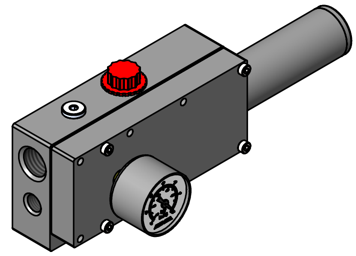




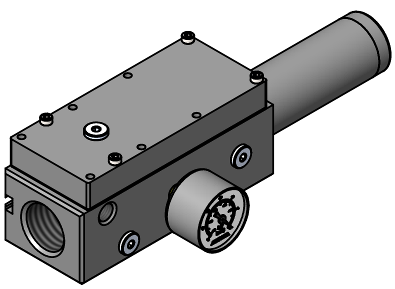
Basic



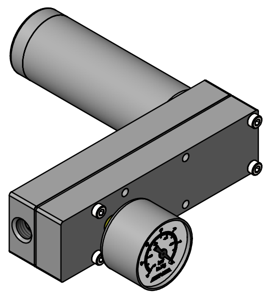
Control Options



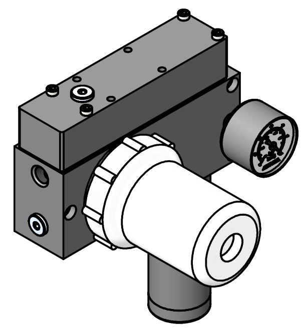
SM & SMS



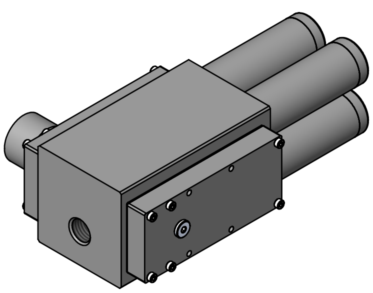
6010 & 6034



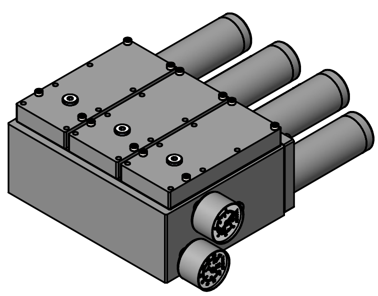
Mini-Classic



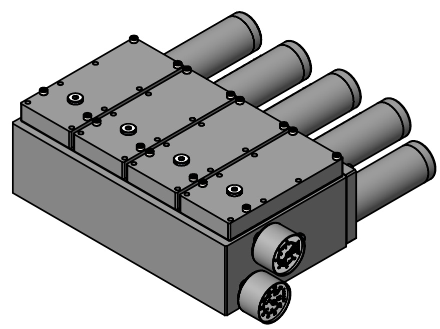
Integrated Filter



Dual-Base



Triple-Base

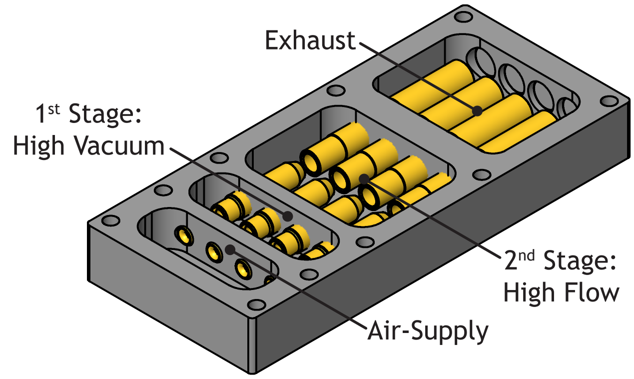


Quadruple-Base

## Principles of Operation

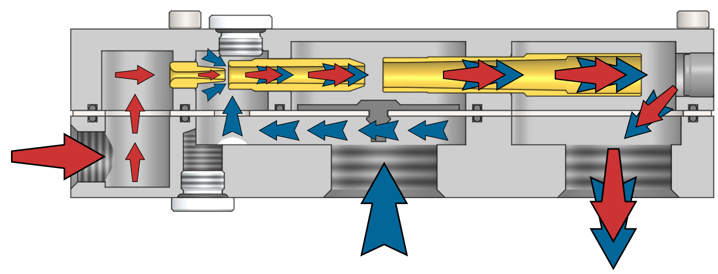
### Multi-Ejector

Larger capacity vacuum pumps are created by placing identical nozzle sets in a parallel configuration, either in the same body or in a stacking module. Additional vacuum flow capacity is attained but maximum vacuum level is not affected since that is determined by the nozzle series. This method provides a specific repeatable increment of capacity increase that is very handy when sizing a pump for an application since the basic shape of the performance curve doesn't change. Vacuum flow and air consumption is increased in proportion to the number of nozzle sets, and system evacuation time is decreased proportionately.



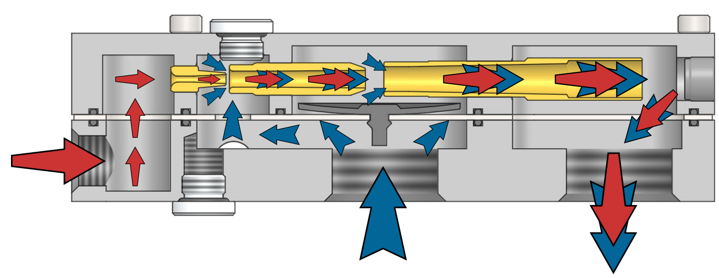

### High-Flow Mode

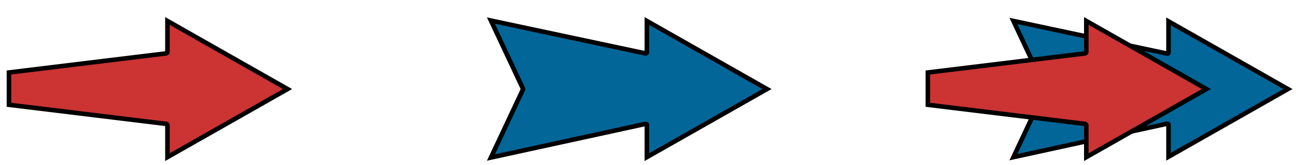
An air supply to the pump is turned on and high-pressure air flows thru the first nozzle, generating a vacuum flow when it passes into the second nozzle. As air is evacuated from the system, induced air flows into the vacuum port and is drawn into the first stage ejector (gap between first and second nozzles) and combines with the compressed air flow from the first nozzle before passing into the second stage ejector (gap between second and third nozzle). The powerful combined airflow induces a high vacuum flow rate thru the second stage ejector until the increasing vacuum level causes the flap check valve to close. The valve closing point is dependent on nozzle series (A, E, L, M, ML, or X) and the operating air pressure. For example at 87 psi the flap valve will close at 11 inHg for an ML-series pump and at 18 inHg for an E-series pump. This closing is evident by the change in slope of the performance curve.



### High-Vacuum Mode

After the flap valve closes, induced air continues to be drawn into the first stage ejector and the vacuum level will increase to the maximum level allowed by the nozzle series. At this point the second stage is isolated and is not contributing to evacuation of the system. Some of our competitors offer three and four stage vacuum pumps but these provide very little benefit for industrial systems since a third stage will shut down at 3 inHg and a fourth stage will shut down at 1.5 inHg. EDCO nozzles are optimized to give extra vacuum flow at higher vacuum levels to more-than make up for lower flows from zero to 3 inHg. EDCO evacuation times to 12 inHg or higher will be equal or better than our competition.





**Compressed Air Flow** **Induced Vacuum Flow** **Exhaust Flow**

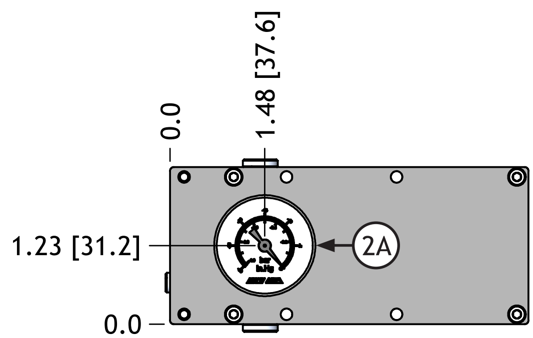
## Basic Pump

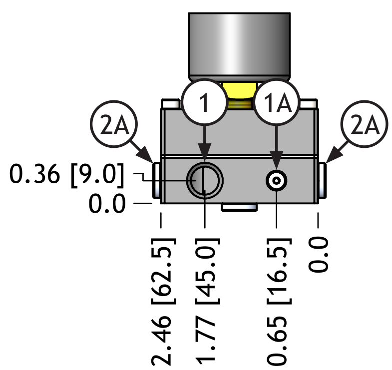
Basic pump controlled via air supply through the pump base inlet port.

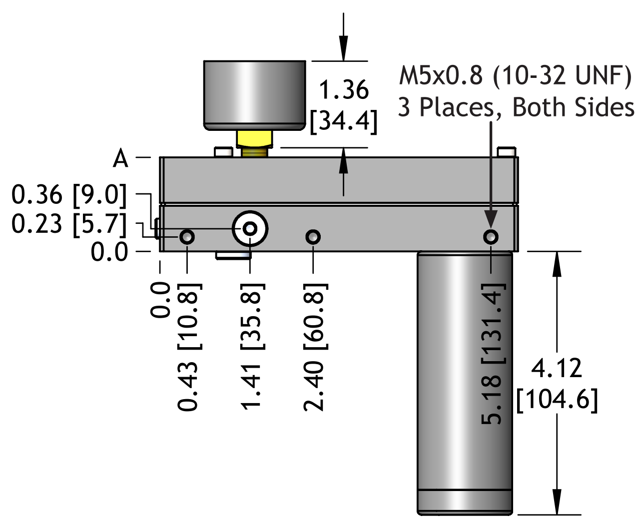
| Series | Capacity | Seal Material | | Ports | | Valve Options | |
|---|---|---|---|---|---|---|---|
| ML | 100 | N | | | | | |
| A | 25 (40) | N | Nitrile | (Blank) | NPTF Threads | (Blank) | Standard |
| E | 50 (80) | S | Silicone | -G | G Threads | -NR | Non-Return |
| L | 75 (120) | V | Viton[2] | | | | |
| M | 100 (160) | | | | | | |
| ML | 125 (200) | | | | | | |
| X | 150 (240) | | | | | | |
| | 175 (280) | | | | | | |
| | 200 (320) | | | | | | |

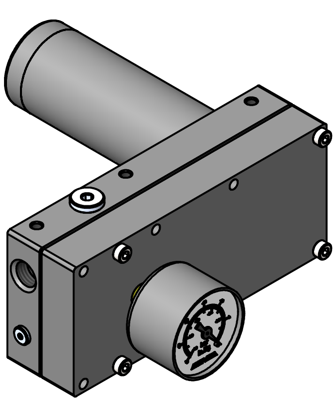
(X Series)

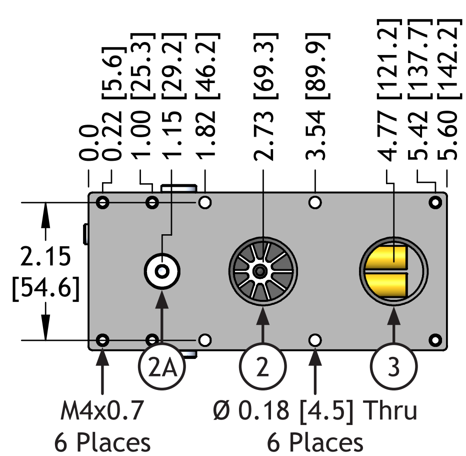
[2]*Viton is a registered trademark of Du Pont Dow Elastomers.*



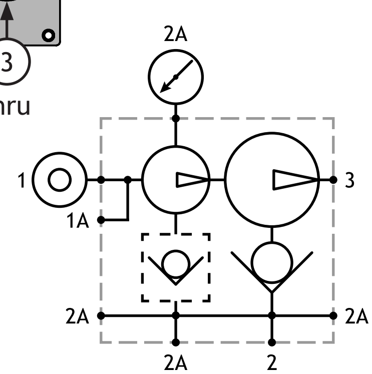






| Code | Function | NPTF | G |
|---|---|---|---|
| 1 | Air-Supply | 1/4 NPTF | G 1/4 |
| 1A | Alternate Air-Supply | M5x0.8 (10-32 UNF) | |
| 2 | Vacuum | 3/4 NPTF | G 3/4 |
| 2A | Alternate Vacuum | G 1/8 NPSF | |
| 3 | Exhaust | 3/4 NPTF | G 3/4 |

| Capacity | A in [mm] | Weight lb [g] |
|---|---|---|
| 25-100 | 1.47 [37.3] | 1.63 [739] |
| 125-200 | 2.18 [55.4] | 2.21 [1002] |

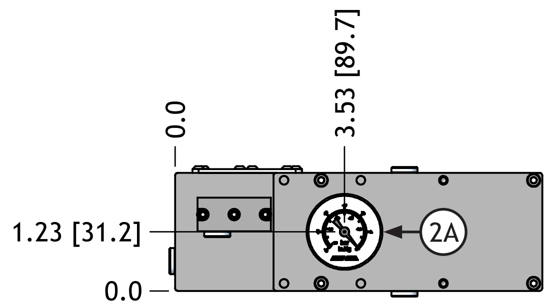


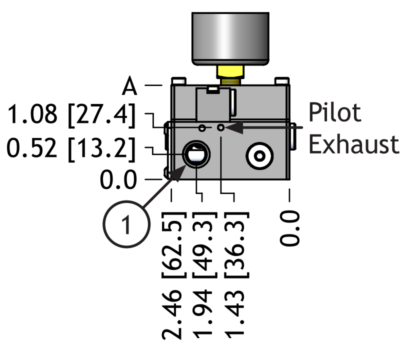
## Pilot Controlled Air-Supply

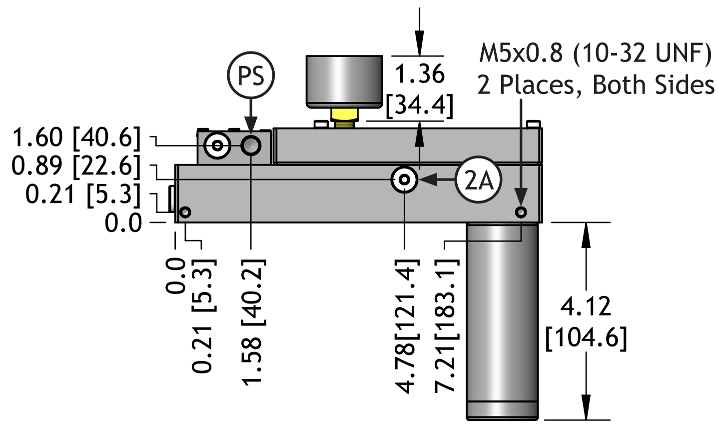
The pump base contains an integral, pilot-operated, 3-way air valve which controls vacuum on/off via pneumatic pilot signal. When the pilot signal is presented, the vacuum is turned on. When the pilot signal is exhausted, the pump turns off.

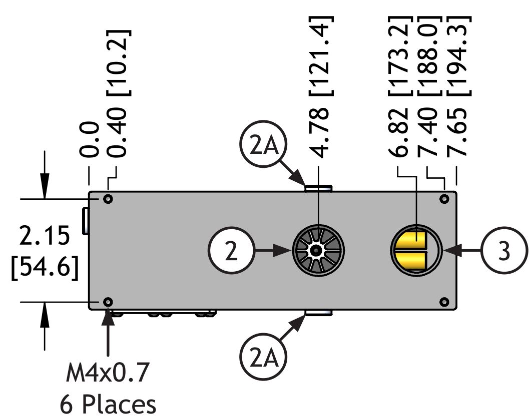
| Series | Capacity | Seal Material | | Ports | | Valve Options | |
|---|---|---|---|---|---|---|---|
| ML | 100 | N | | -2PS | | | |
| A | 25 (40) | N | Nitrile | (Blank) | NPTF Threads | (Blank) | Standard |
| E | 50 (80) | S | Silicone | -G | G Threads | -NR | Non-Return |
| L | 75 (120) | V | Viton[2] | | | | |
| M | 100 (160) | | | | | | |
| ML | 125 (200) | | | | | | |
| X | 150 (240) | | | | | | |
| | 175 (280) | | | | | | |
| | 200 (320) | | | | | | |
| | (X Series) | | | | | | |

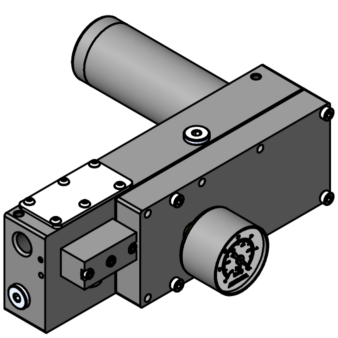
[2]*Viton is a registered trademark of Du Pont Dow Elastomers.*

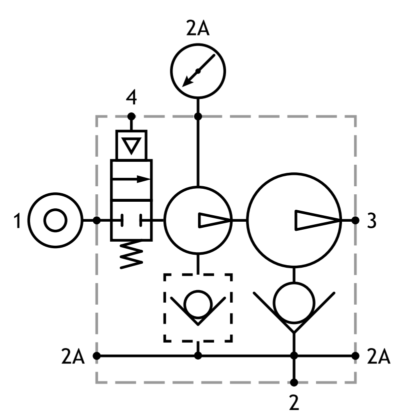





| Code | Function | NPTF | G |
|---|---|---|---|
| 1 | Air-Supply | 1/4 NPTF | G 1/4 |
| 2 | Vacuum | 3/4 NPTF | G 3/4 |
| 2A | Vacuum - Alternate | G 1/8 NPSF | |
| 3 | Exhaust | 3/4 NPTF | G 3/4 |
| PS | Pilot Signal, Air-Supply | G 1/8 NPSF | |

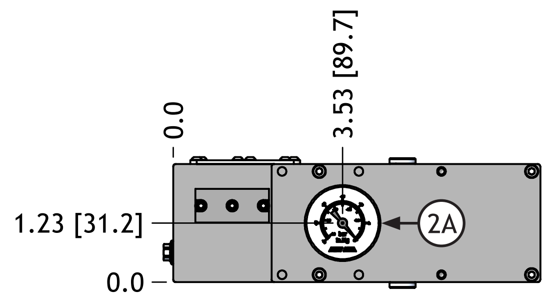
| Capacity | A in [mm] | Weight lb [g] |
|---|---|---|
| 25-100 | 1.96 [49.8] | 2.81 [1275.0] |
| 125-200 | 2.67 [67.8] | 3.41 [1547.0] |

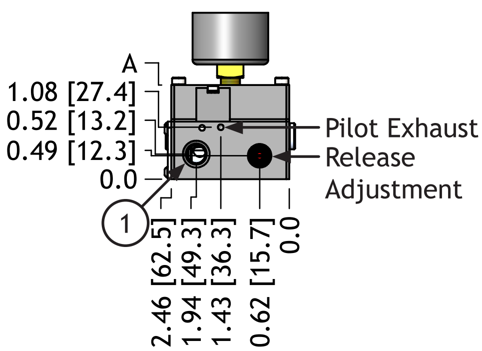
## Pilot Controlled Air-Supply & Release

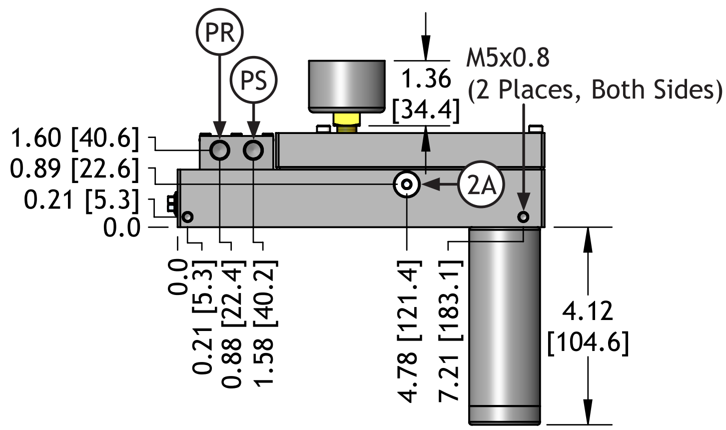
The pump base contains two integral, pilot-operated, 3-way air valves which provide full pump control via two externally supplied pneumatic pilot signals. With a constant air-supply to the pump base, one pilot signal controls vacuum on/off while a second pilot signal controls blow-off air to dissipate vacuum for faster system cycle time.

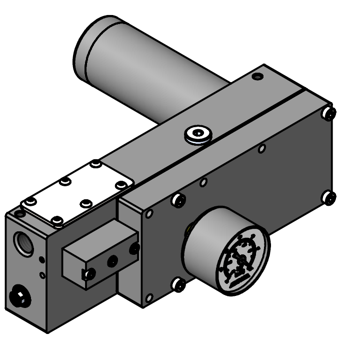
| Series | Capacity | Seal Material | | Ports | | Valve Options | |
|---|---|---|---|---|---|---|---|
| ML | 100 | N | | -2PSB | | | |
| A | 25 (40) | N | Nitrile | (Blank) | NPTF Threads | (Blank) | Standard |
| E | 50 (80) | S | Silicone | -G | G Threads | -NR | Non-Return |
| L | 75 (120) | V | Viton[2] | | | | |
| M | 100 (160) | | | | | | |
| ML | 125 (200) | | | | | | |
| X | 150 (240) | | | | | | |
| | 175 (280) | | | | | | |
| | 200 (320) | | | | | | |
| | (X Series) | | | | | | |

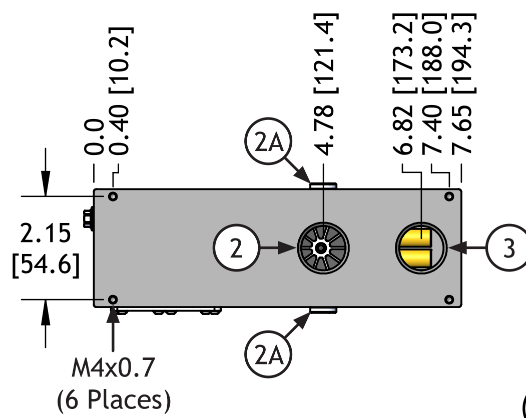
*[2]Viton is a registered trademark of Du Pont Dow Elastomers.*



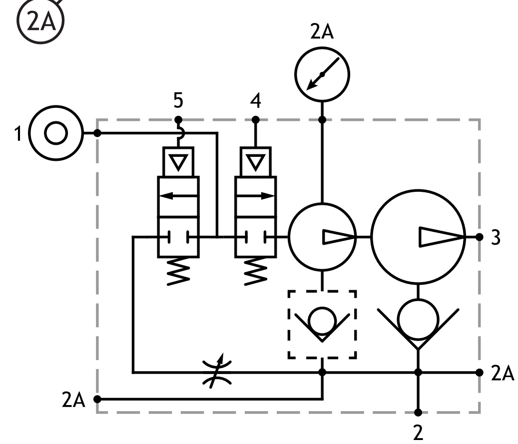






| Capacity | A in [mm] | Weight lb [g] |
|---|---|---|
| 25-100 | 1.96 [49.8] | 2.81 [1275.0] |
| 125-200 | 2.67 [67.8] | 3.41 [1547.0] |




| Code | Function | NPTF | G |
|---|---|---|---|
| 1 | Air-Supply | 1/4 NPTF | G 1/4 |
| 2 | Vacuum | 3/4 NPTF | G 3/4 |
| 2A | Vacuum - Alternate | G 1/8 NPSF | |
| 3 | Exhaust | 3/4 NPTF | G 3/4 |
| PS | Pilot Signal, Air-Supply | G 1/8 NPSF | |
| PR | Pilot Signal, Release | G 1/8 NPSF | |

## Solenoid Controlled Air-Supply

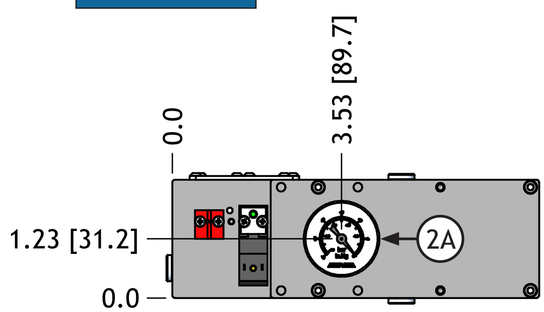
The pump base contains an integral, pilot-operated, 3-way air valve which controls vacuum on/off via a solenoid valve. When the solenoid valve is energized, the vacuum pump turns on. When the solenoid valve is de-energized, the pump turns off.

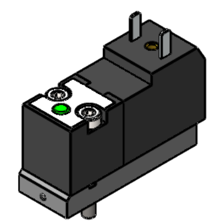
**-2S24D**: 24V DC, 2.3 W Solenoid Control Valve (**-2OS24D** for N.O. Supply)
**-2S110A**: 20V AC 60 Hz (110V AC 50 Hz), 2.3 W Solenoid Control Valve (**-2OS110A** for N.O. Supply)

| Series | Capacity | Seal Material | | Ports | | Solenoid Option | Valve Options | |
|---|---|---|---|---|---|---|---|---|
| ML | 100 | N | | | | -2S24D | | |
| A | 25 (40) | N | Nitrile | (Blank) | NPTF Threads | -2S24D | (Blank) | Standard |
| E | 50 (80) | S | Silicone | -G | G Threads | -2S110A | -NR | Non-Return |
| L | 75 (120) | V | Viton[2] | | | -2OS24D | | |
| M | 100 (160) | | | | | -2OS110A | | |
| ML | 125 (200) | | | | | | | |
| X | 150 (240) | | | | | | | |
| | 175 (280) | | | | | | | |
| | 200 (320) | | | | | | | |
| | (X Series) | | | | | | | |

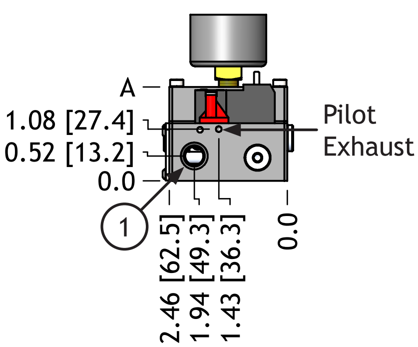
[2]*Viton is a registered trademark of Du Pont Dow Elastomers.*

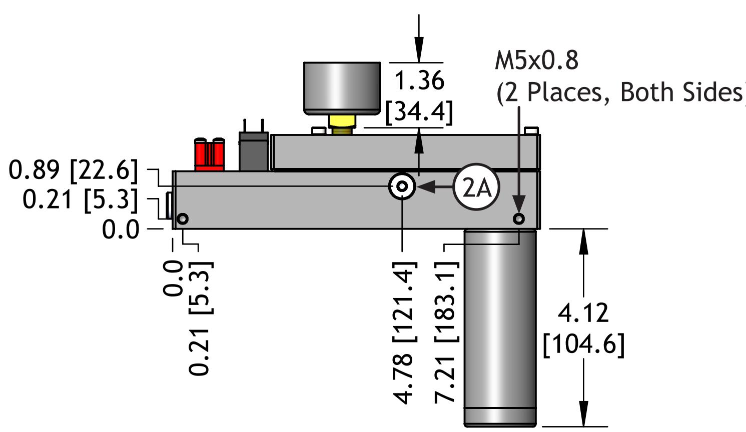
*Order DIN T-9 Molded Cords Separately:*
**923-2M01**: *Std. 2M*
**923-2M31**: *L.E.D. 0-50V, 2M*
**923-2M81**: *L.E.D.70-250V, 2M*

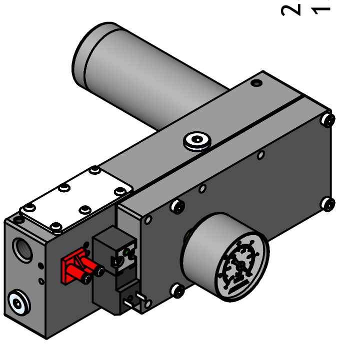


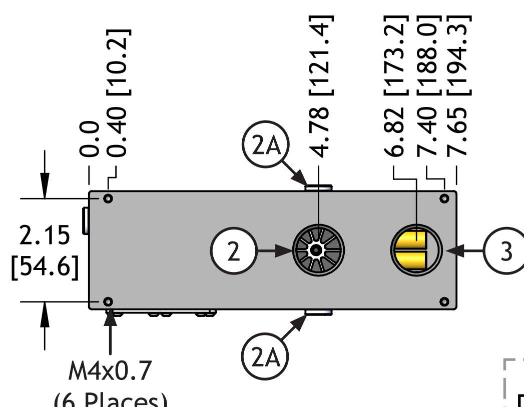



**N.O. Supply Option**
*Weight: 0.02 [9.1]*

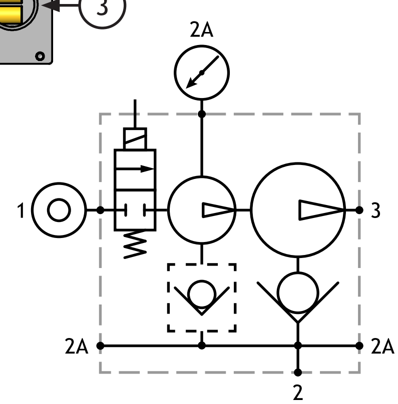





| Capacity | A in [mm] | Weight lb [g] |
|---|---|---|
| 25-100 | 1.96 [49.8] | 2.87 [1301.0] |
| 125-200 | 2.67 [67.8] | 3.47 [1574.0] |




| Code | Function | NPTF | G |
|---|---|---|---|
| 1 | Air-Supply | 1/4 NPTF | G 1/4 |
| 2 | Vacuum | 3/4 NPTF | G 3/4 |
| 2A | Vacuum - Alternate | G 1/8 NPSF | |
| 3 | Exhaust | 3/4 NPTF | G 3/4 |

## Solenoid Controlled Air-Supply & Release

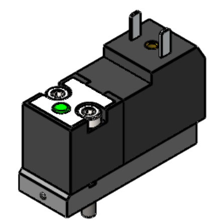
The pump base contains two integral, pilot-operated, 3-way air valves which provide full pump control via two solenoid valves. With a constant air-supply to the pump base, one solenoid valve controls vacuum on/off while a second solenoid valve controls blow-off air to dissipate vacuum for faster system cycle time.

**-2SB24D**: 24V DC, 2.3 W Solenoid Control Valve (**-2OSB24D** for normally open supply)
**-2SB110A**: 20V AC 60 Hz (110V AC 50 Hz), 2.3 W Solenoid Control Valve (**-2OS110A** for normally open supply)

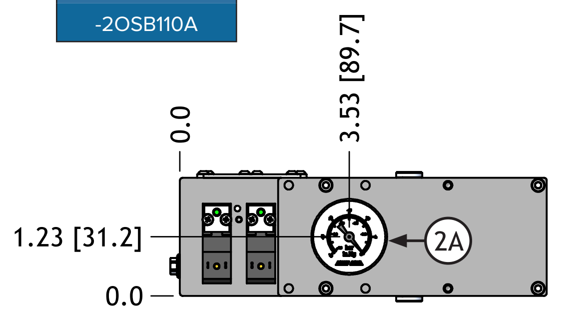
| Series | Capacity | Seal Material | | Ports | | Solenoid Option | Valve Options | |
|---|---|---|---|---|---|---|---|---|
| ML | 100 | N | | | | -2SB24D | | |
| A | 25 (40) | N | Nitrile | (Blank) | NPTF Threads | -2BS24D | (Blank) | Standard |
| E | 50 (80) | S | Silicone | -G | G Threads | -2SB110A | -NR | Non-Return |
| L | 75 (120) | V | Viton[2] | | | -2OSB24D | | |
| M | 100 (160) | | | | | -2OSB110A | | |
| ML | 125 (200) | | | | | | | |
| X | 150 (240) | | | | | | | |
| | 175 (280) | | | | | | | |
| | 200 (320) | | | | | | | |
| | (X Series) | | | | | | | |

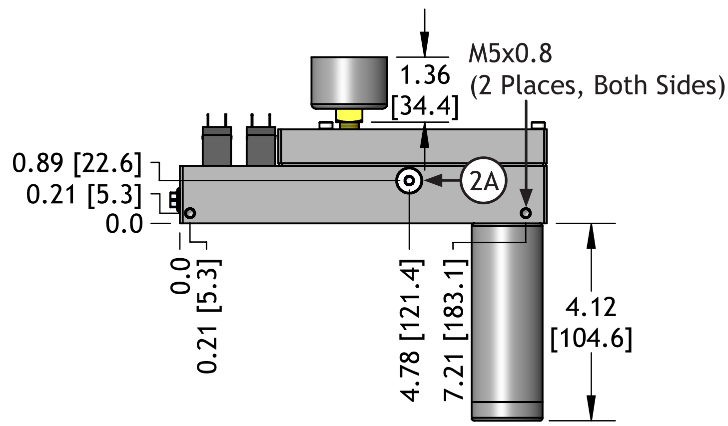
[2]*Viton is a registered trademark of Du Pont Dow Elastomers.*

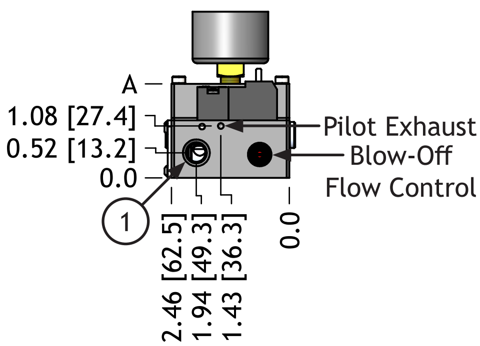
*Order DIN T-9 Molded Cords Separately:*
**923-2M01**: *Std. 2M*
**923-2M31**: *L.E.D. 0-50V, 2M*
**923-2M81**: *L.E.D.70-250V, 2M*

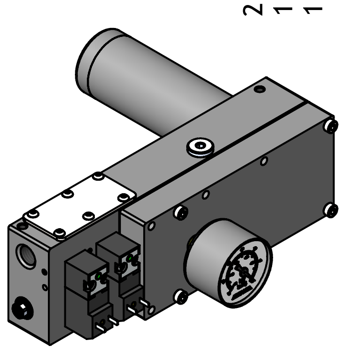


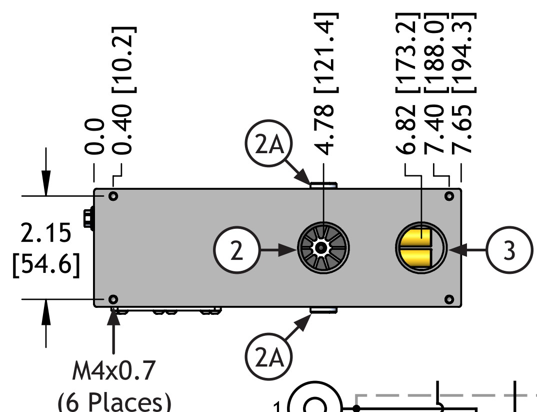
*N.O. Supply Option*
*Weight: 0.02 [9.1]*



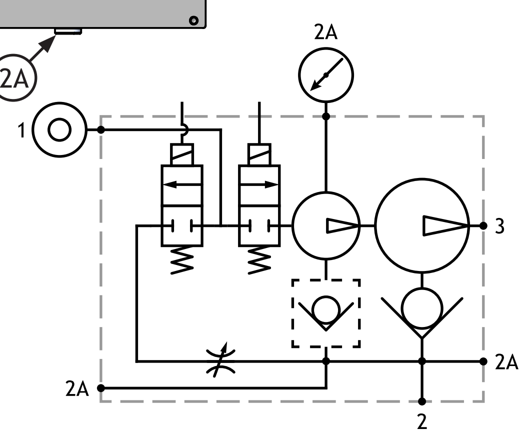






| Capacity | A in [mm] | Weight lb [g] |
|---|---|---|
| 25-100 | 1.96 [49.8] | 2.81 [1275.0] |
| 125-200 | 2.67 [67.8] | 3.41 [1547.0] |

| Code | Function | NPTF | G |
|---|---|---|---|
| 1 | Air-Supply | 1/4 NPTF | G 1/4 |
| 2 | Vacuum | 3/4 NPTF | G 3/4 |
| 2A | Vacuum - Alternate | G 1/8 NPSF | |
| 3 | Exhaust | 3/4 NPTF | G 3/4 |



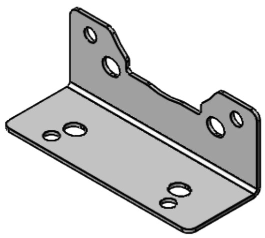
## Mounting Brackets

Stainless steel mounting brackets come in 90° and 180° styles to use in a variety of mounting options. ML-BKT-90 and ML-BKT-180 can be use in side or end orientation on the basic classic pump base and end orientation on pump bases with air-supply or blow-off control options. Dual hole patterns provide attachment to both metric and inch structural framing extrusion t-slots.

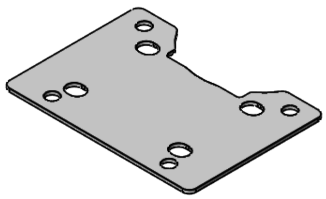
*Weight: 0.06 lbs [131.1 g]*

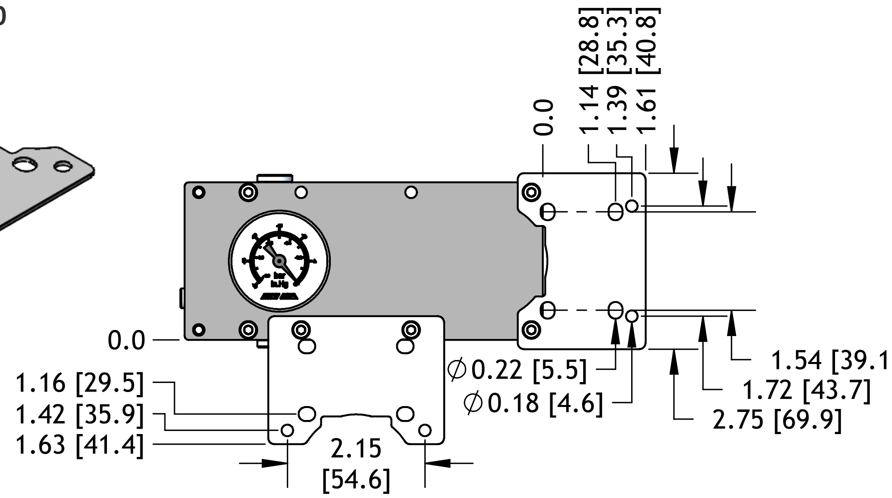
Brackets and fastener kits must be ordered separately. Not compatible with 6010, 6034, SM, or SMS bases.

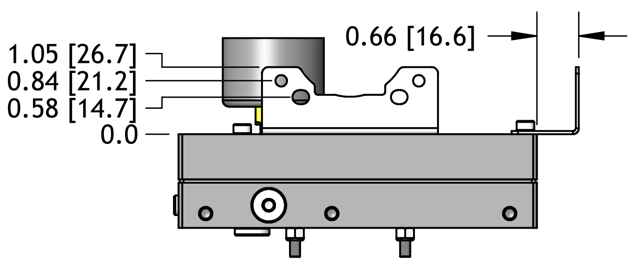
**ML-BKT-90**

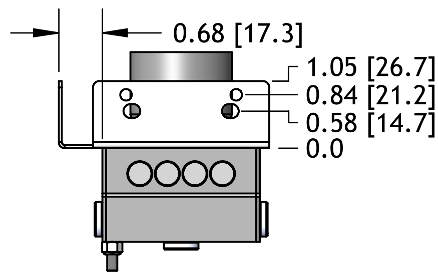


**ML-BKT-180**






## Fastener Kits

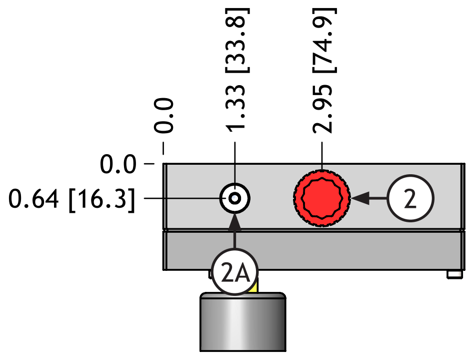
| Fastener Kit | Description | Contains |
|---|---|---|
| ML-M4-E1 | End Mount, 25-100 Capacity | M4X8 (2) & M4X30 (2) |
| ML-M4-E2 | End Mount, 125-200 Capacity | M4X8 (2) & M4X45 (2) |
| ML-M4-S1 | Side Mount, 25-100 Capacity | M4X50 (2) & M4 Nut (2) |
| ML-M4-S2 | Side Mount, 125-200 Capacity | M4X70 (2) & M4 Nut (2) |

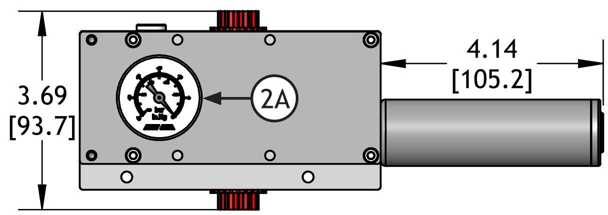
## Surface Mount Base

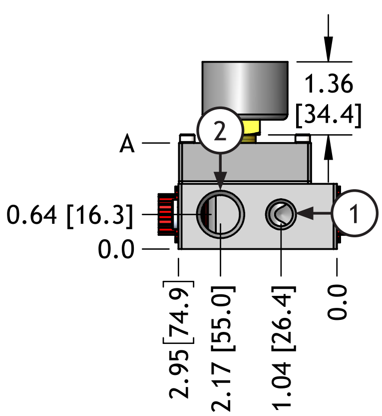
The SM (surface mount) base includes 1/2” vacuum ports at three locations and a flat backside for panel mounting. One to three vacuum lines can be ran directly from the pump base. Unused vacuum ports simply need to be plugged. This design makes this pump configuration ideal for robotic end-effectors.

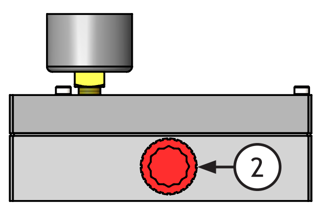
| Series | Capacity | Seal Material | | Ports | | Gauge Orientation | | Valve Options | |
|---|---|---|---|---|---|---|---|---|---|
| ML | 100 | N | | -SM | | | | | |
| A | 25 (40) | N | Nitrile | (Blank) | NPTF Threads | -SM | Standard | (Blank) | Standard |
| E | 50 (80) | S | Silicone | -G | G Threads | -SMS | Side Gauge | -NR | Non-Return |
| L | 75 (120) | V | Viton[2] | | | | | | |
| M | 100 (160) | | | | | | | | |
| ML | 125 (200) | | | | | | | | |
| X | 150 (240) | | | | | | | | |
| | 175 (280) | | | | | | | | |
| | 200 (320) | | | | | | | | |
| | (X Series) | | | | | | | | |

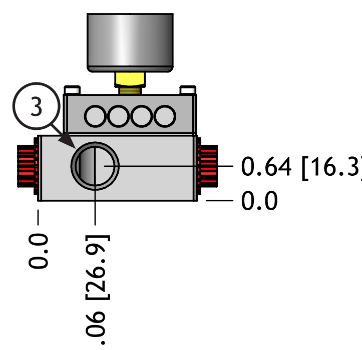
*[2]Viton is a registered trademark of Du Pont Dow Elastomers.*

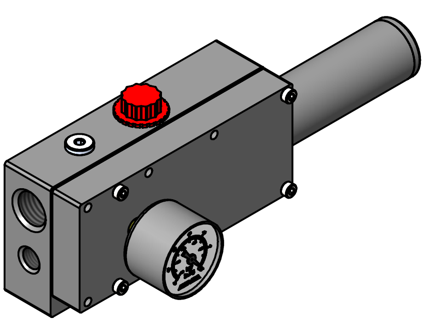


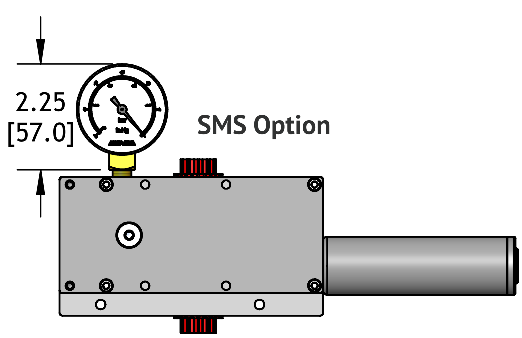



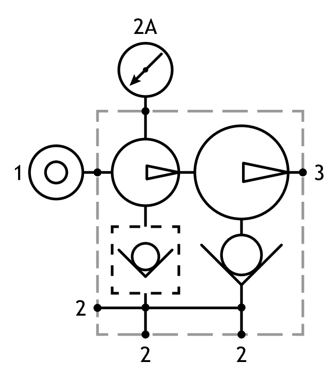






| Code | Function | NPT | G |
|---|---|---|---|
| 1 | Air-Supply | 1/4 NPTF | G 1/4 |
| 2 | Vacuum | 3/4 NPTF | G 3/4 |
| 2A | Vacuum - Alternate | G 1/8 NPSF | |
| 3 | Exhaust | 1/2 NPTF | G 1/2 |

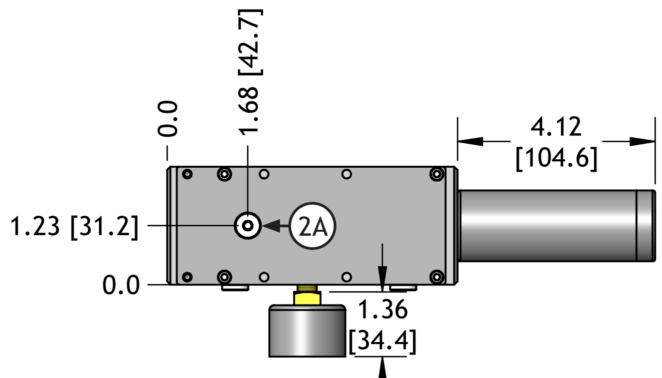
| Capacity | A in [mm] | Weight lb [g] |
|---|---|---|
| 25-100 | 1.97 [50.0] | 2.27 [1030.0] |
| 125-200 | 2.68 [68.1] | 3.05 [1383.0] |

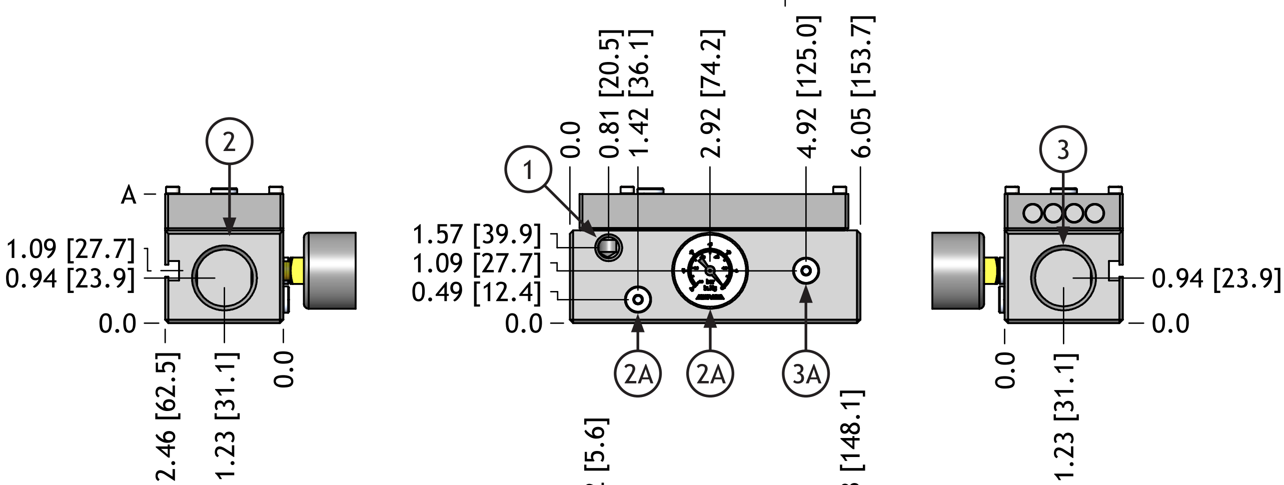
## 6010 Base

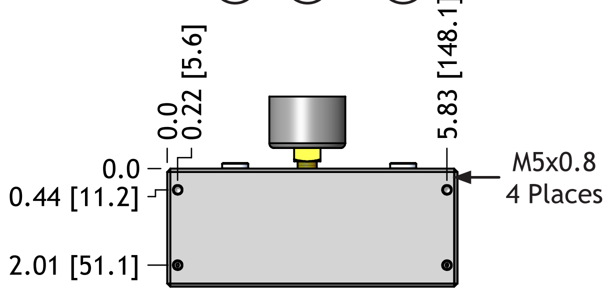
G 1" vacuum and exhaust ports are at opposite ends of the base. The pump is controlled via air-supply through the inlet port. Vacuum gauge, silencer, and full length t-slot are included.

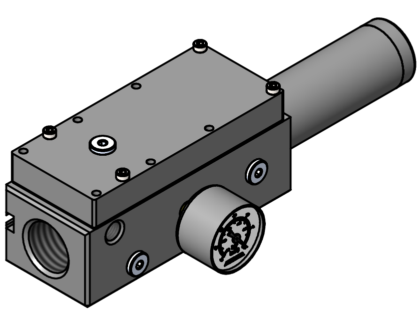
| Series | Capacity | Seal Material | | | Valve Options | |
|---|---|---|---|---|---|---|
| ML | 100 | N | | -6010 | | |
| A | 25 (40) | N | Nitrile | | (Blank) | Standard |
| E | 50 (80) | S | Silicone | | -NR | Non-Return |
| L | 75 (120) | V | Viton[2] | | | |
| M | 100 (160) | | | | | |
| ML | 125 (200) | | | | | |
| X | 150 (240) | | | | | |
| | 175 (280) | | | | | |
| | 200 (320) | | | | | |
| | (X Series) | | | | | |

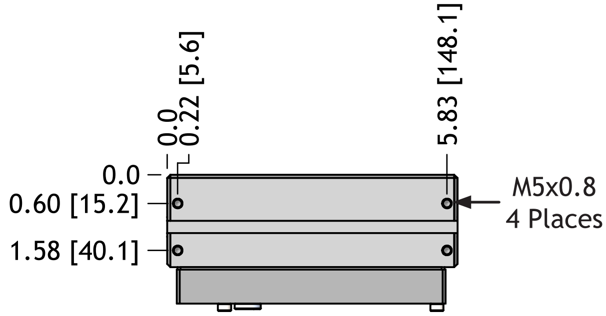
*[2]Viton is a registered trademark of Du Pont Dow Elastomers.*



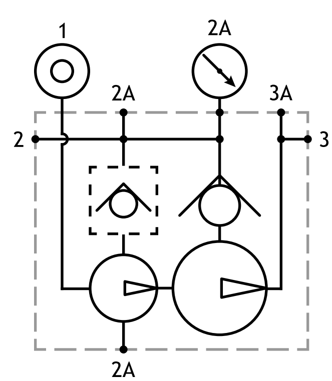






| Code | Function | Ports |
|---|---|---|
| 1 | Air-Supply | 1/4 NPSF |
| 2 | Vacuum | G 1 |
| 2A | Vacuum - Alternate | G 1/8 NPSF |
| 3 | Exhaust | G 3/4 NPSF |
| 3A | Exhaust - Alternate | G 1/8 NPSF |

| Capacity | A in [mm] | Weight lb [g] |
|---|---|---|
| 25-100 | 2.69 [68.3] | 2.43 [1102.0] |
| 125-200 | 3.40 [86.4] | 3.02 [1370.0] |

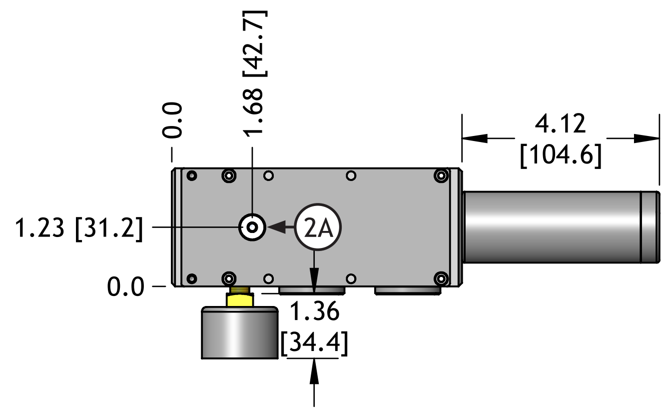


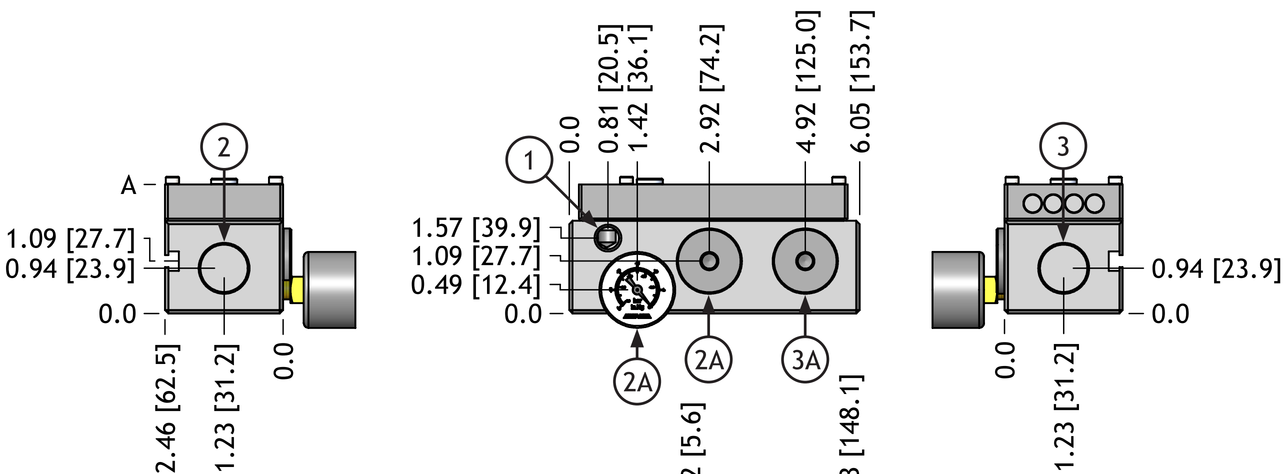
## 6034 Base

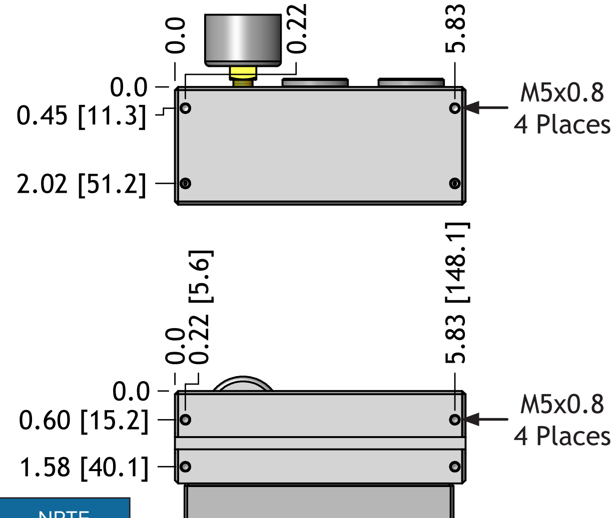
3/4" vacuum and exhaust ports are at opposite ends of the base. The pump is controlled via air-supply through the inlet port. Vacuum gauge, silencer, and full length t-slot are included.

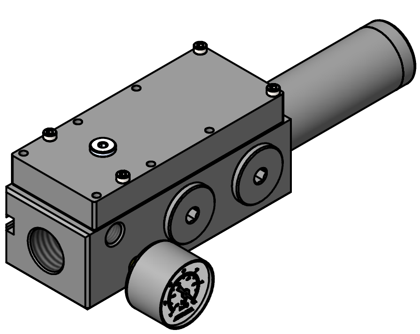
| Series | Capacity | Seal Material | | Ports | | | Valve Options | |
|---|---|---|---|---|---|---|---|---|
| ML | 100 | N | | | | -6034 | | |
| A | 25 (40) | N | Nitrile | (Blank) | NPTF Threads | | (Blank) | Standard |
| E | 50 (80) | S | Silicone | -G | G Threads | | -NR | Non-Return |
| L | 75 (120) | V | Viton[2] | | | | | |
| M | 100 (160) | | | | | | | |
| ML | 125 (200) | | | | | | | |
| X | 150 (240) | | | | | | | |
| | 175 (280) | | | | | | | |
| | 200 (320) | | | | | | | |
| | (X Series) | | | | | | | |

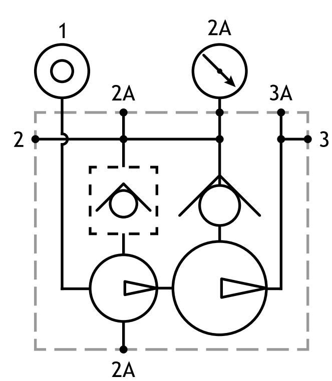
*[2]Viton is a registered trademark of Du Pont Dow Elastomers.*






| Code | Function | G | NPTF |
|---|---|---|---|
| 1 | Air-Supply | 1/4 NPSF | G 1/4 |
| 2 | Vacuum | G 3/4 NPSF | |
| 2A | Vacuum - Alternate | G 1/8 NPSF | |
| 3 | Exhaust | G 3/4 NPSF | |

| Capacity | A<br>in [mm] | Weight<br>lb [g] |
|---|---|---|
| 25-100 | 2.69 [68.3] | 2.58 [1170.0] |
| 125-200 | 3.40 [86.4] | 3.17 [1438.0] |

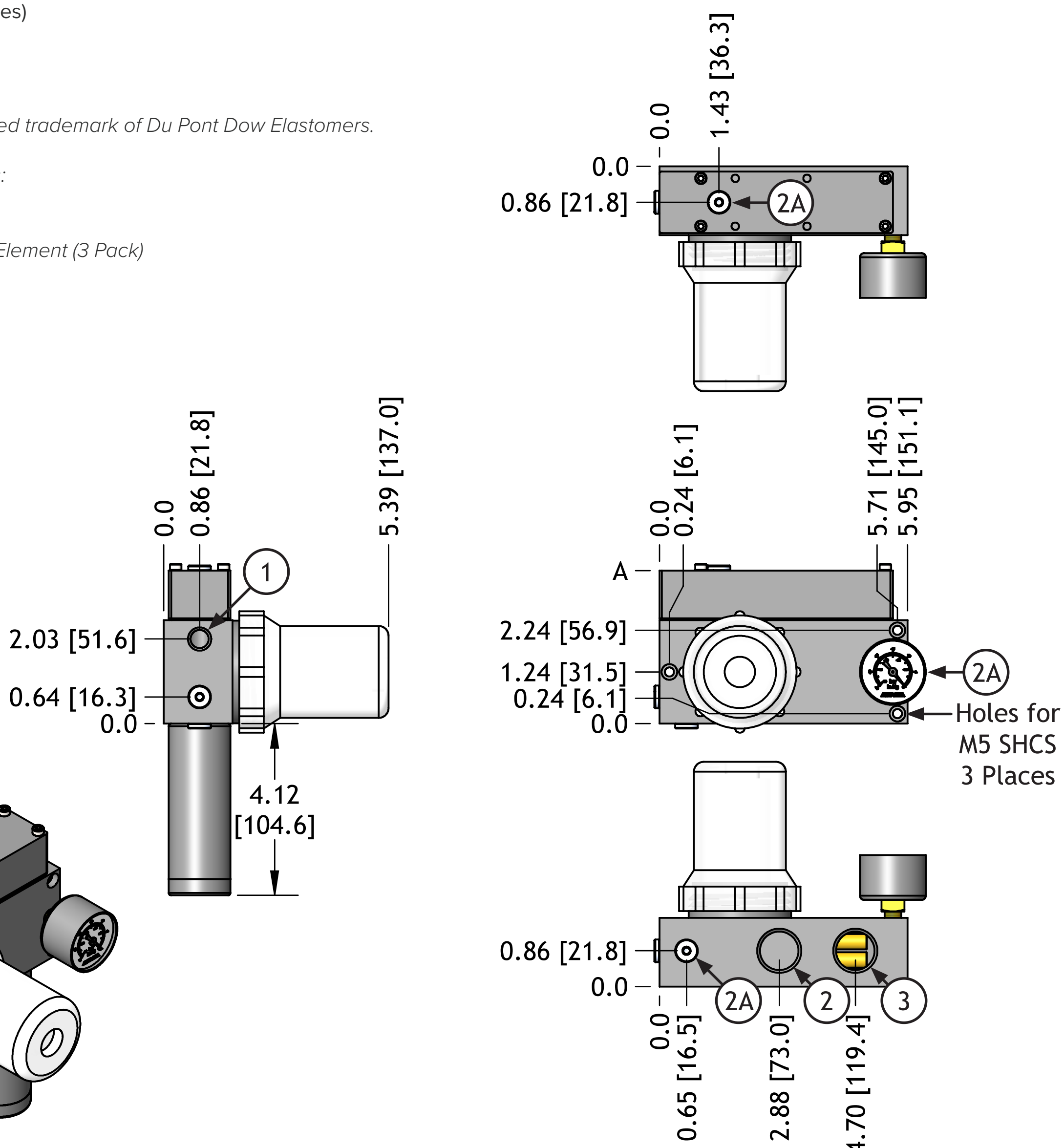
## Basic Pump w/ Integrated Filter

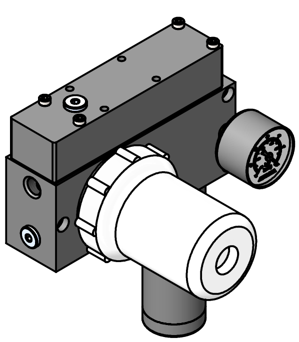
Basic pump controlled via air supply through the pump base inlet port. This pump incorporates the bowl, gasket, and filter element of our t-style filters directly into the pump base eliminating the necessity of incorporating an external filter into the vacuum system.

| Series | Capacity | Seal | | Ports | | |
|---|---|---|---|---|---|---|
| ML | 100 | N | | | | -IF |
| A | 25 (40) | N | Nitrile | (Blank) | NPTF Threads | |
| E | 50 (80) | V | Viton | -G | G Threads | |
| L | 100 (160) | | | | | |
| M | (X Series) | | | | | |
| ML | | | | | | |
| X | | | | | | |

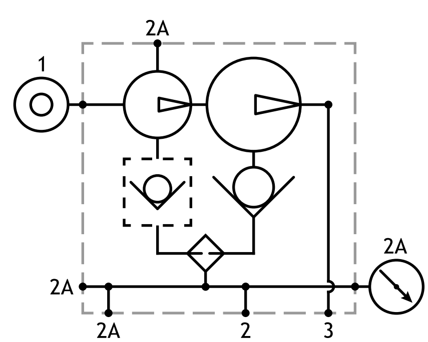
*[2]Viton is a registered trademark of Du Pont Dow Elastomers.*

*Replacement Parts:*
**10503**: *Bowl*
**10514**: *Gasket*
**PPX35RE3**: *Filter Element (3 Pack)*



| Capacity | A in [mm] | Weight lb [g] |
|---|---|---|
| 25-50 | 3.24 [82.2] | 3.09 [1400.5] |
| 100 | 3.67 [93.3] | 3.36 [1524.6] |




| Code | Function | NPTF | G |
|---|---|---|---|
| 1 | Air-Supply | 1/4 NPTF | G 1/4 |
| 2 | Vacuum | 3/4 NPTF | G 3/4 |
| 2A | Vacuum - Alternate | G 1/8 NPSF | |
| 3 | Exhaust | 3/4 NPTF | G 3/4 |

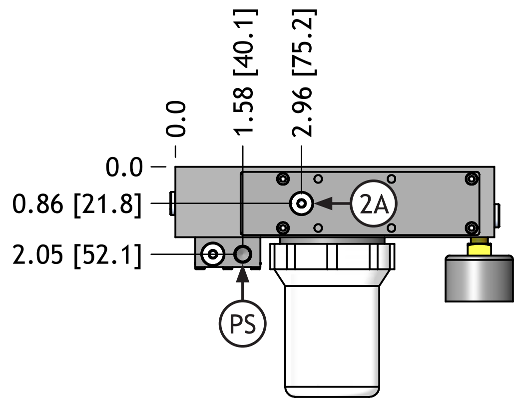
## Pump w/ Integrated Filter & Pilot Controlled Air-Supply

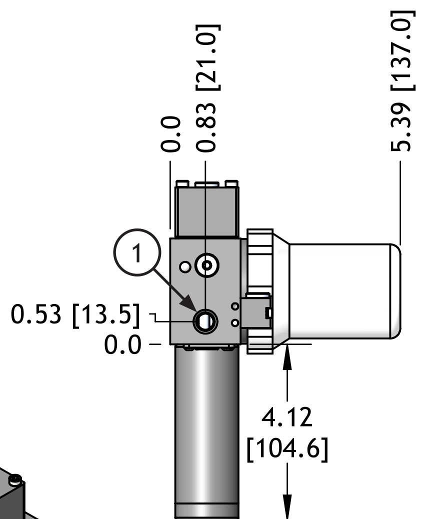
The pump base contains an integral, pilot-operated, 3-way air valve which controls vacuum on/off via pneumatic pilot signal. When the pilot signal is presented, the vacuum is turned on. When the pilot signal is exhausted, the pump turns off. This pump incorporates the bowl, gasket, and filter element of our t-style filters directly into the pump base eliminating the necessity of incorporating an external filter into the vacuum system.

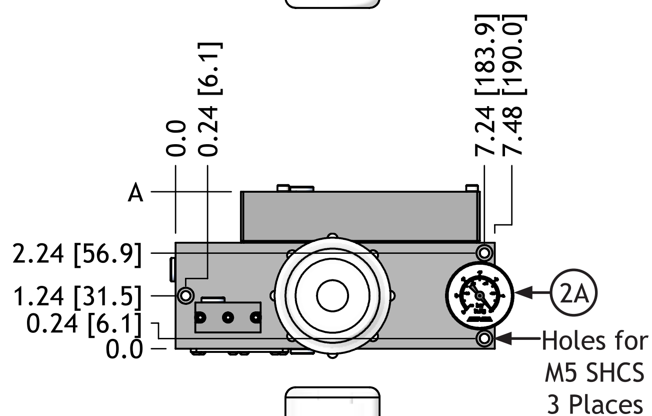
| Series | Capacity | Seal | | Ports | | |
|---|---|---|---|---|---|---|
| ML | 100 | N | | | | -IF-PS |
| A | 25 (40) | N | Nitrile | (Blank) | NPTF Threads | |
| E | 50 (80) | V | Viton | -G | G Threads | |
| L | 100 (160) | | | | | |
| M | (X Series) | | | | | |
| ML | | | | | | |
| X | | | | | | |

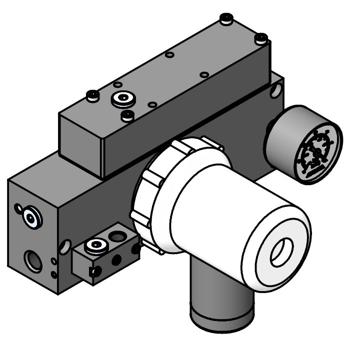
*[2]Viton is a registered trademark of Du Pont Dow Elastomers.*

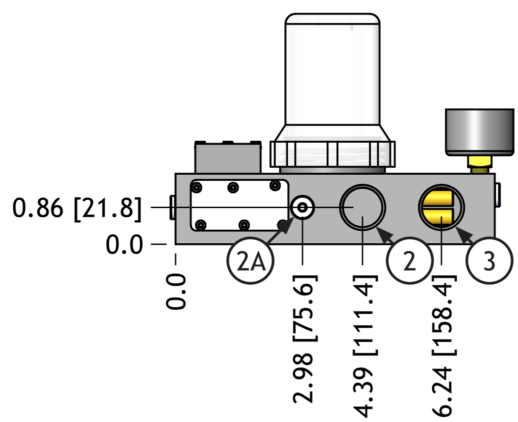
*Replacement Parts:*
**10503**: *Bowl*
**10514**: *Gasket*
**PPX35RE3**: *Filter Element (3 Pack)*



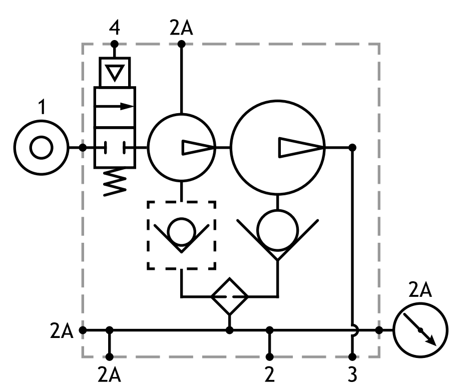






| Capacity | A in [mm] | Weight lb [g] |
|---|---|---|
| 25-50 | 3.24 [82.2] | 3.78 [1712.9] |
| 100 | 3.67 [93.3] | 4.04 [1833.1] |

| Code | Function | NPTF | G |
|---|---|---|---|
| 1 | Air-Supply | 1/4 NPTF | G 1/4 |
| 2 | Vacuum | 3/4 NPTF | G 3/4 |
| 2A | Vacuum - Alternate | G 1/8 NPSF | |
| 3 | Exhaust | 3/4 NPTF | G 3/4 |
| PS | Pilot Signal - Air-Supply | G 1/8 NPSF | |



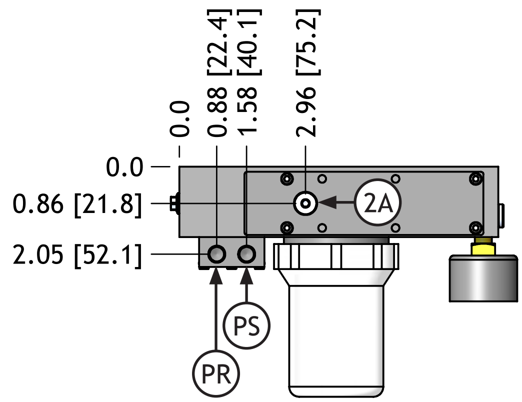
# Pump w/ Integrated Filter & Pilot Controlled Air-Supply & Release

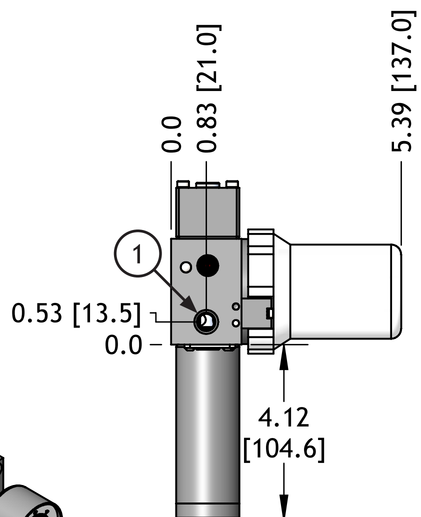
The pump base contains two integral, pilot-operated, 3-way air valves which provide full pump control via two externally supplied pneumatic pilot signals. With a constant air-supply to the pump base, one pilot signal controls vacuum on/off while a second pilot signal controls blow-off air to dissipate vacuum for faster system cycle time. This pump incorporates the bowl, gasket, and filter element of our t-style filters directly into the pump base eliminating the necessity of incorporating an external filter into the vacuum system.

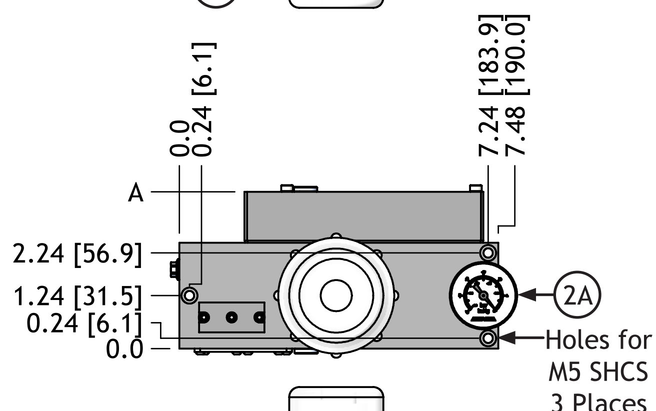
| Series | Capacity | Seal | | Ports | | |
|---|---|---|---|---|---|---|
| ML | 100 | N | | | | -IF-PSB |
| A | 25 (40) | N | Nitrile | (Blank) | NPTF Threads | |
| E | 50 (80) | V | Viton | -G | G Threads | |
| L | 100 (160) | | | | | |
| M | (X Series) | | | | | |
| ML | | | | | | |
| X | | | | | | |

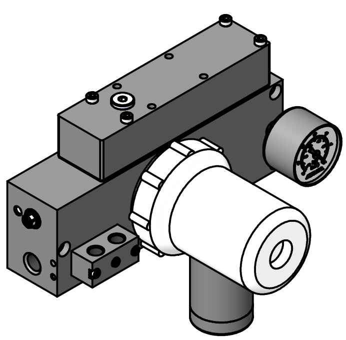
[2]*Viton is a registered trademark of Du Pont Dow Elastomers.*

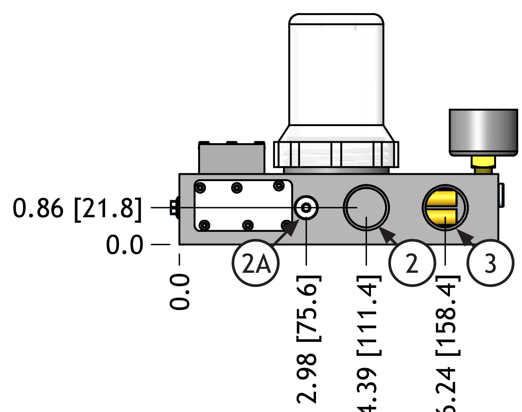
*Replacement Parts:*
**10503**: *Bowl*
**10514**: *Gasket*
**PPX35RE3**: *Filter Element (3 Pack)*



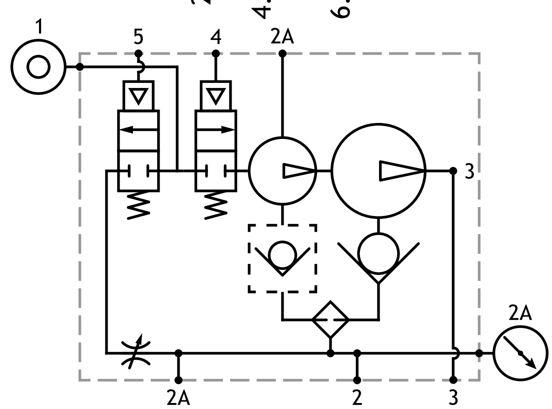






| Capacity | A in [mm] | Weight lb [g] |
|---|---|---|
| 25-50 | 3.24 [82.2] | 3.78 [1712.4] |
| 100 | 3.67 [93.3] | 4.04 [1832.5] |




| Code | Function | NPTF | G |
|---|---|---|---|
| 1 | Air-Supply | 1/4 NPTF | G 1/4 |
| 2 | Vacuum | 3/4 NPTF | G 3/4 |
| 2A | Vacuum - Alternate | G 1/8 NPSF | |
| 3 | Exhaust | 3/4 NPTF | G 3/4 |
| PS | Pilot Signal - Air-Supply | G 1/8 NPSF | |
| PR | Pilot Signal - Release | G 1/8 NPSF | |

## Pump w/ Integrated Filter & Solenoid Controlled Air-Supply

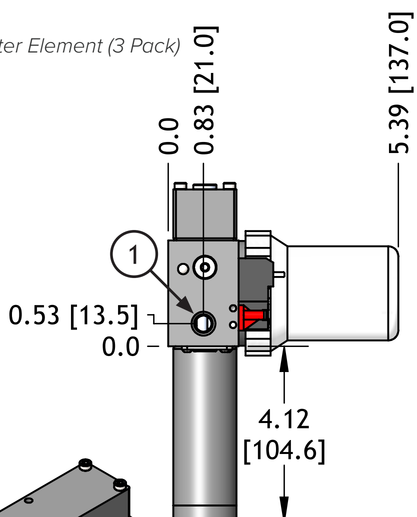
The pump base contains an integral, pilot-operated, 3-way air valve which controls vacuum on/off via a solenoid valve. When the solenoid valve is energized, the vacuum pump turns on. When the solenoid valve is de-energized, the pump turns off. This pump incorporates the bowl, gasket, and filter element of our t-style filters directly into the pump base eliminating the necessity of incorporating an external filter into the vacuum system.

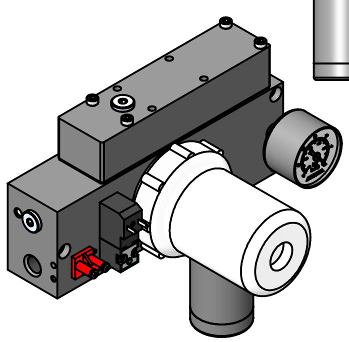
| Series | Capacity | Seal | | Ports | | |
|---|---|---|---|---|---|---|
| ML | 100 | N | | | | -IF-S24D |
| A | 25 (40) | N | Nitrile | (Blank) | NPTF Threads | |
| E | 50 (80) | V | Viton | -G | G Threads | |
| L | 100 (160) | | | | | |
| M | (X Series) | | | | | |
| ML | | | | | | |
| X | | | | | | |

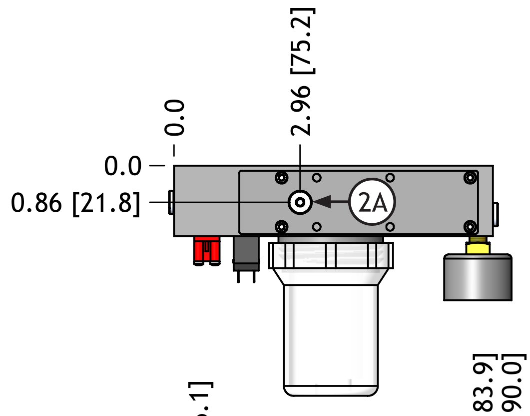
*²Viton is a registered trademark of Du Pont Dow Elastomers.*

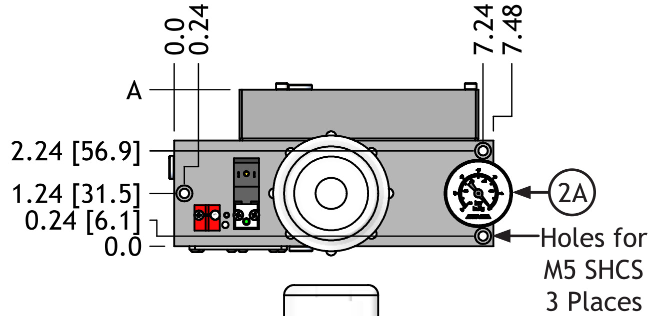
*Order DIN T-9 Molded Cords Separately:*
**923-2M01**: *Std. 2M*
**923-2M31**: *L.E.D. 0-50V, 2M*
**923-2M81**: *L.E.D.70-250V, 2M*

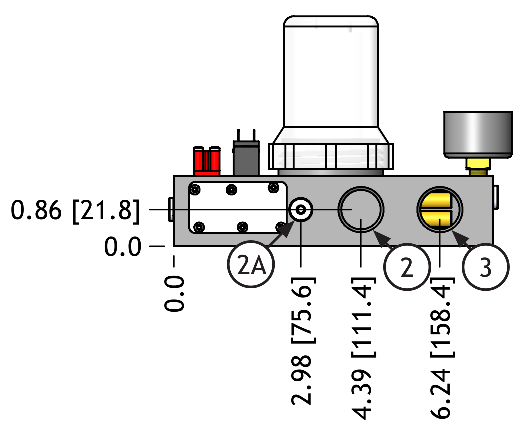
*Replacement Parts:*
**10503**: *Bowl*
**10514**: *Gasket*
**PPX35RE3**: *Filter Element (3 Pack)*



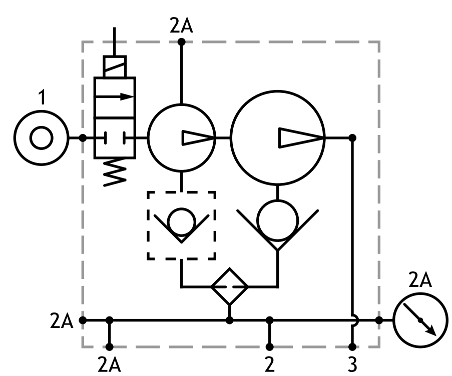






| Capacity | A in [mm] | Weight lb [g] |
|---|---|---|
| 25-50 | 3.24 [82.2] | 3.73 [1692.0] |
| 100 | 3.67 [93.3] | 4.00 [1812.2] |




| Code | Function | NPTF | G |
|---|---|---|---|
| 1 | Air-Supply | 1/4 NPTF | G 1/4 |
| 2 | Vacuum | 3/4 NPTF | G 3/4 |
| 2A | Vacuum - Alternate | G 1/8 NPSF | |
| 3 | Exhaust | 3/4 NPTF | G 3/4 |

# Pump w/ Integrated Filter & Solenoid Controlled Air-Supply & Release

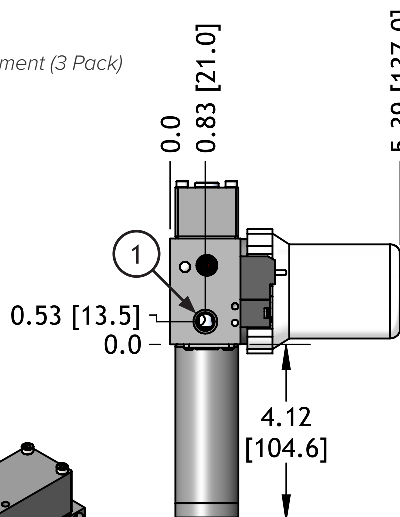
The pump base contains two integral, pilot-operated, 3-way air valves which provide full pump control via two solenoid valves. With a constant air-supply to the pump base, one solenoid valve controls vacuum on/off while a second solenoid valve controls blow-off air to dissipate vacuum for faster system cycle time. This pump incorporates the bowl, gasket, and filter element of our t-style filters directly into the pump base eliminating the necessity of incorporating an external filter into the vacuum system.

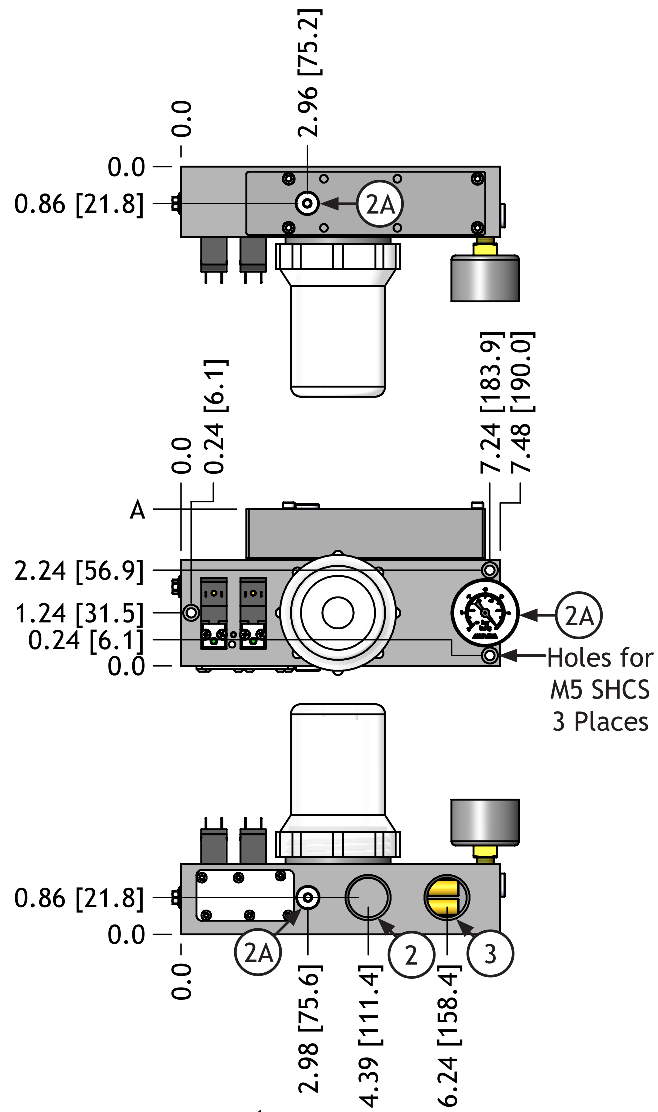
| Series | Capacity | Seal | | Ports | | |
|---|---|---|---|---|---|---|
| ML | 100 | N | | | | -IF-SB24D |
| A | 25 (40) | N | Nitrile | (Blank) | NPTF Threads | |
| E | 50 (80) | V | Viton | -G | G Threads | |
| L | 100 (160) | | | | | |
| M | (X Series) | | | | | |
| ML | | | | | | |
| X | | | | | | |

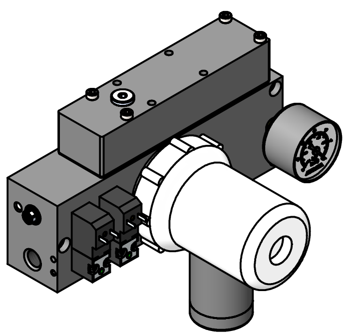
*[2]Viton is a registered trademark of Du Pont Dow Elastomers.*

*Order DIN T-9 Molded Cords Separately:*
**923-2M01**: *Std. 2M*
**923-2M31**: *L.E.D. 0-50V, 2M*
**923-2M81**: *L.E.D.70-250V, 2M*

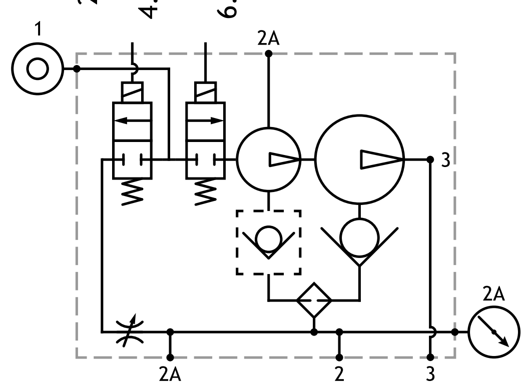
*Replacement Parts:*
**10503**: *Bowl*
**10514**: *Gasket*
**PPX35RE3**: *Filter Element (3 Pack)*



| Capacity | A in [mm] | A - Weight lb [g] |
|---|---|---|
| 25-50 | 3.24 [82.2] | 3.76 [1703.7] |
| 100 | 3.67 [93.3] | 4.02 [1823.9] |




| Code | Function | NPTF | G |
|---|---|---|---|
| 1 | Air-Supply | 1/4 NPTF | G 1/4 |
| 2 | Vacuum | 3/4 NPTF | G 3/4 |
| 2A | Vacuum - Alternate | G 1/8 NPSF | |
| 3 | Exhaust | 3/4 NPTF | G 3/4 |

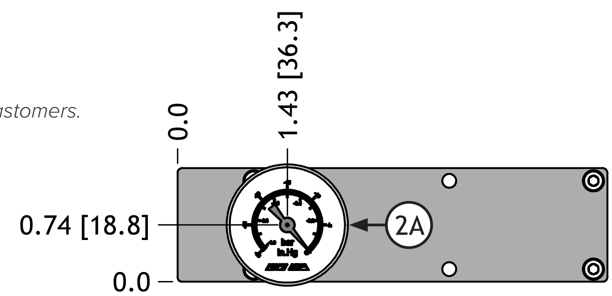
 

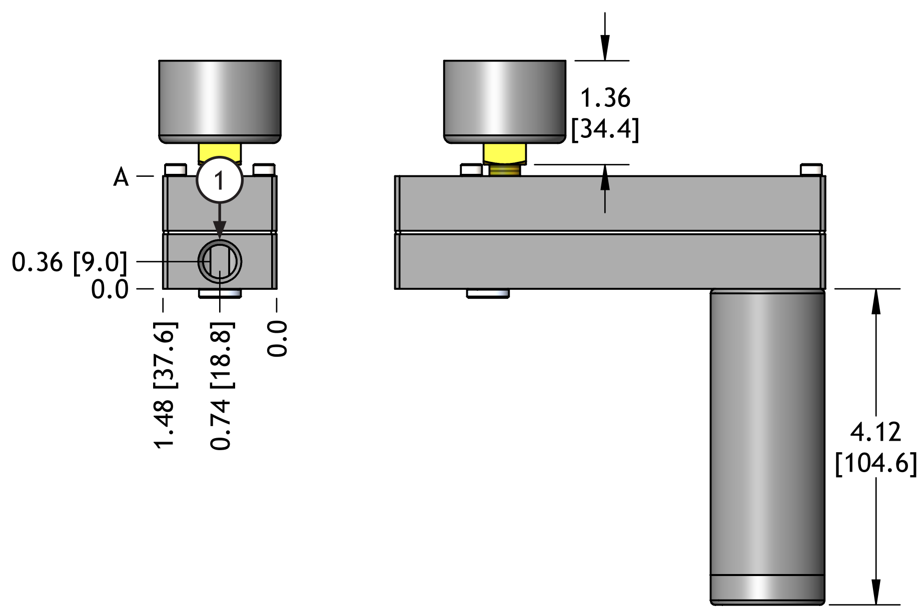
## Mini Classic Pumps

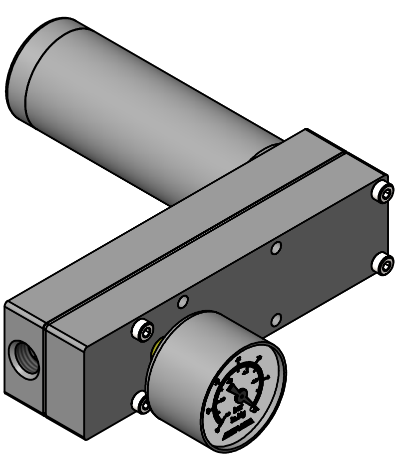
Basic pump controlled via air supply through the pump base inlet port.

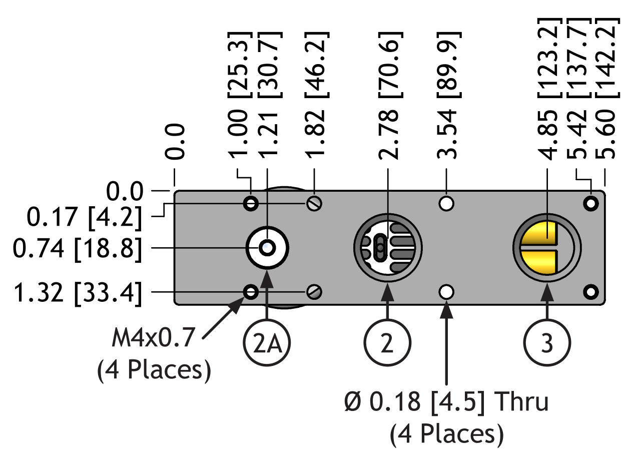
| Series | Capacity | Seal Material | | Ports | | |
|---|---|---|---|---|---|---|
| ML | 100 | N | | | | -12 |
| A | 25 (40) | N | Nitrile | (Blank) | NPTF Threads | |
| E | 50 (80) | V | Viton | -G | G Threads | |
| L | 100 (160) | | | | | |
| M | (X Series) | | | | | |
| ML | | | | | | |
| X | | | | | | |

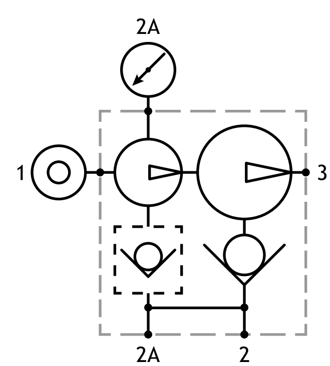
[2]Viton is a registered trademark of Du Pont Dow Elastomers.






| Code | Function | NPTF | G |
|---|---|---|---|
| 1 | Air-Supply | 1/4 NPTF | G 1/4 |
| 2 | Vacuum | 1/2 NPTF | G 1/2 |
| 2A | Vacuum - Alternate | G 1/8 NPSF | |
| 3 | Exhaust | 1/2 NPTF | G 1/2 |

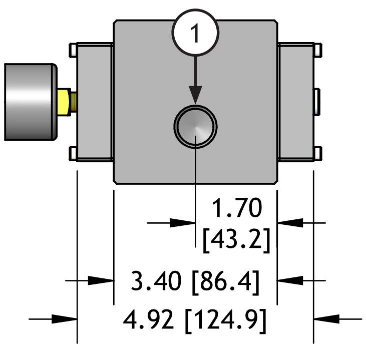
| Capacity | A in [mm] | Weight lb [g] |
|---|---|---|
| 25-50 | 1.47 [37.3] | 1.25 [565.7] |
| 100 | 1.90 [48.3] | 1.53 [693.7] |

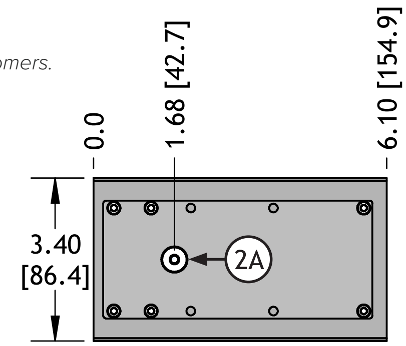
## Dual-Base Classic Pumps

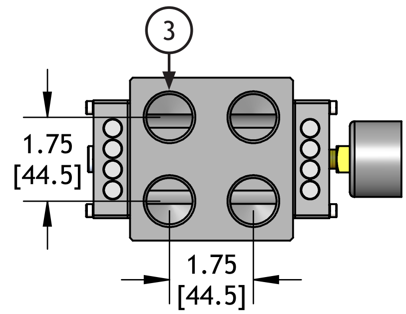
Basic pump controlled via air supply through the pump base inlet port.

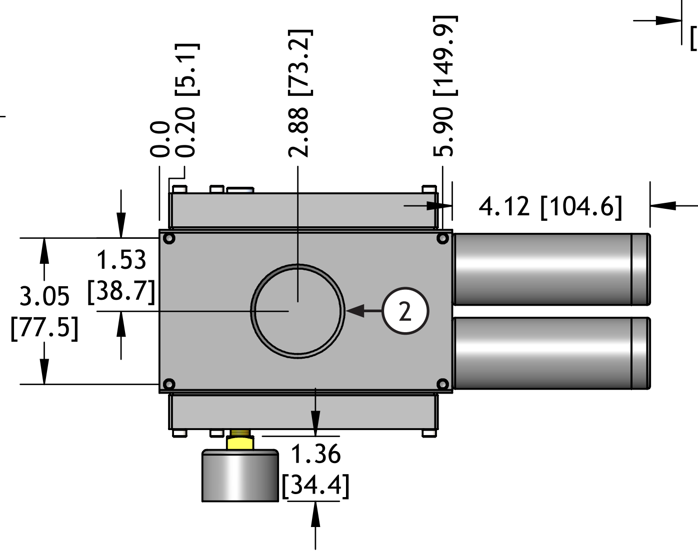
| | Series | Capacity | Seal Material | | Valve Options | |
|---|---|---|---|---|---|---|
| D | ML | 200 | N | | | |
| | A | 200 (320) | N | Nitrile | (Blank) | Standard |
| | E | 300 (480) | S | Silicone | -NR | Non-Return |
| | L | 400 (640) | V | Viton[2] | | |
| | M | (X Series) | | | | |
| | ML | | | | | |
| | X | | | | | |

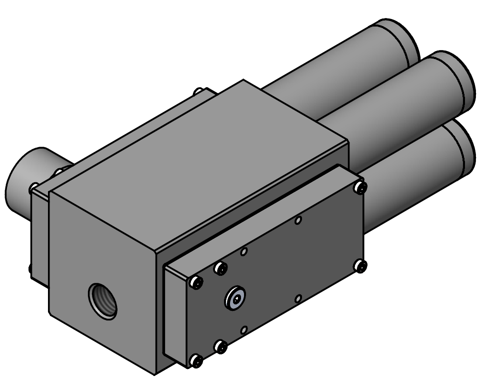
*[2]Viton is a registered trademark of Du Pont Dow Elastomers.*

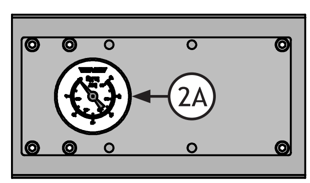


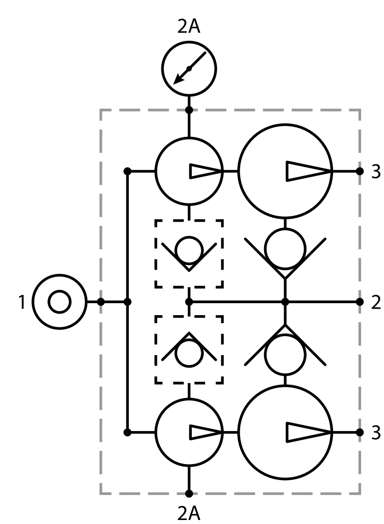






| Code | Function | NPTF |
|---|---|---|
| 1 | Air-Supply | G 1/2 NPSF |
| 2 | Vacuum | G 1/2 NPSF |
| 2A | Vacuum - Alternate | G 1/8 NPSF |
| 3 | Exhaust | G 3/4 NPSF |

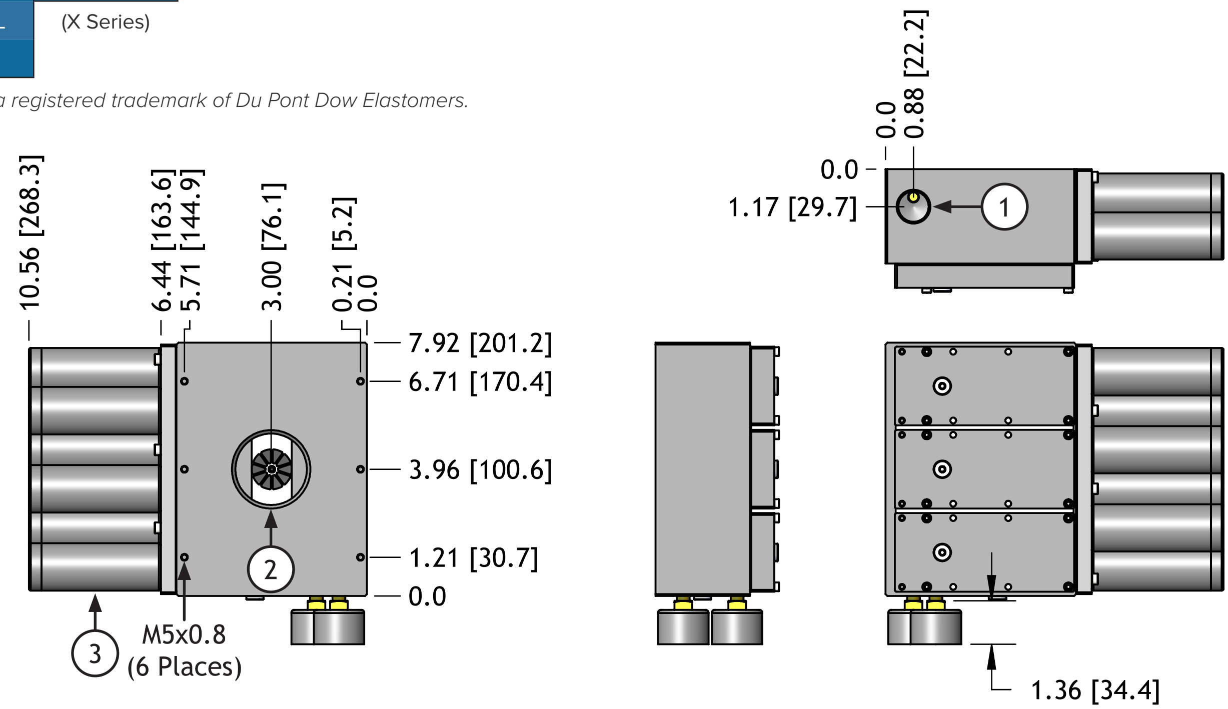
| Capacity | A in [mm] | Weight lb [g] |
|---|---|---|
| 200 | 4.92 [124.9] | 6.94 [3146.8] |
| 300 | 5.63 [142.9] | 7.58 [3436.3] |
| 400 | 6.34 [160.9] | 8.21 [3752.9] |

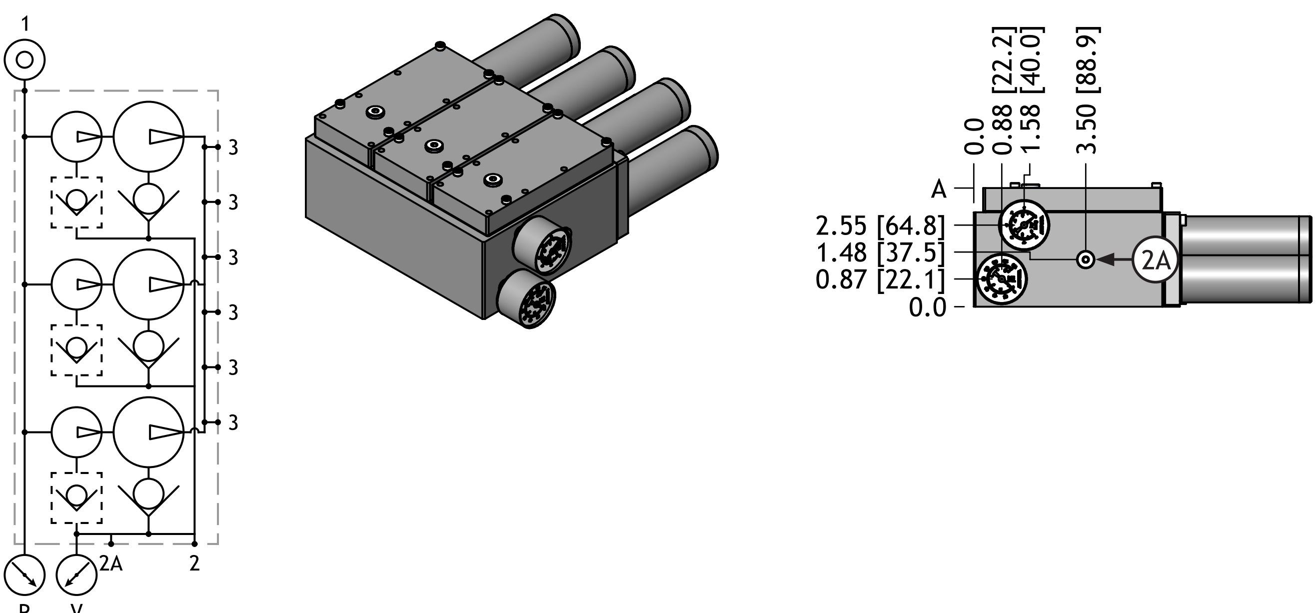
## Triple-Base Classic Pumps

Basic pump controlled via air supply through the pump base inlet port.

| | Series | Capacity | Seal Material | | Ports | | Valve Options | | Exhaust Option | |
|---|---|---|---|---|---|---|---|---|---|---|
| T | ML | 300 | N | | | | | | | |
| | A | 300 (480) | N | Nitrile | (Blank) | NPTF Threads | (Blank) | Standard | (Blank) | Standard |
| | E | 400 (640) | S | Silicone | -G | G Threads | -NR | Non-Return | -CE | Captured |
| | L | 500 (800) | V | Viton[2] | | | | | | |
| | M | 600 (960) | | | | | | | | |
| | ML | (X Series) | | | | | | | | |
| | X | | | | | | | | | |

[2]Viton is a registered trademark of Du Pont Dow Elastomers.




| Code | Function | NPTF | G |
|---|---|---|---|
| 1 | Air-Supply | 3/4 NPTF | G 3/4 |
| 2 | Vacuum | 2 NPTF | G 2 |
| 2A | Vacuum - Alternate | G 1/8 NPSF | |
| 3 | Exhaust | 3/4 NPTF | G 3/4 |

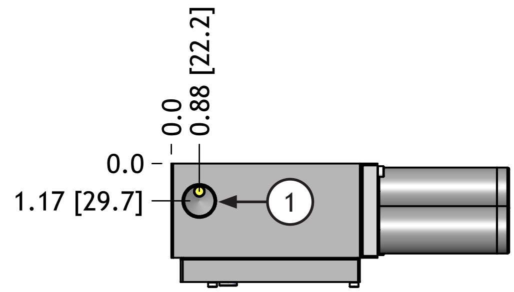
| Capacity | A in [mm] | Weight lb [g] |
|---|---|---|
| 300 | 3.71 [94.2] | 12.68 [5749.8] |
| 400 | 4.42 [112.2] | 13.31 [6039.3] |
| 500 | 4.42 [112.2] | 13.95 [6328.8] |
| 600 | 4.42 [112.2] | 14.59 [6618.3] |

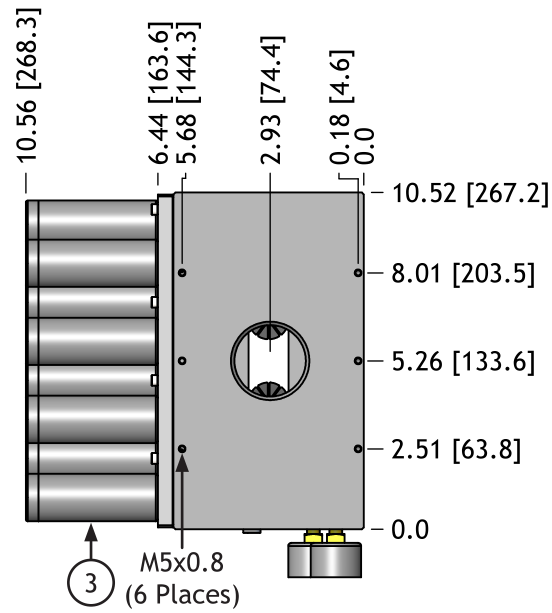
## Quadruple-Base Classic Pumps

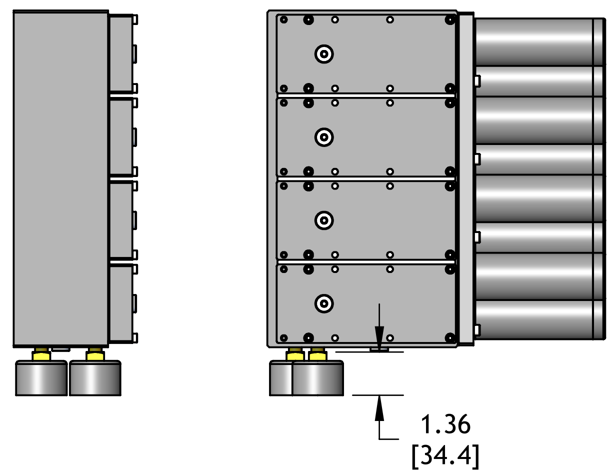
Basic pump controlled via air supply through the pump base inlet port.

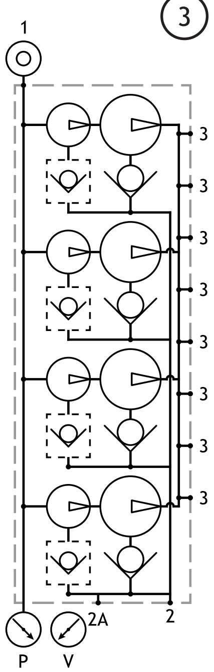
| | Series | Capacity | Seal Material | | Valve Options | | Exhaust Option | |
|---|---|---|---|---|---|---|---|---|
| Q | ML | 400 | N | | | | | |
| | A | 400 (640) | N | Nitrile | (Blank) | Standard | (Blank) | Standard |
| | E | 500 (800) | S | Silicone | -NR | Non-Return | -CE | Captured |
| | L | 600 (960) | V | Viton[2] | | | | |
| | M | 700 (1120) | | | | | | |
| | ML | 800 (1280) | | | | | | |
| | X | (X Series) | | | | | | |

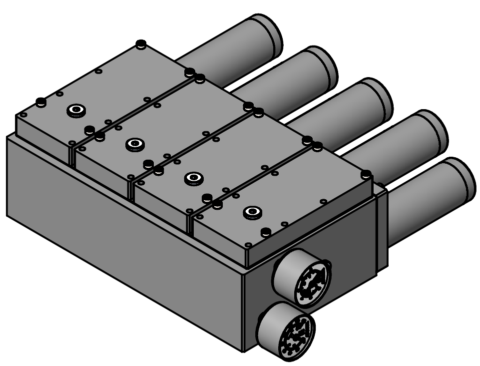
*[2]Viton is a registered trademark of Du Pont Dow Elastomers.*

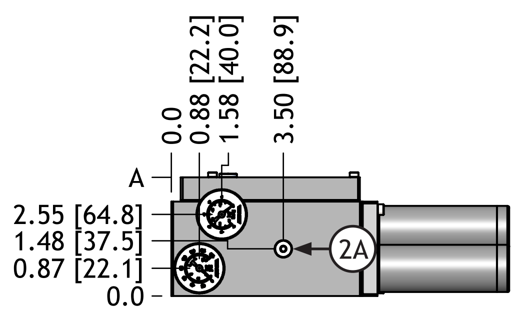




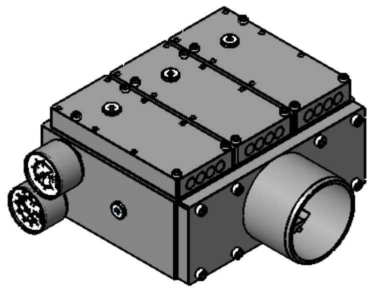

| Code | Function | NPTF | G |
|---|---|---|---|
| 1 | Air-Supply | 3/4 NPTF | G 3/4 |
| 2 | Vacuum | 2 NPTF | G 2 |
| 2A | Vacuum - Alternate | G 1/8 NPSF | |
| 3 | Exhaust | 3/4 NPTF | G 3/4 |

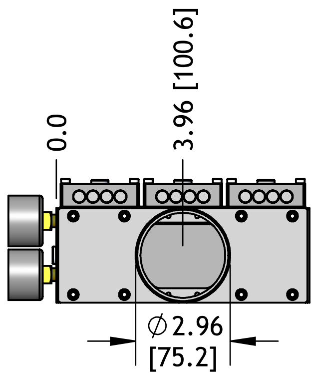
| Capacity | A in [mm] | Weight lb [g] |
|---|---|---|
| 400 | 3.71 [94.2] | 16.78 [7610.0] |
| 500 | 4.42 [112.2] | 17.42 [7899.6] |
| 600 | 4.42 [112.2] | 18.05 [8189.1] |
| 700 | 4.42 [112.2] | 18.69 [8478.6] |
| 800 | 4.42 [112.2] | 19.33 [8768.1] |

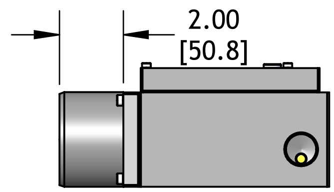
## Quadruple-Base Classic Pumps

To use the Captured Exhaust Option, use 3.00” (75 mm) inner diamter hose.

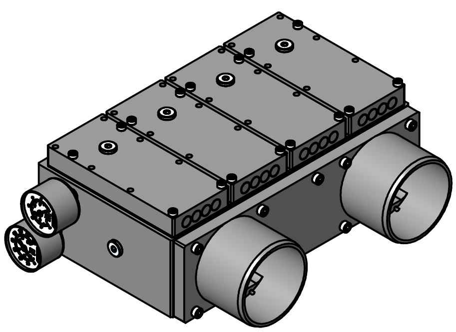
### Triple Base Captured Exhaust Option

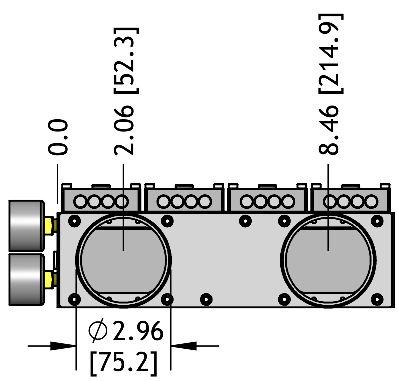

Subtract Weight: 0.97 lb [438.5 g]

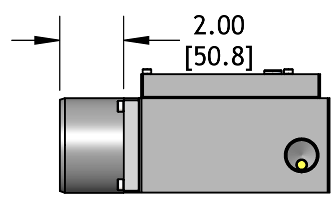



### Quadruple Base Captured Exhaust Option


Subtract Weight: 1.22 lb [553.0 g]




## Performance

### Series Selection

| Code | Description | Max Vacuum inHG [-kPa] | Supply Pressure psi [bar] |
|---|---|---|---|
| A | Ultra-High Flow | 27.0 [91.4] | 87 [6] |
| E | Ultra-High Flow | 26.7 [90.4] | 87 [6] |
| L | High Flow | 22.8 [77.2] | 87 [6] |
| M | Low Pressure | 27.1 [91.8] | 49 [3.4] |
| ML | Multi-Characteristic | 27.5 [93.1] | 58-87 [4-6] |
| X | High Vacuum | 28.3 [95.8] | 87 [6] |

### Seal Material Selection

| Code | Description | Working Temperature | Color |
|---|---|---|---|
| N | Nitrile (Buna-N) | -4°F to 230°F -20°C to 110°C | Black |
| S | Silicone | -100°F to 400°F -70°C to 205°C | Orange |
| V[1] | Fourocarbon (Viton[2]) | -40°F to 450°F 4°C to 230°C | Gray |

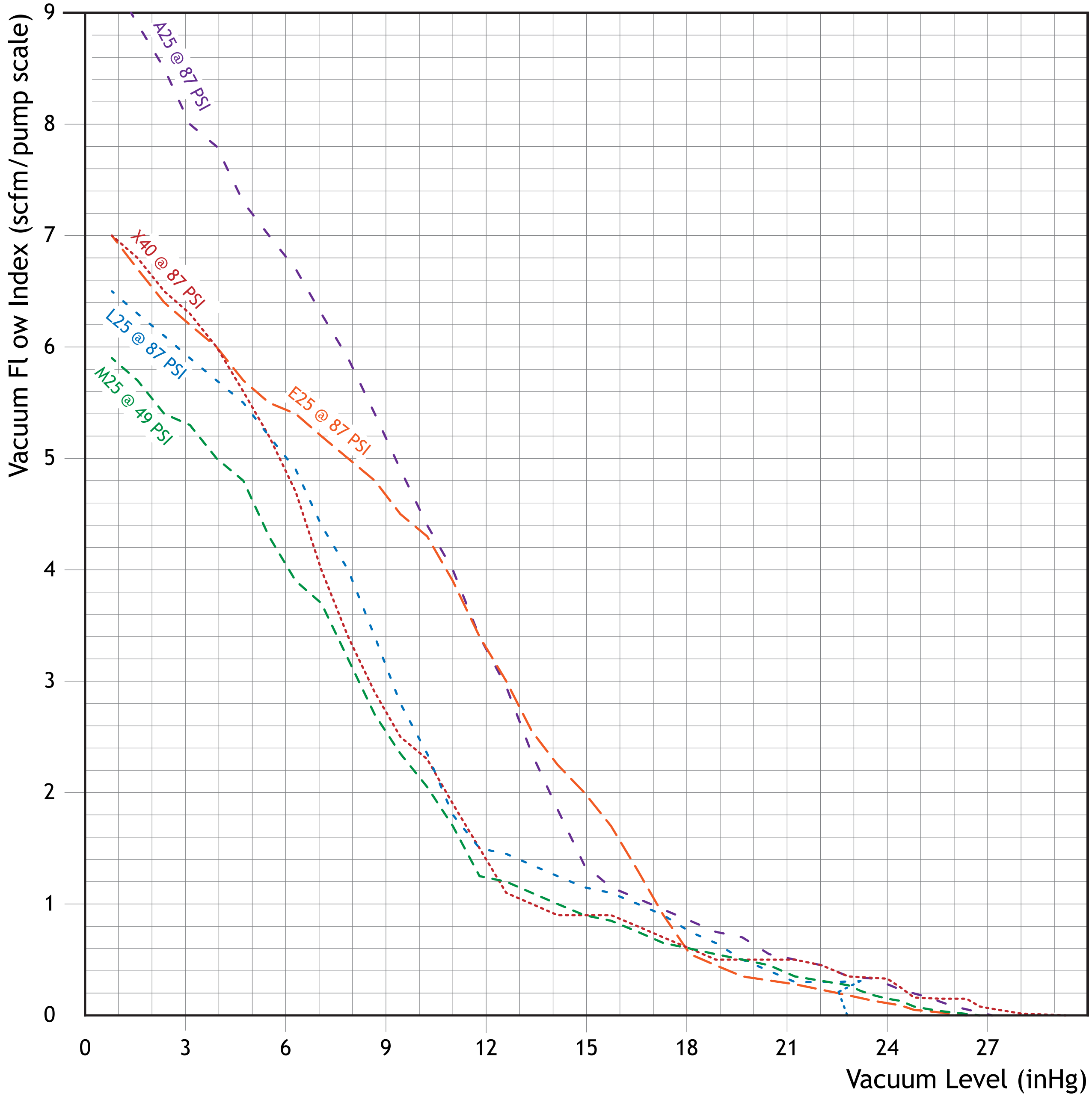
*[1]For operating temperatures above 180°F [82.2°C]. The pump will be assembled using high-temperature sealant, metal end plugs, and will be supplied without ehaust silencer and vacuum gauge. Available for basic pump style only.*

*[2]Viton is a registered trademark of Du Pont Dow Elastomers.*

*All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.*

## Performance

### Vacuum Flow - SCFM




| Capacity | 25 | 50 | 75 | 100 | 125 | 150 | 175 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scale | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 44 | 48 |

*SCFM X 28.32 = nl / m*

### Evacuation Time - Sec / 1,000 in³

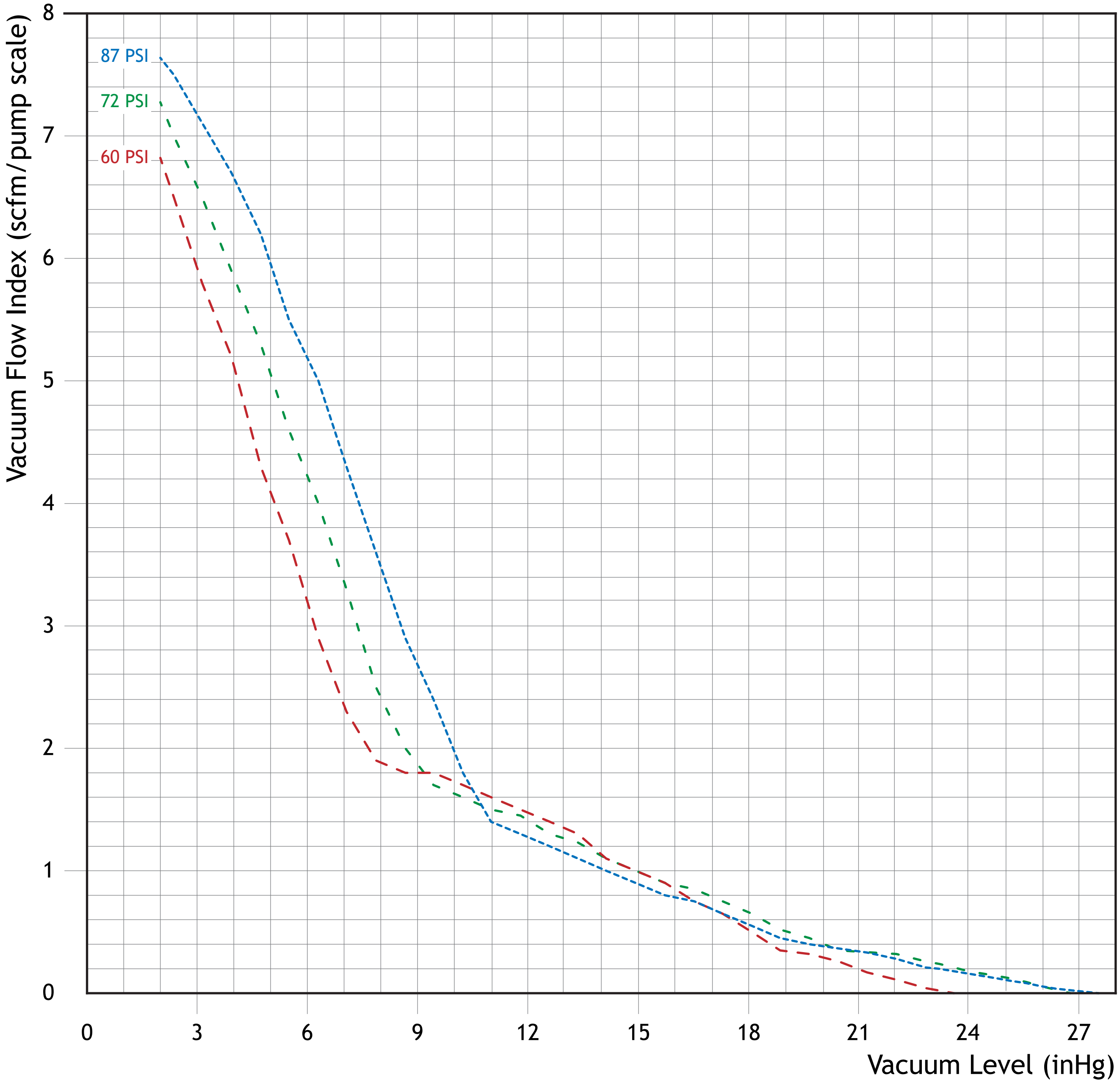
| Pump Series | Air Supply PSI | Air Consum SCFM | Max Vacuum inHg | Seconds to Evacuate 1,000 in³ to Vacuum Level | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 3 inHg | 6 inHg | 9 inHg | 12 inHg | 15 inHg | 18 inHg | 21 inHg | 24 inHg | 26 inHg |
| A | 87 | 6.8 | 27.1 | 0.31 | 0.75 | 1.4 | 2.5 | 4.3 | 7.4 | 13.2 | 25.6 | 45 |
| E | 87 | 6.8 | 26.7 | 0.4 | 0.99 | 1.8 | 3.0 | 5.09 | 8.7 | 15.6 | 30.6 | 56 |
| L | 87 | 4.0 | 22.8 | 0.44 | 1.04 | 1.9 | 3.6 | 6.34 | 10.8 | 19.3 | - | - |
| M | 49 | 4.3 | 27.1 | 0.48 | 1.18 | 2.3 | 4.2 | 7.36 | 12.7 | 22.5 | 43.7 | 77 |
| ML | 87 | 4.0 | 27.5 | 0.87 | 1.7 | 3.3 | 5.9 | 10.2 | 18.4 | 35.8 | 64 | |
| X | 87 | 5.4 | 28.3 | 0.4 | 1.0 | 2.0 | 3.6 | 6.4 | 11.1 | 19.6 | 38 | 67 |

*sec / 1,000 in³ X 0.61 = sec / l*

*All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.*

## Performance (ML Series)

### Vacuum Flow - SCFM




| Capacity | 25 | 50 | 75 | 100 | 125 | 150 | 175 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scale | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 44 | 48 |

*SCFM X 28.32 = nl / m*

### Evacuation Time - Sec / 1,000 in³

| Air Supply PSI | Air Consum SCFM | Max Vacuum inHg | Seconds to Evacuate 1,000 in³ to Vacuum Level | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 3 inHg | 6 inHg | 9 inHg | 12 inHg | 15 inHg | 18 inHg | 21 inHg | 24 inHg | 26 inHg |
| 60 | 3.0 | 23.6 | 0.39 | 1.1 | 2.9 | 4.3 | 7.5 | 12.9 | 29.3 | - | - |
| 72 | 3.5 | 26.8 | 0.36 | 0.93 | 1.9 | 3.8 | 6.6 | 11.4 | 20.2 | 39.5 | 70 |
| 87 | 4.0 | 27.5 | 0.35 | 0.87 | 1.7 | 3.3 | 5.9 | 10.2 | 18.4 | 35.8 | 64 |

*sec / 1,000 in³ X 0.61 = sec / l*

*All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.*

# Performance

## Vacuum Flow - SCFM

| Model | Air Supply PSI | Air Consum SCFM | Max Vacuum inHg | SCFM at Vacuum Level (inHg) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 3 inHg | 6 inHg | 9 inHg | 12 inHg | 15 inHg | 18 inHg | 21 inHg | 24 inHg | 26 inHg | 27 inHg |
| E25 | 87 | 6.8 | 26.7 | 6.24 | 5.44 | 4.67 | 3.3 | 1.98 | 0.6 | 0.29 | 0.11 | 0.012 | - |
| E50 | 87 | 13.6 | 26.7 | 12.5 | 10.9 | 9.34 | 6.6 | 3.96 | 1.2 | 0.58 | 0.22 | 0.024 | - |
| E75 | 87 | 20.4 | 26.7 | 18.7 | 16.3 | 14.0 | 9.9 | 5.94 | 1.8 | 0.87 | 0.33 | 0.036 | - |
| E100 | 87 | 27.2 | 26.7 | 25.0 | 21.8 | 18.7 | 13.2 | 7.92 | 2.4 | 1.16 | 0.44 | 0.048 | - |
| E125 | 87 | 34.0 | 26.7 | 31.2 | 27.2 | 23.4 | 16.5 | 9.9 | 3.0 | 1.45 | 0.55 | 0.06 | - |
| E150 | 87 | 40.8 | 26.7 | 37.4 | 32.6 | 28.0 | 19.8 | 11.9 | 3.6 | 1.74 | 0.66 | 0.072 | - |
| E175 | 87 | 47.6 | 26.7 | 43.7 | 38.1 | 32.7 | 23.1 | 13.9 | 4.2 | 2.03 | 0.77 | 0.084 | - |
| E200 | 87 | 54.4 | 26.7 | 49.9 | 43.5 | 37.4 | 26.4 | 15.8 | 4.8 | 2.32 | 0.88 | 0.096 | - |
| E300 | 87 | 81.6 | 26.7 | 74.9 | 65.3 | 56.0 | 39.6 | 23.8 | 7.2 | 3.48 | 1.32 | 0.14 | - |
| L25 | 87 | 4.0 | 22.8 | 5.57 | 4.63 | 3.15 | 1.8 | 1.37 | 1.06 | 0.74 | - | - | - |
| L50 | 87 | 8.0 | 22.8 | 11.1 | 9.26 | 6.30 | 3.6 | 2.74 | 2.12 | 1.48 | - | - | - |
| L75 | 87 | 12.0 | 22.8 | 16.7 | 13.9 | 9.45 | 5.4 | 4.11 | 3.18 | 2.22 | - | - | - |
| L100 | 87 | 16.0 | 22.8 | 22.3 | 18.5 | 12.6 | 7.2 | 5.48 | 4.24 | 2.96 | - | - | - |
| L125 | 87 | 20.0 | 22.8 | 27.9 | 23.2 | 15.8 | 9.0 | 6.85 | 5.3 | 3.7 | - | - | - |
| L150 | 87 | 24.0 | 22.8 | 33.4 | 27.8 | 18.9 | 10.8 | 8.22 | 6.36 | 4.44 | - | - | - |
| L175 | 87 | 28.0 | 22.8 | 39.0 | 32.4 | 22.0 | 12.6 | 9.59 | 7.42 | 5.18 | - | - | - |
| L200 | 87 | 32.0 | 22.8 | 44.6 | 37.0 | 25.2 | 14.4 | 11.0 | 8.48 | 5.92 | - | - | - |
| L300 | 87 | 48.0 | 22.8 | 66.8 | 55.6 | 37.8 | 21.6 | 16.4 | 12.7 | 8.88 | - | - | - |
| M25 | 49 | 4.3 | 27.1 | 5.32 | 4.05 | 2.55 | 1.24 | 0.9 | 0.61 | 0.38 | 0.15 | 0.03 | - |
| M50 | 49 | 8.6 | 27.1 | 10.6 | 8.1 | 5.1 | 2.48 | 1.8 | 1.22 | 0.76 | 0.3 | 0.06 | - |
| M75 | 49 | 12.9 | 27.1 | 16.0 | 12.2 | 7.65 | 3.72 | 2.7 | 1.83 | 1.14 | 0.45 | 0.09 | - |
| M100 | 49 | 17.2 | 27.1 | 21.3 | 16.2 | 10.2 | 4.96 | 3.6 | 2.44 | 1.52 | 0.6 | 0.12 | - |
| M125 | 49 | 21.5 | 27.1 | 26.6 | 20.3 | 12.8 | 6.2 | 4.5 | 3.05 | 1.9 | 0.75 | 0.15 | - |
| M150 | 49 | 25.8 | 27.1 | 31.9 | 24.3 | 15.3 | 7.44 | 5.4 | 3.66 | 2.28 | 0.9 | 0.18 | - |
| M175 | 49 | 30.1 | 27.1 | 37.2 | 28.4 | 17.9 | 8.68 | 6.3 | 4.27 | 2.66 | 1.05 | 0.21 | - |
| M200 | 49 | 34.4 | 27.1 | 42.6 | 32.4 | 20.4 | 9.92 | 7.2 | 4.88 | 3.04 | 1.2 | 0.24 | - |
| M300 | 49 | 51.6 | 27.1 | 63.8 | 48.6 | 30.6 | 14.9 | 9.72 | 7.32 | 4.56 | 1.8 | 0.36 | - |
| ML25 | 87 | 4.0 | 27.5 | 7.17 | 5.12 | 2.91 | 1.27 | 0.84 | 0.51 | 0.34 | 0.16 | 0.06 | 0.017 |
| ML50 | 87 | 8.0 | 27.5 | 14.3 | 10.2 | 5.82 | 2.54 | 1.68 | 1.02 | 0.68 | 0.32 | 0.12 | 0.034 |
| ML75 | 87 | 12.0 | 27.5 | 21.5 | 15.4 | 8.73 | 3.81 | 2.52 | 1.53 | 1.02 | 0.48 | 0.18 | 0.051 |
| ML100 | 87 | 16.0 | 27.5 | 28.7 | 20.5 | 11.6 | 5.08 | 3.36 | 2.04 | 1.36 | 0.64 | 0.24 | 0.068 |
| ML125 | 87 | 20.0 | 27.5 | 35.9 | 25.6 | 14.6 | 6.35 | 4.2 | 2.55 | 1.7 | 0.8 | 0.3 | 0.085 |
| ML150 | 87 | 24.0 | 27.5 | 43.0 | 30.7 | 17.5 | 7.62 | 5.04 | 3.06 | 2.04 | 0.96 | 0.36 | 0.102 |
| ML175 | 87 | 28.0 | 27.5 | 50.2 | 35.8 | 20.4 | 8.89 | 5.88 | 3.57 | 2.38 | 1.12 | 0.42 | 0.119 |
| ML200 | 87 | 32.0 | 27.5 | 57.4 | 41.0 | 23.3 | 10.2 | 6.72 | 4.08 | 2.72 | 1.28 | 0.48 | 0.136 |
| ML300 | 87 | 48.0 | 27.5 | 86.0 | 61.4 | 34.9 | 15.2 | 10.1 | 6.12 | 4.08 | 1.92 | 0.72 | 0.2 |
| X40 | 87 | 5.4 | 28.3 | 6.33 | 4.89 | 2.73 | 1.4 | 0.9 | 0.61 | 0.5 | 0.33 | 0.15 | 0.067 |
| X80 | 87 | 10.8 | 28.3 | 12.7 | 9.78 | 5.46 | 2.8 | 1.8 | 1.22 | 1.0 | 0.66 | 0.3 | 0.134 |
| X120 | 87 | 16.2 | 28.3 | 19.0 | 14.7 | 8.19 | 4.2 | 2.7 | 1.83 | 1.5 | 0.99 | 0.45 | 0.201 |
| X160 | 87 | 21.6 | 28.3 | 25.3 | 19.6 | 10.9 | 5.6 | 3.6 | 2.44 | 2.0 | 1.32 | 0.6 | 0.268 |
| X200 | 87 | 27.0 | 28.3 | 31.7 | 24.5 | 13.7 | 7.0 | 4.5 | 3.05 | 2.5 | 1.65 | 0.75 | 0.335 |
| X240 | 87 | 32.4 | 28.3 | 38.0 | 29.3 | 16.4 | 8.4 | 5.4 | 3.66 | 3.0 | 1.98 | 0.9 | 0.402 |
| X280 | 87 | 37.8 | 28.3 | 44.3 | 34.2 | 19.1 | 9.8 | 6.3 | 4.27 | 3.5 | 2.31 | 1.05 | 0.469 |
| X320 | 87 | 43.2 | 28.3 | 50.6 | 39.1 | 21.8 | 11.2 | 7.2 | 4.88 | 4.0 | 2.64 | 1.2 | 0.536 |
| X480 | 87 | 64.8 | 28.3 | 76 | 58.7 | 32.8 | 16.8 | 10.8 | 7.32 | 6.0 | 3.96 | 1.8 | 0.8 |

*SCFM X 28.32 = nl / m*

*All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.*

# Performance

### Vacuum Flow - SCFM

| Model | Air Supply PSI | Air Consum SCFM | Max Vacuum inHg | SCFM at Vacuum Level (inHg) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 3 inHg | 6 inHg | 9 inHg | 12 inHg | 15 inHg | 18 inHg | 21 inHg | 24 inHg | 26 inHg | 27 inHg |
| E400 | 87 | 109 | 26.7 | 99.8 | 87 | 74.7 | 52.8 | 31.7 | 9.6 | 4.64 | 1.76 | 0.19 | - |
| E500 | 87 | 136 | 26.7 | 125 | 109 | 93.4 | 66 | 39.6 | 12 | 5.8 | 2.2 | 0.24 | - |
| E600 | 87 | 163 | 26.7 | 150 | 131 | 112 | 79.2 | 47.5 | 14.4 | 6.96 | 2.6 | 0.29 | - |
| E700 | 87 | 190 | 26.7 | 175 | 152 | 131 | 92.4 | 55.4 | 16.8 | 8.12 | 3.08 | 0.34 | - |
| E800 | 87 | 218 | 26.7 | 200 | 174 | 149 | 106 | 63.4 | 19.2 | 9.28 | 3.52 | 0.38 | - |
| E900 | 87 | 245 | 26.7 | 225 | 196 | 168 | 119 | 71.3 | 21.6 | 10.4 | 3.96 | 0.43 | - |
| E1000 | 87 | 272 | 26.7 | 250 | 218 | 187 | 132 | 79.2 | 24 | 11.6 | 4.4 | 0.48 | - |
| E1100 | 87 | 299 | 26.7 | 275 | 240 | 205 | 145 | 87.1 | 26.4 | 12.8 | 4.84 | 0.53 | - |
| E1200 | 87 | 326 | 26.7 | 300 | 262 | 224 | 158 | 95 | 28.8 | 13.9 | 5.3 | 0.58 | - |
| L400 | 87 | 64 | 22.8 | 89.1 | 74.1 | 50.4 | 28.8 | 21.9 | 17 | 11.8 | - | - | - |
| L500 | 87 | 80 | 22.8 | 111 | 92.6 | 63. | 36 | 27.4 | 21.2 | 14.8 | - | - | - |
| L600 | 87 | 96 | 22.8 | 134 | 111 | 75.6 | 43.2 | 32.9 | 25.4 | 17.8 | - | - | - |
| L700 | 87 | 112 | 22.8 | 156 | 130 | 88.2 | 50.4 | 38.4 | 29.7 | 20.7 | - | - | - |
| L800 | 87 | 128 | 22.8 | 178 | 148 | 101 | 57.6 | 43.8 | 33.9 | 23.7 | - | - | - |
| L900 | 87 | 144 | 22.8 | 201 | 167 | 113 | 64.8 | 49.3 | 38.2 | 26.6 | - | - | - |
| L1000 | 87 | 160 | 22.8 | 223 | 185 | 126 | 72 | 54.8 | 42.4 | 29.6 | - | - | - |
| L1100 | 87 | 176 | 22.8 | 245 | 204 | 139 | 79.2 | 60.3 | 46.6 | 32.6 | - | - | - |
| L1200 | 87 | 192 | 22.8 | 267 | 222 | 151 | 86.4 | 65.8 | 50.9 | 35.5 | - | - | - |
| M400 | 49 | 68.8 | 27.1 | 85.1 | 64.8 | 40.8 | 19.8 | 14.4 | 9.76 | 6.08 | 2.4 | 0.48 | - |
| M500 | 49 | 86 | 27.1 | 106 | 81 | 51 | 24.8 | 18 | 12.2 | 7.6 | 3 | 0.6 | - |
| M600 | 49 | 103 | 27.1 | 128 | 97.2 | 61.2 | 29.8 | 21.6 | 14.6 | 9.12 | 3.6 | 0.72 | - |
| M700 | 49 | 120 | 27.1 | 149 | 113 | 71.4 | 34.7 | 25.2 | 17.1 | 10.6 | 4.2 | 0.84 | - |
| M800 | 49 | 138 | 27.1 | 170 | 130 | 81.6 | 39.7 | 28.8 | 19.5 | 12.2 | 4.8 | 0.96 | - |
| M900 | 49 | 155 | 27.1 | 192 | 146 | 91.8 | 44.6 | 32.4 | 22.0 | 13.7 | 5.4 | 1.08 | - |
| M1000 | 49 | 172 | 27.1 | 213 | 162 | 102 | 49.6 | 36 | 24.4 | 15.2 | 6 | 1.2 | - |
| M1100 | 49 | 189 | 27.1 | 234 | 178 | 112 | 54.6 | 39.6 | 26.8 | 16.7 | 6.6 | 1.32 | - |
| M1200 | 49 | 206 | 27.1 | 255 | 194 | 122 | 59.5 | 43.2 | 29.3 | 18.2 | 7.2 | 1.44 | - |
| ML400 | 87 | 64 | 27.5 | 114 | 81.9 | 46.6 | 20.3 | 13.4 | 8.16 | 5.44 | 2.56 | 0.96 | 0.27 |
| ML500 | 87 | 80 | 27.5 | 143 | 102 | 58.2 | 25.4 | 16.8 | 10.2 | 6.8 | 3.2 | 1.2 | 0.34 |
| ML600 | 87 | 96 | 27.5 | 172 | 123 | 69.8 | 30.5 | 20.2 | 12.2 | 8.2 | 3.84 | 1.44 | 0.41 |
| ML700 | 87 | 112 | 27.5 | 201 | 143 | 81.5 | 35.6 | 23.5 | 14.3 | 9.5 | 4.48 | 1.68 | 0.48 |
| ML800 | 87 | 128 | 27.5 | 229 | 164 | 93.1 | 40.6 | 26.9 | 16.3 | 10.9 | 5.12 | 1.92 | 0.54 |
| ML900 | 87 | 144 | 27.5 | 258 | 184 | 105 | 45.72 | 30.2 | 18.4 | 12.2 | 5.76 | 2.16 | 0.61 |
| ML1000 | 87 | 160 | 27.5 | 287 | 205 | 116 | 50.8 | 33.6 | 20.4 | 13.6 | 6.4 | 2.4 | 0.68 |
| ML1100 | 87 | 176 | 27.5 | 315 | 225 | 128 | 55.9 | 37 | 22.4 | 15 | 7.04 | 2.64 | 0.75 |
| ML1200 | 87 | 192 | 27.5 | 344 | 246 | 140 | 61 | 40.3 | 24.5 | 16.3 | 7.68 | 2.88 | 0.82 |
| X640 | 87 | 86.4 | 28.3 | 101 | 78.2 | 43.7 | 22.4 | 14.4 | 9.76 | 8 | 5.3 | 2.4 | 1.07 |
| X800 | 87 | 108 | 28.3 | 127 | 97.8 | 54.6 | 28 | 18 | 12.2 | 10 | 6.6 | 3.0 | 1.34 |
| X960 | 87 | 130 | 28.3 | 152 | 117 | 65.5 | 33.6 | 21.6 | 14.6 | 12 | 7.92 | 3.6 | 1.61 |
| X1120 | 87 | 151 | 28.3 | 177 | 137 | 76.4 | 39.2 | 25.2 | 17.1 | 14 | 9.24 | 4.2 | 1.88 |
| X1280 | 87 | 173 | 28.3 | 203 | 156 | 87.4 | 44.8 | 28.8 | 19.5 | 16 | 10.6 | 4.8 | 2.14 |
| X1440 | 87 | 194 | 28.3 | 228 | 176 | 98.3 | 50.4 | 32.4 | 22 | 18 | 11.9 | 5.4 | 2.41 |
| X1600 | 87 | 216 | 28.3 | 253 | 196 | 109 | 56 | 36 | 24.4 | 20 | 13.2 | 6.0 | 2.68 |
| X1760 | 87 | 238 | 28.3 | 279 | 215 | 120 | 61.6 | 39.6 | 26.8 | 22 | 14.5 | 6.6 | 2.95 |
| X1920 | 87 | 259 | 28.3 | 304 | 235 | 131 | 67.2 | 43.2 | 29.3 | 24 | 15.8 | 7.2 | 3.22 |

*SCFM X 28.32 = nl / m*

*All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.*

## Performance

### Evacuation Time - Sec / ft³

| Model | Air Supply PSI | Air Consum SCFM | Max Vacuum inHg | Seconds to Evacuate 1 cu ft to Vacuum Level | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 3 inHg | 6 inHg | 9 inHg | 12 inHg | 15 inHg | 18 inHg | 21 inHg | 24 inHg | 26 inHg | 27 inHg |
| E25 | 87 | 6.8 | 26.7 | 0.7 | 1.7 | 3.1 | 5.23 | 8.8 | 15.0 | 27.0 | 52.8 | 93.7 | - |
| E50 | 87 | 13.6 | 26.7 | 0.35 | 0.85 | 1.55 | 2.62 | 4.4 | 7.5 | 13.5 | 26.4 | 46.9 | - |
| E75 | 87 | 20.4 | 26.7 | 0.23 | 0.57 | 1.03 | 1.74 | 2.93 | 5.0 | 9.0 | 17.6 | 31.2 | - |
| E100 | 87 | 27.2 | 26.7 | 0.18 | 0.43 | 0.79 | 1.31 | 2.2 | 3.75 | 6.75 | 13.2 | 23.4 | - |
| E125 | 87 | 34.0 | 26.7 | 0.14 | 0.34 | 0.62 | 1.05 | 1.76 | 3.0 | 5.4 | 10.6 | 18.7 | - |
| E150 | 87 | 40.8 | 26.7 | 0.12 | 0.28 | 0.52 | 0.87 | 1.47 | 2.5 | 4.5 | 8.8 | 15.6 | - |
| E175 | 87 | 47.6 | 26.7 | 0.1 | 0.24 | 0.44 | 0.75 | 1.26 | 2.14 | 3.86 | 7.54 | 13.4 | - |
| E200 | 87 | 54.4 | 26.7 | 0.088 | 0.21 | 0.39 | 0.65 | 1.1 | 1.88 | 3.38 | 6.6 | 11.7 | - |
| E300 | 87 | 81.6 | 26.7 | 0.058 | 0.14 | 0.26 | 0.44 | 0.73 | 1.25 | 2.25 | 4.4 | 7.81 | - |
| L25 | 87 | 4.0 | 22.8 | 0.8 | 1.9 | 3.7 | 6.6 | 12.3 | 19.0 | 33.2 | - | - | - |
| L50 | 87 | 8.0 | 22.8 | 0.4 | 0.95 | 1.85 | 3.3 | 6.15 | 9.5 | 16.6 | - | - | - |
| L75 | 87 | 12.0 | 22.8 | 0.27 | 0.63 | 1.23 | 2.2 | 4.1 | 6.3 | 11.1 | - | - | - |
| L100 | 87 | 16.0 | 22.8 | 0.2 | 0.48 | 0.93 | 1.65 | 3.08 | 4.75 | 8.3 | - | - | - |
| L125 | 87 | 20.0 | 22.8 | 0.16 | 0.38 | 0.74 | 1.32 | 2.46 | 3.8 | 6.64 | - | - | - |
| L150 | 87 | 24.0 | 22.8 | 0.13 | 0.32 | 0.62 | 1.1 | 2.05 | 3.17 | 5.53 | - | - | - |
| L175 | 87 | 28.0 | 22.8 | 0.11 | 0.27 | 0.53 | 0.94 | 1.76 | 2.71 | 4.74 | - | - | - |
| L200 | 87 | 32.0 | 22.8 | 0.1 | 0.24 | 0.46 | 0.83 | 1.54 | 2.38 | 4.15 | - | - | - |
| L300 | 87 | 48.0 | 22.8 | 0.07 | 0.16 | 0.31 | 0.55 | 1.03 | 1.58 | 2.77 | - | - | - |
| M25 | 49 | 4.3 | 27.1 | 0.83 | 2.03 | 3.96 | 7.23 | 12.7 | 21.9 | 38.8 | 75.4 | 134 | - |
| M50 | 49 | 8.6 | 27.1 | 0.42 | 1.02 | 1.98 | 3.62 | 6.35 | 11.0 | 19.4 | 37.7 | 67.0 | - |
| M75 | 49 | 12.9 | 27.1 | 0.28 | 0.68 | 1.32 | 2.41 | 4.23 | 7.3 | 12.9 | 25.1 | 44.7 | - |
| M100 | 49 | 17.2 | 27.1 | 0.21 | 0.51 | 0.99 | 1.81 | 3.18 | 5.48 | 9.7 | 18.9 | 33.5 | - |
| M125 | 49 | 21.5 | 27.1 | 0.17 | 0.41 | 0.79 | 1.45 | 2.54 | 4.38 | 7.76 | 15.1 | 26.8 | - |
| M150 | 49 | 25.8 | 27.1 | 0.14 | 0.34 | 0.66 | 1.21 | 2.12 | 3.65 | 6.47 | 12.7 | 22.3 | - |
| M175 | 49 | 30.1 | 27.1 | 0.12 | 0.29 | 0.57 | 1.03 | 1.81 | 3.13 | 5.54 | 10.8 | 19.1 | - |
| M200 | 49 | 34.4 | 27.1 | 0.1 | 0.25 | 0.5 | 0.9 | 1.59 | 2.74 | 4.85 | 9.43 | 16.8 | - |
| M300 | 49 | 51.6 | 27.1 | 0.069 | 0.17 | 0.33 | 0.6 | 1.06 | 1.83 | 3.23 | 6.28 | 11.2 | - |
| ML25 | 87 | 4.0 | 27.5 | 0.6 | 1.51 | 3.04 | 5.7 | 10.2 | 17.7 | 31.8 | 61.8 | 110 | 159 |
| ML50 | 87 | 8.0 | 27.5 | 0.3 | 0.76 | 1.52 | 2.85 | 5.1 | 8.85 | 15.9 | 31.0 | 55.0 | 79.5 |
| ML75 | 87 | 12.0 | 27.5 | 0.2 | 0.5 | 1.01 | 1.9 | 3.39 | 5.9 | 10.6 | 20.6 | 36.7 | 53.0 |
| ML100 | 87 | 16.0 | 27.5 | 0.15 | 0.38 | 0.76 | 1.43 | 2.54 | 4.43 | 7.95 | 15.5 | 27.5 | 39.8 |
| ML125 | 87 | 20.0 | 27.5 | 0.12 | 0.3 | 0.61 | 1.14 | 2.03 | 3.54 | 6.36 | 12.4 | 22.0 | 31.8 |
| ML150 | 87 | 24.0 | 27.5 | 0.1 | 0.25 | 0.51 | 0.95 | 1.69 | 2.95 | 5.3 | 10.3 | 18.3 | 26.5 |
| ML175 | 87 | 28.0 | 27.5 | 0.086 | 0.22 | 0.43 | 0.81 | 1.45 | 2.53 | 4.54 | 8.84 | 15.7 | 22.7 |
| ML200 | 87 | 32.0 | 27.5 | 0.075 | 0.19 | 0.38 | 0.71 | 1.27 | 2.21 | 3.98 | 7.74 | 13.8 | 19.9 |
| ML300 | 87 | 48.0 | 27.5 | 0.05 | 0.13 | 0.25 | 0.48 | 0.85 | 1.48 | 2.65 | 5.16 | 9.17 | 13.3 |
| X40 | 87 | 5.4 | 28.3 | 0.69 | 1.71 | 3.38 | 6.21 | 11.0 | 19.1 | 33.9 | 65.6 | 116 | 167 |
| X80 | 87 | 10.8 | 28.3 | 0.35 | 0.86 | 1.69 | 3.11 | 5.5 | 9.6 | 17.0 | 32.8 | 58.0 | 83.5 |
| X120 | 87 | 16.2 | 28.3 | 0.23 | 0.57 | 1.13 | 2.07 | 3.67 | 6.37 | 11.3 | 21.9 | 38.7 | 55.7 |
| X160 | 87 | 21.6 | 28.3 | 0.17 | 0.43 | 0.85 | 1.55 | 2.75 | 4.8 | 8.48 | 16.4 | 29.0 | 41.8 |
| X200 | 87 | 27.0 | 28.3 | 0.14 | 0.34 | 0.68 | 1.24 | 2.2 | 3.8 | 6.78 | 13.4 | 23.2 | 33.4 |
| X240 | 87 | 32.4 | 28.3 | 0.12 | 0.29 | 0.56 | 1.04 | 1.83 | 3.18 | 5.65 | 10.9 | 19.3 | 27.8 |
| X280 | 87 | 37.8 | 28.3 | 0.1 | 0.24 | 0.48 | 0.89 | 1.57 | 2.73 | 4.84 | 9.37 | 16.6 | 23.9 |
| X320 | 87 | 43.2 | 28.3 | 0.086 | 0.21 | 0.42 | 0.78 | 1.38 | 2.39 | 4.24 | 8.2 | 14.5 | 20.9 |
| X480 | 87 | 64.8 | 28.3 | 0.058 | 0.14 | 0.28 | 0.52 | 0.92 | 1.59 | 2.83 | 5.47 | 9.6 | 13.9 |

*sec / ft³ X 35.32 = sec / m3*

*All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.*

# Performance

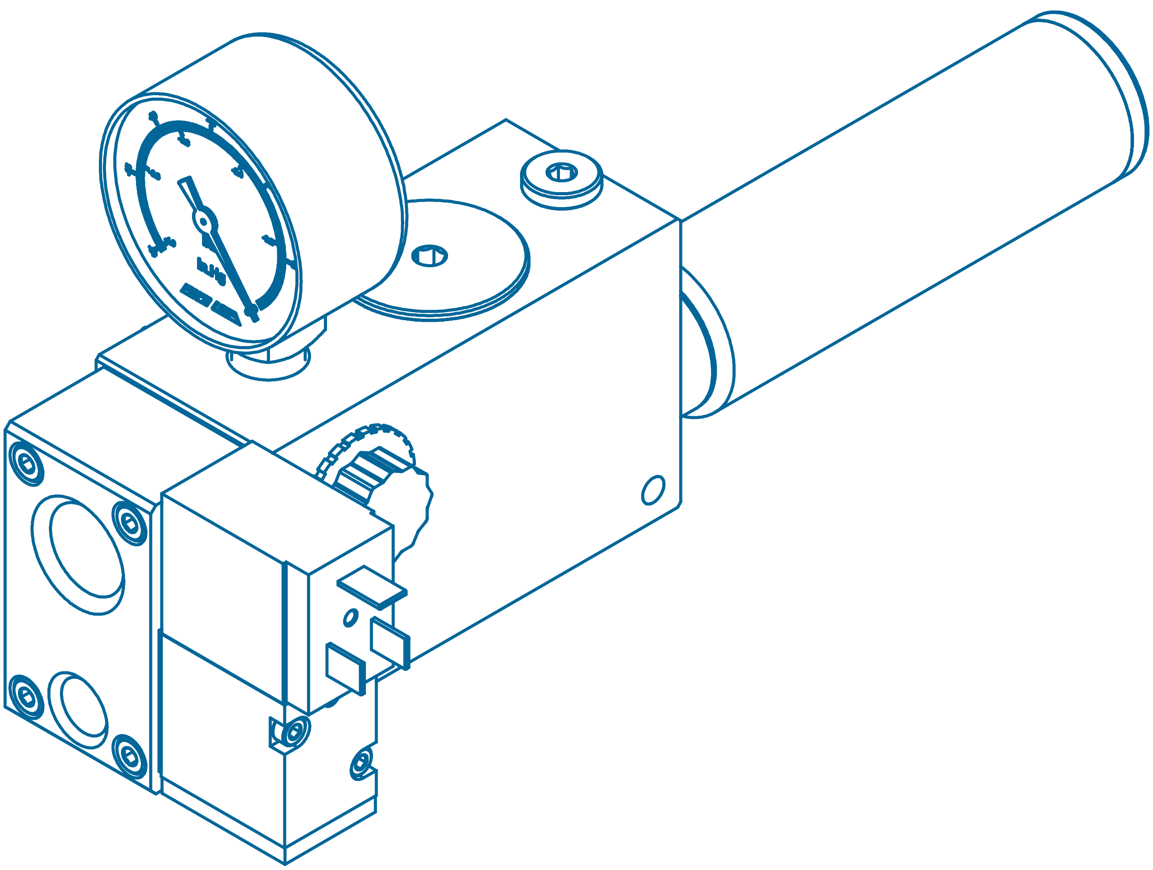
### Evacuation Time - Sec / $ft^3$

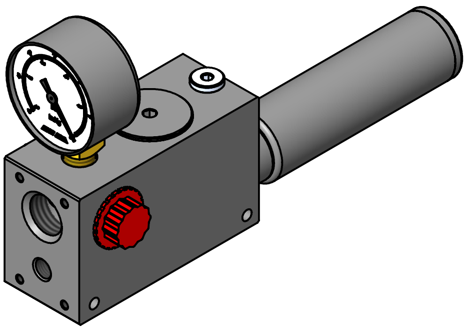
| Model | Air Supply PSI | Air Consum SCFM | Max Vacuum inHg | Seconds to Evacuate 1 cu ft to Vacuum Level | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 3 inHg | 6 inHg | 9 inHg | 12 inHg | 15 inHg | 18 inHg | 21 inHg | 24 inHg | 26 inHg | 27 inHg |
| E400 | 87 | 109 | 26.7 | 0.044 | 0.11 | 0.19 | 0.33 | 0.55 | 0.94 | 1.69 | 3.3 | 5.86 | - |
| E500 | 87 | 136 | 26.7 | 0.035 | 0.085 | 0.16 | 0.26 | 0.44 | 0.75 | 1.35 | 2.64 | 4.69 | - |
| E600 | 87 | 163 | 26.7 | 0.029 | 0.071 | 0.13 | 0.22 | 0.37 | 0.63 | 1.13 | 2.2 | 3.9 | - |
| E700 | 87 | 190 | 26.7 | 0.025 | 0.061 | 0.11 | 0.19 | 0.31 | 0.54 | 0.96 | 1.89 | 3.35 | - |
| E800 | 87 | 218 | 26.7 | 0.022 | 0.053 | 0.097 | 0.16 | 0.28 | 0.47 | 0.84 | 1.65 | 2.93 | - |
| E900 | 87 | 245 | 26.7 | 0.019 | 0.047 | 0.086 | 0.15 | 0.24 | 0.42 | 0.75 | 1.47 | 2.6 | - |
| E1000 | 87 | 272 | 26.7 | 0.018 | 0.043 | 0.078 | 0.13 | 0.22 | 0.38 | 0.68 | 1.32 | 2.34 | - |
| E1100 | 87 | 299 | 26.7 | 0.016 | 0.039 | 0.07 | 0.12 | 0.2 | 0.34 | 0.61 | 1.2 | 2.1 | - |
| E1200 | 87 | 326 | 26.7 | 0.015 | 0.035 | 0.065 | 0.11 | 0.18 | 0.31 | 0.56 | 1.1 | 2.0 | - |
| L400 | 87 | 64 | 22.8 | 0.05 | 0.12 | 0.23 | 0.41 | 0.77 | 1.19 | 2.08 | - | - | - |
| L500 | 87 | 80 | 22.8 | 0.04 | 0.1 | 0.19 | 0.33 | 0.62 | 0.95 | 1.66 | - | - | - |
| L600 | 87 | 96 | 22.8 | 0.03 | 0.08 | 0.15 | 0.28 | 0.51 | 0.79 | 1.38 | - | - | - |
| L700 | 87 | 112 | 22.8 | 0.029 | 0.07 | 0.13 | 0.24 | 0.44 | 0.68 | 1.19 | - | - | - |
| L800 | 87 | 128 | 22.8 | 0.025 | 0.06 | 0.12 | 0.21 | 0.38 | 0.59 | 1.04 | - | - | - |
| L900 | 87 | 144 | 22.8 | 0.022 | 0.05 | 0.1 | 0.18 | 0.34 | 0.53 | 0.92 | - | - | - |
| L1000 | 87 | 160 | 22.8 | 0.02 | 0.048 | 0.09 | 0.17 | 0.31 | 0.48 | 0.83 | - | - | - |
| L1100 | 87 | 176 | 22.8 | 0.018 | 0.043 | 0.08 | 0.15 | 0.28 | 0.43 | 0.75 | - | - | - |
| L1200 | 87 | 192 | 22.8 | 0.017 | 0.04 | 0.077 | 0.14 | 0.26 | 0.40 | 0.69 | - | - | - |
| M400 | 49 | 68.8 | 27.1 | 0.052 | 0.13 | 0.25 | 0.45 | 0.79 | 1.37 | 2.43 | 4.71 | 8.38 | - |
| M500 | 49 | 86 | 27.1 | 0.042 | 0.1 | 0.2 | 0.36 | 0.64 | 1.1 | 1.94 | 3.77 | 6.7 | - |
| M600 | 49 | 103 | 27.1 | 0.035 | 0.085 | 0.17 | 0.3 | 0.53 | 0.91 | 1.62 | 3.14 | 5.58 | - |
| M700 | 49 | 120 | 27.1 | 0.03 | 0.073 | 0.14 | 0.26 | 0.45 | 0.78 | 1.39 | 2.69 | 4.79 | - |
| M800 | 49 | 138 | 27.1 | 0.026 | 0.063 | 0.12 | 0.23 | 0.39 | 0.68 | 1.21 | 2.35 | 4.19 | - |
| M900 | 49 | 155 | 27.1 | 0.023 | 0.056 | 0.11 | 0.2 | 0.35 | 0.61 | 1.08 | 2.09 | 3.72 | - |
| M1000 | 49 | 172 | 27.1 | 0.021 | 0.051 | 0.1 | 0.18 | 0.32 | 0.55 | 0.97 | 1.89 | 3.35 | - |
| M1100 | 49 | 189 | 27.1 | 0.019 | 0.046 | 0.09 | 0.16 | 0.29 | 0.5 | 0.88 | 1.71 | 3.05 | - |
| M1200 | 49 | 206 | 27.1 | 0.017 | 0.042 | 0.83 | 0.15 | 0.26 | 0.46 | 0.81 | 1.57 | 2.79 | - |
| ML400 | 87 | 34 | 27.5 | 0.038 | 0.094 | 0.19 | 0.36 | 0.64 | 1.12 | 1.99 | 3.87 | 6.88 | 9.94 |
| ML500 | 87 | 80 | 27.5 | 0.03 | 0.076 | 0.15 | 0.29 | 0.51 | 0.89 | 1.59 | 3.1 | 5.5 | 7.95 |
| ML600 | 87 | 96 | 27.5 | 0.025 | 0.063 | 0.13 | 0.24 | 0.42 | 0.74 | 1.33 | 2.58 | 4.58 | 6.63 |
| ML700 | 87 | 112 | 27.5 | 0.021 | 0.054 | 0.11 | 0.2 | 0.36 | 0.63 | 1.14 | 2.21 | 3.93 | 5.68 |
| ML800 | 87 | 128 | 27.5 | 0.019 | 0.047 | 0.095 | 0.18 | 0.32 | 0.55 | 0.99 | 1.93 | 3.44 | 4.97 |
| ML900 | 87 | 144 | 27.5 | 0.017 | 0.042 | 0.84 | 0.16 | 0.28 | 0.49 | 0.88 | 1.72 | 3.06 | 4.42 |
| ML1000 | 87 | 160 | 27.5 | 0.015 | 0.038 | 0.76 | 0.14 | 0.26 | 0.44 | 0.8 | 1.55 | 2.75 | 3.98 |
| ML1100 | 87 | 176 | 27.5 | 0.014 | 0.034 | 0.069 | 0.13 | 0.23 | 0.4 | 0.72 | 1.41 | 2.5 | 3.61 |
| ML1200 | 87 | 192 | 27.5 | 0.013 | 0.031 | 0.063 | 0.12 | 0.21 | 0.37 | 0.66 | 1.3 | 2.29 | 3.31 |
| X640 | 87 | 86.4 | 28.3 | 0.043 | 0.11 | 0.21 | 0.39 | 0.69 | 1.19 | 2.12 | 4.1 | 7.25 | 10.4 |
| X800 | 87 | 108 | 28.3 | 0.035 | 0.086 | 0.17 | 0.31 | 0.55 | 0.96 | 1.7 | 3.28 | 5.8 | 8.35 |
| X960 | 87 | 130 | 28.3 | 0.029 | 0.071 | 0.14 | 0.26 | 0.46 | 0.8 | 1.41 | 2.73 | 4.83 | 6.6 |
| X1120 | 87 | 151 | 28.3 | 0.025 | 0.061 | 0.12 | 0.22 | 0.39 | 0.68 | 1.21 | 2.34 | 4.14 | 5.96 |
| X1280 | 87 | 173 | 28.3 | 0.022 | 0.053 | 0.11 | 0.19 | 0.34 | 0.6 | 1.06 | 2.05 | 3.63 | 5.22 |
| X1440 | 87 | 194 | 28.3 | 0.019 | 0.048 | 0.094 | 0.17 | 0.31 | 0.53 | 0.94 | 1.82 | 3.22 | 4.64 |
| X1600 | 87 | 216 | 28.3 | 0.017 | 0.043 | 0.085 | 0.16 | 0.28 | 0.48 | 0.85 | 1.64 | 2.9 | 4.18 |
| X1760 | 87 | 238 | 28.3 | 0.016 | 0.039 | 0.077 | 0.14 | 0.25 | 0.43 | 0.77 | 1.49 | 2.64 | 3.8 |
| X1920 | 87 | 259 | 28.3 | 0.014 | 0.036 | 0.07 | 0.13 | 0.23 | 0.4 | 0.71 | 1.37 | 2.42 | 3.48 |

*sec / $ft^3$ X 35.32 = sec / m3*

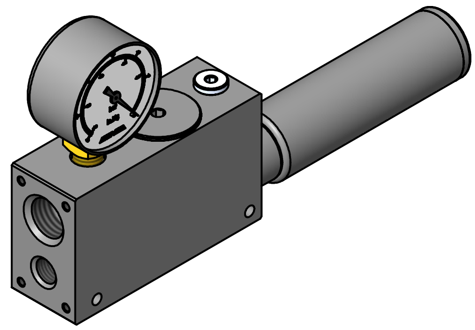
*All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.*

# VG & VQ Series Vacuum Pumps
## Section 9





**VG Pumps**
(Interchange w/ Gast VG-Series)



**VQ Pumps**
(Interchange w/ Vac-Cube 60-240 Series

## Basic Information

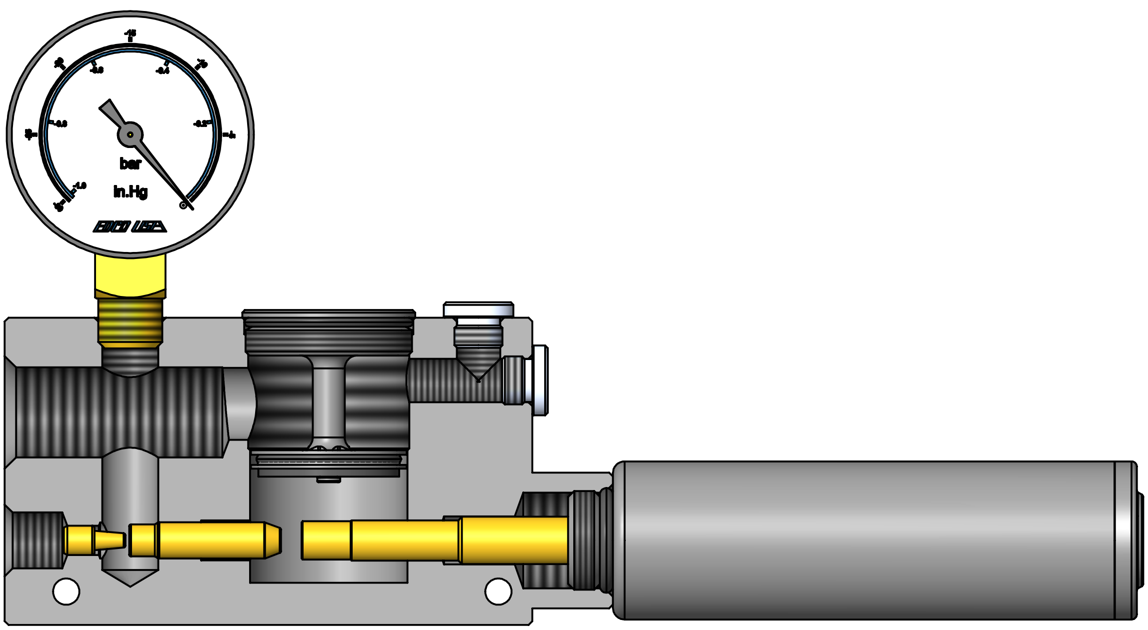
EDCO VG and VQ series vacuum pumps have different bodies to make them directly interchangeable with competitor pumps but utilize the same ejetor nozzles. Performance is the same regardless of which body style you choose. These multi-stage vacuum pumps are designed as direct physical replacements for competitive brand pumps and consistently provide equal or better performance. Customers who were previously limited to a sole source for pumps of this style will now have the option of using higher-quality, all-metal EDCO pumps.

VG and VQ series multi-stage pumps are designed as a drop-in interchange for similarly shaped, competitor pumps, but the similarity ends there. Our all-metal pumps feature externally removable, one-piece valves and one-piece, fully machined aluminum bodies to eliminate loose parts and are manufactured in-house on precision, CNC machines to the highest quality standards.

EDCO pumps produce consistently higher performance because of our precision-machined brass nozzles and one-piece valve with over three times the flow area of competitive designs which provides improved vacuum-flow and increased ability to pass ingested debris. EDCO quality control inspectors individually test each and every product before shipment to assure that catalog specifications are met.

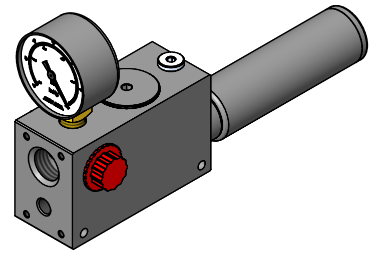
An option exclusive to EDCO is an integral solenoid control valve to control on/off which reduces plumbing complexity, fitting costs, and labor as well as increases system reliability by elminating potential leak points. The solenoid valve is shipped assembled to the pump in the normally-closed (not-passing) mode but can be easily changed to normally-open (passing) by simply inverting the valve whenever the application requires it.

Instead of gang-mounting multiple VG or VQ series pumps to a manifold to obtain a higher flow capacity pump, EDCO offers larger, multi-stage pumps in the classic series (3/4” ports) or dual-base classic series (1-1/2” ports) styles that are much more compact and easier to maintain.



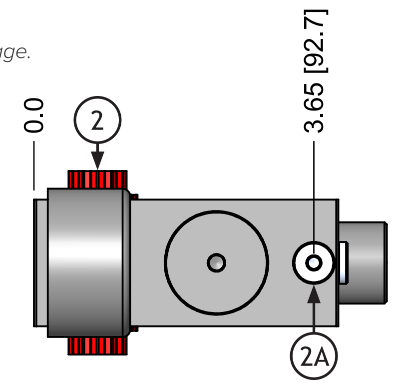
## VG Pumps

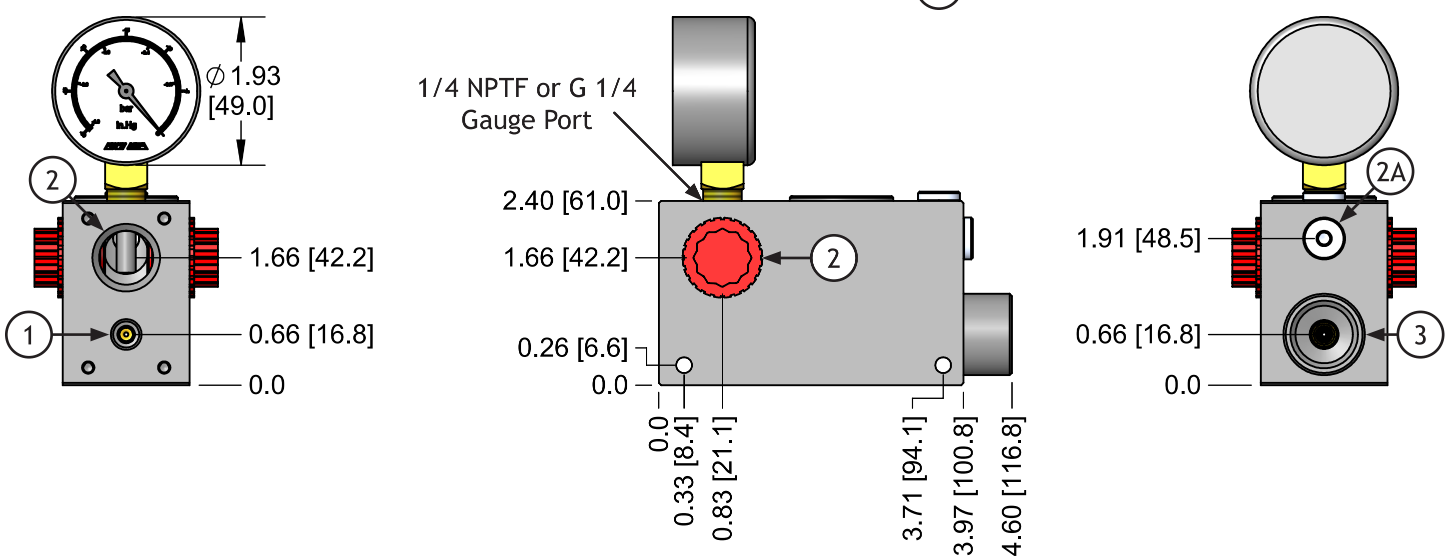
| | Capacity | Ports | | Solenoid Option | | Solenoid Position[1] | |
|---|---|---|---|---|---|---|---|
| VG- | 065 | | | | | | |
| | 065 | (Blank) | NPTF | (Blank) | None | (Blank) | None |
| | 075 | -G | G Threads | -12V | 12 Volt DC | -L | Left Side |
| | 130 | | | -24V | 24 Volt DC | -R | Right Side |
| | 140 | | | | | | |
| | 260 | | | | | | |

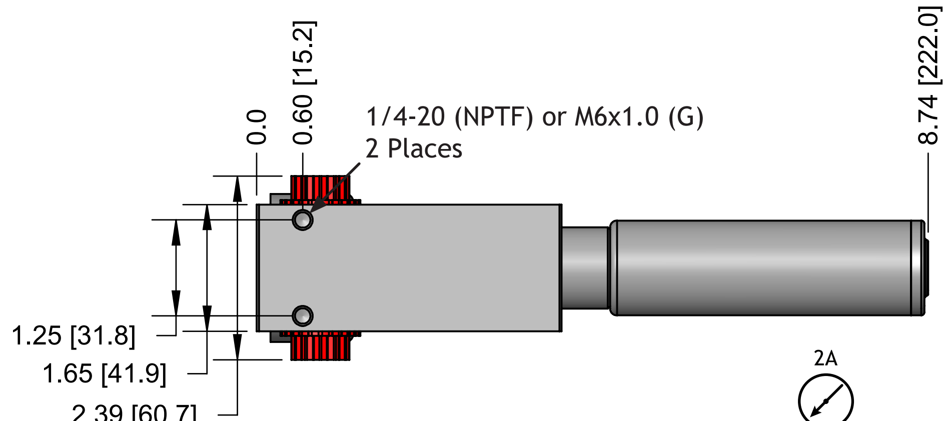


*Weight: 1.51 lb [684.9 g]*

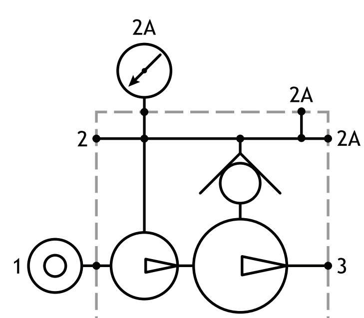
*[1]When selecting the solenoid option, you must pick a solenoid voltage. Solenoid will be shipped in the normally closed position.*



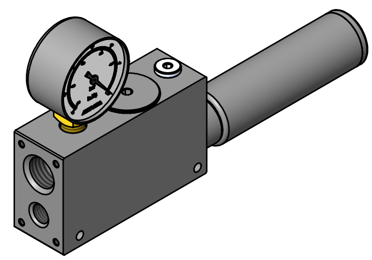

| Code | Function | NPTF | G |
|---|---|---|---|
| 1 | Air Supply | G 1/8 NPSF | |
| 2 | Vacuum - Main | 1/2 NPTF | G 1/2 |
| 2A | Vacuum - Alternate | G 1/8 NPSF | |
| 3 | Exhaust | G 1/2 NPSF | |



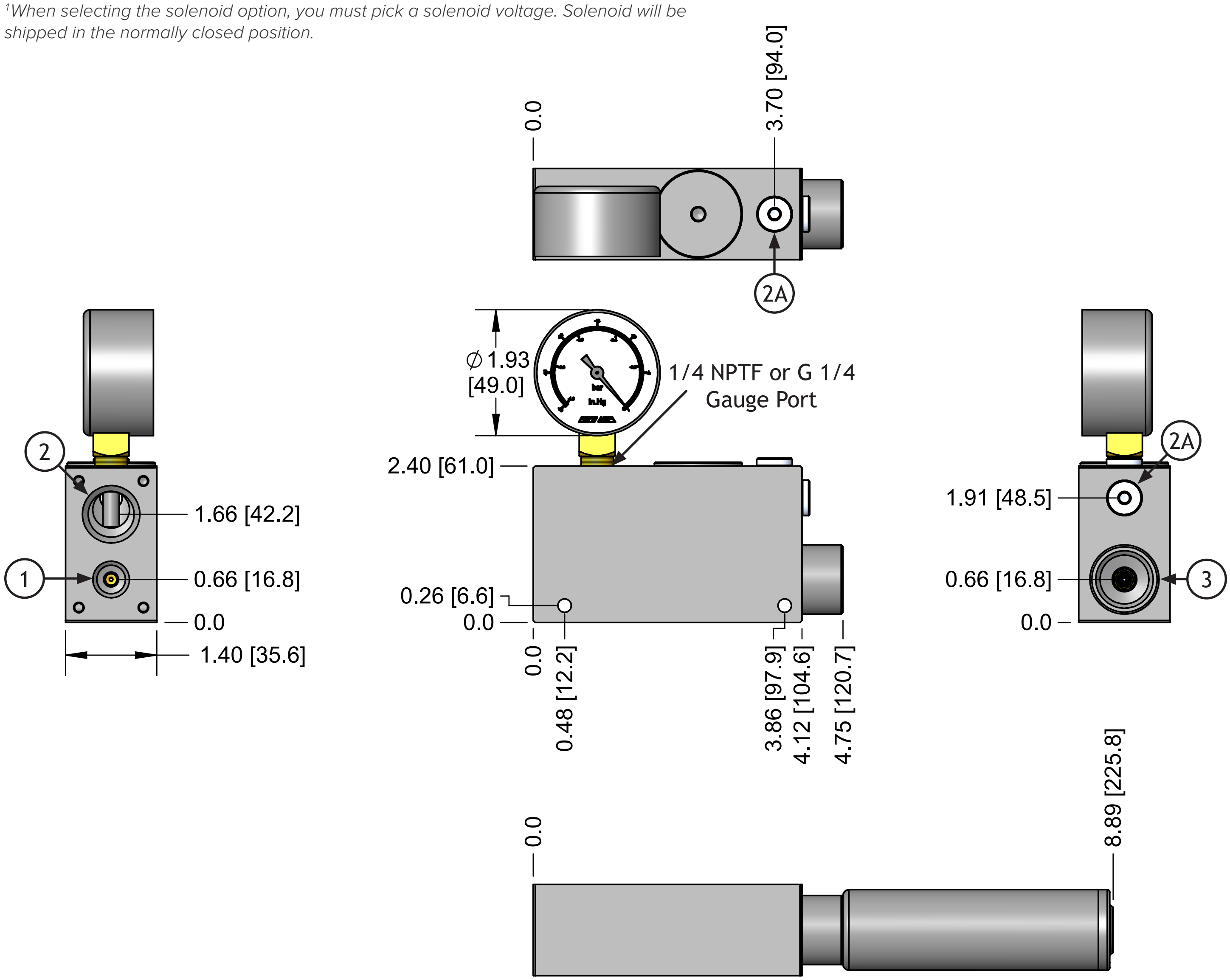
## VQ Pumps

| | Capacity | Ports | | Solenoid Option | | Solenoid Position[1] | |
|---|---|---|---|---|---|---|---|
| VQ- | 60 | | | | | | |
| | 60 | (Blank) | NPTF | (Blank) | None | (Blank) | n/a |
| | 60L | -G | G Threads | -12V | 12 Volt DC | -L | Left Side |
| | 120 | | | -24V | 24 Volt DC | -R | Right Side |
| | 120L | | | | | | |
| | 180 | | | | | | |
| | 180L | | | | | | |
| | 240 | | | | | | |

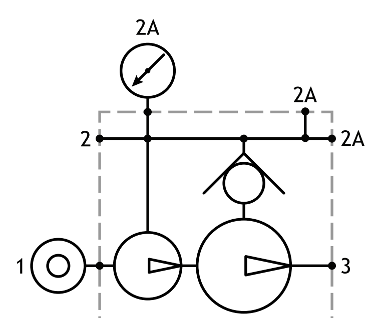
[1]*When selecting the solenoid option, you must pick a solenoid voltage. Solenoid will be shipped in the normally closed position.*



*Weight: 1.35 lb [612.3 g]*



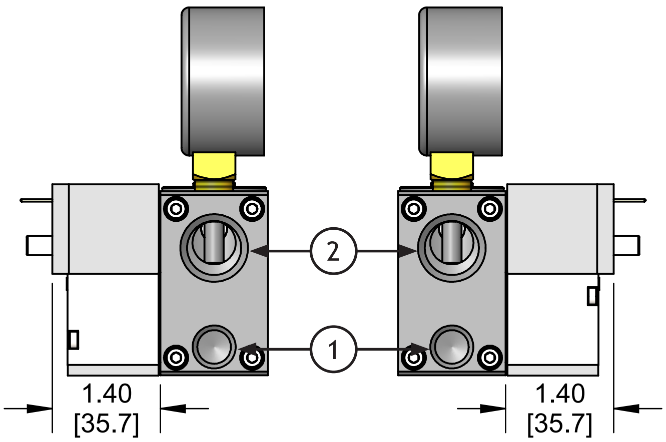

| Code | Function | NPTF | G |
|---|---|---|---|
| 1 | Air Supply | G 1/8 NPSF | |
| 2 | Vacuum - Main | 1/2 NPTF | G 1/2 |
| 2A | Vacuum - Alternate | G 1/8 NPSF | |
| 3 | Exhaust | G 1/2 NPSF | |

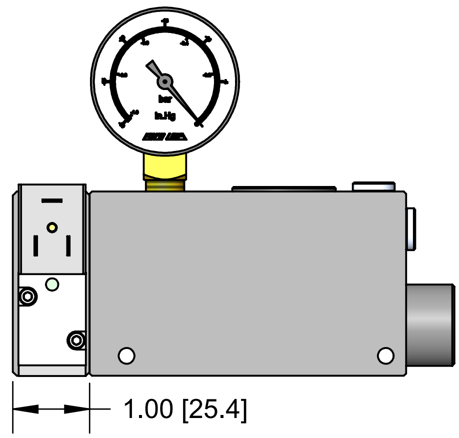


## Solenoid Options

Order DIN T-1 Molded Cords Separately:
**163-2M31**: 2M Cord w/ Varistor & LED, 12-24 V DC

Left Side Right Side




*Additional Weight: 0.40 lb [181.4 g]*

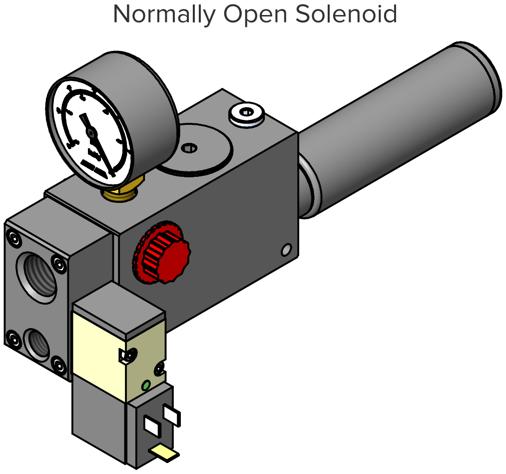
| Code | Function | NPTF | G |
|---|---|---|---|
| 1 | Air Supply | 1/4 NPTF | G 1/4 |
| 2 | Vacuum - Main | 1/2 NPTF | G 1/2 |

### Examples

These additional options are shown for demonstration purposes only.

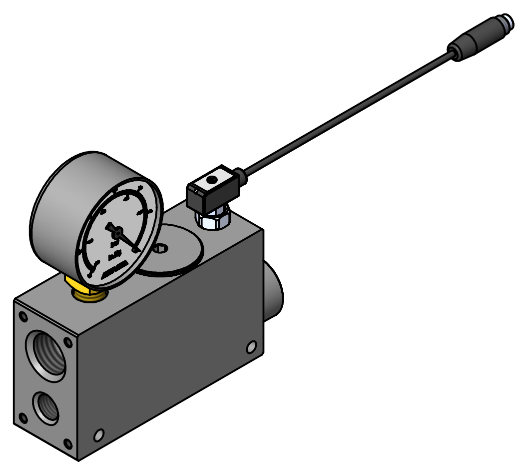
Please order any adittional items needed separately.

Normally Open Solenoid

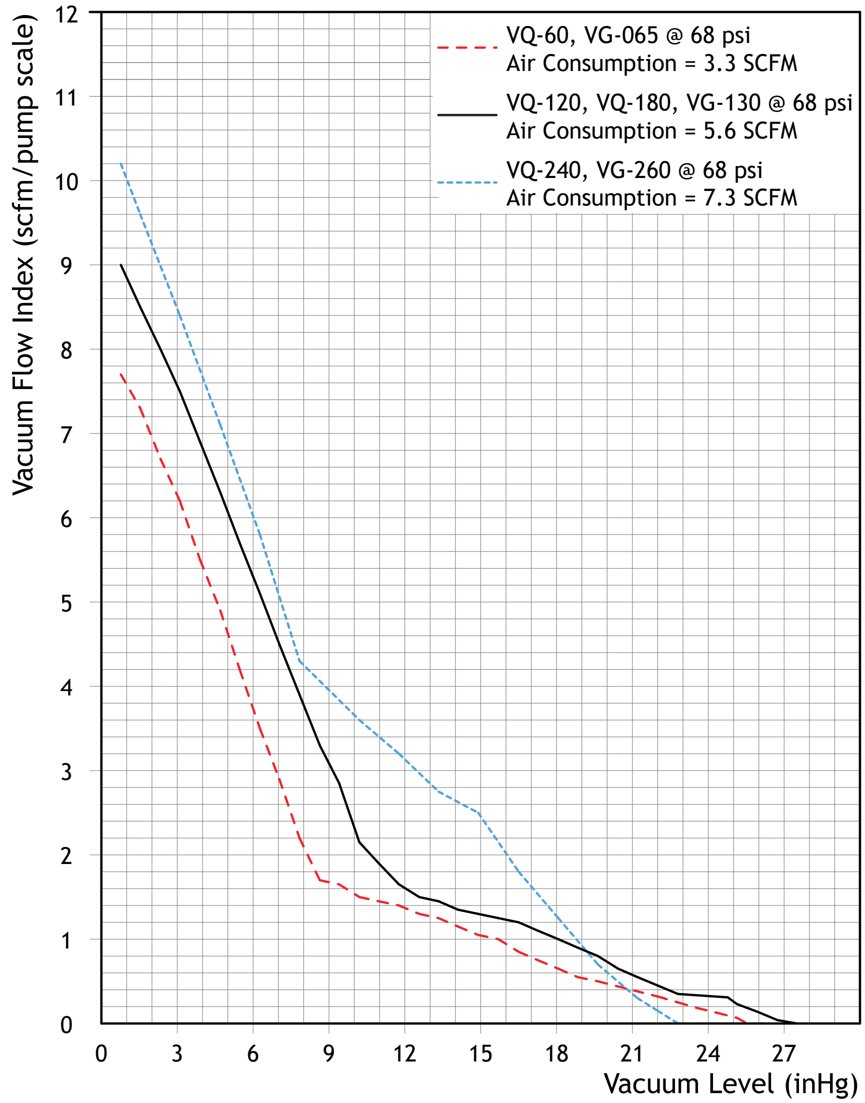


*Flip solenoid 180° for normally open mode.*

V-Series Vacuum Switch



## Performance Data




### Vacuum Flow - SCFM

| Model | | Air Supply PSI | Air Consu SCFM | Max Vacuum inHg | SCFM at Vacuum Level | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 3 inHg | 6 inHg | 9 inHg | 12 inHg | 15 inHg | 18 inHg | 21 inHg | 24 inHg |
| VG-065 | VQ-60 | 68 | 3.3 | 25.5 | 6.3 | 3.8 | 1.7 | 1.4 | 1.0 | 0.7 | 0.4 | 0.15 |
| VG-130 | VQ-120 | 68 | 5.6 | 27.5 | 7.6 | 5.3 | 3.1 | 1.6 | 1.3 | 1.0 | 0.6 | 0.3 |
| - | VQ-180 | 68 | 5.6 | 27.5 | 7.6 | 5.3 | 3.1 | 1.6 | 1.3 | 1.0 | 0.6 | 0.3 |
| VG-260 | VQ-240 | 68 | 7.3 | 22.7 | 8.5 | 6.0 | 4.0 | 3.1 | 2.5 | 1.3 | 0.4 | - |

*SCFM X 28.32 = nl / m*

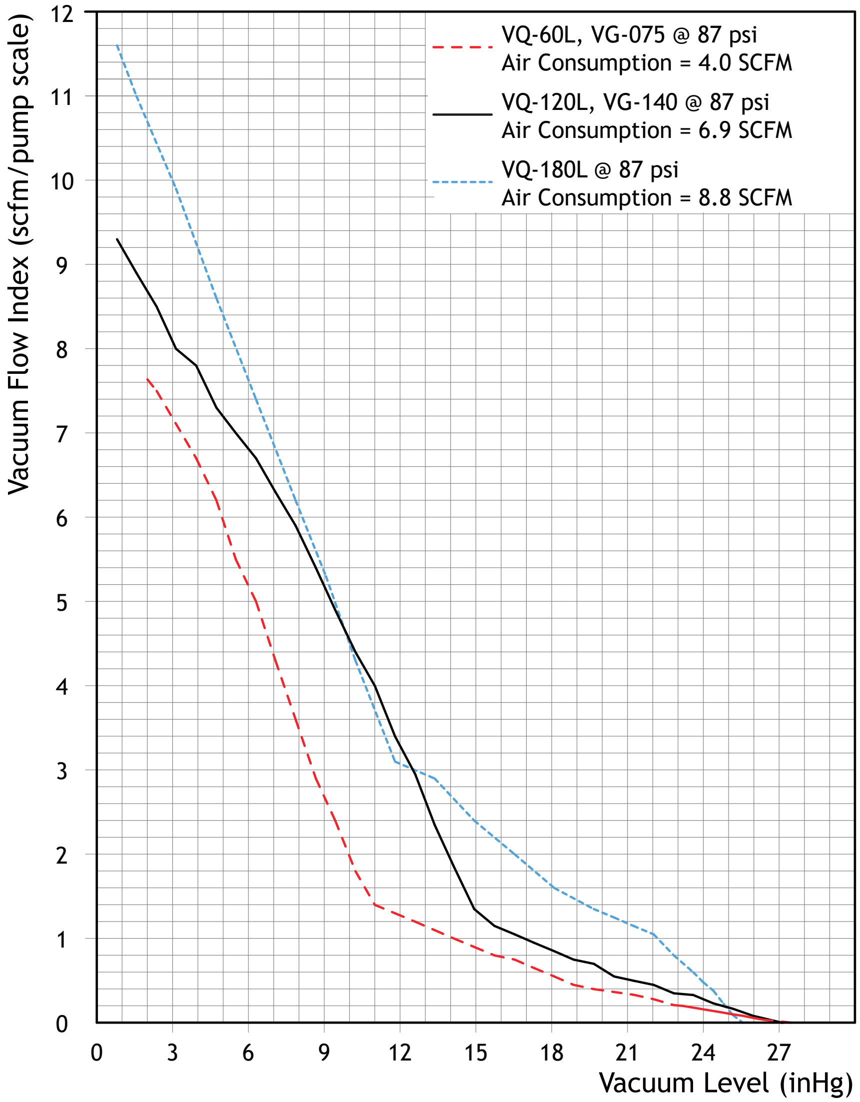
### Evacuation Time (sec / 100 in$^3$)

| Model | | Air Supply PSI | Air Consu SCFM | Max Vacuum inHg | Seconds to Evacuate 1 ft$^3$ to Vacuum Level (inHg) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 3 sec | 6 sec | 9 sec | 12 sec | 15 sec | 18 sec | 21 sec | 24 sec |
| VG-065 | VQ-60 | 68 | 3.3 | 25.5 | 0.65 | 2.4 | 3.7 | 6.9 | 12.1 | 20.8 | 37 | 46 |
| VG-130 | VQ-120 | 68 | 5.6 | 27.5 | 0.55 | 1.4 | 2.9 | 5.3 | 9.3 | 16 | 28 | 35 |
| - | VQ-180 | 68 | 5.6 | 27.5 | 0.55 | 1.4 | 2.9 | 5.3 | 9.3 | 16 | 28 | 35 |
| VG-260 | VQ-240 | 68 | 7.3 | 22.7 | 0.63 | 1.3 | 2.5 | 4.5 | 7.6 | 12.8 | 13.2 | - |

*sec / ft$^3$ X 35.32 = sec / m$^3$*

*All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.*

## Performance Data




### Vacuum Flow - SCFM

| Model | | Air Supply PSI | Air Consu SCFM | Max Vacuum inHg | SCFM at Vacuum Level | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 3 inHg | 6 inHg | 9 inHg | 12 inHg | 15 inHg | 18 inHg | 21 inHg | 24 inHg |
| VG-075 | VQ-60L | 87 | 4.0 | 27.5 | 7.2 | 5.2 | 2.7 | 1.3 | 0.9 | 0.6 | 0.3 | 0.14 |
| VG-140 | VQ-120L | 87 | 6.9 | 27.0 | 8.1 | 6.8 | 5.1 | 3.3 | 1.3 | 0.9 | 0.5 | 0.3 |
| - | VQ-180L | 87 | 8.8 | 25.5 | 10.0 | 7.6 | 5.4 | 3.1 | 2.4 | 1.6 | 1.2 | 0.5 |

*SCFM X 28.32 = nl / m*

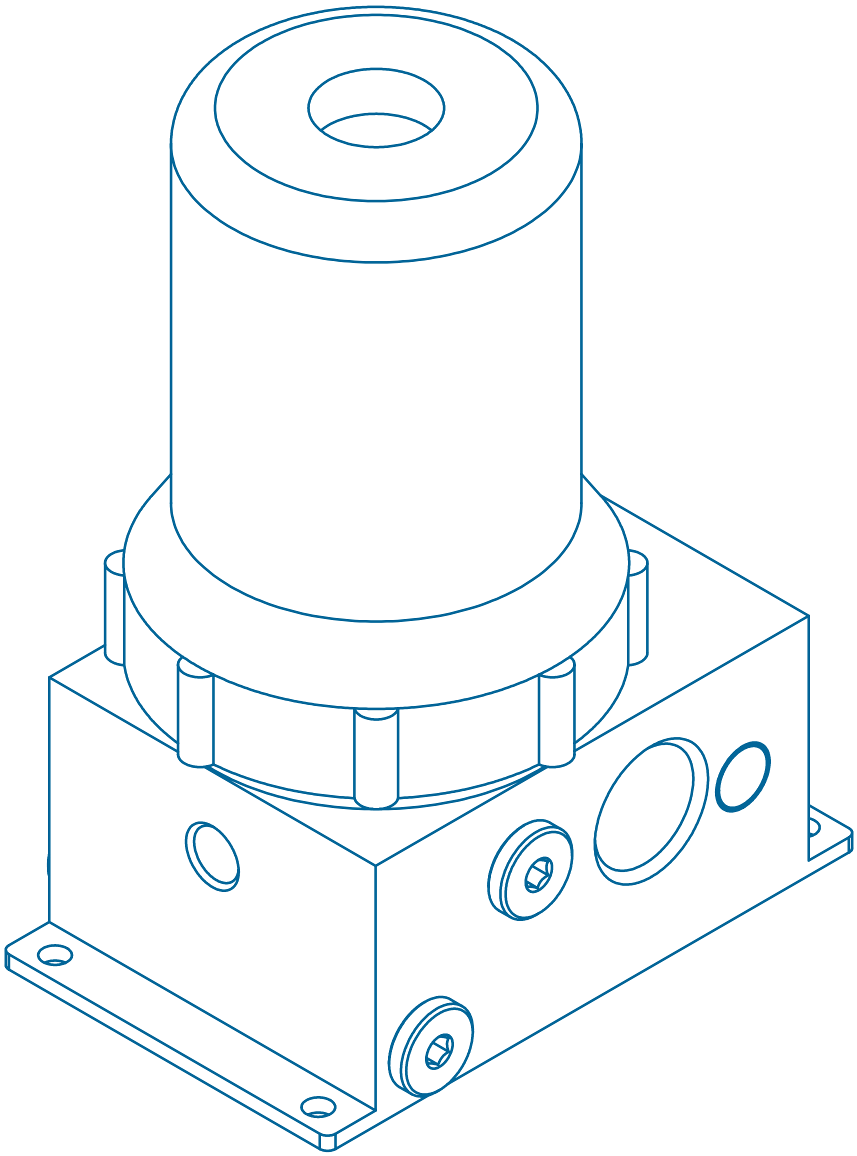
### Evacuation Time (sec / 100 in³)

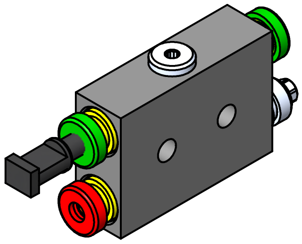
| Model | | Air Supply PSI | Air Consu SCFM | Max Vacuum inHg | Seconds to Evacuate 1 ft³ to Vacuum Level (inHg) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 3 sec | 6 sec | 9 sec | 12 sec | 15 sec | 18 sec | 21 sec | 24 sec |
| VG-075 | VQ-60L | 87 | 4.0 | 27.5 | 0.6 | 1.5 | 3.0 | 5.7 | 10.2 | 17.7 | 32 | 62 |
| VG-140 | VQ-120L | 87 | 6.9 | 27.0 | 0.53 | 1.3 | 2.5 | 4.3 | 7.4 | 12.8 | 23 | 44 |
| - | VQ-180L | 87 | 8.8 | 25.5 | 0.42 | 1.1 | 2.9 | 3.7 | 6.4 | 10.9 | 19.2 | 24 |

*sec / ft³ X 35.32 = sec / m³*

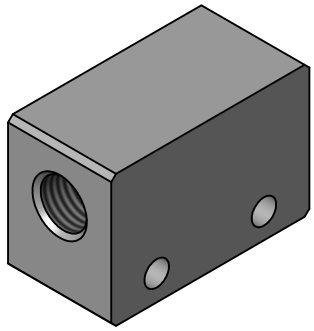
*All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.*

# ER Series Vacuum Pumps
## Section 10

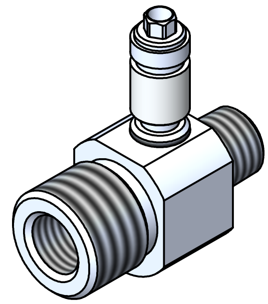




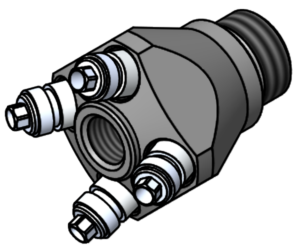
2010 Micro-Pump



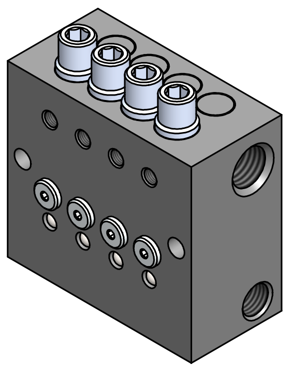
T18F Body



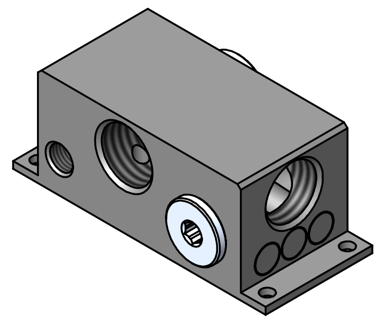
Inline



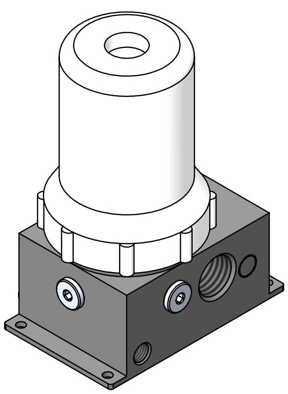
Inline, Multi-Venturi



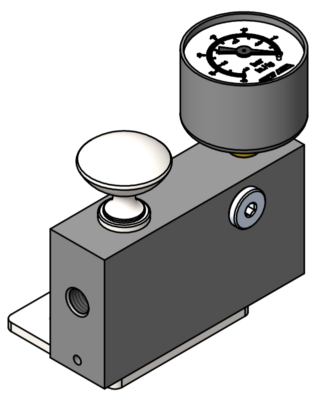
Vacuum Bar



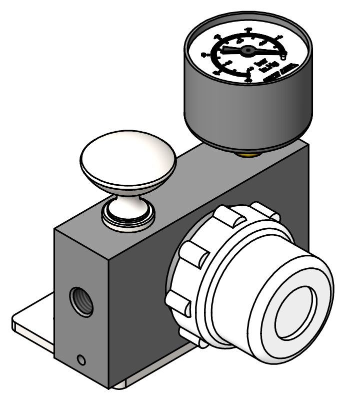
T12F Base



Integrated Filter

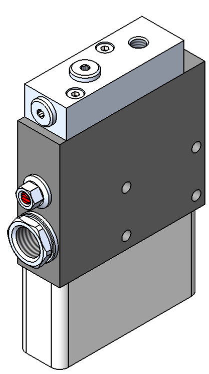


Manual Valve

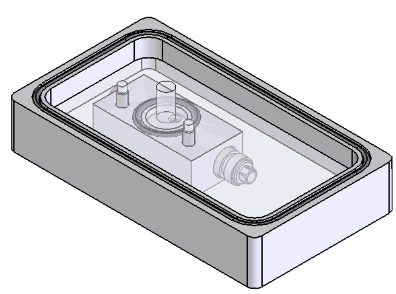


Manual Valve with Integrated Filter





Dual ER Pump



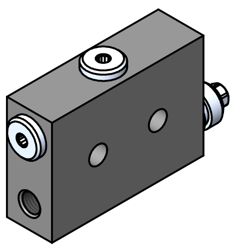
Surface Mount Micro-Pump

## 2010 Series ER Micro Pumps

The ER2010 micro-pump has an anodized alumin body available in two styles. The M4 style micro-pump has 4 mm (5/32) push-in tube connectors for the air-supply and two vacuum ports and a third, M5 (10-32) female vacuum port. The 5F style micro-pump has M5 (10-32) female ports for air-supply and three vacuum ports.

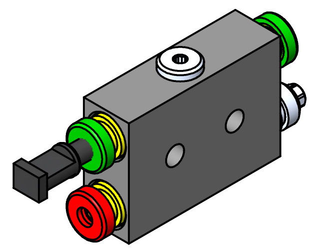
| | Venturi | | Body Style | |
|---|---|---|---|---|
| ER2010- | 05 | - | | |
| | 05 | | M4 | 4 mm Push-In Tube |
| | 07 | | 5F | M5 Female |
| | 09 | | | |
| | 10 | | | |
| | 08L | | | |
| | 10L | | | |

**M5 Female**

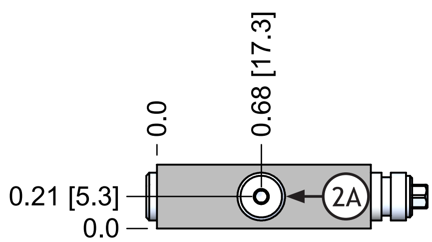


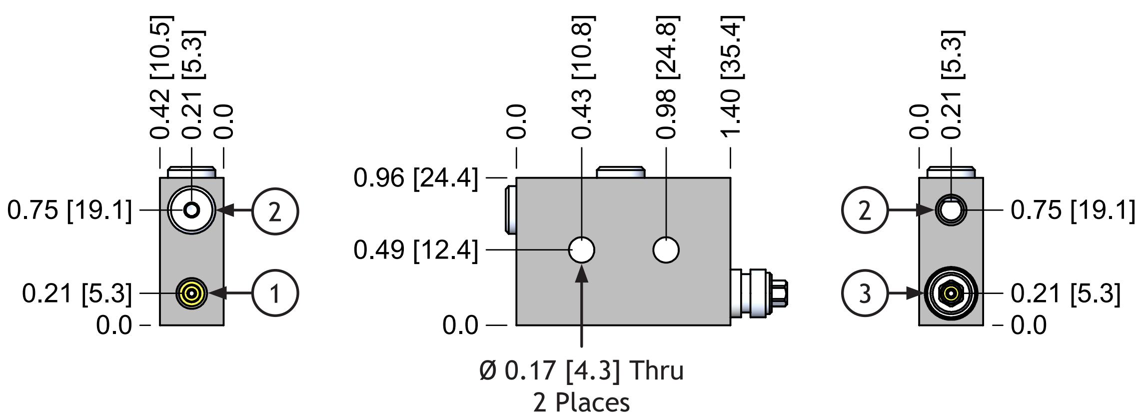
*Weight: 1.10 oz [31.0 g]*

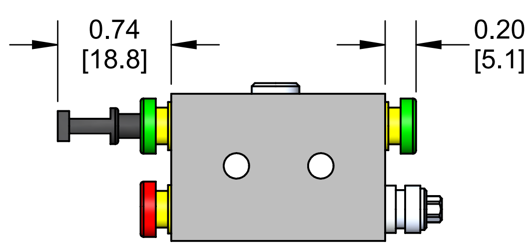
**4mm Push-In Tube**



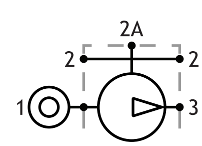
*Weight: 0.90 oz [25.0 g]*



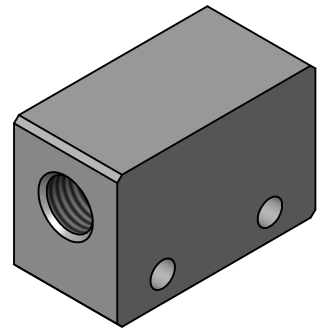




| Code | Function | -M4 | -5F |
|---|---|---|---|
| 1 | Air-Supply | 4 mm Tube | M5 Female |
| 2 | Vacuum | 4 mm Tube | M5 Female |
| 2A | Vacuum - Alternate | M5 Female | |
| 3 | Exhaust | - | |



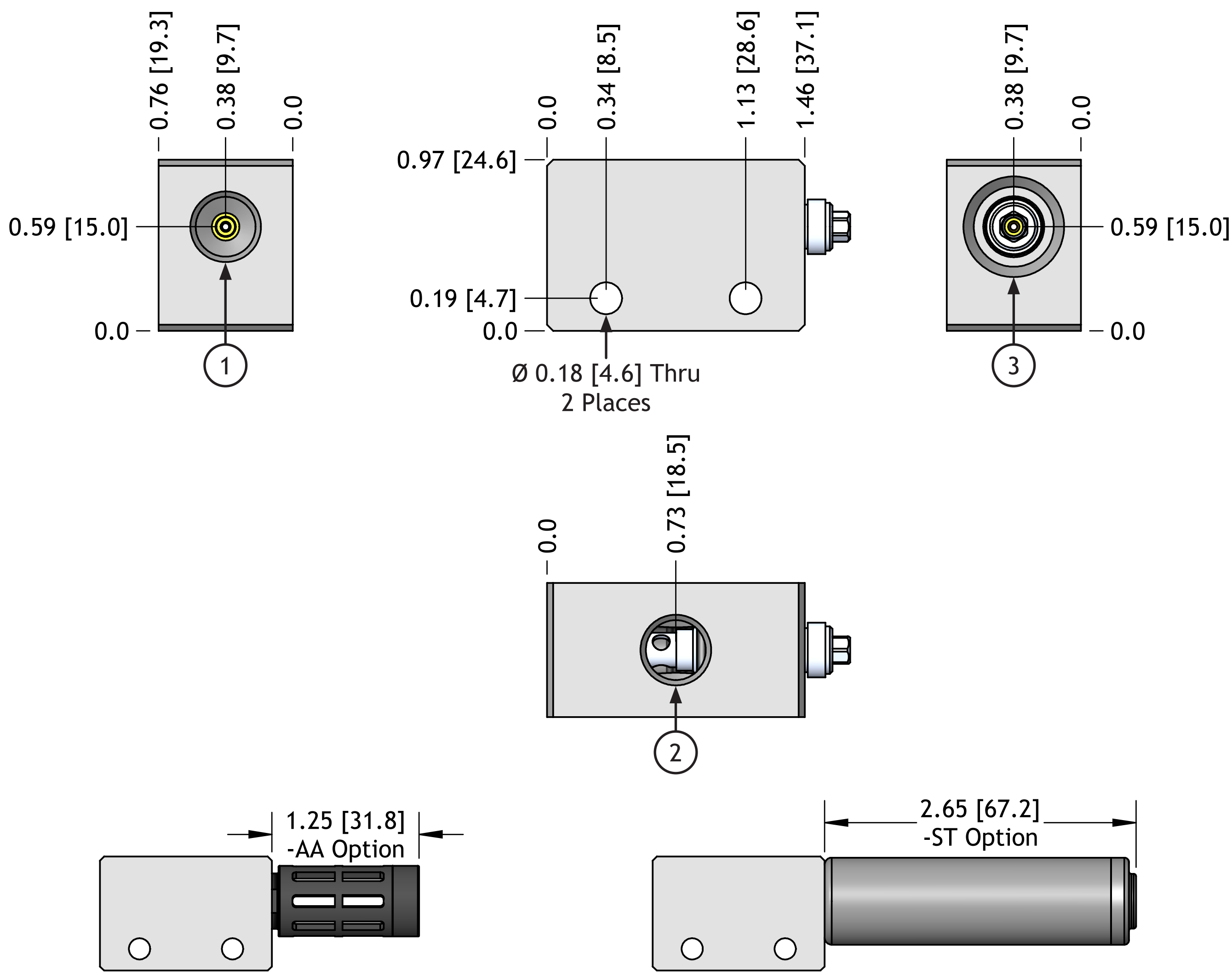
## T18F Body ER Pumps

The T18F base places high performance ER pumps in a compact traditional tee-style body with through holes for mounting and a threaded exhaust port for an optional silencer. The one-piece, anodized aluminum, tee-style body is ideal for small systems or one-pump-per-suction-cup applications. The T18F base has G1/8 NPSF air supply and vacuum ports with a G1/4 exhaust port.

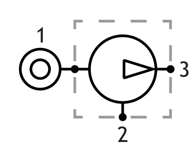


*Weight: 1.44 oz [40.8 g]*

| | Venturi | | Silencer | |
|---|---|---|---|---|
| ER | 10L | -T18F | | |
| | 05 | | (Blank) | None |
| | 07 | | -AA | AA14M |
| | 09 | | -ST | STA14M |
| | 10 | | | |
| | 08L | | | |
| | 10L | | | |



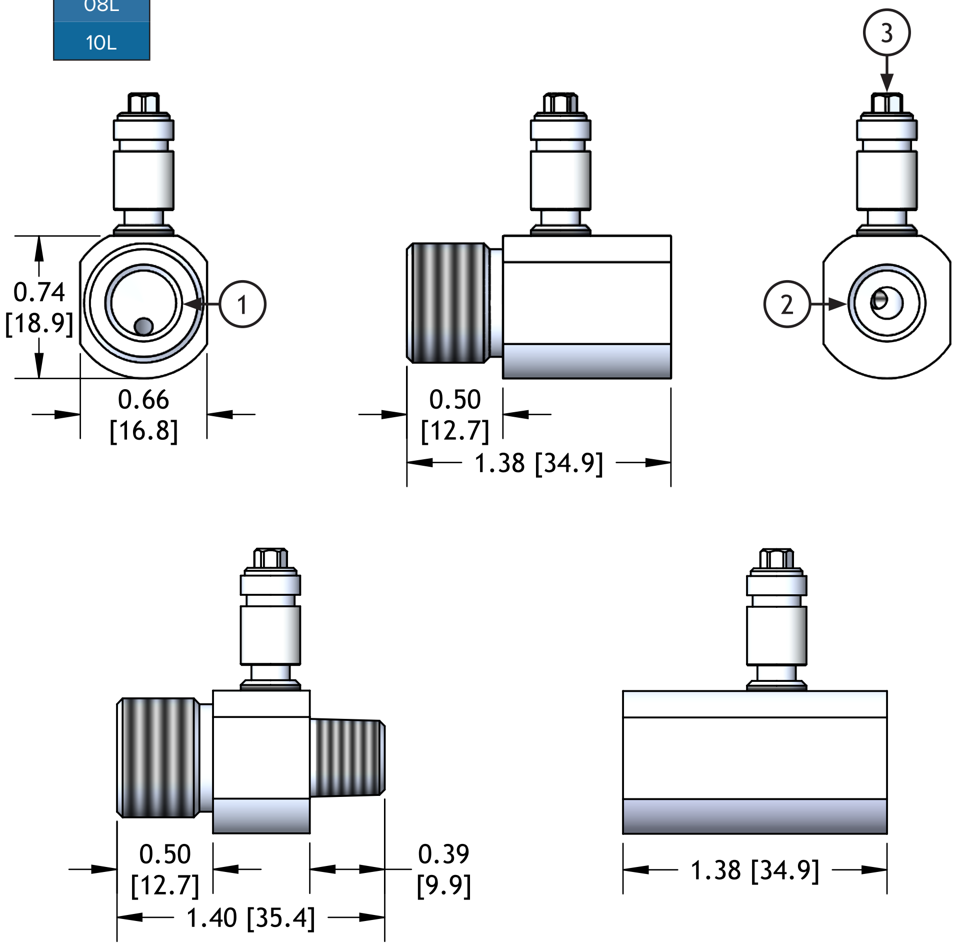

| Code | Function | Port |
|---|---|---|
| 1 | Air-Supply | G 1/8 NPSF |
| 2 | Vacuum | G 1/8 NPSF |
| 3 | Exhaust | G 1/4 |



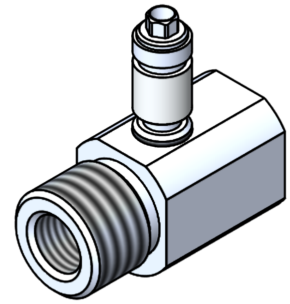
## Inline ER Pumps

Compact, high-performance inline pumps can be conveniently located near the point of vacuum usage. Ideal for small systems or one pump-per-suction-cup applications. We offer three body styles that allow you to choose the vacuum and air-supply threads that best suit your application.

| | Venturi | | Body Style | |
|---|---|---|---|---|
| ER | 10L | - | | |
| | 05 | | -18F | G 1/8 NPSF Female Vacuum |
| | 07 | | -18M | G 1/8 NPSF Male Vacuum |
| | 09 | | -G14F18F | G 1/4 Female Air-Supply |
| | 10 | | | |
| | 08L | | | |
| | 10L | | | |

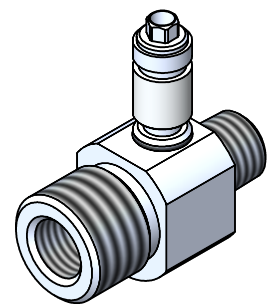



G 1/8 NPSF Female



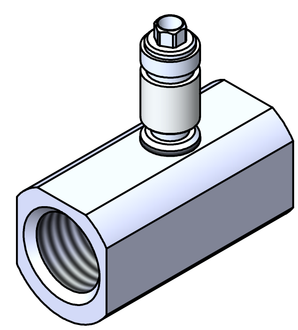
*Weight: 0.76 oz [21.6 g]*

G 1/8 NPSF Male



*Weight: 0.62 oz [17.7 g]*

G 1/4 NPSF Female

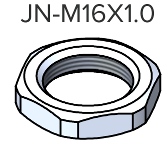


*Weight: 0.80 oz [22.6 g]*

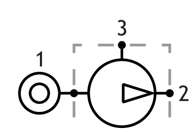
| Venturi Series | Air Consumption @ 72 psi [5 bar] | Venturi Diameter | IP Series Replacement |
|---|---|---|---|
| ER05 | 0.51 SCFM [14.4 Nl/m] | 0.5 mm | - |
| ER07 | 0.66 SCFM [18.7 Nl/m] | 0.7 mm | IP6M-5 |
| ER09 | 1.40 SCFM [39.6 Nl/m] | 0.9 mm | IP6M-10 |
| ER10 | 1.80 SCFM [51.0 Nl/m] | 1.0 mm | - |
| ER08L | 1.20 SCFM [34.0 Nl/m] | 0.8 mm | - |
| ER10L | 1.90 SCFM [53.8 Nl/m] | 1.0 mm | - |

| Code | Function | -18F | -18M | -G14F18F |
|---|---|---|---|---|
| 1 | Air-Supply | G 1/8 NPSF Female / M16X1.0 Male | | G 1/4 Female |
| 2 | Vacuum | G 1/8 NPSF Female | G 1/8 NPSF Male | G 1/8 NPSF Female |
| 3 | Exhaust | - | | |

JN-M16X1.0



*Jam nut for use with -18F inline pumps.*

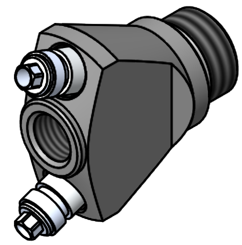


## Multi-Venturi Inline ER Pumps

Compact, high-performance inline pumps can be conveniently located near the point of vacuum usage. Ideal for small systems or one pump-per-suction-cup applications.

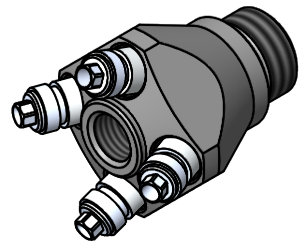
| | Venturi | Number of Venturis | | |
|---|---|---|---|---|
| ER | 10L | X2 | | -18F |
| | 09 | X2 | Double Venturi | |
| | 10 | X4 | Quadruple Venturi | |
| | 08L | | | |
| | 10L | | | |

Double Venturi

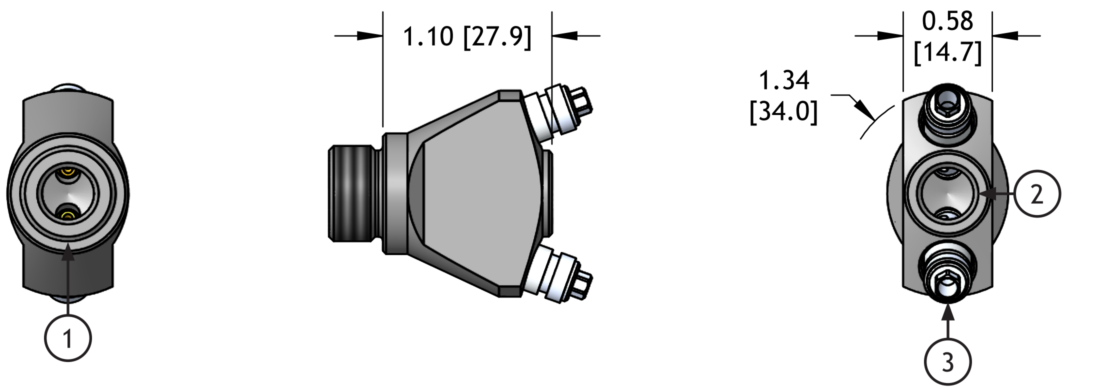


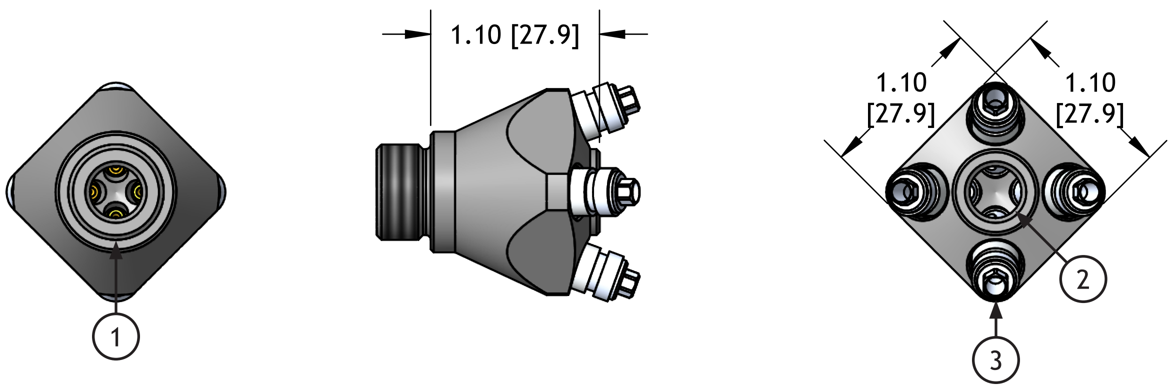
*Weight: 0.98 oz [27.7 g]*

Quadruple Venturi



*Weight: 1.38 oz [39.2 g]*



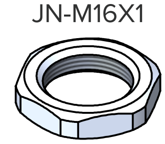




| Venturi Series | Air Consumption @ 72 psi [5 bar] | Venturi Diameter | IP Series Replacement |
|---|---|---|---|
| ER09X2 | 2.80 SCFM [79.0 Nl/m] | 1.2 mm | IP6M-20 |
| ER10X2[1] | 3.80 SCFM [108.0 Nl/m] | 1.4 mm | - |
| ER08LX2[1] | 2.40 SCFM [68.0 Nl/m] | 1.1 mm | IP6M-20 |
| ER10LX2[1] | 3.60 SCFM [102.0 Nl/m] | 1.4 mm | - |
| ER09X4 | 5.60 SCFM [158.0 Nl/m] | 1.8 mm | IP6M-30 |
| ER10X4[1] | 7.20 SCFM [362.0 Nl/m] | 2.0 mm | - |
| ER08LX4[1] | 4.80 SCFM [136.0 Nl/m] | 1.6 mm | - |
| ER10LX4[1] | 7.60 SCFM [215.0 Nl/m] | 2.0 mm | - |

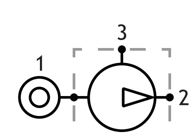
*[1]May require -18F fitting plus 1/8" nipple for clearance to mount the cup.*

| Code | Function | Port |
|---|---|---|
| 1 | Air-Supply | G 1/8 NPSF Female / M16X1.0 Male |
| 2 | Vacuum | G 1/8 NPSF Female |
| 3 | Exhaust | - |

JN-M16X1



*Jam nut for use with -18F inline pumps.*

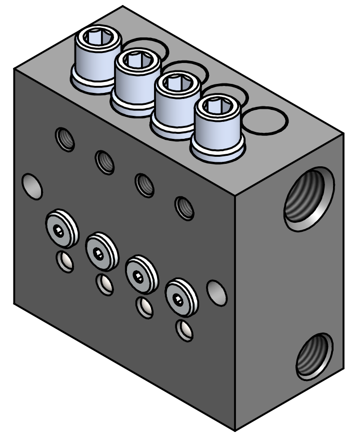


## ER Series Vacuum Bars

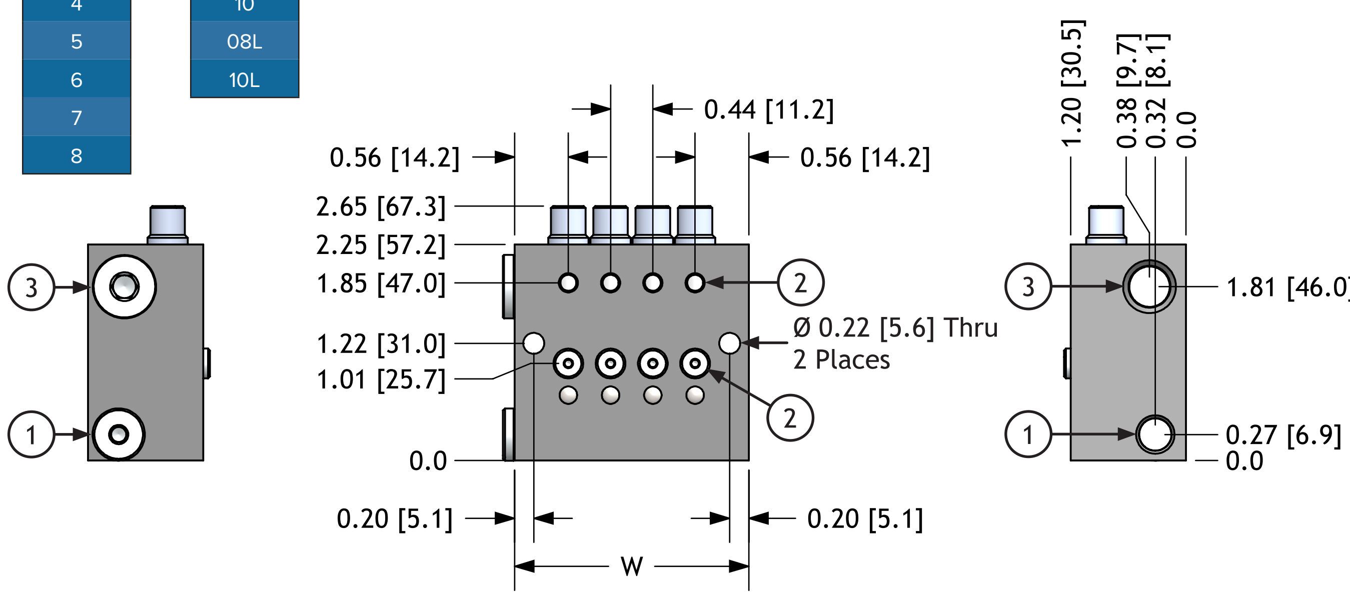
Vacuum bars eliminate the clutter and plumbing complexity of small vacuum systems by incorporating multiple vacuum pumps that have common air supply and common exhaust ports within the bar manifold. Vacuum lines can be routed from the pumps directly to individual suction cups.

Even though all of the vacuum pumps are operated by one air-supply, the pump vacuum ports are independent of one another so it doesn’t matter if some vacuum lines are open to atmosphere due to missing work pieces. Vacuum loss in one line doesn’t affect performance of the other vacuum pumps.

Integral polyethylene filter elements are easily serviced by removing a knurled retainer. The filters protect two ports per vacuum pump so either port can be used for a vacuum outlet, and the other for a vacuum switch.



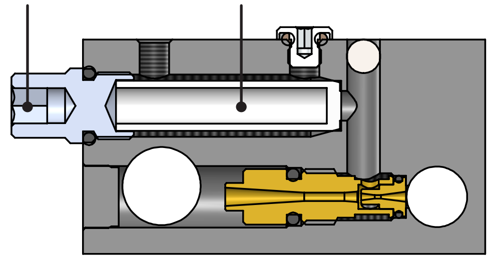
| | Stations | | Series |
|---|---|---|---|
| VB | 2 | -ER | 10 |
| | 1 | | 05 |
| | 2 | | 07 |
| | 3 | | 09 |
| | 4 | | 10 |
| | 5 | | 08L |
| | 6 | | 10L |
| | 7 | | |
| | 8 | | |



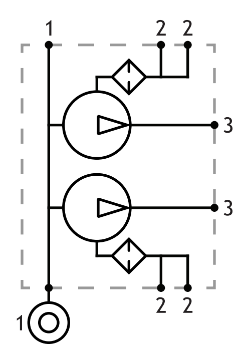

| Stations | W in [mm] | Weight lbs [g] |
|---|---|---|
| 2 | 1.56 [39.6] | 0.36 [162.0] |
| 4 | 2.44 [62.0] | 0.56 [255.0] |
| 6 | 3.32 [84.2] | 0.77 [349.0] |
| 8 | 4.20 [106.7] | 0.97 [442.0] |

*Refer to ER performance graph. Use the X1 values.*

| Code | Function | Port |
|---|---|---|
| 1 | Air-Supply | G 1/8 NPSF |
| 2 | Vacuum | M5x0.8 (10-32 UNF) |
| 3 | Exhaust | G 1/4 |



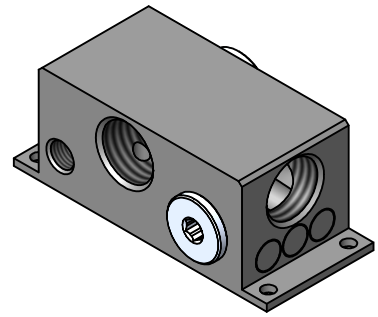

*Replacement Filter: RE7X32*



## T12F Base ER Pumps

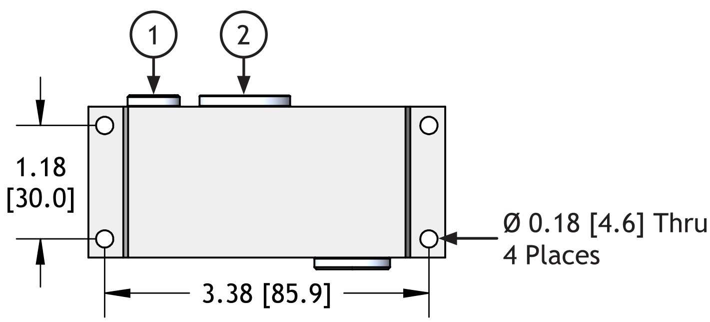
A T-base allows either one, two, or three ER venturis to be internally connected in parallel to obtain a greater combined vacuum flow rate. For total vacuum flow, read the vacuum flow rate at the desired vacuum level from the ER performance graph then multiply by the number of venturis installed in the T-Base. Normally, only the larger ER venturis would be selected for this pump.

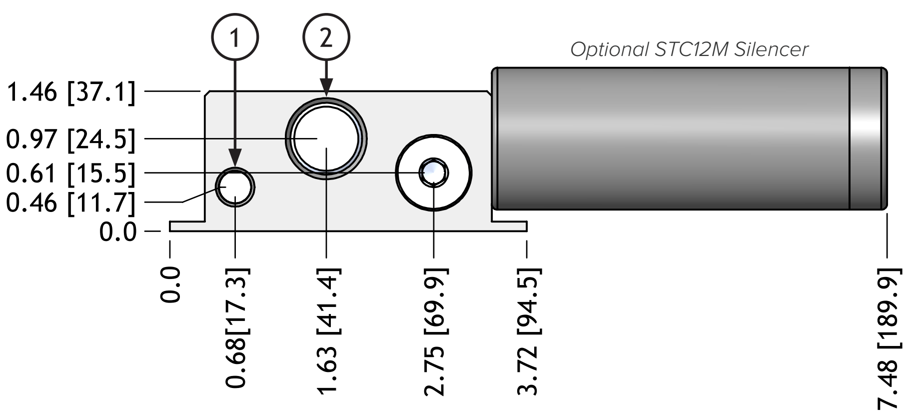
The ER series T-base offers greater vacuum flow in the same foot print as the Chip Pump T-base.

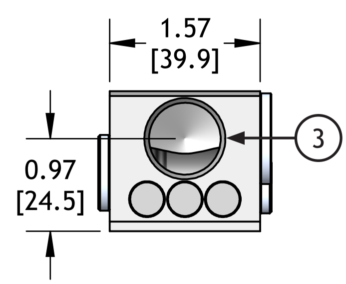


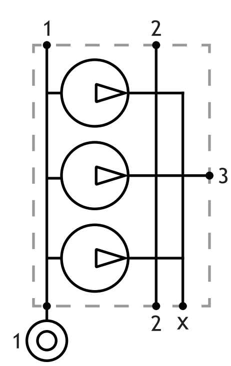
*Weight: 9.25 oz [262.3 g]*

| | Venturi | Number of Venturis | | | Silencer | |
|---|---|---|---|---|---|---|
| ER | 10L | X3 | | -T12F | | |
| | 05 | X2 | Double Venturi | | (Blank) | None |
| | 07 | X3 | Triple Venturi | | -AA | AA12M |
| | 09 | | | | -ST | STC12M |
| | 10 | | | | | |
| | 08L | | | | | |
| | 10L | | | | | |



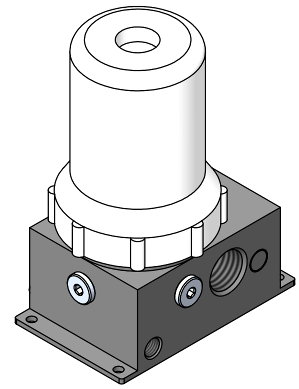




| Code | Function | Port |
|---|---|---|
| 1 | Air-Supply | G 1/8 NPSF |
| 2 | Vacuum | G 1/2 NPSF |
| 3 | Exhaust | G 1/2 NPSF |

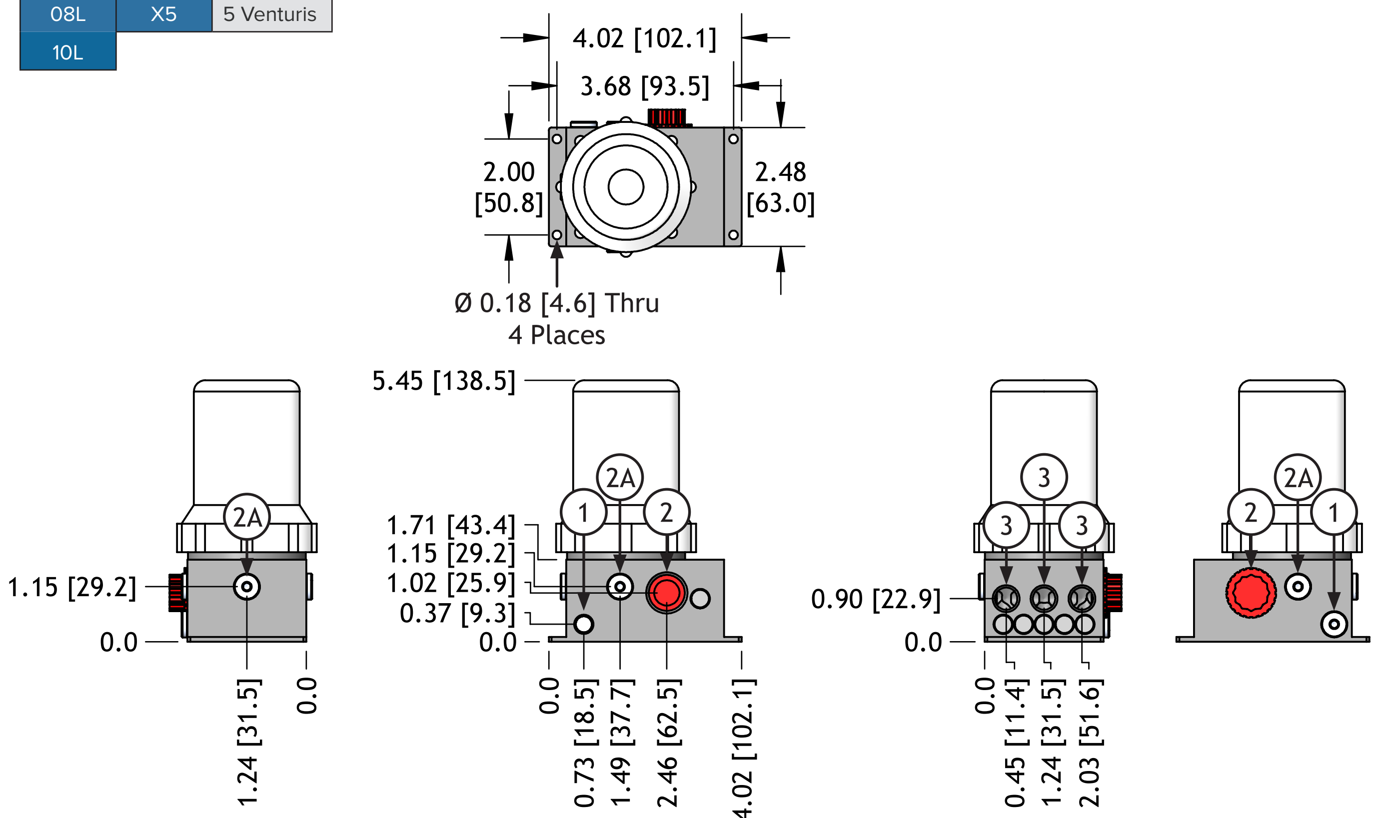
# T12F Base ER Pumps w/ Integrated Filter

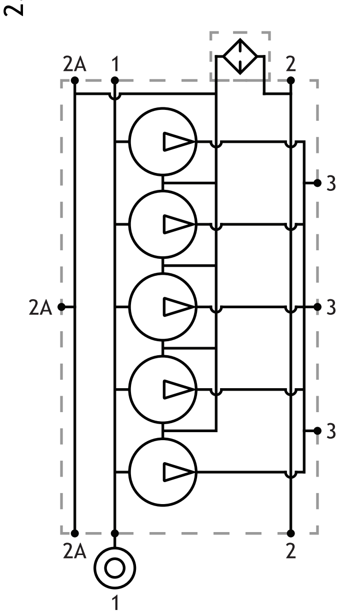
Similar to the 12F t-base, our ER Pump with Integrated Filter allows one to five ER venturis to be internally connected in parallel to obtain a greater combined vacuum flow rate. This pump incorporates the bowl, gasket, and filter element of our t-style filters directly into the pump base eliminating the necessity of incorporating an external filter into the vacuum system.

| | Series | Number of Venturis | | | Silencer Option | |
|---|---|---|---|---|---|---|
| ER | 10L | X5 | | -T12FIF | | |
| | 05 | X1 | 1 Venturis | | (Blank) | None |
| | 07 | X2 | 2 Venturis | | -AA | AA14M (3) |
| | 09 | X3 | 3 Venturis | | -ST | STA14M (3) |
| | 10 | X4 | 4 Venturis | | | |
| | 08L | X5 | 5 Venturis | | | |
| | 10L | | | | | |



*Weight: 24.25 oz [687.6 g]*



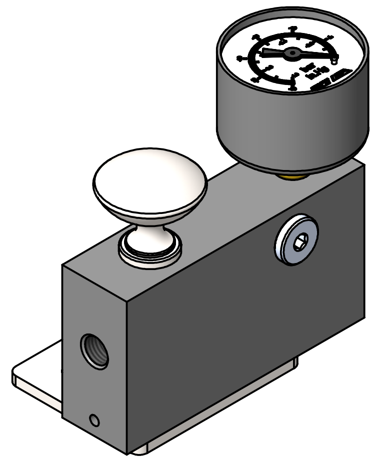




| Code | Function | Port |
|---|---|---|
| 1 | Air-Supply | G 1/8 NPSF |
| 2 | Vacuum | G 1/2 NPSF |
| 2A | Vacuum, Alternate | G 1/8 NPSF |
| 3 | Exhaust | G 1/4 |

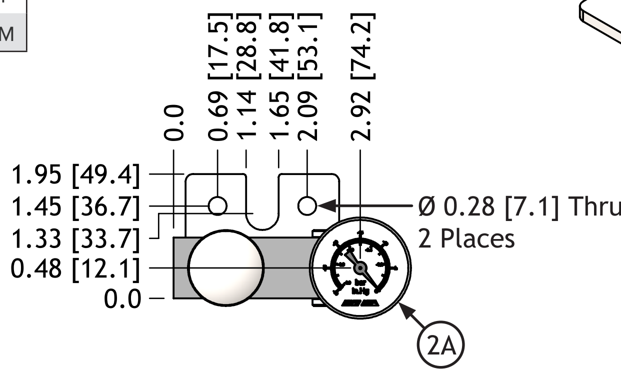
## Manual Valve ER Pumps

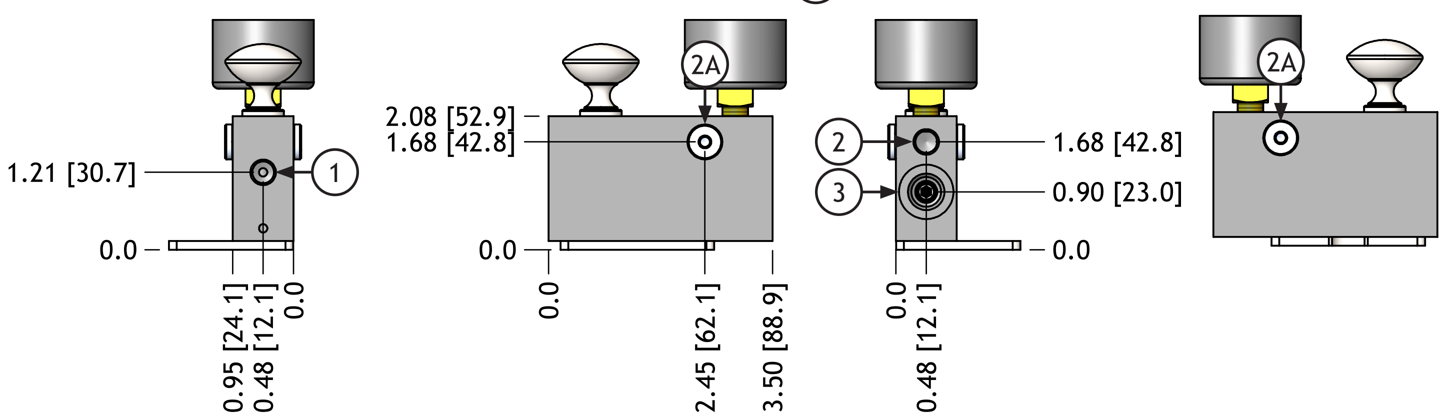
EDCO Vacuum pumps with manual valve (MV) option provide a compact compressed-air powered control unit for vacuum workholding fixtures. An easily-readable 1-1/2" vacuum gauge displays depth of vacuum within the system so a technician can determine whether an adequate vacuum level has been achieved based on experience.

| | Series | | Silencer Option | |
|---|---|---|---|---|
| ER | 10L | -MV | | |
| | 05 | | (Blank) | None |
| | 07 | | -AA | AA14M |
| | 09 | | -ST | STA14M |
| | 10 | | | |
| | 08L | | | |
| | 10L | | | |

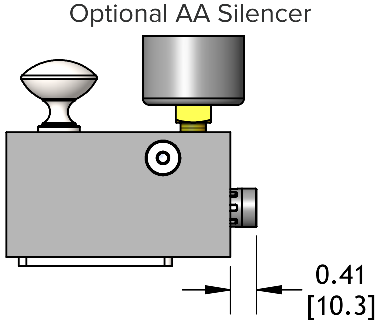


*Weight: 13.94 oz [395.1 g]*



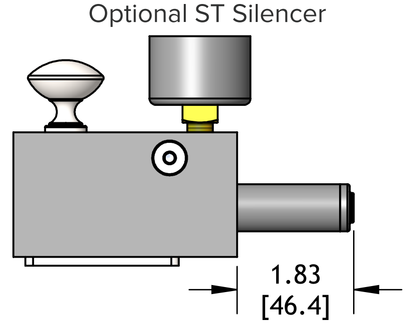




Optional AA Silencer



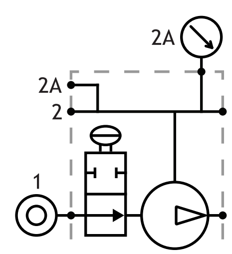

*Additional Weight: 0.11 oz [3.1 g]*

Optional ST Silencer



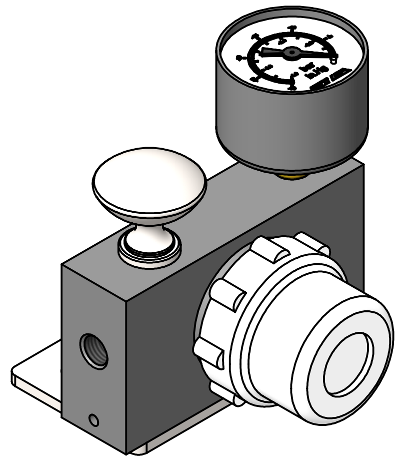

*Additional Weight: 0.56 oz [15.8 g]*

| Code | Function | Port |
|---|---|---|
| 1 | Air-Supply | G 1/8 NPSF |
| 2 | Vacuum | G 1/8 NPSF |
| 2A | Vacuum, Alternate | G 1/8 NPSF |
| 3 | Exhaust | G 1/4 |



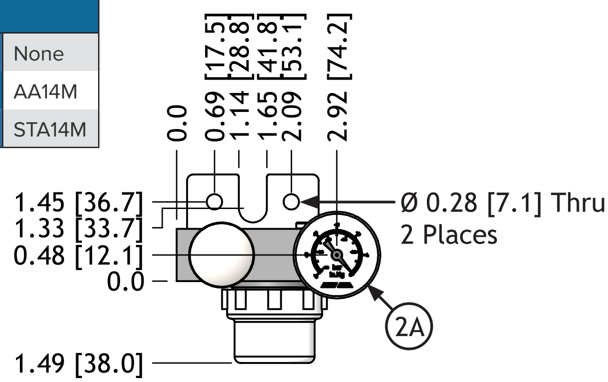
## Manual Valve ER Pumps w/ Integrated Filter

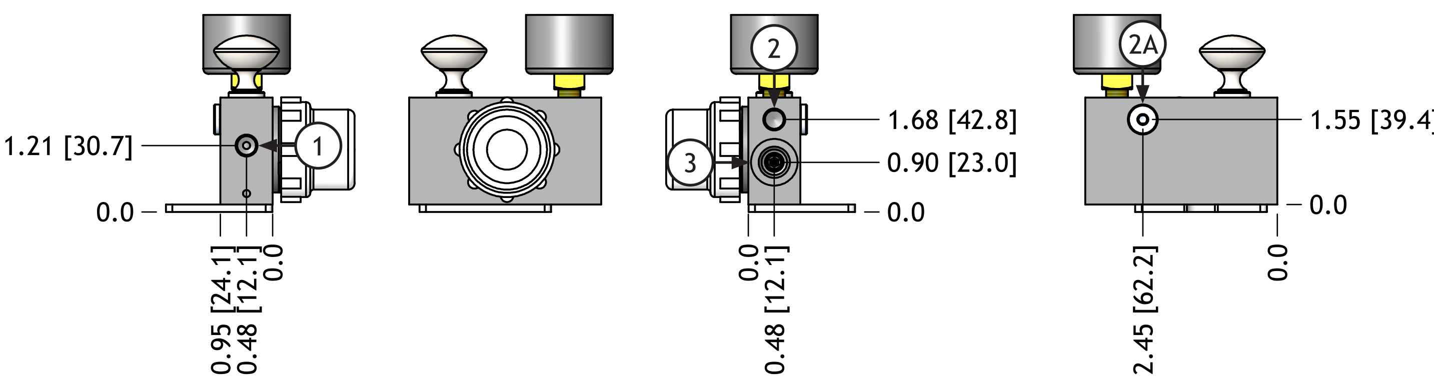
EDCO Vacuum pumps with manual valve (MV) option provide a compact compressed-air powered control unit for vacuum workholding fixtures. An easily-readable 1-1/2” vacuum gauge displays depth of vacuum within the system so a technician can determine whether an adequate vacuum level has been achieved based on experience. This pump incorporates the bowl, gasket, and filter element of our t-style filters directly into the pump base eliminating the necessity of incorporating an external filter into the vacuum system.



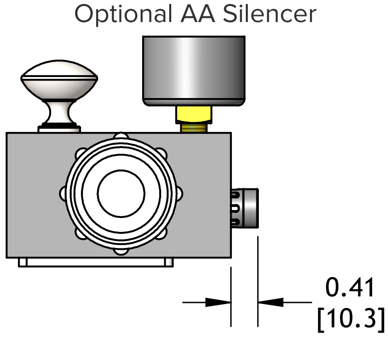
Weight: 15.89 oz [450.5 g]

| | Series | | Silencer Option | |
|---|---|---|---|---|
| ER | 10L | -MV-IF | | |
| | 05 | | (Blank) | None |
| | 07 | | -AA | AA14M |
| | 09 | | -ST | STA14M |
| | 10 | | | |
| | 08L | | | |
| | 10L | | | |



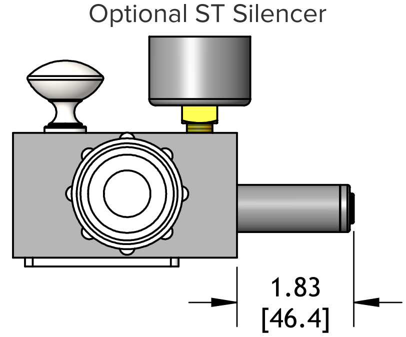




Optional AA Silencer



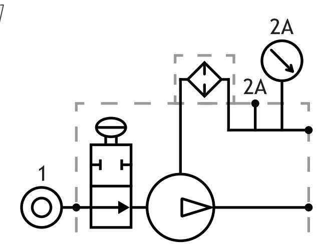

Additional Weight: 0.11 oz [3.1 g]

Optional ST Silencer




Additional Weight: 0.56 oz [15.8 g]

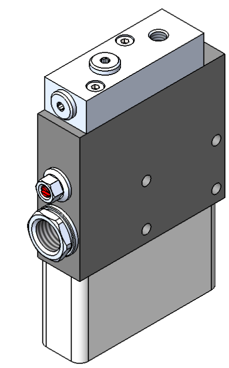
| Code | Function | Port |
|---|---|---|
| 1 | Air-Supply | G 1/8 NPSF |
| 2 | Vacuum | G 1/8 NPSF |
| 2A | Vacuum, Alternate | G 1/8 NPSF |
| 3 | Exhaust | G 1/4 |



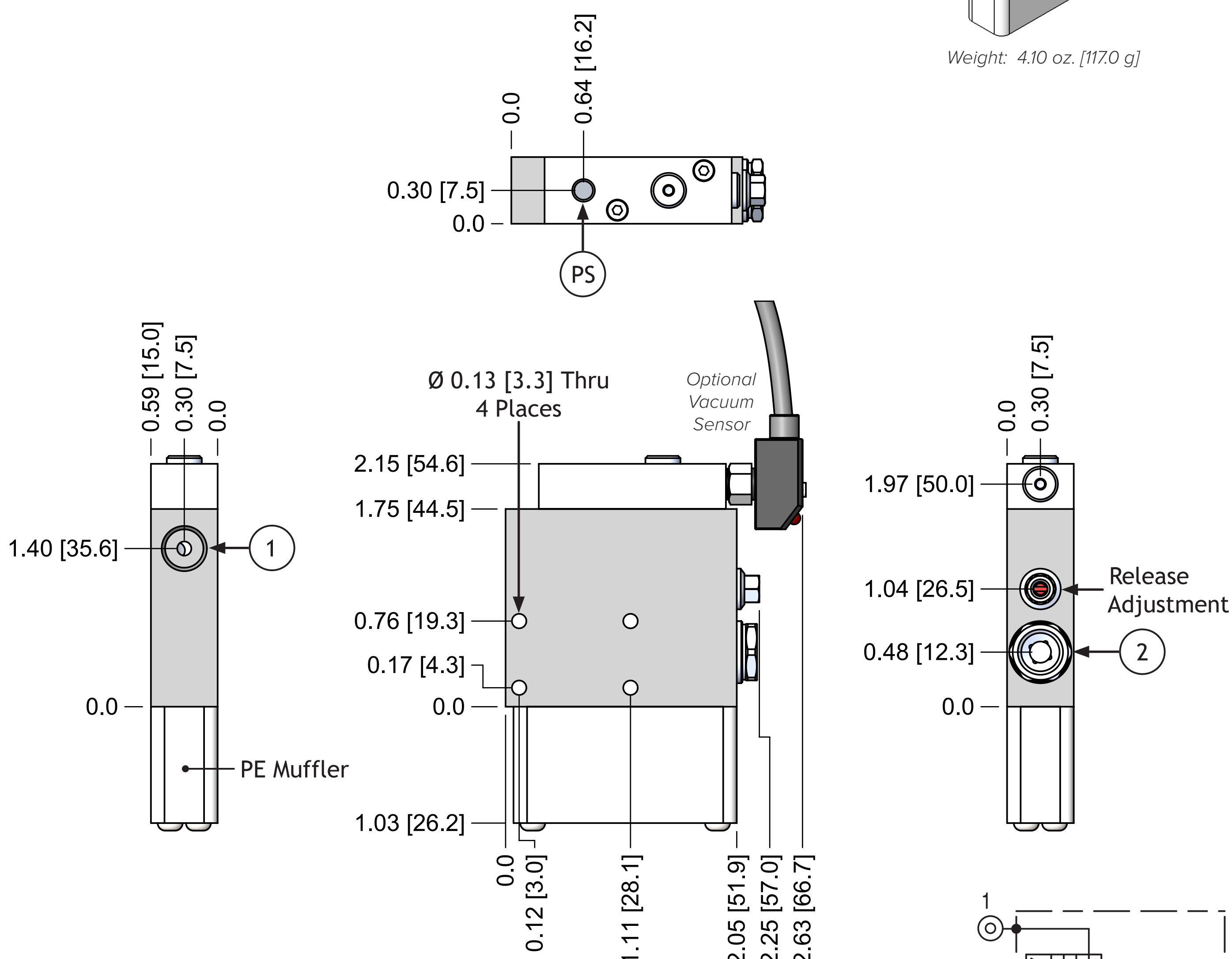
## Dual ER Pumps w/ Pilot Controlled Air-Supply

Miniature DER series vacuum pumps provide full control features in a compact package. These lightweight pumps can be mounted near the point of vacuum usage to eliminate long vacuum lines and improve system response. DER pumps are availalable with single or dual coaxial ejectors to match pump performance to system requirements. Quick-release air is controlled via an integral flow control valve so blow-off intensity can be fine-tuned for delicate, lightweight parts. Using 1/8 inch vacuum ports allows for taking advantage of high vacuum flow produced by coaxial ejectors that are designed to handle porour materials at mid-range vacuum levels. An optional non-return valve is available for use in sealed, non-porous systems.

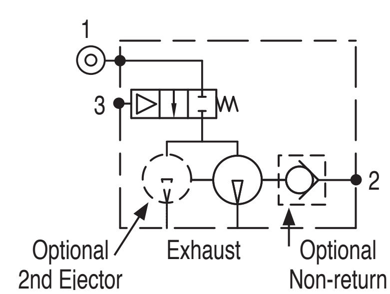
| | Series | Number of Ejectors | | | Option | | Sensor Options | |
|---|---|---|---|---|---|---|---|---|
| DER18- | 10L | | | -PS | | | | |
| | 05 | X1 | Single Ejector | | (Blank) | None | (Blank) | None |
| | 07 | X2 | Dual Ejector | | -NR | Non-Return | -VA3 | Analog, 3 Wire |
| | 09 | | | | | | -VN3 | NPN, 3 Wire |
| | 10 | | | | | | -VN4 | NPN, 4 Wire |
| | 08L | | | | | | -VP3 | PNP, 3 Wire |
| | 10L | | | | | | -VP4 | PNP, 4 Wire |



*Weight: 4.10 oz. [117.0 g]*



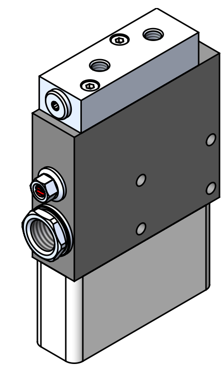

| Code | Function | Port |
|---|---|---|
| 1 | Air-Supply | G 1/8 NPSF |
| 2 | Vacuum | G 1/8 NPSF |
| PS | Pilot - Air-Supply | M5x0.8 (10-32 UNF) |



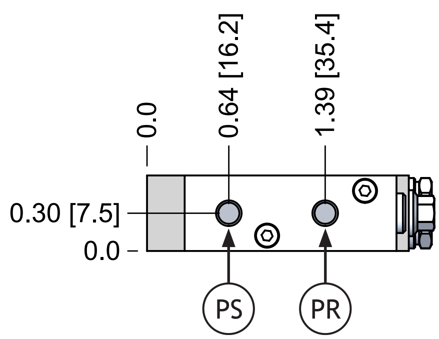
# Dual ER Pumps w/ Pilot Controlled Air-Supply & Release

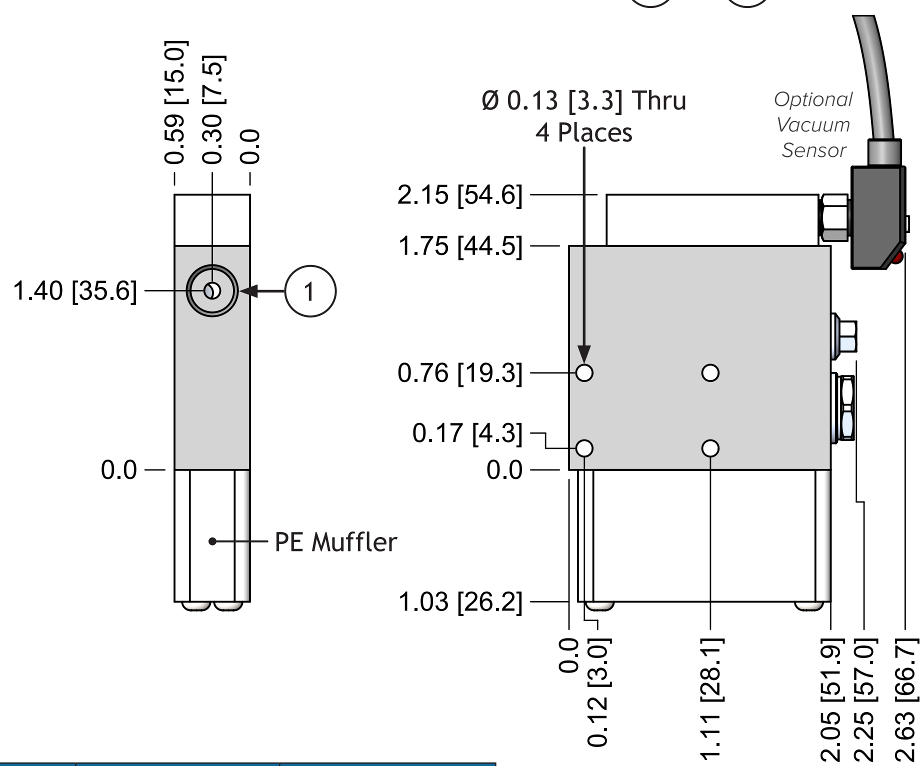
Miniature DER series vacuum pumps provide full control features in a compact package. These lightweight pumps can be mounted near the point of vacuum usage to eliminate long vacuum lines and improve system response. DER pumps are availalable with single or dual coaxial ejectors to match pump performance to system requirements. Quick-release air is controlled via an integral flow control valve so blow-off intensity can be fine-tuned for delicate, lightweight parts. Using 1/8 inch vacuum ports allows for taking advantage of high vacuum flow produced by coaxial ejectors that are designed to handle porour materials at mid-range vacuum levels. An optional non-return valve is available for use in sealed, non-porous systems.

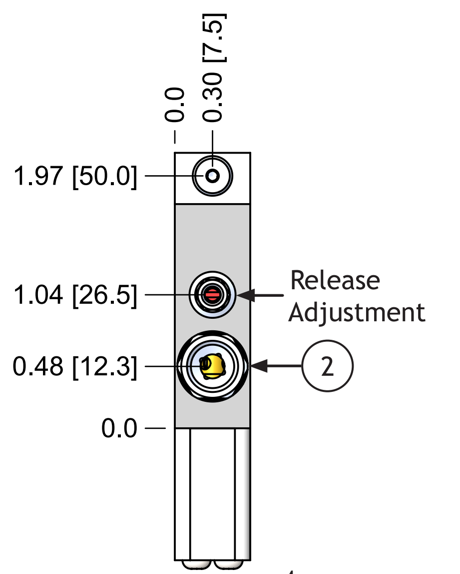
| | Series | Number of Ejectors | | | Option | | Sensor Options | |
|---|---|---|---|---|---|---|---|---|
| DER18- | 10L | | | | -PSB | | | |
| | 05 | X1 | Single Ejector | | (Blank) | None | (Blank) | None |
| | 07 | X2 | Dual Ejector | | -NR | Non-Return | -VA3 | Analog, 3 Wire |
| | 09 | | | | | | -VN3 | NPN, 3 Wire |
| | 10 | | | | | | -VN4 | NPN, 4 Wire |
| | 08L | | | | | | -VP3 | PNP, 3 Wire |
| | 10L | | | | | | -VP4 | PNP, 4 Wire |

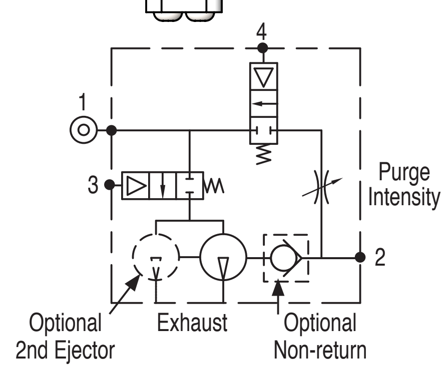


Weight: 4.10 oz [117.0 g]



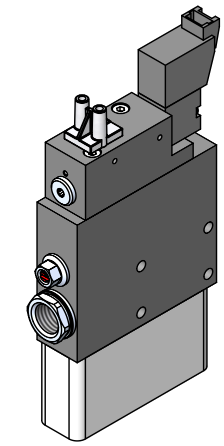

| Code | Function | Port |
|---|---|---|
| 1 | Air-Supply | G 1/8 NPSF |
| 2 | Vacuum | G 1/8 NPSF |
| PS | Pilot - Air-Supply | M5x0.8 (10-32 UNF) |
| PR | Pilot - Blow-Off | M5x0.8 (10-32 UNF) |

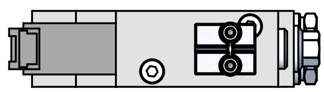
## Dual ER Pumps w/ Solenoid Controlled Air-Supply

Miniature DER series vacuum pumps provide full control features in a compact package. These lightweight pumps can be mounted near the point of vacuum usage to eliminate long vacuum lines and improve system response. DER pumps are availalable with single or dual coaxial ejectors to match pump performance to system requirements. Quick-release air is controlled via an integral flow control valve so blow-off intensity can be fine-tuned for delicate, lightweight parts. Using 1/8 inch vacuum ports allows for taking advantage of high vacuum flow produced by coaxial ejectors that are designed to handle porour materials at mid-range vacuum levels. An optional non-return valve is available for use in sealed, non-porous systems.

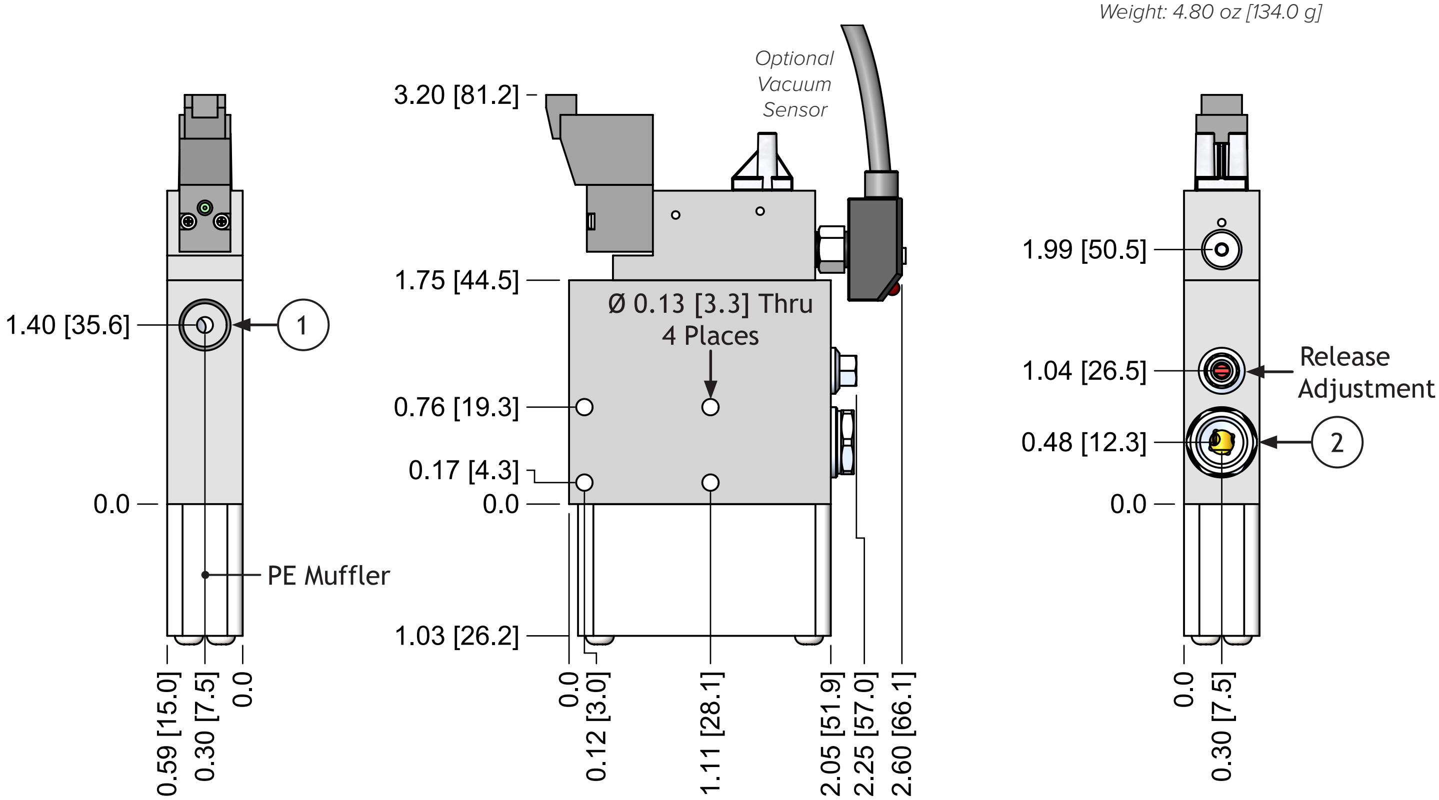
*Order SV10-QD-1M solenoid cables separately.*

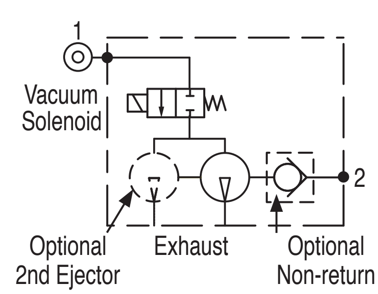
| | Series | Number of Ejectors | | | Option | | Sensor Options | |
|---|---|---|---|---|---|---|---|---|
| DER18- | 10L | | | -S24D | | | | |
| | 05 | X1 | Single Ejector | | (Blank) | None | (Blank) | None |
| | 07 | X2 | Dual Ejector | | -NR | Non-Return | -VA3 | Analog, 3 Wire |
| | 09 | | | | | | -VN3 | NPN, 3 Wire |
| | 10 | | | | | | -VN4 | NPN, 4 Wire |
| | 08L | | | | | | -VP3 | PNP, 3 Wire |
| | 10L | | | | | | -VP4 | PNP, 4 Wire |





*Weight: 4.80 oz [134.0 g]*



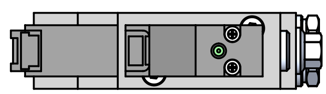

| Code | Function | Port |
|---|---|---|
| 1 | Air-Supply | G 1/8 NPSF |
| 2 | Vacuum | G 1/8 NPSF |

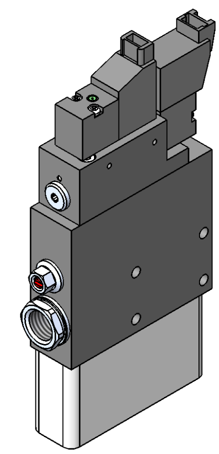
## Dual ER Pumps w/ Solenoid Controlled Air-Supply & Release

Miniature DER series vacuum pumps provide full control features in a compact package. These lightweight pumps can be mounted near the point of vacuum usage to eliminate long vacuum lines and improve system response. DER pumps are availalable with single or dual coaxial ejectors to match pump performance to system requirements. Quick-release air is controlled via an integral flow control valve so blow-off intensity can be fine-tuned for delicate, lightweight parts. Using 1/8 inch vacuum ports allows for taking advantage of high vacuum flow produced by coaxial ejectors that are designed to handle porour materials at mid-range vacuum levels. An optional non-return valve is available for use in sealed, non-porous systems.

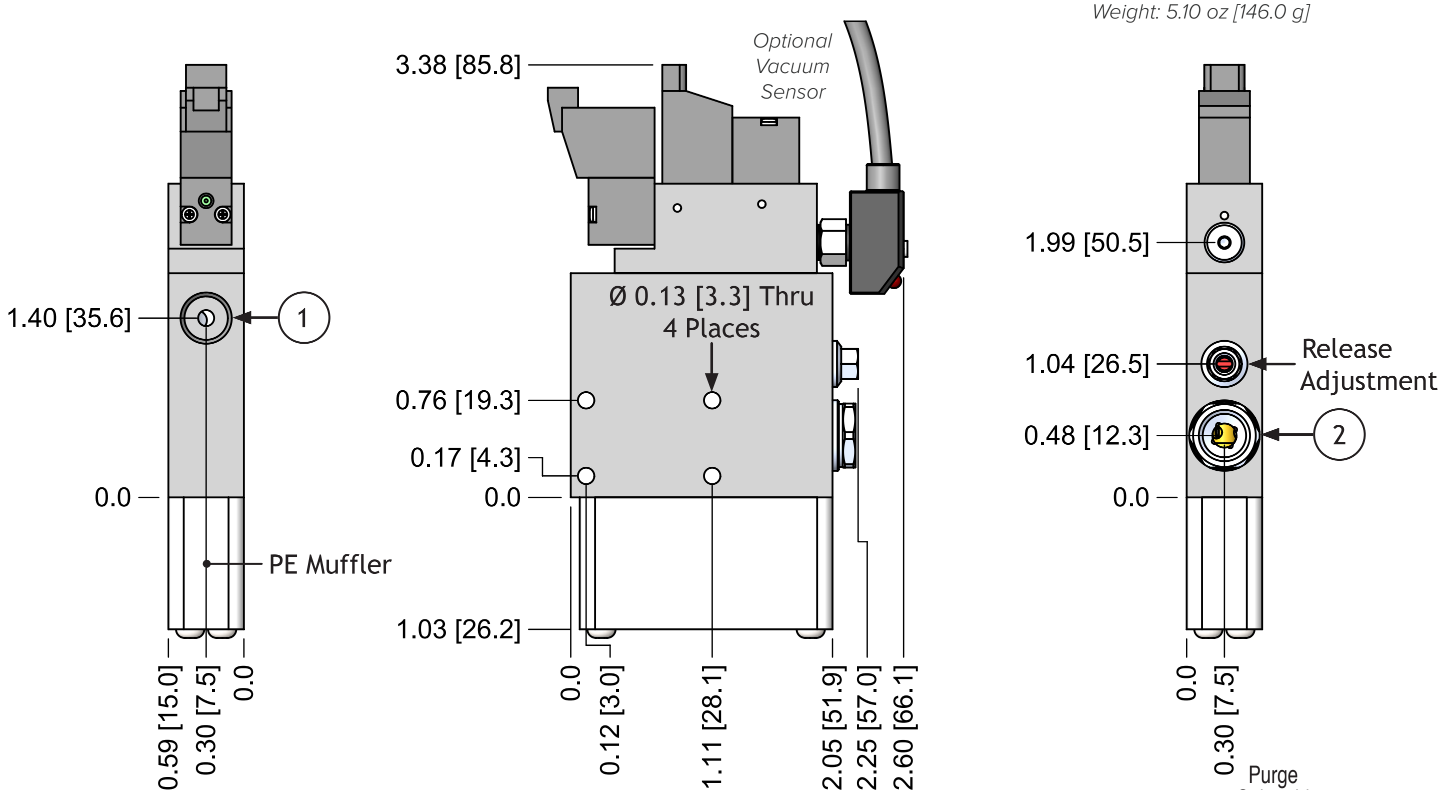
*Order SV10-QD-1M solenoid cables separately.*

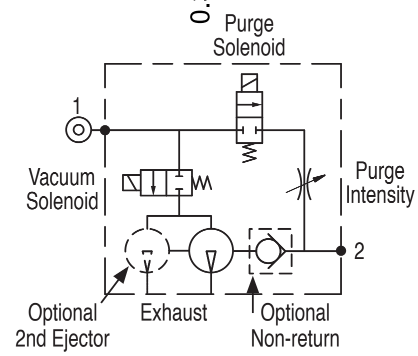
| | Series | Number of Ejectors | | Option | | Sensor Options | |
|---|---|---|---|---|---|---|---|
| DER18- | 10L | | -SB24D | | | | |
| | 05 | X1 | Single Ejector | (Blank) | None | (Blank) | None |
| | 07 | X2 | Dual Ejector | -NR | Non-Return | -VA3 | Analog, 3 Wire |
| | 09 | | | | | -VN3 | NPN, 3 Wire |
| | 10 | | | | | -VN4 | NPN, 4 Wire |
| | 08L | | | | | -VP3 | PNP, 3 Wire |
| | 10L | | | | | -VP4 | PNP, 4 Wire |





*Weight: 5.10 oz [146.0 g]*



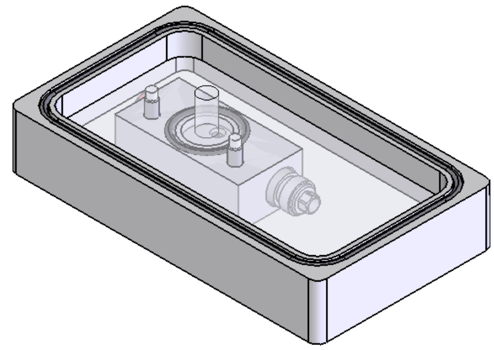




| Code | Function | Port |
|---|---|---|
| 1 | Air-Supply | G 1/8 NPSF |
| 2 | Vacuum | G 1/8 NPSF |

## Surface Mount Micro Pump

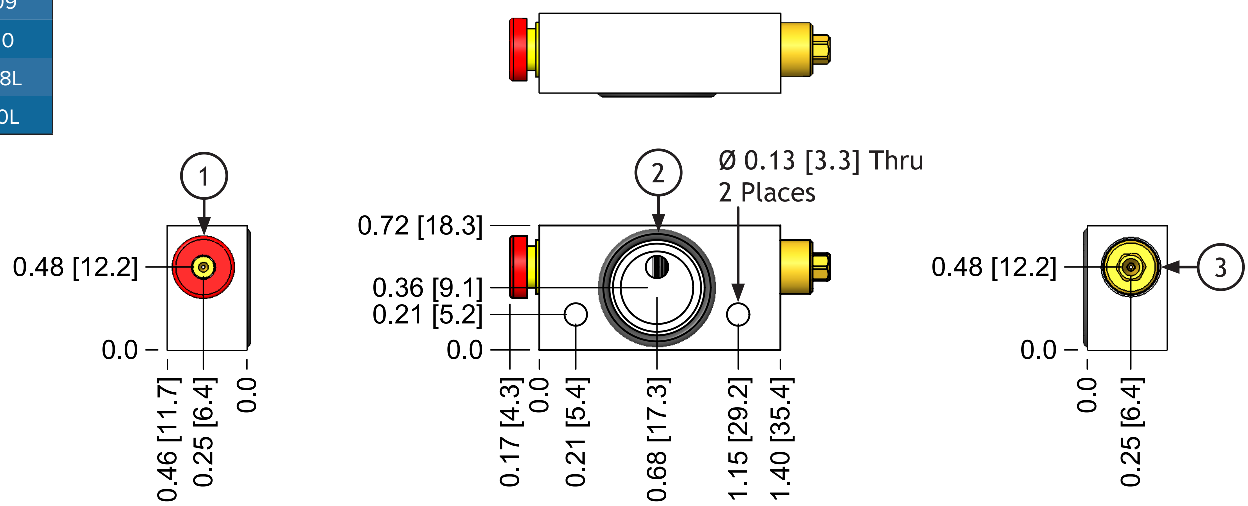
Simply add a vacuum passage and two tapped holes to any flat surface to integrate our micro-vacuum pump into a machine component. An integral push-in 4mm (5/32”) tube fitting air supply and an atmospheric exhaust will almost eliminate assembly labor.

Select from five ER venturi sizes to match vacuum pump specifications to your application requirements and minimize compressed air consumption.



*Weight: 0.90 oz. [25.0 g]*

| | Series | |
|---|---|---|
| ER | 10L | -SM |
| | 05 | |
| | 07 | |
| | 09 | |
| | 10 | |
| | 08L | |
| | 10L | |




| Code | Function | Port |
|---|---|---|
| 1 | Air-Supply | 4 mm (5/32) Tube |
| 2 | Vacuum | Ø 0.42 in [10.7 mm] |
| 3 | Exhaust | - |

## Performance

### Vacuum Flow - SCFM

For X2, X3, & X4 flow rates multiply the value in the table by 2, 3, or 4 respectively.

For example, an ER09X3 @ 15 inHg would flow: 0.32 x 3 = 0.96 SCFM

| Model | Air Supply PSI | Air Consu SCFM | Max Vacuum inHg | SCFM at Vacuum Level | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 3 inHg | 6 inHg | 9 inHg | 12 inHg | 15 inHg | 18 inHg | 21 inHg | 24 inHg |
| ER05 | 72 | 0.4 | 26.7 | 0.25 | 0.22 | 0.20 | 0.15 | 0.12 | 0.07 | 0.03 | 0.01 |
| ER07 | 72 | 0.8 | 26.7 | 0.34 | 0.33 | 0.31 | 0.25 | 0.21 | 0.14 | 0.05 | 0.02 |
| ER09 | 72 | 1.4 | 25.5 | 0.54 | 0.47 | 0.40 | 0.36 | 0.32 | 0.24 | 0.15 | 0.02 |
| ER10 | 72 | 1.8 | 28.0 | 0.70 | 0.57 | 0.46 | 0.35 | 0.33 | 0.27 | 0.21 | 0.12 |
| ER08L | 72 | 1.2 | 23.6 | 0.88 | 0.76 | 0.58 | 0.44 | 0.33 | 0.26 | 0.13 | - |
| ER10L | 72 | 1.9 | 23.6 | 1.34 | 1.22 | 1.03 | 0.89 | 0.70 | 0.51 | 0.29 | - |
| ER08L | 60 | 1.0 | 20.4 | 0.91 | 0.79 | 0.59 | 0.42 | 0.35 | 0.19 | - | - |
| ER10L | 60 | 1.65 | 21.6 | 1.31 | 1.17 | 1.01 | 0.79 | 0.60 | 0.28 | 0.04 | - |

*SCFM X 28.32 = nl / m*

### Evacuation Time - sec / 100 in$^3$

For X2, X3, & X4 evacuation time multiply the value in the table by 2, 3, or 4 respectively.

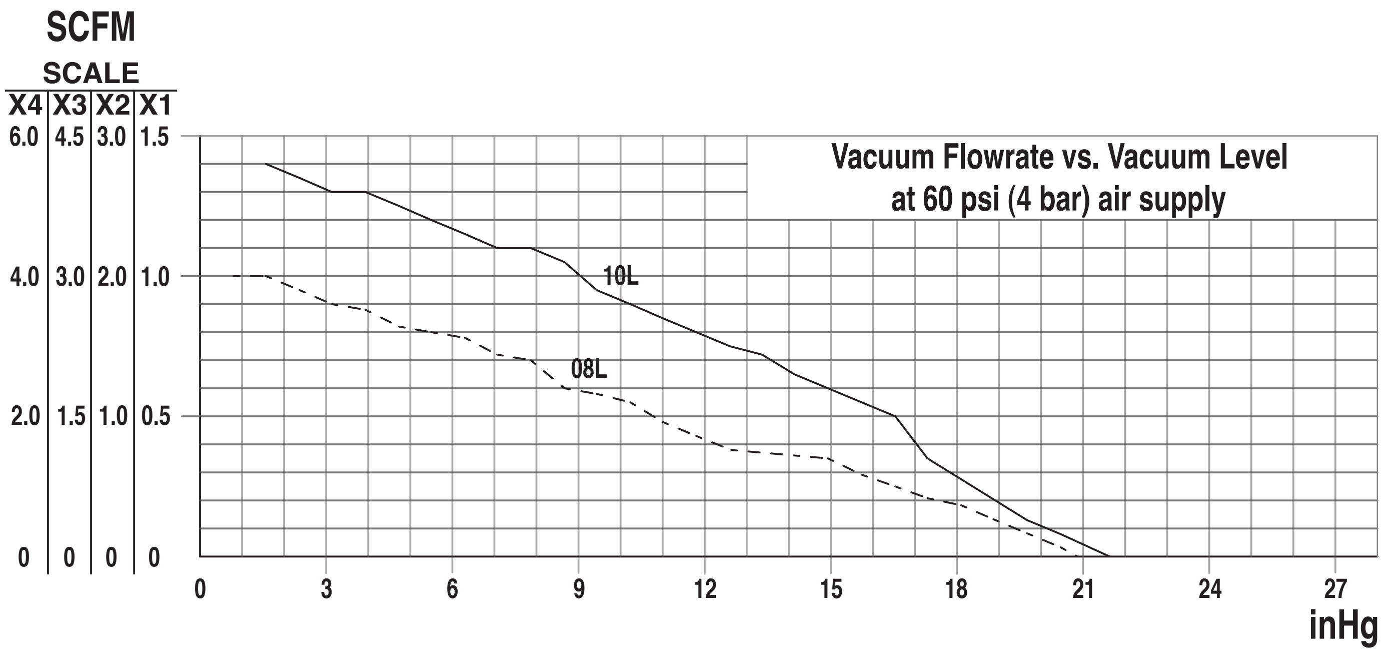
For example, an ER07X2 @ 15 inHg would evacuate 100 in$^3$: 8.1 x 2 = 16.2 seconds

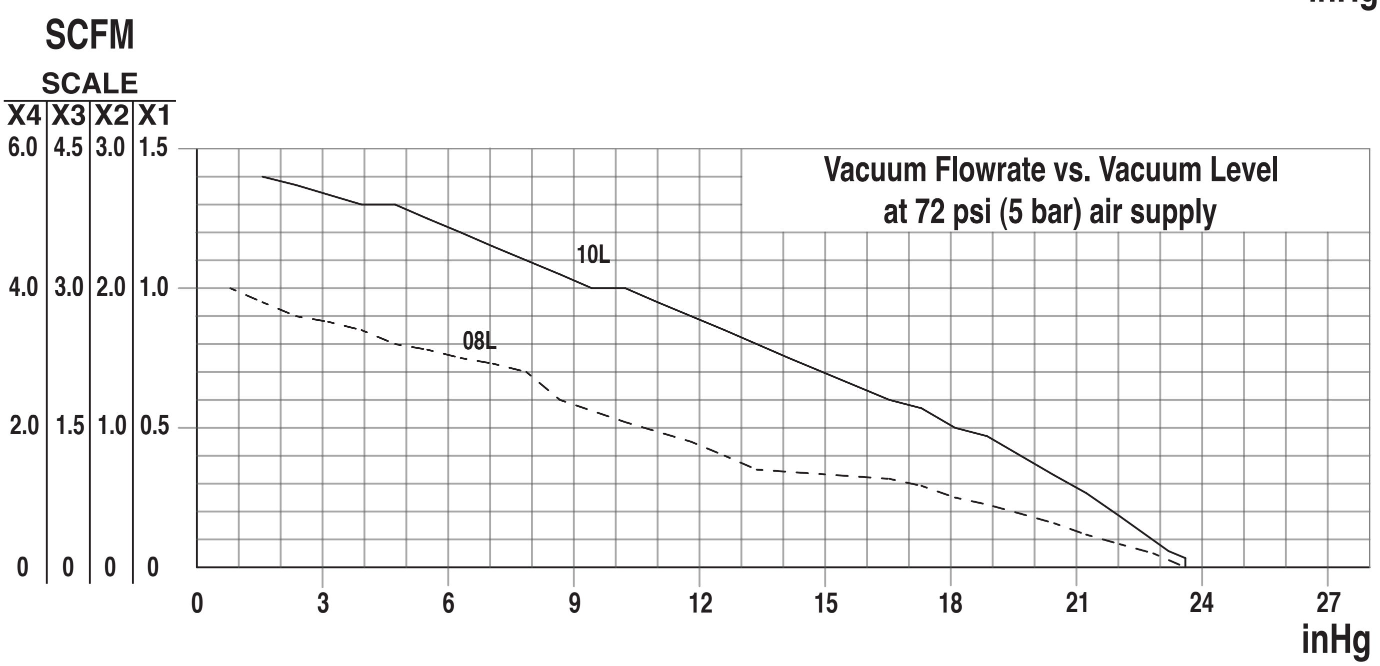
| Model | Air Supply PSI | Air Consu SCFM | Max Vacuum inHg | SCFM at Vacuum Level | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 3 inHg | 6 inHg | 9 inHg | 12 inHg | 15 inHg | 18 inHg | 21 inHg | 24 inHg |
| ER05 | 72 | 0.4 | 26.7 | 1.0 | 2.5 | 4.5 | 7.5 | 12.5 | 20.0 | 35.0 | - |
| ER07 | 72 | 0.8 | 26.7 | 0.8 | 1.8 | 3.1 | 5.1 | 8.1 | 13.1 | 22.8 | - |
| ER09 | 72 | 1.4 | 25.5 | 0.5 | 1.1 | 2.0 | 3.4 | 5.4 | 8.7 | 14.8 | - |
| ER10 | 72 | 1.8 | 28.0 | 0.4 | 2.9 | 1.7 | 2.8 | 4.6 | 7.5 | 12.7 | - |
| ER08L | 72 | 1.2 | 23.6 | 0.3 | 0.7 | 1.3 | 2.2 | 3.7 | 6.1 | 10.5 | - |
| ER10L | 72 | 1.9 | 23.6 | 0.2 | 0.5 | 0.8 | 1.4 | 2.2 | 3.6 | 6.1 | - |
| ER08L | 60 | 1.0 | 20.4 | 0.3 | 0.7 | 1.3 | 2.1 | 3.6 | 6.1 | 11.0 | - |
| ER10L | 60 | 1.65 | 21.6 | 0.2 | 0.5 | 0.8 | 1.4 | 2.3 | 3.8 | 6.8 | - |

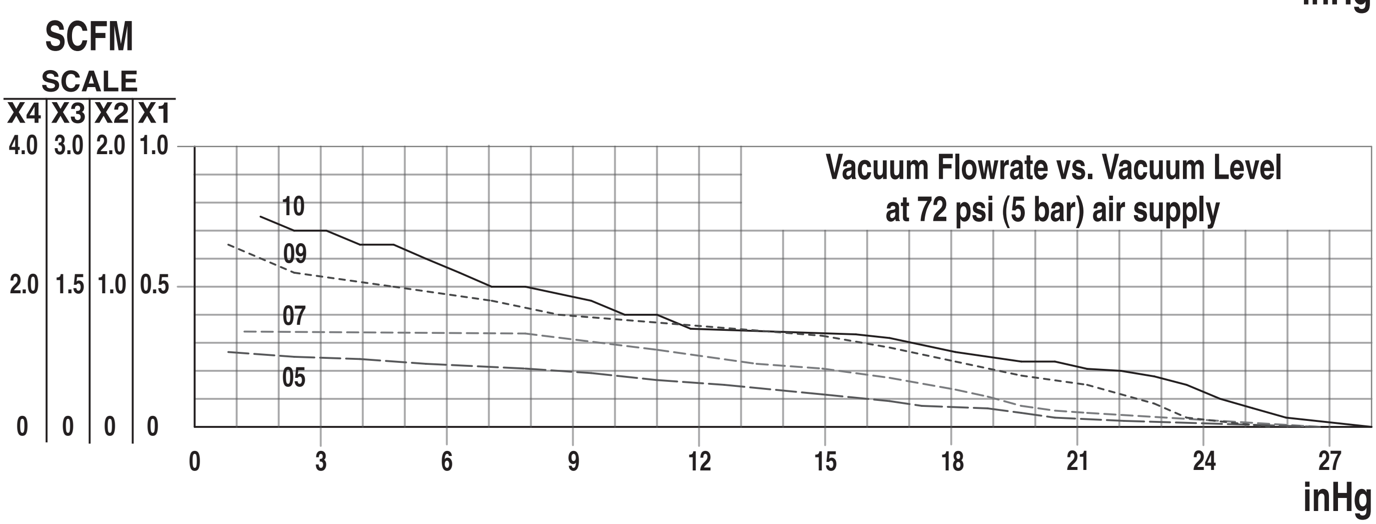
*sec / 100 in$^3$ X 0.61 = sec / l*

*All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.*

## Performance

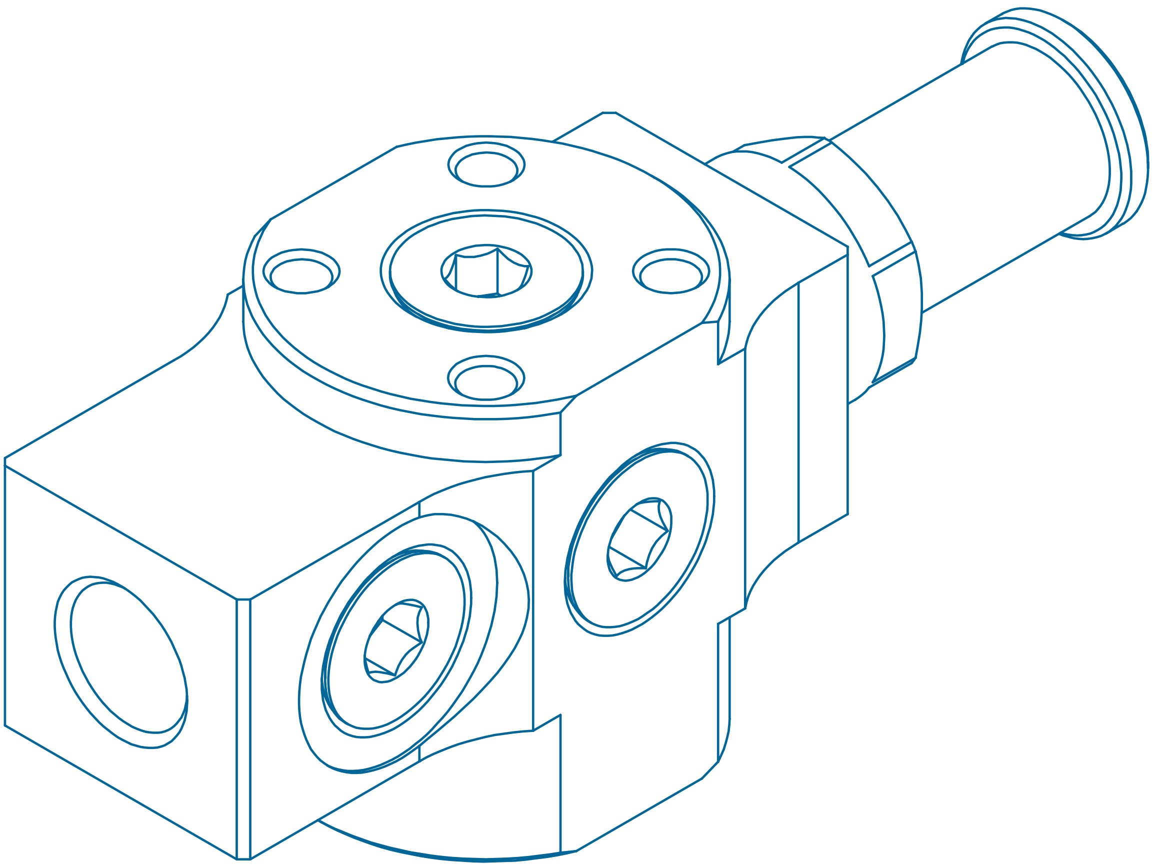


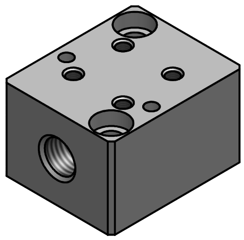



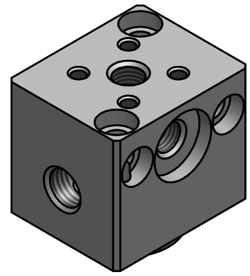

*All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.*

# Vacuum Grippers
## Section 11

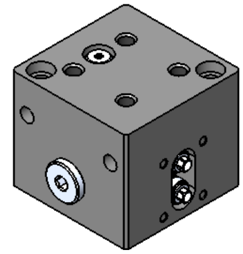




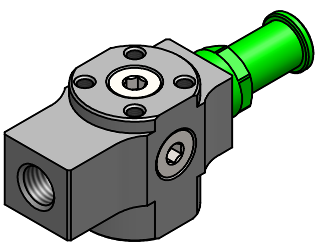
VG18



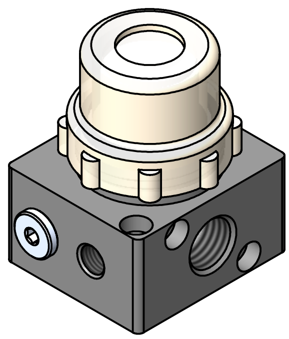
VG38



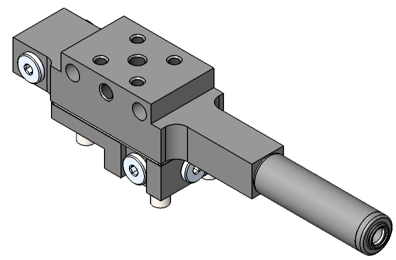
DVG38



VGP



VGIF



VG-G12

## Basic Information

### Coaxial Venturi Technology

The ER L-series nozzles have been specifically tuned and optimized to provide the high-flow mid-range vacuum that a typical industrial system requires. This vacuum pump can efficiently handle a wide variety of both porous and non-porous applications at only 72 psi (5 bar) air supply.

Additional benefits of EDCO ER L-series venturis are rugged metal nozzles, no internal flap valves to foul and a large nozzle throat gap that allows ingested debris to pass through and out the exhaust. When coupled with the PP or LP purge options, debris too large to pass can be expelled between cycles.

### Centralized System

A centralized system has one "central" vacuum pump supplying all vacuum cups in the system so all cups operate at the same system vacuum level. This vacuum level is affected by the flow capacity of the vacuum pump and the aggregate system leakage. System internal volume is increased by the necessary vacuum hoses, manifolds and tubing in a centralized system. The increased volume results in a longer evacuation time for the system to attain a safe vacuum level.

Centralized vacuum pumps are necessarily oversized to provide enough extra vacuum flow capacity to overcome normal porosity and cup wear. However, in instances where there is gross leakage caused by non-sealing vacuum cups due to missing or damaged work pieces, pump capacity can't overcome the leakage and system vacuum level can be reduced to the point where it is unsafe or impossible to pick up the work pieces. Interdependence of all suction cups in a system is not desirable so EDCO has developed components such as Flow Sensor Valves and Dual-Flow valves to make centralized systems perform better by limiting the flow loss from non-sealing suction cups.

Part quick-release, or blow-off, is accomplished by injecting a blast of compressed air through an isolation check valve and into the centralized vacuum system somewhere prior to the suction cups. This pulse of air quickly dissipates system vacuum. Since flow follows the path of least resistance, most of the air can flow out of the pump exhaust instead of to the suction cups.

### Operating Pressure

Operating a vacuum generator at a lower pressure will not result in reduced energy consumption. Energy usage of air-powered devices is measured by the volume flow rate of compressed air. Operating one machine device at 45 psi, for example, will not reduce the overall energy consumption of a manufacturing plant because of all the other machine devices that still require higher air pressures to function properly. The central compressed air system must be tuned to continuously provide at least the minimum air pressure required by any device in the plant.

To make direct comparisons possible, air consumption at different operating pressures must be converted to a "standard' or "naturalized" volume at standardized atmospheric conditions. For example, either 1.0 SCFM (28.3 Nl/m) at 87 psi (6 bar) or 1.36 SCFM (38.5 Nl/m) at 60 psi (4 bar) are equivalent to 6.9 SCFM (195 Nl/m) at standard atmospheric conditions and are thus equivalent compressor loads.

Compressed air systems are designed with receivers (storage tanks) that are charged with high pressure air to serve as accumulators that can supply air flow in addition to what the compressor can produce for short periods of time. During extreme peak demands, the stored high pressure air may be drawn down, or depleted, causing the delivered system pressure to dip below optimum pressure. For this reason industrial machines are commonly designed to operate at only 80 psi, but some plants with marginal air systems may require machines to operate at only 60 psi. Systems that are optimized to operate at reduced air pressure should include air regulators set to deliver the proper minimum design pressure otherwise air consumption (energy costs) will be increased substantially whenever the system air pressure is higher.

# Basic Information

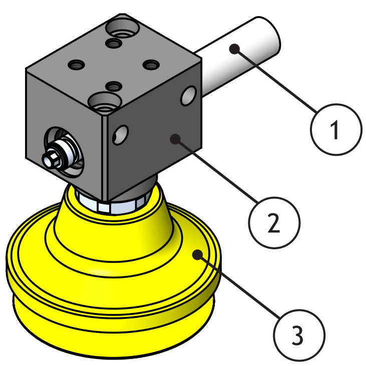
### Discrete Systems

A discrete system is made up of several mini-system units. Each unit consists of a small vacuum pump coupled to a single suction cup so that each unit operates independently of the others. Leakage at a non-sealing cup can only affect the vacuum level of that single cup so any leakage problems are automatically isolated. This gives the overall system the best possible chance to operate reliably even with a reduced number of active cups.

An EDCO Vacuum Gripper integrates a vacuum pump and suction cup into one compact unit to eliminate all excess system volume so that evacuation time is minimized.

A discrete system may be split into several zones that are each controlled by separate air supply valves to allow operation of one, several, or all zones as the application requirements change. All discrete units in a zone are simultaneously turned on or off via the compressed air supply - however, each mini-system unit still operates independently on the vacuum side.

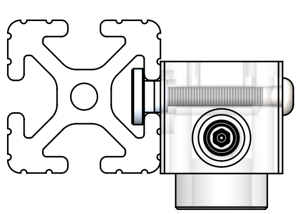
Part quick-release is accomplished by blocking the pump exhaust with an air piloted piston which causes the pump air supply to flow directly into the vacuum cup because there is no other possible flow path. This positive pressure reverse flow not only provides a very fast part release but also provides a cleaning action to purge any debris that was ingested into the suction cup.



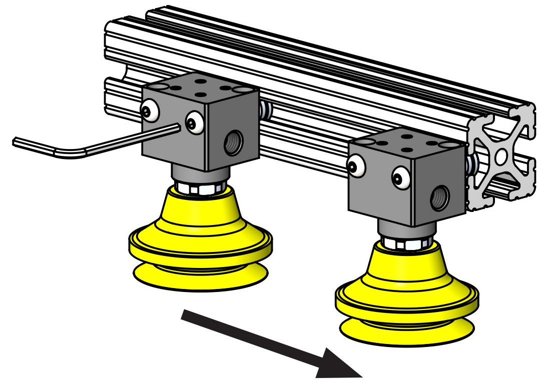

1) Compressed Air Line
2) Vacuum Generator
3) Vacuum Cup

### Optional Rugged Shear Key Mount

Two-point mount with shear keys eliminates the possibility of the pumps shifting out of position during operation. Work loads are efficiently and directly transferred to the mounting profile so that mounting screws carry only tensile loads.



Vacuum Grippers mount easily to extrusion profiles having 5/16" (8mm) T-slots so they can be easily repositioned to accommodate changing handling conditions. The two-point mount provides security and rigidity.



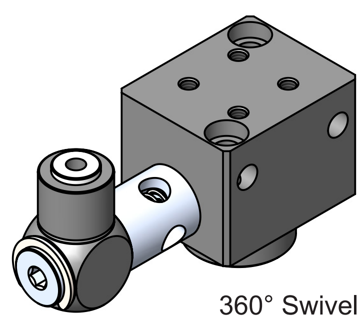
Loosen two screws, and slide the vacuum gripper to the desired location.

### Positive Pressure Purge (PP)

Air pressure supplied to the venturi is diverted to the vacuum port by blocking the venturi exhaust with a piston operated by a pilot pressure signal. Push-in tube connector swivel accepts 5/32 (4MM) tubing. Tool separation movement must begin immediately (no dwell) when purge signal is initiated to prevent excessive positive pressure inside suction cups due to forces pressing the tool onto the work surface. Do not use PP option with vacuum switches due to the limited over-pressure capability of switches.

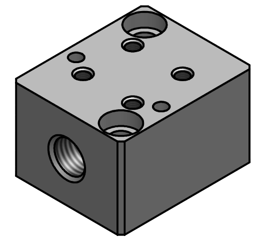
### Limited Pressure Purge (LP)

Similar to Positive Purge except includes an orifice in the purge piston. Purge air flow is not as robust as with the PP option, but air pressure is limited inside the suction cups.



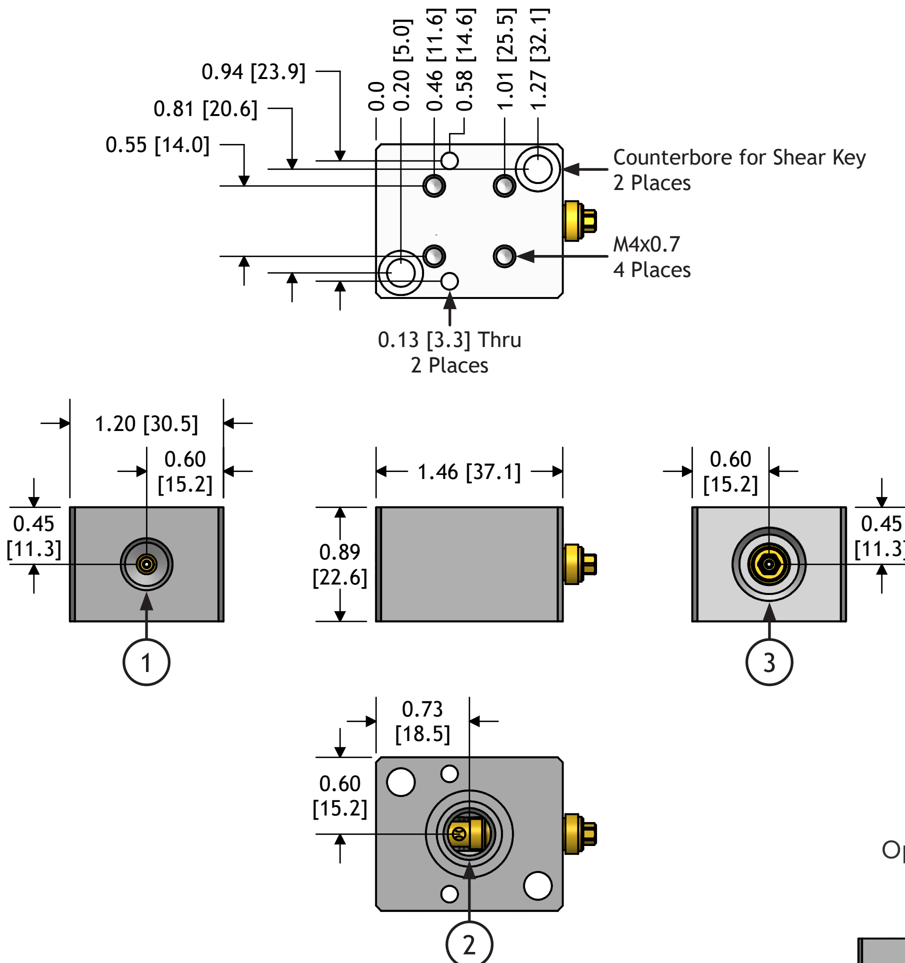
# VG18: G 1/8 NPSF

| | Venturi | Purge[1] | | Sensor Port | | Silencer | |
|---|---|---|---|---|---|---|---|
| VG18- | 10L | | | | | | |
| | 05 | (Blank) | None | (Blank) | None | (Blank) | None |
| | 07 | -LP | Limited Pressure | -A5F | M5 Sensor Port, A Side | -AA | AA14M |
| | 09 | -PP | Positive Pressure | -B5F | M5 Sensor Port, B Side | -ST | STA14M |
| | 10 | | | | | | |
| | 08L | | | | | | |
| | 10L | | | | | | |



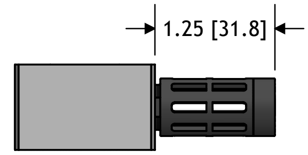
*Weight: 2.24 oz [63.6 g]*

*[1]Only available with 08L or 10L venturi series. Cannot be used with a silencer.*



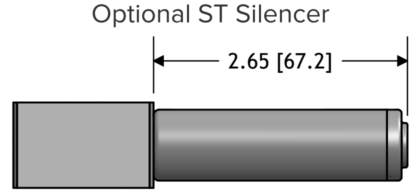

*Groove accepts -014 standard O-Ring*
*EDCO Part # N70-014 (o-ring not included)*

Optional AA Silencer



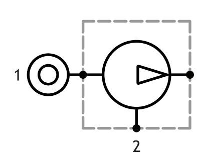

*Additional Weight: 0.14 oz [4.0 g]*

Optional ST Silencer




*Additional Weight: 0.25 oz [7.1 g]*

| Code | Function | Port |
|---|---|---|
| 1 | Air-Supply | G 1/8 NPSF |
| 2 | Vacuum | G 1//8 NPSF |
| 3 | Exhaust | G 1/4 |

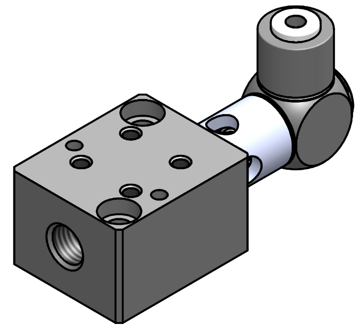


## VG18 Options

### -PP / -LP: Purge Options

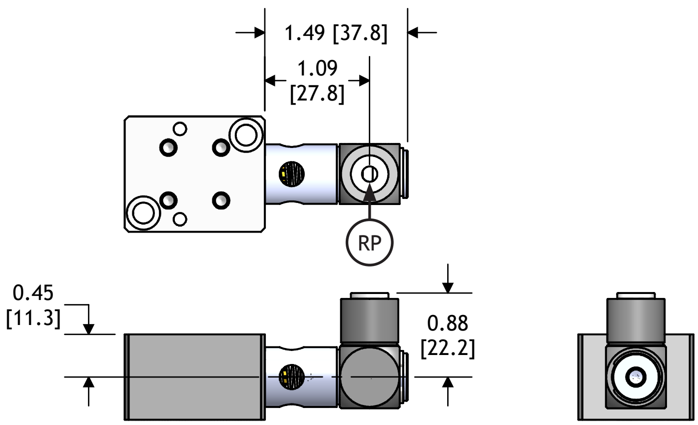
Air pressure supplied to the venturi is diverted to the vacuum port by blocking the venturi exhaust with a piston operated by a pilot pressure signal.   Push-in tube connector swivel accepts 5/32 [4 mm] tubing.  Tool separation movement must begin immediately (no dwell) when purge signal is initiated to prevent excessive positive pressure inside vacuum cups due to forces pressing the tool onto the work surface.  Do not use PP option with vacuum switches due to the limited over-pressure capability of switches.

Limited Purge is similar to Positive Purge except includes an orifice in the purge piston.  Purge air flow is not as robust as with the PP option, but air pressure is limited inside the suction cups.



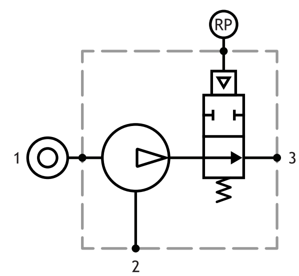
*Additional Weight: 0.83 oz [23.5 g]*

*The differences between LP and PP options are internal and do not affect outward appearance or overall size and weight.*

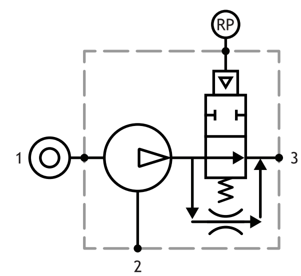



*Pilot can be rotated 360 degrees.*

-PP: Positive Pressure Purge



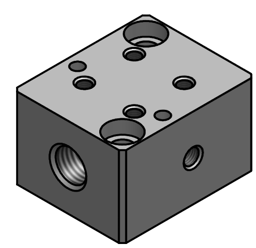

-LP: Limited Pressure Purge

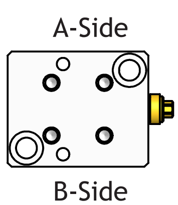



### -A5F / -B5F: M5 Vacuum Sensor Port Options

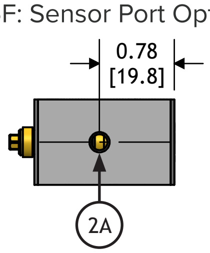
An additional M5x0.8 port is added for use as an auxiliary vacuum port. Choose the side best suited for your application.

Any of our vacuum sensors that use an M5 male connection thread can be used with the M5 sensor port options.

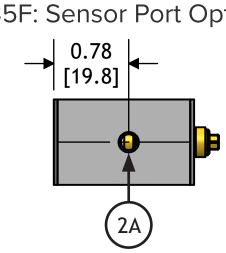


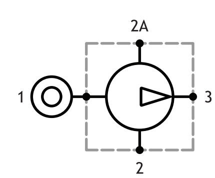



-A5F: Sensor Port Option




-B5F: Sensor Port Option

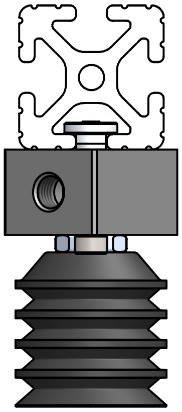


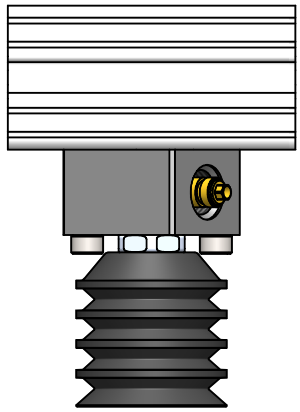



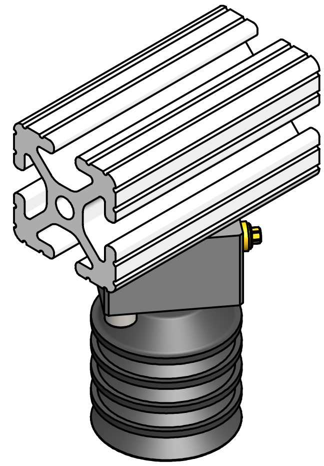
## VG18 Accessories

**VG18-TKIT: T-Nut Mount Kit**

EDCO Vacuum Gripper T-Nut kits include two t-nuts and the appropriate M5 screws for your pump model.





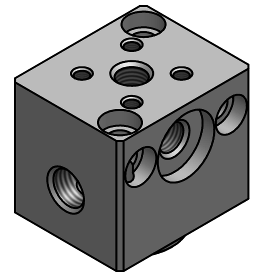


*Additional Weight: 0.61 oz [17.4 g]*

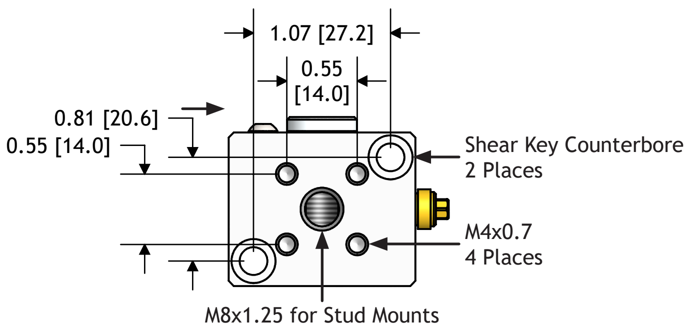
## VG38: G 3/8

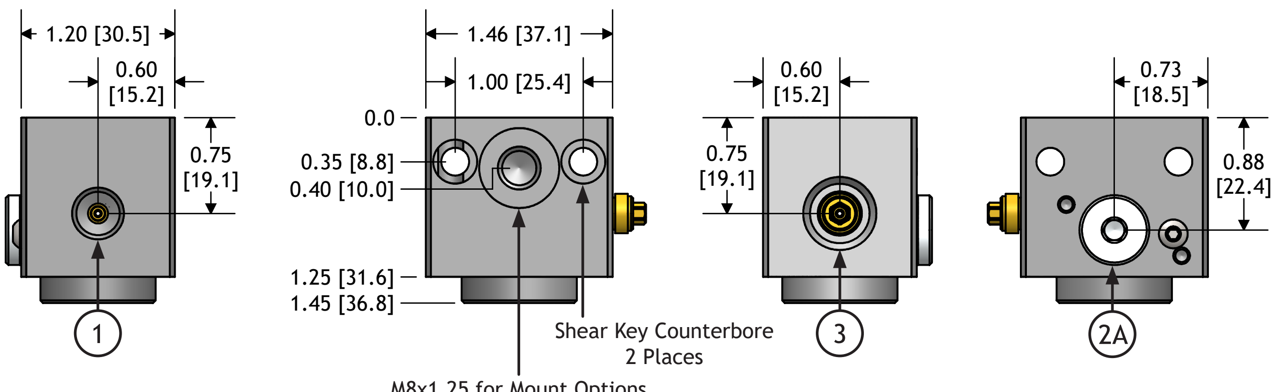
| | Venturi | Release Options | | Mount Options | | Silencer[1] | |
|---|---|---|---|---|---|---|---|
| VG38- | 10L | | | | | | |
| | 05 | (Blank) | None | (Blank) | None | (Blank) | None |
| | 07 | -AQR | Atmospheric Quick Release | -A | Pin | -AA | AA14M |
| | 09 | -LP[1] | Limited Purge | -B | Ball | -ST | STA14M |
| | 10 | -PP[1] | Positive Purge | | | | |
| | 08L | | | | | | |
| | 10L | | | | | | |

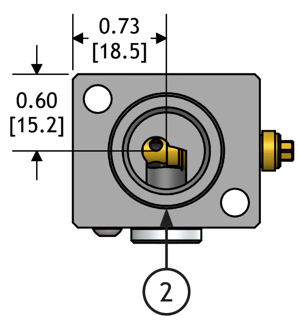
[1]Only available with 08L or 10L venturi series. Cannot be used with a silencer.



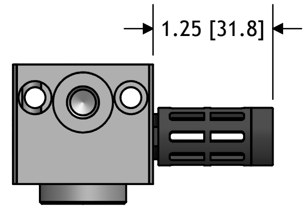
*Weight: 2.95 oz [83.5 g]*



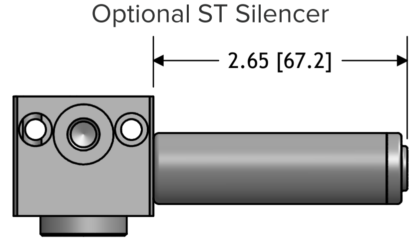




Optional AA Silencer



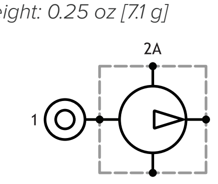

*Additional Weight: 0.14 oz [4.0 g]*

Optional ST Silencer




*Additional Weight: 0.25 oz [7.1 g]*

| Code | Function | Port |
|---|---|---|
| 1 | Air-Supply | G 1/8 NPSF |
| 2 | Vacuum | G 3/8 |
| 2A | Vacuum - Auxiliary | G 1/8 NPSF |
| 3 | Exhaust | G 1/4 |

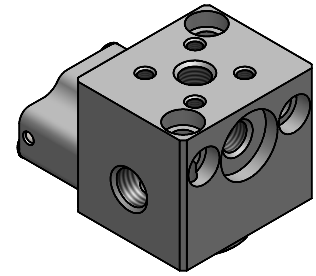


# VG38 Options

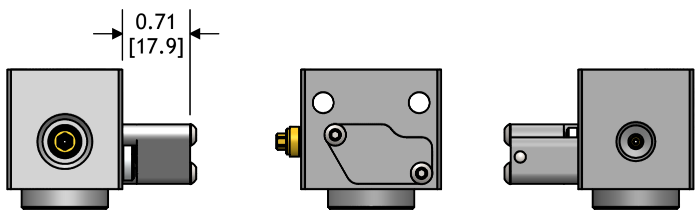
### -AQR: Atmospheric Quick Release

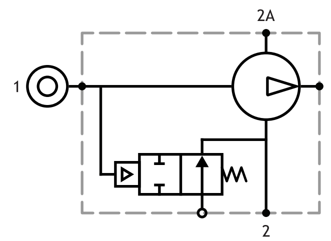
Vacuum generators, or vacuum pumps, are powered by compressed air to create vacuum. When the air source is turned off, vacuum is dissipated by atmospheric air entering the exhaust port and reverse flowing through the last venturi nozzle. This works well for slow cycle speeds and small cups but when relatively large cups are used with small vacuum generators then reverse air flow may not be sufficient to dissipate residual vacuum fast enough.

The AQR valve is spring-biased open but is held closed by air pressure supplied to the vacuum generator. When the air supply is turned off, vacuum is no longer generated and the AQR valve opens a large passage to atmosphere so that vacuum is quickly dissipated to release the work object.



*Additional Weight: 0.55 oz [15.5 g]*

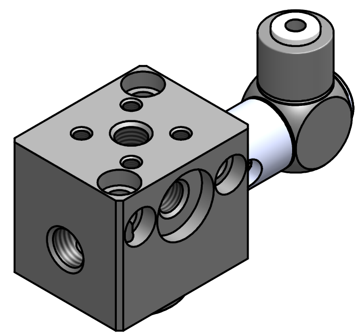



### -PP / -LP: Purge Options

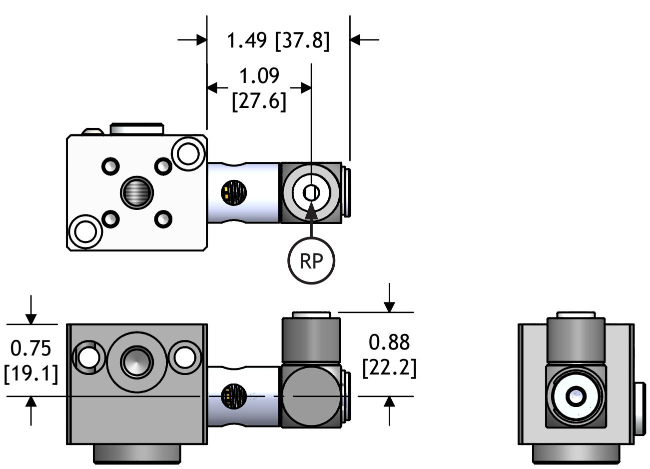
Air pressure supplied to the venturi is diverted to the vacuum port by blocking the venturi exhaust with a piston operated by a pilot pressure signal. Push-in tube connector swivel accepts 5/32 [4 mm] tubing. Tool separation movement must begin immediately (no dwell) when purge signal is initiated to prevent excessive positive pressure inside vacuum cups due to forces pressing the tool onto the work surface. Do not use -PP option with vacuum switches due to the limited over-pressure capability of switches.

Limited Purge is similar to Positive Purge except includes an orifice in the purge piston. Purge air flow is not as robust as with the -PP option, but air pressure is limited inside the suction cups.



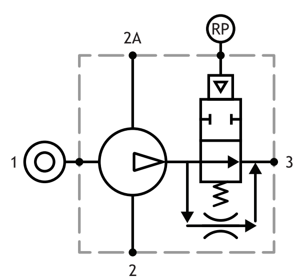
*Additional Weight: 0.83 oz [23.5 g]*

*The differences between LP and PP options are internal and do not affect outward appearance or overall size and weight.*

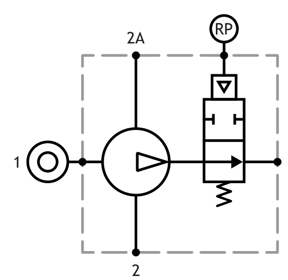



*Pilot can be rotated 360 degrees.*

-PP: Positive Pressure Purge




-LP: Limited Pressure Purge

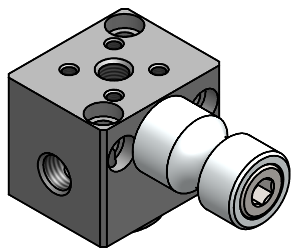


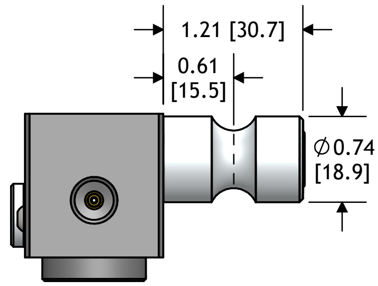
# VG38 Options

**Swivel Mount Options**

There are two types of swivel mount options available for the VG38 vacuum gripper. Both types of mounts connect with EDCO USA Modular Automation Tooling Arms.

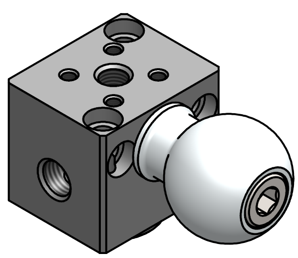
**-A : Pin Mount**
Allows rotational adjustment of a vacuum cup about a single axis. These are also known as lock-pin or apple-core mounts.

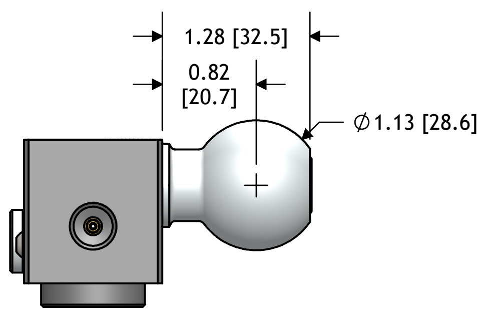





*Additional Weight: 1.37 oz [38.9 g]*

**-B : Ball Mount**
Allows universal adjustment of a vacuum cup about a single suspension point. These are also known as a swivel joint.





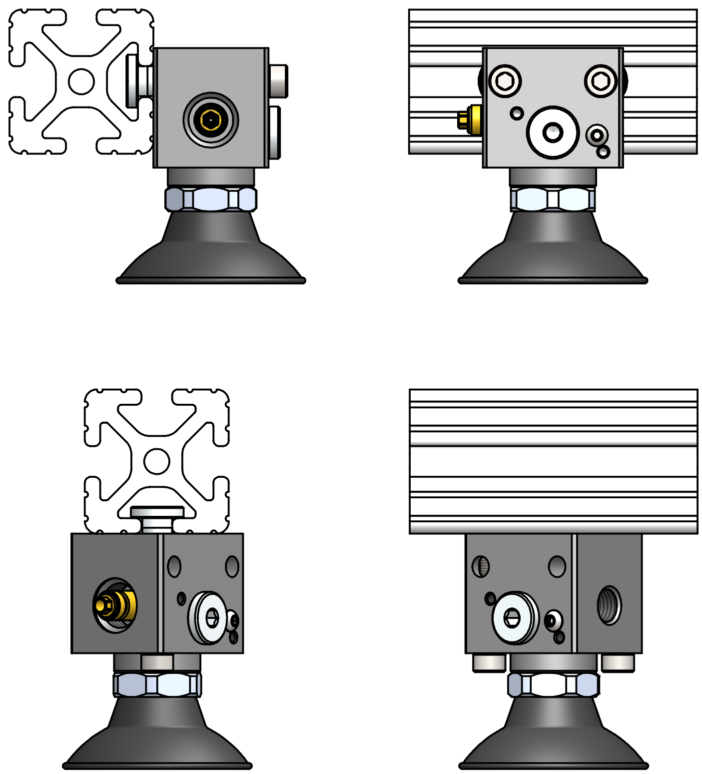

*Additional Weight: 1.96 oz [55.6 g]*

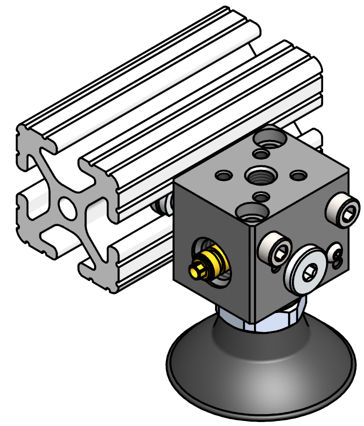
## VG38 Accessories

**VG38-TKIT: T-Nut Mount Kit**

EDCO Vacuum Gripper T-Nut kits include two t-nuts and the appropriate M5 screws for your pump model.

Use either top or side mount positions.



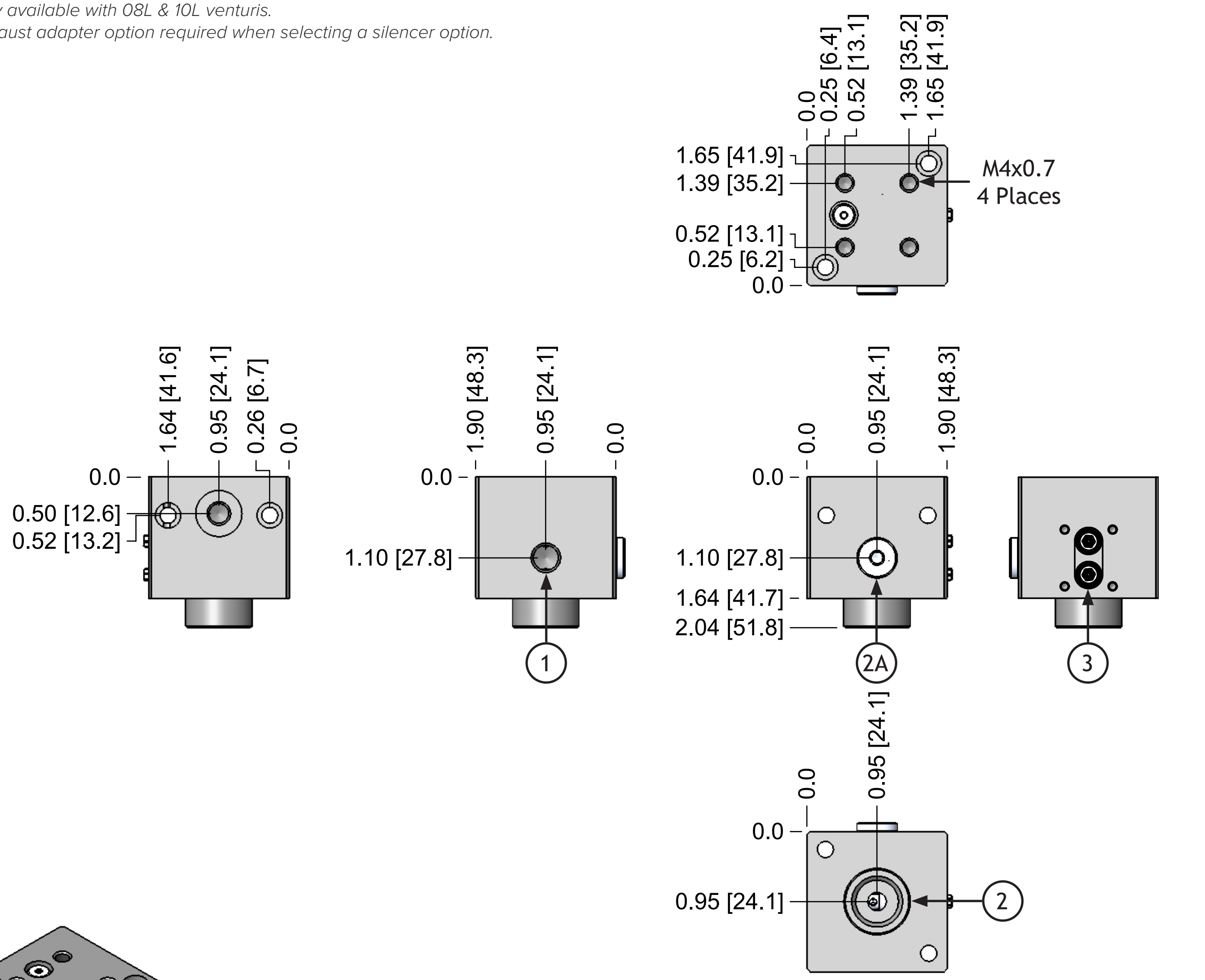


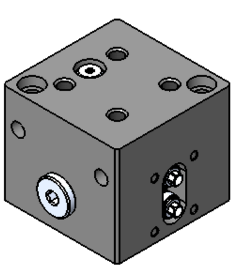
*Additional Weight: 0.67 oz [19.0 g]*

# DVG38: Dual Venturi, G 3/8

| | Venturi | | Options | | Mount Options | | Silencer Options | |
|---|---|---|---|---|---|---|---|---|
| DVG38- | 10L | X2 | -PP | | -A | | | |
| | 05 | | (Blank) | None | (Blank) | None | (Blank) | None |
| | 07 | | -EA | Exhaust Adapter | -A | Apple Core Pin | -AA[2] | AA38M |
| | 09 | | -PP[1] | Positive Pressure Purge | -B | Ball Swivel | -ST[2] | STB38M |
| | 10 | | -LP[1] | Limited Pressure Purge | | | | |
| | 08L | | | | | | | |
| | 10L | | | | | | | |

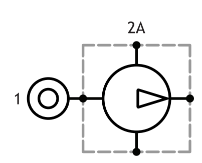
*[1]Only available with 08L & 10L venturis.*
*[2]Exhaust adapter option required when selecting a silencer option.*



*Weight: 0.20 lbs [90.7 g]*

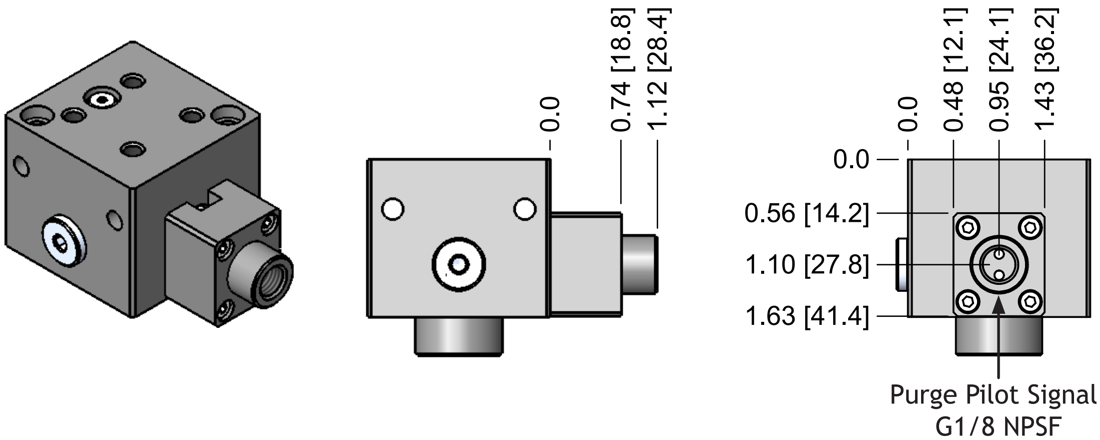
| Code | Function | Ports |
|---|---|---|
| 1 | Air Supply | G 1/8 NPSF |
| 2 | Vacuum - Main | G 3/8 |
| 2A | Vacuum - Alternate | G 1/8 NPSF |
| 3 | Exhaust | - |



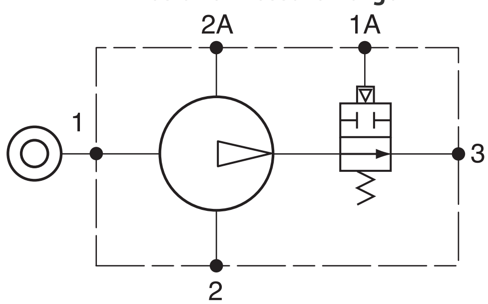
# DVG38 Options

## Purge Options

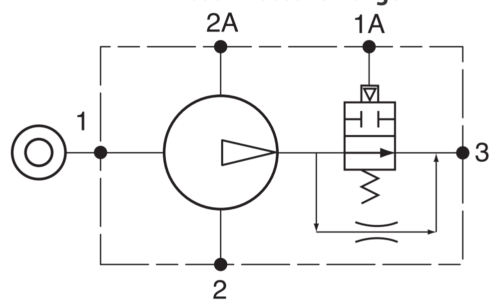
*Differences between positive pressure and limited pressure purge options are internal.*



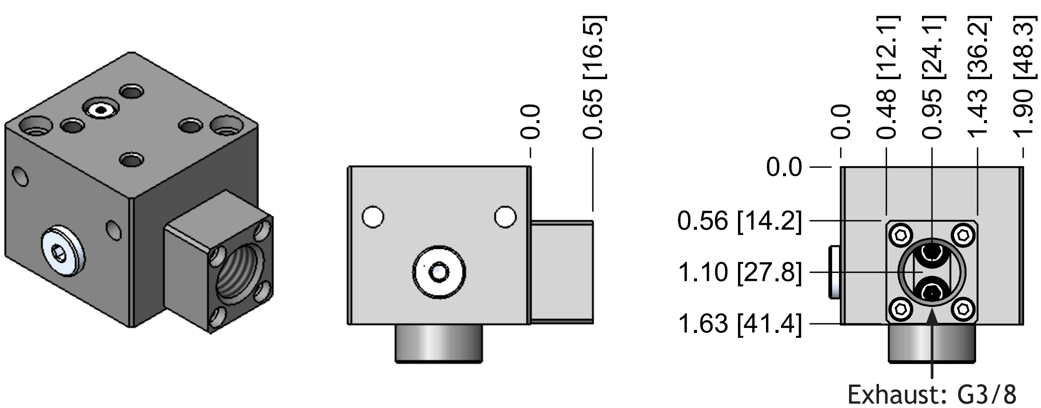

**PP: Positive Pressure Purge**




**LP: Limited Pressure Purge**




## EA: Exhaust Adapter

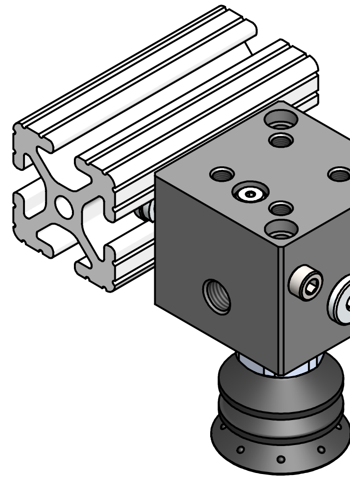


## DVG38 Accessories

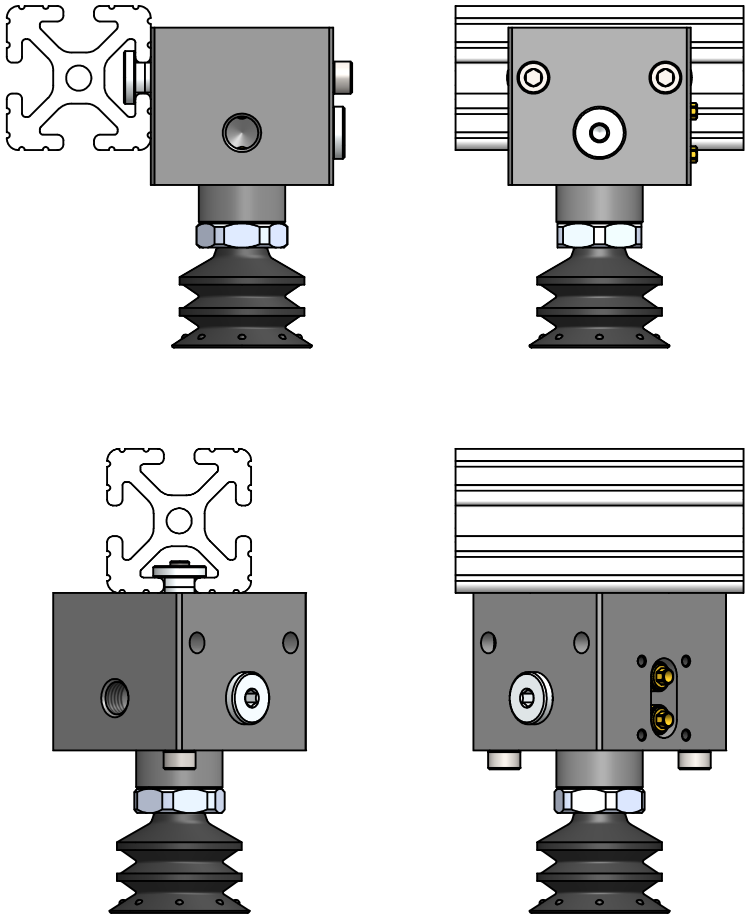
**DVG38-TKIT: T-Nut Mount Kit**

EDCO Vacuum Gripper T-Nut kits include two t-nuts and the appropriate M5 screws for your pump model.

Use either top or side mount positions.



*Additional Weight: 0.89 oz [23.3 g]*

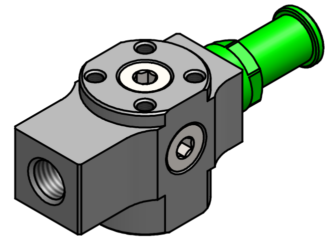


# VGP38: Low-Profile Vacuum Gripper, G 3/8

EDCO VGP pumps are a direct interchange with competitor brands but provide improved vacuum flow (10L) and better reliability because there are no flapper valves or filter screens to collect ingested debris.

Exhaust extension may be removed to add LP or PP purge options for faster part release or for a true reverse-flow cleaning mode to blow out ingested debris.

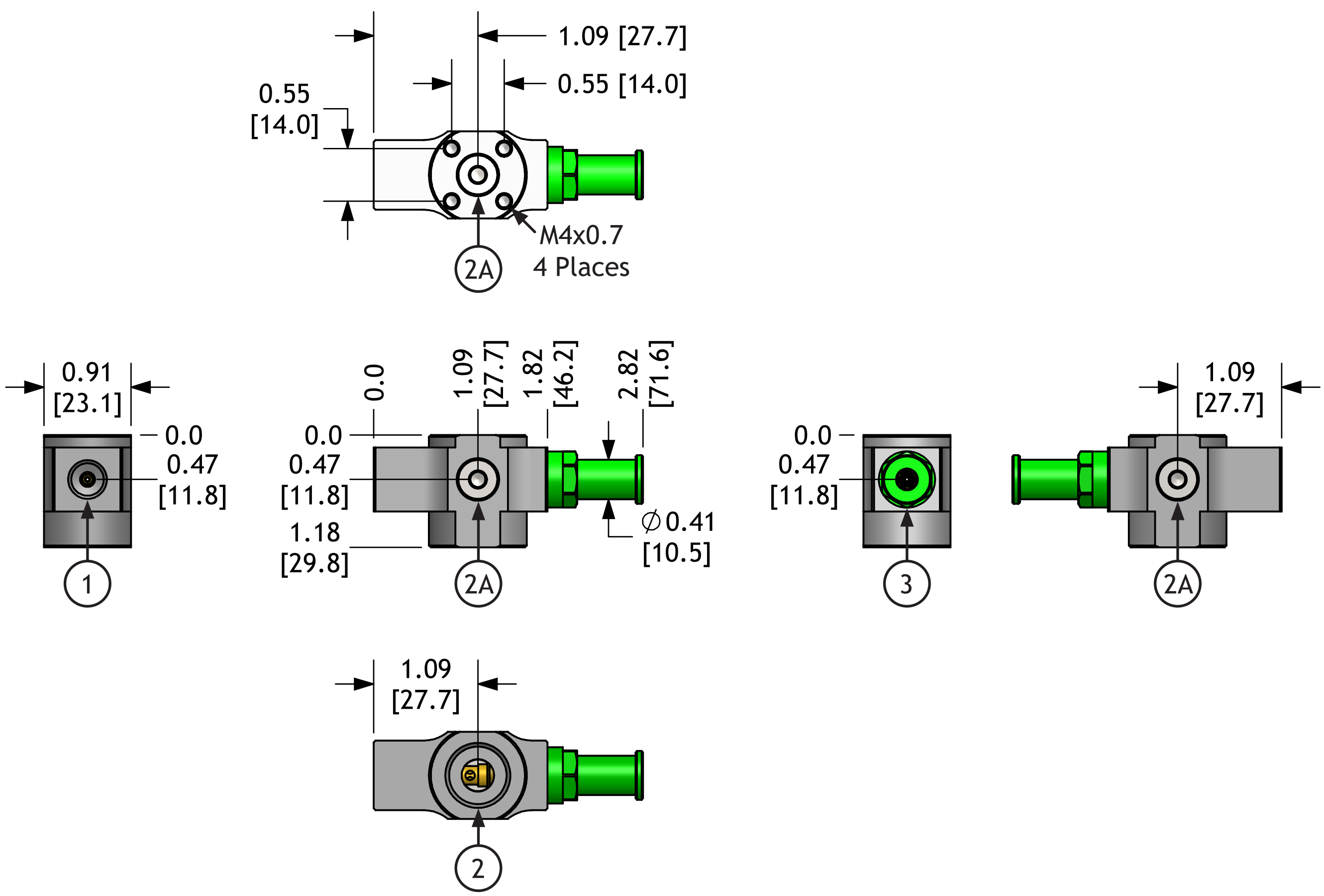
M6 or M8 stud mounting hardware may be installed in any of the three locations.



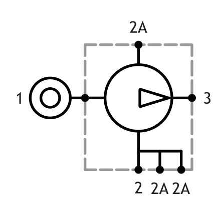
*Weight: 2.20 oz [62.4 g]*

| | Venturi | Purge Options | | Mount Options[2] | | Mount Position[2] | | Mount Type | |
|---|---|---|---|---|---|---|---|---|---|
| VGP38- | 10L | -PP | | -M6X22 | | -T | | E | |
| | 08L | (Blank) | None | (Blank) | None | (Blank) | None | (Blank) | Standard |
| | 10L | -LP | Limited Pressure[1] | -M6X22 | M6X22 Stud | -T | Top | E | Extrusion |
| | 10 | -PP | Positive Pressure[1] | -M8X16 | M8X16 Stud | -L | Left | | |
| | 09 | | | -M8X27 | M8X27 Stud | -R | Right | | |
| | 07 | | | | | | | | |
| | 05 | | | | | | | | |

[1]Only available on 08L & 10L Venturi
[2]When selecting a mount option, mount position selection is required.

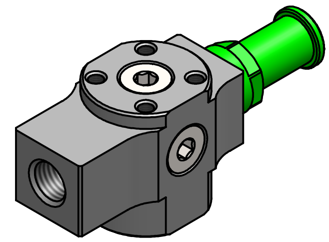



| Code | Function | Port |
|---|---|---|
| 1 | Air-Supply | G 1/8 NPSF |
| 2 | Vacuum | G 3/8 |
| 2A | Vacuum, Alternate | G 1/8 NPSF |
| 3 | Exhaust | - |



# VGP38 Options

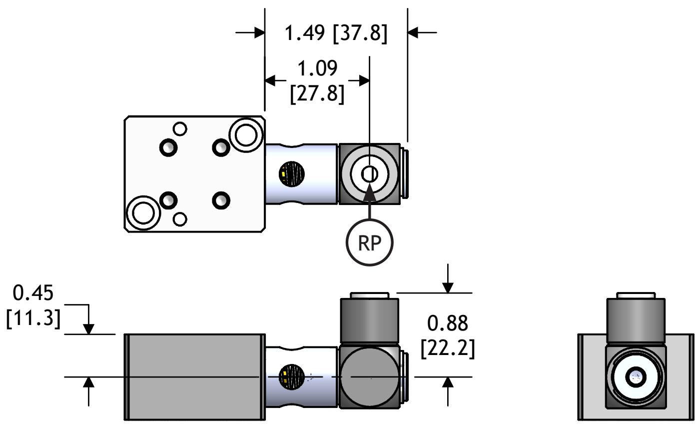
### -PP / -LP: Purge Options



Air pressure supplied to the venturi is diverted to the vacuum port by blocking the venturi exhaust with a piston operated by a pilot pressure signal.   Push-in tube connector swivel accepts 5/32 [4 mm] tubing.  Tool separation movement must begin immediately (no dwell) when purge signal is initiated to prevent excessive positive pressure inside vacuum cups due to forces pressing the tool onto the work surface.  Do not use PP option with vacuum switches due to the limited over-pressure capability of switches.

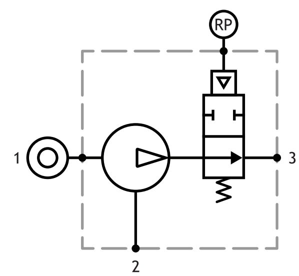
Limited Purge is similar to Positive Purge except includes an orifice in the purge piston.  Purge air flow is not as robust as with the PP option, but air pressure is limited inside the suction cups.

*The differences between LP and PP options are internal and do not affect outward appearance or overall size and weight.*

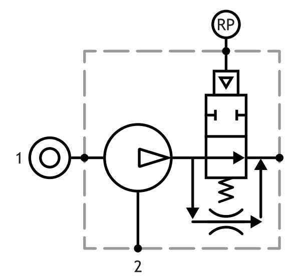



*Pilot can be rotated 360 degrees.*

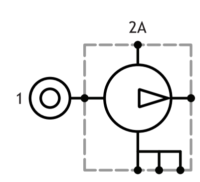
-PP: Positive Pressure Purge




-LP: Limited Pressure Purge




| Code | Function | Port |
|---|---|---|
| 1 | Air-Supply | G 1/8 NPSF |
| 2 | Vacuum | G 3/8 |
| 2A | Vacuum, Alternate | G 1/8 NPSF |
| 3 | Exhaust | - |

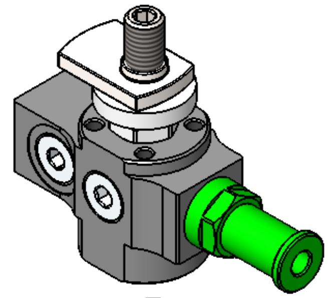


## VGP Options

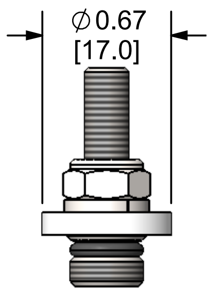
**Stud Mounts**

We offer M6 threads by 22 MM length, and M8 threads by 16 and 27 MM lengths. The extrusion mounts come with a T-Nut for mounting to an extrusion.

The mounting kits are made to fit into any of the three alternate vacuum ports designated by the Top, A-Side, and B-Side positions.

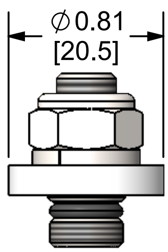


**M6x22**



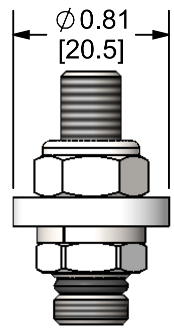

*Weight: 0.03 lbs [11.6 g]*

**M8x16**

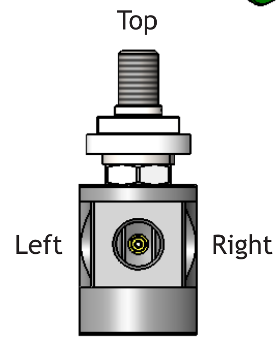



*Weight: 0.04 lbs [17.4 g]*

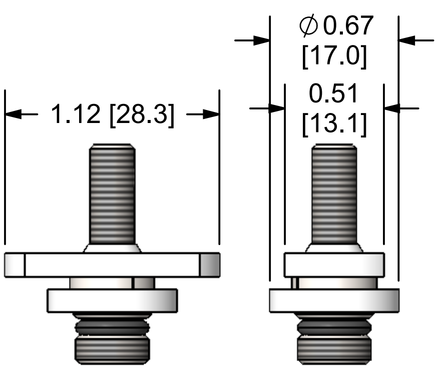
**M8x27**




*Weight: 0.05 lbs [22.1 g]*

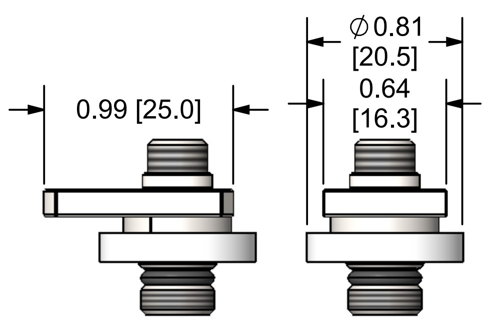



**M6x22E**



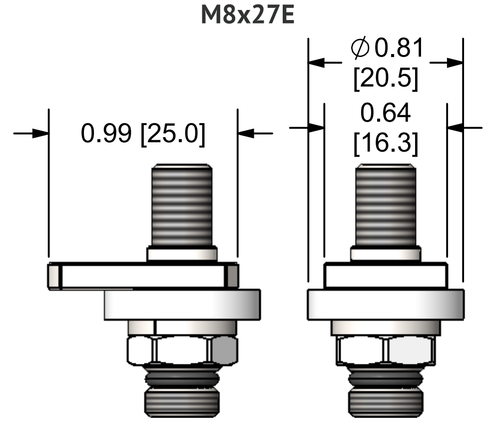

*Weight: 0.02 lbs [10.3 g]*

**M8x16E**




*Weight: 0.05 lbs [22.1 g]*

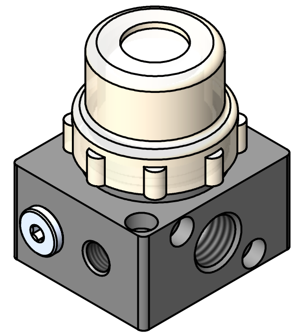
**M8x27E**




*Weight: 0.06 lbs [26.6 g]*

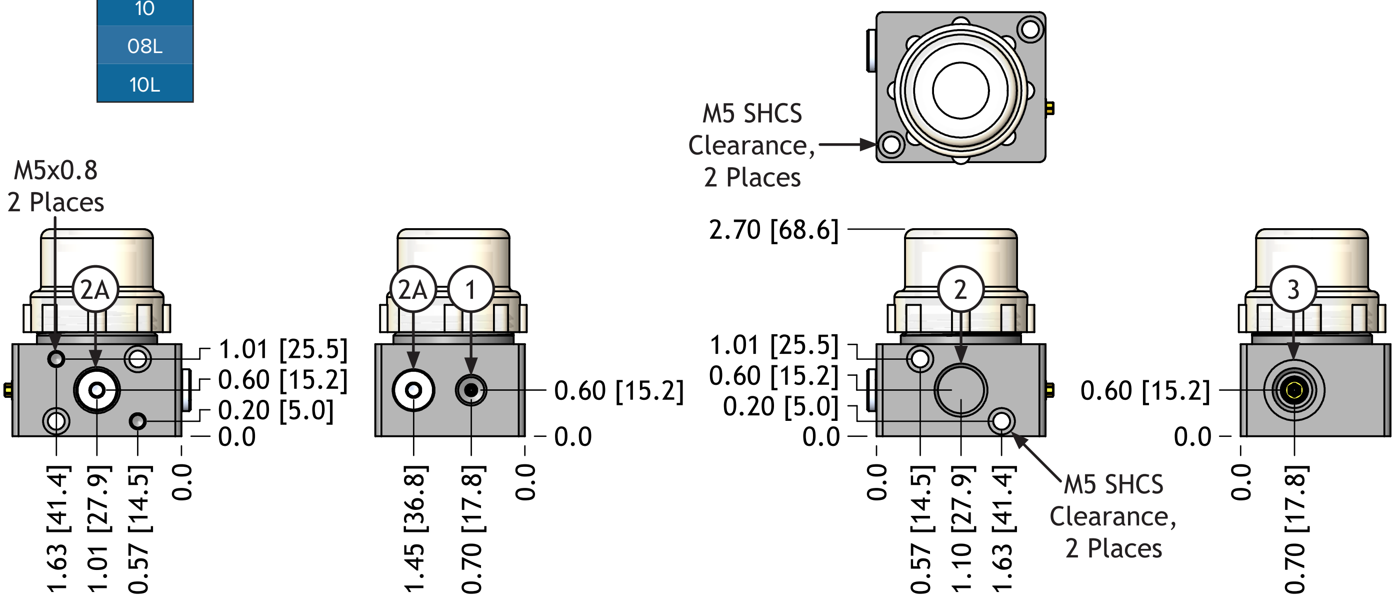
## VGIF: Integrated Filter, G 3/8

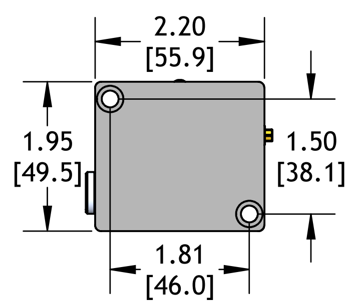
The integrated filter vacuum grippers work in the same way as the VG38. The body of the VGIF vacuum gripper includes a variety of holes for mounting. Two M5 x 0.8 holes are located on the face opposite the vacuum port while clearance holes for M5 socket head cap screws can be used from a total of 4 faces. This pump incorporates the bowl, gasket, and filter element of our t-style filters directly into the pump base eliminating the necessity of incorporating an external filter into the vacuum system.



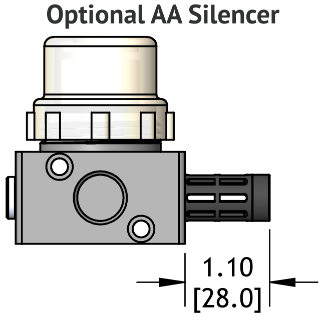
*Weight: 8.50 oz [240.9 g]*

| | Venturi | Silencer Option | |
|---|---|---|---|
| VGIF-38F- | 10L | | |
| | 05 | (Blank) | None |
| | 07 | -AA | AA14M |
| | 09 | -ST | STA14M |
| | 10 | | |
| | 08L | | |
| | 10L | | |



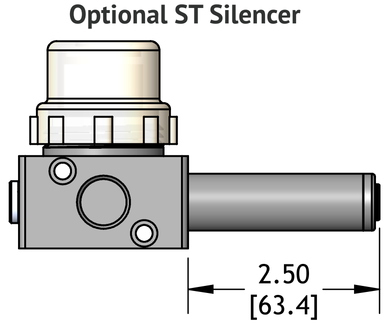




**Optional AA Silencer**



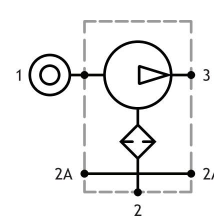

*Additional Weight: 0.14 oz [4.0 g]*

**Optional ST Silencer**




*Additional Weight: 0.25 oz [7.1 g]*

| Code | Function | Port |
|---|---|---|
| 1 | Air-Supply | G 1/8 NPSF |
| 2 | Vacuum | G 3/8 |
| 2A | Vacuum, Alternate | G 1/8 NPSF |
| 3 | Exhaust | G 1/4 |

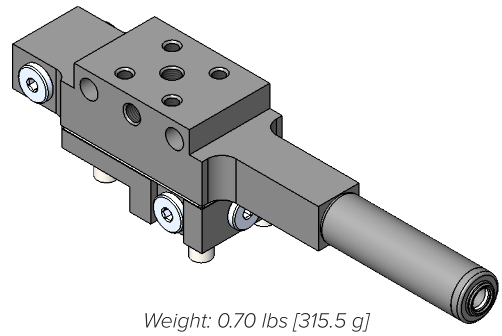


# VG-G12: Multi-Stage, G 1/2 NPSF

VG12 has the vacuum flow capacity required for larger diameter cups, especially when they are used on porous surfaces. Multi-stage nozzles have the same flow capacity as EDCO Classic pumps and provide quick evacuation times for bellows cups with large internal volumes.

Multiple 1/8" vacuum accessory ports allow adding vacuum sensors or an air-assisted quick release circuit.

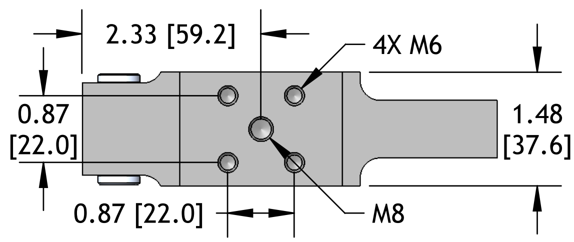
*For performance data, see Classic Pump performance.*

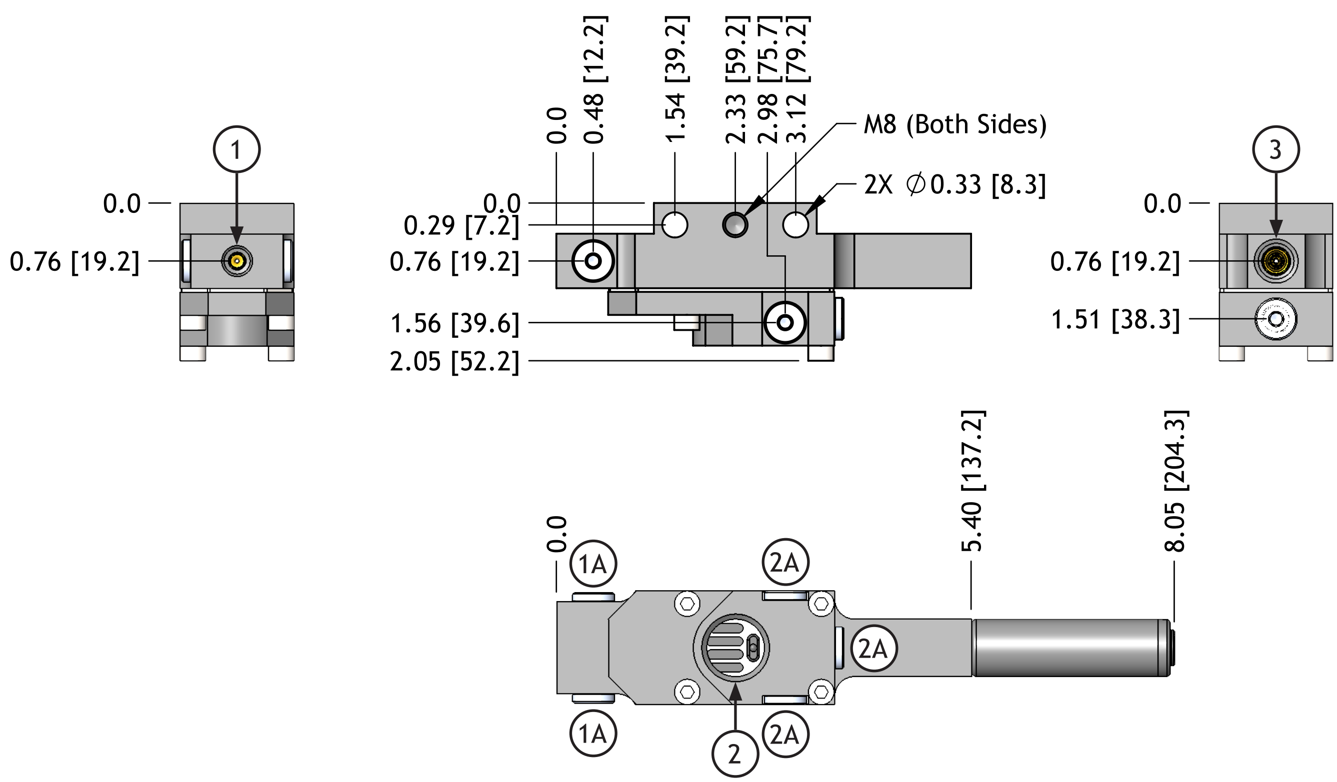


*Weight: 0.70 lbs [315.5 g]*

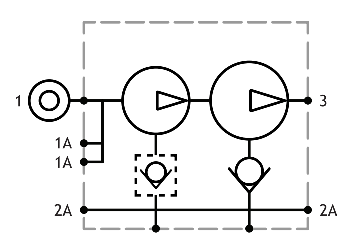
| | Nozzle Series | Options | |
|---|---|---|---|
| VG-G12 | A25 | | |
| | A25 | (Blank) | None |
| | E25 | -NR | Non-Return |
| | M25 | | |
| | ML25 | | |
| | X40 | | |

[1]Viton is a registered trademark of DuPont Dow.




| Code | Function | Port |
|---|---|---|
| 1 | Air Supply | G 1/8 NPSF |
| 1A | Alternate Air Supply | G 1/8 NPSF |
| 2 | Vacuum | G 1/2 |
| 2A | Alternate Vacuum | G 1/8 NPSF |
| 3 | Exhaust | G 1/4 |



## VG-G12 Mount Options

The pump body comes standard with through-holes for mounting to a vertical surface or to the side of an extrusion profile, or optional M8 or M12 stud mounts may be installed in the top or on either side of the pump body (Loctite is recommended).

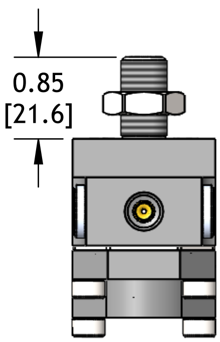
Our versatile mounting bracket kit may be used to position the pump in 45-degree increments either alongside or underneath an extrusion profile to suit your application.

### Stud Mounts

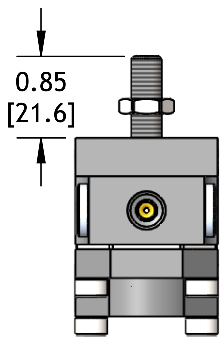
*Kits include stainless steel stud and jam nut.*

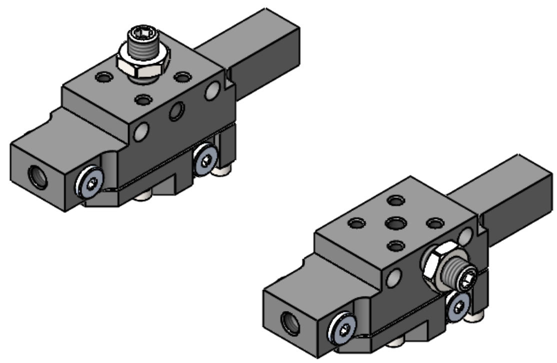
*Weight: 0.03 lbs [14.2 g]*

**VG-G12-M12**
*M12X1.75 Stud & Jam Nut*




**VG-G12-M8**
*M8X1.25 Stud & Jam Nut*

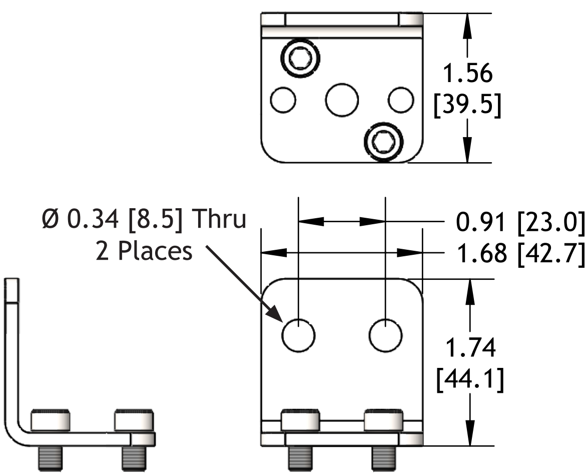


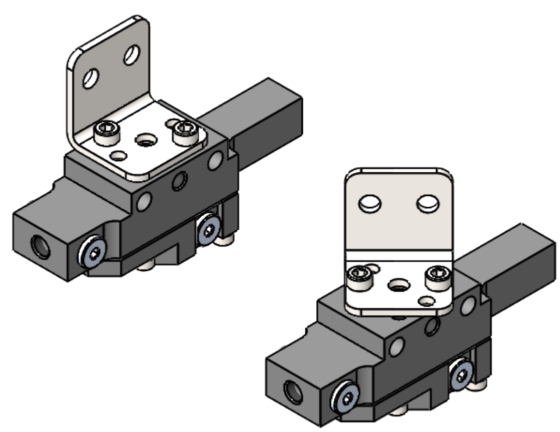



### VG-G12-BKT-90: Mounting Bracket

*Kit includes stainless steel bracket and M6X10 socket head cap screws (2).*

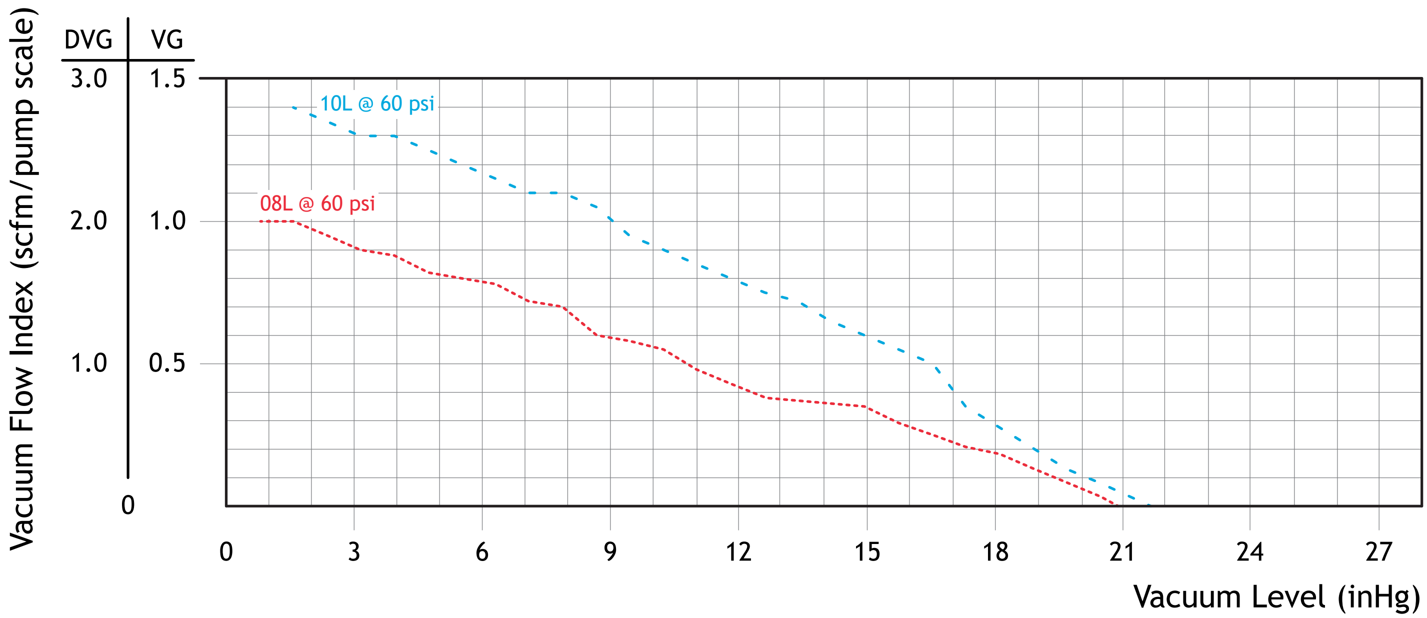
*Weight: 0.20 lbs [90.6 g]*

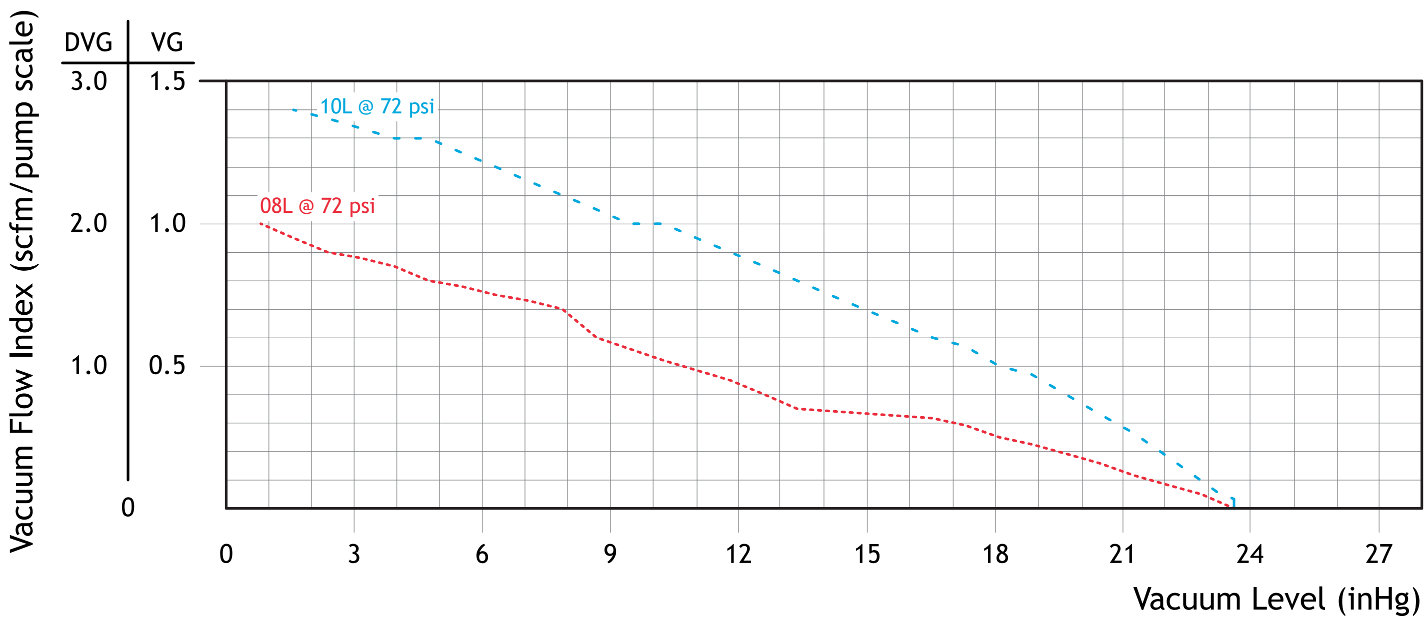


## Performance

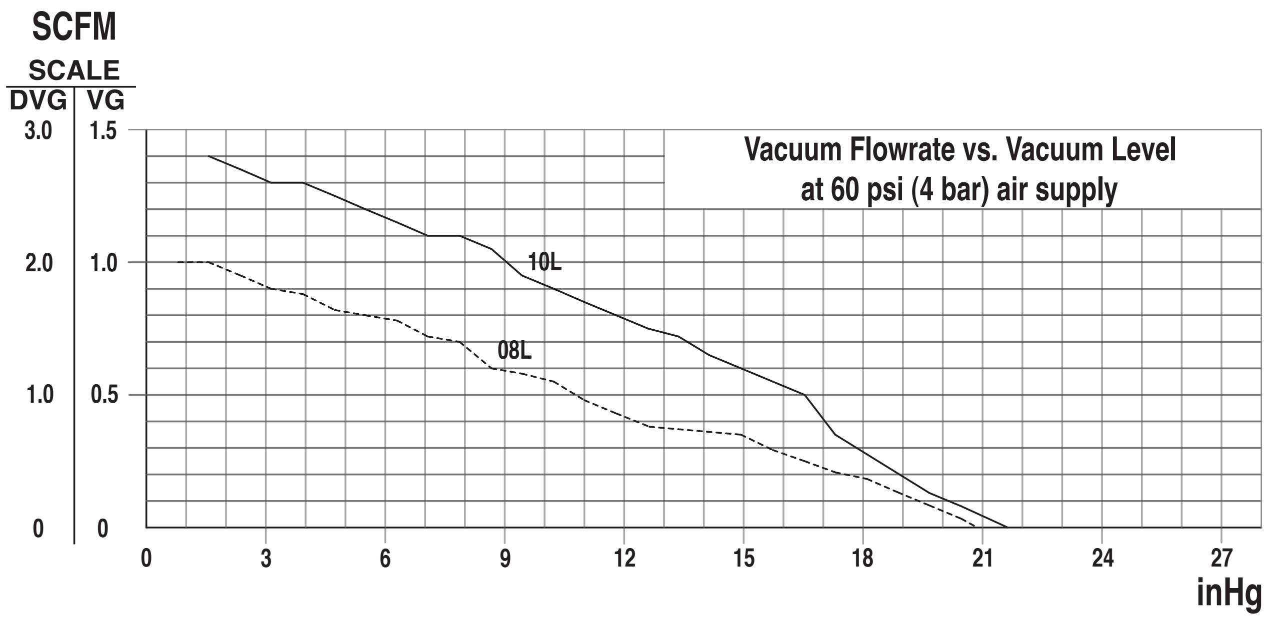
For information regarding the performance of our ER-10, ER-09, ER-07, and ER-05 venturis, please refer to ER Series Vacuum Pump performance (Section 10).




*All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.*

## Performance




### Evacuation Time

In a non-porous system, evacuation time for any vacuum cup is calculated by multiplying the internal cup volume by the time factor for the desired vacuum level from the Evacuation Time Calculation Table.

Example: XP-B75 @ 15 inHg [50.8 kPa]

| Volume | | Time Factor | | Evacuation Time |
|---|---|---|---|---|
| 6.7 in³ | X | 0.022 sec / in³ | = | 0.15 sec |

| Vacuum Level: inHG (-kPa) | 9 (30.5) | 12 (40.6) | 15 (50.8) | 18 (61) | 21 (71) |
|---|---|---|---|---|---|
| Time Factor: sec/in³ | 0.008 | 0.014 | 0.022 | 0.022 | 0.061 |

### ER-10L Performance in a Non-Porous System

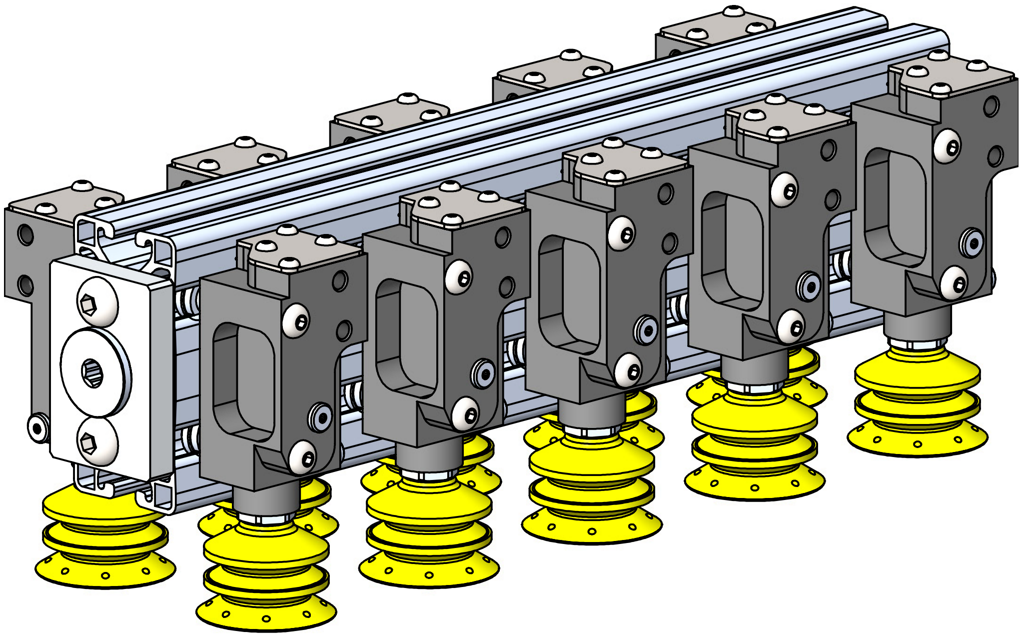
| | B30 | B40 | B50 | B75 | B110 | BF80 | BF100 | F75 | F110 | FC75 | FC100 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Volume: in³ [cc] | 0.61 [10] | 0.9 [14.7] | 2.0 [32.8] | 6.7 [110] | 19.0 [311] | 1.8 [29.5] | 4.9 [80.3] | 1.2 [19.7] | 4.3 [70.5] | 2.3 [37.6] | 4.9 [80.3] |
| Evacuation Time[1]: sec | 0.013 | 0.02 | 0.04 | 0.15 | 0.42 | 0.04 | 0.11 | 0.03 | 0.1 | 0.05 | 0.11 |
| Force @ 15 inHG: lb [N] | 4.1 [18.2] | 7.3 [32.5] | 12.1 [53.8] | 30.8 [137] | 64.1 [285] | 35.0 [156] | 65.0 [289] | 37.5 [167] | 78.3 [348] | 29.1 [129] | 53.3 [237] |

*[1]Evacuating to 15 inHG (50.8 -kPa) at 72 psi (5 bar)*

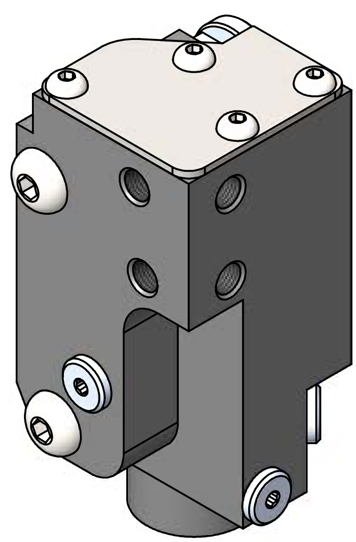
*All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.*

# RAIL SYSTEMS

## SECTION 12

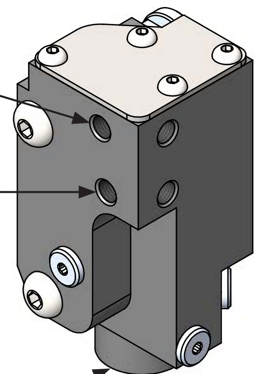


## RAIL SYSTEM ASSEMBLIES



## RAIL SYSTEMS
### THE ULTIMATE VACUUM GRIPPER SYSTEM

Rail System Modules include all the features of EDCO Vacuum Grippers with a Positive or Limited Purge. In addition they include a pilot-operated cartridge valve for vacuum on/off control. The modules mount to the side of a lightweight 1-1/2 in. X 3 in. rail profile. Air supply plumbing is completely eliminated by utilizing the rail as a manifold to distribute compressed air to each module.




### SIMPLE SYSTEM ZONING

One of the most important features of the Rail System is the ease and ability of zoning. Zoning groups several modules to a pair of 3-way solenoid pilot valves. One solenoid pilot valve controls the vacuum-on and the second controls the positive purge for each zone. Zones can include one to several modules and a system can have one to several zones. Systems should be configured with the smallest number of zones that provide the degree of control required for the application. If the requirements of the application change over time, the Rail System can easily be reconfigured by adjusting the number of modules per zone and/or the number of zones per system.

Zones with small numbers of modules provide the most system control, however, they also require the largest number of solenoid pilot valves.

Application example: Picking and placing various sizes of cases onto a single mixed pallet load.

Systems with all modules controlled as a single zone are the simplest and require only two solenoid pilot valves. These systems are limited to basically on/off operation for all of the modules. Application example: Picking and placing identical cases onto a single pallet load.

### PP : POSITIVE PRESSURE PURGE

Air pressure supplied to the venturi is diverted to the vacuum port by blocking the venturi exhaust with a piston operated by a pilot pressure signal. Tool separation movement must begin immediately (no dwell) when purge signal is initiated to prevent excessive positive pressure inside suction cups due to forces pressing the tool onto the work surface. Vacuum switches should not be used due to their limited over-pressure capability.

### LP : LIMITED PRESSURE PURGE

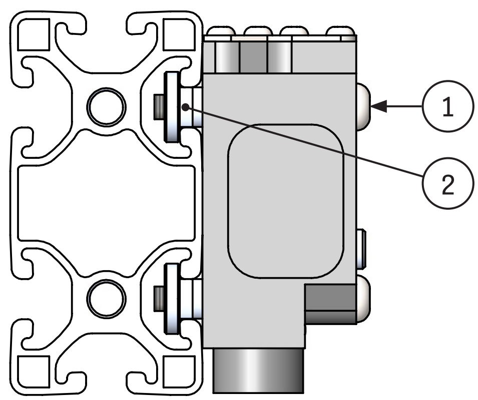
Similar to Positive Purge except it is modified to limit the pressure applied to the suction cup. Purge air flow is not as robust as with the PP option but the pressure is limited so a vacuum switch can be used for part presence detection.

### CLEANING OPERATION

Some systems may not require the quick-release provided by the PP or LP options. For these systems, the purge pilot ports can be plugged and not used. However, it would be worthwhile to connect all the purge pilot ports to one pilot valve to provide a brief reverse-flow cleaning action to blow out any ingested debris from the suction cups every few cycles depending on the application environment. This brief cleaning operation won't add to total cycle time and should be performed during the return-home period while suction cups are open to atmosphere.

### RUGGED SHEAR KEY MOUNT

Two-point mount with shear keys eliminates the possibility of pumps shifting out of position during operation. Work loads are efficiently and directly transferred to the mounting profile so that mounting screws carry only tensile loads.




1) M5 X 40 Screw
2) RS-5 - T-Nut

## RAIL SYSTEMS

| | EXTRUSION PROFILE | | VENTURI | | PURGE | | OPTIONS | | CUP SELECTION |
|---|---|---|---|---|---|---|---|---|---|
| RS18 | | - | 10L | - | PP | - | SX | - | B50N |
| | (Blank) = 1-1/2" Profile Rails | | 08L | | **PP** = Positive Pressure | | (Blank) = Standard | | (Blank) = No Cup |
| | **M** = 40 mm Profile Rails | | 10L | | **LP** = Limited Pressure | | **SX**[2] = Without Valve | | See Information Below |

[1]RS18M can't be purchased as rail assembly.

[2]Supply valve omitted for constant air supply

## VACUUM CUP SELECTION

Choose vacuum cup style, size, and rubber material from section two of this catalog and add this information as a suffix to the RS18 pump model number. For example: RS18-10L-PP pump and XP-B50N cup are selected. The complete Vacuum Gripper model number would be RS18-10LP-PP-B50N.

For simplified ordering, several Rail System model numbers are tabulated, but other combinations are readily available at standard prices. Contact your local EDCO USA distributor or call EDCO for assistance.

| Cup[1] | B30 | B40 | B50 | B75 | B110 | BF80 | BF100 | F75 | F110 | FC75 | FC100 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Volume: $in^3$ (cc) | 0.61 [10] | 0.9 [14.7] | 2.0 [32.8] | 6.7 [110] | 19 [311] | 1.8 [29.5] | 4.9 [80.3] | 1.2 [19.7] | 4.3 [70.5] | 2.3 [37.6] | 4.9 [80.3] |
| Evacuation Time[2]: sec | 0.013 | 0.02 | 0.04 | 0.15 | 0.42 | 0.04 | 0.11 | 0.03 | 0.1 | 0.05 | 0.11 |
| Force @ 15 inHG: lb (N) | 4.1 [18.2] | 7.3 [32.5] | 12.1 [53.8] | 30.8 [137] | 64.1 [285] | 35 [156] | 65 [289] | 37.5 [167] | 78.3 [348] | 29.1 [129] | 53.3 [237] |

[1]Values apply to all cup materials

[2]Evacuating to 15 inHG (50.8 -kPa) at 72 psi (5 bar).

## EVACUATION TIME

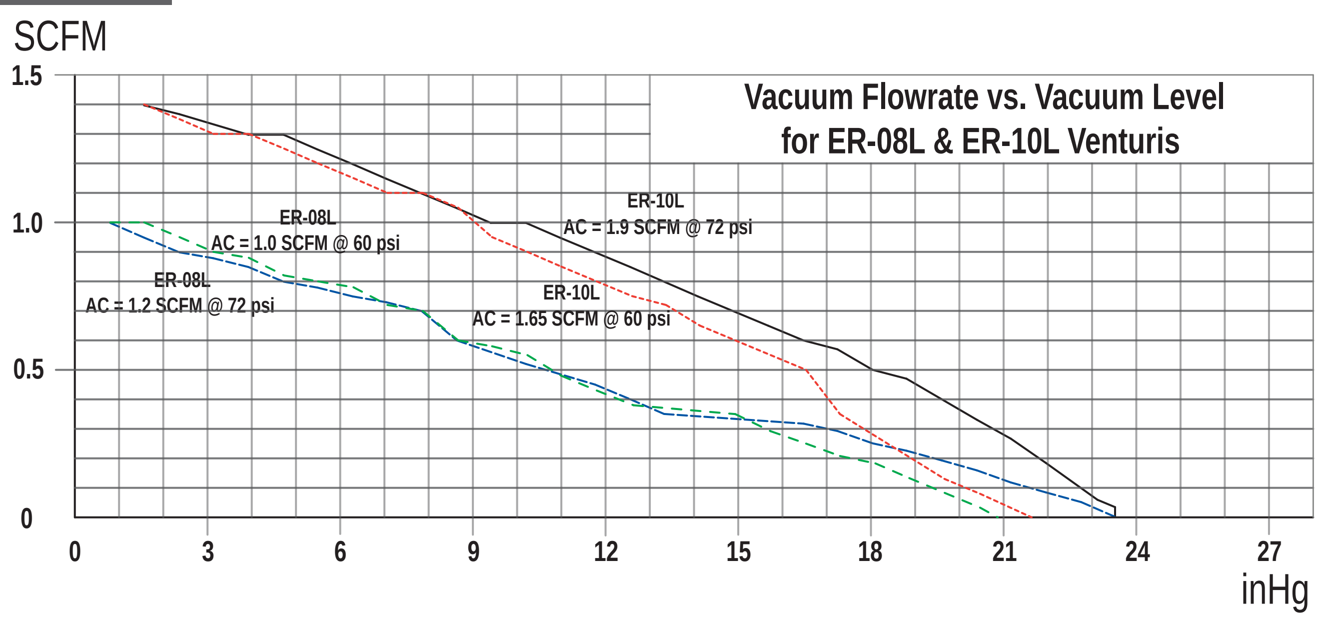
In a non-porous system, evacuation time for any vacuum cup is calculated by multiplying the internal cup volume by the time factor for the desired vacuum level from the Evacuation Time Calculation Table.

For Example: XP-B75 @ 15 inHG (50.8 kPa)

| | Volume | | Time Factor | | |
|---|---|---|---|---|---|
| | $in^3$ | | $sec/in^3$ | | |
| Evacuation Time = | 6.7 | X | 0.022 | = | 0.15 sec |

| Vacuum Level: inHG (-kPa) | 9 [30.5] | 12 [40.6] | 15 [50.8] | 18 [61] | 21 [71] |
|---|---|---|---|---|---|
| Time Factor: sec/in3 | 0.008 | 0.014 | 0.022 | 0.036 | 0.061 |

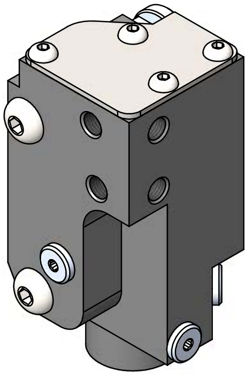
## PERFORMANCE



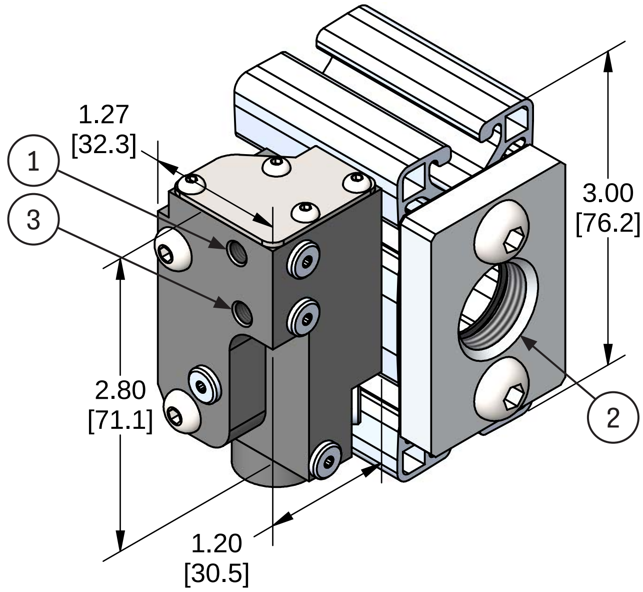

All performance data presented is a representatation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.

# RAIL SYSTEMS

## RS18-10L-PP / RS18-10L-LP



Weight: 0.28 lbs [125.0 g]

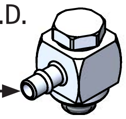



1) Purge Pilot Signal - M5 (10-32 UNF)
2) Air Supply - 3/8 NPSF
3) Vacuum On/Off - M5 (10-32 UNF)

## ALUMINUM PILOT FITTINGS

LB25-10 – Elbow
10-32 UNF (M5),
with O-ring seal

4mm (5/32 in) O.D.
Tubing Barb



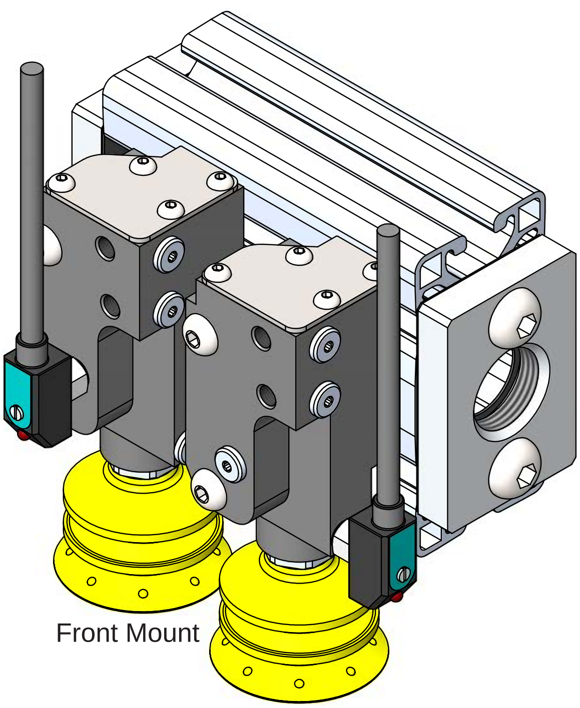
Weight: 0.0045 lbs (2.14 g)

P10 – Plug
10-32 UNF(M5),
with O-ring seal

Weight: 0.0005 lbs (0.28 g)

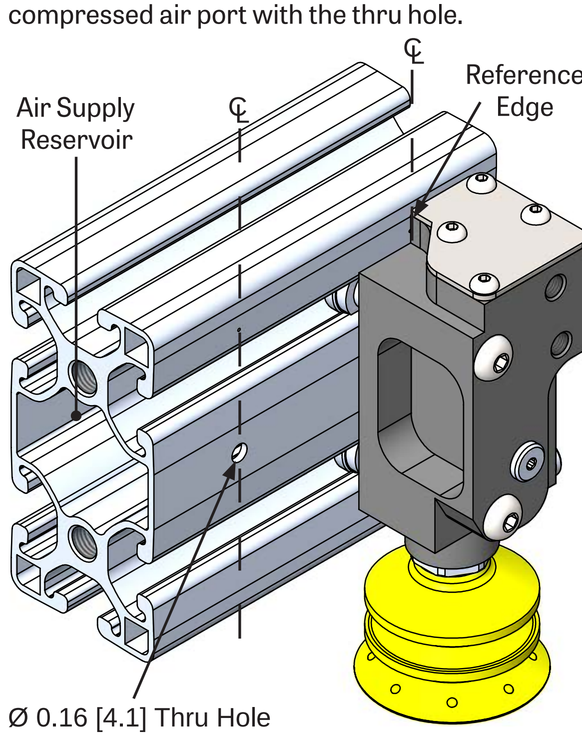
## VACUUM SENSOR OPTION

A P10 plug can be removed from the front or side of the RS18 module to accommodate a VP-3 or VN-3 vacuum sensor.



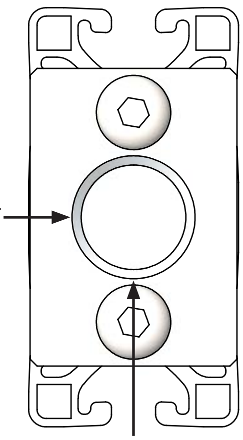

## SIMPLE MODULE ALIGNMENT

Placing the Reference Face of the module on the center line of the thru hole aligns the compressed air port with the thru hole.



# RAIL SYSTEMS
## RAIL ASSEMBLIES

The 1-1/2"x3" Aluminum extrusion profiles include 3/8" NPSF ports at each end, one for air supply and the other for a plug or a pressure gauge. Rails are drilled to mount modules on center-to-center distances to your specifications. The minimum recommended spacing is 1-1/2 in. (38.1 mm) but is also dependent on suction cup diameter. RS18-10L modules will be mounted to the rail and tested by EDCO USA. Pilot port fittings, zone tubing, and 3-way air solenoid pilot valves must be installed by the system integrator because of the many possible configurations.




| | MODULES | | CENTER SPACING | | END SPACING | | SINGLE OR DOUBLE SIDED |
|---|---|---|---|---|---|---|---|
| RSA | 20 | - | 2.40 | - | 0.9 | - | S |
| | Insert number of modules desired | | Insert distance from center of one module to the center of the next module (inches) | | Insert distance from end of profile to the center of the first module | | **S** = Single Sided<br>**D**[1] = Double Sided |

[1]Limited to 50 mm and smaller cups.

## PROFILE LENGTH

Minimum recommended center-to-center spacing is 1.5in but is also dependent on suction cup diameter. The minimum recommended end spacing is 0.9 in.

**Profile Length Calculation**

2 x **End Spacing** (in)
\+ **Center Spacing** (in) x (**Number of Modules*** - 1)
**= Profile Length** (in)

***** For a Double Sided rail divide the **Number of Modules** by 2.

**Examples:**

**Single Sided Rail**

**RSA-20-2.40-0.9-S**

**End Spacing** = 0.9
**Center Spacing** = 2.40
**Number of Modules** = 20

2 x (0.9)
\+ 2.40 x (20-1)
= 47.4 in.

**Double Sided Rail**

**RSA-40-2.00-0.9-D**

**End Spacing** = 0.9
**Center Spacing** = 2.00
***Number of Modules** = 40
For the calculation we need to divide the Number of Modules by 2.
40/2 = 20

2 x (0.9)
\+ 2.00 x (20-1)
= 39.8 in.

## RAIL ASSEMBLY WEIGHT

For total assembly weight add the Rail weight with RS18 Module weights, 0.253 lbs for the 3/8 NPSF End Caps, suction cup weights, and fitting weights.

**Weight Calculations**

**Rail Weight** (lbs)

**Profile Length** (in) x 0.138
**Number of Modules** x 0.275
\+ 0.267 (End Plates)
**= Rail Weight** (lbs)

**Example:**

**RSA-20-2.40-0.9-S**

**Profile Length** = 47.4 in

47.4 x 0.138
20 x 0.275
\+ 0.267
= 11.21 lbs

**Total Weight** (lbs)

**Rail Weight** (lbs)
**Number of P10** x 0.0005
**Number of LB25-10** x 0.0045
**Number of Cups** x **Cup Weight**
\+ **Number of Cups** x **Cup Fitting Weight**
**Total Weight** (lbs)

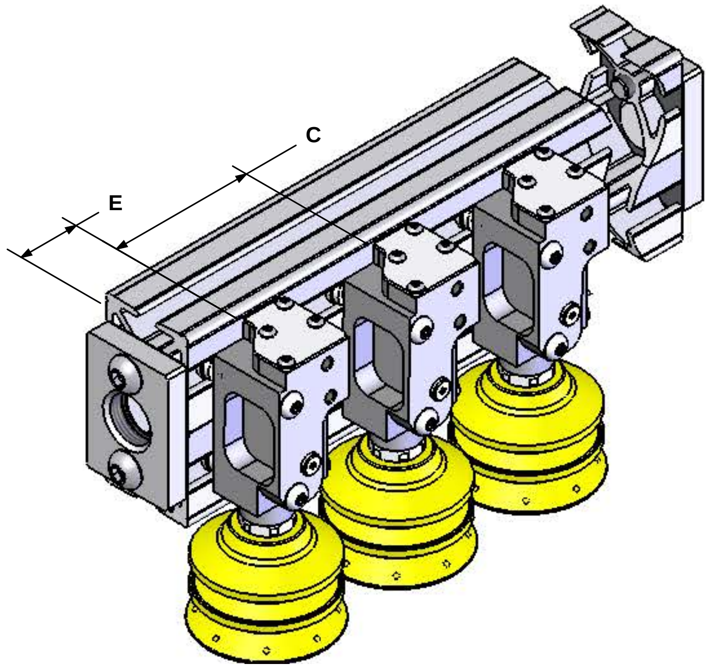
**Example:**

**RSA-20-2.40-0.9-S with RS18-10L-PP-B50N**

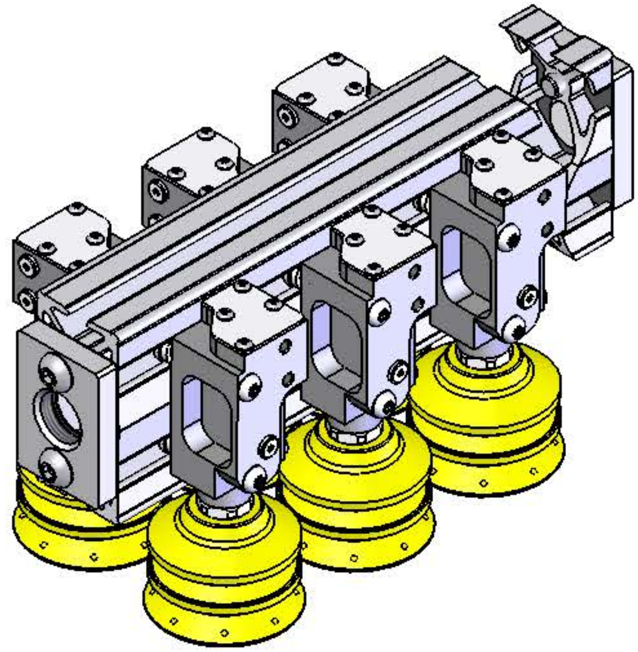
| | |
|---|---|
| **Rail Weight** | 11.21 |
| **20 P10 Plugs** | 20 x 0.0005 |
| **20 LB25-10 Elbows** | 20 x 0.0045 |
| **20 XP-B50N Cups** | 20 x 0.047 |
| **20 50-38M Fittings** | + 20 x 0.02 |
| **Total Weight** | = 12.65 lbs |

# RAIL SYSTEMS

## SINGLE SIDED RAIL ASSEMBLY

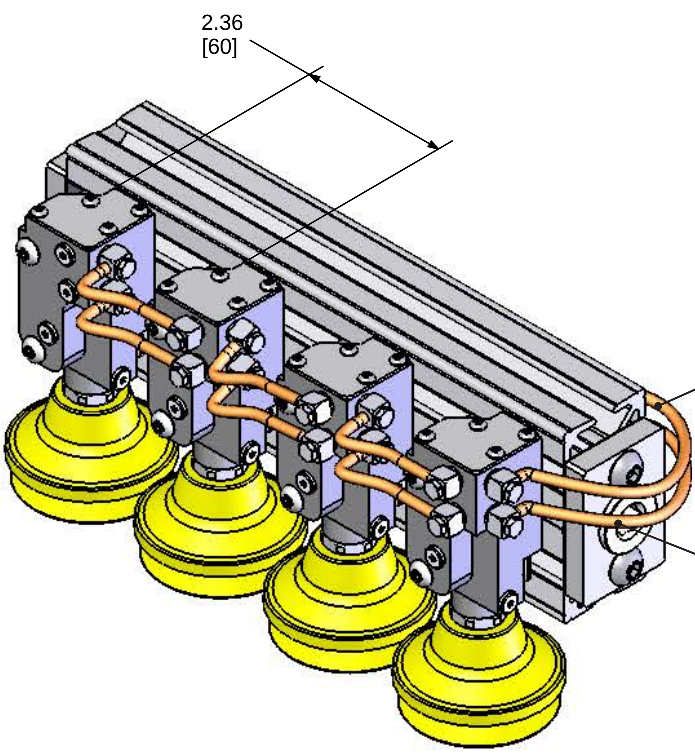


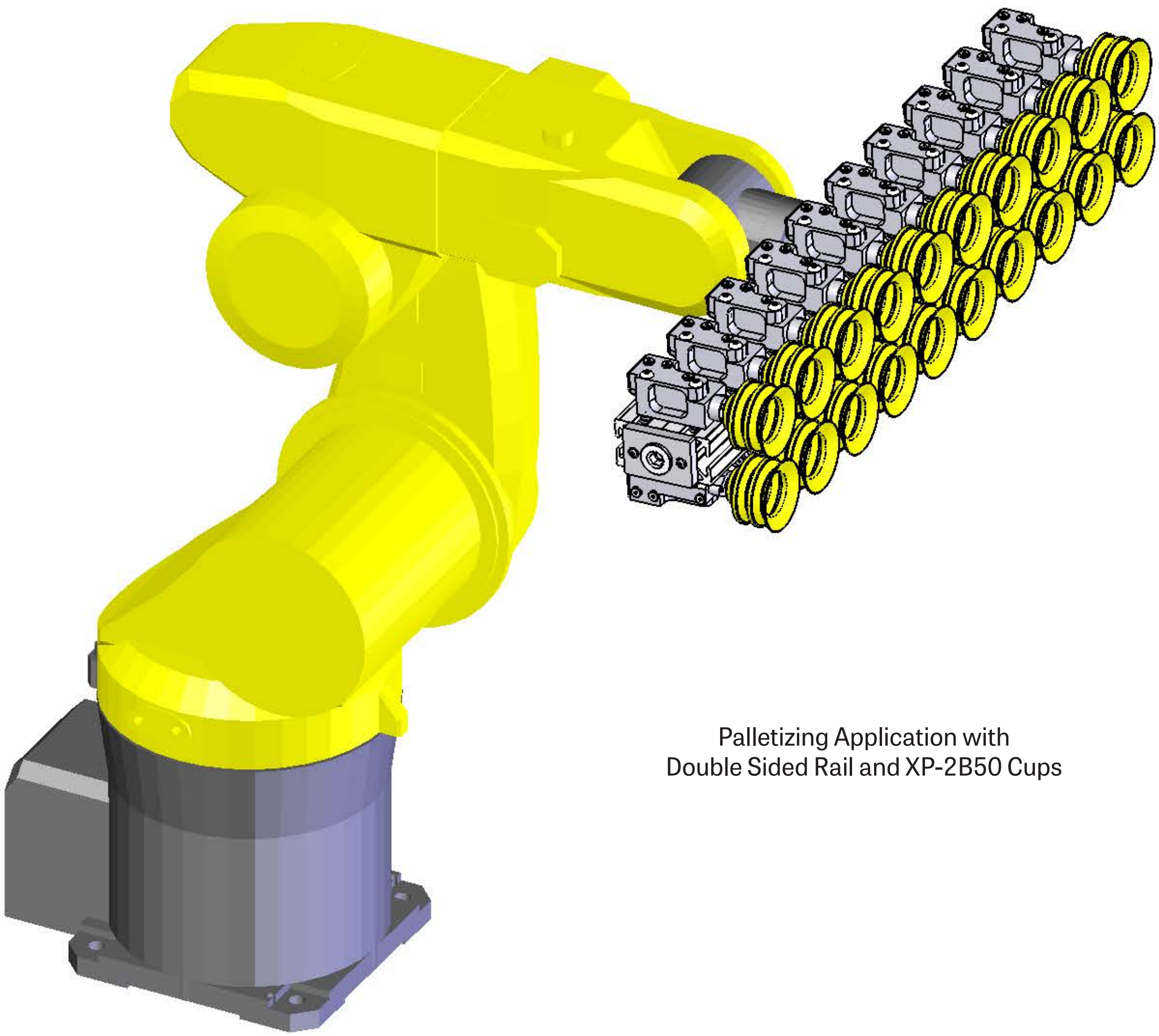

## DOUBLE SIDED RAIL ASSEMBLY



## ZONED RAIL ASSEMBLY

Typical XP-B50 center-to-center spacing of 2.36 in [60 mm].



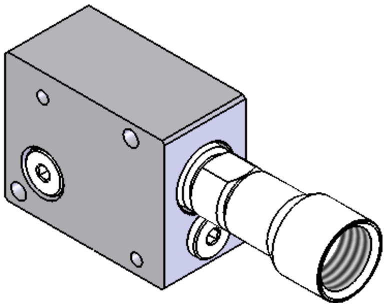


Palletizing Application with
Double Sided Rail and XP-2B50 Cups

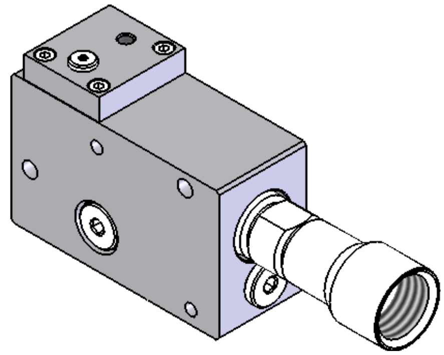
# J PUMPS

## SECTION 13

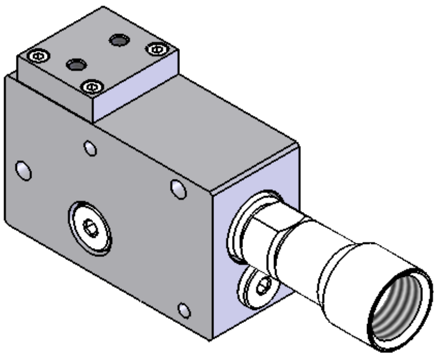
UPDATED 02/27/20



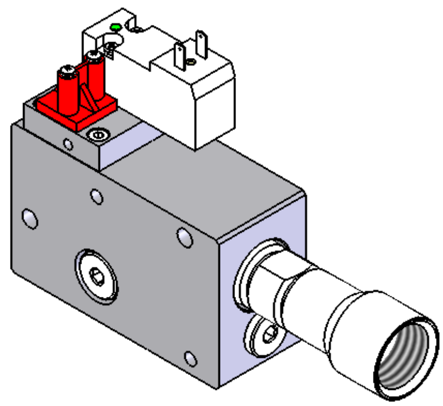
BASIC



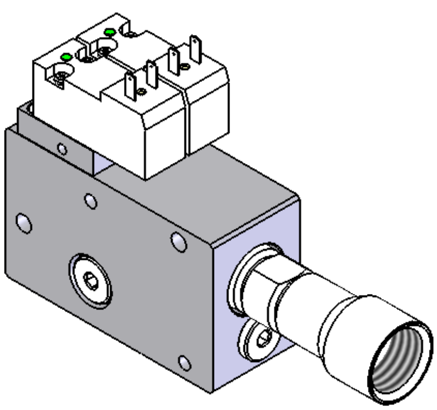
PS



PSB



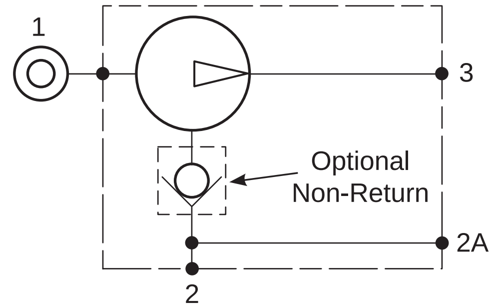
S24D / S110A



SB24D / SB110A

## J SERIES PUMPS

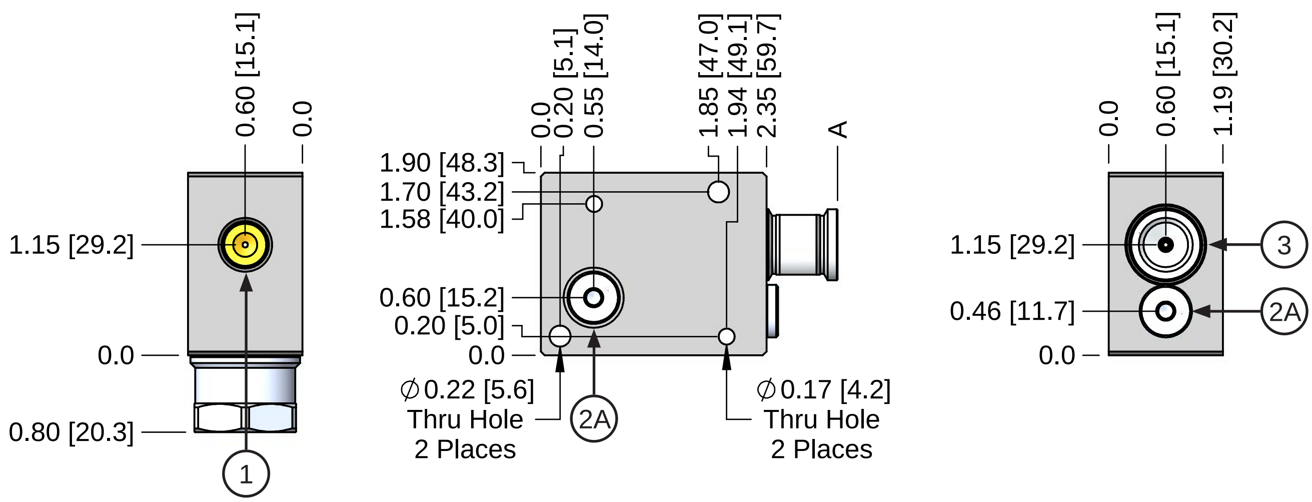
Basic J-series pumps may be ordered with any of five different coaxial ejectors to match pump performance to system requirements. Vacuum on/off control is accomplished via external control valves in the pump air supply. An optional non-return vacuum check valve is available for use in sealed systems, but some method of releasing vacuum must be added to the system – see RC18 Release Check. Vacuum sensors may be installed in either of the two 1/8" auxiliary vacuum ports to monitor system vacuum level.

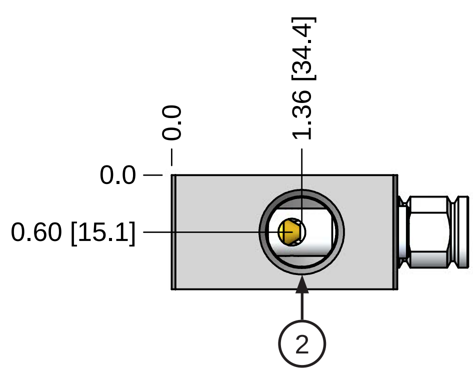


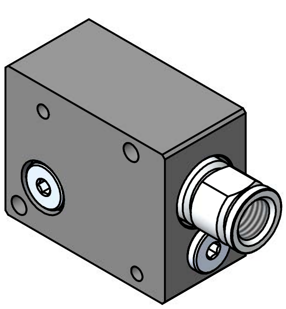

| | VENTURI DIAMETER | | PORTS | | NON RETURN | | SILENCER |
|---|---|---|---|---|---|---|---|
| J | 12 | H | | - | | - | |
| | **12** = 1.2 mm | | (Blank) = NPTF | | (Blank) = No | | (Blank) = None |
| | **15** = 1.5 mm | | **G** = G Threads | | **NR** = Yes | | **ST** = STA14M |

| CODE | FUNCTION | NPT | G |
|---|---|---|---|
| 1 | Air Supply | 1/4 NPTF | G 1/4 |
| 2 | Vacuum - Main | G 1/2 NPSF | G 1/2 NPSF |
| 2A | Vacuum - Alternate | G 1/8 NPSF | G 1/8 NPSF |
| 3 | Exhaust | G 1/4 NPSF | G 1/4 NPSF |

| VENTURI DIAMETER | A in [mm] |
|---|---|
| 12 | 3.09 [78.5] |
| 15 | 3.49 [88.7] |

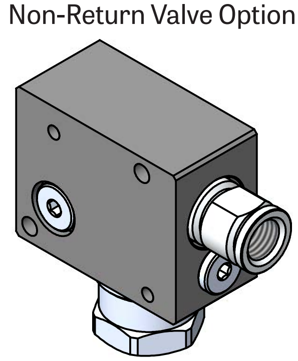


Weight: 0.47 lbs [213.0 g]

Non-Return Valve Option

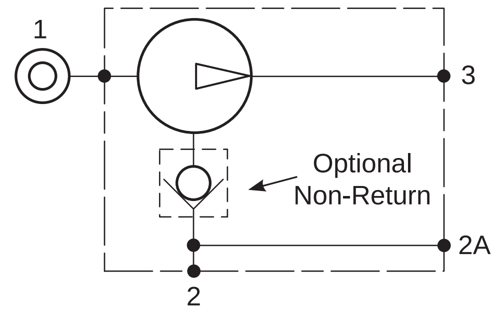


Weight: 0.52 lbs [236.0 g]

# J SERIES PUMPS

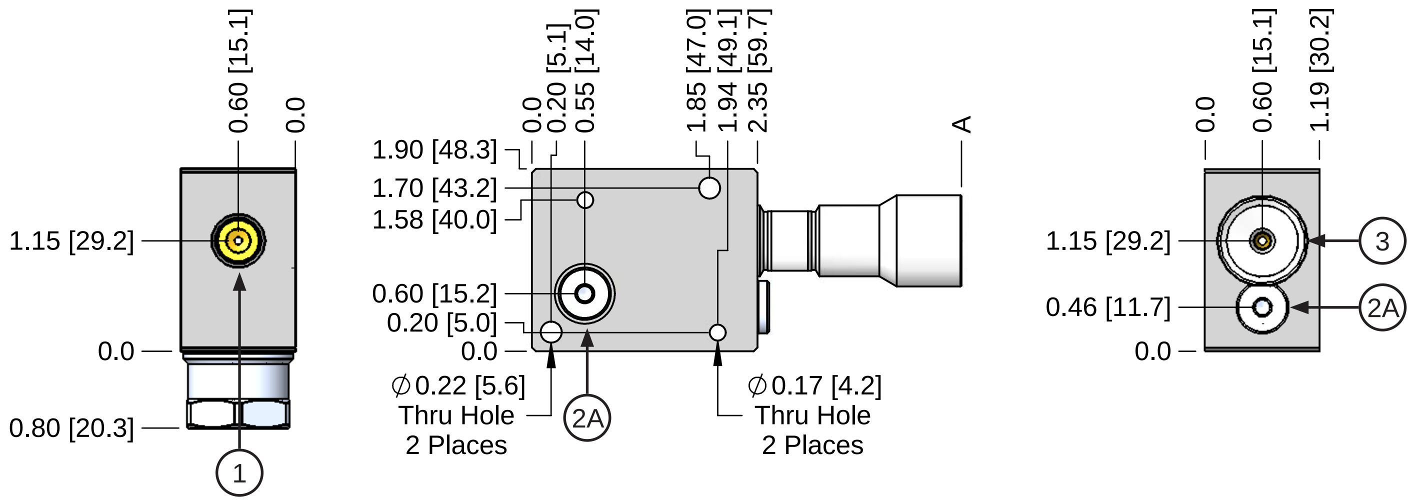
Basic J-series pumps may be ordered with any of five different coaxial ejectors to match pump performance to system requirements. Vacuum on/off control is accomplished via external control valves in the pump air supply. An optional non-return vacuum check valve is available for use in sealed systems, but some method of releasing vacuum must be added to the system – see RC18 Release Check. Vacuum sensors may be installed in either of the two 1/8" auxiliary vacuum ports to monitor system vacuum level.

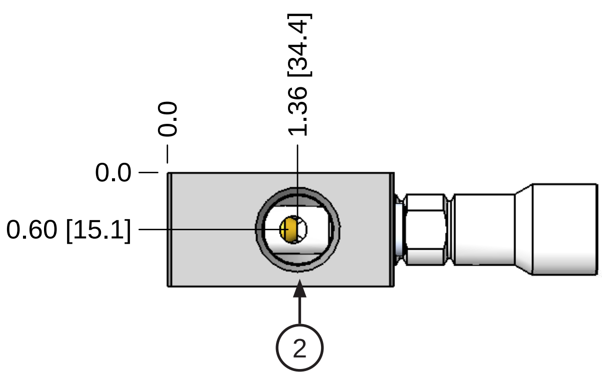


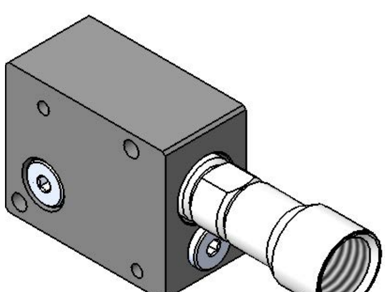

| | VENTURI DIAMETER | | PORTS | | NON RETURN | | SILENCER |
|---|---|---|---|---|---|---|---|
| J | 20 | H | | - | | - | |
| | **20** = 2.0 mm | | (Blank) = NPTF | | (Blank) = No | | (Blank) = None |
| | **25** = 2.5 mm | | **G** = G Threads | | **NR** = Yes | | **ST** = STC12M |
| | **30** = 3.0 mm | | | | | | |

| CODE | FUNCTION | NPT | G |
|---|---|---|---|
| 1 | Air Supply | 1/4 NPTF | G 1/4 |
| 2 | Vacuum - Main | G 1/2 NPSF | G 1/2 NPSF |
| 2A | Vacuum - Alternate | G 1/8 NPSF | G 1/8 NPSF |
| 3 | Exhaust | G 1/2 NPSF | G 1/2 NPSF |

| VENTURI DIAMETER | A in (mm) |
|---|---|
| 20 | 4.47 (113.5) |
| 25 | 4.87 (123.6) |
| 30 | 5.71 (144.9) |

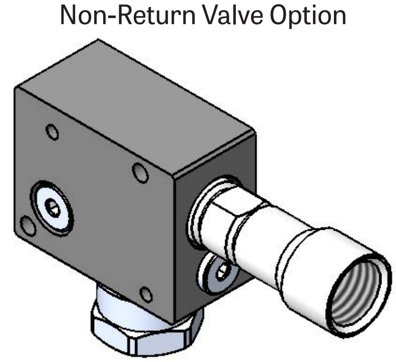


Weight: 0.54 lbs [245.0 g]

Non-Return Valve Option

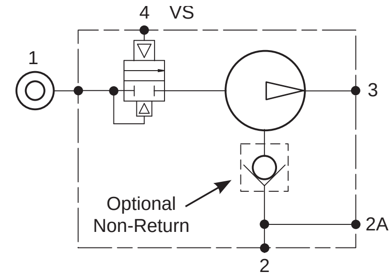


Weight: 0.59 lbs [268.0 g]

# J SERIES PUMPS
## PS : AIR PILOT CONTROLLED VACUUM SUPPLY

Large capacity J-series coaxial pumps provide full control features in an integrated package. Pumps may be ordered with any of five different coaxial ejectors to match pump performance to system requirements. An integral pilot-operated valve provides on/off vacuum control. An optional non-return vacuum check valve is available for use in sealed systems, but some method of releasing vacuum must be added to the system – see RC18 Release Check. Vacuum sensors may be installed in either of the two 1/8" auxiliary vacuum ports to monitor system vacuum level. Large 1/2" vacuum port readily handles the high vacuum flow produced by coaxial ejectors.

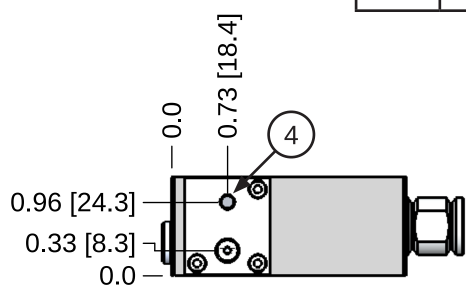
Air-pilot operation simplifies integration into field-bus systems by shifting electrical control to a bank of pneumatic 3-way solenoid valves. Flexing control wires in an automation system are replaced with small diameter air tubing for greater reliability.

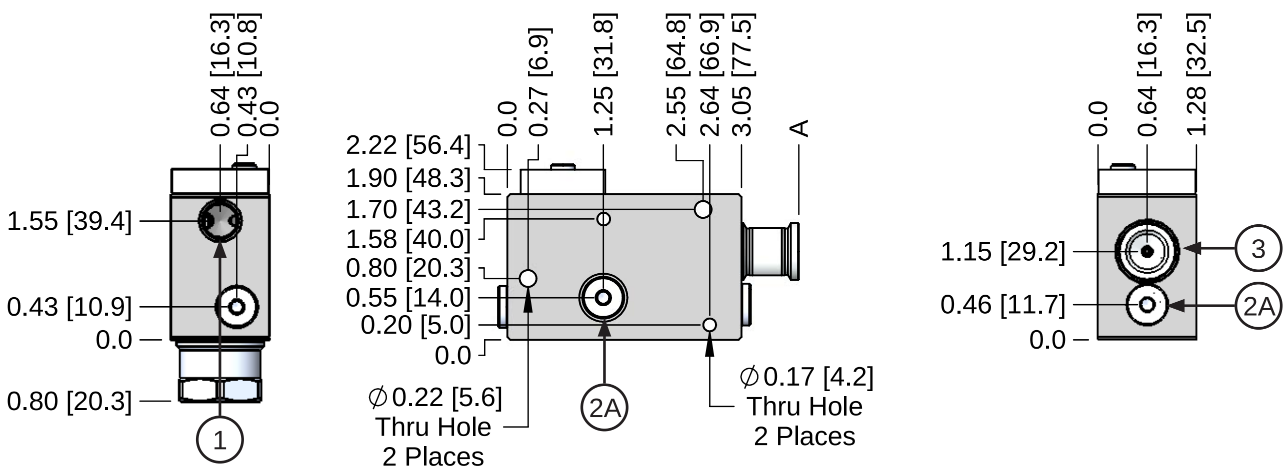


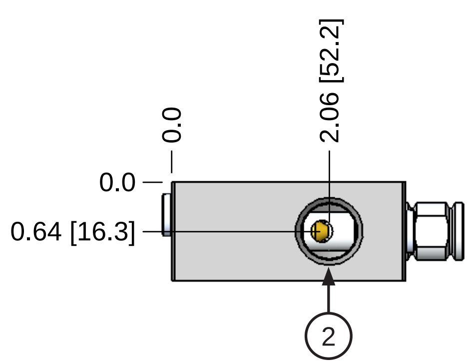

| VENTURI DIAMETER | A in (mm) |
|---|---|
| 12 | 3.09 (78.5) |
| 15 | 3.49 (88.7) |

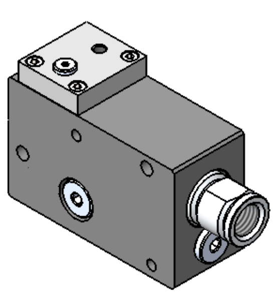
| | VENTURI DIAMETER | | PORTS | | NON RETURN | | SILENCER |
|---|---|---|---|---|---|---|---|
| J | 12 | H | | -PS- | | - | |
| | **12** = 1.2 mm | | (Blank) = NPTF | | (Blank) = No | | (Blank) = None |
| | **15** = 1.5 mm | | **G** = G Threads | | **NR** = Yes | | **ST** = STA14M |

| CODE | FUNCTION | NPT | G |
|---|---|---|---|
| 1 | Air Supply | 1/4 NPTF | G 1/4 |
| 2 | Vacuum - Main | G 1/2 NPSF | G 1/2 NPSF |
| 2A | Vacuum - Alternate | G 1/8 NPSF | G 1/8 NPSF |
| 3 | Exhaust | G 1/4 NPSF | G 1/4 NPSF |
| 4 | Pilot Signal - Vacuum | M5X0.8 (10-32 UNF) | M5X0.8 (10-32 UNF) |



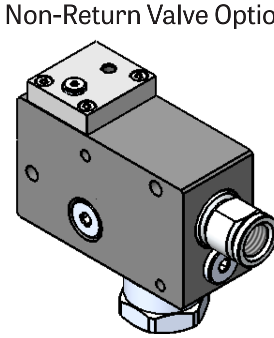



Weight: 0.69 lbs [313.0 g]

Non-Return Valve Option

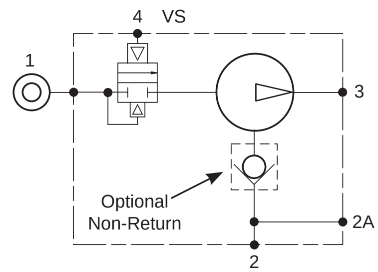


Weight: 0.74 lbs [336.0 g]

# J SERIES PUMPS
## PS : AIR PILOT CONTROLLED VACUUM SUPPLY

Large capacity J-series coaxial pumps provide full control features in an integrated package. Pumps may be ordered with any of five different coaxial ejectors to match pump performance to system requirements. An integral pilot-operated valve provides on/off vacuum control. An optional non-return vacuum check valve is available for use in sealed systems, but some method of releasing vacuum must be added to the system – see RC18 Release Check. Vacuum sensors may be installed in either of the two 1/8” auxiliary vacuum ports to monitor system vacuum level. Large 1/2” vacuum port readily handles the high vacuum flow produced by coaxial ejectors.

Air-pilot operation simplifies integration into field-bus systems by shifting electrical control to a bank of pneumatic 3-way solenoid valves. Flexing control wires in an automation system are replaced with small diameter air tubing for greater reliability.

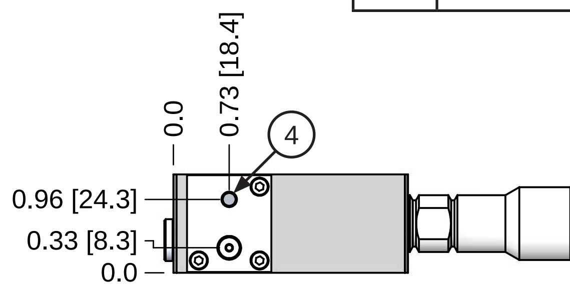


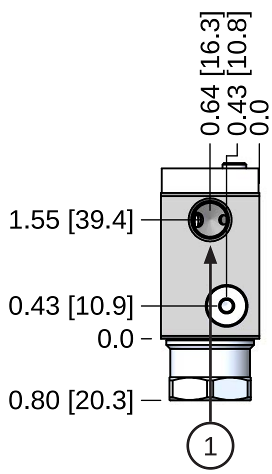

| VENTURI DIAMETER | A in (mm) |
|---|---|
| 20 | 4.47 (113.5) |
| 25 | 4.87 (123.6) |
| 30 | 5.71 (144.9) |

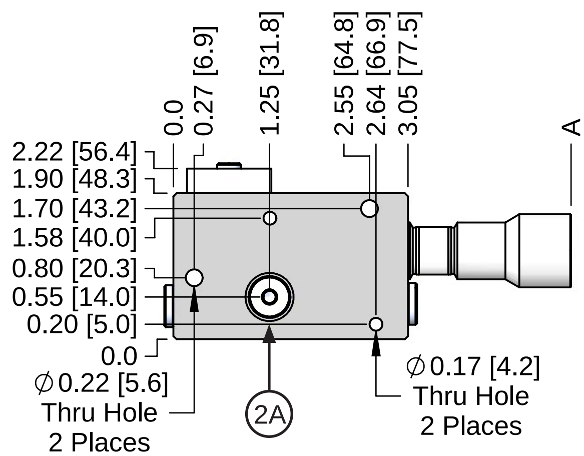
J [VENTURI DIAMETER: 20] H [PORTS] -PS- [NON RETURN] - [SILENCER]

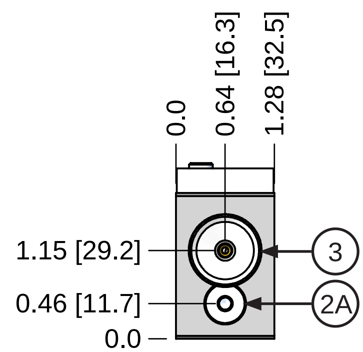
| VENTURI DIAMETER | PORTS | NON RETURN | SILENCER |
|---|---|---|---|
| **20** = 2.0 mm | (Blank) = NPTF | (Blank) = No | (Blank) = None |
| **25** = 2.5 mm | **G** = G Threads | **NR** = Yes | **ST** = STC12M |
| **30** = 3.0 mm | | | |

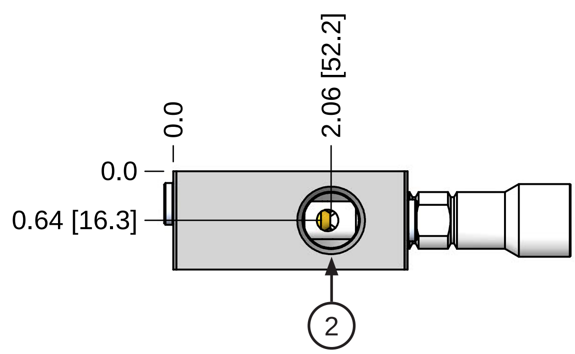
| CODE | FUNCTION | NPT | G |
|---|---|---|---|
| 1 | Air Supply | 1/4 NPTF | G 1/4 |
| 2 | Vacuum - Main | G 1/2 NPSF | G 1/2 NPSF |
| 2A | Vacuum - Alternate | G 1/8 NPSF | G 1/8 NPSF |
| 3 | Exhaust | G 1/2 NPSF | G 1/2 NPSF |
| 4 | Pilot Signal - Vacuum | M5X0.8 (10-32 UNF) | M5X0.8 (10-32 UNF) |

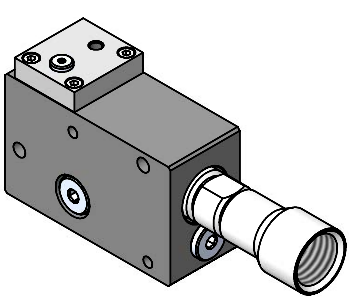


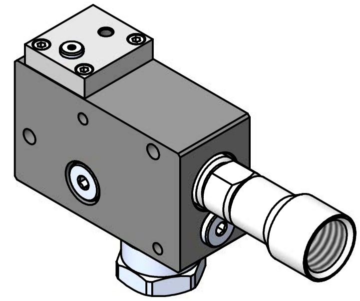



Weight: 0.76 lbs [345.0 g]

Non-Return Valve Option



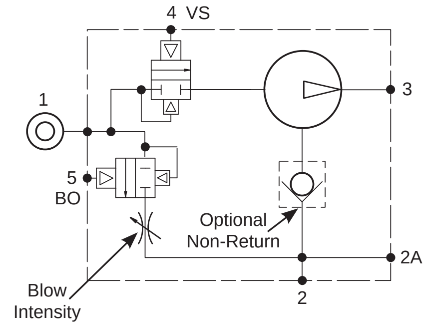
Weight: 0.81 lbs [367.0 g]

# J SERIES PUMPS

## PSB : AIR PILOT CONTROLLED VACUUM SUPPLY & BLOW-OFF

Large capacity J-series coaxial pumps provide full control features in an integrated package. Pumps may be ordered with any of five different coaxial ejectors to match pump performance to system requirements. An integral pilot-operated valve provides on/off vacuum control. A second integral pilot-operated valve provides quick-release air control, while an integral flow control valve that fine-tunes the blow intensity to suit the application. An optional non-return valve is available for use in sealed non-porous systems. Vacuum sensors may be installed in either of the two 1/8" auxiliary vacuum ports to monitor system vacuum level. Large 1/2" vacuum port readily handles the high vacuum flow produced by coaxial ejectors.

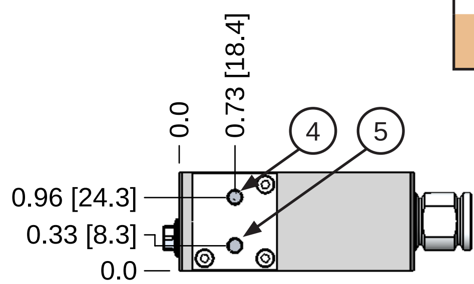
Air-pilot operation simplifies integration into field-bus systems by shifting electrical control to a bank of pneumatic 3-way solenoid valves. Flexing control wires in an automation system are replaced with small diameter air tubing for greater reliability.

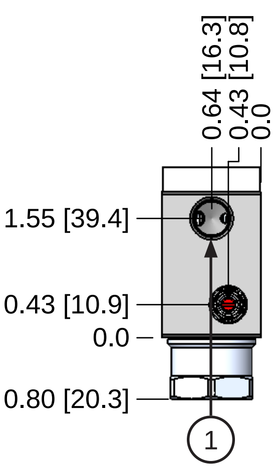


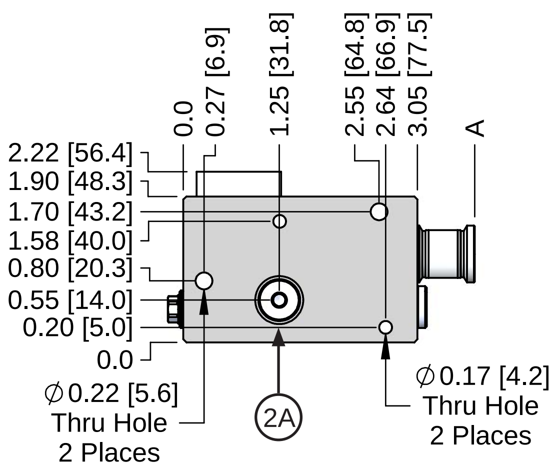

| VENTURI DIAMETER | A in (mm) |
|---|---|
| 12 | 3.09 [78.5] |
| 15 | 3.49 [88.7] |

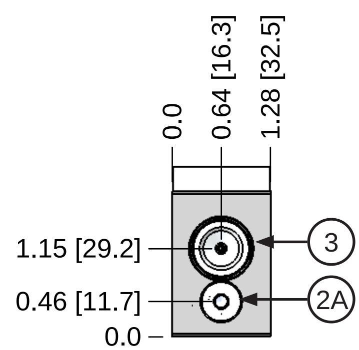
| | VENTURI DIAMETER | | PORTS | | NON RETURN | | SILENCER |
|---|---|---|---|---|---|---|---|
| J | 12 | H | | -PSB- | | - | |
| | **12** = 1.2 mm | | (Blank) = NPTF | | (Blank) = No | | (Blank) = None |
| | **15** = 1.5 mm | | **G** = G Threads | | **NR** = Yes | | **ST** = STA14M |

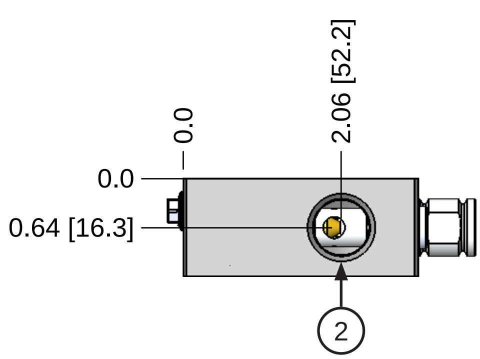
| CODE | FUNCTION | NPT | G |
|---|---|---|---|
| 1 | Air Supply | 1/4 NPTF | G 1/4 |
| 2 | Vacuum - Main | G 1/2 NPSF | G 1/2 NPSF |
| 2A | Vacuum - Alternate | G 1/8 NPSF | G 1/8 NPSF |
| 3 | Exhaust | G 1/4 NPSF | G 1/4 NPSF |
| 4 | Pilot Signal - Vacuum | M5X0.8 (10-32 UNF) | M5X0.8 (10-32 UNF) |
| 5 | Pilot Signal - Blow-Off | M5X0.8 (10-32 UNF) | M5X0.8 (10-32 UNF) |

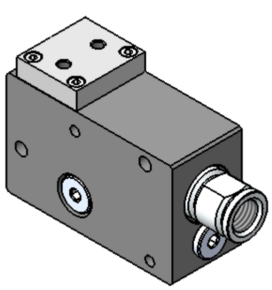


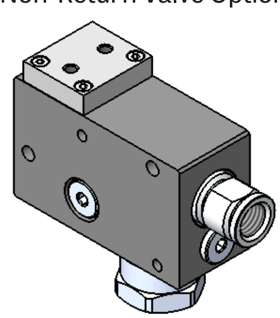



Weight: 0.69 lbs [313.0 g]

Non-Return Valve Option

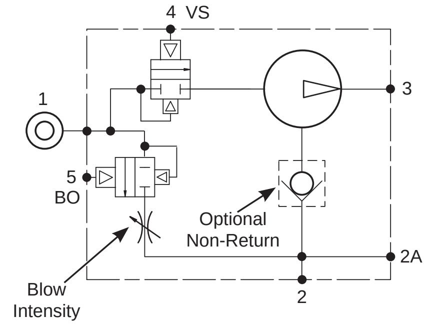


Weight: 0.74 lbs [336.0 g]

# J SERIES PUMPS
## PSB : AIR PILOT CONTROLLED VACUUM SUPPLY & BLOW-OFF

Large capacity J-series coaxial pumps provide full control features in an integrated package. Pumps may be ordered with any of five different coaxial ejectors to match pump performance to system requirements. An integral pilot-operated valve provides on/off vacuum control. A second integral pilot-operated valve provides quick-release air control, while an integral flow control valve that fine-tunes the blow intensity to suit the application. An optional non-return valve is available for use in sealed non-porous systems. Vacuum sensors may be installed in either of the two 1/8" auxiliary vacuum ports to monitor system vacuum level. Large 1/2" vacuum port readily handles the high vacuum flow produced by coaxial ejectors.

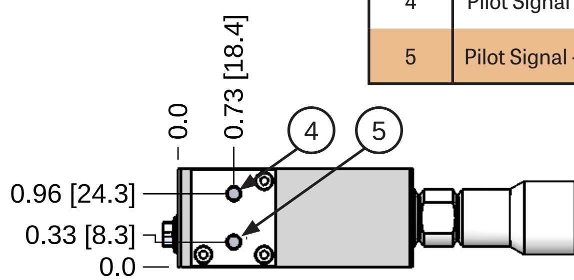
Air-pilot operation simplifies integration into field-bus systems by shifting electrical control to a bank of pneumatic 3-way solenoid valves. Flexing control wires in an automation system are replaced with small diameter air tubing for greater reliability.

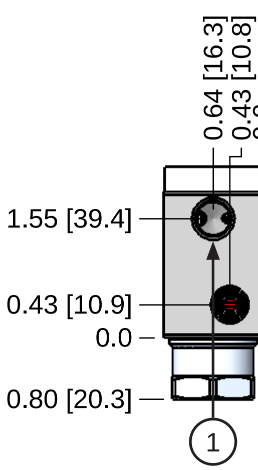


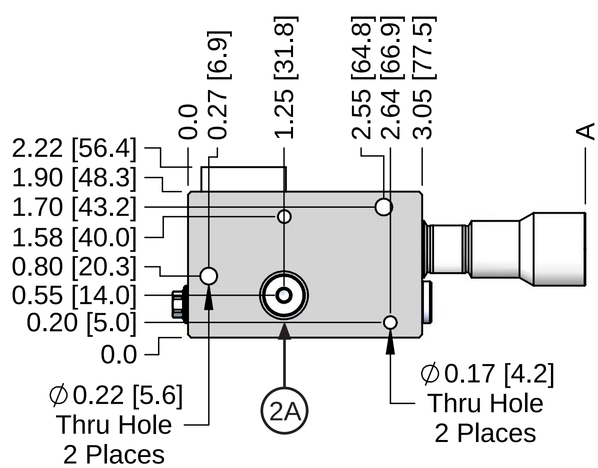

| VENTURI DIAMETER | A in (mm) |
|---|---|
| 20 | 4.47 (113.5) |
| 25 | 4.87 (123.6) |
| 30 | 5.71 (144.9) |

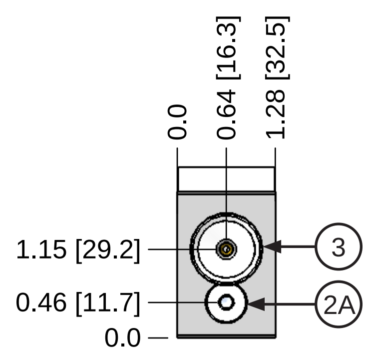
| | VENTURI DIAMETER | | PORTS | | NON RETURN | | SILENCER |
|---|---|---|---|---|---|---|---|
| J | 20 | H | | -PSB- | | - | |
| | **20** = 2.0 mm | | (Blank) = NPTF | | (Blank) = No | | (Blank) = None |
| | **25** = 2.5 mm | | **G** = G Threads | | **NR** = Yes | | **ST** = STC12M |
| | **30** = 3.0 mm | | | | | | |

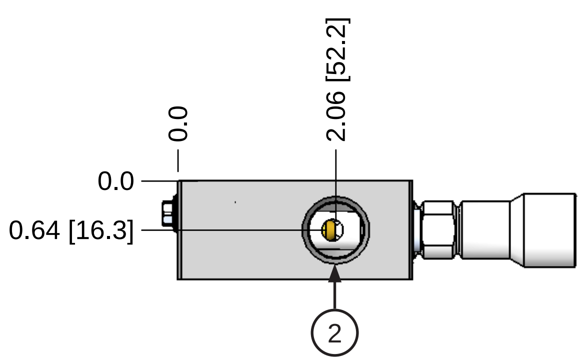
| CODE | FUNCTION | NPT | G |
|---|---|---|---|
| 1 | Air Supply | 1/4 NPTF | G 1/4 |
| 2 | Vacuum - Main | G 1/2 NPSF | G 1/2 NPSF |
| 2A | Vacuum - Alternate | G 1/8 NPSF | G 1/8 NPSF |
| 3 | Exhaust | G 1/2 NPSF | G 1/2 NPSF |
| 4 | Pilot Signal - Vacuum | M5X0.8 (10-32 UNF) | M5X0.8 (10-32 UNF) |
| 5 | Pilot Signal - Blow-Off | M5X0.8 (10-32 UNF) | M5X0.8 (10-32 UNF) |

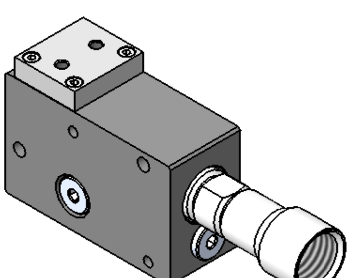


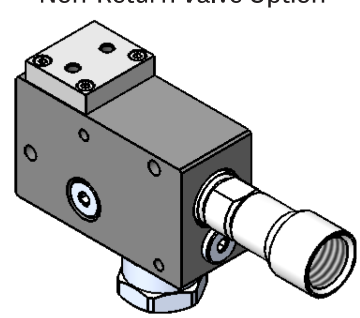



Weight: 0.76 lbs [345.0 g]

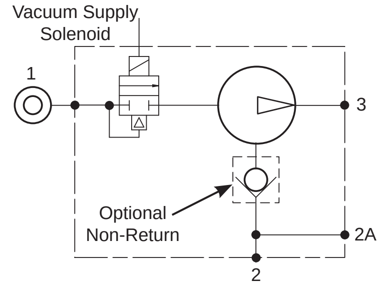
Non-Return Valve Option



Weight: 0.81 lbs [367.0 g]

# J SERIES PUMPS
## S24D / S110A : SOLENOID CONTROLLED VACUUM SUPPLY

Large capacity J-series coaxial pumps provide full control features in an integrated package. Pumps may be ordered with any of five different coaxial ejectors to match pump performance to system requirements. An integral solenoid valve provides on/off vacuum control. An optional non-return vacuum check valve is available for use in sealed systems, but some method of releasing vacuum must be added to the system – see RC18 Release Check. Vacuum sensors may be installed in either of the two 1/8" auxiliary vacuum ports to monitor system vacuum level. Large 1/2" vacuum port readily handles the high vacuum flow produced by coaxial ejectors.

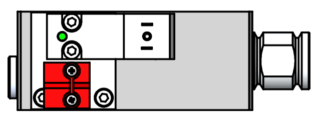


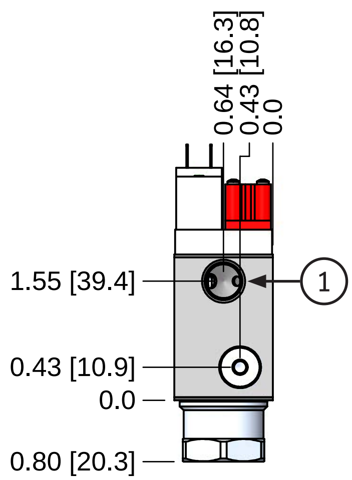

| | VENTURI DIAMETER | | PORTS | | SOLENOID VOLTAGE | | NON RETURN | | SILENCER |
|---|---|---|---|---|---|---|---|---|---|
| J | 12 | H | | -S | 24D | - | | - | |
| | **12** = 1.2 mm | | (Blank) = NPTF | | **24D** = 24V DC | | (Blank) = No | | (Blank) = None |
| | **15** = 1.5 mm | | **G** = G Threads | | **110A** = 110V AC | | **NR** = Yes | | **ST** = STA14M |

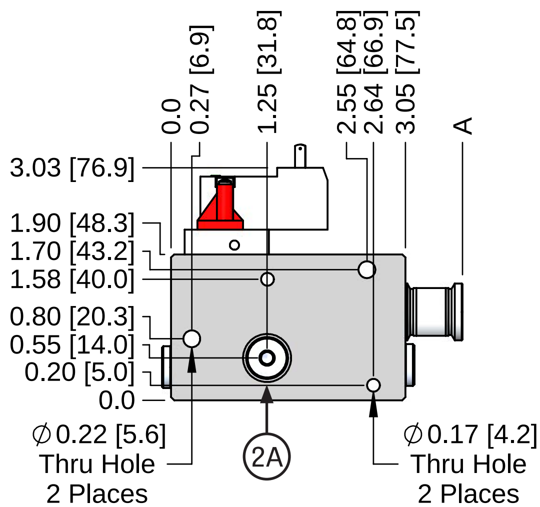
| CODE | FUNCTION | NPT | G |
|---|---|---|---|
| 1 | Air Supply | 1/4 NPTF | G 1/4 |
| 2 | Vacuum - Main | G 1/2 NPSF | G 1/2 NPSF |
| 2A | Vacuum - Alternate | G 1/8 NPSF | G 1/8 NPSF |
| 3 | Exhaust | G 1/4 NPSF | G 1/4 NPSF |

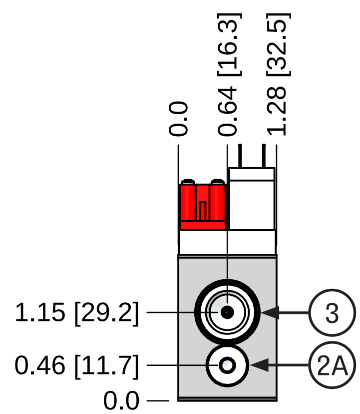
| VENTURI DIAMETER | A in (mm) |
|---|---|
| 12 | 3.09 [78.5] |
| 15 | 3.49 [88.7] |

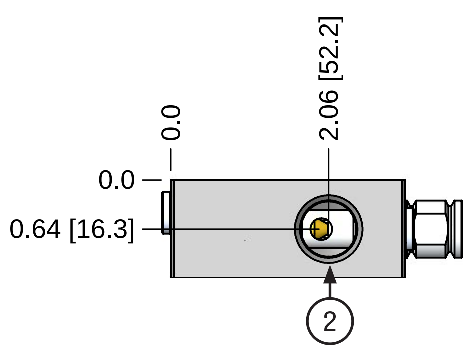
Order DIN T-9 Molded Cords Separately:
923-2M01 = Std. 2M
923-2M31 = L.E.D. 0-50V, 2M
923-2M81 = L.E.D.70-250V, 2M

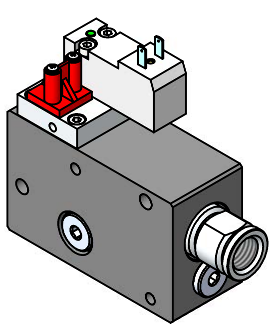




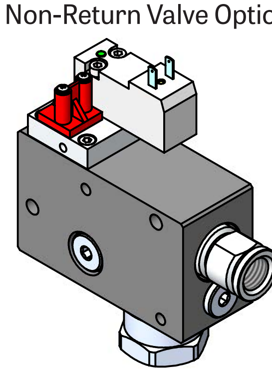



Weight: 0.77 lbs [349.0 g]

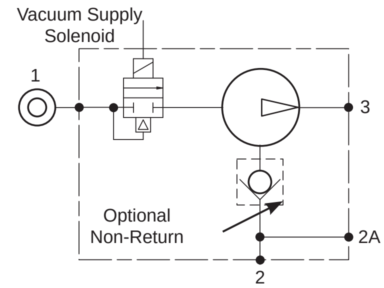
Non-Return Valve Option



Weight: 0.82 lbs [372.0 g]

# J SERIES PUMPS
## S24D / S110A : SOLENOID CONTROLLED VACUUM SUPPLY

Large capacity J-series coaxial pumps provide full control features in an integrated package. Pumps may be ordered with any of five different coaxial ejectors to match pump performance to system requirements. An integral solenoid valve provides on/off vacuum control. An optional non-return vacuum check valve is available for use in sealed systems, but some method of releasing vacuum must be added to the system – see RC18 Release Check. Vacuum sensors may be installed in either of the two 1/8" auxiliary vacuum ports to monitor system vacuum level. Large 1/2" vacuum port readily handles the high vacuum flow produced by coaxial ejectors.

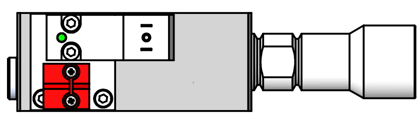


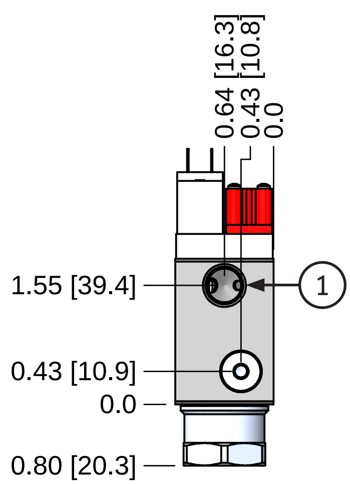

| | VENTURI DIAMETER | | PORTS | | SOLENOID VOLTAGE | | NON RETURN | | SILENCER |
|---|---|---|---|---|---|---|---|---|---|
| J | 25 | H | | -S | 24D | - | | - | |
| | **20** = 2.0 mm | | (Blank) = NPTF | | **24D** = 24V DC | | (Blank) = No | | (Blank) = None |
| | **25** = 2.5 mm | | **G** = G Threads | | **110A** = 110V AC | | **NR** = Yes | | **ST** = STC12M |
| | **30** = 3.0 mm | | | | | | | | |

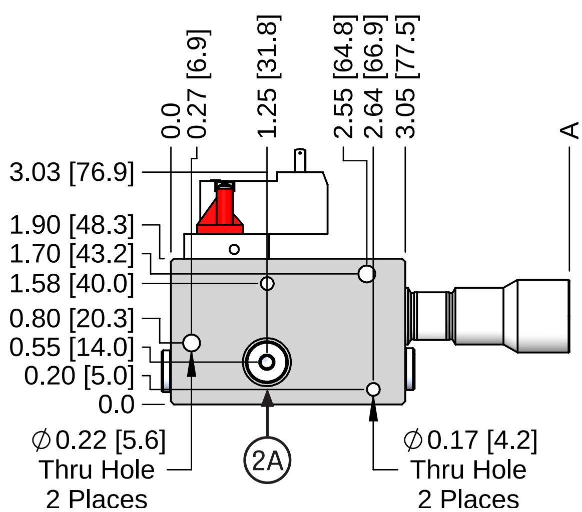
| CODE | FUNCTION | NPT | G |
|---|---|---|---|
| 1 | Air Supply | 1/4 NPTF | G 1/4 |
| 2 | Vacuum - Main | G 1/2 NPSF | G 1/2 NPSF |
| 2A | Vacuum - Alternate | G 1/8 NPSF | G 1/8 NPSF |
| 3 | Exhaust | G 1/2 NPSF | G 1/2 NPSF |

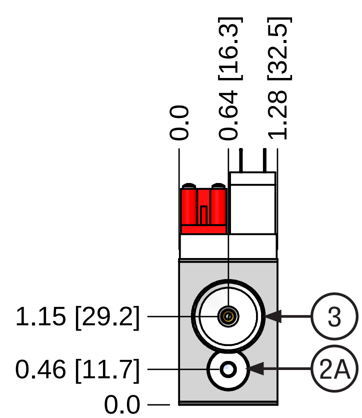
| VENTURI DIAMETER | A in (mm) |
|---|---|
| 20 | 4.47 (113.5) |
| 25 | 4.87 (123.6) |
| 30 | 5.71 (144.9) |

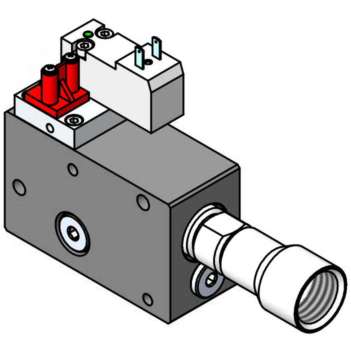
Order DIN T-9 Molded Cords Separately:
923-2M01 = Std. 2M
923-2M31 = L.E.D. 0-50V, 2M
923-2M81 = L.E.D.70-250V, 2M



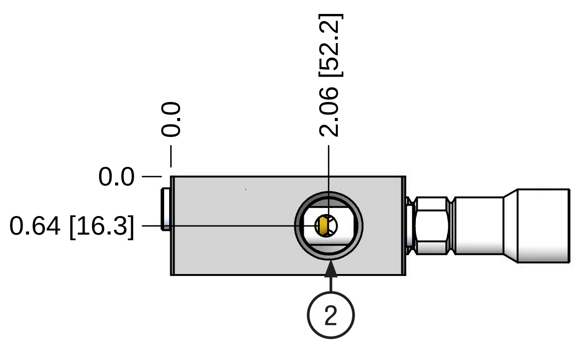


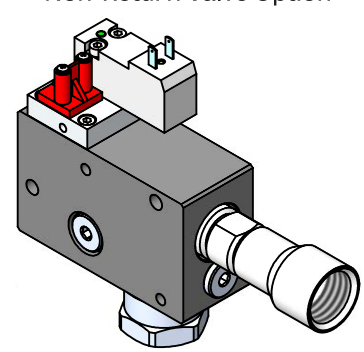



Weight: 0.84 lbs [381.0 g]



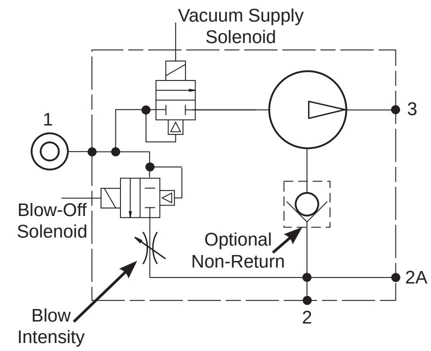

Non-Return Valve Option



Weight: 0.89 lbs [404.0 g]

# J SERIES PUMPS
## SB24D / SB110A : SOLENOID CONTROLLED VACUUM SUPPLY & BLOW-OFF

Large capacity J-series coaxial pumps provide full control features in an integrated package. Pumps may be ordered with any of five different coaxial ejectors to match pump performance to system requirements. An integral solenoid valve provides on/off vacuum control. A second integral pilot-operated valve provides quick-release air control while an integral flow control valve that fine-tunes the blow intensity to suit the application. An optional non-return valve is available for use in sealed non-porous systems. Vacuum sensors may be installed in either of the two 1/8" auxiliary vacuum ports to monitor system vacuum level. Large 1/2" vacuum port readily handles the high vacuum flow produced by coaxial ejectors.

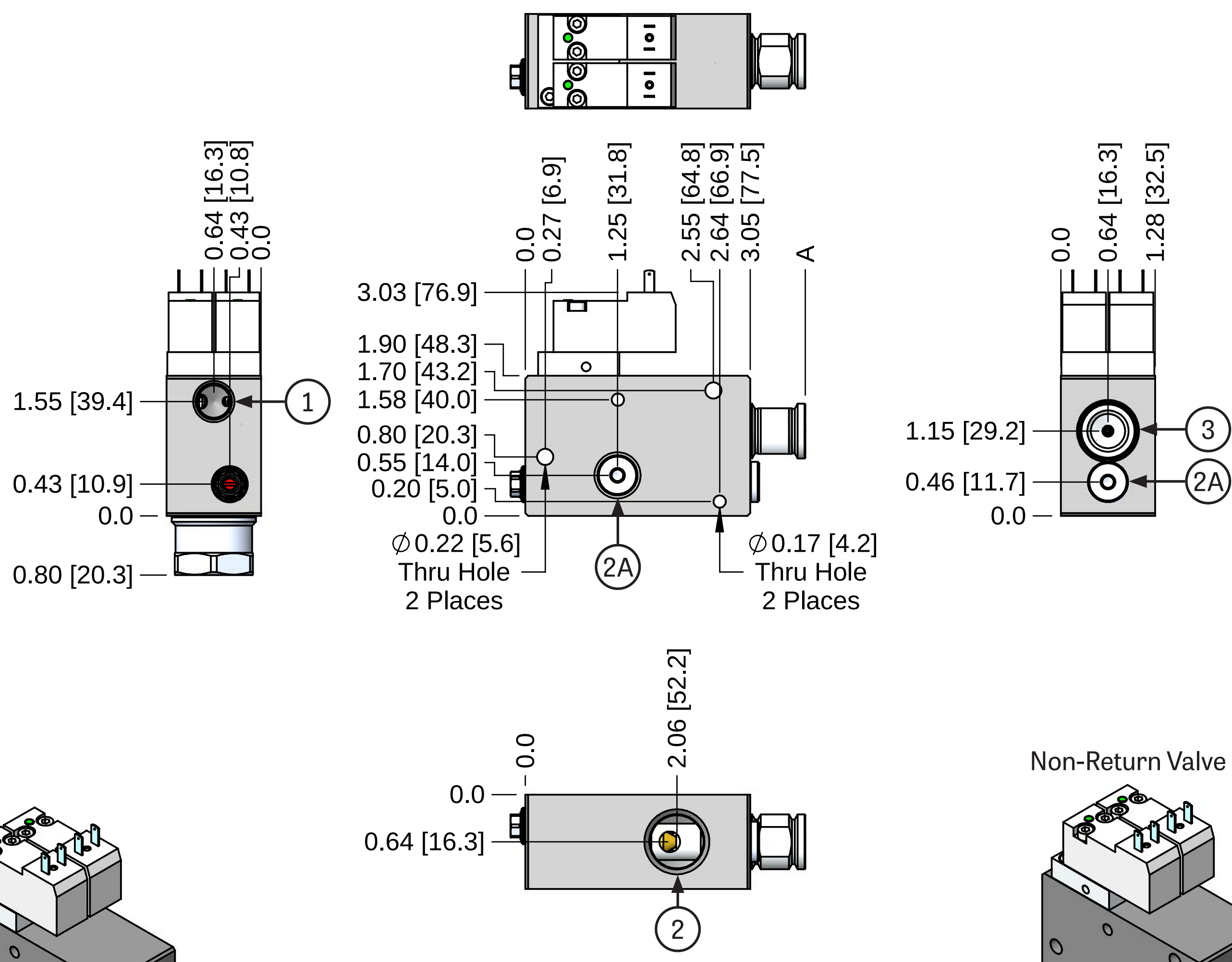


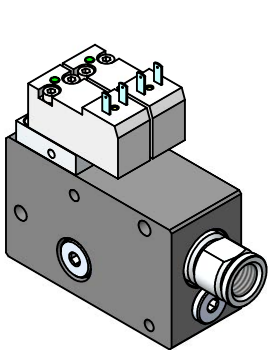

| | VENTURI DIAMETER | | PORTS | | SOLENOID VOLTAGE | | NON RETURN | | SILENCER |
|---|---|---|---|---|---|---|---|---|---|
| J | 12 | H | | -SB | 24D | - | | - | |
| | **12** = 1.2 mm | | (Blank) = NPTF | | **24D** = 24V DC | | (Blank) = No | | (Blank) = None |
| | **15** = 1.5 mm | | **G** = G Threads | | **110A** = 110V AC | | **NR** = Yes | | **ST** = STA14M |

| CODE | FUNCTION | NPT | G |
|---|---|---|---|
| 1 | Air Supply | 1/4 NPTF | G 1/4 |
| 2 | Vacuum - Main | G 1/2 NPSF | G 1/2 NPSF |
| 2A | Vacuum - Alternate | G 1/8 NPSF | G 1/8 NPSF |
| 3 | Exhaust | G 1/4 NPSF | G 1/4 NPSF |

| VENTURI DIAMETER | A in (mm) |
|---|---|
| 12 | 3.09 (78.5) |
| 15 | 3.49 (88.7) |

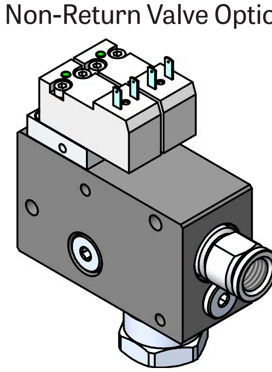
Order DIN T-9 Molded Cords Separately:
923-2M01 = Std. 2M
923-2M31 = L.E.D. 0-50V, 2M
923-2M81 = L.E.D.70-250V, 2M



Weight: 0.85 lbs [386.0 g]

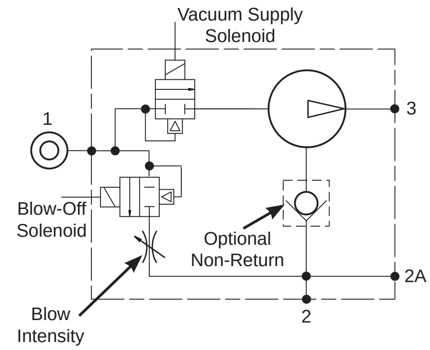
Non-Return Valve Option



Weight: 0.90 lbs [408.0 g]

# J SERIES PUMPS
## SB24D / SB110A : SOLENOID CONTROLLED VACUUM SUPPLY & BLOW-OFF

Large capacity J-series coaxial pumps provide full control features in an integrated package. Pumps may be ordered with any of five different coaxial ejectors to match pump performance to system requirements. An integral solenoid valve provides on/off vacuum control. A second integral pilot-operated valve provides quick-release air control while an integral flow control valve that fine-tunes the blow intensity to suit the application. An optional non-return valve is available for use in sealed non-porous systems. Vacuum sensors may be installed in either of the two 1/8" auxiliary vacuum ports to monitor system vacuum level. Large 1/2" vacuum port readily handles the high vacuum flow produced by coaxial ejectors.

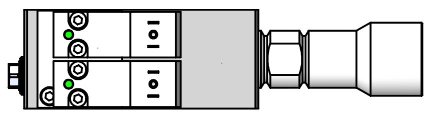


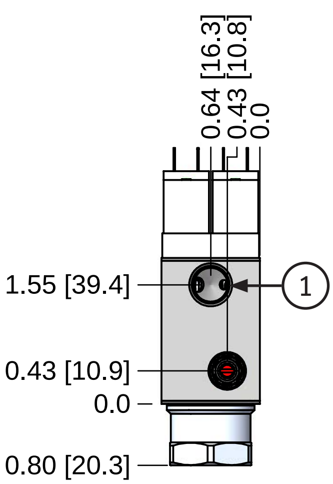

| | VENTURI DIAMETER | | PORTS | | SOLENOID VOLTAGE | | NON RETURN | | SILENCER |
|---|---|---|---|---|---|---|---|---|---|
| J | 25 | H | | -SB | 24D | - | | - | |
| | **20** = 2.0 mm | | (Blank) = NPTF | | **24D** = 24 V DC | | (Blank) = No | | (Blank) = None |
| | **25** = 2.5 mm | | **G** = G Threads | | **110A** = 110V AC | | **NR** = Yes | | **ST** = STC12M |
| | **30** = 3.0 mm | | | | | | | | |

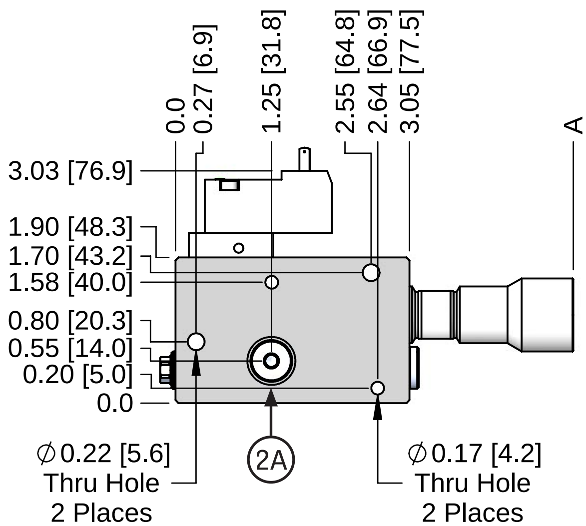
| CODE | FUNCTION | NPT | G |
|---|---|---|---|
| 1 | Air Supply | 1/4 NPTF | G 1/4 |
| 2 | Vacuum - Main | G 1/2 NPSF | G 1/2 NPSF |
| 2A | Vacuum - Alternate | G 1/8 NPSF | G 1/8 NPSF |
| 3 | Exhaust | G 1/2 NPSF | G 1/2 NPSF |

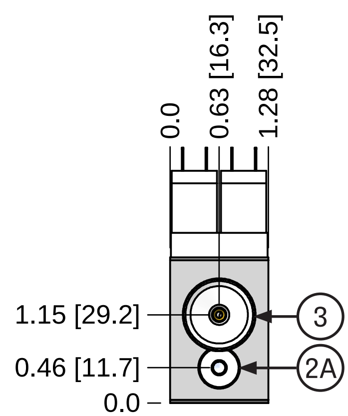
| VENTURI DIAMETER | A in (mm) |
|---|---|
| 20 | 4.47 (113.5) |
| 25 | 4.87 (123.6) |
| 30 | 5.71 (144.9) |

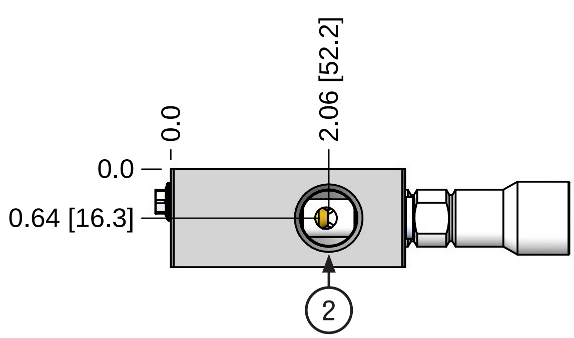
Order DIN T-9 Molded Cords Separately:
923-2M01 = Std. 2M
923-2M31 = L.E.D. 0-50V, 2M
923-2M81 = L.E.D.70-250V, 2M

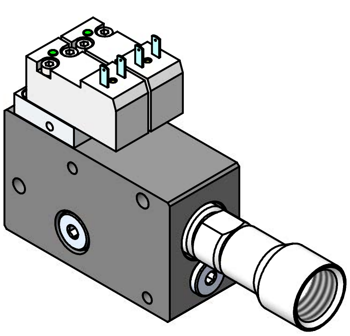




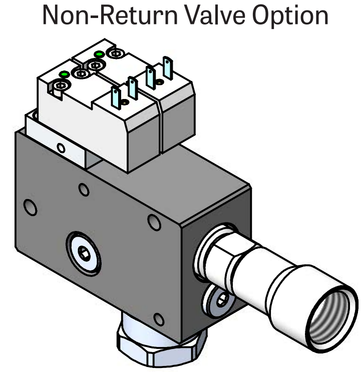



Weight: 0.92 lbs [417.0 g]

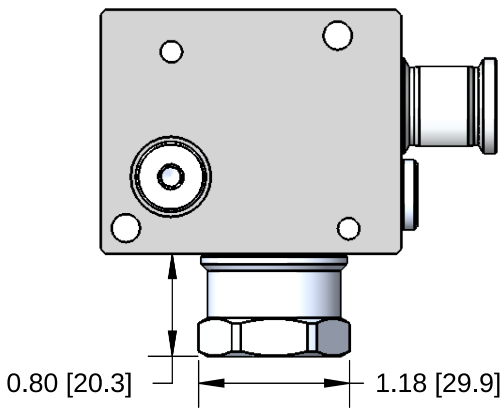
Non-Return Valve Option



Weight: 0.97 lbs [440.0 g]

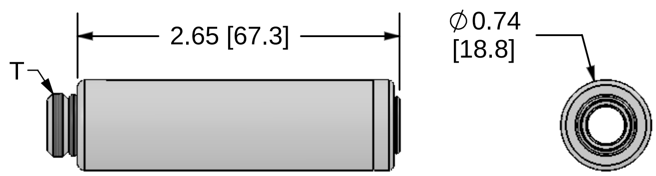
# J SERIES PUMPS OPTIONS

## NON-RETURN VALVE



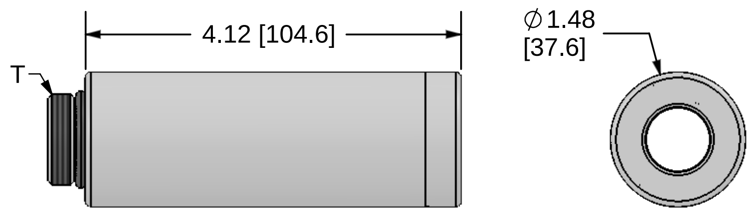

## SILENCERS

### STA14M




Weight: 0.56 oz [15.8 g]

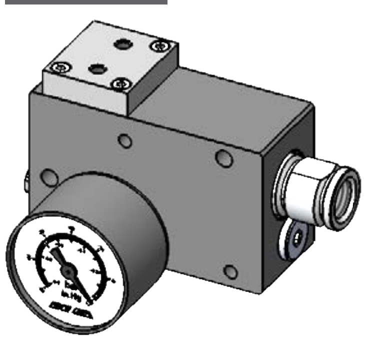
### STC12M



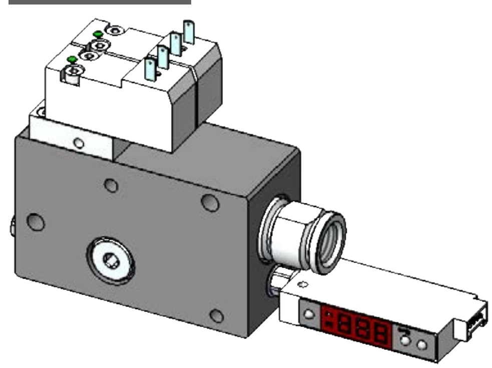

Weight: 1.18 oz [33.6 g]

## ACCESSORIES

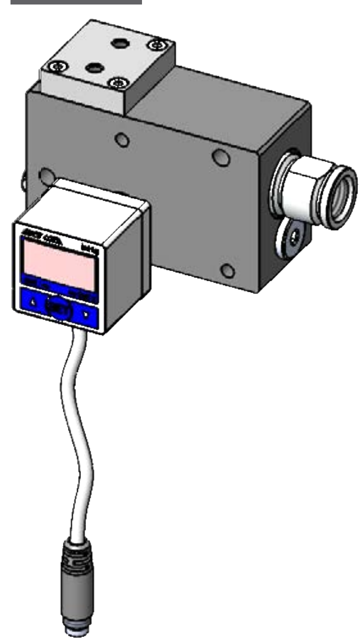
### VG15-18CB



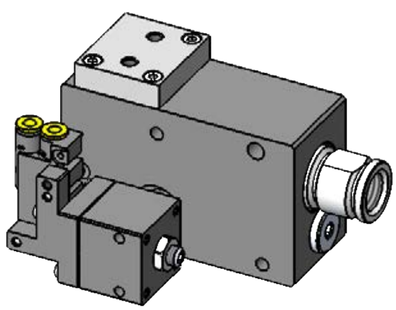
### DVN-61-18M



### DVN-200

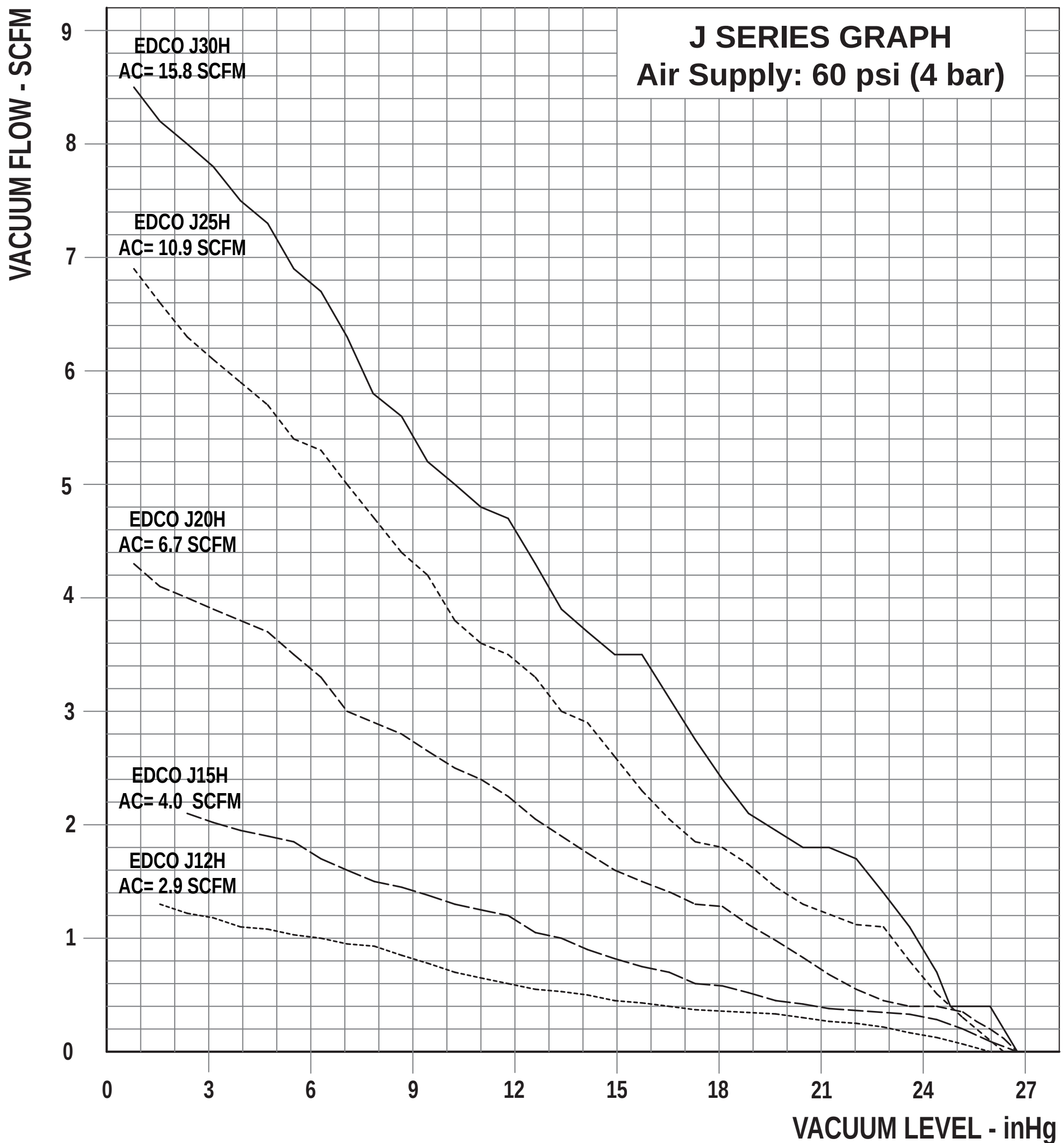


### VSA18-NCL



All performance data presented is a representatation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.

# J SERIES PUMPS
## PERFORMANCE




## VACUUM FLOW - SCFM

| MODEL | AIR SUPPLY PSI | AIR CONS SCFM | MAX VACUUM inHG | SCFM AT VACUUM LEVEL 3 inHG | 6 inHG | 9 inHG | 12 inHG | 15 inHG | 18 inHG | 21 inHG | 24 inHG |
|---|---|---|---|---|---|---|---|---|---|---|---|
| J12H | 60 | 2.9 | 26 | 1.2 | 1.0 | 0.8 | 0.6 | 0.5 | 0.4 | 0.3 | 0.1 |
| J15H | 60 | 4.0 | 26.7 | 2.0 | 1.8 | 1.4 | 1.2 | 0.8 | 0.6 | 0.4 | 0.3 |
| J20H | 60 | 6.7 | 26.7 | 3.9 | 3.4 | 2.7 | 2.2 | 1.6 | 1.3 | 0.7 | 0.4 |
| J25H | 60 | 10.9 | 26.3 | 6.1 | 5.3 | 4.3 | 3.5 | 2.6 | 1.8 | 1.2 | 0.7 |
| J30H | 60 | 15.8 | 26.7 | 7.8 | 6.8 | 5.4 | 4.6 | 3.5 | 2.4 | 1.8 | 0.9 |

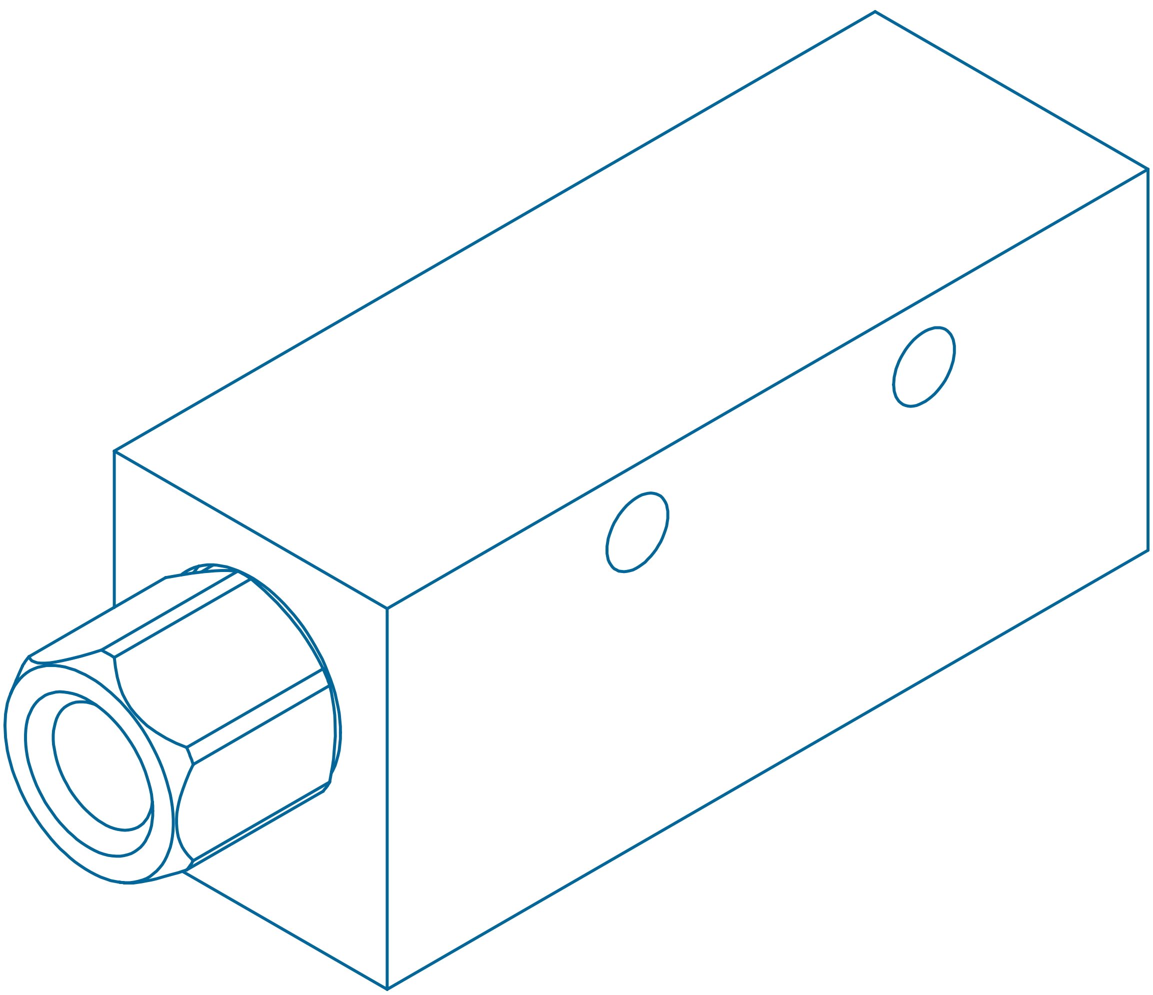
SCFM X 28.32 = nl / m

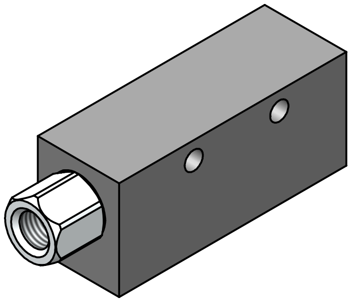
## EVACUATION TIME - SEC / FT³

| MODEL | AIR SUPPLY PSI | AIR CONS SCFM | MAX VACUUM inHG | SECONDS TO VACUUM LEVEL 3 inHG | 6 inHG | 9 inHG | 12 inHG | 15 inHG | 18 inHG | 21 inHG | 24 inHG |
|---|---|---|---|---|---|---|---|---|---|---|---|
| J12H | 60 | 2.9 | 26 | 3.7 | 1.0 | 16.5 | 28.4 | 47.2 | 78.0 | 134.0 | 252.0 |
| J15H | 60 | 4.0 | 26.7 | 2.2 | 5.2 | 9.7 | 16.4 | 27.0 | 63.3 | 77.0 | 147.0 |
| J20H | 60 | 6.7 | 26.7 | 1.1 | 2.7 | 5.1 | 8.5 | 14.0 | 23.1 | 39.8 | 76.2 |
| J25H | 60 | 10.9 | 26.3 | 0.7 | 1.7 | 3.2 | 5.4 | 8.9 | 14.7 | 25.3 | 48.0 |
| J30H | 60 | 15.8 | 26.7 | 0.6 | 1.4 | 2.5 | 4.3 | 7.0 | 11.4 | 19.6 | 37.2 |

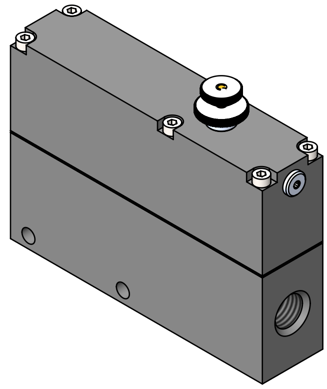
sec / ft$^3$ X 35.32 = sec / m$^3$

# Single-Stage Vacuum Pumps
## Section 14

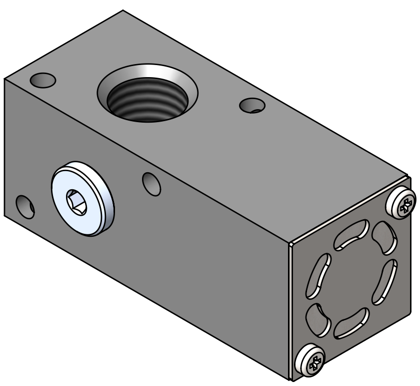




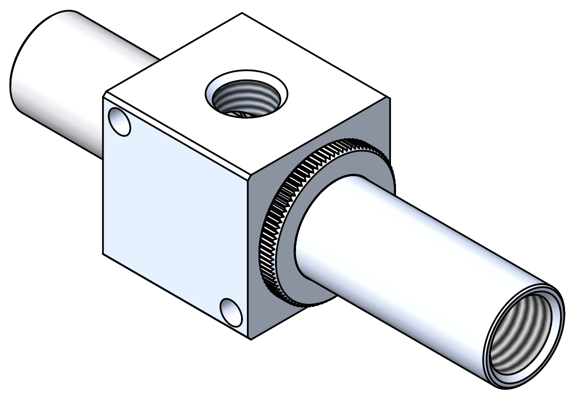
EV Series



V Series



SM Series

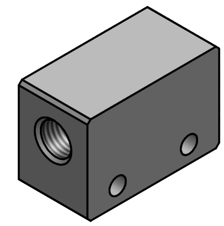


Variable Displacement

## EV Series Vacuum Pump

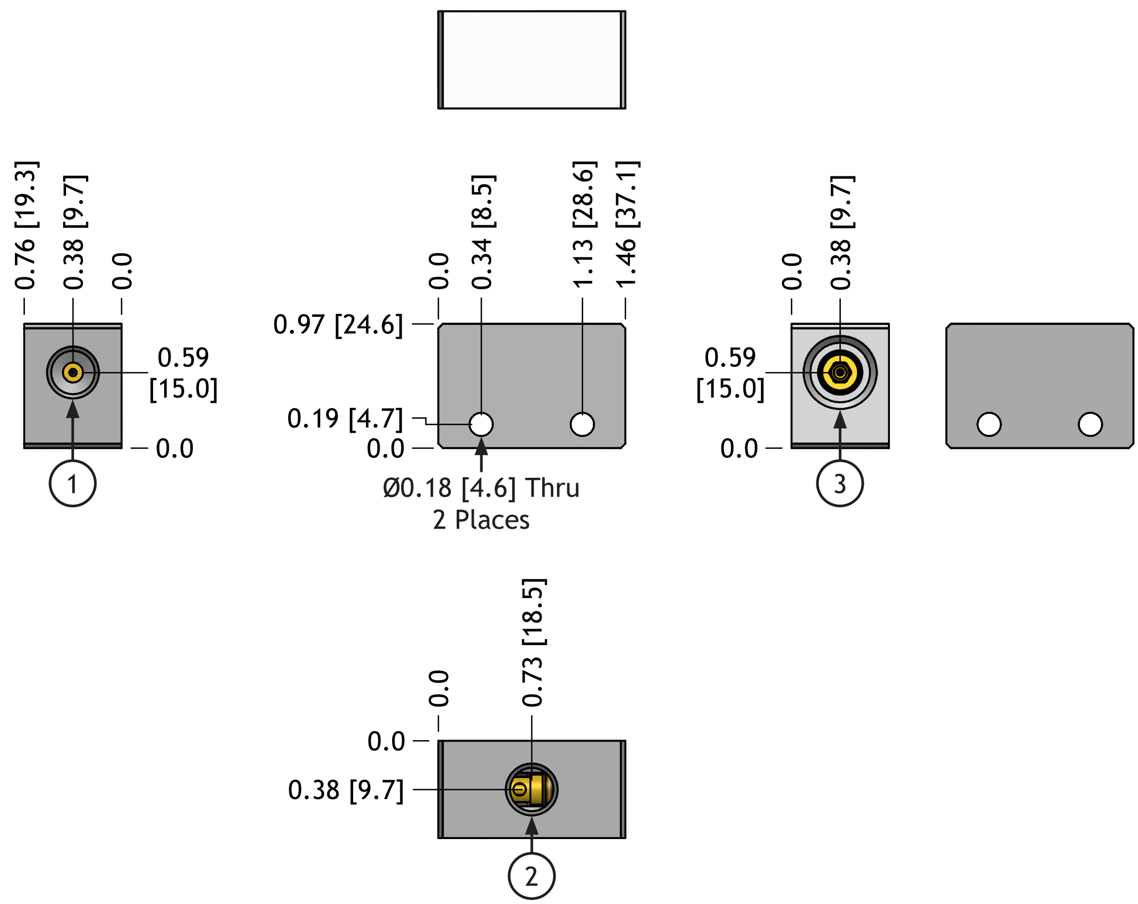
EV single-stage vacuum generators provide a compact, lightweight, low-cost vacuum source for pick & place and material handling applications. The simple two-piece design allows ingested debris to exit the exhaust port. The optional "ST" straight-through exhaust silencer is a no-clog design that will pass ingested debris to atmosphere.

A G 1/8 NPSF auxiliary vacuum port is included so a gauge or vacuum switch can be easily added to complete a system. Construction is aluminum with anodized pump body and electroless-nickel plated primary nozzle.

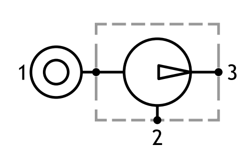


*Weight: 1.56 oz [44.2 g]*

| Model | Silencer | |
|---|---|---|
| EV05HS | | |
| | (Blank) | None |
| | -ST | STA14M |
| | -AA | AA14M |



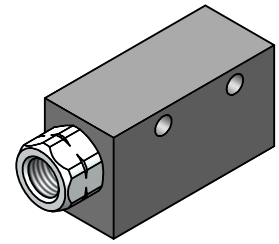

| Code | Function | Ports |
|---|---|---|
| 1 | Air-Supply | G 1/8 NPSF |
| 2 | Vacuum | G 1/8 NPSF |
| 3 | Exhaust | G 1/4 |



# EV Series Vacuum Pump

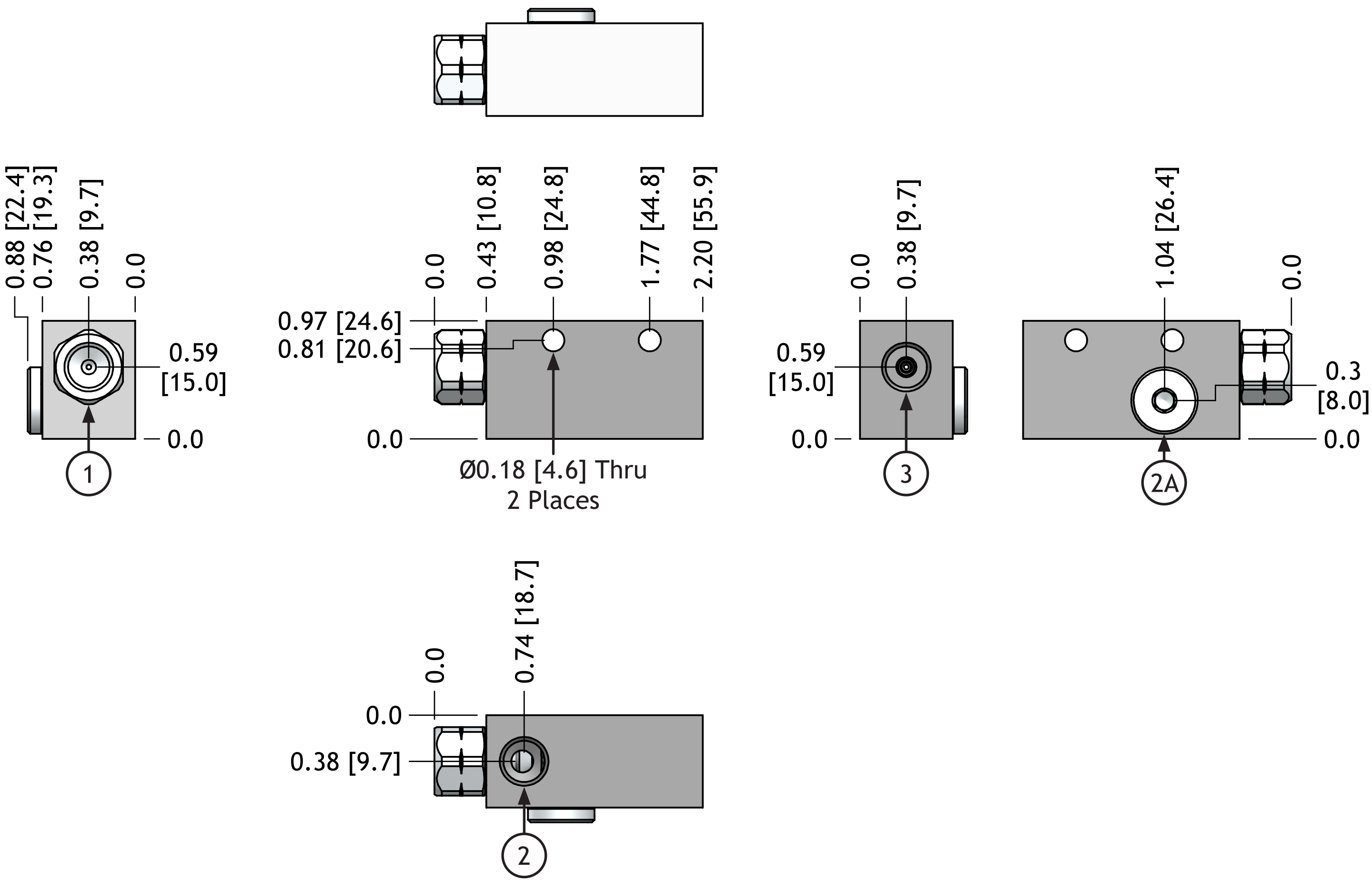
EV single-stage vacuum generators provide a compact, lightweight, low-cost vacuum source for pick & place and material handling applications. The simple two-piece design allows ingested debris to exit the exhaust port. The optional “ST” straight-through exhaust silencer is a no-clog design that will pass ingested debris to atmosphere.

A G 1/8 NPSF auxiliary vacuum port is included so a gauge or vacuum switch can be easily added to complete a system. Construction is aluminum with anodized pump body and electroless-nickel plated primary nozzle.

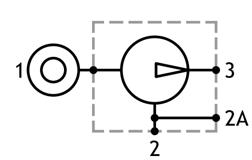


*Weight: 1.98 oz [56.0 g]*

| Model | Silencer | |
|---|---|---|
| EV10HS | | |
| | (Blank) | None |
| | -ST | STA18M |
| | -AA | AA18M |



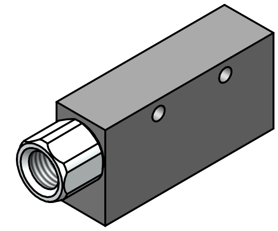

| Code | Function | Ports |
|---|---|---|
| 1 | Air-Supply | G 1/8 NPSF |
| 2 | Vacuum | G 1/8 NPSF |
| 2A | Vacuum - Auxiliary | G 1/8 NPSF |
| 3 | Exhaust | G 1/8 NPSF |



## EV Series Vacuum Pump

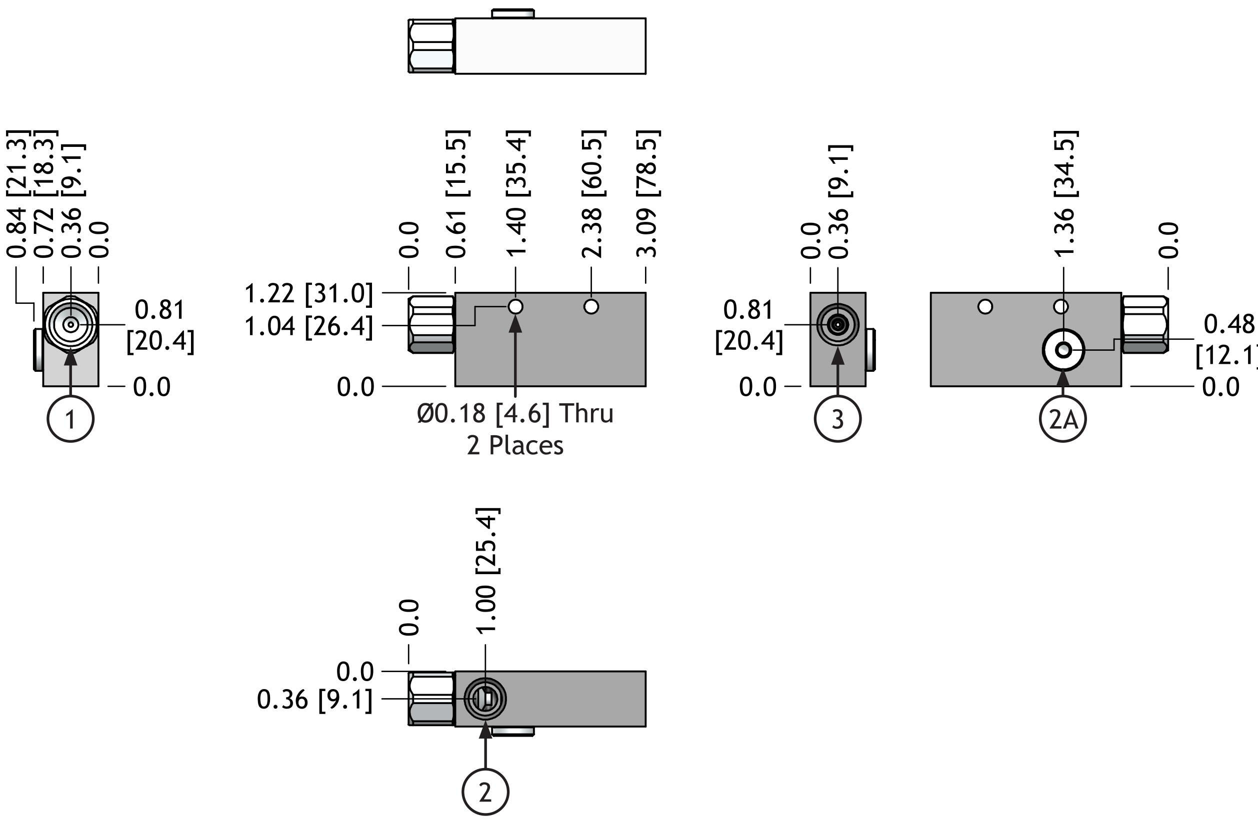
EV single-stage vacuum generators provide a compact, lightweight, low-cost vacuum source for pick & place and material handling applications. The simple two-piece design allows ingested debris to exit the exhaust port. The optional "ST" straight-through exhaust silencer is a no-clog design that will pass ingested debris to atmosphere.

A G 1/8 NPSF auxiliary vacuum port is included so a gauge or vacuum switch can be easily added to complete a system. Construction is aluminum with anodized pump body and electroless-nickel plated primary nozzle.

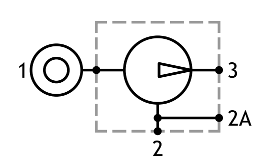


*Weight: 3.27 oz [92.8 g]*

| | Threads | | Silencer | |
|---|---|---|---|---|
| EV15HS | | | | |
| | (Blank) | NPT Threads | (Blank) | None |
| | -G | G Threads | -ST | STA14M |
| | | | -AA | AA14M |



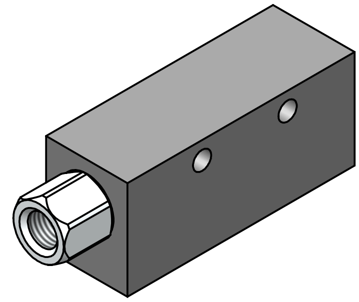

| Code | Function | NPT | G |
|---|---|---|---|
| 1 | Air-Supply | 1/4 NPTF | G 1/4 |
| 2 | Vacuum | 1/4 NPTF | G 1/4 |
| 2A | Vacuum - Auxiliary | G 1/8 NPSF | |
| 3 | Exhaust | 1/4 NPTF | G 1/4 |



## EV Series Vacuum Pump

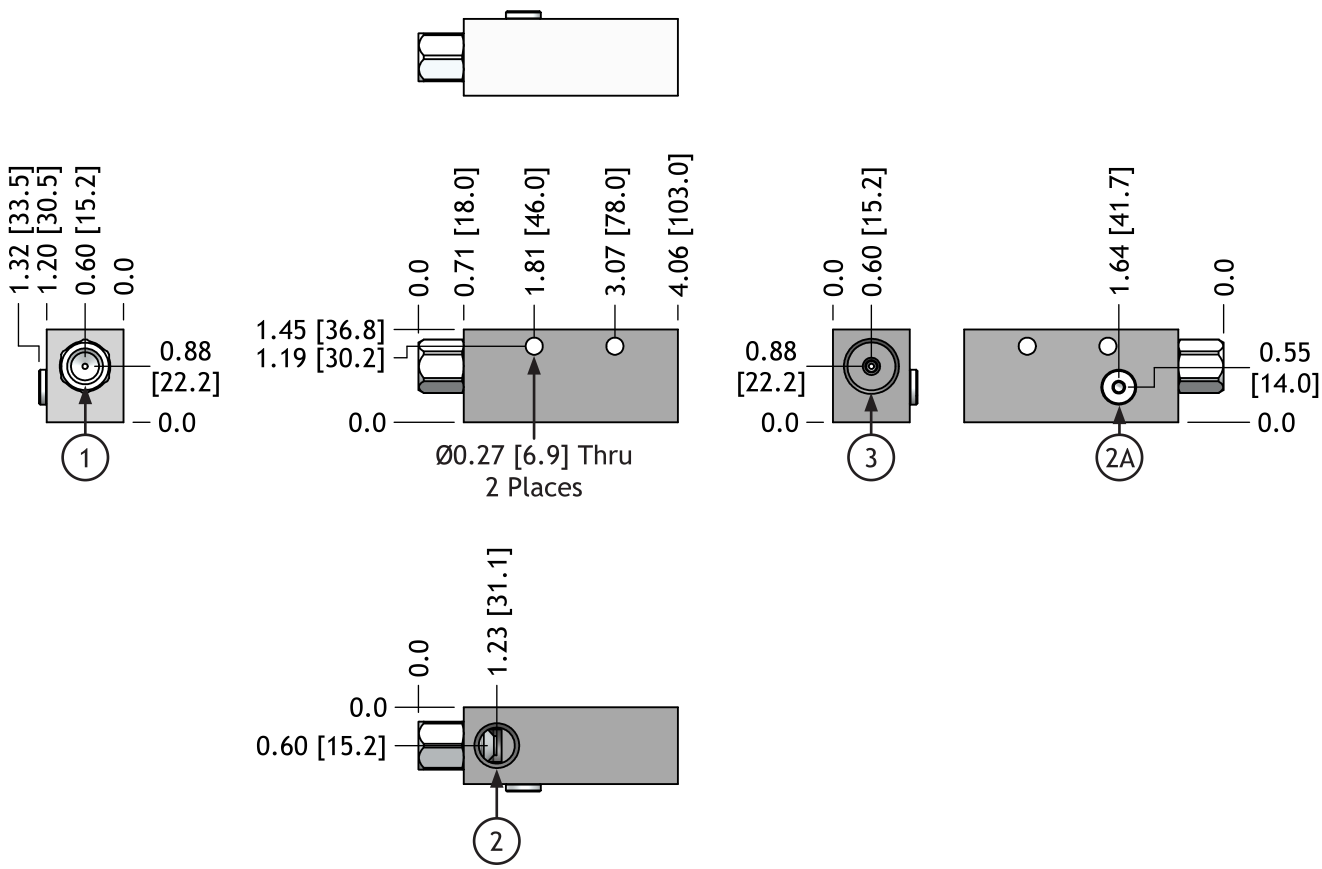
EV single-stage vacuum generators provide a compact, lightweight, low-cost vacuum source for pick & place and material handling applications. The simple two-piece design allows ingested debris to exit the exhaust port. The optional "ST" straight-through exhaust silencer is a no-clog design that will pass ingested debris to atmosphere.

A G 1/8 NPSF auxiliary vacuum port is included so a gauge or vacuum switch can be easily added to complete a system. Construction is aluminum with anodized pump body and electroless-nickel plated primary nozzle.

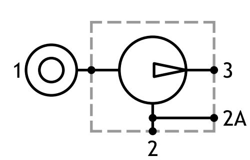


*Weight: 8.45 oz [239.6 g]*

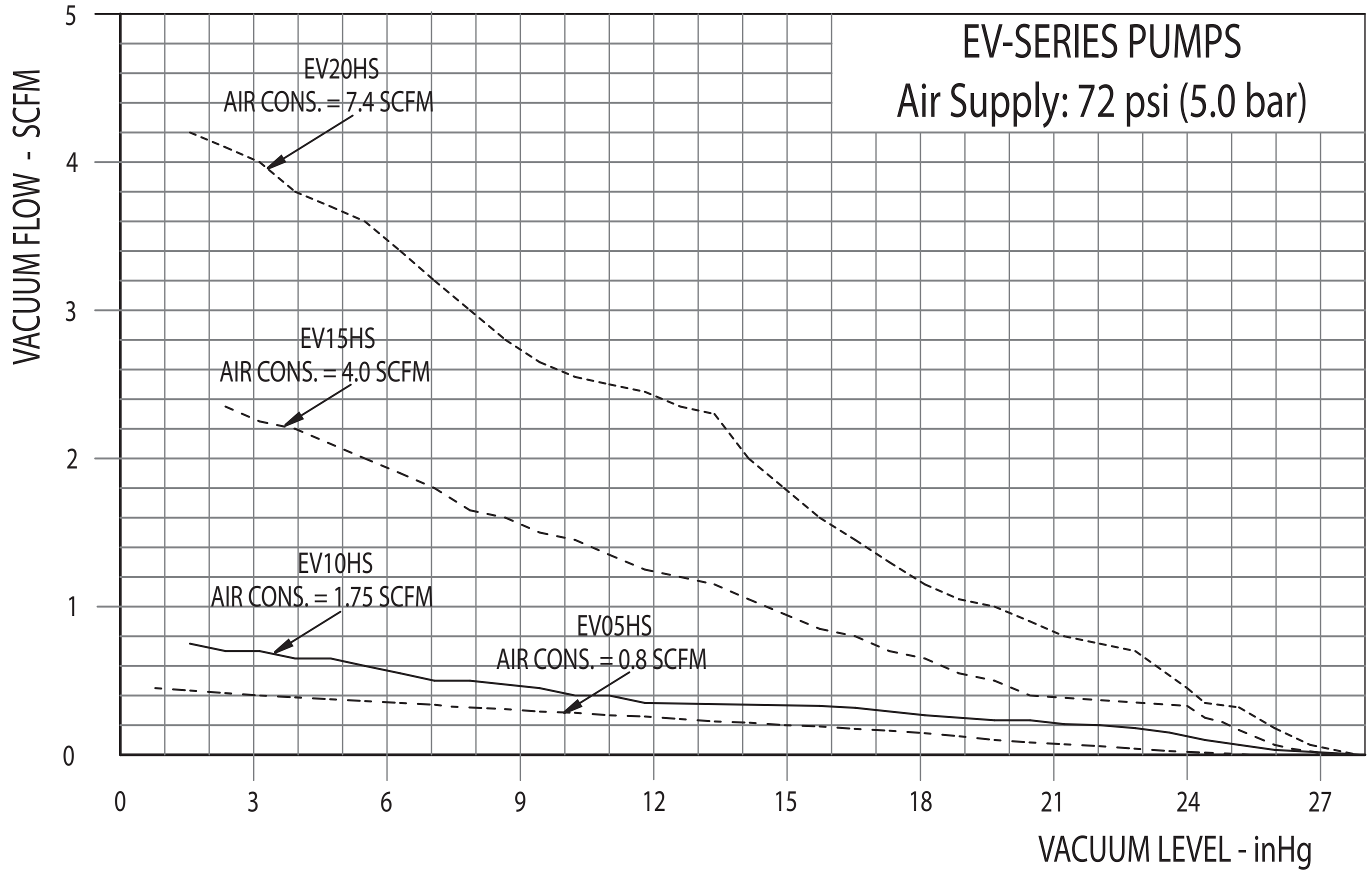
| | Threads | | Silencer | |
|---|---|---|---|---|
| EV20HS | | | | |
| | (Blank) | NPT Threads | (Blank) | None |
| | -G | G Threads | -ST | STC12M |
| | | | -AA | AA12M |




| Code | Function | NPT | G |
|---|---|---|---|
| 1 | Air-Supply | 1/4 NPTF | G 1/4 |
| 2 | Vacuum | 3/8 NPTF | G 3/8 |
| 2A | Vacuum - Auxiliary | G 1/8 NPSF | |
| 3 | Exhaust | G 1/2 NPSF | |



## EV Series Performance




### Vacuum Flow - SCFM

| Model | Air-Supply PSI | Air Cons SCFM | Max Vac inHg | SCFM at Vacuum Level | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 3 inHg | 6 inHg | 9 inHg | 12 inHg | 15 inHg | 18 inHg | 21 inHg | 24 inHg |
| EV05HS | 72 | 0.4 | 26.7 | 0.25 | 0.22 | 0.20 | 0.15 | 0.12 | 0.7 | 0.03 | 0.01 |
| EV10HS | 72 | 1.8 | 28 | 0.70 | 0.57 | 0.46 | 0.35 | 0.33 | 0.27 | 0.22 | 0.13 |
| EV15HS | 72 | 4.0 | 27.3 | 2.27 | 1.94 | 1.56 | 1.24 | 0.94 | 0.66 | 0.39 | 0.33 |
| EV20HS | 72 | 7.4 | 27.8 | 4.01 | 3.48 | 2.74 | 2.42 | 1.78 | 1.17 | 0.83 | 0.45 |

*SCFM X 28.32 = nl / m*

### Evacuation Time - sec / 100 in³

| Model | Air-Supply PSI | Air Cons SCFM | Max Vac inHg | SCFM at Vacuum Level | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 3 inHg | 6 inHg | 9 inHg | 12 inHg | 15 inHg | 18 inHg | 21 inHg | 24 inHg |
| EV05HS | 72 | 0.4 | 26.7 | 1 | 2.5 | 4.5 | 7.5 | 12.5 | 20 | 35 | - |
| EV10HS | 72 | 1.8 | 28 | 0.36 | 0.44 | 1.6 | 2.8 | 4.6 | 7.6 | 12.6 | 23.6 |
| EV15HS | 72 | 4.0 | 27.3 | 0.11 | 0.27 | 0.5 | 0.86 | 1.4 | 2.3 | 4.1 | 7.8 |
| EV20HS | 72 | 7.4 | 27.8 | 0.06 | 0.15 | 0.3 | 0.5 | 0.8 | 1.3 | 2.2 | 4.2 |

*sec / 100 in³ X 0.61 = sec / l*

*All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.*

## V Series Vacuum Pumps

V-Series vacuum pumps are available in 24 models with anodized aluminum bodies plus 12 cartridge models for integration into custom vacuum manifold systems.

EDCO Single-Stage Pumps provide the instantaneous response common to air operated devices in addition to being compact, light, and cost-effective. Rugged, all-metal construction will provide years of trouble-free service.

Our no-clog, flow-through design is perfectly suited for packaging and other applications involving paper fibers or other debris that can be ingested into the vacuum system. Our optional straight-through silencer passes the exhaust directly to atmosphere after absorbing high-frequency noise from the air stream. Many of our competitors use closed-end plastic exhaust mufflers where the exhaust is passed through a filter media that will accumulate debris, eventually causing a loss of pump performance. In systems where conditions are very dirty, such as woodworking, a vacuum filter should be used to remove dust and debris so they will not be dispersed in the exhaust and breathed by workers.

As always, to obtain maximum benefits of EDCO compressed air powered vacuum pumps, they should be mounted close to the point of vacuum usage to minimize line losses, reduce vacuum system volume, and minimize system evacuation time.

For ease of mounting, V-Series Pump bodies feature square or rectangular cross-sections and include mounting holes. This results in a much simpler installation with a better appearance than with cylindrical body vacuum pumps.

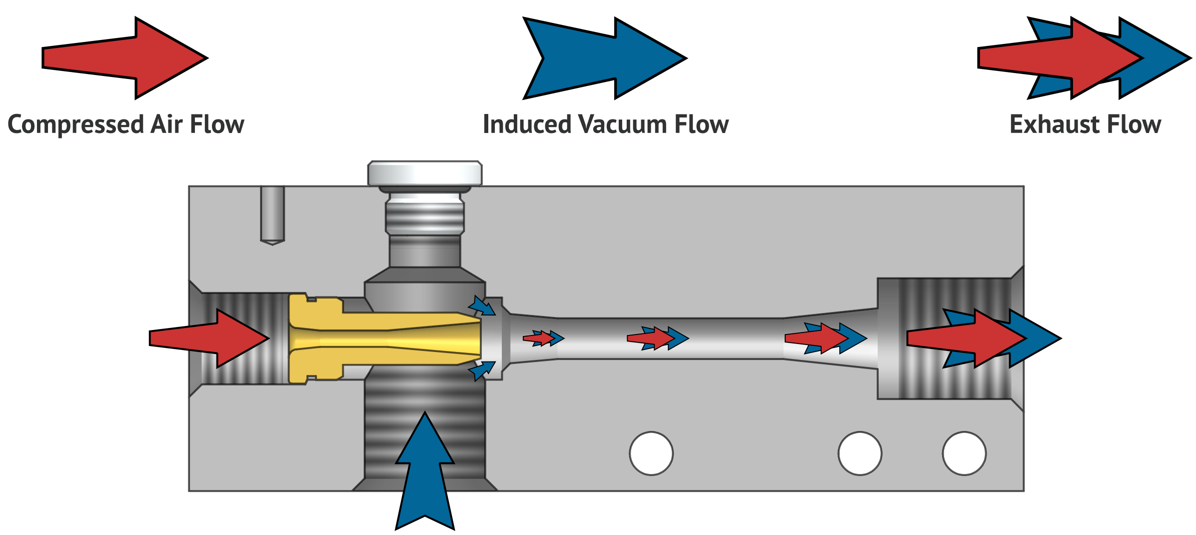
### Principles of Operation

To generate vacuum, compressed air is supplied to the inlet of a shaped primary nozzle to concentrate the air stream so that it increases in velocity as it passes through the nozzle throat. As velocity increases, pressure decreases until it is below atmospheric pressure (vacuum) and the high-velocity air stream is passed into a second nozzle that is spaced away from the end of the primary nozzle. The gap between the two nozzles occurs within a chamber with a threaded port for connecting to a system requiring a vacuum source. As evacuated air flows into the vacuum port, it is drawn into a second nozzle where it is mixed with air from the primary nozzle and combined flow is exhausted to atmosphere after passing through a silencer where expansion continues and noise is absorbed by an acoustic media.

To stop the vacuum, the compressed air supply is removed and vented by a 3-way supply valve. When air flow stops, vacuum is no longer generated and ambient air flows into the exhaust and into the vacuum line to dissipate the residual vacuum thereby releasing work pieces from vacuum cups or other vacuum holders in the system.

Geometry of the primary and secondary nozzles determines the shape of the pump performance curve and the depth of vacuum that can be achieved. Nozzles are optimized for operation at specific pressure but can be used at other supply pressures to suit an application. When operating at some non-optimum air pressure, a rapid popping noise may be heard in the exhaust which is caused when air velocity achieves unstable, supersonic / subsonic velocity and can be eliminated by slightly increasing or decreasing the air supply pressure.

There are many terms for these devices included generator, ejector, and venturi. They are commonly called vacuum pumps in the industry, so that is the term we use. No matter what the name is, they are very useful for providing fast, reliable, compact, low-cost vacuum sources for all manners of application.

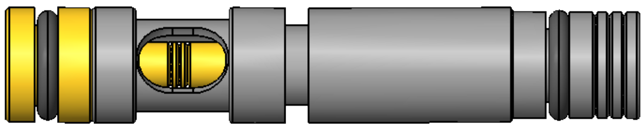


## V Series Venturi Cartridges

V10 and V20 Series Nozzle Sets can be ordered on their own for use in your custom applications.

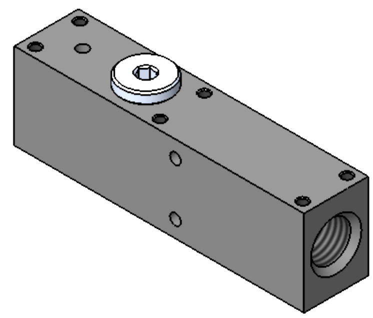
Contact EDCO USA for cavity detail drawing.

| | Nozzle Set | Series |
|---|---|---|
| V- | 60 | H |
| | 60 | H |
| | 90 | H-60 |
| | 100 | M |
| | 150 | M-60 |

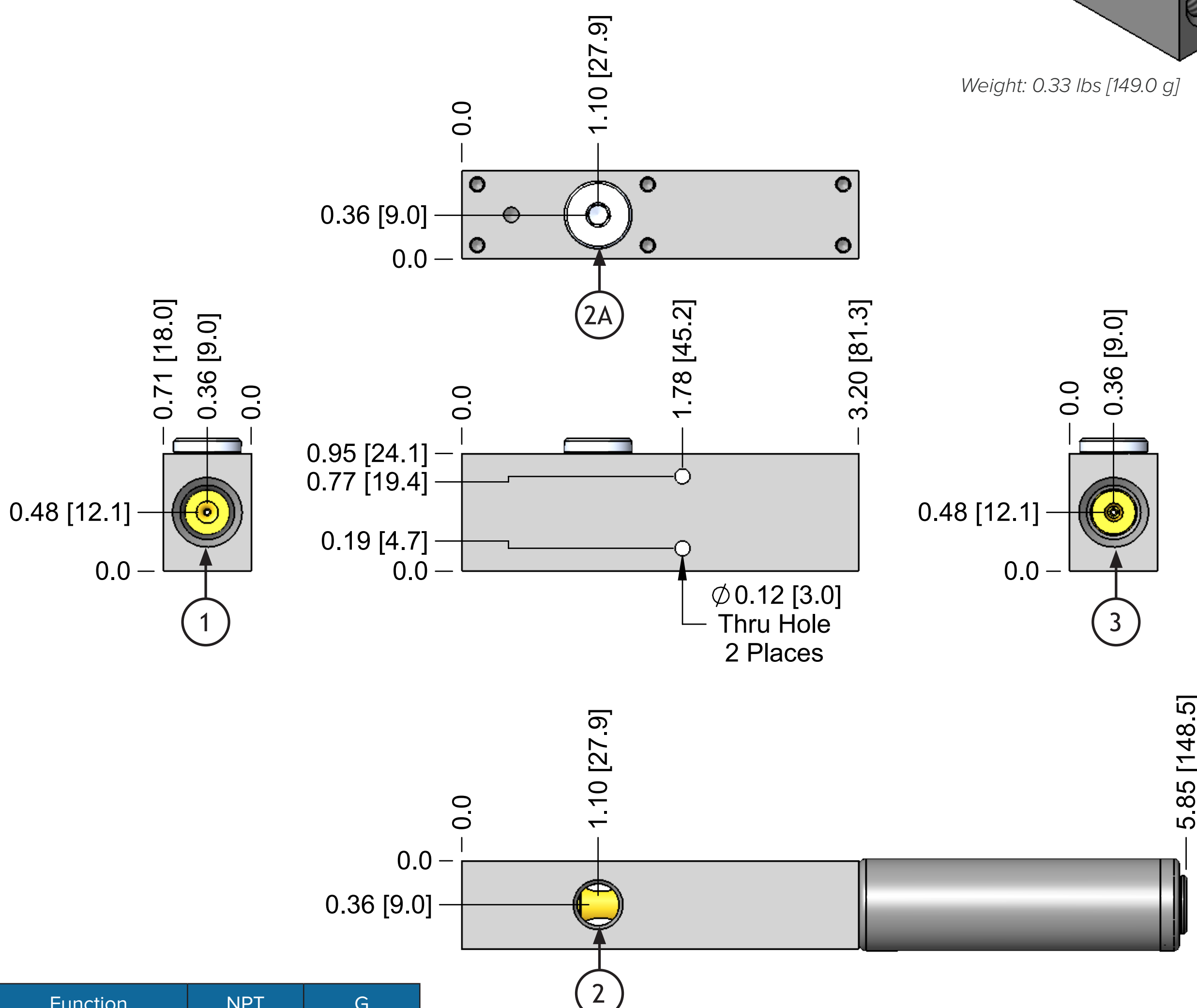


## V10 Vacuum Pumps

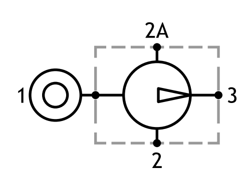
| | Blow-Off Options | | | Nozzle Set | Series | Threads | | Silencer | |
|---|---|---|---|---|---|---|---|---|---|
| V10 | | | - | 60 | H | | | | |
| | (Blank) | None | | 60 | H | (Blank) | NPT | (Blank) | None |
| | -X | Blow-Off | | 90 | H-60 | -G | G Threads | -ST | STA14M |
| | | | | 100 | M | | | | |
| | | | | 150 | M-60 | | | | |



*Weight: 0.33 lbs [149.0 g]*

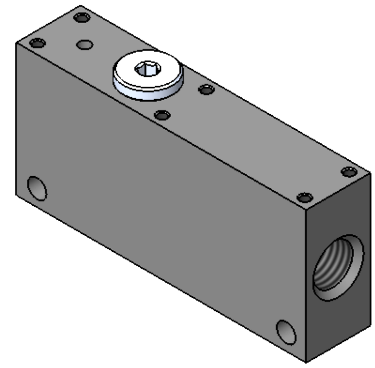



| Code | Function | NPT | G |
|---|---|---|---|
| 1 | Air-Supply | 1/4 NPTF | G 1/4 |
| 2 | Vacuum | G 1/8 NPSF | |
| 2A | Vacuum - Auxiliary | G 1/8 NPSF | |
| 3 | Exhaust | 1/4 NPTF | G 1/4 |

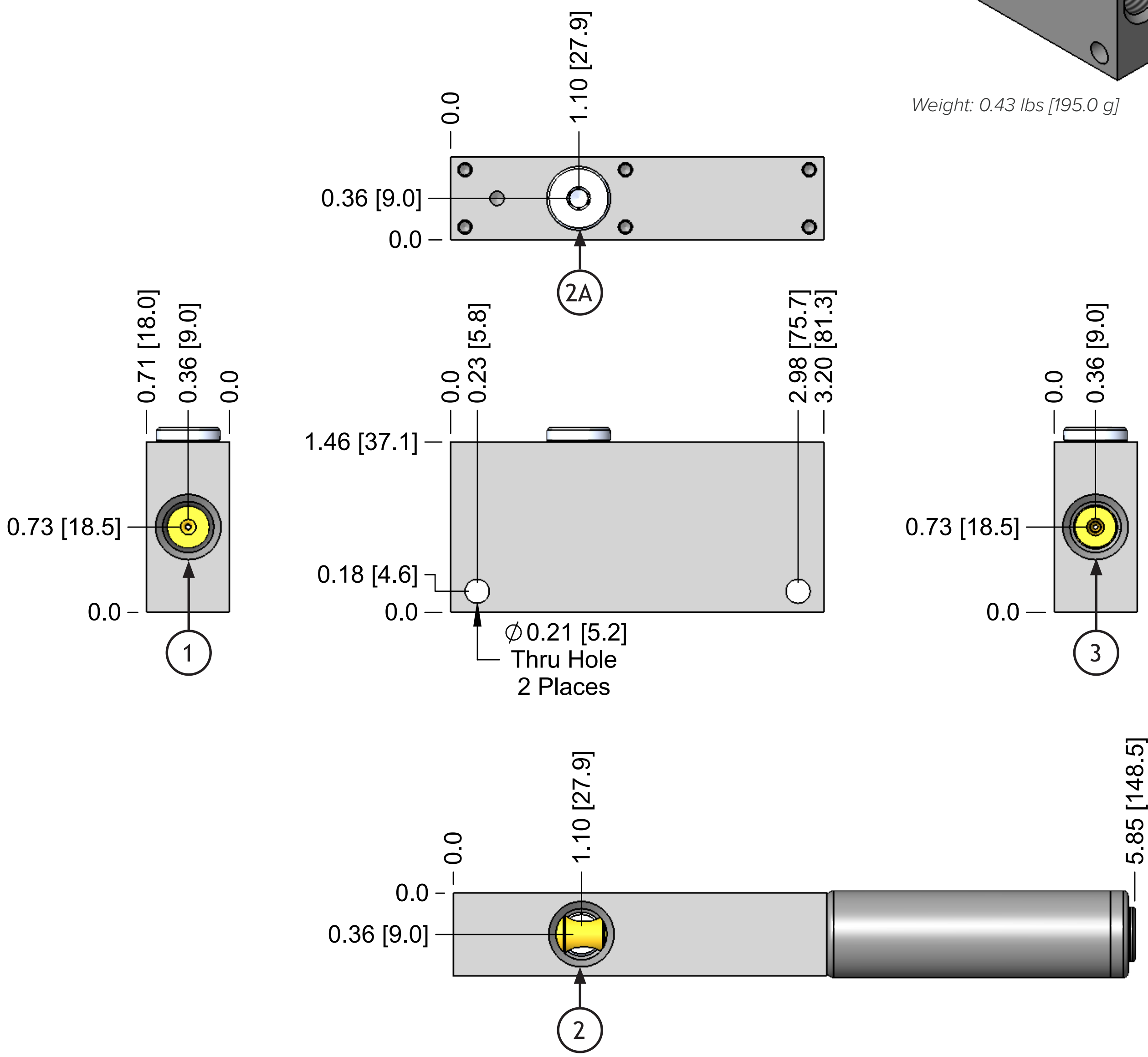


# V20 Vacuum Pumps

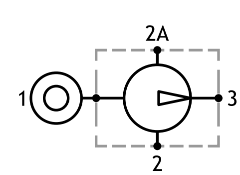
| | Blow-Off Options | | | Nozzle Set | Series | Threads | | Silencer | |
|---|---|---|---|---|---|---|---|---|---|
| V20 | | | - | 60 | H | | | | |
| | (Blank) | None | | 60 | H | (Blank) | NPT | (Blank) | None |
| | -X | Blow-Off | | 90 | H-60 | -G | G Threads | -ST | STA14M |
| | | | | 100 | M | | | | |
| | | | | 150 | M-60 | | | | |



*Weight: 0.43 lbs [195.0 g]*



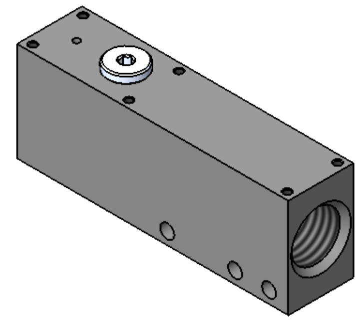

| Code | Function | NPT | G |
|---|---|---|---|
| 1 | Air-Supply | 1/4 NPTF | G 1/4 |
| 2 | Vacuum | 1/4 NPTF | G 1/4 |
| 2A | Vacuum - Auxiliary | G 1/8 NPSF | |
| 3 | Exhaust | 1/4 NPTF | G 1/4 |



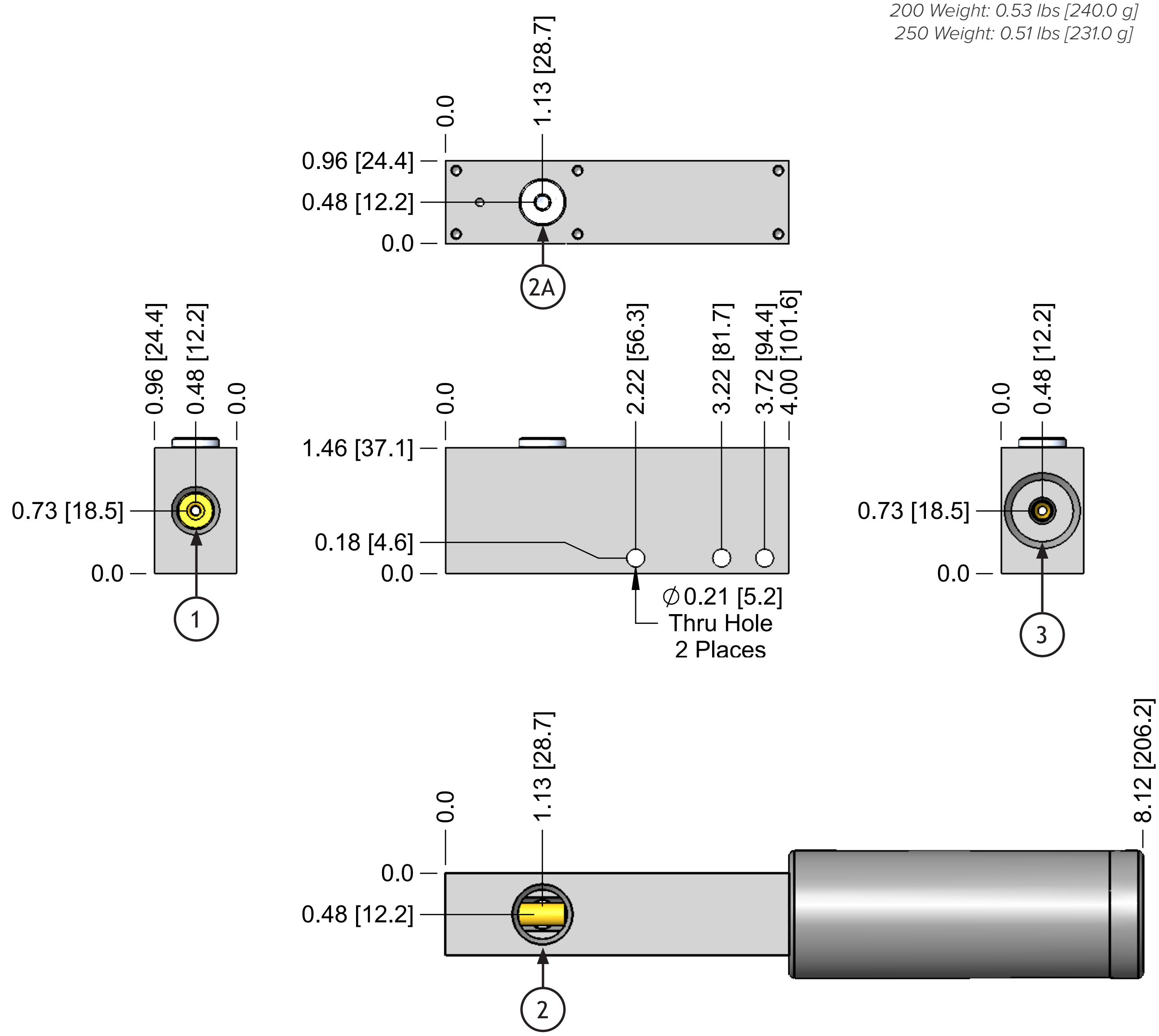
# V80 Vacuum Pumps

| | Blow-Off Options | | Nozzle Set | Series | Threads | | Silencer[1] | |
|---|---|---|---|---|---|---|---|---|
| V80 | | - | 200 | H | | | | |
| | (Blank) | None | 200 | H | (Blank) | NPT | (Blank) | None |
| | -X | Blow-Off | 250 | H-60 | -G | G Threads | -ST | ST Silencer |
| | | | | M | | | | |
| | | | | M-60 | | | | |

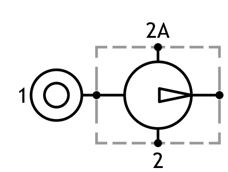
*[1]Pumps with 200 Nozzle Sets use STB38M Silencers.*
*[1]Pumps with 250 Nozzle Sets use STC12M ilencers.*



*200 Weight: 0.53 lbs [240.0 g]*
*250 Weight: 0.51 lbs [231.0 g]*



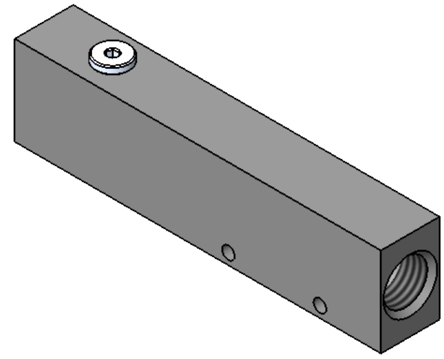

| Code | Function | 200 - NPT | 200 - G | 250 - NPT | 250 - G |
|---|---|---|---|---|---|
| 1 | Air-Supply | 1/4 NPTF | G 1/4 | 1/4 NPTF | G 1/4 |
| 2 | Vacuum | 3/8 NPTF | G 3/8 | 3/8 NPTF | G 3/8 |
| 2A | Vacuum - Auxiliary | G 1/8 NPSF | | | |
| 3 | Exhaust | 3/8 NPTF | G 3/8 | 1/2 NPTF | G 1/2 |



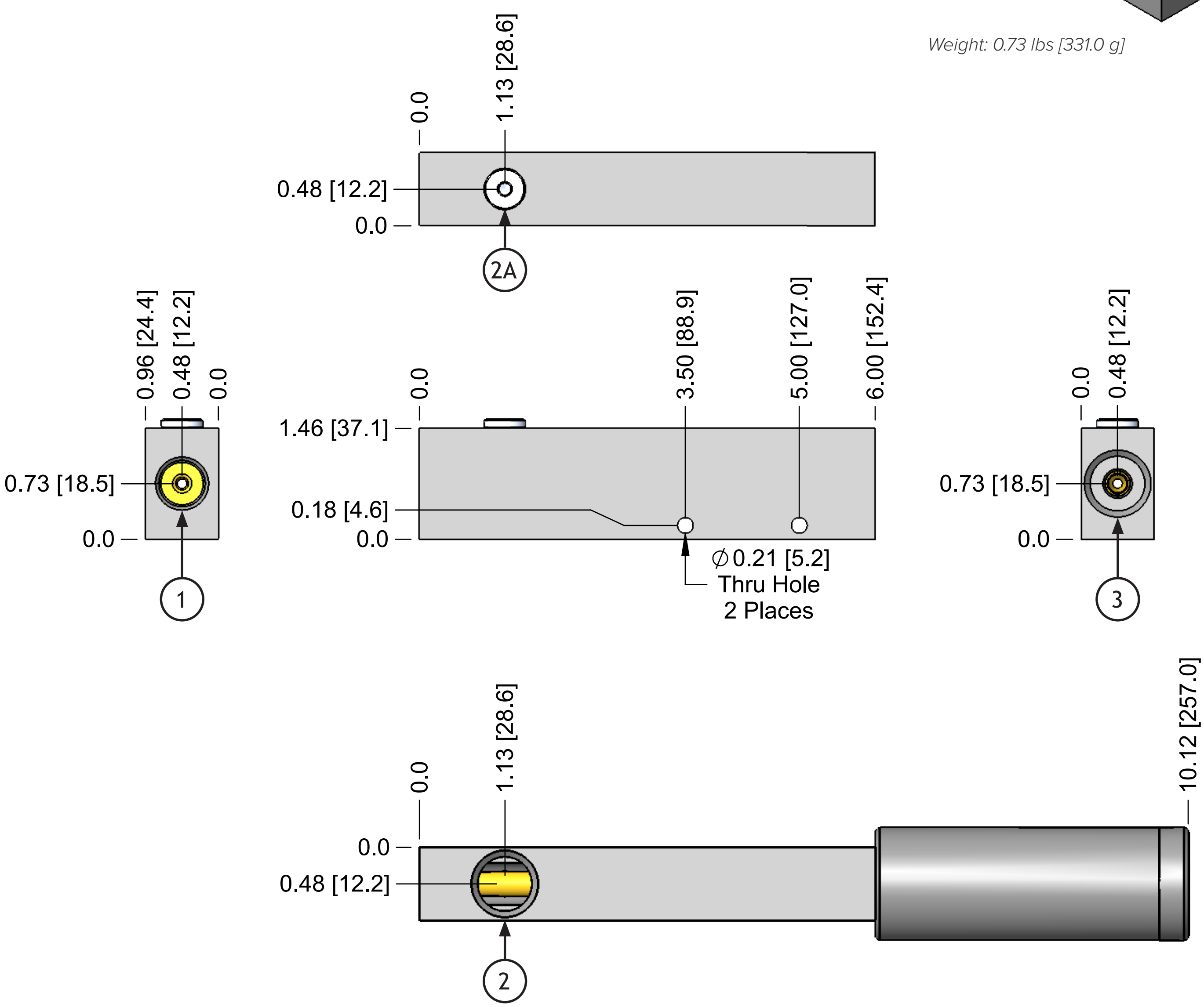
# V90 Vacuum Pumps

| | Blow-Off Options | | Nozzle Set | Series | Threads | | Silencer[1] | |
|---|---|---|---|---|---|---|---|---|
| V90 | | - | 300 | H | | | | |
| | (Blank) | None | 300 | H | (Blank) | NPT | (Blank) | None |
| | -X | Blow-Off | 350 | H-60 | -G | G Threads | -ST | ST Silencer |
| | | | | M | | | | |
| | | | | M-60 | | | | |

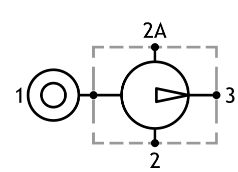
[1]Pumps with 300 Nozzle Sets use STC12M Silencers.
[1]Pumps with 350 Nozzle Sets use STC12M-6 Silencers.



*Weight: 0.73 lbs [331.0 g]*




| Code | Function | NPT | G |
|---|---|---|---|
| 1 | Air-Supply | 3/8 NPTF | G 3/8 |
| 2 | Vacuum | 1/2 NPTF | G 1/2 |
| 2A | Vacuum - Auxiliary | G 1/8 NPSF | |
| 3 | Exhaust | 1/2 NPTF | G 1/2 |



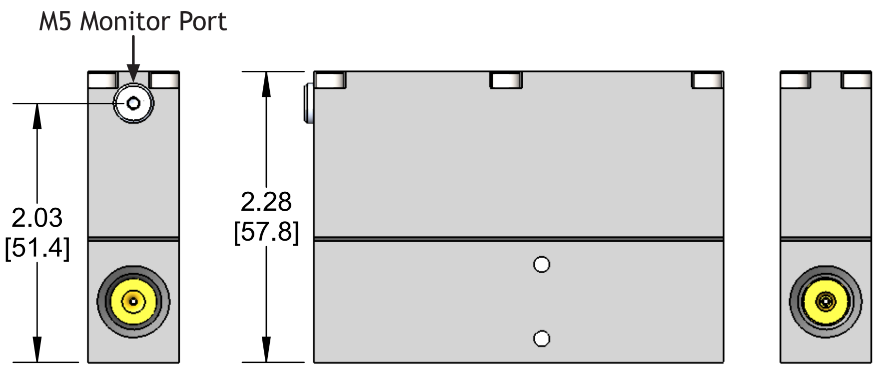
## VX: V Series Vacuum Pumps w/ Automatic Blow-Off

Same performance as a standard V-series but with automatic quick-release blow-off module. Air supply to the pump fills a volume chamber via an integral quick exhaust valve.

When the pump air supply is turned off and pressure drops about 5 psi (0,3 bar), the quick exhaust valve shifts and passes the stored volume directly into the pump vacuum port to quickly dissipate system vacuum for a faster cycle time.

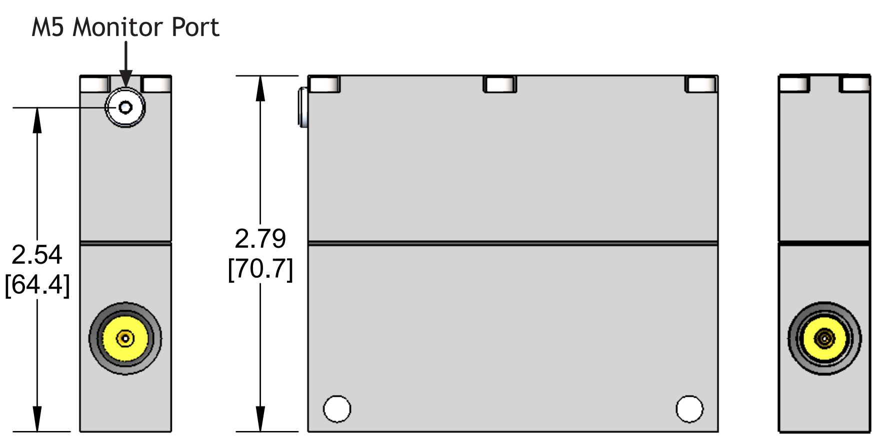
### V10X

*Storage Volume: 1.0 in³ [16.4 ml]*
*Weight: 0.33 lbs [149.0 g]*



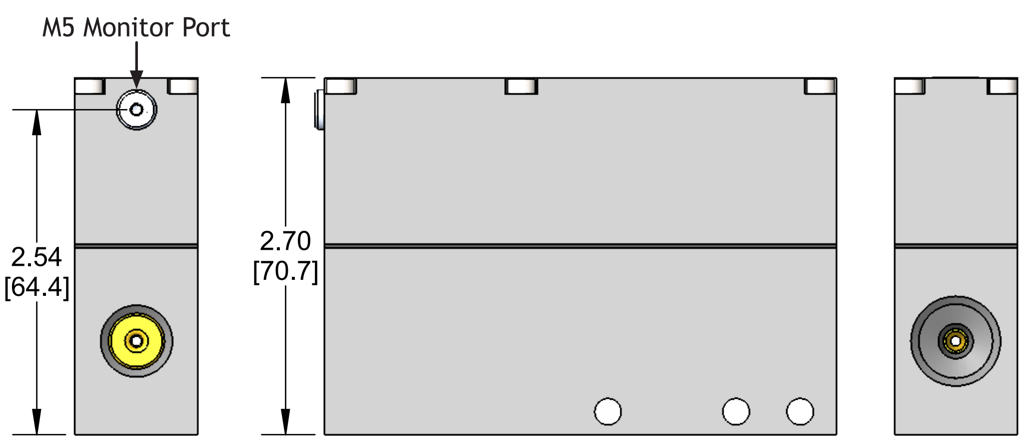

### V20X

*Storage Volume: 1.0 in³ [16.4 ml]*
*Weight: 0.43 lbs [195.0 g]*



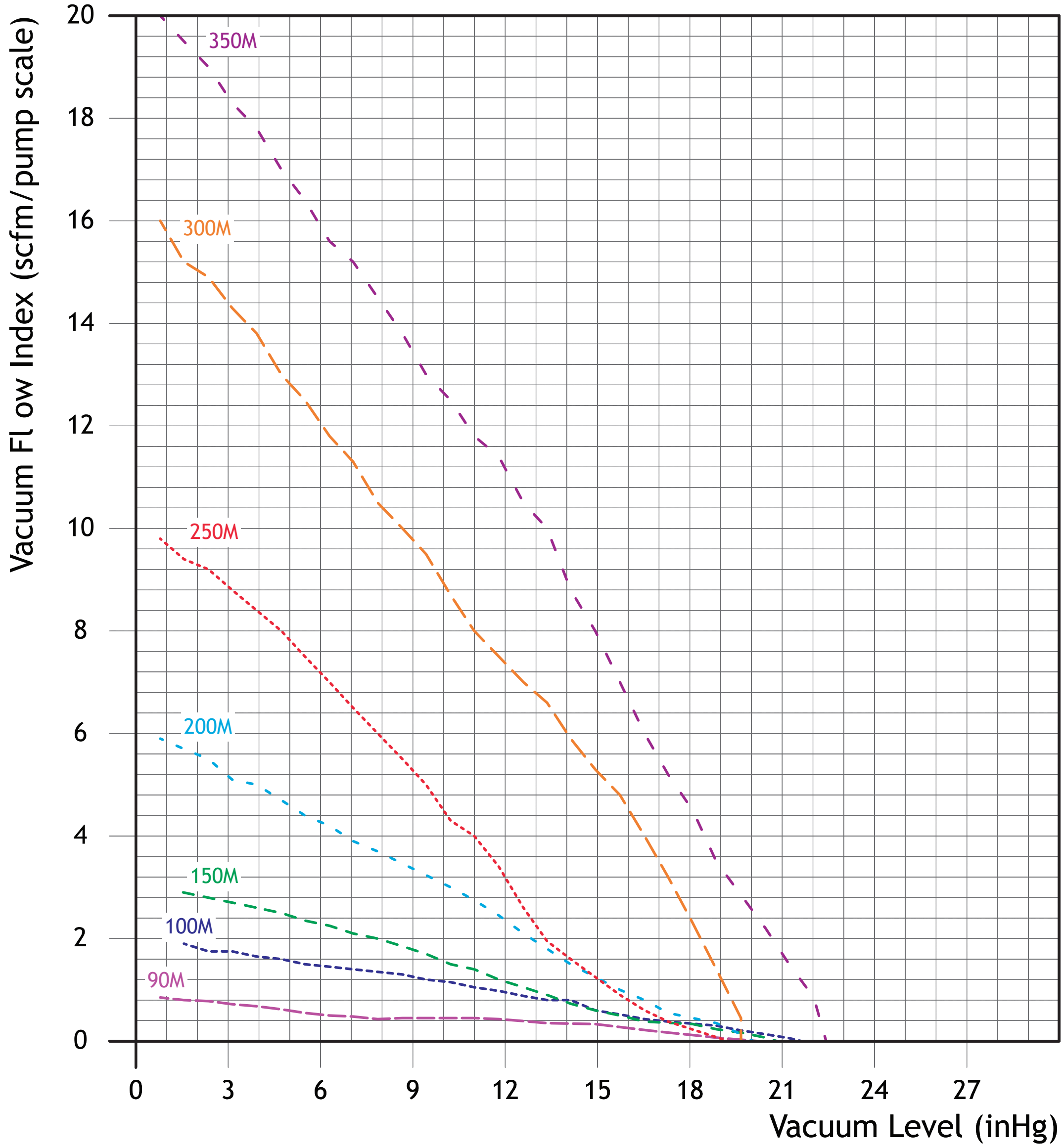

### V80X

*Storage Volume: 2.8 in³ (45 ml)*
*Weight: 0.71 lbs [322.0 g]*



## V Series Performance - M Series

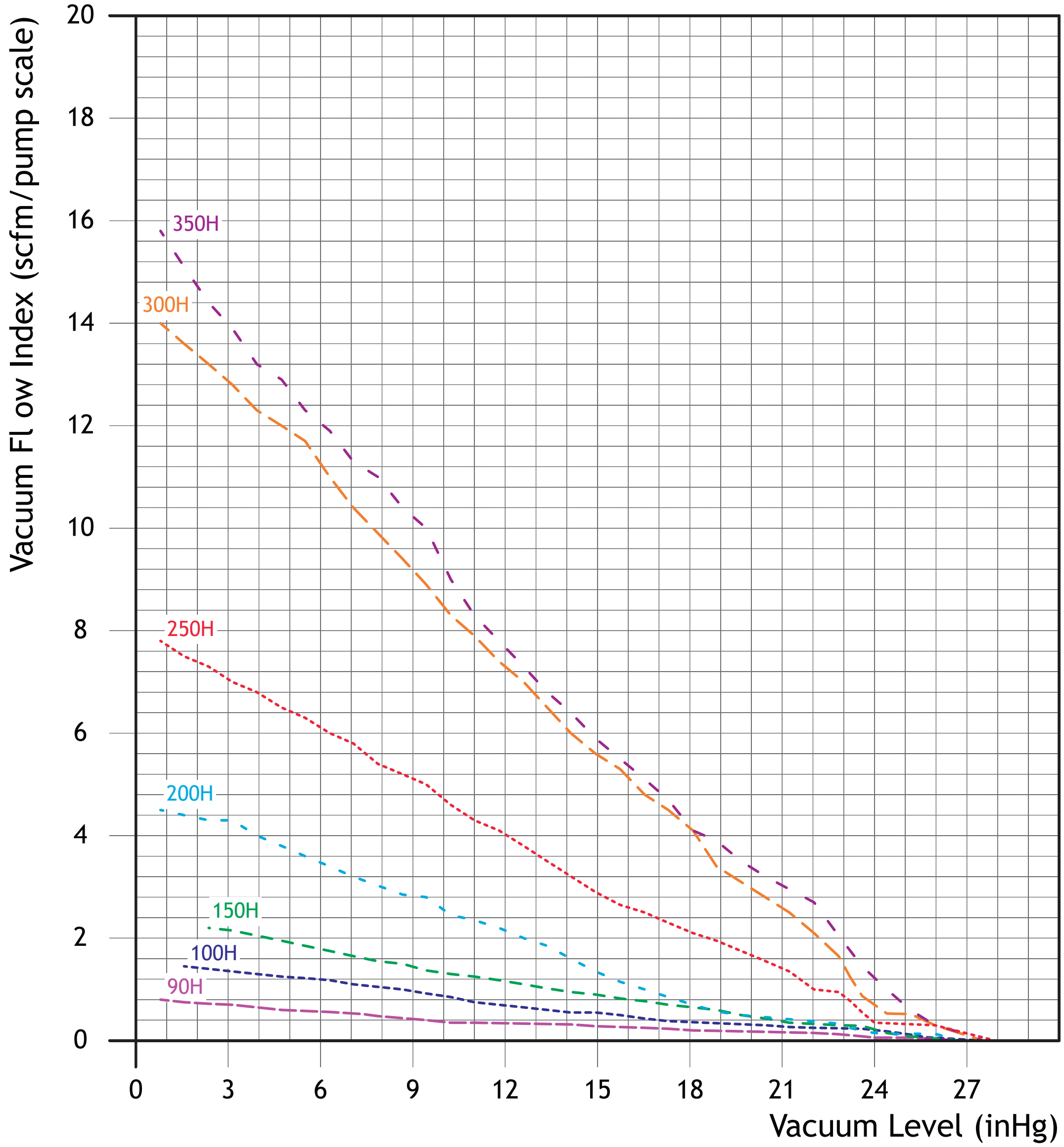
- High Flow
- 20 inHg Maximum Vacuum




*All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.*

## V Series Performance - H Series

- High Vacuum
- 28 inHg Maximum Vacuum




*All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.*

# V Series Performance - All Series

## Vacuum Flow - SCFM

| Model | Air Cons SCFM @ 80 PSI | Max Vac inHg | SCFM at Vacuum Level | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 3 inHg | 6 inHg | 9 inHg | 12 inHg | 15 inHg | 18 inHg | 21 inHg | 24 inHg | 27 inHg |
| 60H | 0.8 | 27 | 0.38 | 0.32 | 0.3 | 0.27 | 0.23 | 0.2 | 0.13 | 0.05 | 0.02 |
| 90H | 1.7 | 26.7 | 0.7 | 0.6 | 0.4 | 0.35 | 0.3 | 0.21 | 0.17 | 0.06 | 0 |
| 100H | 2.5 | 27.5 | 1.4 | 1.2 | 1 | 0.7 | 0.55 | 0.36 | 0.28 | 0.21 | 0.02 |
| 150H | 4.7 | 26.7 | 2.1 | 1.8 | 1.4 | 1.2 | 0.9 | 0.66 | 0.37 | 0.22 | 0 |
| 200H | 7.9 | 26.7 | 4.3 | 3.5 | 2.8 | 2.1 | 1.3 | 0.72 | 0.43 | 0.15 | 0 |
| 250H | 13.4 | 27.5 | 7.1 | 6.1 | 5.1 | 4 | 2.9 | 2.1 | 1.4 | 0.35 | 0.12 |
| 300H | 20.0 | 27.5 | 12.9 | 11.3 | 9.2 | 7.3 | 5.6 | 4.1 | 2.6 | 0.7 | 0.1 |
| 350H | 27.0 | 27.5 | 14 | 12 | 10.2 | 7.7 | 5.9 | 4.2 | 3 | 1.2 | 0.14 |
| 60M | 0.5 | 20 | 0.4 | 0.3 | 0.22 | 0.15 | 0.08 | 0.03 | - | - | - |
| 90M | 1.8 | 20.2 | 0.73 | 0.52 | 0.45 | 0.42 | 0.33 | 0.12 | 0 | - | - |
| 100M | 1.9 | 21.6 | 1.8 | 1.5 | 1.3 | 1 | 0.6 | 0.34 | 0.08 | - | - |
| 150M | 2.9 | 20.8 | 2.7 | 2.3 | 1.8 | 1.1 | 0.6 | 0.34 | 0 | - | - |
| 200M | 5.2 | 20 | 5.1 | 4.3 | 3.4 | 2.4 | 1.2 | 0.46 | 0 | - | - |
| 250M | 8.6 | 19.2 | 8.9 | 7.2 | 5.3 | 3.2 | 1.2 | 0.24 | 0 | - | - |
| 300M | 13.3 | 19.6 | 14.4 | 12 | 9.8 | 7.4 | 5.3 | 2.4 | 0 | - | - |
| 350M | 20.4 | 22.4 | 18.4 | 15.9 | 13.5 | 11.2 | 7.9 | 4.6 | 1.7 | - | - |

*SCFM X 28.32 = nl / m*

## Evacuation Time - sec / 1,000 in³

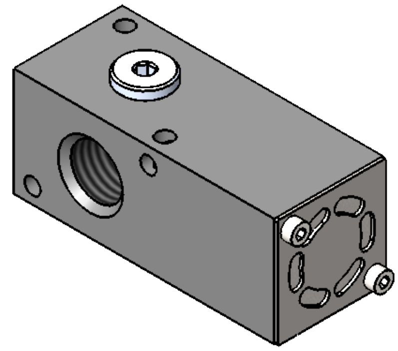
| Model | Air Cons SCFM @ 80 PSI | Max Vac inHg | SCFM at Vacuum Level | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 3 inHg | 6 inHg | 9 inHg | 12 inHg | 15 inHg | 18 inHg | 21 inHg | 24 inHg | 27 inHg |
| 60H | 0.8 | 27 | 15 | 30 | 51 | 75 | 103 | 136 | 183 | 246 | 410 |
| 90H | 1.7 | 26.7 | 3.5 | 13 | 17 | 29 | 48 | 79 | 135 | 255 | - |
| 100H | 2.5 | 27.5 | 1.9 | 4.5 | 8.3 | 14 | 24 | 39 | 68 | 129 | 325 |
| 150H | 4.7 | 26.7 | 1.2 | 2.9 | 5.4 | 9.3 | 15 | 25 | 43 | 82 | - |
| 200H | 7.9 | 26.7 | 0.64 | 1.5 | 2.9 | 4.6 | 8.1 | 13 | 24 | 46 | - |
| 250H | 13.4 | 27.5 | 0.36 | 0.87 | 1.6 | 2.7 | 4.5 | 7.3 | 13 | 24 | 62 |
| 300H | 20.0 | 27.5 | 0.2 | 0.48 | 0.87 | 1.5 | 2.4 | 4 | 6.9 | 13 | 34 |
| 350H | 27.0 | 27.5 | 0.18 | 0.44 | 0.81 | 1.2 | 2.3 | 3.7 | 6.4 | 12 | 31 |
| 60M | 0.5 | 20 | 12.5 | 25.0 | 44 | 69 | 99 | 154 | - | - | - |
| 90M | 1.8 | 20.2 | 3.4 | 12 | 17 | 28 | 46 | 76 | - | - | - |
| 100M | 1.9 | 21.6 | 1.7 | 3.5 | 6.4 | 11 | 18 | 31 | 54 | - | - |
| 150M | 2.9 | 20.8 | 0.93 | 2.3 | 4.2 | 7.3 | 13 | 22 | - | - | - |
| 200M | 5.2 | 20 | 0.48 | 1.2 | 2.2 | 3.8 | 6.4 | 12 | - | - | - |
| 250M | 8.6 | 19.2 | 0.29 | 0.69 | 1.3 | 2.3 | 4.1 | 7.2 | - | - | - |
| 300M | 13.3 | 19.6 | 0.18 | 0.43 | 0.81 | 1.4 | 2.3 | 3.8 | - | - | - |
| 350M | 20.4 | 22.4 | 0.14 | 0.34 | 0.64 | 1 | 1.7 | 2.8 | 4.9 | - | - |

*sec / 1,000 in³ X 0.61 = sec / l*

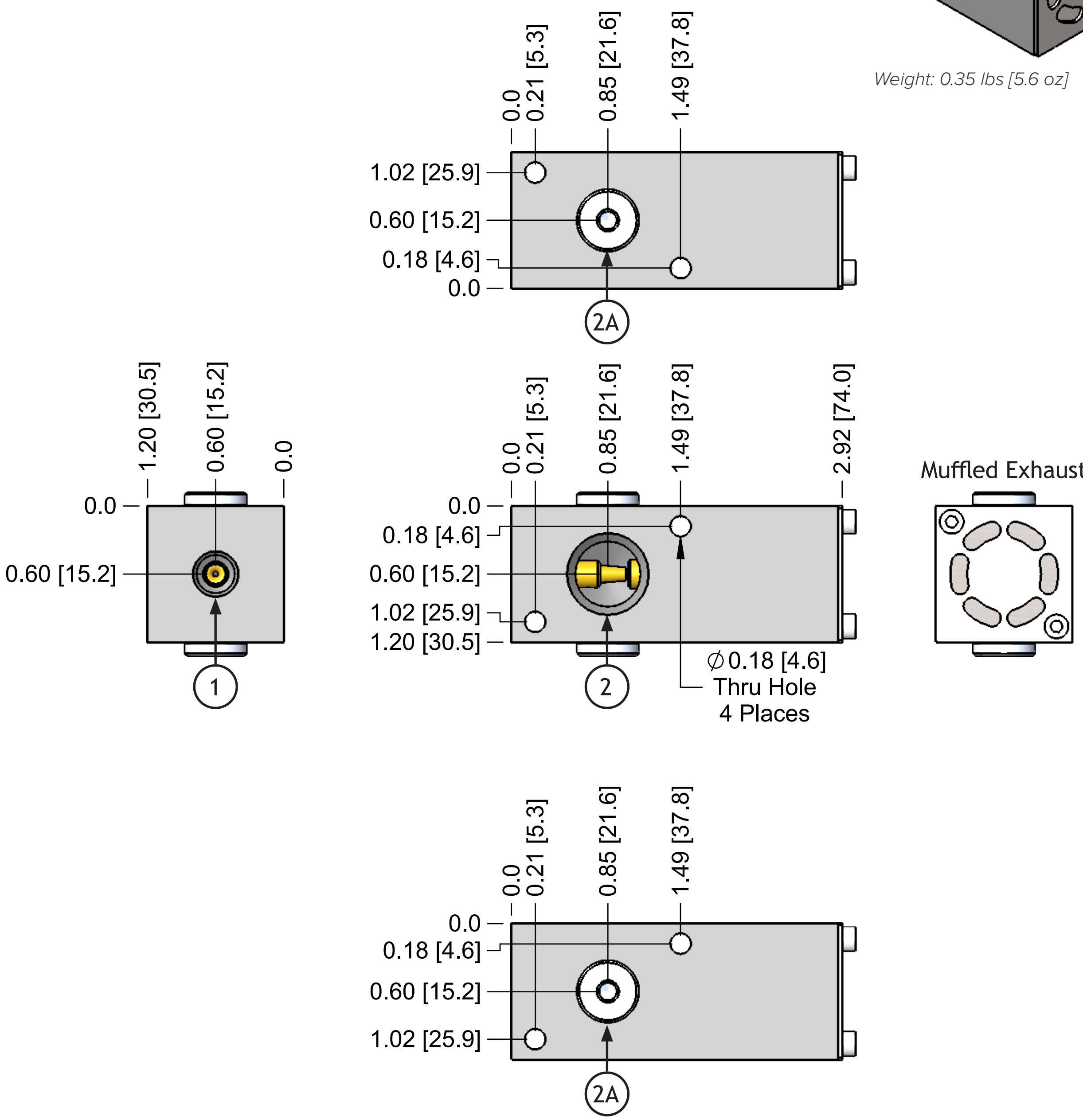
*All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.*

## SM24-38: Compact Vacuum Pump

The SM24-38 is a multi-characteristic pump with three operating pressures.  It is compact, light-weight, economical, maintenance free, energy efficient, and quiet. Made of brass nozzles and an anodized aluminum body, the SM24-38 has a high flow rate with a maximum air supply of 100 psi.  With its metal construction and stainless steel fasteners, the SM24-38 is also a very rugged pump.



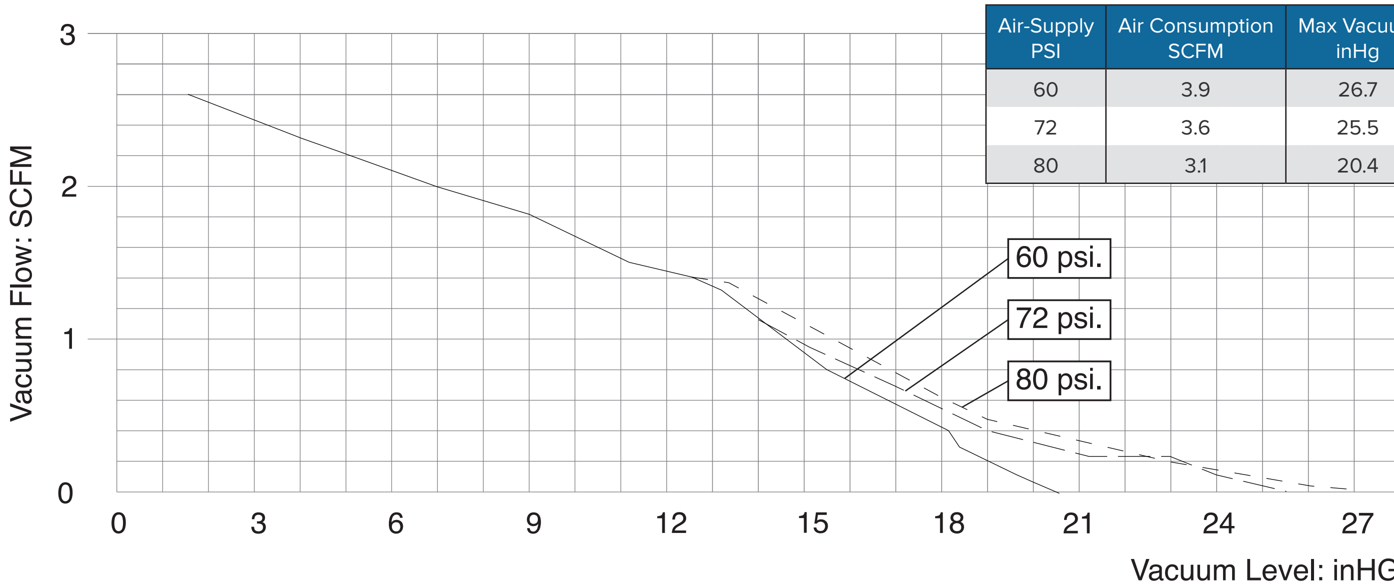
*Weight: 0.35 lbs [5.6 oz]*




| Code | Function | Ports |
|---|---|---|
| 1 | Air-Supply | G 1/8 NPSF |
| 2 | Vacuum | 3/8 NPS |
| 2A | Vacuum - Auxiliary | G 1/8 NPSF |

## SM Series Performance

### Vacuum Flow - SCFM



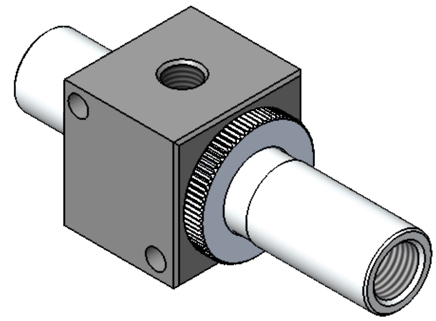

| Air-Supply PSI | Air Consumption SCFM | Max Vacuum inHg |
|---|---|---|
| 60 | 3.9 | 26.7 |
| 72 | 3.6 | 25.5 |
| 80 | 3.1 | 20.4 |

*SCFM X 28.32 = nl / m*

*All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.*

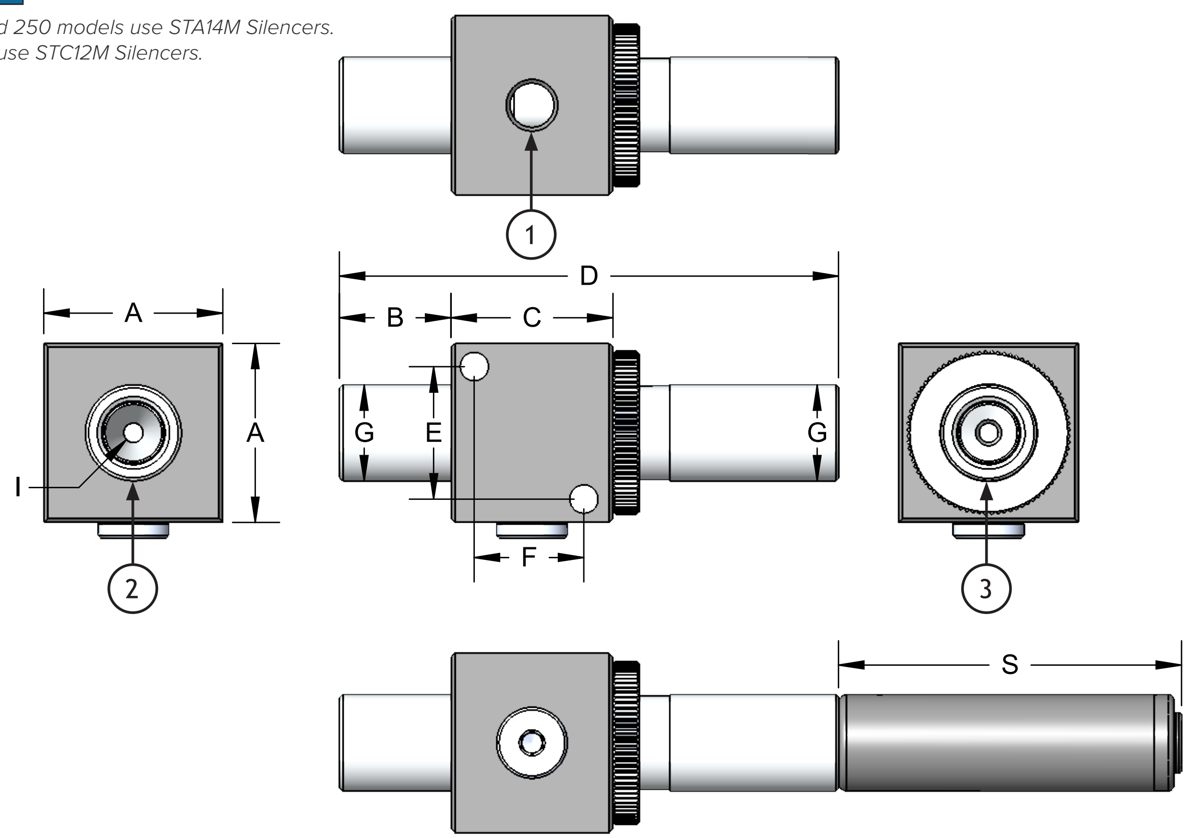
## Variable Displacement Pumps

VDS vacuum pumps can provide over 20” Hg (68 kPa) and their straight through non-clog design is ideal for very dusty and dirty applications such as bag filling or handling ceramics or masonry products. The square body and two mounting holes makes the VDS pump easy to attach to any flat surface. An ST Straight Thru silencer will not accumulate debris and will pass it out with the exhaust air. For less critical applications where cost is more of an issue, a conventional AA silencer may be used.



| | Model | Threads | | Silencer[1] | |
|---|---|---|---|---|---|
| VDS- | 150 | | | | |
| | 150 | (Blank) | NPT Threads | (Blank) | None |
| | 200 | -G | G Threads | -ST | ST Silencer |
| | 250 | | | | |
| | 375 | | | | |

*[1]150, 200, and 250 models use STA14M Silencers.*
*[1]375 models use STC12M Silencers.*



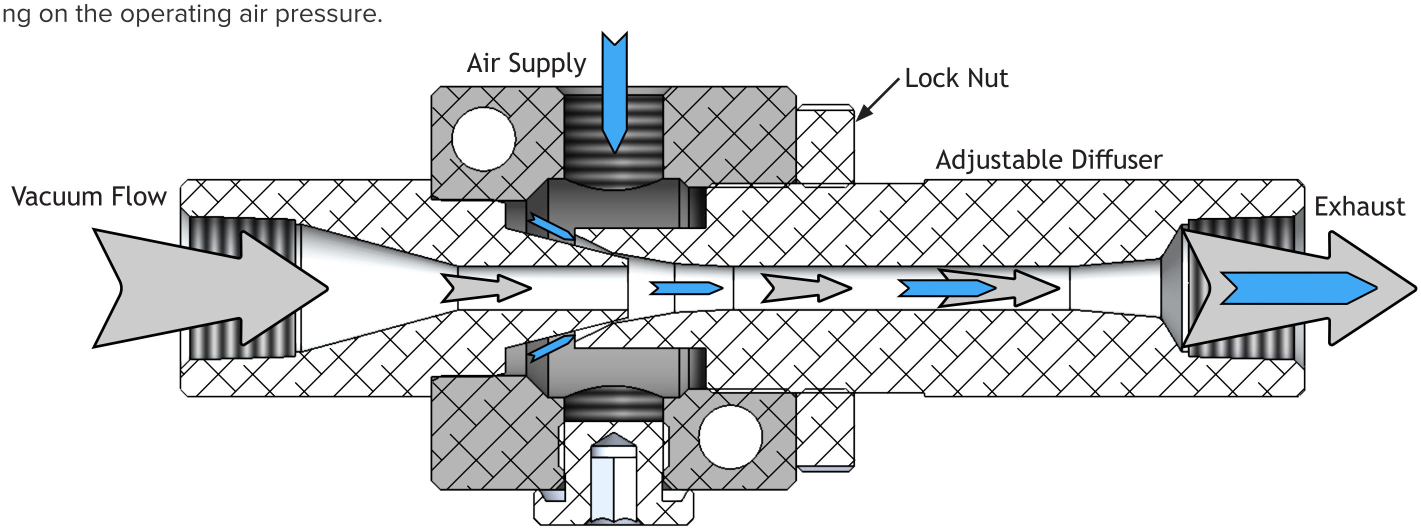

| MODEL | 1 - Air-Supply | 2 - Vacuum | 3 - Exhaust | A | B | C | D | E | F | G | H | I | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VDS-150 | G 1/8 NPSF | 1/4 I G 1/4 | 1/4 I G 1/4 | 1.38 [35.0] | 0.86 [21.8] | 1.25 [31.8] | 3.81 [96.7] | 1.02 [25.9] | 0.84 [21.3] | 0.74 [18.8] | 0.22 [5.5] | 0.15 [3.8] | 2.65 [67.3] |
| VDS-200 | G 1/8 NPSF | 1/4 I G 1/4 | 1/4 I G 1/4 | 1.38 [35.0] | 0.86 [21.8] | 1.25 [31.8] | 3.81 [96.7] | 1.02 [25.9] | 0.84 [21.3] | 0.74 [18.8] | 0.22 [5.5] | 0.2 [5.1] | 2.65 [67.3] |
| VDS-250 | G 1/8 NPSF | 1/4 I G 1/4 | 1/4 I G 1/4 | 1.38 [35.0 | 0.86 [21.8] | 1.25 [31.8] | 3.81 [96.7] | 1.02 [25.9] | 0.84 [21.3] | 0.74 [18.8] | 0.22 [5.5] | 0.25 [6.3] | 2.65 [67.3] |
| VDS-375 | 3/8 NPSF | G 1/2 NPSF | G 1/2 NPSF | 1.72 [43.7] | 1.5 [38.1] | 1.75 [44.5] | 5.99 [152.0] | 1.32 [33.5] | 1.35 [34.3] | 0.98 [24.9] | 0.26 [6.6] | 0.38 [9.5] | 4.12 [104.6] |

# Variable Displacement Pumps

### Operation

Loosen the jam nut and turn the diffuser nozzle clockwise, by hand, until it contacts the inlet nozzle. With the work piece against the suction cup or holding fixture, supply regulated compressed air to the side air supply port and gradually rotate the diffuser nozzle to adjust the annular gap between the two nozzles until the desired vacuum level or vacuum flow is achieved. To minimize air consumption, use the lowest pressure air supply that will yield the desired results. Turning the diffuser too far open will suddenly cause a decrease in performance and this point will vary depending on the operating air pressure.

Ingested debris passes directly from end-to-end through the pump bore without any turns and without passing through the annular venturi created by the inlet and diffuser nozzles, so there is no opportunity for clogging as long as the pump bore is large enough to pass the largest debris particle. As the pump bore size is increased, it can also generate more vacuum flow to overcome porosity and leakage.

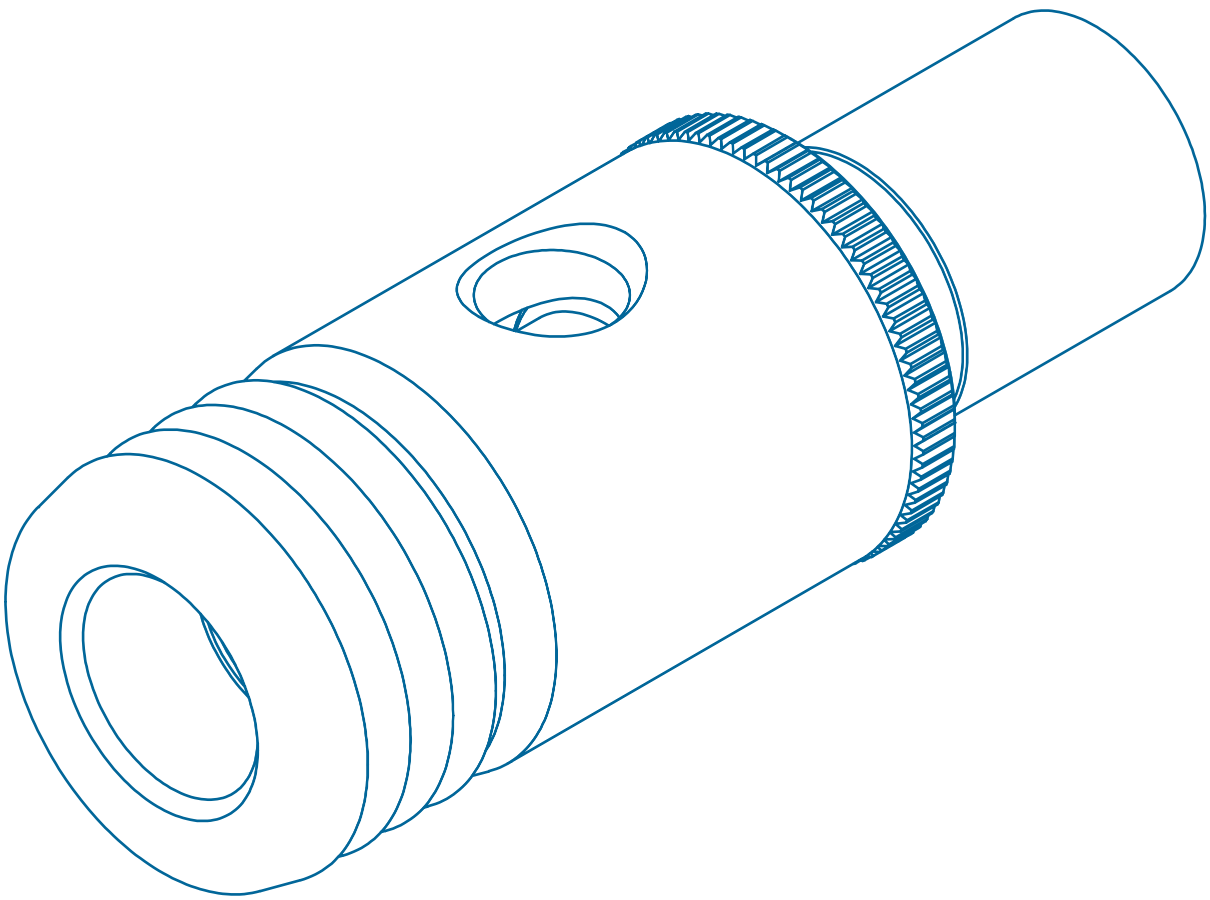



### Performance

| Model | Max Vac Flow SCFM | Air Consumption vs Vacuum Level @ 80 PSI | | | | |
|---|---|---|---|---|---|---|
| | | 5 inHg | 10 inHg | 15 inHg | 20 inHg | 25 inHg |
| VDS-150 | 3.2 | 1.3 | 1.7 | 2.4 | 3.2 | 4.5 |
| VDS-200 | 6 | 2.4 | 3.7 | 4.7 | 6 | 6.8 |
| VDS-250 | 10 | 4 | 6 | 8.3 | 9.7 | 12 |
| VDS-375 | 30 | 6.2 | 11.5 | 17 | 21 | 29 |

*All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.*

# Air-Amplifiers & Transfer Pumps
## Section 15

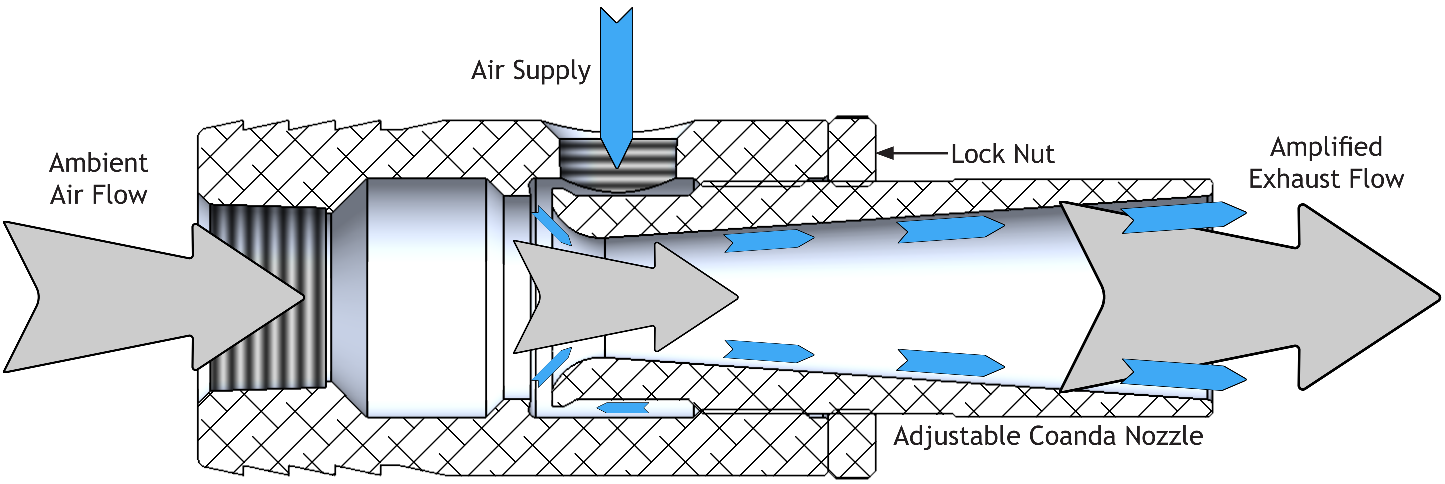


## Air-Amplifiers

CD-style pumps use the Coanda effect to draw in large volumes of ambient air in relation to the small amount of compressed air consumed.

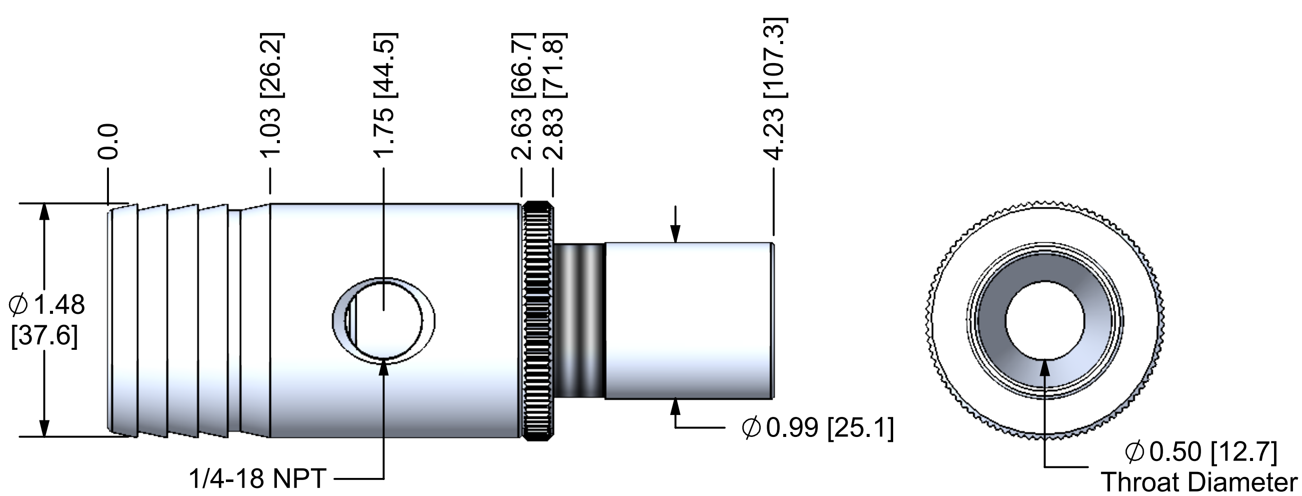
Applications include: blow-drying, ventilation and handling highly porous but lightweight parts.

**Operation**
The Coanda principle employs a nozzle that causes high velocity compressed air to cling to its shaped airfoil wall. Ambient air is drawn into the inlet and down into the center of the vortex formed by the Coanda nozzle so that the discharge air flow at the exhaust is much greater than the compressed air consumption.
Loosen the jam nut and turn the Coanda nozzle clockwise, by hand, until it stops, indicating the throat is fully closed. Supply regulated compressed air to the side air supply port and gradually rotate the Coanda nozzle to increase the throat gap until the desired vacuum level or discharge flow is achieved. To minimize air consumption, use the lowest pressure air supply that will yield the desired results. Higher air pressure will increase the airflow but will also increase air consumption. Turning the Coanda nozzle too far open will suddenly cause air flow to reverse direction and the pump will not perform properly.



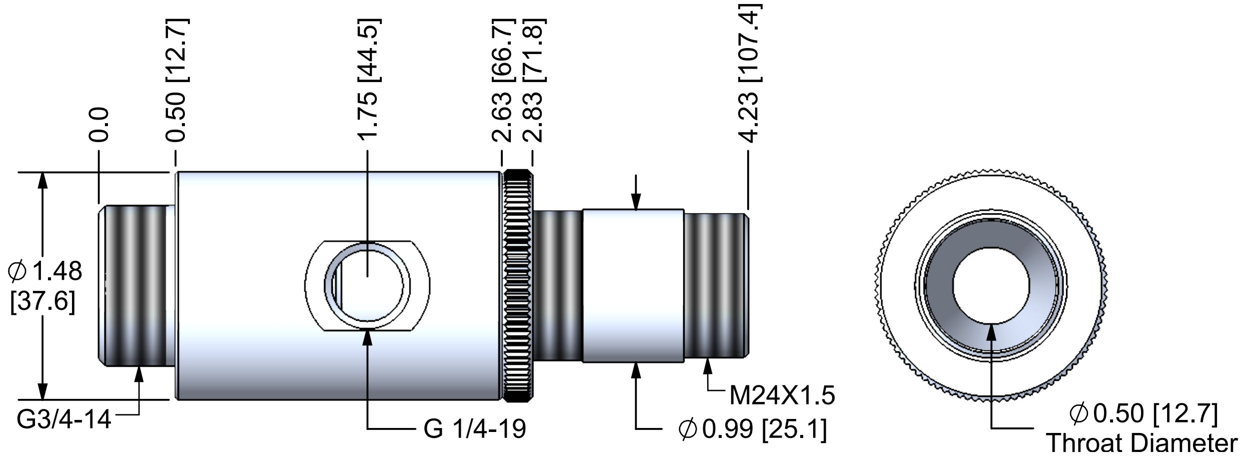

| Model | Internal Diameter in [mm] | Air-Supply @ 80 PSI (5.5 bar) Input Flow SCFM [Nl/min] | Output Flow SCFM [Nl/min] | Velocity ft/s [m/s] |
|---|---|---|---|---|
| CD-500HG CD-500H | 0.5 [13] | 9 [255] | 75 [2124] | 910 [277] |
| | | 5 [142] | 42 [1189] | 530 [162] |
| | | 3 [85] | 22 [623] | 265 [81] |

**CD-500H**

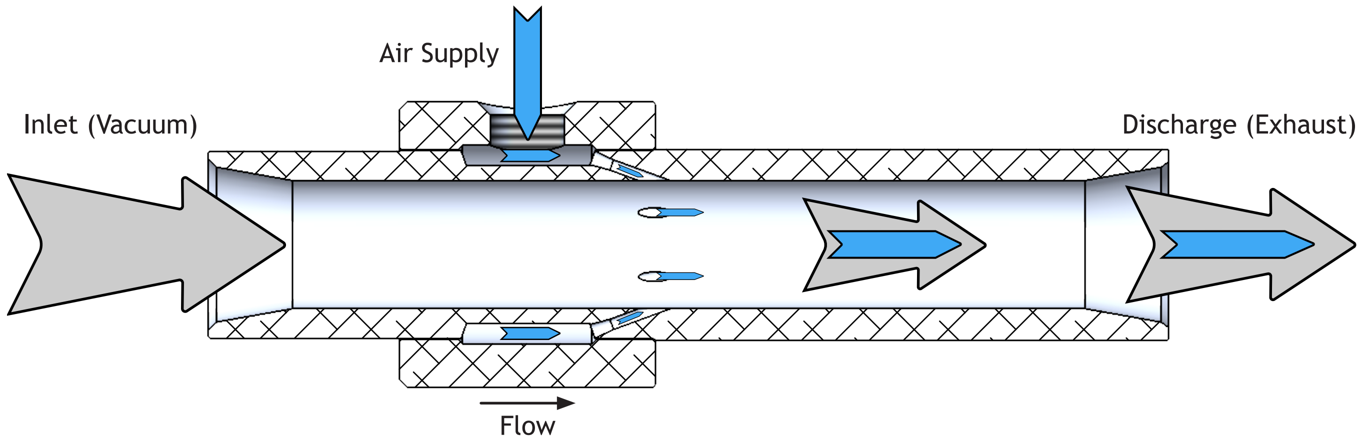



*All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.*

**CD-500HG**




## Transfer Pumps



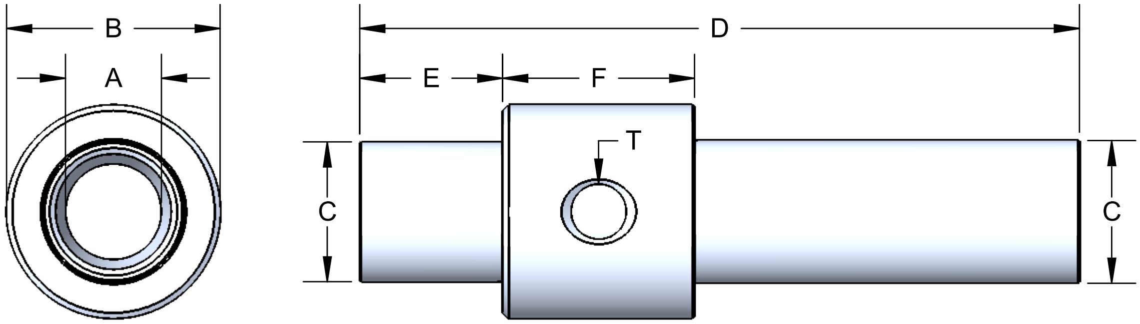

Direct Transfer Pumps use high velocity compressed air to generate a vacuum in the inlet of a smooth bore tubular body to drawn in bulk dry goods and then convey it in a turbulent air stream through a hose attached to the discharge end of the pump. Plastic pellets, powders, beans, peas, sawdust, and continuous fabric trimmings are only a few examples of the numerous items that can be transferred.

These versatile pumps can also be used to convey small parts from an assembly station at much lower cost than a pick and place device. Select a pump inner diameter that is a little larger than the part's outer diameter then provide generous bends in the discharge hose for free passage of parts. For longer parts, select a pump (and discharge hose) diameter large enough to pass the part diameter but not large enough for the part length. This method will eliminate end-over-end tumbling that can damage parts. At the hose discharge end, direct the parts against hanging curtains or foam rubber to decelerate parts.

Vacuum flow rate, and thus material transfer rate, is easily controlled by simply changing the compressed air supply pressure. Higher air pressure increases the transfer rate. When shutting the pump off, it is good practice to let the pump blow air for a long enough period to allow all parts in the discharge hose to exit.

**Principle Of Operation**
Compressed air is supplied to the body port and passes through an annular ring to several nozzles leading into the transfer tube at an angle. The nozzles concentrate the air stream so that it increases to maximum velocity as it passes through the nozzle throat and into the pump transfer tube. The air jets meet in the center and create a powerful vacuum at the tube inlet and a turbulent, spiraling flow at the discharge end. Large quantities of ambient air are ingested along with the material being transferred and, combined with nozzle air, helps to move material through the discharge hose.

## D-Series Material Transfer Pumps

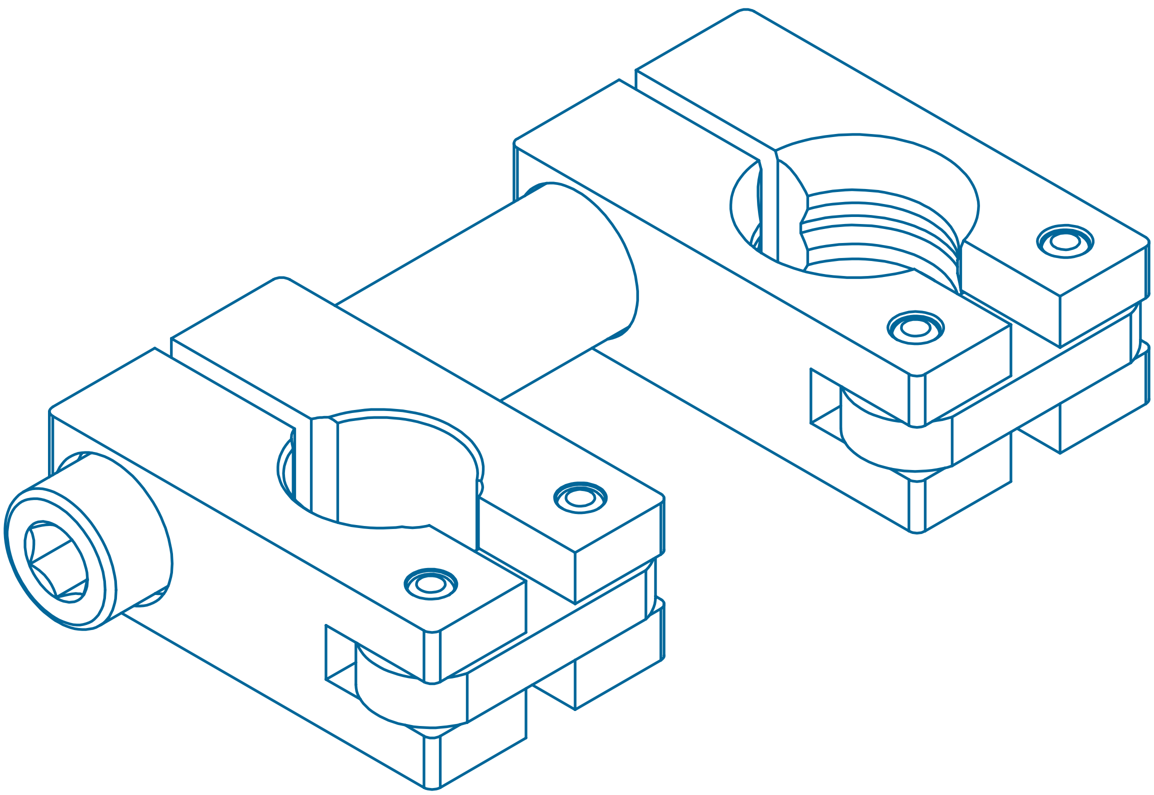


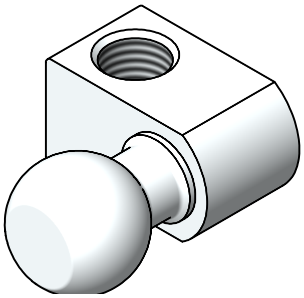

| Model | A Throat I.D. in [mm] | B Collar O.D. in [mm] | C Tube O.D. in [mm] | D Length in [mm] | E Offset in [mm] | F Collar Width in [mm] | T Air-Supply Threads |
|---|---|---|---|---|---|---|---|
| D2-3 | 0.25 [6.35] | 1.25 [31.8] | 0.75 [19.1] | 3.5 [88.9] | 0.75 [19.1] | 1.0 [25.4] | 1/8 |
| D3-3 | 0.375 [9.5] | 1.25 [31.8] | 0.75 [19.1] | 3.5 [88.9] | 0.75 [19.1] | 1.0 [25.4] | 1/8 |
| D3-6 | 0.375 [9.5] | 1.25 [31.8] | 0.75 [19.1] | 3.5 [88.9] | 0.75 [19.1] | 1.0 [25.4] | 1/8 |
| D5-3 | 0.5 [12.7] | 1.5 [38.1] | 1.0 [25.4] | 5.5 [140] | 1.0 [25.4] | 1.25 [31.8] | 1/4 |
| D5-6 | 0.5 [12.7] | 1.5 [38.1] | 1.0 [25.4] | 5.5 [140] | 1.0 [25.4] | 1.25 [31.8] | 1/4 |
| D7-3 | 0.75 [19.1] | 2.0 [50.8] | 1.25 [31.8] | 7.5 [191] | 1.5 [38.1] | 2.0 [50.8] | 3/8 |
| D7-6 | 0.75 [19.1] | 2.0 [50.8] | 1.25 [31.8] | 7.5 [191] | 1.5 [38.1] | 2.0 [50.8] | 3/8 |
| D10-3 | 1.0 [25.4] | 2.25 [57.2] | 1.5 [38.1] | 7.5 [191] | 1.5 [38.1] | 2.0 [50.8] | 3/8 |
| D10-6 | 1.0 [25.4] | 2.25 [57.2] | 1.5 [38.1] | 7.5 [191] | 1.5 [38.1] | 2.0 [50.8] | 3/8 |
| D15-3 | 1.5 [38.1] | 2.75 [69.9] | 2.0 [50.8] | 7.5 [191] | 1.5 [38.1] | 2.0 [50.8] | 3/8 |
| D15-6 | 1.5 [38.1] | 2.75 [69.9] | 2.0 [50.8] | 7.5 [191] | 1.5 [38.1] | 2.0 [50.8] | 3/8 |
| D20-3 | 2.0 [50.8] | 3.25 [82.6] | 2.5 [63.5] | 7.5 [191] | 1.5 [38.1] | 2.0 [50.8] | 3/8 |
| D20-6 | 2.0 [50.8] | 3.25 [82.6] | 2.5 [63.5] | 7.5 [191] | 1.5 [38.1] | 2.0 [50.8] | 3/8 |

| Model | I.D. in [mm] | Air Velocity ft/s [m/s] | Vacuum Flow SCFM [Nl/m] | Vacuum Level inHg [mmHg] | Air Consumption SCFM (Nl/m) | |
|---|---|---|---|---|---|---|
| | | | | | @ 40 psi | @ 80 psi |
| D2-3 | 0.25 [6.35] | 490 [149] | 10 [283] | 8 [203] | 3.1 [87.8] | 6 [170] |
| D3-3 | 0.375 [9.5] | 328 [100] | 15 [425] | 6 [152] | 3.5 [99.1] | 6 [170] |
| D3-6 | 0.375 [9.5] | 393 [120] | 18 [510] | 8 [203] | 5.8 [164] | 10 [283] |
| D5-3 | 0.5 [12.7] | 306 [93.3] | 25 [708] | 3 [76] | 5.2 [147] | 9 [255] |
| D5-6 | 0.5 [12.7] | 362 [110] | 30 [850] | 10 [254] | 14 [396] | 24 [680] |
| D7-3 | 0.75 [19.1] | 272 [82.9] | 50 [1416] | 4.3 [109] | 14 [396] | 24 [680] |
| D7-6 | 0.75 [19.1] | 326 [99.4] | 60 [1699] | 8 [203] | 28 [793] | 48 [1359] |
| D10-3 | 1.0 [25.4] | 229 [69.8] | 75 [2124] | 3 [76] | 14 [396] | 24 [680] |
| D10-6 | 1.0 [25.4] | 290 [88.4] | 95 [2690] | 5.8 [147] | 28 [793] | 48 [1359] |
| D15-3 | 1.5 [38.1] | 224 [68.3] | 165 [4672] | 1.3 [33] | 14 [396] | 24 [680] |
| D15-6 | 1.5 [38.1] | 272 [82.9] | 200 [5663] | 2.5 [64] | 28 [793] | 48 [1359] |
| D20-3 | 2.0 [50.8] | 183 [55.8] | 240 [6796] | 0.8 [20] | 14 [396] | 24 [680] |
| D20-6 | 2.0 [50.8] | 229 [69.8] | 300 [8495] | 1.5 [38] | 28 [793] | 48 [1359] |

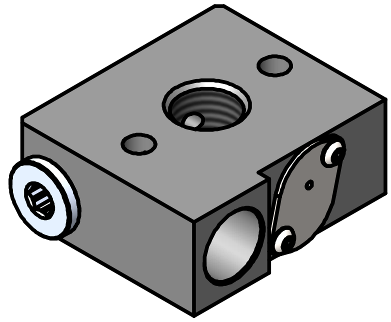
*All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.*

# End of Arm Tooling (EOAT)
## Section 16

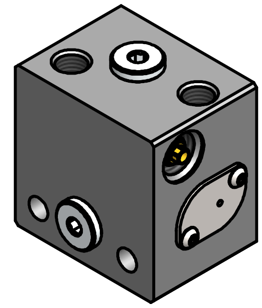




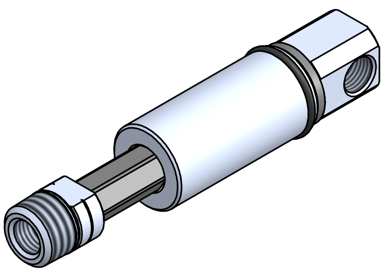
Vacuum Connections



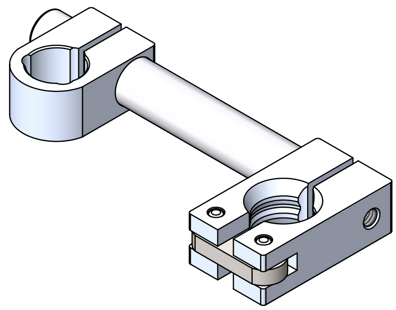
Low-Profile Vacuum Connections & Pumps



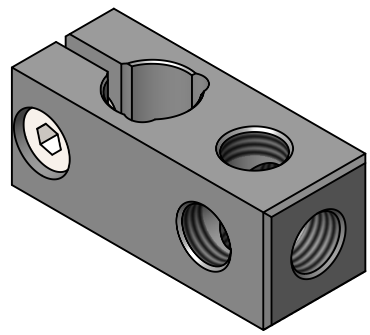
VacLoc



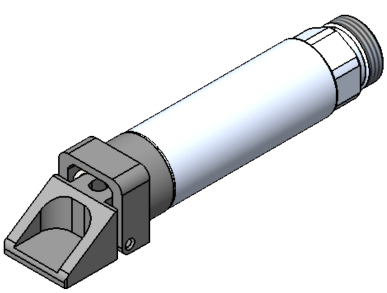
EMAT Level Compensators



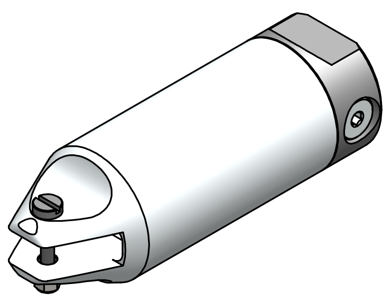
EMAT Arms



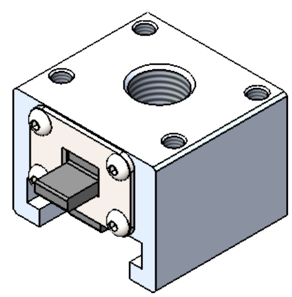
Clamps & Mounts



Gripper Fingers

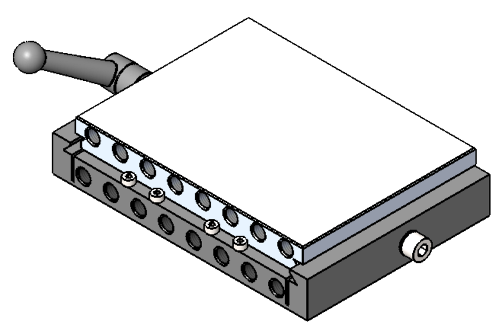


Nipper Bodies



T-Slot Receivers





Robotic Quick Changers

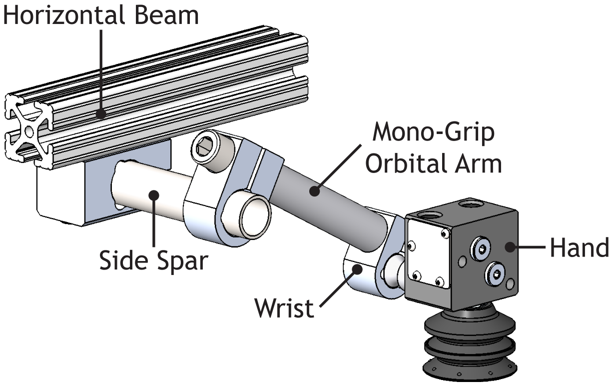
# Modular Automation Tooling

Modular automation tooling (EMAT) provides an efficient way to construct automation or robotic tools with minimal design time. Rugged, lightweight anodized aluminum components adjust easily to conform to the work piece then are securely tightened with standard hand tools.

Typically, a tool is constructed with a horizontal beam of round tubing or t-slot, structural extrusion and several side spars for attaching mono-grip, orbital arms, wrists, and hands with appropriately selected options that provide virtually unlimited design freedom.

EMAT systems may be set up using a large, centralized vacuum pump to supply several vacuum cups, but much greater system reliability can be achieved via the redundancy of a discrete system. A discrete system with small, independent, compressed air powered vacuum pumps at each vacuum cup is the preferred method. With a discrete system, a poor seal at one vacuum cup can't affect the vacuum level at other vacuum cups. A discrete system also allows splitting the system into several, independently controlled zones allowing for a wider variety of part sizes and shapes to be efficiently handled.

Modular automation tooling with EDCO USA products provides simplicity, adjustability, rigidity, serviceability, energy conservation, and cost-effectiveness in readily available components.




Energy conservation is provided by efficient high-flow coaxial ejector technology which is also capable of passing more debris than competitive designs without clogging. In addition, there is no flap valve to stick and affect performance.

High-efficiency sequence valve remains fully open during blow-off so chattering, humming, and squealing noises are eliminated. Compressed air consumption is reduced significantly by using lower air pressure during the blow-off mode.

An internal orifice balances air flow so that several VacLoc blow-off ports may be supplied and controlled by one solenoid valve.

EMAT tooling is easily reconfigurable to meet changing application requirements.

Fast and simple single-bolt arm adjustment (mono-clamp) and tri-arc grip provides superior positional security via higher clamping forces.

Modular construction allows swapping hands, changing arm lengths, changing suction cups or duty-attachments and repositioning or adding slide-on or clamp-on orbital arms to reconfigure the tool whenever necessary.

Unlimited multi-axis arm positioning - configure wrists with either an orbital apple-core pin or a ball swivel for greater mobility to conform to part contours.

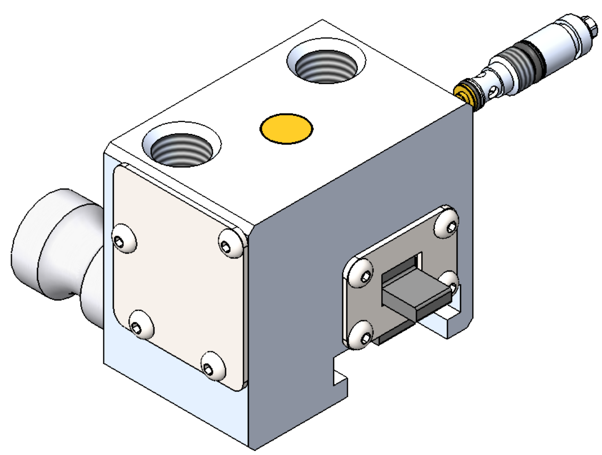
### VacLoc

Fail-safe operation is provided by integral VacLoc valves in leak-free systems. If the vacuum source is lost, or is purposely interrupted as in an Energy-Saving system, the VacLoc will trap vacuum for an indefinite time period so the load can be lowered to a safe position.

Modular VacLoc vacuum check valve and sequence blow valve are installed in a cartridge body for perfect alignment and valve seats are electroless-nickel plated for long life. A one-piece work-attachment body eliminates secondary vacuum leak paths and the potential for loosening or separation during operation.

### Coaxial Venturi Technology

Proprietary EMAT coaxial ejector vacuum pumps are optimized to provide high vacuum flow and reduce compressed air consumption. There are no flap-valves to swell up or stick due to ingesting die lubricants and the simplified design is tolerant of debris.



## EMAT Arm Features

Improved technology provides greater arm positional security.

1.) A spherical nut nests into a spherical pocket to eliminate misalignment and resultant stress concentration that can cause joints to loosen.

2.) A larger hex wrench socket allows greater torque to be applied.

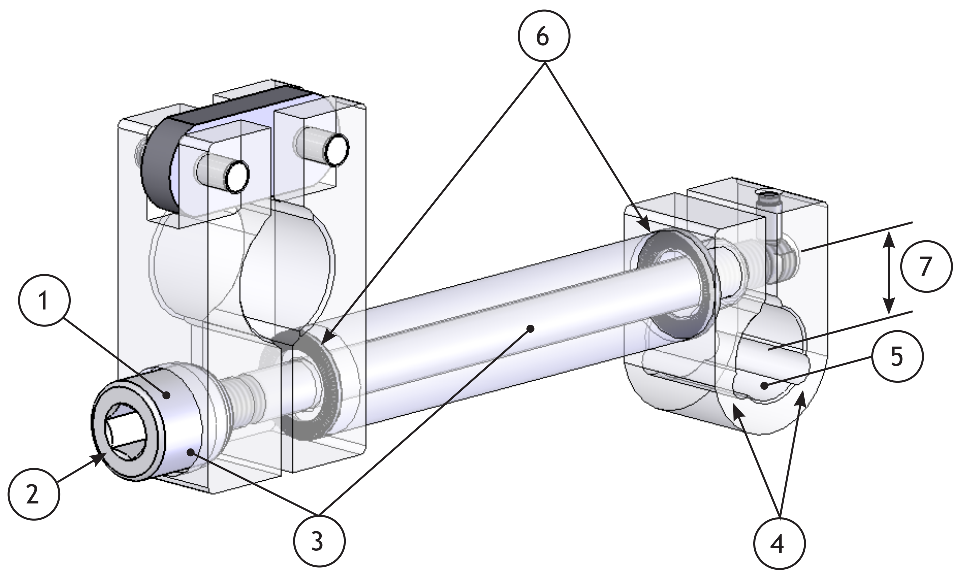
3.) A nut and stud configuration more efficiently translates tightening torque into stud tension than a long cap and screw do where much of the torque is absorbed by twisting off the long screw shank.

4.) Clamp jaws are relieved to form flexible hinges to greatly reduce the spring-back effect, significantly increasing the available clamp force.

5.) Segmented clamp jaws provide a secure tri-arc grip superior to the weaker group produced by the two-point-contact grip of competitive units.

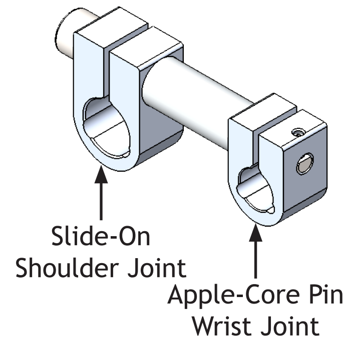
6.) Hardened spacers having raised radial micro-teeth are installed at both ends of the arm extension rod to mechanically interlock the arm components, providing rational resistance and positional security.

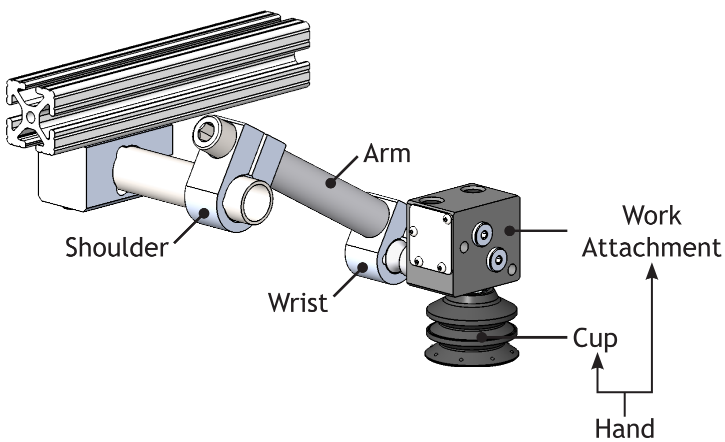
7.) A larger pin retainer diameter positions the stud farther from the clamp centerline and the increased leverage produces a higher clamping force.

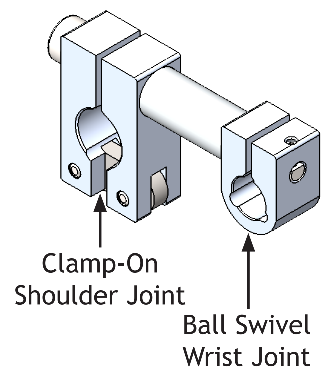


## EMAT System Explanation

An EMAT arm is analogous to a human arm. The shoulder joint is either a slide-on or clamp-on orbital connection to a round structural tube. The arm extends from the shoulder to a wrist which can provide either an orbital (apple-core pin) or a swivel (ball) connection to the hand. The hand consists of a suction cup plus a work-attachment that can be configured to perform several functions such as admitting or producing vacuum, additional compliance (level compensator) or greater control via VacLoc or energy-saving controls.




**Selection Guide**

Begin at work-piece and select components in sequence back to the main beam.

1.) Select a vacuum cup style and size based on the weight of the work-piece, area available, and work-piece surface. For cup style, refer to the cup selection guide.

2.) Select a work-attachment based on your system requirements for function and control.

3.) Select either an orbital  apple-core pin wrist (A) or a swivel ball wrist (B).

4.) Select the arm length based on how far the vacuum cup will be positioned away from the mounting spar.

5.) Select a shoulder joint to attach to the spar. The slide-on style costs less but isn’t as convenient for reconfiguring the tool. The hinged, clamp-on style can be mounted or added anywhere along the spar length without disturbing other arms.

Components selected in steps 1 through 5 can be coded into a single, convenient part number. See “How To Order” for instructions.

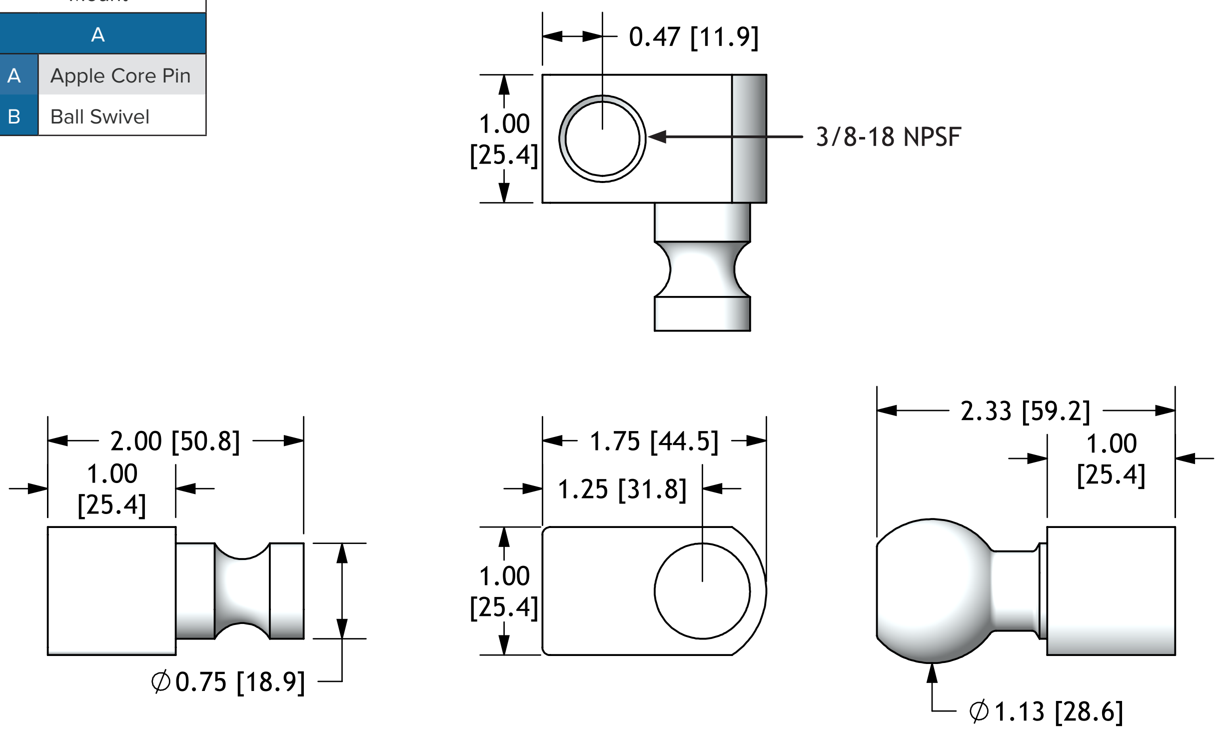
6.) Select spar tubing diameter and lengths based on where vacuum cups must be positioned in the tool layout.

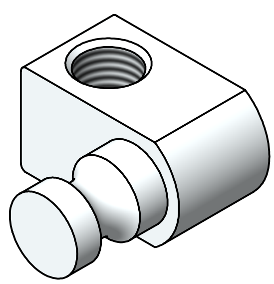
7.) Select appropriate structural adapters to connect spars to the main beam.

## Vacuum Connection w/ Mount

Our vacuum connections provide a low-profile solution for connecting a vacuum source to your work piece while also being compatible with our EMAT line of arms and tooling.

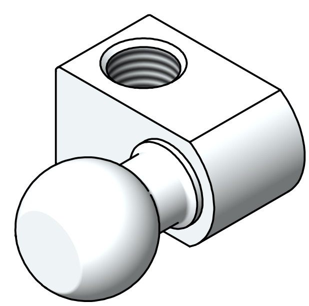
| | | Mount |
|---|---|---|
| V-38F- | | A |
| | A | Apple Core Pin |
| | B | Ball Swivel |



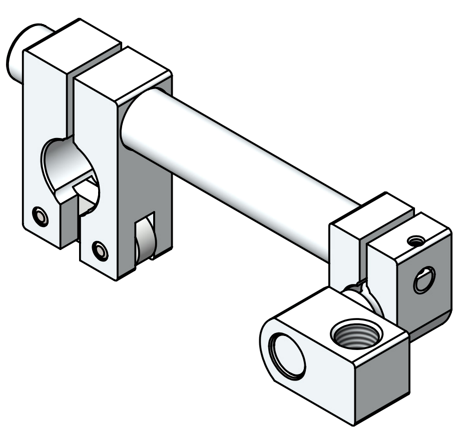
Apple Core Pin

*Weight: 0.17 lb [77.1 g]*

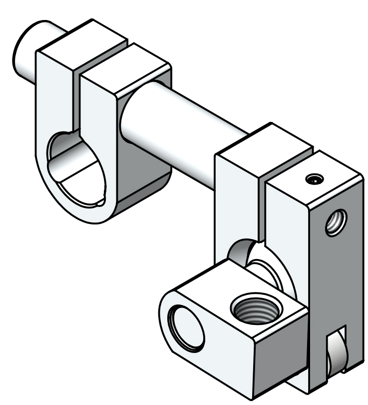


Ball Swivel

*Weight: 0.22 lb [99.2 g]*



*Example: V38F-A w/ C10X2A*

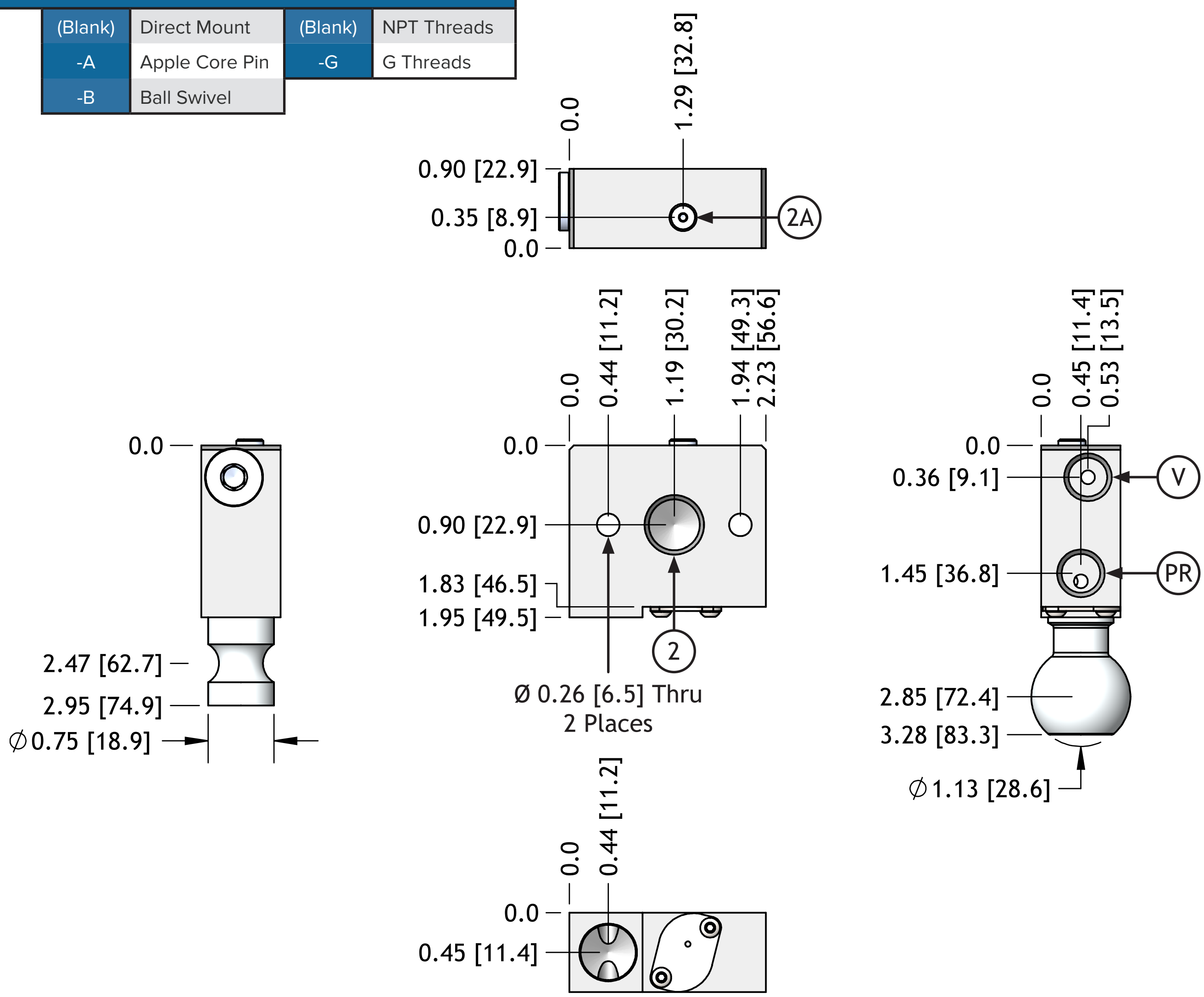


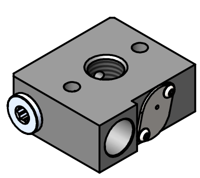
*Example: V38F-B w/ S10X1B*

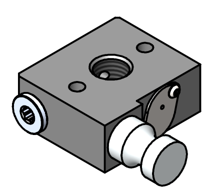
## Low-Profile Vacuum Connection w/ Release

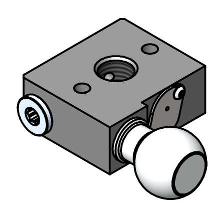
Includes a reliease (blow-off) sequence valve, provides for mounting a vacuum cup and for connecting a vacuum source. Can be configured with or without a vacuum pump. When used with the direct mount (standard) option, the 3/8 Vacuum Port works great for mounting to our EMAT Level Compensators.

| | Mount | | Ports | |
|---|---|---|---|---|
| LVB-38F | -A | | | |
| | (Blank) | Direct Mount | (Blank) | NPT Threads |
| | -A | Apple Core Pin | -G | G Threads |
| | -B | Ball Swivel | | |

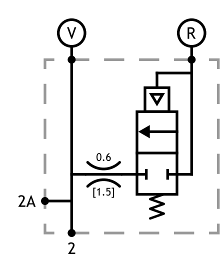




Level Compensator Mount
*Weight: 0.28 lb [127.7 g]*


Apple Core Pin Mount
*Weight: 0.34 lb [156.4 g]*


Ball Swivel Mount
*Weight: 0.39 lb [178.5 g]*

| Code | Function | NPT | G |
|---|---|---|---|
| V | Vacuum Source | 1/4 NPTF | G 1/4 |
| 2 | Vacuum | 1/4 NPTF | G 1/4 |
| 2A | Vacuum - Auxiliary | 3/8 NPSF | G 3/8 |
| PR | Pilot Signal - Release | M5X0.8 (10-32 UNF) | |

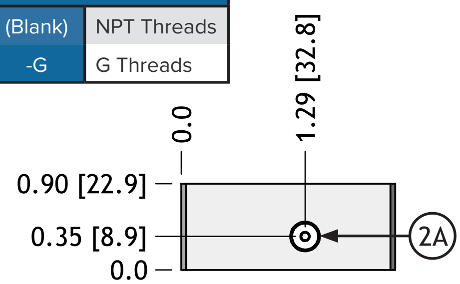


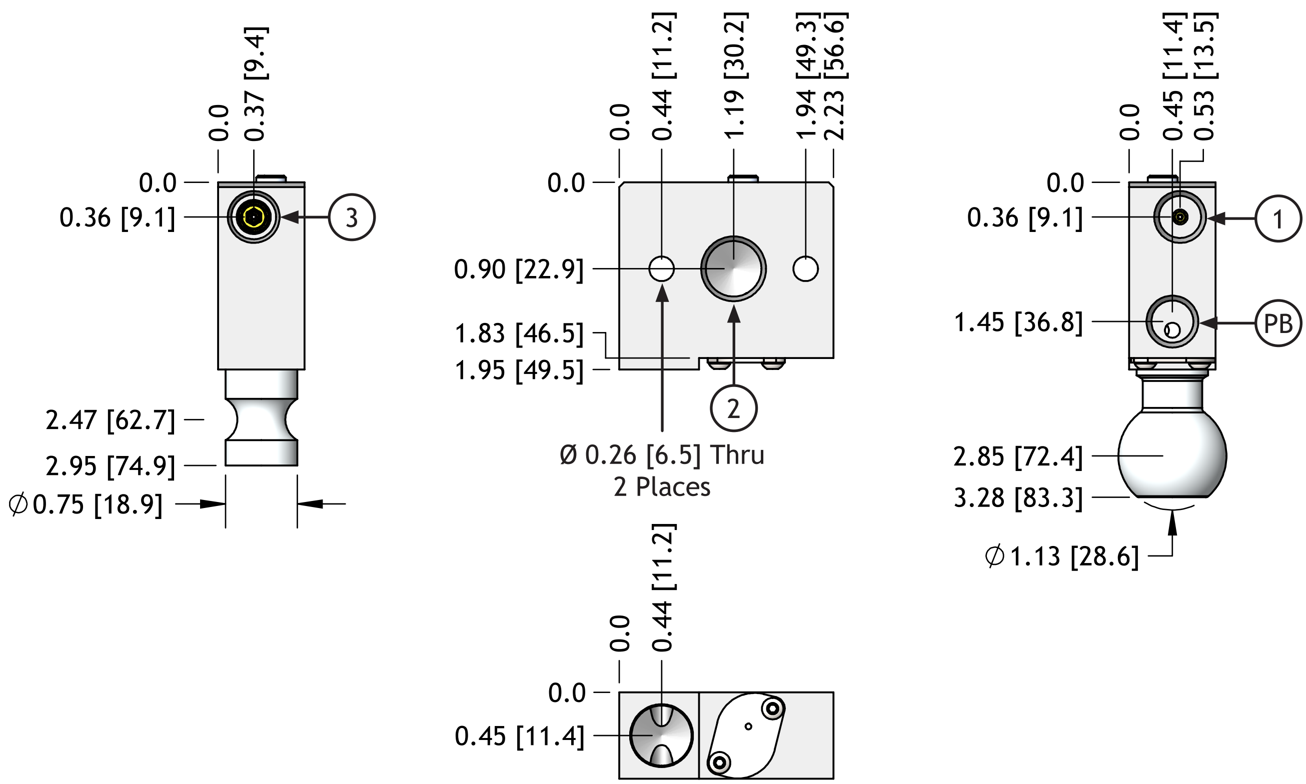
## Low-Profile Vacuum Pump w/ Release

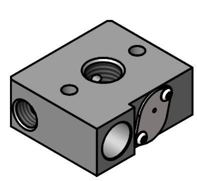
Includes a vacuum pump with release (blow-off) sequence valve, provides for mounting a vacuum cup. When used with the direct mount (standard) option, the 3/8 Vacuum Port works great for mounting to our EMAT Level Compensators.

*See ER Series Vacuum Pumps section for performance data.*

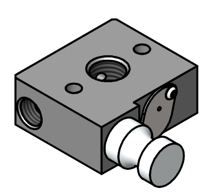
| | Venturi | | Mount | | Ports | |
|---|---|---|---|---|---|---|
| LPB | 10L | -38F | | | | |
| | 07 | | (Blank) | None | (Blank) | NPT Threads |
| | 09 | | -A | Apple Core Pin | -G | G Threads |
| | 10 | | -B | Ball Swivel | | |
| | 08L | | | | | |
| | 10L | | | | | |



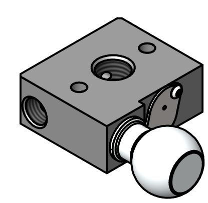



**Basic**
*Weight: 0.29 lb [132.7 g]*

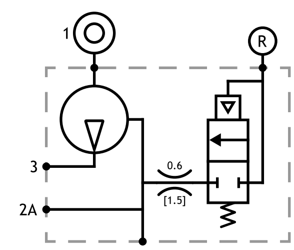


**Apple Core Pin Mount**
*Weight: 0.36 lb [161.3 g]*



**Ball Swivel Mount**
*Weight: 0.40 lb [183.5 g]*

| Code | Function | NPT | G |
|---|---|---|---|
| 1 | Air Supply | 1/4 NPTF | G 1/4 |
| 2 | Vacuum | 1/4 NPTF | G 1/4 |
| 2A | Vacuum - Auxiliary | 3/8 NPSF | G 3/8 |
| 3 | Exhaust | G 1/4 | |
| PB | Pilot Signal - Blow-Off | M5X0.8 (10-32 UNF) | |



## VacLoc

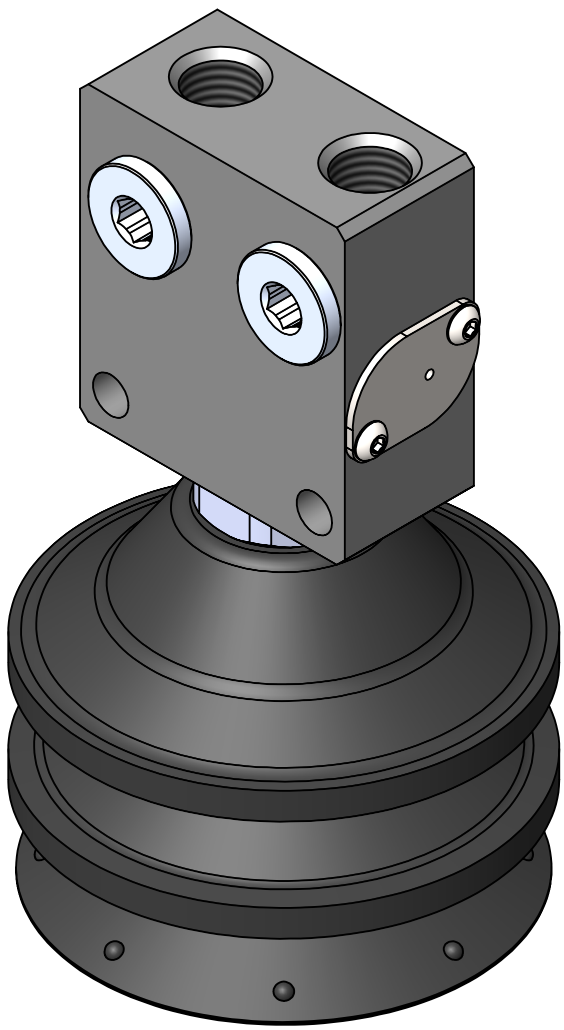
Vacloc valves provide fail-safe operation in leak-free systems. If the vacuum source is lost, or is purposefully interrupted, the Vacloc will trap vacuum for an indefinite time period so the load can be lowered to a safe position.

Modular Vacloc valves include a vacuum check valve and a sequence release valve installed in a cartridge body for perfect alignment. Valve seats are electroless-nickel plated to allow for long life. A one-piece work-attachment body eliminates secondary vacuum leak paths and the potential for loosening or separation during operation.

A high-efficiency sequence valve remains fully open during blow-off so chattering, humming, and squealing noises are eliminated. Compressed air consumption is reduced significiantly by using lower air-pressure during the blow-off mode. An internal orifice balances air-flow so that several Vacloc blow-off ports may be supplied and controlled by one solenoid valve.

Vaclocs can also be ordered with or without an integrated ER Series venturi.

*See ER Series Vacuum Pumps section for performance data.*



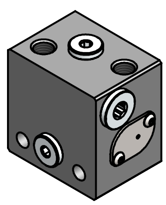
With the addition of the PQR option, our VacLoc models and part numbers have changed. Please confirm that your part number is accurate before placing an order.

## VacLoc

The VacLoc is a combination modular vacuum check valve and a sequence blow valve incorporated in a perfectly aligned, one-piece cartridge body featuring electroless-nickel plated valve seats for long life. An internal orifice provides balanced blow-off air flow so that several unites can be supplied and controlled by one solenoid valve.

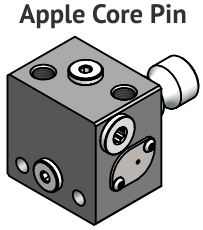
| | Quick Release Option | | Mount | | Ports | |
|---|---|---|---|---|---|---|
| VL-38F | | | -A | | | |
| | (Blank) | None | (Blank) | Standard | (Blank) | NPT Threads |
| | -PQR | Piloted Quick Release | -A | Apple Core Pin | -G | G Threads |
| | | | -B | Ball Swivel | | |

### Standard



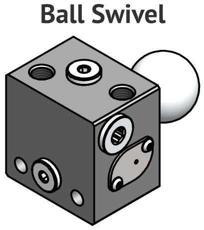
*Weight: 0.47 lbs [215.1 g]*

### Apple Core Pin

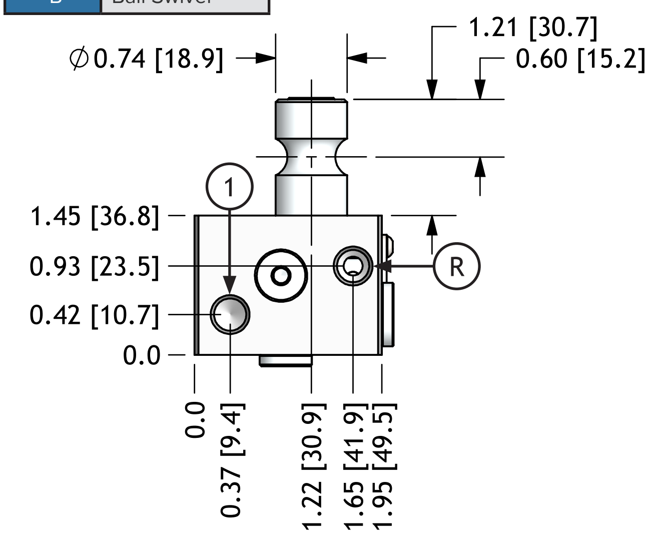


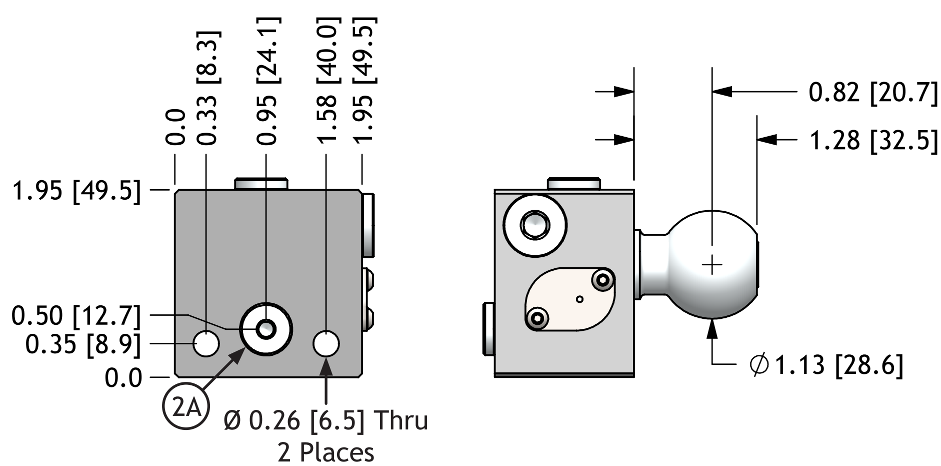
*Weight: 0.56 lbs [253.9 g]*

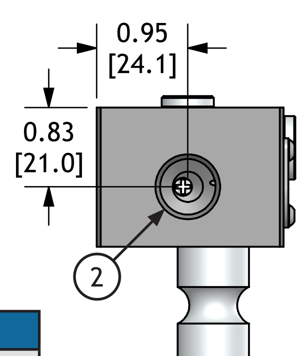
### Ball Swivel



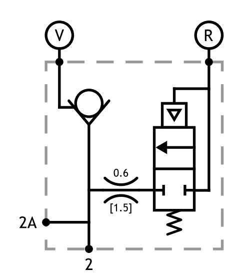
*Weight: 0.60 lbs [270.7 g]*




| Code | Function | NPT | G |
|---|---|---|---|
| V | Vacuum Source | 1/8 NPTF | |
| R | Release Source | 1/8 NPTF | |
| 2 | Vacuum | 3/8 NPSF | G 3/8 |
| 2A | Vacuum - Auxiliary | G 1/8 NPSF | |



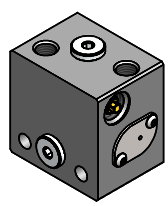
## VacLoc w/ Integral Vacuum Pump

The VLP includes all the VacLoc features plus a coaxial ejector vacuum pump cartridge that is integrated into a compact single-piece body. Response time is greatly improved by minimizing flow paths and system volume. Reliability is improved by eliminating external plumbing and potential leak points.

*See ER Series Vacuum Pumps section for performance data.*

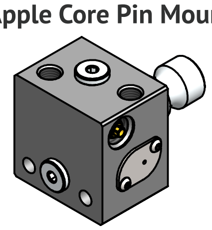
| | Venturi | | Quick Release Option | | Mount | | Ports | |
|---|---|---|---|---|---|---|---|---|
| VLP | 10L | -38F | | | -A | | | |
| | 07 | | (Blank) | None | (Blank) | Standard | (Blank) | NPT Threads |
| | 09 | | -PQR | Piloted Quick Release | -A | Apple Core Pin | -G | G Threads |
| | 10 | | | | -B | Ball Swivel | | |
| | 08L | | | | | | | |
| | 10L | | | | | | | |

**Standard**



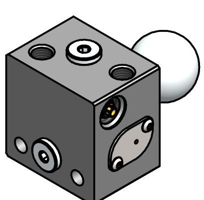
*Weight: 0.49 lb [219.9 g]*

**Apple Core Pin Mount**

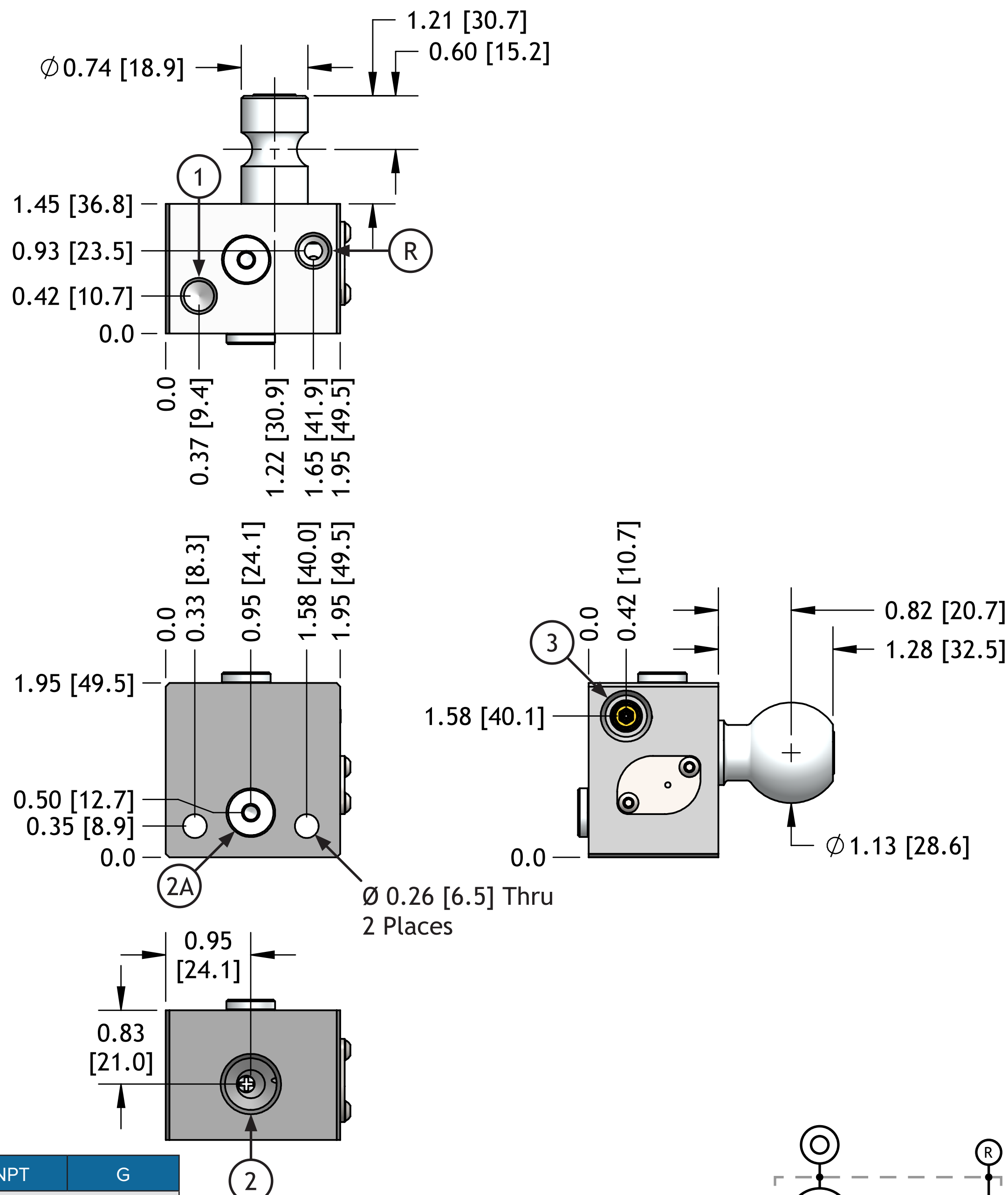


*Weight: 0.57 lb [258.8 g]*

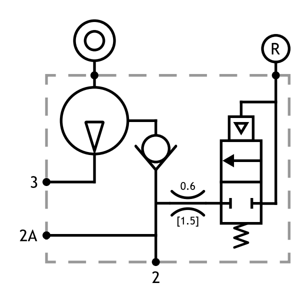
**Ball Swivel Mount**



*Weight: 0.61 lb [275.5 g]*




| Code | Function | NPT | G |
|---|---|---|---|
| 1 | Air-Supply | 1/8 NPTF | |
| 2 | Vacuum | 3/8 NPSF | G 3/8 |
| 2A | Vacuum - Auxiliary | G 1/8 NPSF | |
| 3 | Exhaust | G 1/4 | |
| R | Release Source | 1/8 NPTF | |

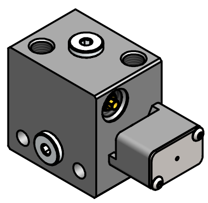


# VacLoc Pilot Controlled Quick Release (PQR) Option

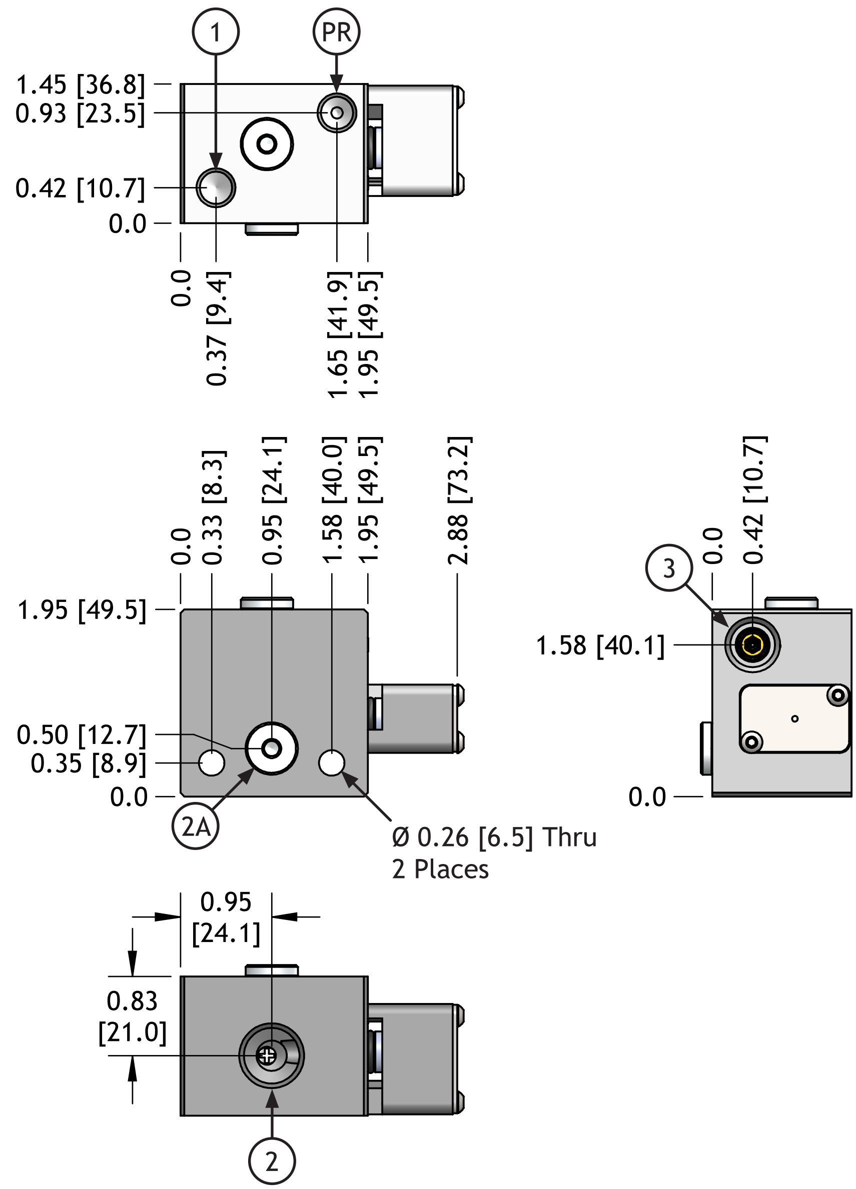
The pilot controlled quick release option for VacLocs work the same as the normal models except compressed-air is not used to release the work object. Using compressed air to release the work object increases air consumption by quite a bit compared to the amount used to generate vacuum. The PQR option uses a valve which is actuated by a compressed air signal that can be connected to all PQR valves in a system without concern for balancing pilot lines. The only compressed air flow is a small amount to pressurize the pilot lines to all PQR valves. The pilot signal shifts the PQR valve which opens a large passage from the vacuum port to atmosphere to immediately dissipate vacuum and release the work object.

The PQR option is available for VacLoc's with or without an integral pump.

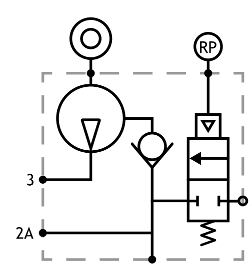
*See pages 16:10 and 16:11 for How To Order chart and additional details.*
*See ER Series Vacuum Pumps section for performance data.*



*Additional Weight: 0.06 lb [28.0 g]*



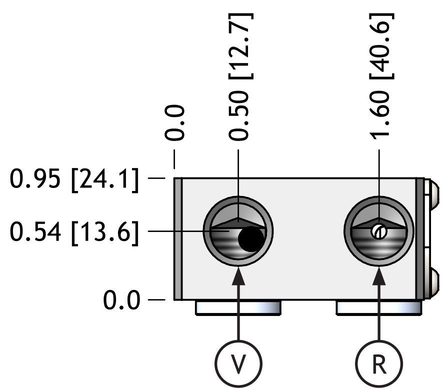

| Code | Function | NPT | G |
|---|---|---|---|
| 1 | Air-Supply | 1/8 NPTF | |
| 2 | Vacuum | 3/8 NPSF | G 3/8 |
| 2A | Vacuum - Auxiliary | G 1/8 NPSF | |
| 3 | Exhaust | G 1/4 | |
| PR | Pilot Signal, Release | 1/8 NPTF | |

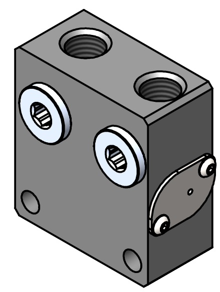


## VacLoc, Slim Body

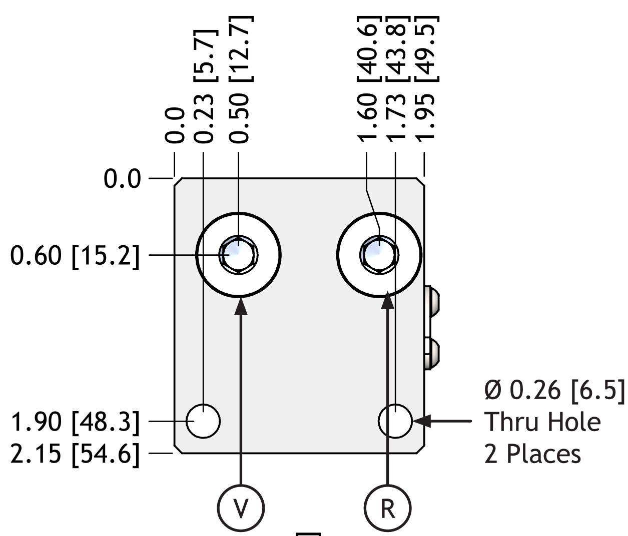
The slim body VacLoc operates in the exact same manner as the normal VacLoc. The only differences between the two are size and available options.

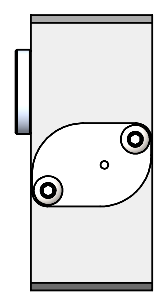
| | Ports | |
|---|---|---|
| VLS-38F | | |
| | (Blank) | NPT Threads |
| | -G | G Threads |

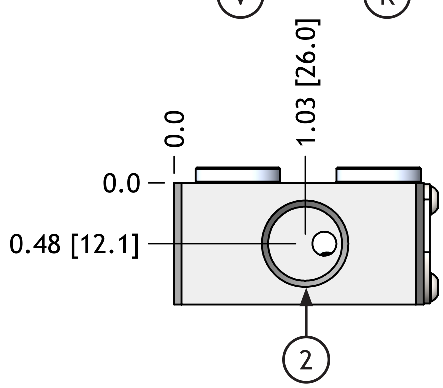


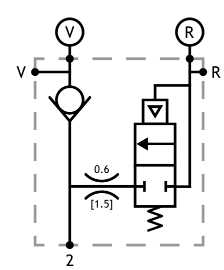
*Weight: 0.33 lb [151.6 g]*



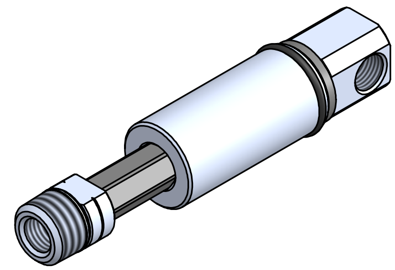






| Code | Function | NPT | G |
|---|---|---|---|
| V | Vacuum Source | 1/4 NPTF | G 1/4 |
| R | Release Source | 1/4 NPTF | G 1/4 |
| 2 | Vacuum | 3/8 NPSF | G 3/8 |



## Level Compensators, EMAT Style

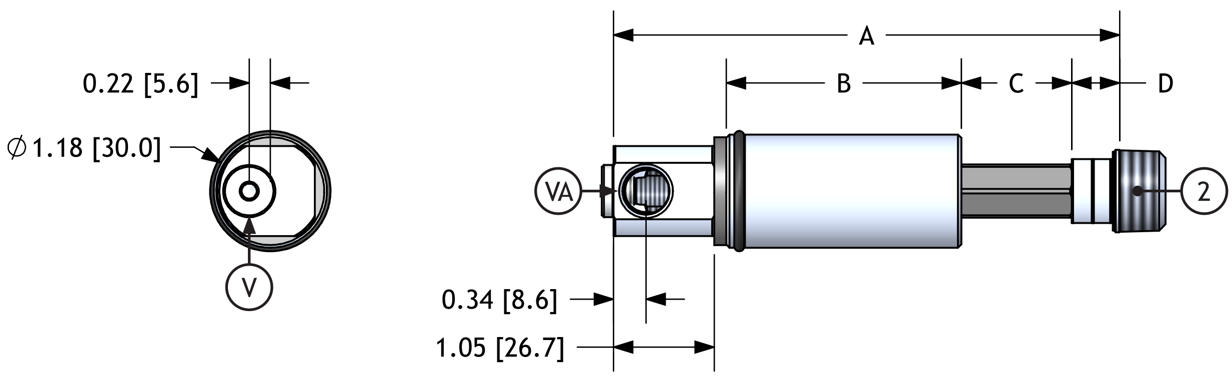


A level compensator is a spring-loaded shaft that can be adjusted to compensate for differences in height between work-piece features. The spring action also provides a soft-touch feature to eliminate shocks and make exact pick positions less critical.

When properly installed, all level compensators will be fully extended when lifting and supporting the work-piece. If a level compensator is not fully extended, it is not supporting any of the workload. The 30 mm diameter sleeve body provides a long adjustment length for this purpose. A retaining o-ring is used to prevent slipping through the mount.

To mount any vacuum connection, vacuum pump, or VacLoc directly to an EMAT level compensator using the 3/8" vacuum port, use two wrenches to gently remove the elbow connection at the top of the level compensator exposing a 3/8" male connection.

| | Stroke | | Cup End Thread | |
|---|---|---|---|---|
| LC | 25 | | 38M | |
| | 25 | 25 mm | 38M | 3/8 NPT |
| | 50 | 50 mm | 38M-G | G 3/8 |
| | | | 12M | 1/2 NPT |
| | | | 12M-G | G 1/2 |



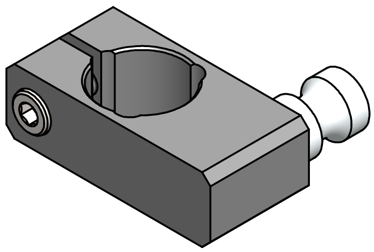

| Code | Function | 38M | 12M | 38M-G | 12M-G |
|---|---|---|---|---|---|
| V | Vacuum Supply | 1/4 NPTF | | | |
| VA | Vacuum Supply - Alternate | 1/8 NPSF | | | |
| 2 | Vacuum | 3/8 NPT | 1/2 NPT | G 3/8 | G 1/2 |

| Part Number | A Length in [mm] | B Sleeve Length in [mm] | C Stroke in [mm] | D Coupler in [mm] | Weight lb [g] |
|---|---|---|---|---|---|
| LC2538M | 5.13 [130.0] | 2.45 [62.2] | 1.00 [25.0] | 0.50 [12.7] | 0.42 [189.0] |
| LC2512M | 5.13 [130.0] | 2.45 [62.2] | 1.00 [25.0] | 0.50 [12.7] | 0.42 [189.0] |
| LC5038M | 7.88 [200.0] | 4.20 [107.0] | 2.00 [50.0] | 0.50 [12.7] | 0.60 [274.0] |
| LC5012M | 7.88 [200.0] | 4.20 [107.0] | 2.00 [50.0] | 0.50 [12.7] | 0.60 [274.0] |

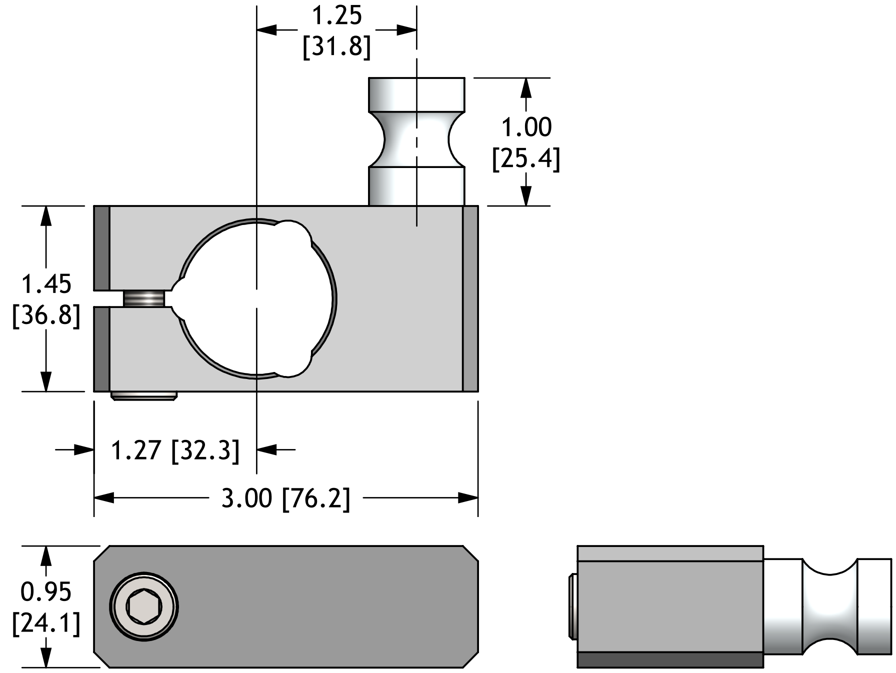
## Level Compensator Mounts

We offer four types of EMAT level compensator mounts. Each mount features an anodized aluminum mount with stainless steel fasteners. With a variety of mounting options and a very simple installation, our level compensator mounts work perfectly and easily with our EMAT style level compensators.

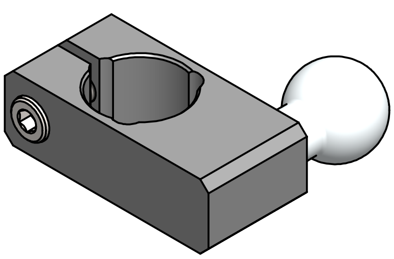
**LCM30A: Level Compensator Apple Core Pin Mount**



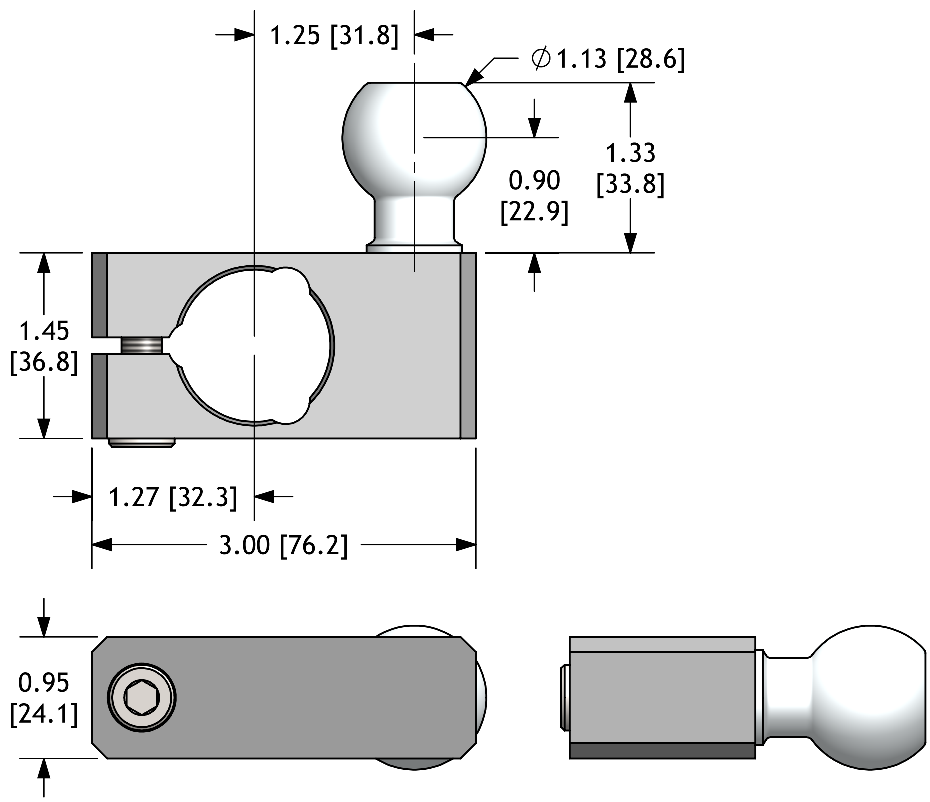
*Weight: 5.45 oz [154.4 g]*




**LCM30B: Level Compensator Ball Swivel Mount**

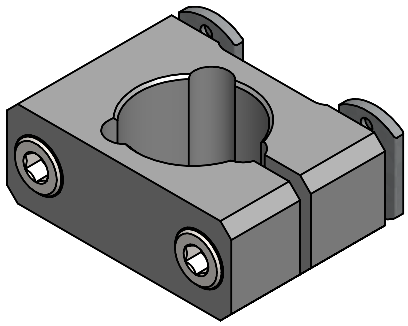


*Weight: 6.23 oz [176.5 g]*

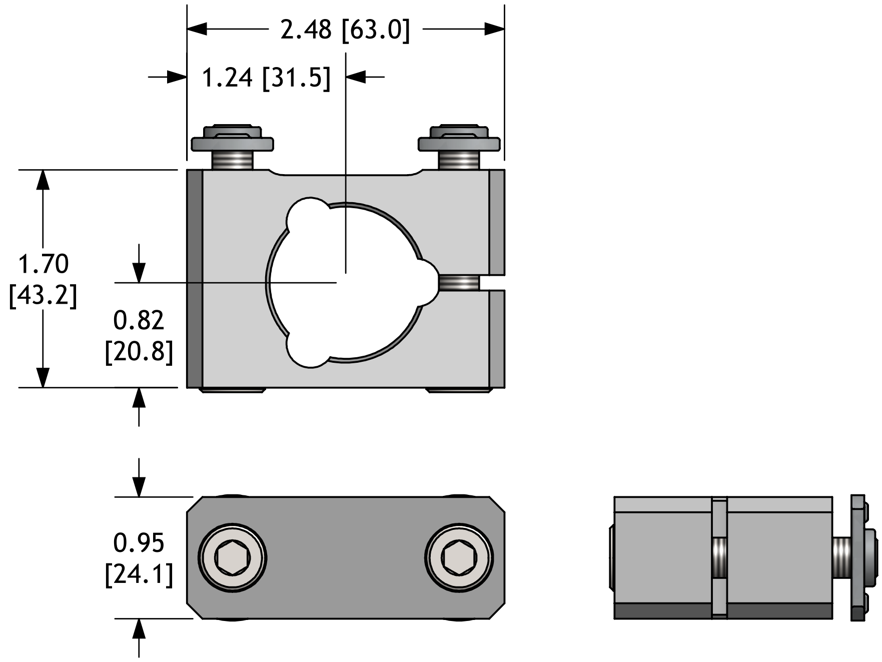


## Level Compensator Mounts

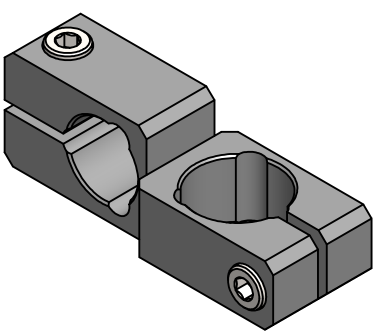
**LCM30E: Level Compensator Extrusion Mount**



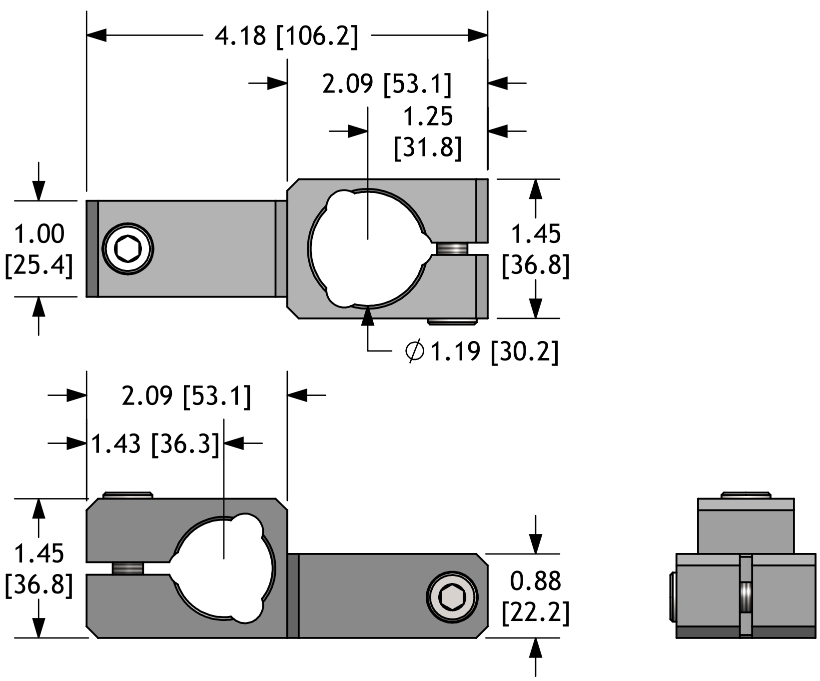
*Weight: 5.96 oz [169.1 g]*




**LCM30S10: Level Compensator 1.0" Slide-On Mount**



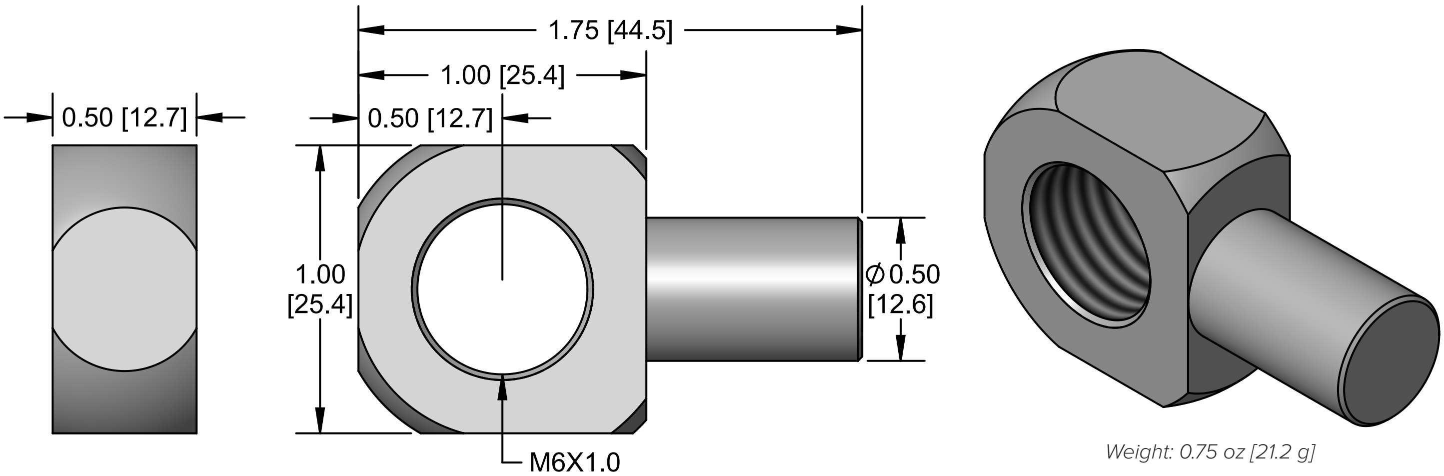
*Weight: 6.47 oz [183.5 g]*



# Level Compensator Mounts

### LCM18: Level Compensator Mount, M16x1.0

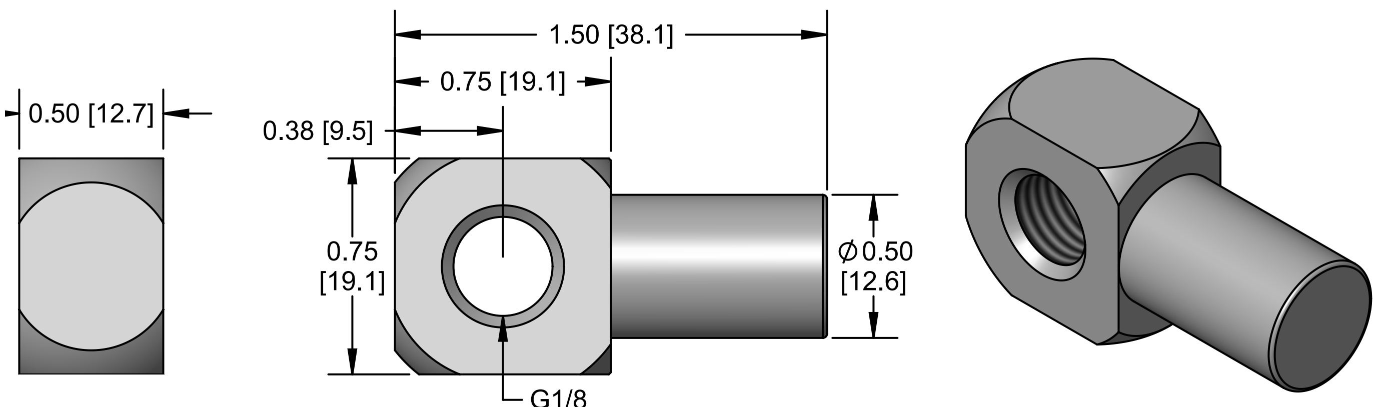
Level compensator mounts make it easy to mount level compensators to clamp blocks.




*Weight: 0.75 oz [21.2 g]*

### LCM10: Level Compensator Mount, G 1/8

Level compensator mounts make it easy to mount level compensators to clamp blocks.




*Weight: 0.58 oz [16.38 g]*

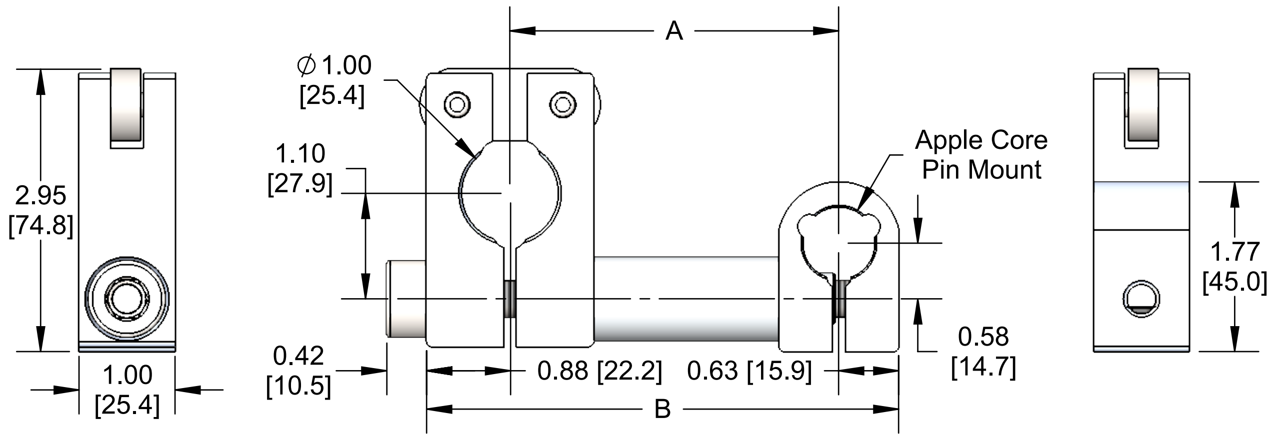
## Clamp-On Arm w/ Apple Core Pin Receiver

| C | 10 | X | 2 | A |
|---|---|---|---|---|
| | Tube Size | | Length | |

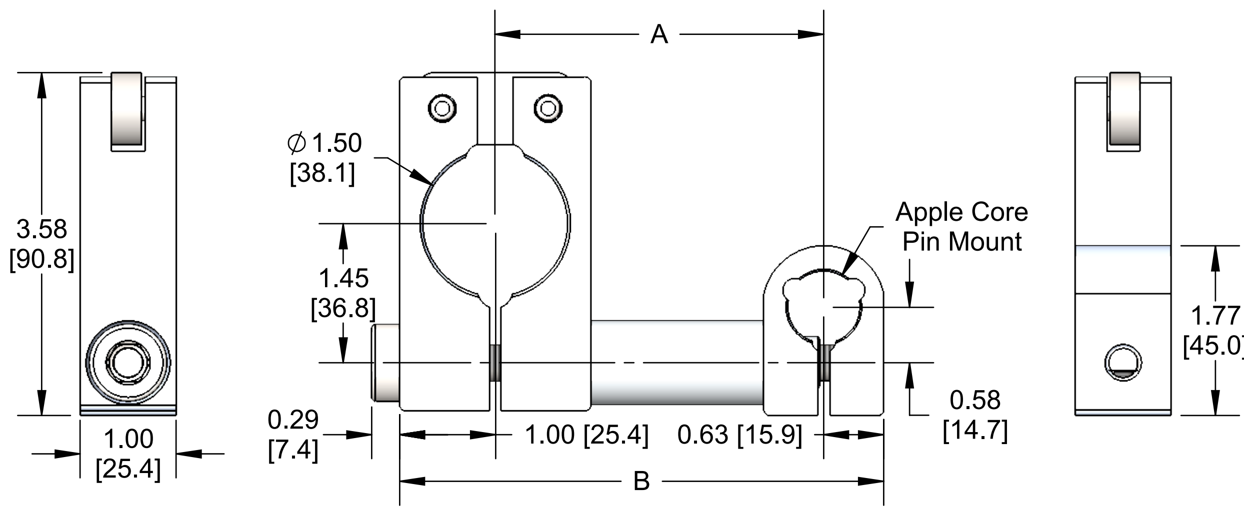
| Tube Size | |
|---|---|
| 10 | 1 in |
| 15 | 1.5 in |

| Length | |
|---|---|
| 1 | 1 in |
| 2 | 2 in |
| 4 | 4 in |
| 6 | 6 in |

### 1 in Tube




### 1.5 in Tube




| | C10X1A | C10X2A | C10X4A | C10X6A | C15X1A | C15X2A | C15X4A | C15X6A |
|---|---|---|---|---|---|---|---|---|
| A: in [mm] | 2.35 [59.7] | 3.35 [85.1] | 5.35 [136.0] | 7.35 [187.0] | 2.35 [59.7] | 3.35 [85.1] | 5.35 [136.0] | 7.35 [187.0] |
| B: in [mm] | 3.84 [97.5] | 4.84 [123.0] | 6.84 [174.0] | 8.84 [225.0] | 3.97 [101.0] | 4.97 [126.0] | 6.97 [177.0] | 8.97 [228.0] |
| Weight: lb [g] | 0.74 [336.0] | 0.82 [370.0] | 1.02 [463.0] | 1.22 [555.0] | 0.78 [354.0] | 0.85 [387.0] | 1.06 [480.0] | 1.26 [572.0] |

## Clamp-On Arm w/ Ball Swivel Receiver

| C | 10 | X | 2 | B |
|---|---|---|---|---|
| | Tube Size | | Length | |

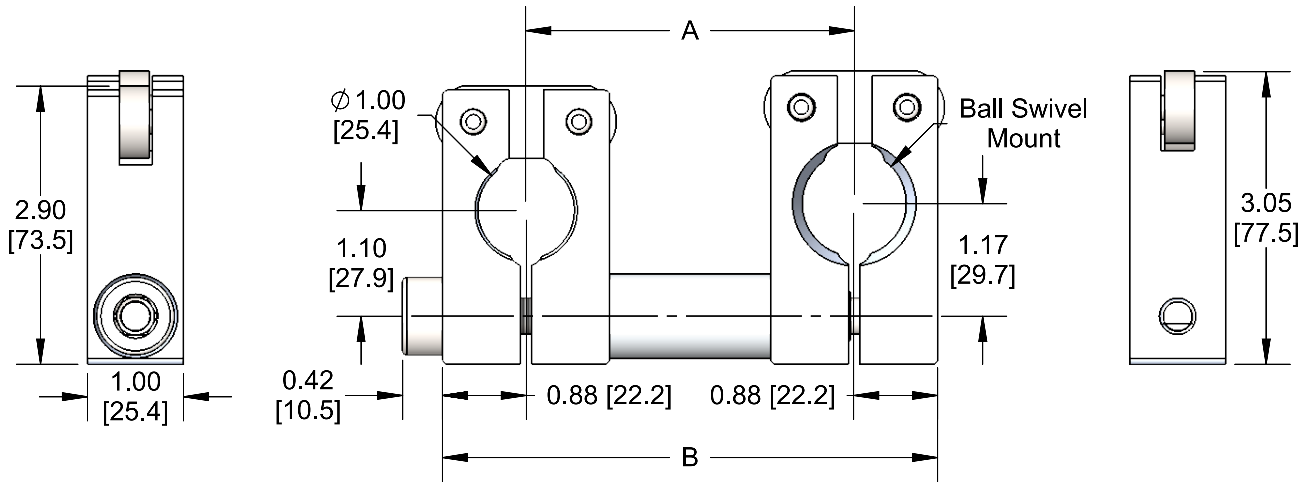
**Tube Size**

| | |
|---|---|
| 10 | 1 in |
| 15 | 1.5 in |

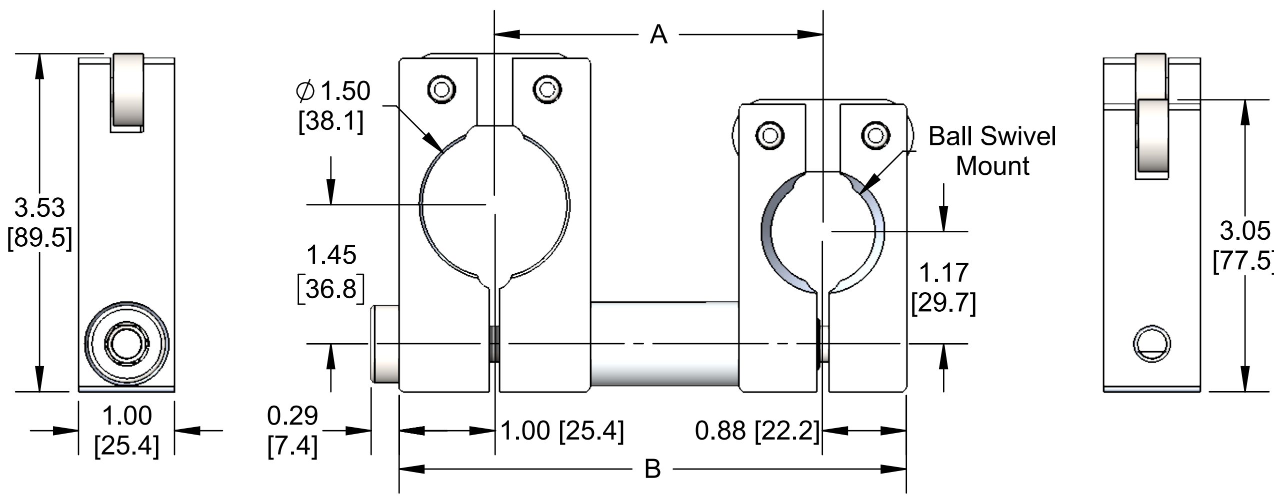
**Length**

| | |
|---|---|
| 1 | 1 in |
| 2 | 2 in |
| 4 | 4 in |
| 6 | 6 in |

### 1 in Tube




### 1.5 in Tube




| | C10X1B | C10X2B | C10X4B | C10X6B | C15X1B | C15X2B | C15X4B | C15X6B |
|---|---|---|---|---|---|---|---|---|
| A: in [mm] | 2.35 [59.7] | 3.35 [85.1] | 5.35 [136.0] | 7.35 [187.0] | 2.35 [59.7] | 3.35 [85.1] | 5.35 [136.0] | 7.35 [187.0] |
| B: in [mm] | 4.09 [104.0] | 5.09 [129.0] | 7.09 [180.0] | 9.09 [231.0] | 4.21 [107.0] | 5.21 [132.0] | 7.21 [183.0] | 9.21 [234.0] |
| Weight: lb [g] | 1.03 [469.0] | 1.11 [503.0] | 1.31 [595.0] | 1.52 [687.0] | 1.07 [487.0] | 1.15 [522.0] | 1.35 [613.0] | 1.56 [705.0] |

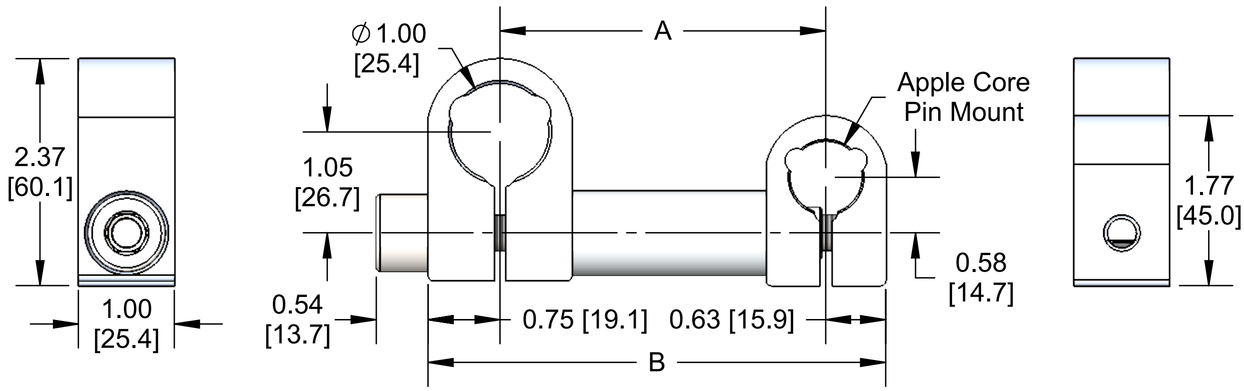
# Slide-On Arm w/ Apple Core Pin Receiver

| Tube Size | | | Length | |
|---|---|---|---|---|
| S | 10 | X | 2 | A |

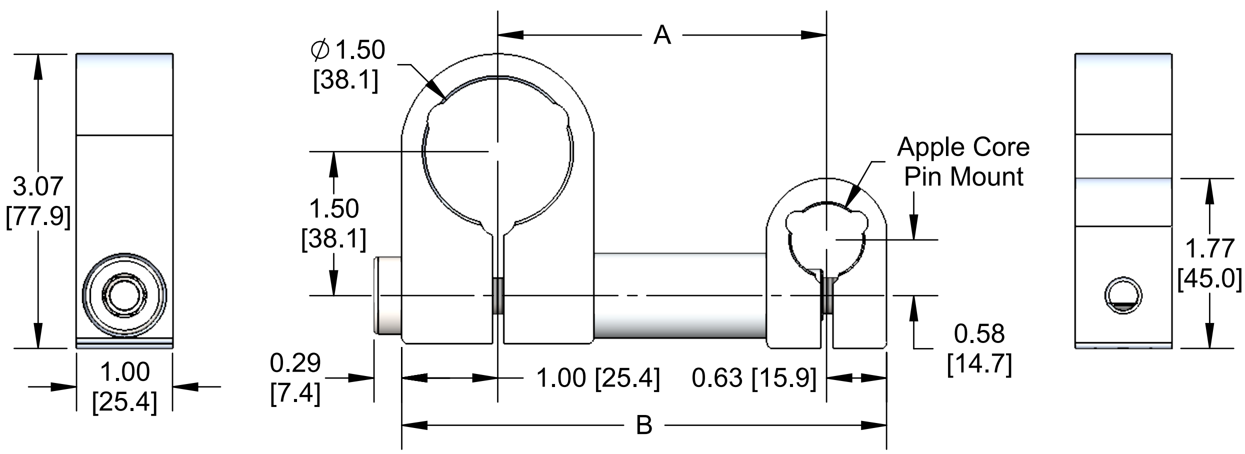
| Tube Size | |
|---|---|
| 10 | 1 in |
| 15 | 1.5 in |

| Length | |
|---|---|
| 1 | 1 in |
| 2 | 2 in |
| 4 | 4 in |
| 6 | 6 in |

**1 in Tube**




**1.5 in Tube**

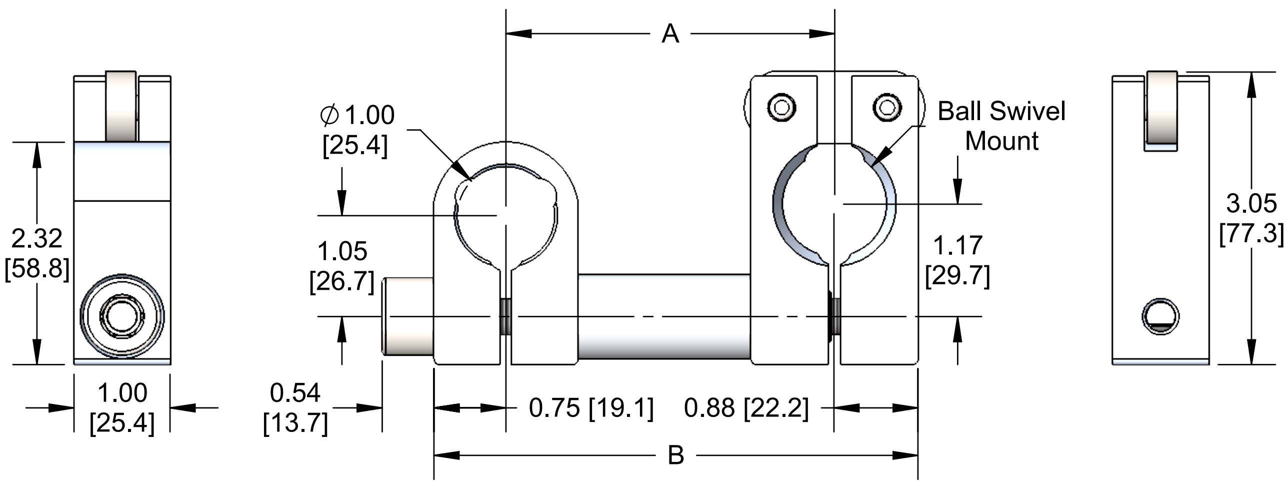



| | C10X1B | C10X2B | C10X4B | C10X6B | C15X1B | C15X2B | C15X4B | C15X6B |
|---|---|---|---|---|---|---|---|---|
| A: in [mm] | 2.35 [59.7] | 3.35 [85.1] | 5.35 [136.0] | 7.35 [187.0] | 2.35 [59.7] | 3.35 [85.1] | 5.35 [136.0] | 7.35 [187.0] |
| B: in [mm] | 3.73 [94.7] | 4.73 [120.0] | 6.73 [171.0] | 8.73 [222.0] | 3.98 [101.0] | 4.98 [126.0] | 6.98 [177.0] | 8.98 [228.0] |
| Weight: lb [g] | 0.52 [235.0] | 0.60 [270.0] | 0.80 [362.0] | 1.00 [454.0] | 0.62 [281.0] | 0.70 [317.0] | 0.90 [408.0] | 1.10 [499.0] |

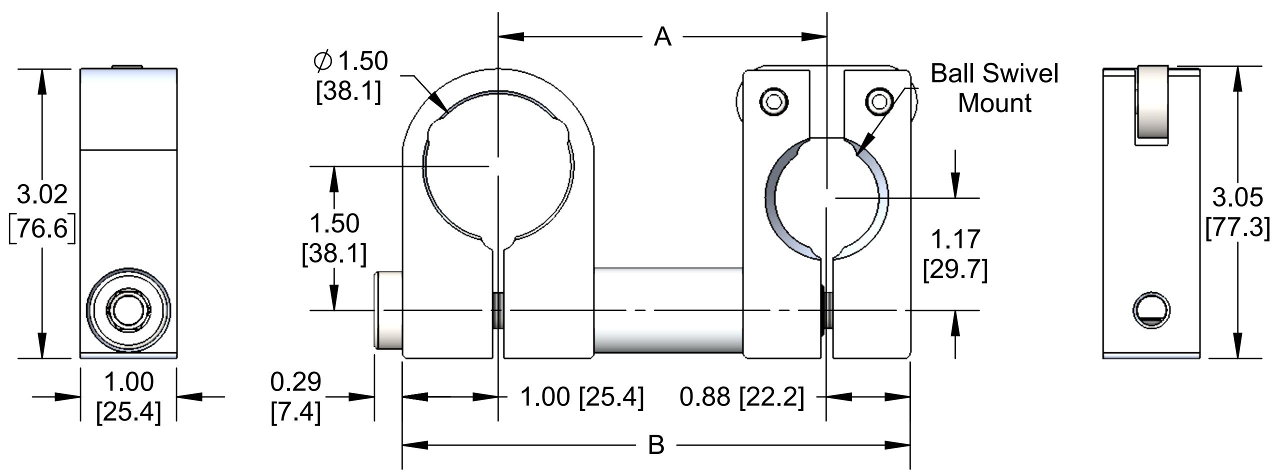
# Slide-On Arm w/ Ball Swivel Receiver

| | Tube Size | | Length | |
|---|---|---|---|---|
| S | 10 | X | 2 | B |
| | 10 — 1 in | | 1 — 1 in | |
| | 15 — 1.5 in | | 2 — 2 in | |
| | | | 4 — 4 in | |
| | | | 6 — 6 in | |

**1 in Tube**




**1.5 in Tube**




| | C10X1B | C10X2B | C10X4B | C10X6B | C15X1B | C15X2B | C15X4B | C15X6B |
|---|---|---|---|---|---|---|---|---|
| A: in [mm] | 2.35 [59.7] | 3.35 [85.1] | 5.35 [136.0] | 7.35 [187.0] | 2.35 [59.7] | 3.35 [85.1] | 5.35 [136.0] | 7.35 [187.0] |
| B: in [mm] | 3.97 [101.0] | 4.97 [126.0] | 6.97 [177.0] | 8.97 [228.0] | 4.22 [107.0] | 5.22 [133.0] | 7.22 [183.0] | 9.22 [234.0] |
| Weight: lb [g] | 0.81 [368.0] | 0.89 [403.0] | 1.09 [495.0] | 1.29 [587.0] | 0.84 [379.0] | 0.91 [414.0] | 1.12 [506.0] | 1.32 [599.0] |

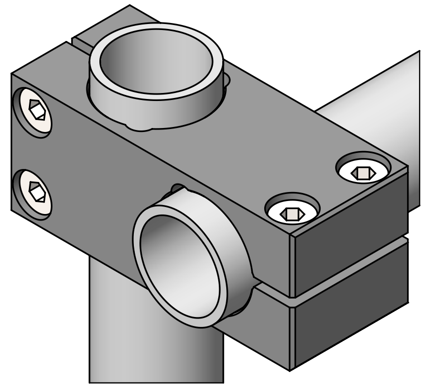
## Cross Clamp Blocks

EDCO USA Cross Clamp Blocks are provided in a number of sizes to easily help you to construct the needed structure for your system. The multiple sizes allow for many different configurations of tubing of varying sizes.

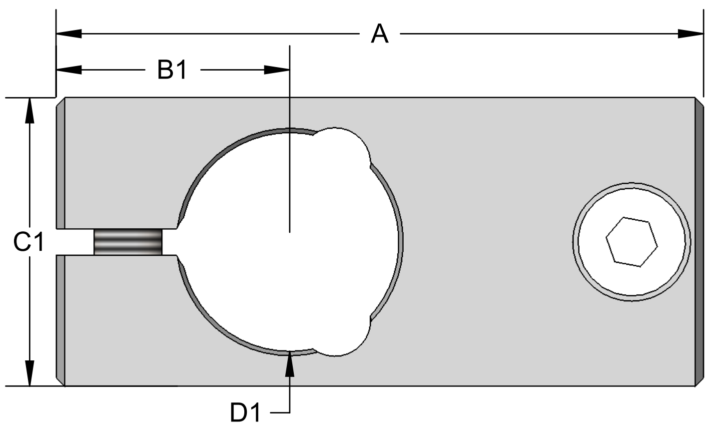
When building part numbers, Tube Ø 1 will always be the larger diameter.

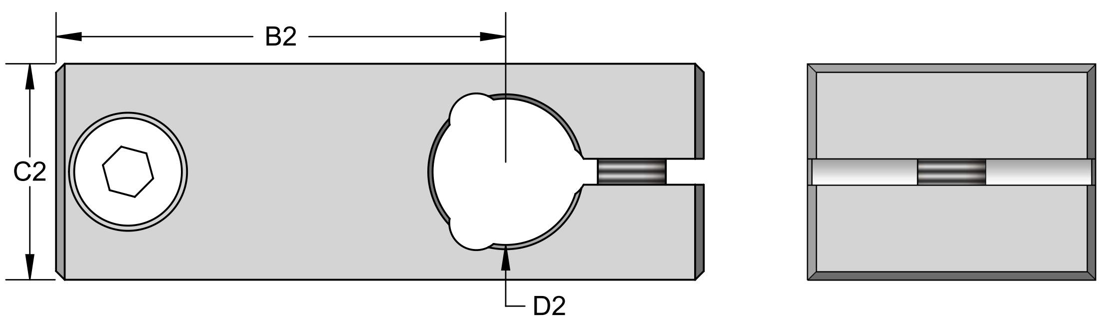
*Example: CLM7550, CLM1050, CLM1075*

| | Tube Ø 1 | | Tube Ø 2 | |
|---|---|---|---|---|
| CLM | 75 | | 50 | |
| | 50 | 1/2" Tube | 50 | 1/2" Tube |
| | 75 | 3/4" Tube | 75 | 3/4" Tube |
| | 10 | 1" Tube | 10 | 1" Tube |



*Example: Tubing not for sale.*



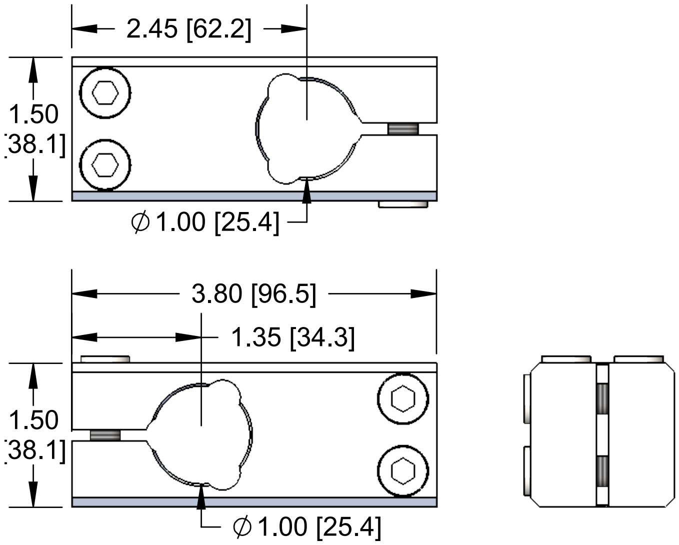



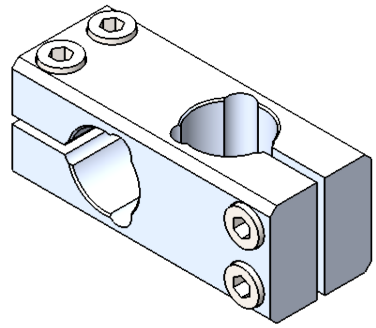

| | A in [mm] | B1 in [mm] | C1 in [mm] | D1 in [mm] | B2 in [mm] | C2 in [mm] | D2 in [mm] | Weight oz [g] |
|---|---|---|---|---|---|---|---|---|
| CLM5050* | 2.00 [50.8] | 0.69 [17.5] | 0.75 [19.1] | 0.51 [12.9] | 1.31 [33.4] | 0.75 [19.1] | 0.51 [12.9] | 1.39 [39.5] |
| CLM7550 | 2.25 [57.2] | 0.69 [17.5] | 0.75 [19.1] | 0.51 [12.9] | 1.44 [36.5] | 1.00 [25.4] | 0.76 [19.3] | 1.87 [53.1] |
| CLM7575 | 2.50 [63.5] | 0.81 [20.7] | 1.00 [25.4] | 0.76 [19.3] | 1.69 [42.9] | 1.00 [25.4] | 0.76 [19.3] | 2.57 [72.9] |
| CLM1050 | 2.50 [63.5] | 0.69 [17.5] | 0.75 [19.1] | 0.51 [12.9] | 1.56 [39.7] | 1.25 [31.8] | 1.01 [25.6] | 2.37 [67.2] |
| CLM1075 | 2.88 [73.0] | 0.88 [22.2] | 1.00 [25.4] | 0.76 [19.3] | 1.88 [47.6] | 1.25 [31.8] | 1.01 [25.6] | 3.55 [100.6] |
| CLM1010 | 3.00 [76.2] | 0.94 [23.8] | 1.25 [31.8] | 1.01 [25.6] | 2.06 [52.4] | 1.25 [31.8] | 1.01 [25.6] | 4.65 [131.7] |

**Screw heads protrude by approximately 0.07 in [1.8 mm].*

# Cross Clamp Blocks (OLD STYLE)

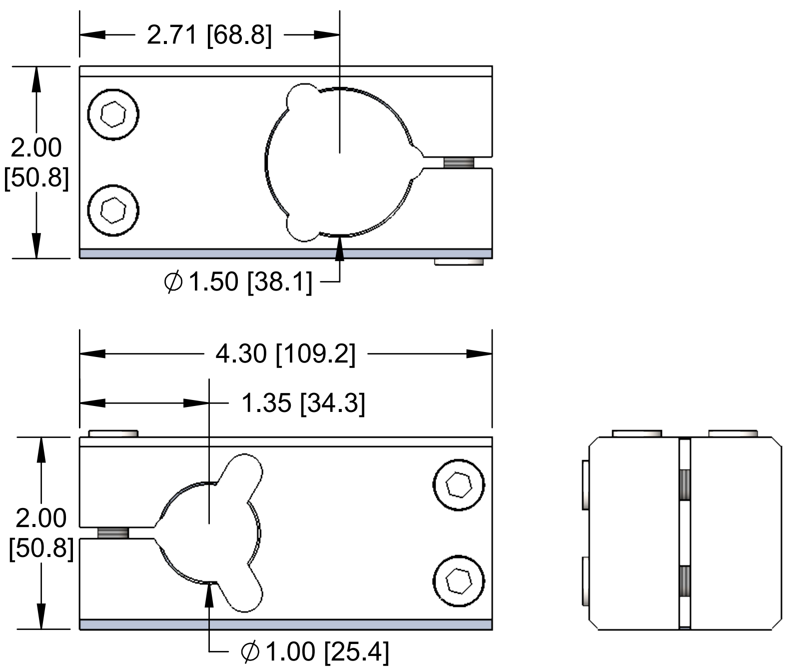
### CB1010: Clamp Block for 1 in Tubes

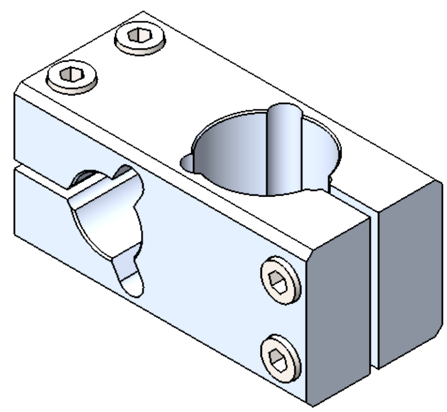


*Weight: 0.64 lb [291.0 g]*

### CB1515: Clamp Block for 1.5 in Tubes



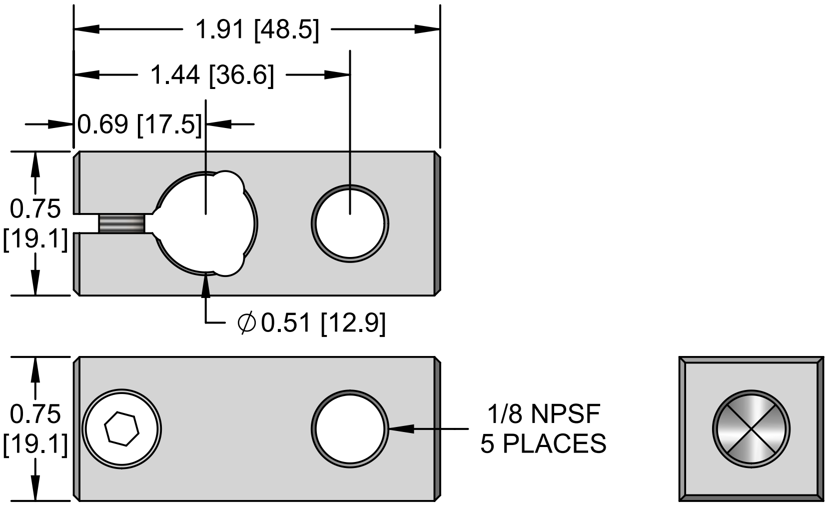
*Weight: 1.12 lb [508.0 g]*

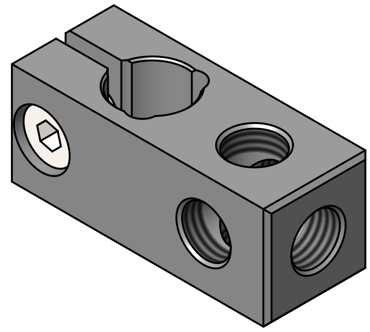
## Clamp Mount Blocks

EDCO USA Clamp Mount Blocks come with a tubing clamp on one end and several 1/8” NPSF connections on the other.

### CM505: Clamp Block Mount for 0.5 in Tubes

1/2” Tube Clamp with 1/8 NPSF Connections (Qty 5)

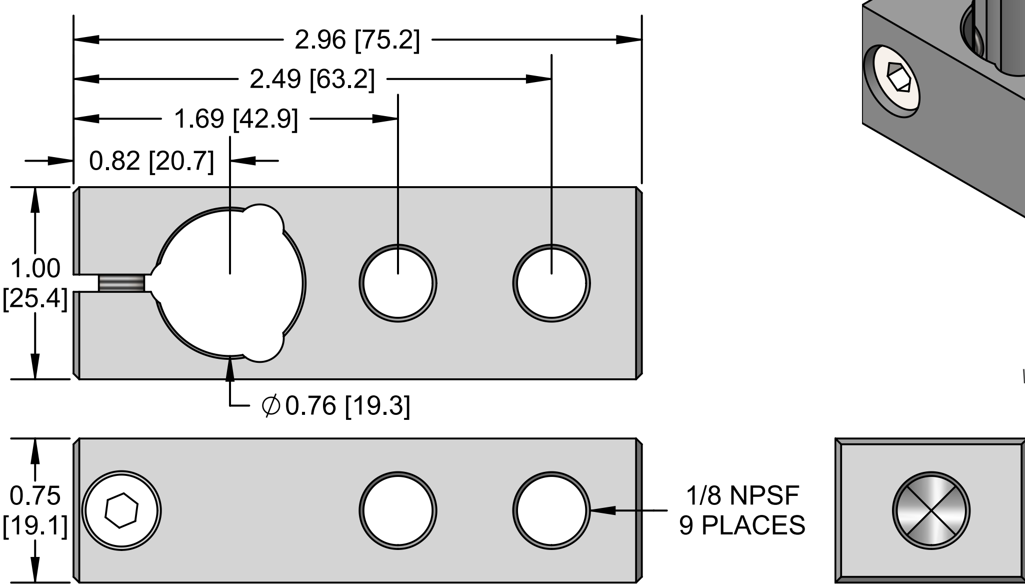


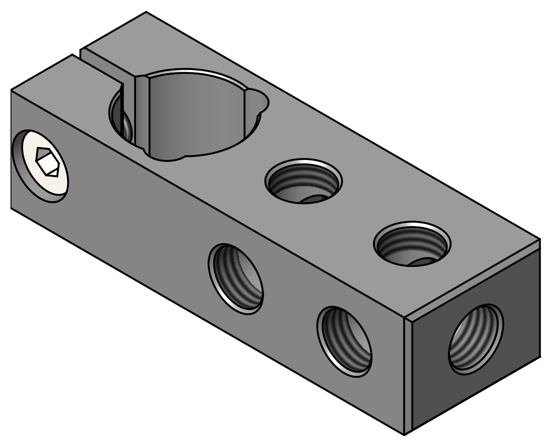



*Weight: 1.23 oz [35.0 g]*

### CM759: Clamp Block Mount for 0.75 in Tubes

3/4” Tube Clamp with 1/8 NPSF Connections (Qty 9)



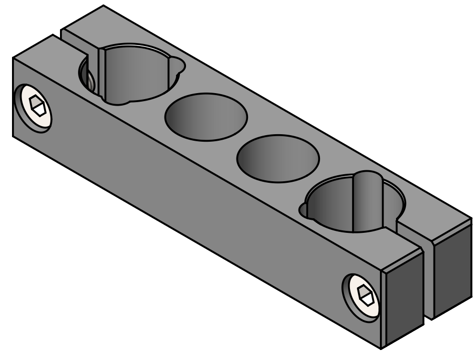



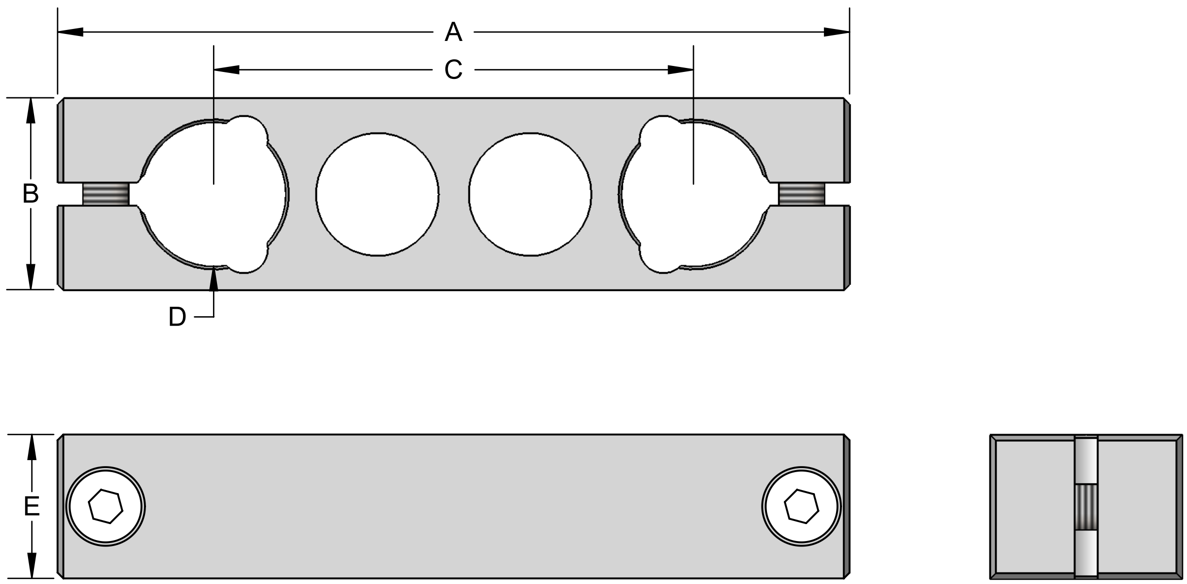
*Weight: 2.48 oz [70.2 g]*

## Parallel Clamp Mounts

Parallel Clamp Mounts are the perfect solution when you need to mount two tubes in parallel.

| | | Tube Size |
|---|---|---|
| PCLM | | 5050 |
| | 5050 | Ø 1/2" Tube |
| | 7575 | Ø 3/4" Tube |
| | 1010 | Ø 1" Tube |





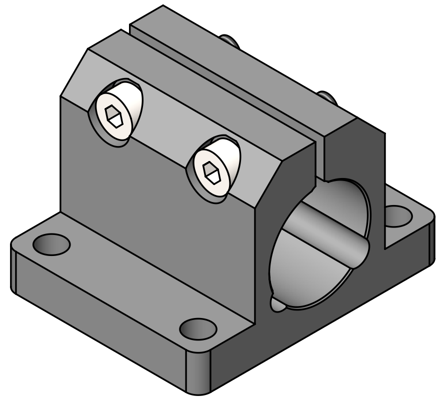

| | A in [mm] | B in [mm] | C in [mm] | D in [mm] | E in [mm] | Weight oz [g] |
|---|---|---|---|---|---|---|
| PCLM5050* | 2.63 [66.7] | 0.75 [19.1] | 1.25 [31.8] | 0.50 [12.8] | 0.75 [19.1] | 1.79 [50.8] |
| PCLM7575 | 4.13 [104.8] | 1.00 [25.4] | 2.50 [63.5] | 0.75 [19.1] | 0.75 [19.1] | 3.08 [87.4] |
| PCLM1010 | 4.63 [117.5] | 1.25 [31.8] | 2.75 [69.9] | 1.00 [25.4] | 0.75 [19.1] | 4.20 [118.9] |

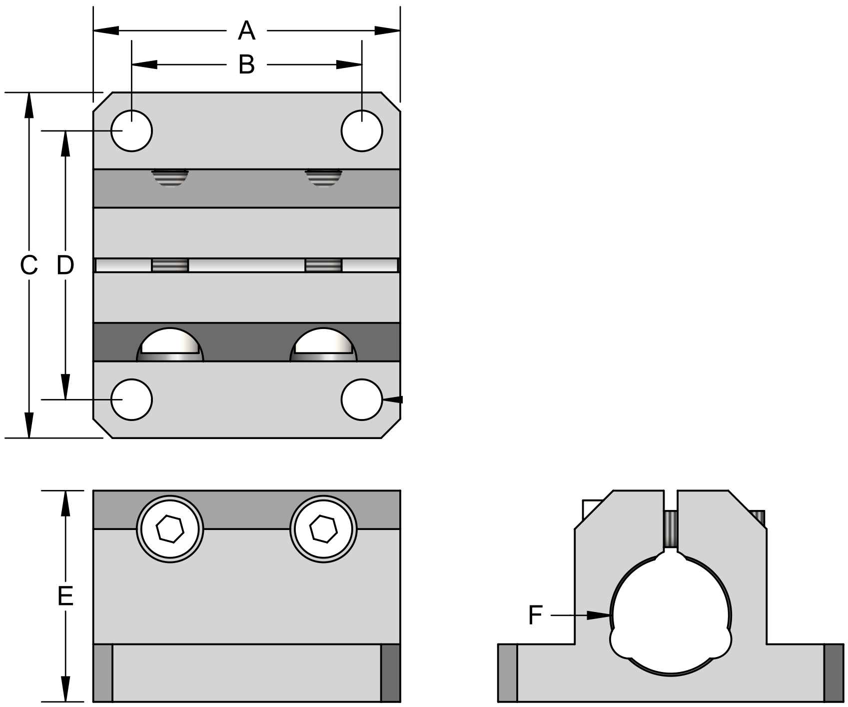
**PCLM5050 screw heads protude by 0.07 [1.8].*

## Flanged Clamps (Horizontal)

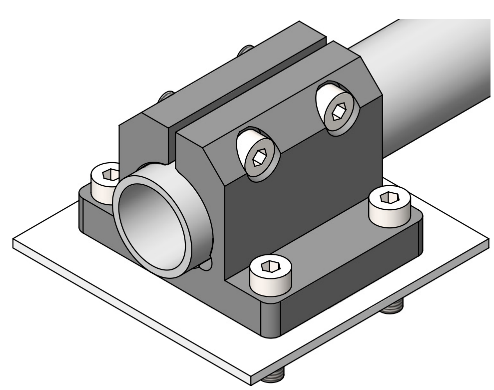
Horizontal Flanged Clamps give the base needed to build your end of arm tooling.

| | | Tube Ø |
|---|---|---|
| FCH | | 100 |
| | 75 | 3/4” Tube |
| | 75L | 3/4” Tube |
| | 100 | 1” Tube |






| | A in [mm] | B in [mm] | C in [mm] | D in [mm] | E in [mm] | F in [mm] | Weight oz [g] |
|---|---|---|---|---|---|---|---|
| FCH75 | 2.00 [50.8] | 1.50 [38.1] | 2.25 [57.2] | 1.75 [44.5] | 1.38 [34.9] | 0.76 [19.3] | 4.95 [140.3] |
| FCH75L | 2.25 [57.2] | 1.75 [44.5] | 2.25 [57.2] | 1.75 [44.5] | 1.38 [34.9] | 0.76 [19.3] | 5.50 [156.0] |
| FCH100 | 2.00 [50.8] | 1.50 [38.1] | 2.49 [63.2] | 2.00 [50.8] | 1.68 [42.7] | 0.76 [19.3] | 5.56 [157.6] |

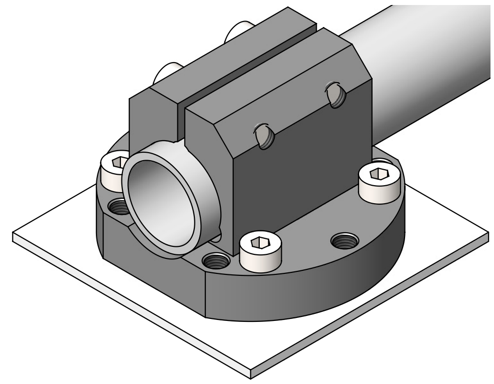


*Example (Not For Sale)*

## Flanged Clamps (Horizontal, Round)

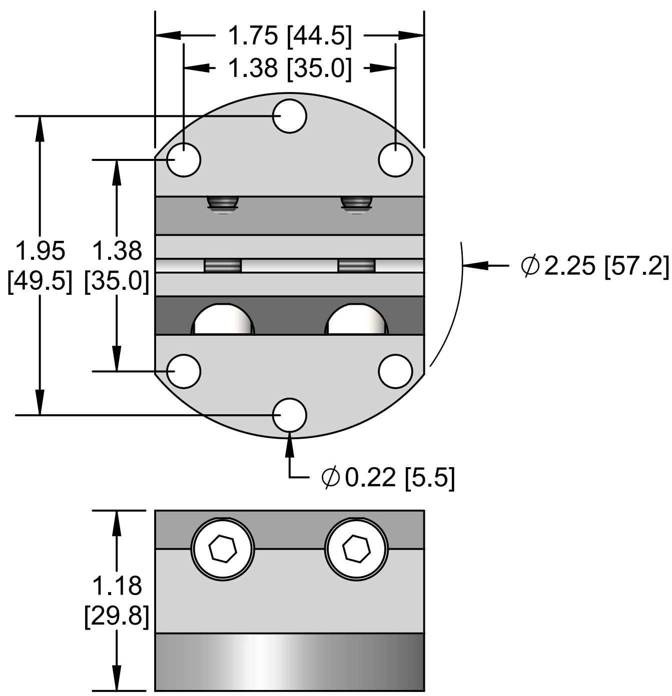
Horizontal Flanged Clamps give the base needed to build your end of arm tooling. The round clamps provide the same function with a rounded base.

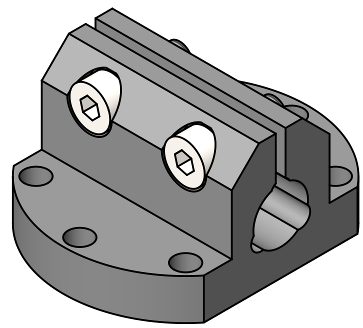
| | Tube Ø | |
|---|---|---|
| FCH | 50 | R |
| | 50 | 1/2" Tube |
| | 75 | 3/4" Tube |
| | 100 | 1" Tube |



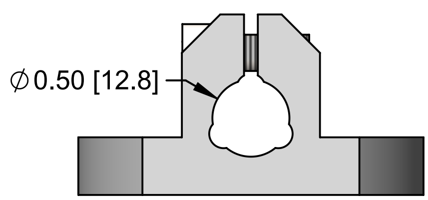
*Example (Not For Sale)*

## FCH50R: Flanged Clamp (Horizontal, Round)

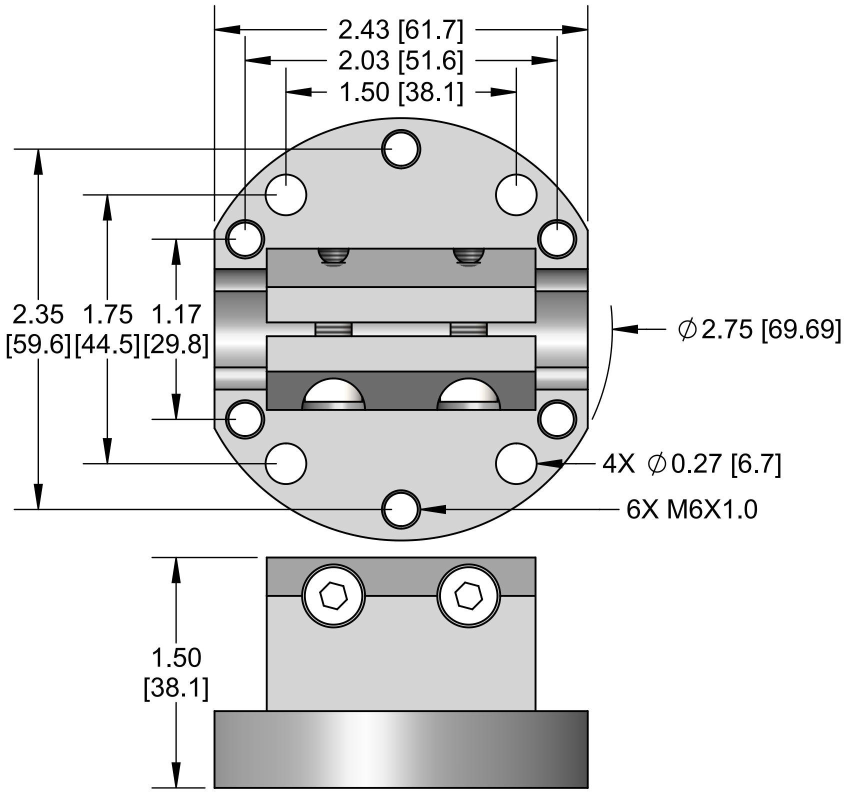


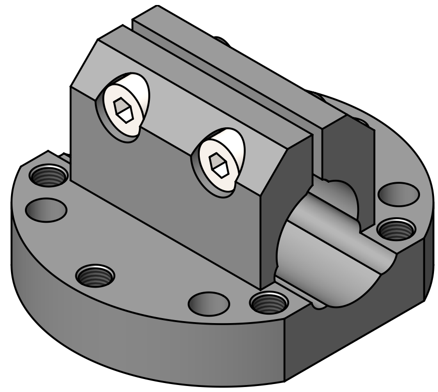



*Weight: 3.31 oz [93.8 g]*

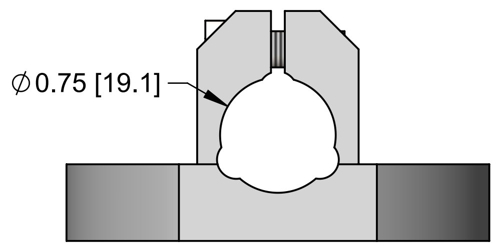


## FCH75R : Flanged Clamp (Horizontal, Round)

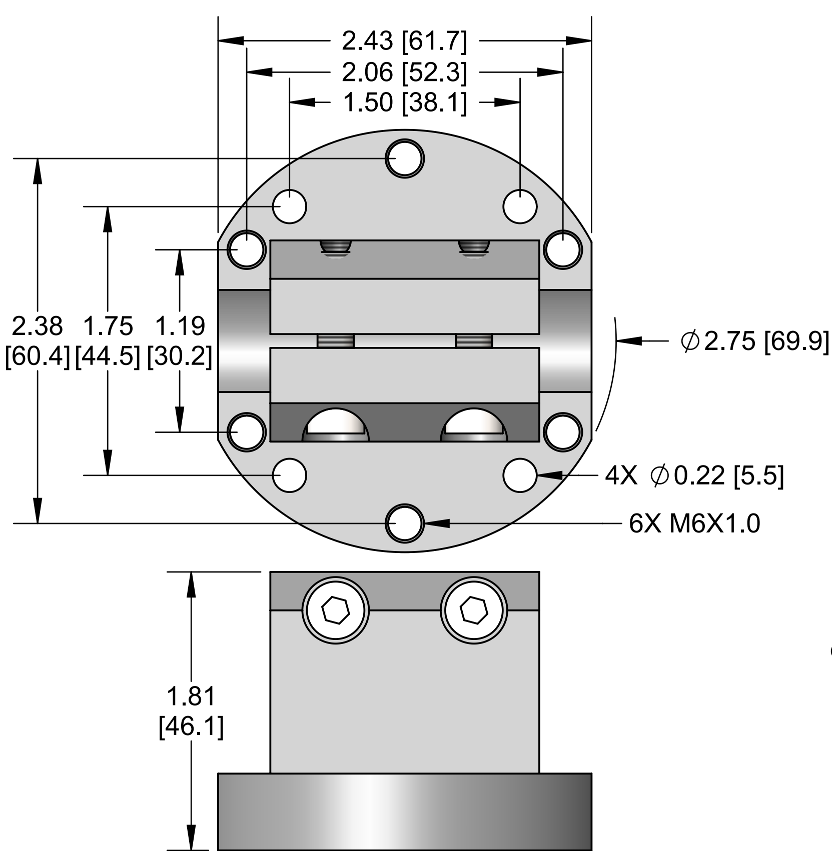


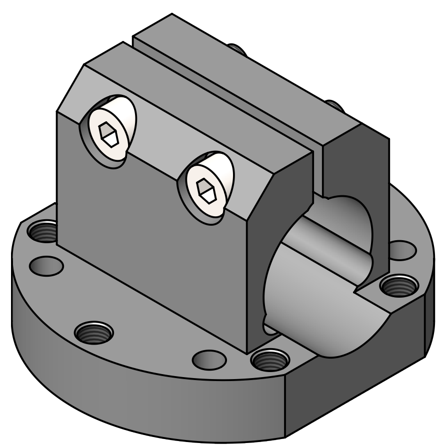



*Weight: 5.56 oz [157.6 g]*

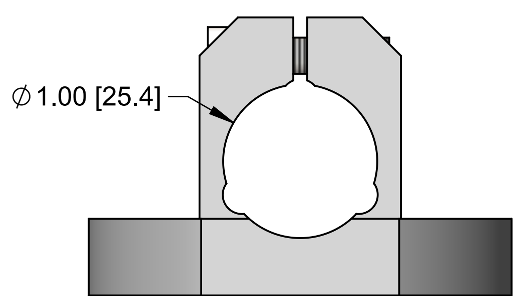



## FCH100R : Flanged Clamp (Horizontal, Round)



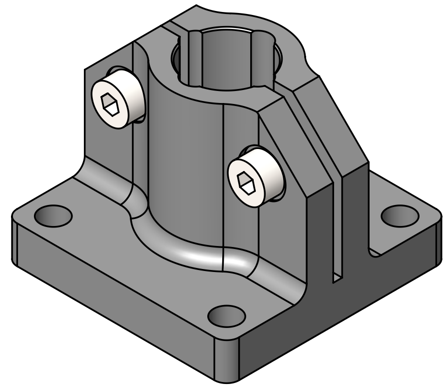



*Weight: 6.56 oz [187.7 g]*

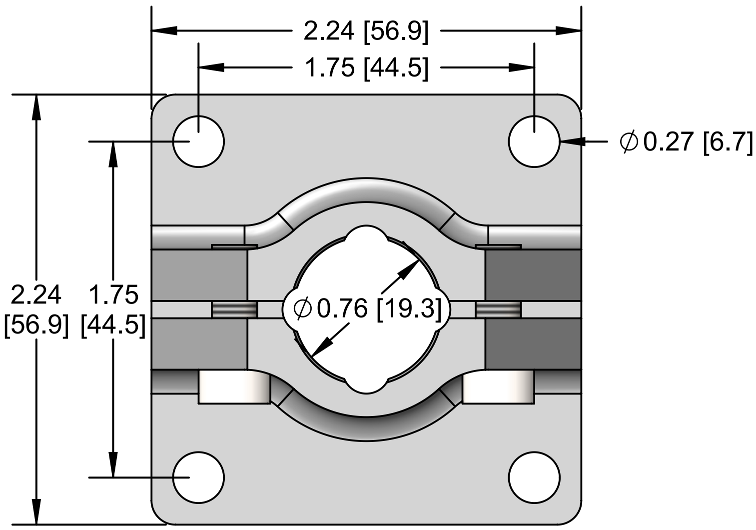


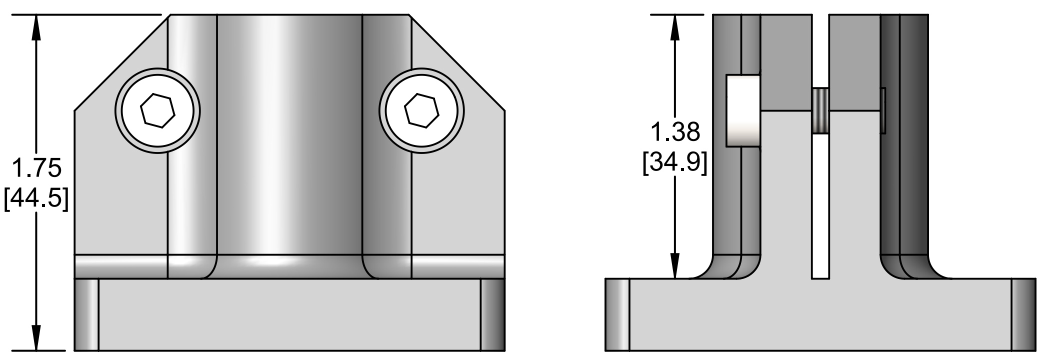
## FCV75: Flanged Clamps (Vertical)

EDCO USA Flanged Clamps give the base needed to build your end of arm tooling structure. Vertical Flanged Clamps offer the same quality and function as the Horizontal Flaned Clamps.



*Weight: 5.08 oz [144.0 g]*

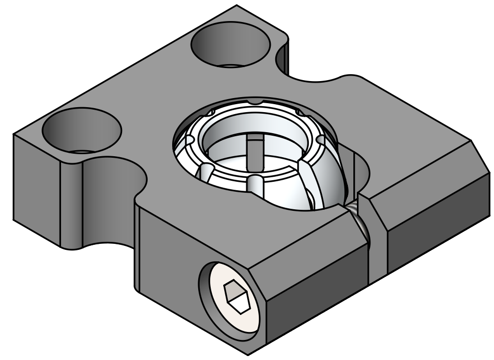


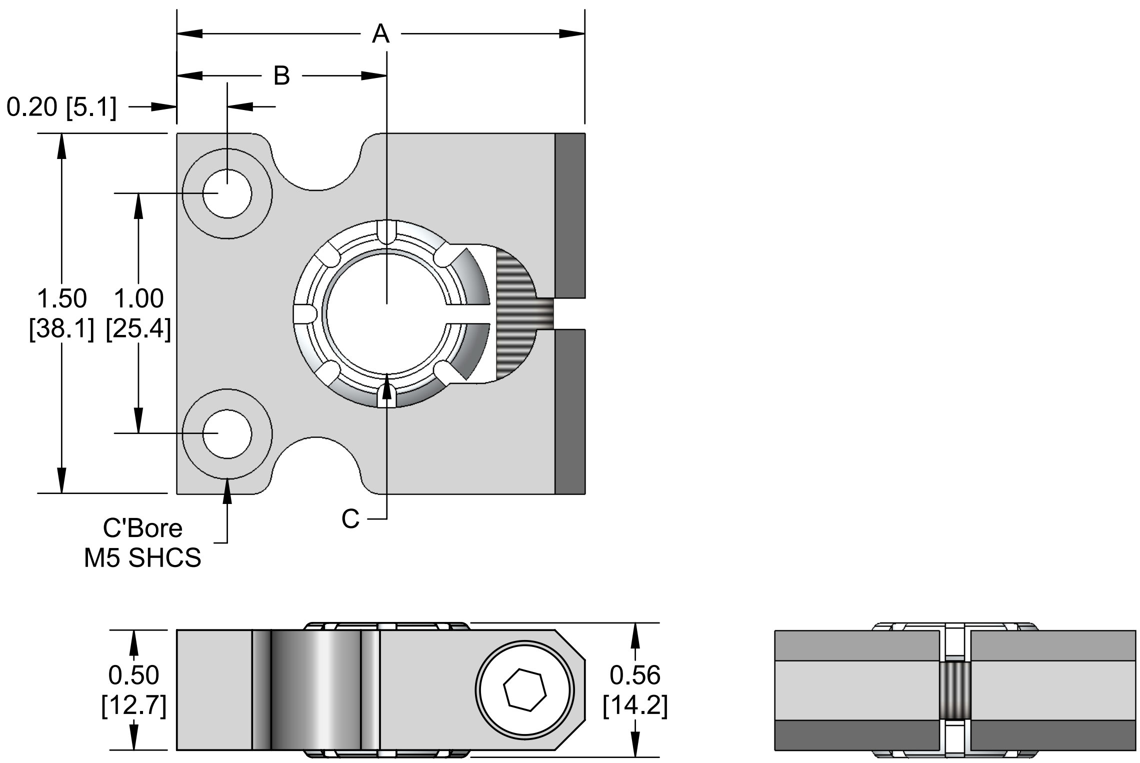



## Swivel-Ball Mounts

Swivel-Ball Mounts give a degree of movement when mounting tubing. One end has clearance for two M5 socket head cap screws while the other end is fitted with a machined aluminum swivel-ball for mounting tubing.

| | Tube Size |
|---|---|
| SMB | 75 |
| 50 | Ø 1/2" Tube |
| 75 | Ø 3/4" Tube |



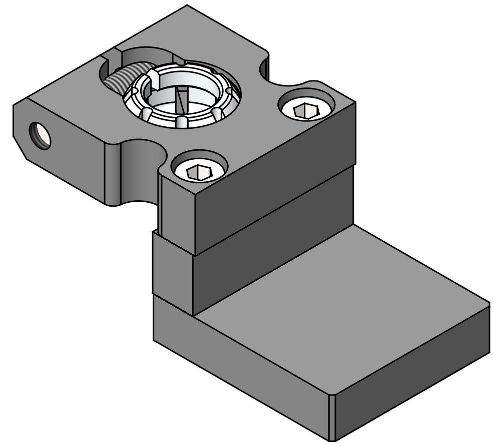


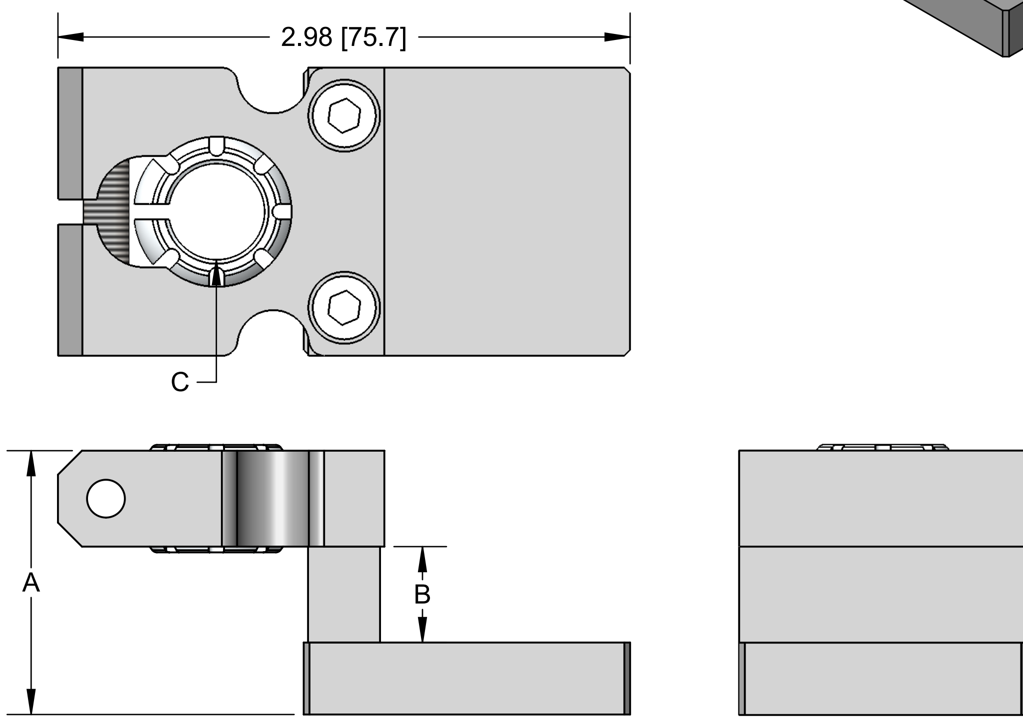

| | A in [mm] | B in [mm] | C in [mm] | Weight oz [g] |
|---|---|---|---|---|
| SMB50 | 1.70 [43.2] | 0.88 [22.2] | 0.50 [12.8] | 1.55 [43.9] |
| SMB75 | 1.95 [49.5] | 0.98 [24.8] | 0.75 [19.1] | 1.70 [48.2] |

## Swivel-Gripper Mounts

Swivel-Gripper Mounts combine the functionality of our Swivel-Ball Mounts and the flexibility of our Stand-Off Mounts with a Mount Plate for a complete assembly.

| | Tube Size | | Stand-Off | |
|---|---|---|---|---|
| SGM | 75 | | 75 | |
| | 50 | Ø 1/2” Tube | (Blank) | None |
| | 75 | Ø 3/4” Tube | -50 | 1/2” Stand-Off |
| | | | -125 | 1-1/4” Stand-Off |



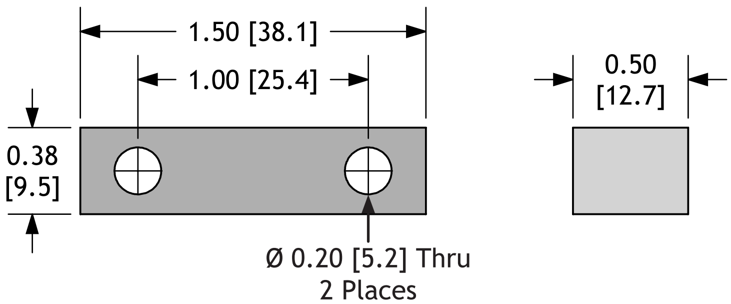


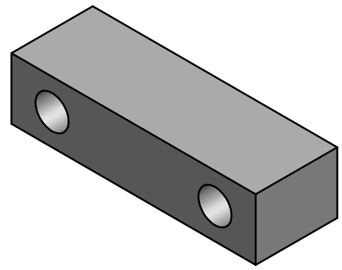

| | A in [mm] | B in [mm] | C in [mm] | Weight oz [g] |
|---|---|---|---|---|
| SGM50 | 0.88 [22.2] | N/A | 0.50 [12.8] | 3.29 [93.2] |
| SGM50-50 | 1.38 [34.9] | 0.50 [12.8] | 0.50 [12.8] | 3.79 [107.5] |
| SGM50-125 | 2.13 [54.0] | 1.25 [31.8] | 0.50 [12.8] | 4.58 [130.0] |
| SGM75 | 0.88 [22.2] | N/A | 0.75 [19.1] | 3.44 [97.6] |
| SGM75-50 | 1.38 [34.9] | 0.50 [12.8] | 0.75 [19.1] | 3.94 [111.8] |
| SGM75-125 | 4.74 [134.3] | 1.25 [31.8] | 0.75 [19.1] | 4.74 [134.3] |

## Stand-Off Mounts (Spacers)

Stand-Off Mounts provide a great deal of flexibility when using multiple EOAT components together. We use our Stand-Off Mounts with Swivel-Ball Mounts and Nipper Mounts to give us a wide variety of mounting options.

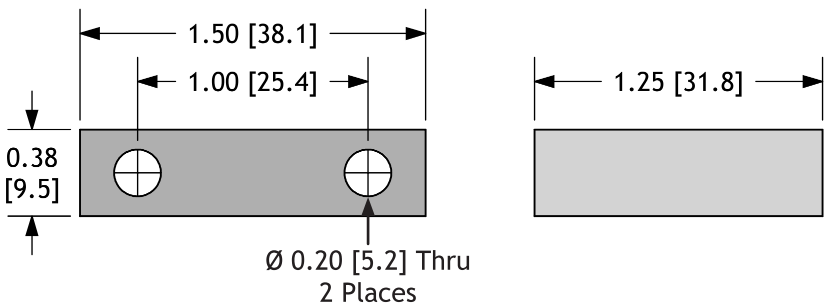
**SP-50: Stand-Off Mount, 1/2" Height**

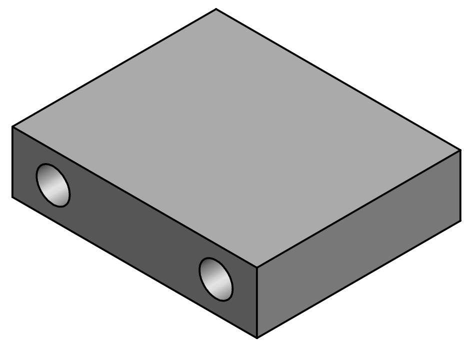


*Weight: 0.39 oz [11.0 g]*

**SP-125: Stand-Off Mount, 1-3/4" Height**

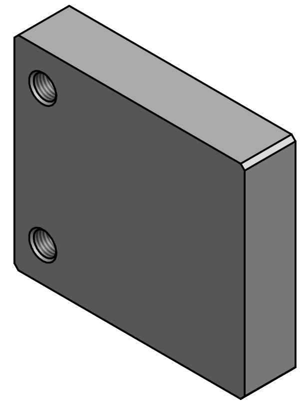


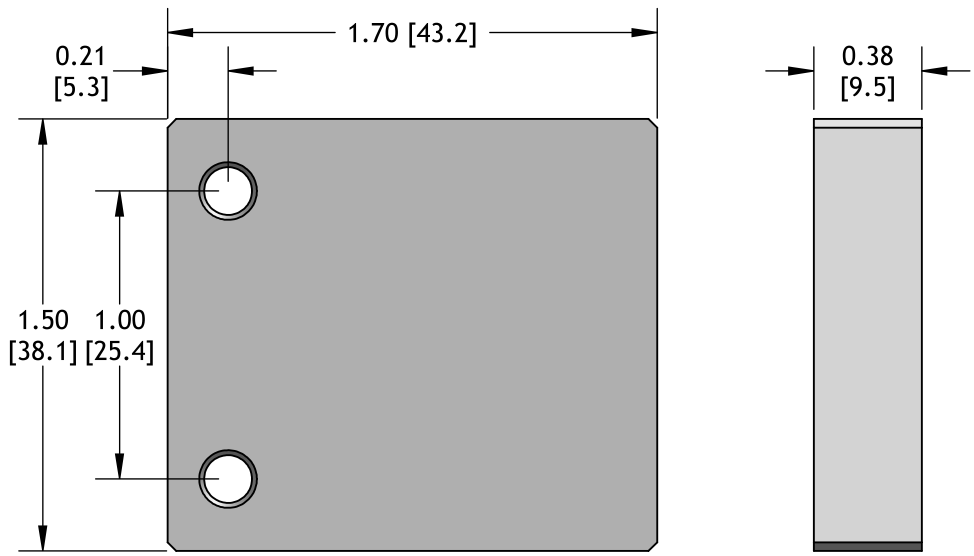
*Weight: 0.97 oz [27.5 g]*

## SMB-GP: Mount Plate

Our mount plate is a simple anodized aluminum machine plate with two M5 thru holes for mounting other pieces of EOAT. We use these with our swivel mounts and spacers to create a versatile mount utilizing a few, simple pieces.



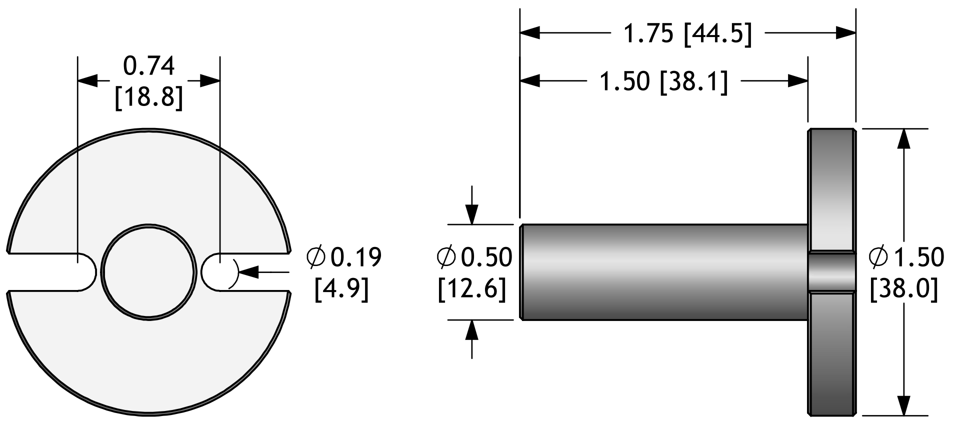
Weight: 1.47 oz [41.5 g]

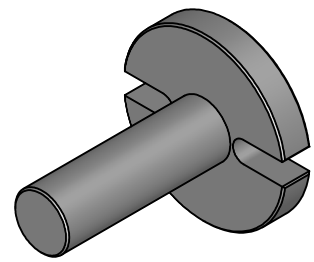


## Post-Style Gripper Mounts

Our Post-Style Gripper Mounts work well with a variety of our clamp mounts when you'd like to mount to a plate rather than use tubing.

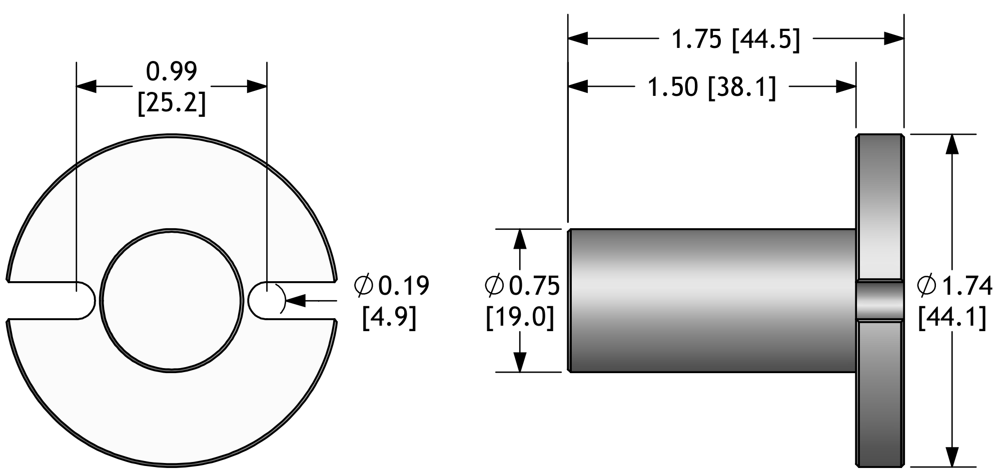
**PGM50R: Post Gripper Mount w/ Ø 1/2" Post**

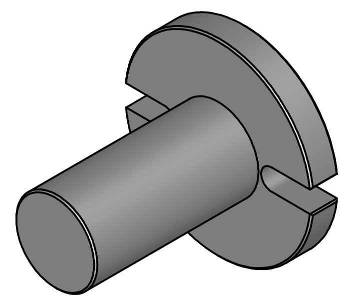


*Weight: 1.07 oz [30.3 g]*

**PGM75R: Post Gripper Mount w/ Ø 1/2" Post**



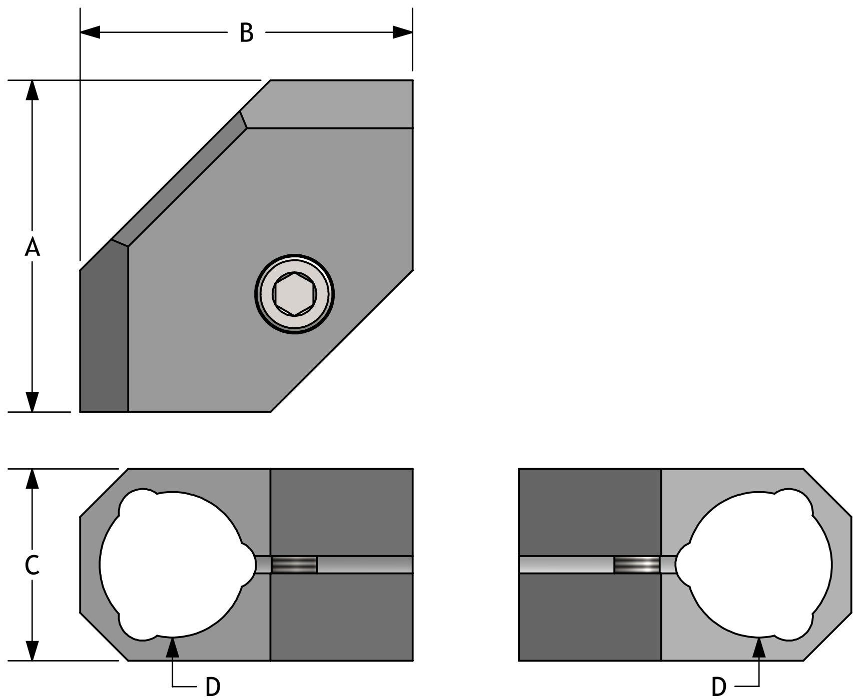



*Weight: 1.89 oz [53.3 g]*

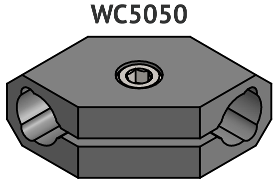
## Wrist Clamps

Made of anodized aluminum, Wrist Clamps are a great way to mount two pieces of tubing (same Ø) at a 90° angle.

| | Tube Size | |
|---|---|---|
| WC | 5050 | |
| | 5050 | Ø 1/2" Tube |
| | 7575 | Ø 3/4" Tube |
| | 1010 | Ø 1" Tube |

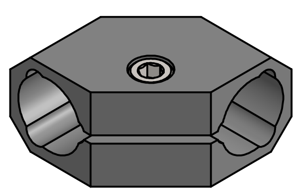



**WC5050**



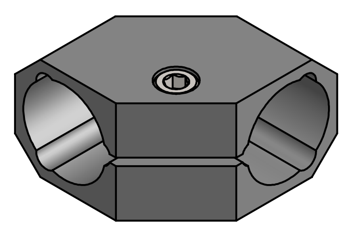
*Weight: 1.52 oz [43.1 g]*

**WC7575**



*Weight: 1.81 oz [51.4 g]*

**WC1010**



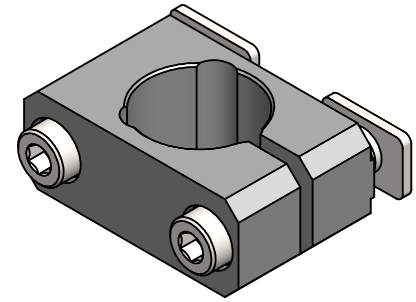
*Weight: 2.55 oz [72.2 g]*

| | A in [mm] | B in [mm] | C in [mm] | D in [mm] |
|---|---|---|---|---|
| WC5050 | 1.63 [41.3] | 1.63 [41.3] | 0.75 [19.1] | 0.51 [12.9] |
| WC7575 | 1.73 [43.9] | 1.73 [43.9] | 1.00 [25.4] | 0.76 [19.3] |
| WC1010 | 1.98 [50.3] | 1.98 [50.3] | 1.25 [31.8] | 1.01 [25.6] |

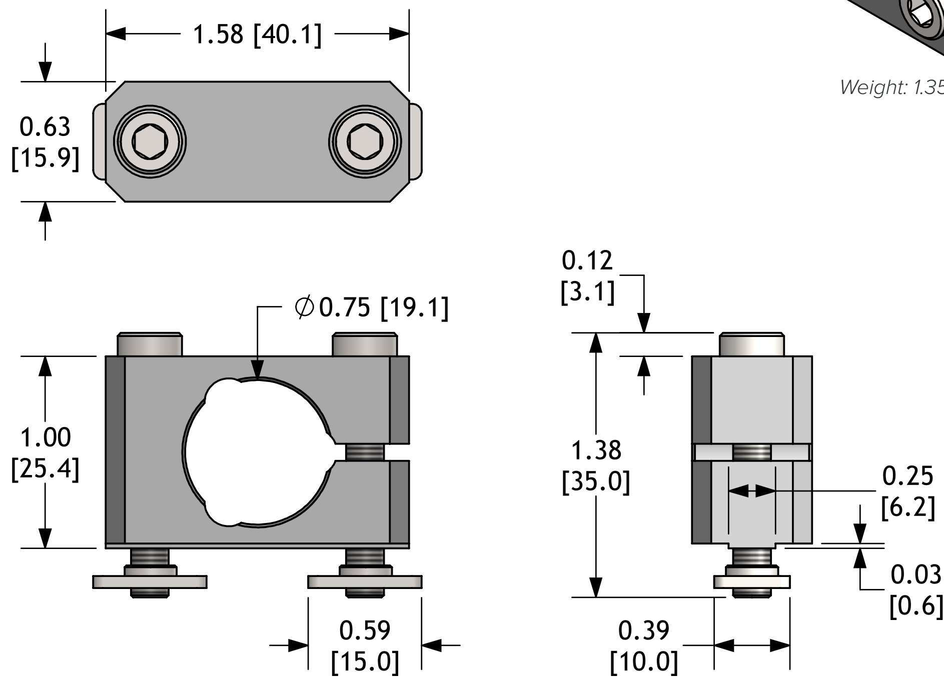
## XCLM75: Extrusion Clamp Mounts

An anodized aluminum clamp with stainless steel fasteners is perfect for mounting tubing to an extrusion.

Fits 1.00 in [25 mm] extrusion size.



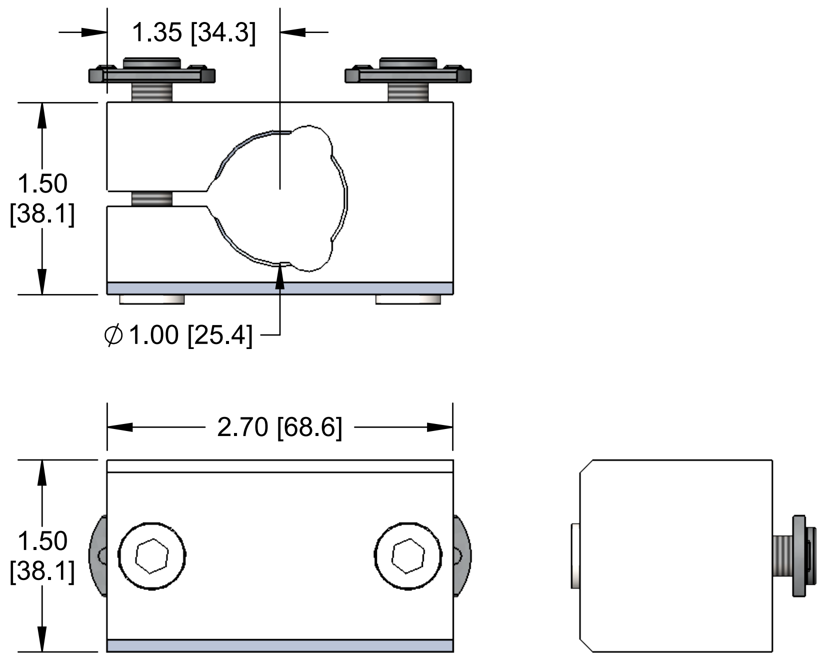
Weight: 1.35 oz [38.3 g]

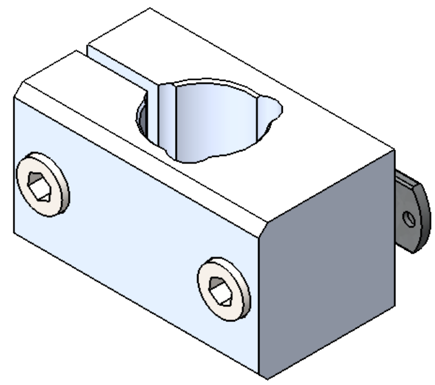


# Clamp Blocks & Mounts

## E10: Extrusion Mount Clamp Block

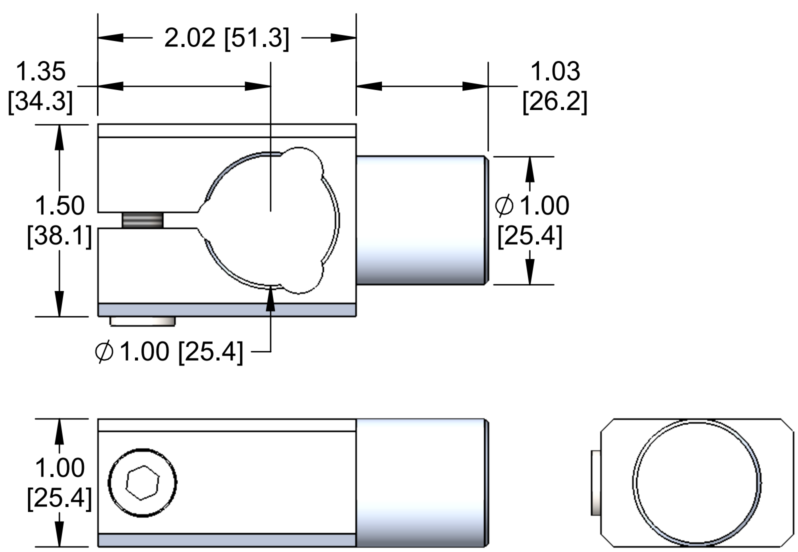
*Fits 1-1/2 in or 40 mm Extrusions.*
*M8X45 Socket Head Cap Screws (2) and M8 T-Nuts (2) included.*

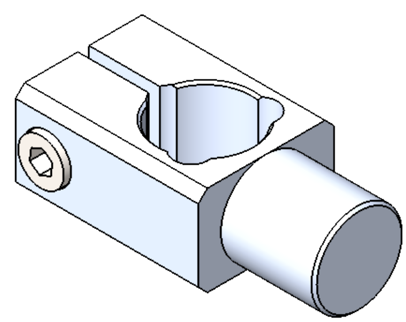


*Weight: 0.54 lb [246.0 g]*

## M3A: 3rd Axis Mount



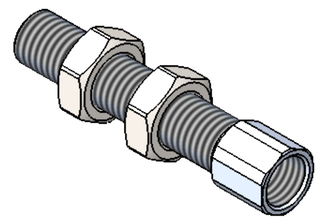



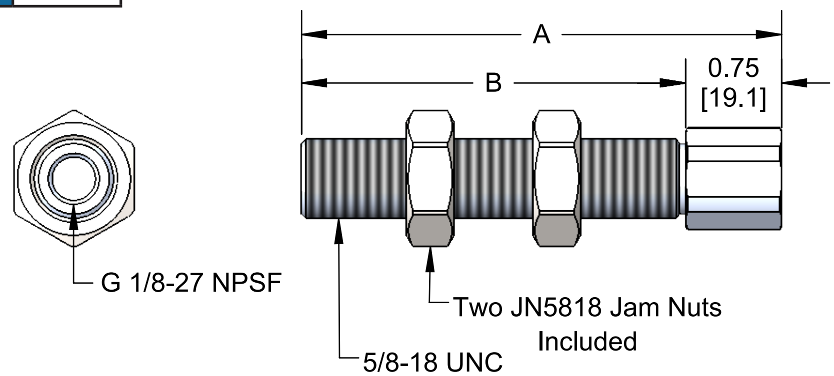
*Weight: 0.30 lb (137.0 g)*

# Height Adjusters

### AM38F: 3/8 NPTF, G 1/8 NPSF

| | Effective Length |
|---|---|
| AM38F- | 2 |
| 2 | 2.00 in |
| 3 | 3.00 in |
| 45 | 4.50 in |
| 8 | 8.00 in |

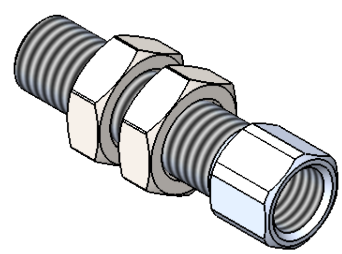


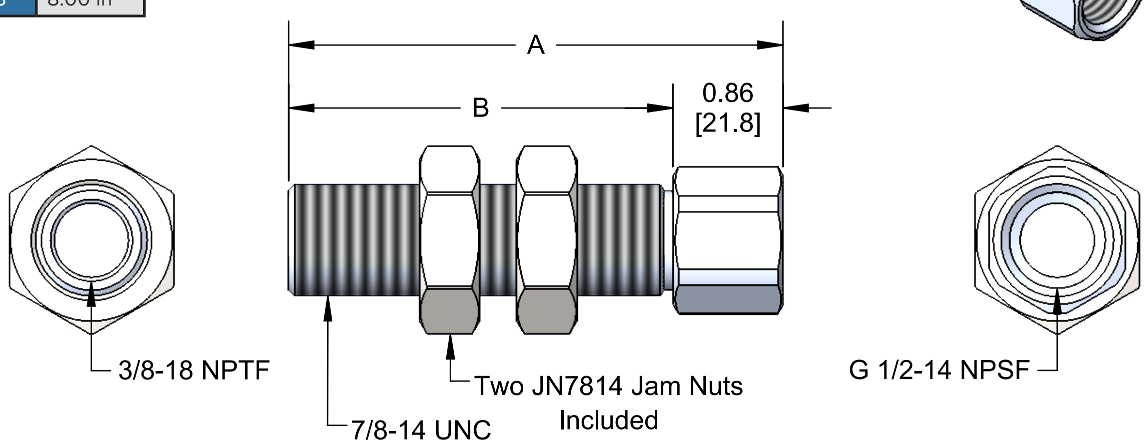



| | AM38F-2 | AM38F-3 | AM38F-45 | AM38F-8 |
|---|---|---|---|---|
| A: in [mm] | 2.75 [69.9] | 3.75 [95.3] | 5.25 [133.0] | 8.75 [222.0] |
| B: in [mm] | 2.00 [50.8] | 3.00 [76.2] | 4.50 [114.0] | 8.00 [203.0] |
| Weight: lb [g] | 0.14 [65.3] | 0.16 [73.0] | 0.19 [85.3] | 0.25 [113.0] |

### AM12F: G 1/2 NPSF, 3/8 NPTF

| | Effective Length |
|---|---|
| AM12F- | 3 |
| 3 | 3.00 in |
| 6 | 6.00 in |
| 8 | 8.00 in |



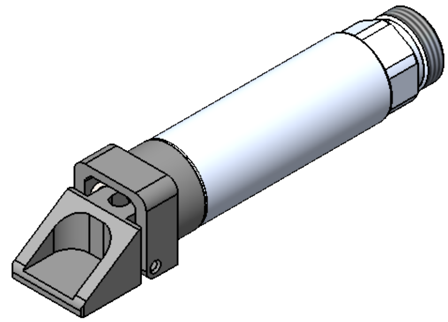



| | AM12F-3 | AM12F-6 | AM12F-8 |
|---|---|---|---|
| A: in [mm] | 3.86 [98.0] | 6.86 [174.0] | 8.86 [225.0] |
| B: in [mm] | 3.00 [76.2] | 6.00 [152.0] | 8.00 [203.0] |
| Weight: lb [g] | 0.34 [156.0] | 0.43 [193.0] | 0.48 [218.0] |

## Gripper Fingers

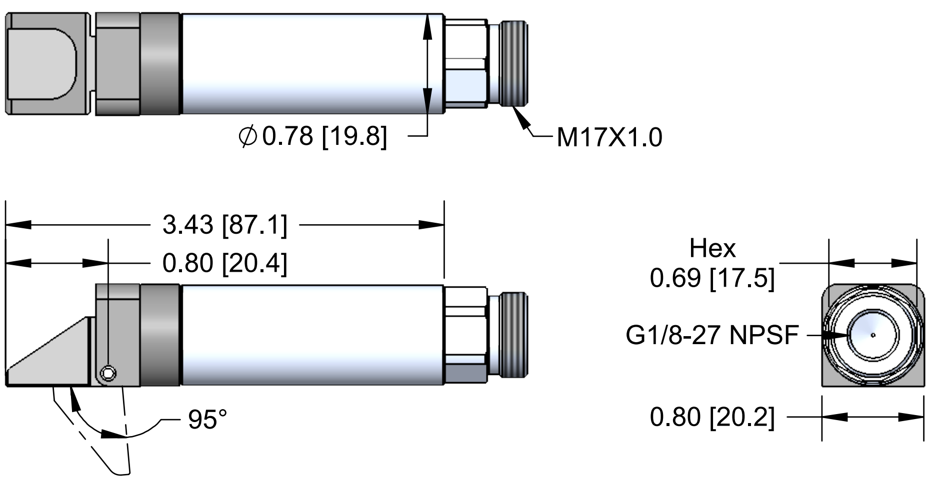
Pneumatic Finger Grippers with spring returns are used to secure parts at the edge.

The GRF20-95 and GRF30-95 provide a full 95° reach and are typically used with an edge clamp



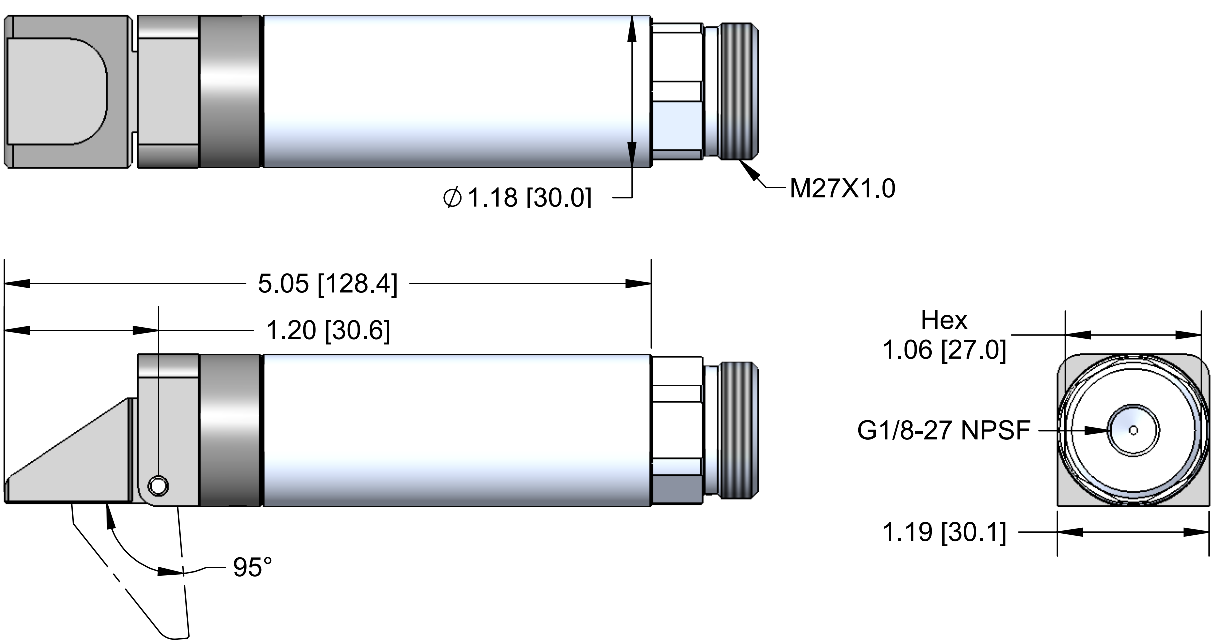
### GRF20-95: 95° Gripper Finger, Size 20

*Weight: 2.14 oz [60.8 g]*




### GRF30-95: 95° Gripper Finger, Size 30

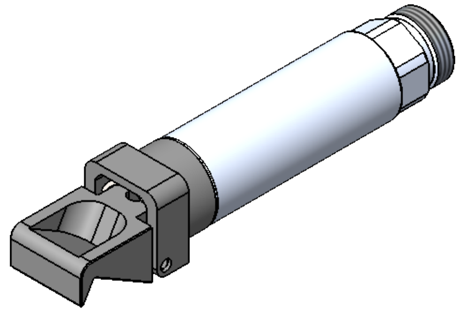
*Weight: 6.45 oz [182.9 g]*



## Gripper Fingers

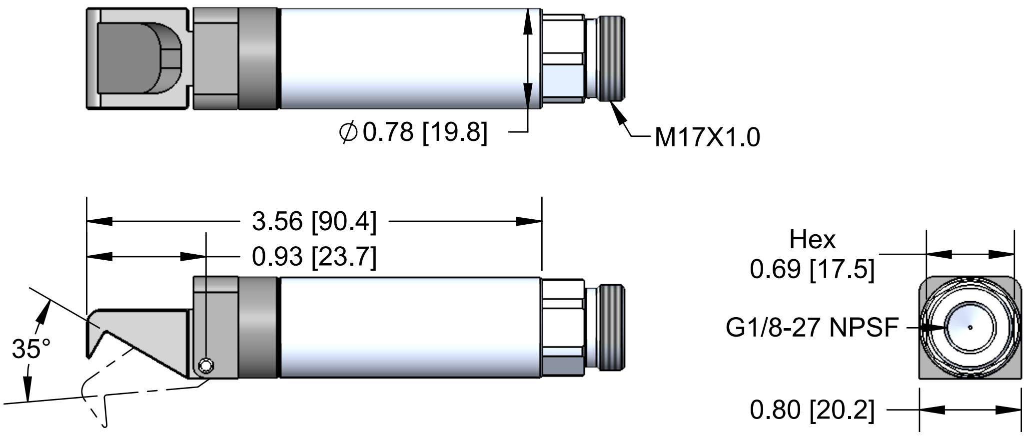
Pneumatic Finger Grippers with spring returns are used to secure parts at the edge.

The GRF20-35 and GRF30-35 provide a full 35° reach and are typically used with an edge clamp



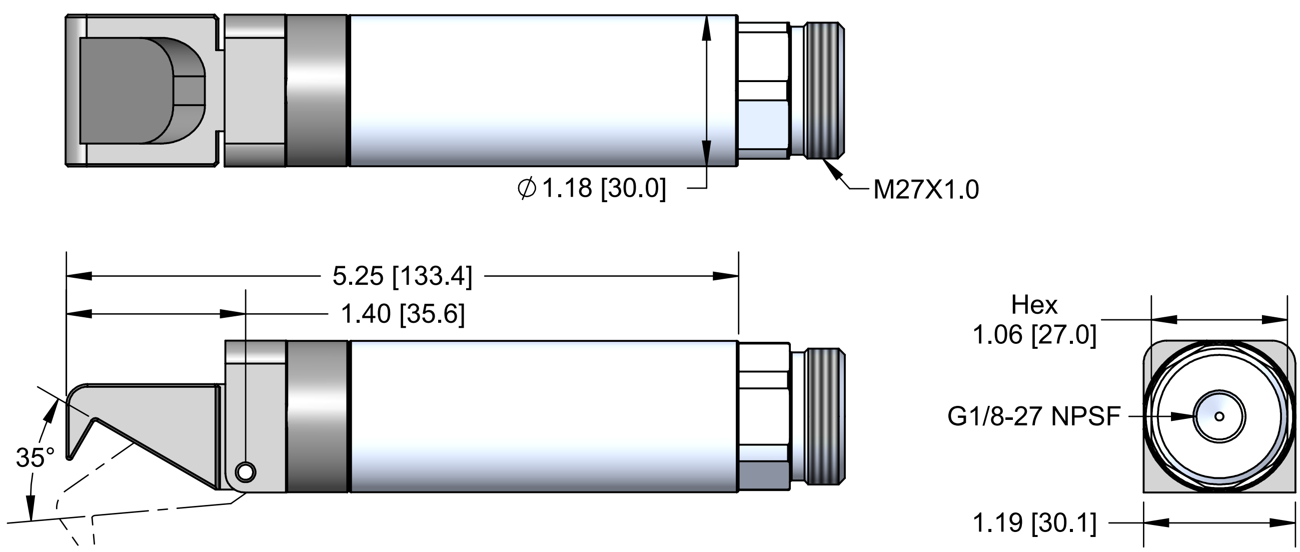
### GRF20-35: 35° Gripper Finger, Size 20

*Weight: 2.24 oz [63.5 g]*




### GRF30-35: 35° Gripper Finger, Size 30

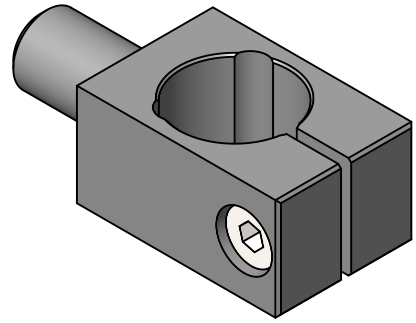
*Weight: 6.78 oz [192.3 g]*

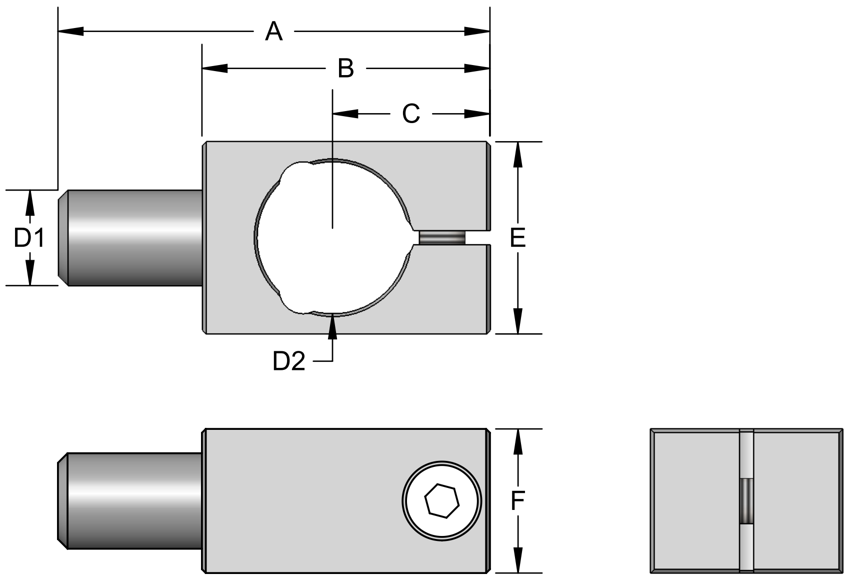


## Gripper Finger Mounts

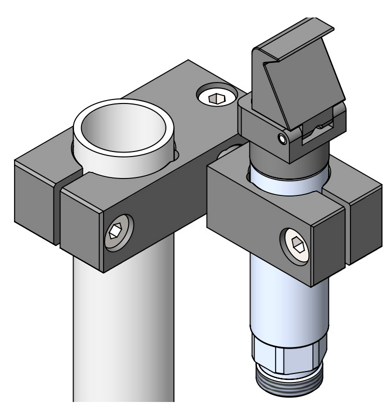
EDCO USA Finger Gripper Clamps come in various sizes to provide a quality clamp for use with a Finger Gripper.

| | Tube Ø |
|---|---|
| FGM-M20 | 50 |
| 50 | 1/2" Tube |
| 75 | 3/4" Tube |
| 100 | 1" Tube |





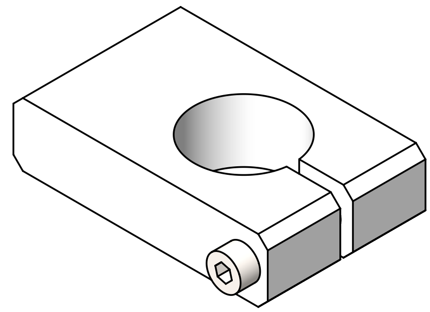

| | A in [mm] | B in [mm] | C in [mm] | D1 in [mm] | D2 in [mm] | E in [mm] | F in [mm] | Weight oz [g] |
|---|---|---|---|---|---|---|---|---|
| FGM-M2050 | 2.25 [57.2] | 1.50 [38.1] | 0.82 [20.8] | 0.50 [12.6] | 0.79 [20.1] | 1.00 [25.4] | 0.75 [19.1] | 1.48 [42.0] |
| FGM-M2075 | 2.25 [57.2] | 1.50 [38.1] | 0.82 [20.8] | 0.75 [19.1] | 0.79 [20.1] | 1.00 [25.4] | 0.75 [19.1] | 1.75 [49.7] |
| FGM-M3075 | 2.70 [68.6] | 1.95 [49.5] | 1.02 [25.9] | 0.75 [19.1] | 1.18 [30.0] | 1.50 [38.1] | 0.75 [19.1] | 2.77 [78.4] |



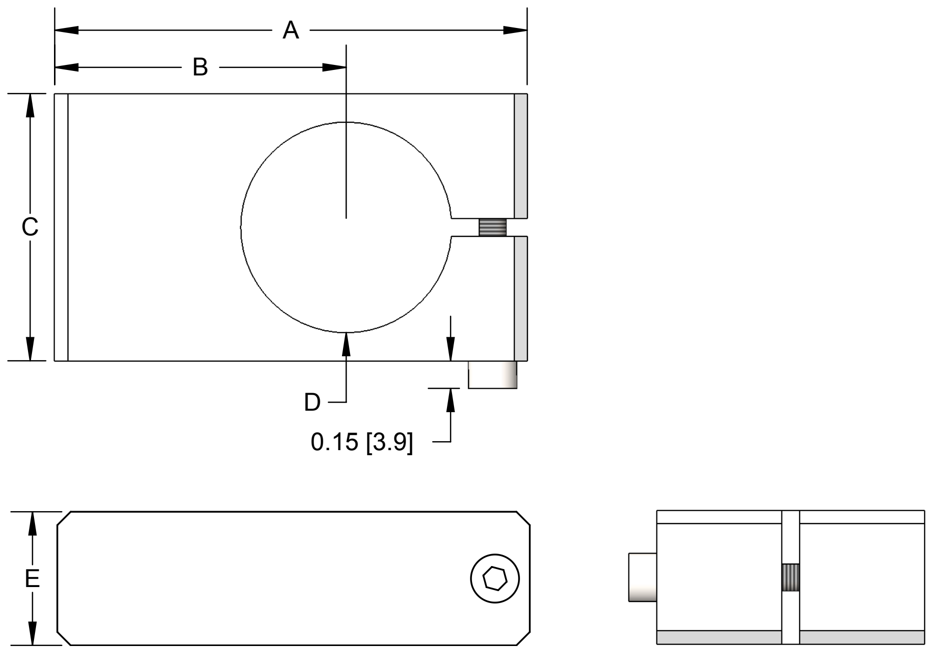
Example: CLM1050, FGM-M2050, and GRF20-35

## Edge Mounts

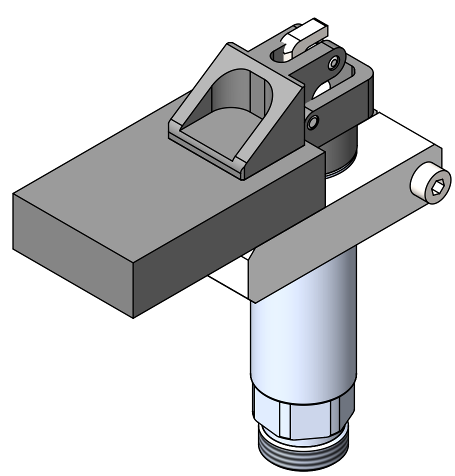
EDCO Edge Clamps are made out of Delrin and are designed for use with the EDCO Finger Grippers, acting as a stop for the part being gripped.



| | Tube Size | |
|---|---|---|
| ANF | 20 | D |
| | 20 | 20 mm Tube |
| | 30 | 30 mm Tube |




| | A in [mm] | B in [mm] | C in [mm] | D in [mm] | E in [mm] | Weight oz [g] |
|---|---|---|---|---|---|---|
| ANF20D | 2.02 [51.2] | 1.20 [30.5] | 1.25 [31.8] | 0.79 [20.0] | 0.50 [12.7] | 0.91 [25.8] |
| ANF30D | 2.65 [67.3] | 1.64 [41.5] | 1.50 [38.1] | 1.18 [30.0] | 0.75 [19.1] | 1.83 [51.8] |

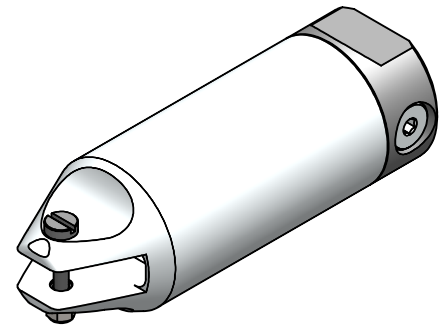


*Example: ANF20D w/ GRF20-95*

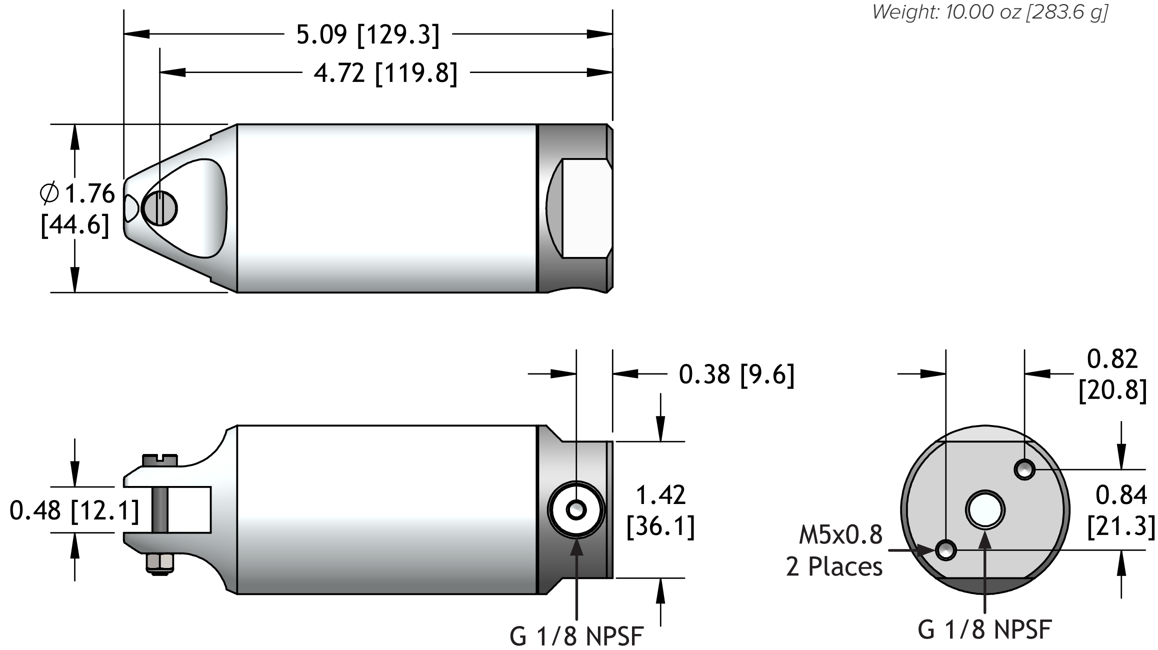
## NR20: Nipper Body

High-quality nipper bodies are designed for reliable operation over a long lifespan.

- accepts any brand size 20 nipper blades
- corrosion resistant stainless-steel spring
- machined aluminum body with low-friction, co-deposited nickel plating with teflon finish
- end cap includes 1/8” bottom and side air-supply ports.
- repair components made by EDCO USA available for purchase



*Weight: 10.00 oz [283.6 g]*



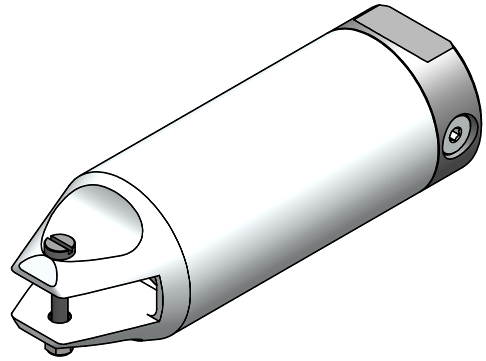

| Tecnical Specifications | |
|---|---|
| Sprue Ø Cut: | 0.28 in [7.0 mm] |
| Cutting Pressure: | 980 lbf* |
| Air Consumption: | 4.75 $in^3$ |

**When compressed air is supplied at 87 psi.*

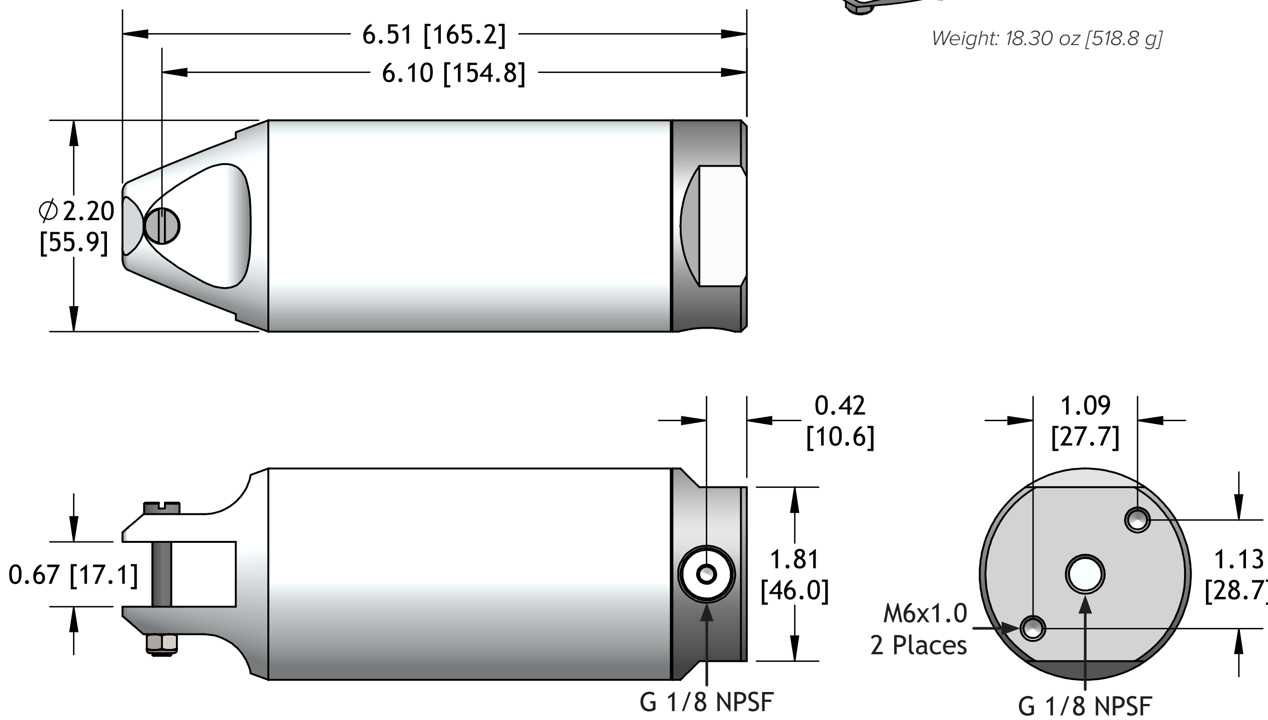
## NR30: Nipper Body

High-quality nipper bodies are designed for reliable operation over a long lifespan.

- accepts any brand size 30 nipper blades
- corrosion resistant stainless-steel spring
- machined aluminum body with low-friction, co-deposited nickel plating with teflon finish
- end cap includes 1/8" bottom and side air-supply ports.
- repair components made by EDCO USA available for purchase



*Weight: 18.30 oz [518.8 g]*




| Tecnical Specifications | |
|---|---|
| Sprue Ø Cut: | 0.39 in [10.0 mm] |
| Cutting Pressure: | 1,320 lbf* |
| Air Consumption: | 10.35 $in^3$ |

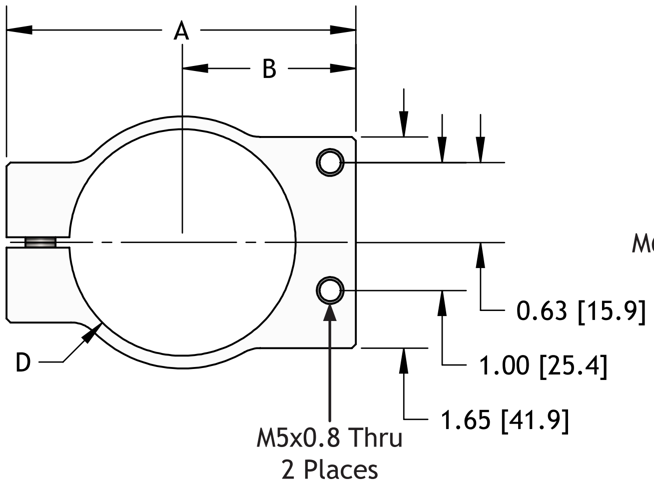
**When compressed air is supplied at 87 psi.*

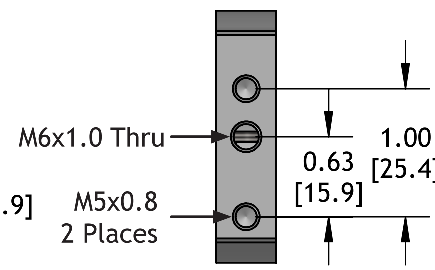
## Nipper Mounts

Anodized aluminum nipper mounts are perfect for mounting nippers with other EOAT components.

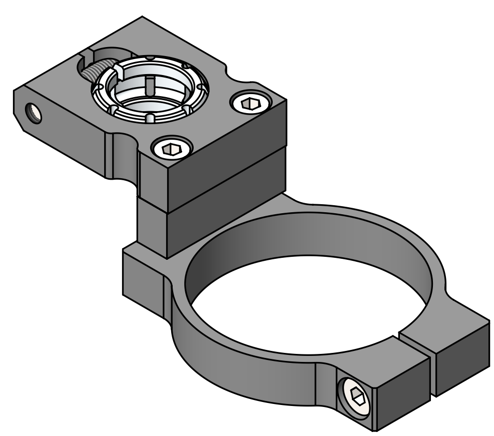
*See page 17:29 to order a preassembled Swivel Nipper Mount.*

| | Nipper Body Size |
|---|---|
| NM | 20 |
| 20 | NR20 |
| 30 | NR30 |




| | A in [mm] | B in [mm] | D in [mm] | Compatible Nipper | Weight oz [g] |
|---|---|---|---|---|---|
| NM20 | 2.73 [69.3] | 1.36 [34.4] | 1.97 [50.0] | NR20 | 1.52 [43.0] |
| NM30 | 3.13 [79.5] | 1.56 [39.5] | 2.21 [56.1] | NR30 | 1.72 [48.6] |

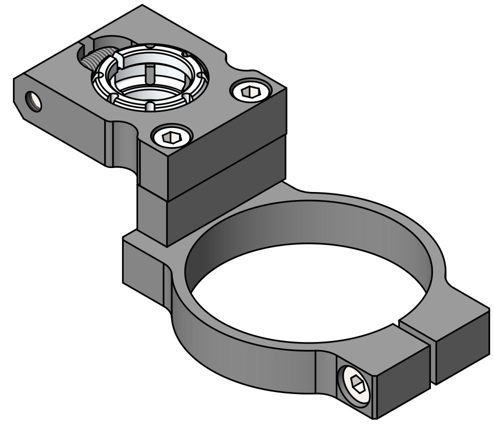


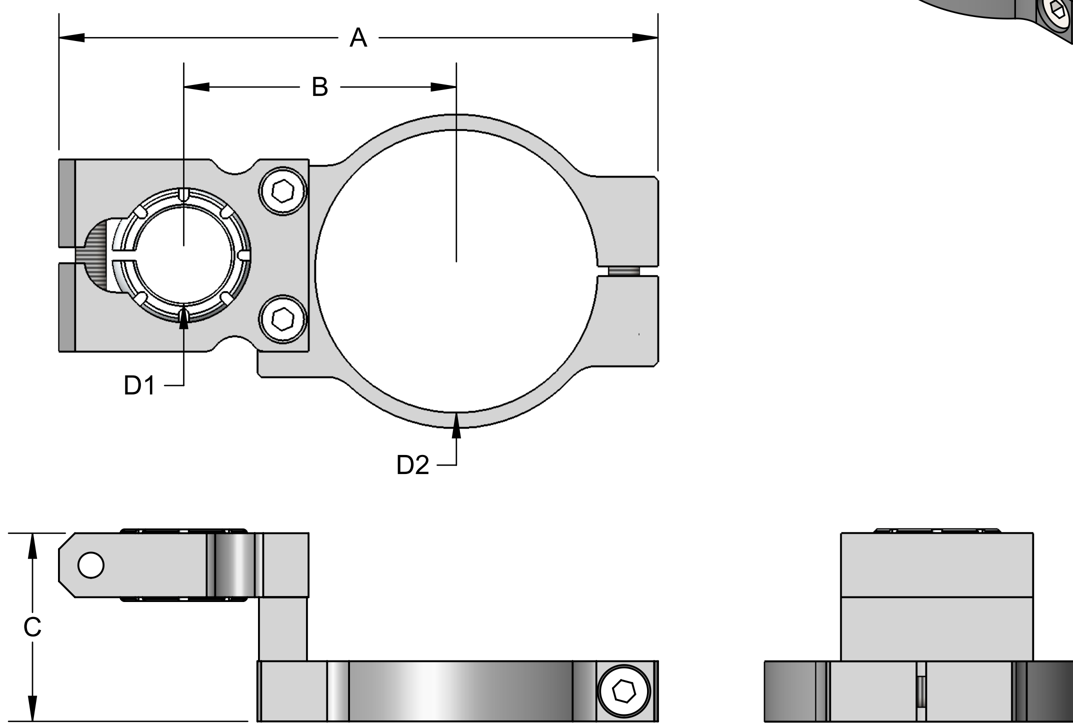
*Example: SNM7530-50*

## Swivel-Nipper Mounts

Swivel-Nripper Mounts combine the functionality of our Nipper Mounts and Swivel-Ball Mounts with the flexibility of our Stand-Off Mounts with a Mount Plate for a complete assembly.

| | Tube Size | | Nipper Size | | Stand-Off | |
|---|---|---|---|---|---|---|
| SNM | 75 | | 75 | | 75 | |
| | 50 | Ø 1/2" Tube | 50 | NR20 | (Blank) | None |
| | 75 | Ø 3/4" Tube | 75 | NR30 | -50 | 1/2" Stand-Off |
| | | | | | -125 | 1-1/4" Stand-Off |





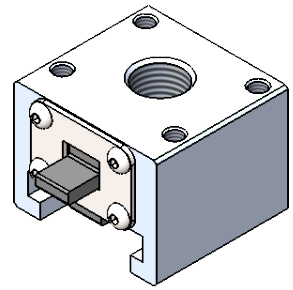

| | A in [mm] | B in [mm] | C in [mm] | D1 in [mm] | D2 in [mm] | Weight oz [g] |
|---|---|---|---|---|---|---|
| SNM5020 | 4.02 [102.1] | 1.82 [46.2] | 0.97 [24.6] | 0.50 [12.8] | 1.77 [45.0] | 3.34 [94.7] |
| SNM5020-50 | 4.02 [102.1] | 1.82 [46.2] | 1.47 [37.3] | 0.50 [12.8] | 1.77 [45.0] | 3.84 [109.0] |
| SNM5020-125 | 4.02 [102.1] | 1.82 [46.2] | 2.22 [56.4] | 0.50 [12.8] | 1.77 [45.0] | 4.64 [131.5] |
| SNM5030 | 4.42 [112.3] | 2.02 [51.3] | 0.97 [24.6] | 0.50 [12.8] | 2.21 [56.1] | 3.54 [100.3] |
| SNM5030-50 | 4.42 [112.3] | 2.02 [51.3] | 1.47 [37.3] | 0.50 [12.8] | 2.21 [56.1] | 4.04 [114.6] |
| SNM5030-125 | 4.42 [112.3] | 2.02 [51.3] | 2.22 [56.4] | 0.50 [12.8] | 2.21 [56.1] | 4.83 [137.0] |
| SNM7520 | 4.28 [108.7] | 1.93 [49.0] | 0.97 [24.6] | 0.75 [19.1] | 1.77 [45.0] | 3.49 [99.0] |
| SNM7520-50 | 4.28 [108.7] | 1.93 [49.0] | 1.47 [37.3] | 0.75 [19.1] | 1.77 [45.0] | 4.00 [113.3] |
| SNM7520-125 | 4.28 [108.7] | 1.93 [49.0] | 2.22 [56.4] | 0.75 [19.1] | 1.77 [45.0] | 4.79 [135.8] |
| SNM7530 | 4.68 [118.9] | 2.13 [54.1] | 0.97 [24.6] | 0.75 [19.1] | 2.21 [56.1] | 3.69 [104.6] |
| SNM7530-50 | 4.68 [118.9] | 2.13 [54.1] | 1.47 [37.3] | 0.75 [19.1] | 2.21 [56.1] | 4.19 [118.9] |
| SNM7530-125 | 4.68 [118.9] | 2.13 [54.1] | 2.22 [56.4] | 0.75 [19.1] | 2.21 [56.1] | 4.99 [141.4] |

## T-Slot Receivers w/ Vacuum Connection

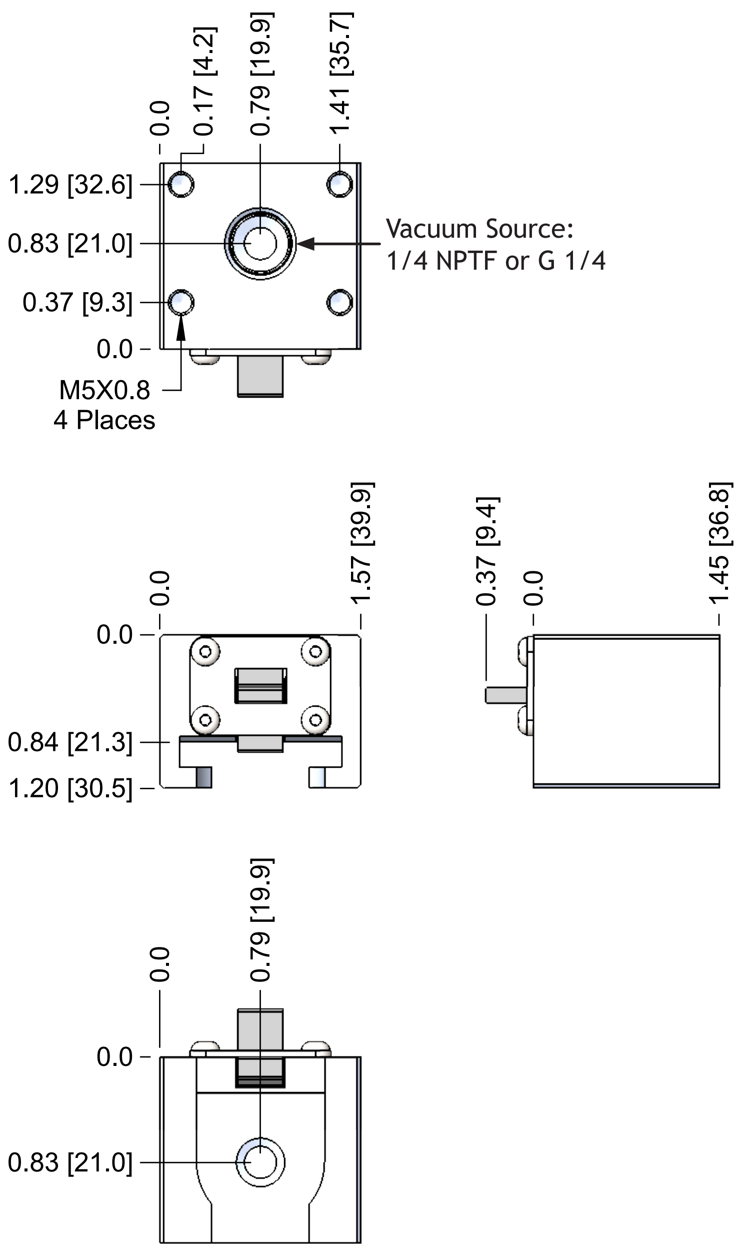
Provides a bayonet-style quick-change for suction cups equipped with o-ring sealed T-slot adapters. High quality Teflon impregnated nickel plating reduces friction during insertion and the simplified latch features a larger finger tab for comfortable operation.

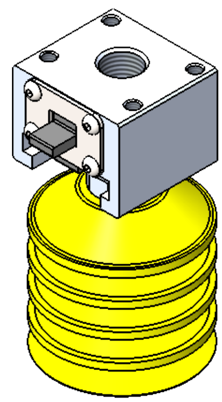
*See the Vacuum Cups Fittings section for T-Slot Adapters.*

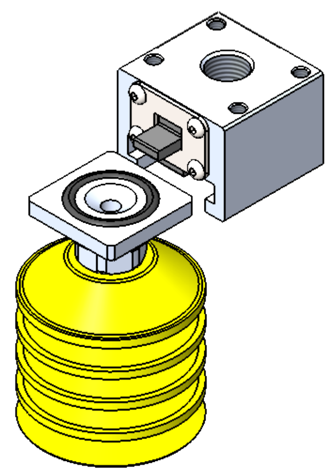
| | | Ports |
|---|---|---|
| TR-14 | | |
| | (Blank) | NPT Threads |
| | -G | G Threads |



*Weight: 0.20 lb [90.7 g]*



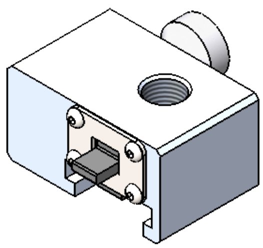


# T-Slot Receivers w/ Vacuum Connection

### T-Slot Receiver w/ Vacuum Connection & Apple Core Pin or Ball Swivel Mount

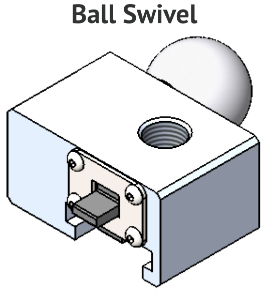
| | Mount | | Ports | |
|---|---|---|---|---|
| TR-14 | -A | | | |
| | -A | Apple Core Pin | (Blank) | NPT Threads |
| | -B | Ball Swivel | -G | G Threads |

**Apple Core Pin**

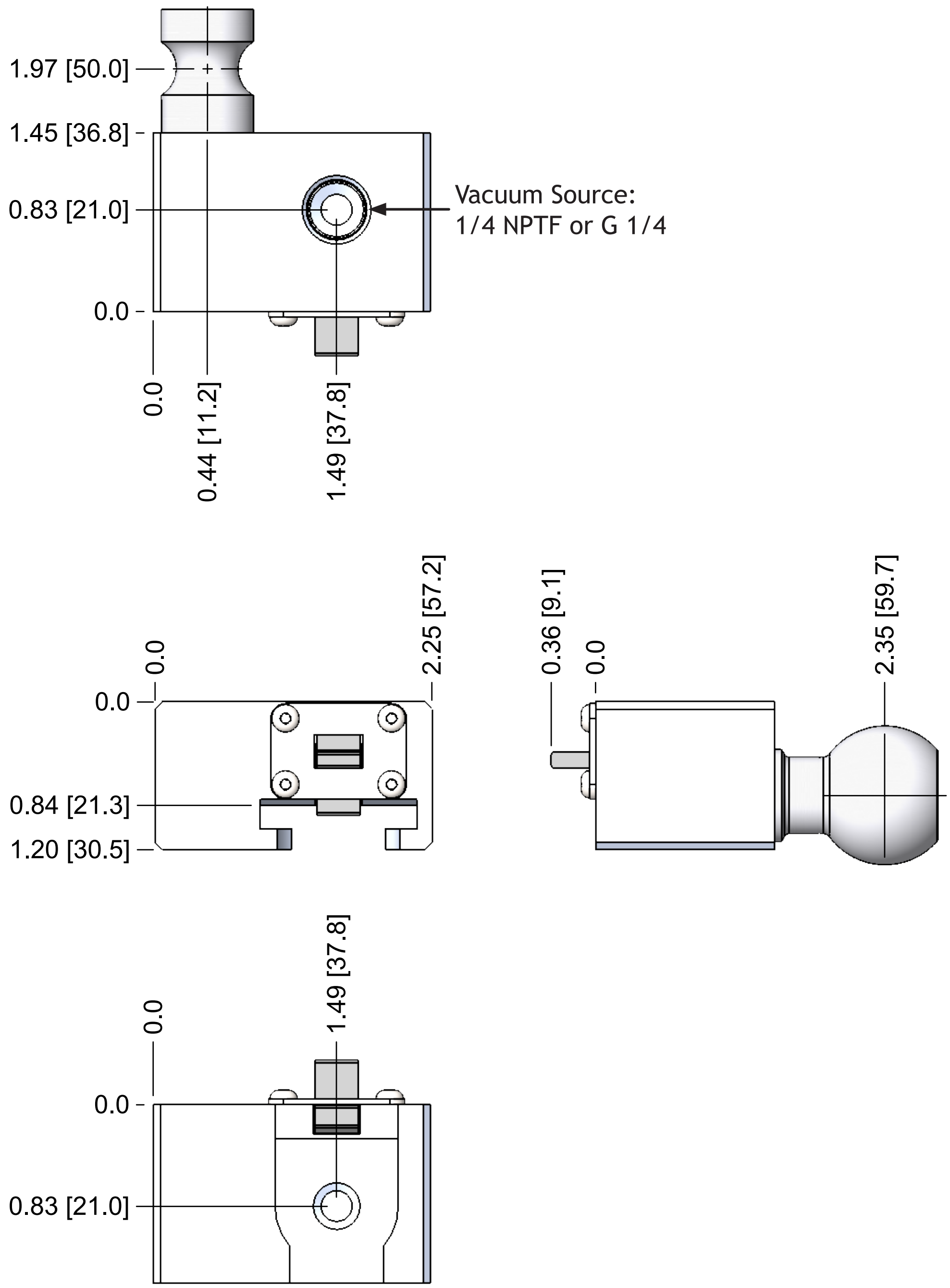


*Weight: 0.35 lbs [159.0 g]*

**Ball Swivel**



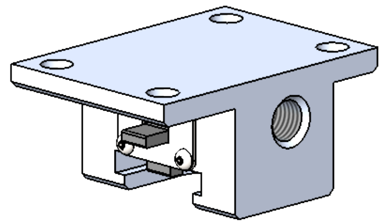
*Weight: 0.40 lbs [181.0 g]*



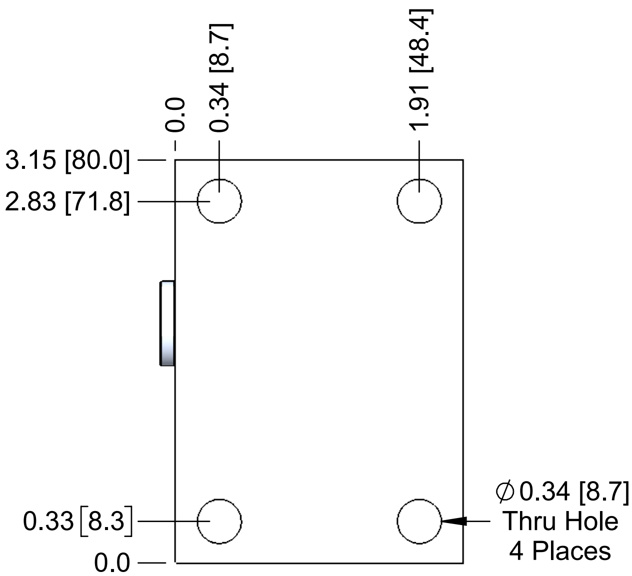
# T-Slot Receivers w/ Vacuum Connection

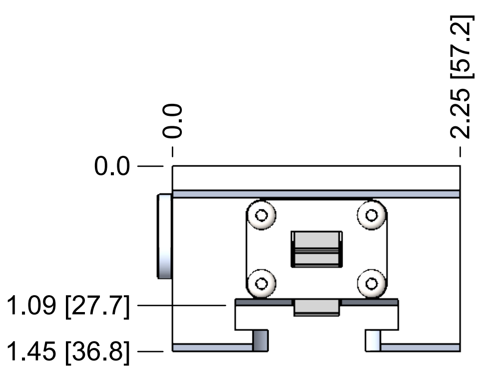
**Surface Mount T-Slot Receiver w/ Vacuum Connection**

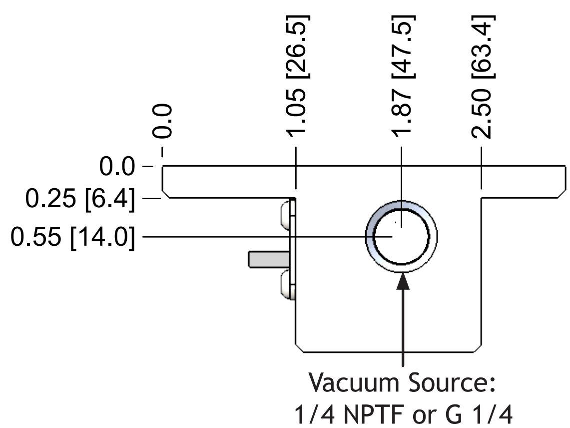
| | | Ports |
|---|---|---|
| TR-14-S | | |
| | (Blank) | NPT Threads |
| | -G | G Threads |

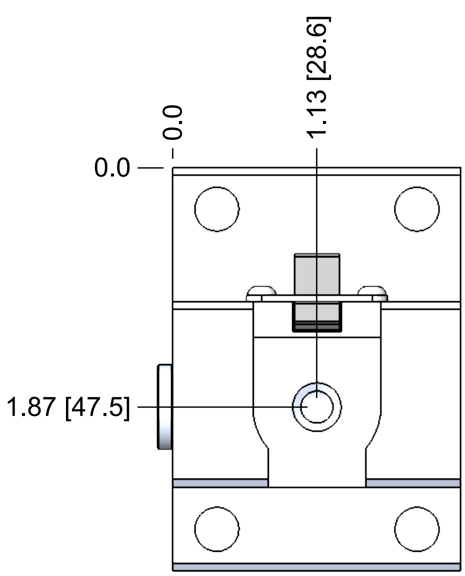


*Weight: 0.46 lb [209.0 g]*



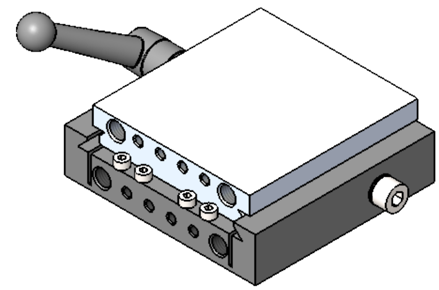



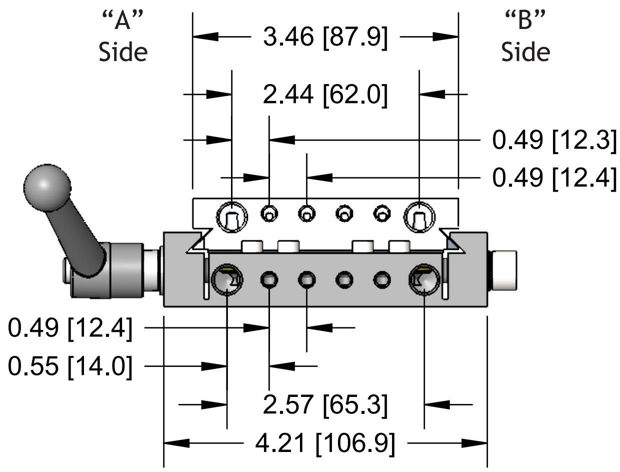



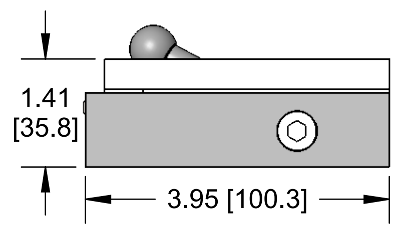
## Quick Change Slides

QCS provides a cost-effective method to increase productivity by virtually eliminating end-of-arm tool change-over time. With QCS, a robot can be re-tooled for a different part and back in service within a few minutes. Compressed air and vacuum lines are automatically connected as the tool plate mates with the clamp base on the robot arm. The clamp handle can be indexed to a convenient position in 30° increments.



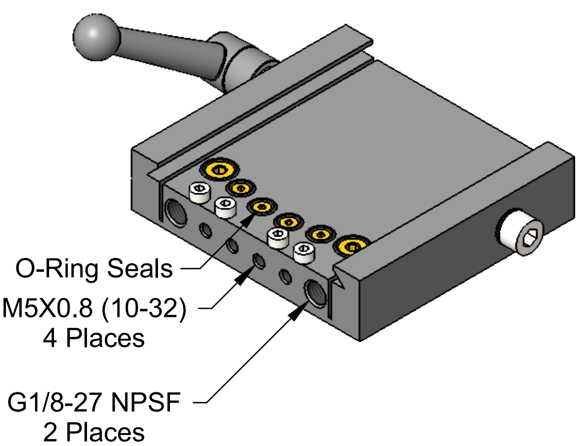
Please contact us for details about custom layouts.



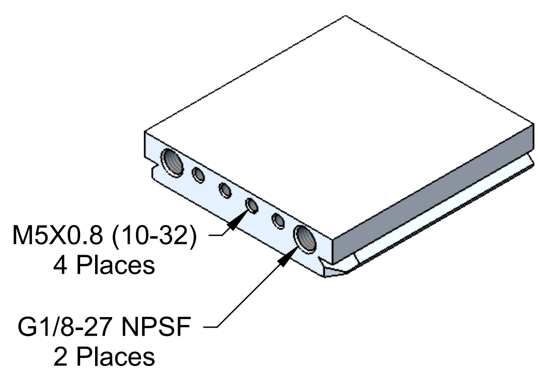

## Robot Clamp Base

| | Handle Location | |
|---|---|---|
| QCS-100B- | A | |
| | A | Handle on "A" Side |
| | B | Handle on "B" Side |



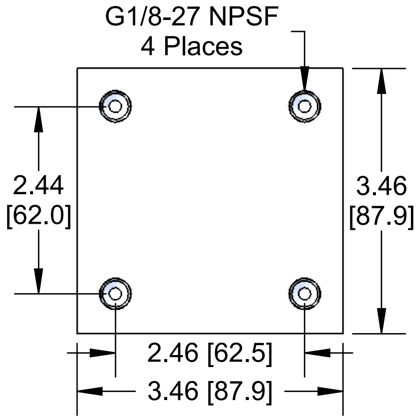

*Weight: 1.41 lb [638.0 g]*

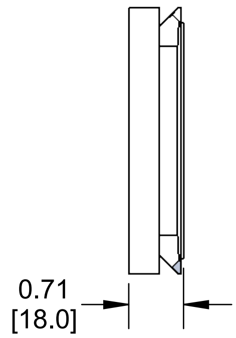
## Tool Plate: QCS-100T

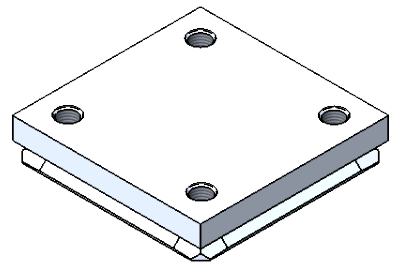



*Weight: 0.85 lb [383.0 g]*

## Tool Plate: QCS-100TD



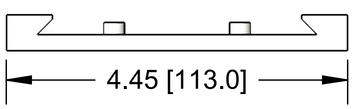



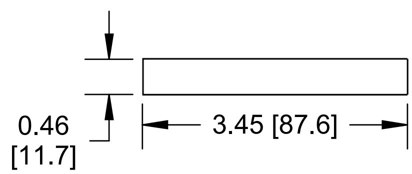



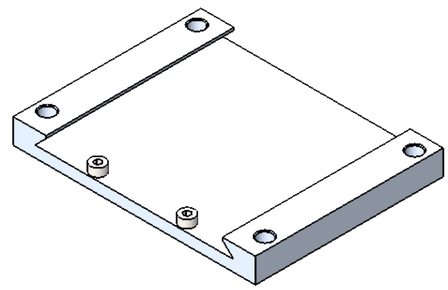
*Weight: 0.77 lb [347.0 g]*

## Tool Park: QCS-100P

An optional Tool Park provides convenient storage and protection for end-of-arm tools when not in service.  One Tool Park per Tool Plate is required for efficient operation.



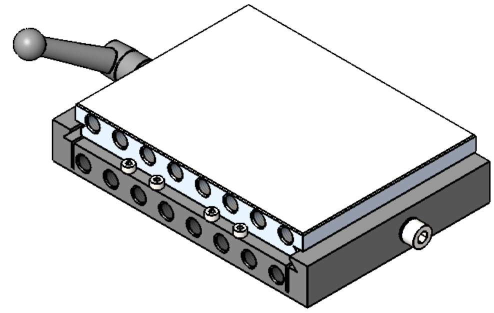



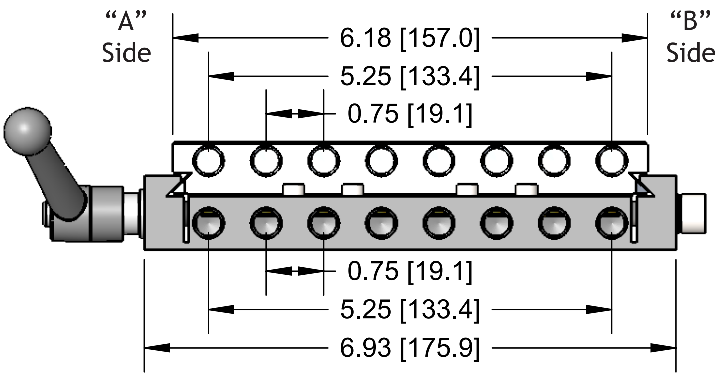
*Weight: 0.39 lb [178.0 g]*

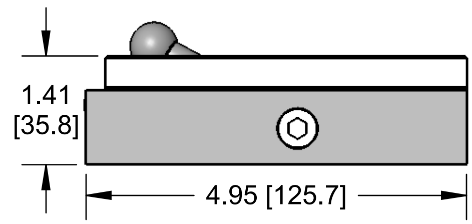
## Quick Change Slides

QCS provides a cost-effective method to increase productivity by virtually eliminating end-of-arm tool change-over time. With QCS, a robot can be re-tooled for a different part and back in service within a few minutes. Compressed air and vacuum lines are automatically connected as the tool plate mates with the clamp base on the robot arm. The clamp handle can be indexed to a convenient position in 30° increments.

Please contact us for details about custom layouts.

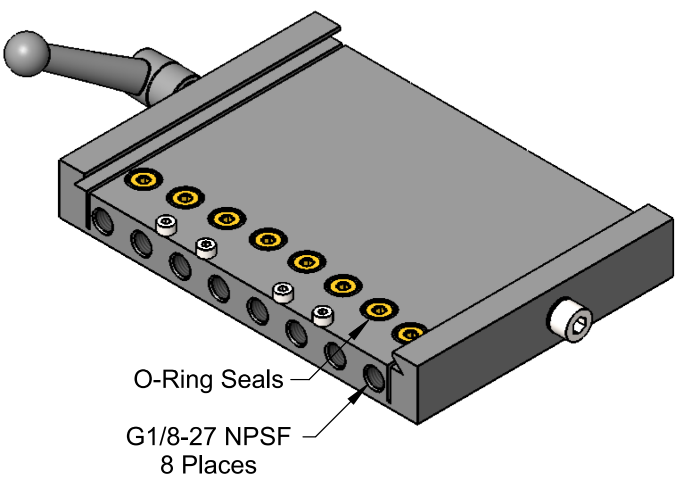




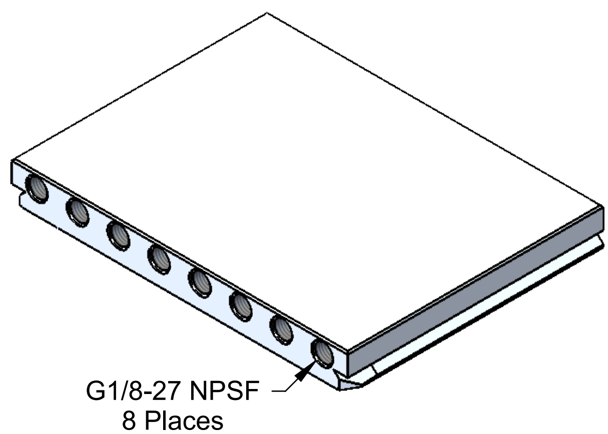

## Robot Clamp Base

| | Handle Location |
|---|---|
| QCS-140B- | A |
| A | Handle on “A” Side |
| B | Handle on “B” Side |




*Weight: 2.58 lb [1169.0 g]*

## Tool Plate: QCS-140T

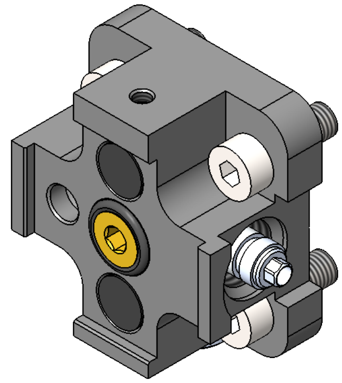



*Weight: 1.91 lb [866.0 g]*

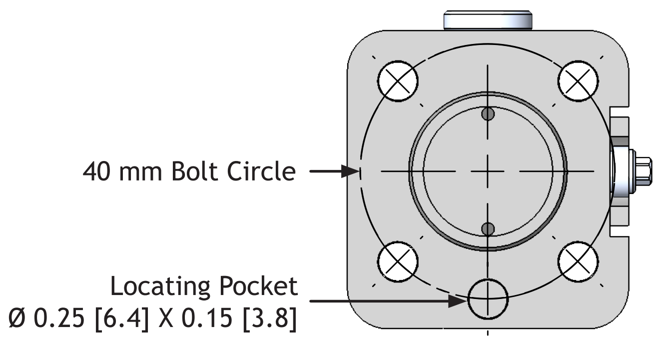
## RQCP: Robot Quick Change Pump

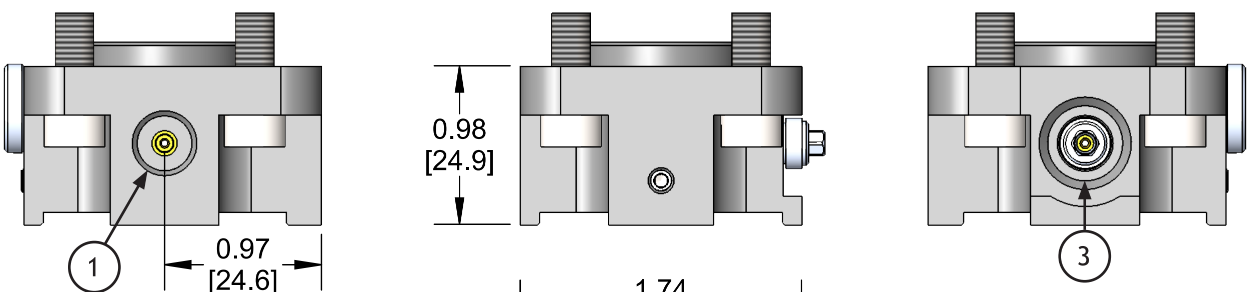
Vacuum pump fits Flexpicker and other robots with four 6mm tapped interface on 40 mm bolt circle. Tool is magnetically coupled to pump for fast replacement for either maintenance or for changeover to manipulate a different part. Handles up to 4.4 lbs (2kg) load. High vacuum flow venturis allow fast evacuation and the purge options quickly dissipate vacuum to optimize cycle times.

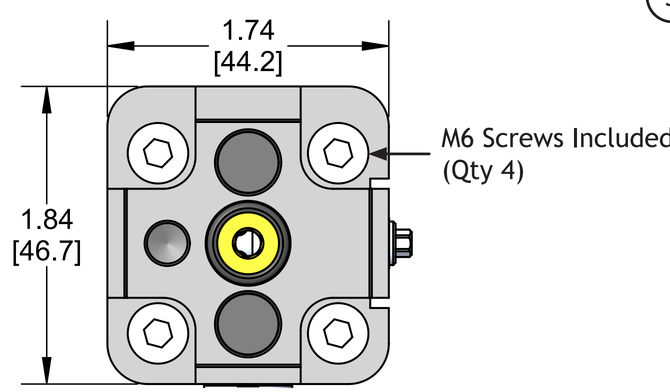
| | Venturi Series | | Purge Option | |
|---|---|---|---|---|
| RQCP- | 10L | | A | |
| | 08L | ER08L | (Blank) | None |
| | 10L | ER10L | -LP | Limited Pressure Purge |
| | | | -PP | Positive Pressure Purge |

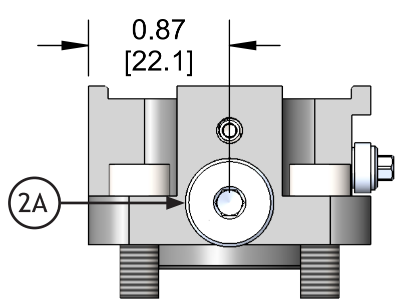


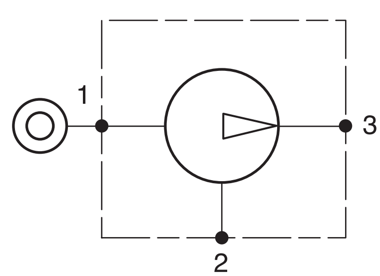
*Weight: 3.70 oz [104.9 g]*



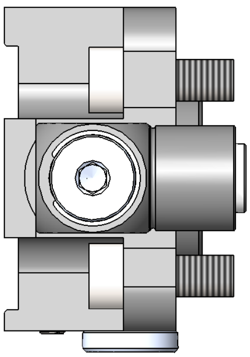




| Code | Function | Threads |
|---|---|---|
| 1 | Air Supply | G 1/8 NPSF |
| 2A | Vacuum - Auxiliary | G 1/8 NPSF |
| 3 | Exhaust | G 1/4 |

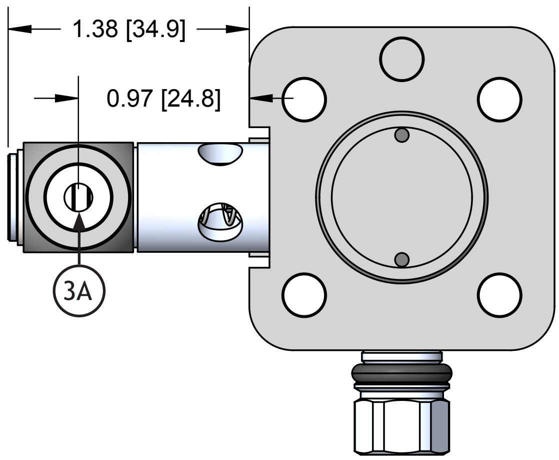
## RQCP: Purge Options

Purge option provides faster part placement by quickly dissipating residual vacuum which is especially useful when using bellows-style vacuum cups. When placing a part, the air supply to the vacuum pump is left on and a compressed air signal to the Purge unit blocks off the pump exhaust to redirect venture air into the vacuum tool to quickly dissipate any residual vacuum.

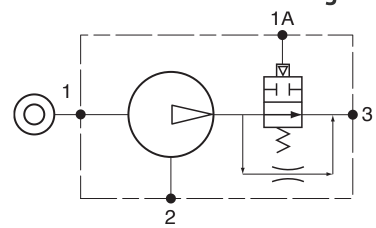
The purge should remain on until the suction cups have separated from the part that was placed then for a brief additional time to blow out any ingested debris. VSP-18 Switch protector is highly recommended when using both a Purge option and a monitoring vacuum sensor to prevent overpressure damage.



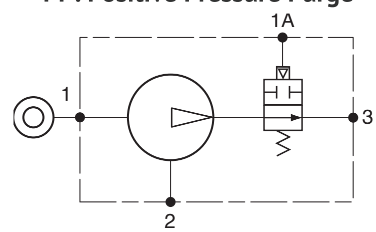
*Weight: 4.53 oz [128.3 g]*




**-LP: Limited Pressure Purge**

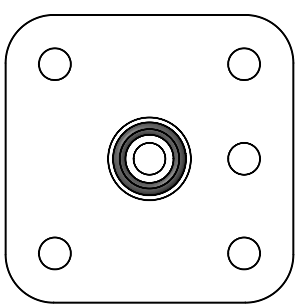


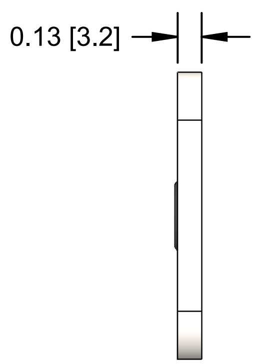

**-PP: Positive Pressure Purge**

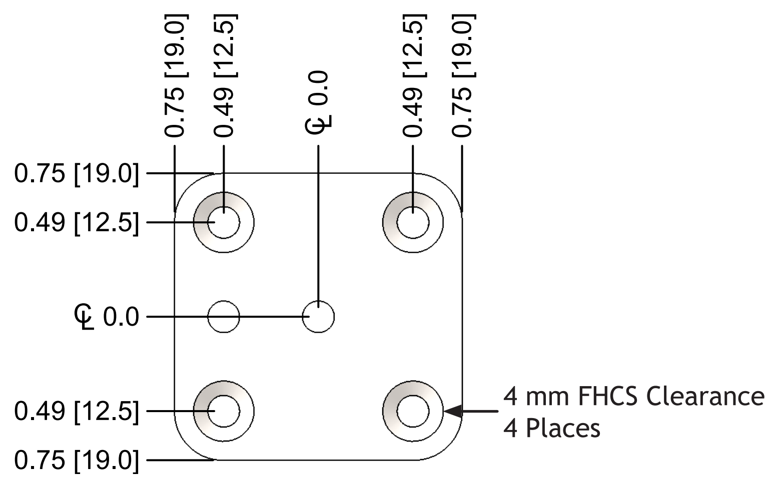


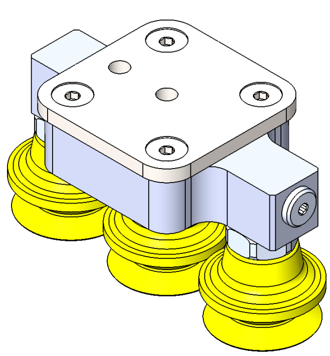

## RQCP-P: Tool Plate

Precision steel tool plate is used to mount and register tooling to the RQCP pump. A port seal passes pump vacuum into the tool so that tool design is simplified.

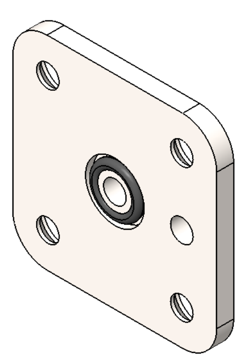




*Example (Not For Sale)*

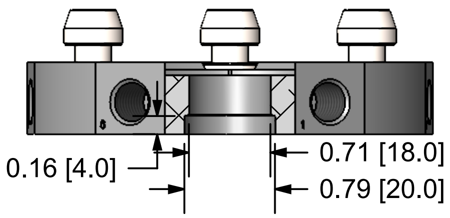


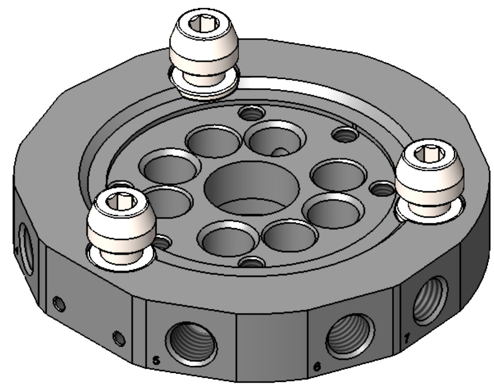
*Weight: 1.08 oz [30.5 g]*

# QC90-B: Tool-Side Quick Changer

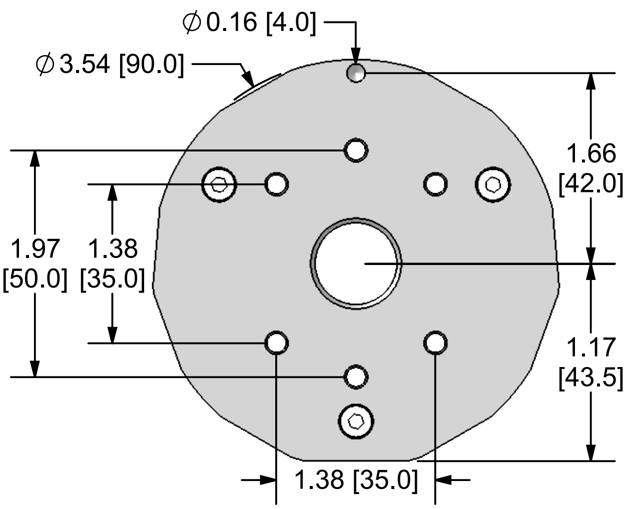
Tool-side EOAT Changer is typically used on injection molding machines to handle tools weighing up to 25 lbs. Mates with 90mm robot-side changer made by others.

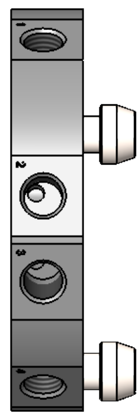
G 1/8 NPSF Connections (Qty 8)

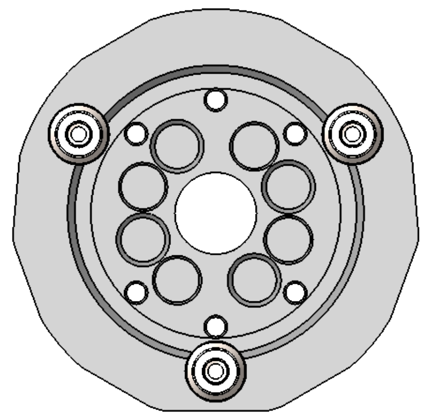


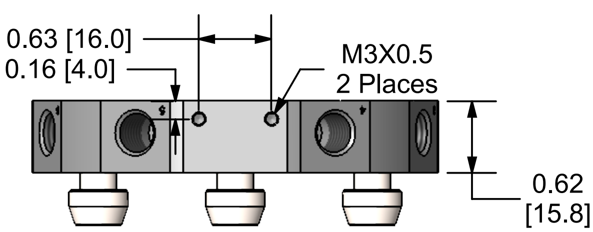



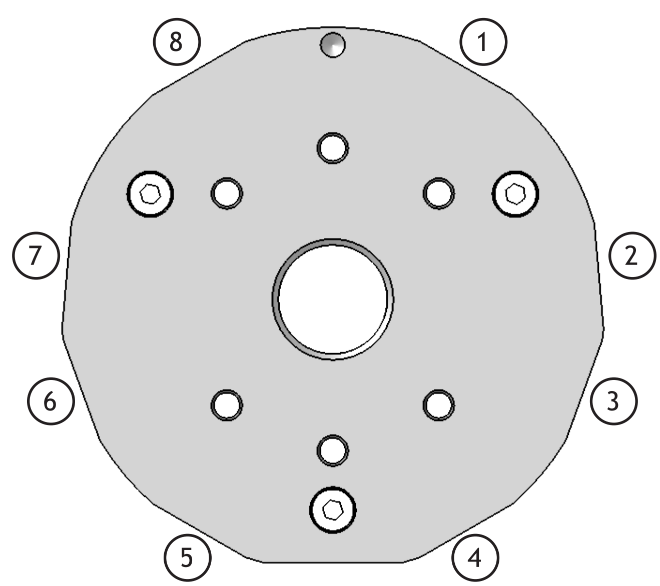
*Weight: 7.90 oz [224.0 g]*





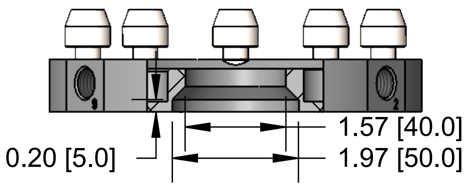


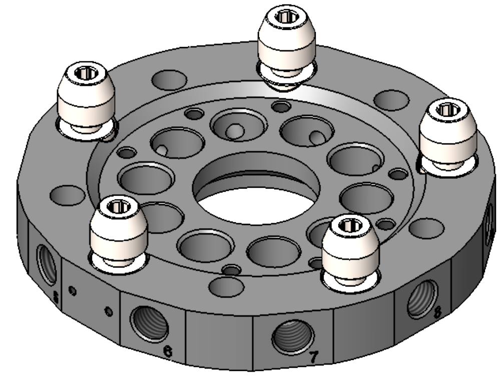



# QC150-B: Tool-Side Quick Changer

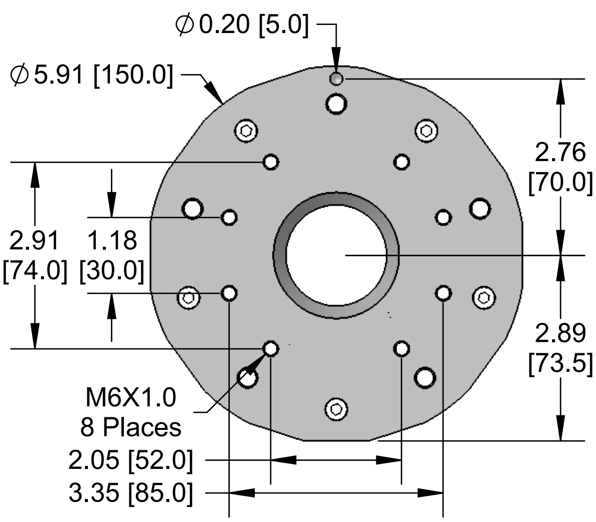
Tool-side EOAT Changer is typically used on injection molding machines to handle tools weighing up to 65 lbs. Mates with 150mm robot-side changer made by others.

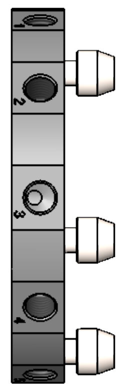
G 1/4 Connections (Qty 10)

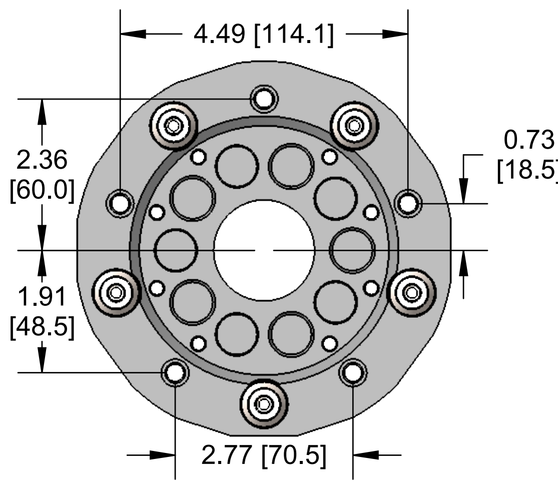


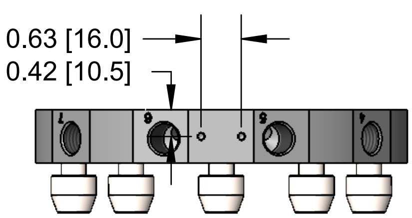



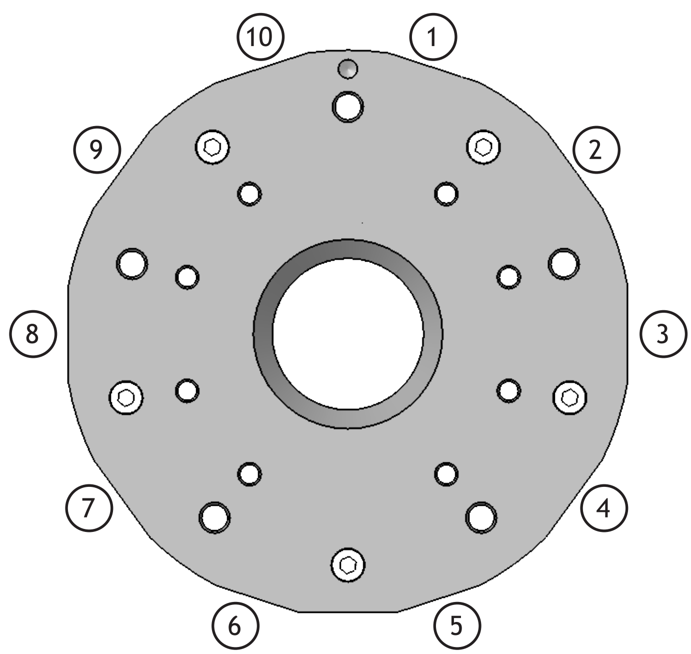
*Weight: 29.69 oz [841.6 g]*





# Vacuum System Training

## Section 17

## Atmospheric Pressure

The Earth is 7,900 miles (12,715 km) in diameter and is enveloped by a layer of gases about 60 miles (96.6 km) thick which is called the atmosphere. This mixture of gases is comprised of 78% nitrogen and 21% oxygen plus trace amounts of many other gases which collectively make up the atmospheric "air" that we all breathe.

The Earth's gravitational field holds the atmosphere so that it rotates in unison with the Earth and the atmospheric pressure exerted at any altitude is simply the sum of the weight of all the air molecules in a column above that point. As altitude increases, air density decreases and there will be fewer molecules in the shorter column above the measurement point. It is easy to see why atmospheric pressure decreases with increasing altitude. At an altitude of 62 miles (100km) and beyond, atmospheric pressure approaches zero. Even in deep outer space there are still a few gas molecules per cubic mile so a true absolute zero pressure is not achieved even though it is very close.

| Altitude | | Barometer | | Atmospheric Pressure | |
|---|---|---|---|---|---|
| Feet | Meters | inHG | mmHG | s | kPa |
| -5,000 | -1,524 | 35.58 | 903.7 | 17.48 | 120.5 |
| -4,500 | -1,372 | 35 | 889 | 17.19 | 118.5 |
| -4,000 | -1,219 | 34.42 | 874.3 | 16.9 | 116.5 |
| -3,500 | -1,067 | 33.84 | 859.5 | 16.62 | 114.6 |
| -3,000 | -914 | 33.27 | 845.1 | 16.34 | 112.7 |
| -2,500 | -762 | 32.7 | 830.6 | 16.06 | 110.7 |
| -2,000 | -610 | 32.14 | 816.4 | 15.78 | 108.8 |
| -1,500 | -457 | 31.58 | 802.1 | 15.51 | 106.9 |
| -1,000 | -305 | 31.02 | 787.9 | 15.23 | 105 |
| -500 | -152 | 30.47 | 773.9 | 14.96 | 103.1 |
| 0 | 0 | 29.92 | 760 | 14.7 | 101.3 |
| 500 | 152 | 29.38 | 746.3 | 14.43 | 99.49 |
| 1,000 | 305 | 28.86 | 733 | 14.16 | 97.63 |
| 1,500 | 457 | 28.33 | 719.6 | 13.91 | 95.91 |
| 2,000 | 610 | 27.82 | 706.6 | 13.66 | 94.19 |
| 2,500 | 762 | 27.32 | 693.9 | 13.41 | 92.46 |
| 3,000 | 914 | 26.82 | 681.2 | 13.17 | 90.81 |
| 3,500 | 1,067 | 26.33 | 668.8 | 12.93 | 89.15 |
| 4,000 | 1,219 | 25.84 | 656.3 | 12.69 | 87.49 |
| 4,500 | 1,372 | 25.37 | 644.4 | 12.46 | 85.91 |
| 5,000 | 1,524 | 24.9 | 632.5 | 12.23 | 84.33 |
| 6,000 | 1,829 | 23.99 | 609.3 | 11.78 | 81.22 |
| 7,000 | 2,134 | 23.1 | 586.7 | 11.34 | 78.19 |
| 8,000 | 2,438 | 22.23 | 564.6 | 10.91 | 75.22 |
| 9,000 | 2,743 | 21.39 | 543.3 | 10.5 | 72.4 |
| 10,000 | 3,048 | 20.58 | 522.7 | 10.1 | 69.64 |
| 15,000 | 4,572 | 16.89 | 429 | 8.3 | 57.16 |
| 20,000 | 6,096 | 13.76 | 349.5 | 6.76 | 46.61 |
| 25,000 | 7,620 | 11.12 | 282.4 | 5.46 | 37.65 |
| 30,000 | 9,144 | 8.9 | 226.1 | 4.37 | 30.13 |
| 35,000 | 10,668 | 7.06 | 179.3 | 3.47 | 23.93 |
| 40,000 | 12,192 | 5.56 | 141.2 | 2.73 | 18.82 |
| 45,000 | 13,716 | 4.37 | 111.1 | 2.15 | 14.82 |
| 50,000 | 15,240 | 3.44 | 87.5 | 1.69 | 11.65 |
| 55,000 | 16,764 | 2.71 | 68.9 | 1.33 | 9.17 |
| 60,000 | 18,288 | 2.14 | 54.2 | 1.05 | 7.24 |
| 70,000 | 21,336 | 1.33 | 33.7 | 0.651 | 4.49 |
| 80,000 | 24,384 | 0.827 | 21 | 0.406 | 2.8 |
| 90,000 | 27,432 | 0.52 | 13.2 | 0.255 | 1.76 |
| 100,000 | 30,480 | 0.329 | 8.36 | 0.162 | 1.12 |

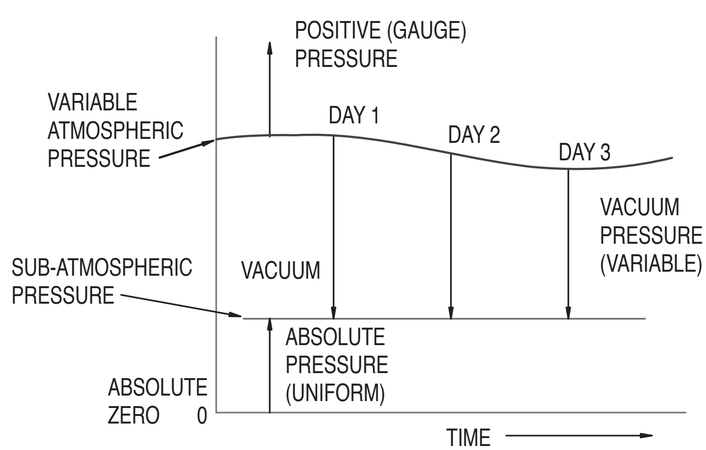
The International Standard Atmosphere (ISA) is defined as a mean atmospheric pressure of 29.92" Hg (760mm Hg) at 59°F (15°C) in dry air at sea level. Other equivalent units are 14.72 psi, 1 bar and 101.3 kPa. To complicate matters, the instrument used to measure atmospheric pressure is a barometer and atmospheric pressure is commonly called barometric pressure so the two terms can be used interchangeably.

In addition to altitude, atmospheric pressure is affected by air temperature, local weather conditions and other variables to a lesser extent. The atmosphere is disturbed by weather systems which can cause either "high" or "low" pressure systems by increasing or decreasing the local atmospheric layer thickness. What we usually hear from a weather forecaster is that the barometric pressure is "falling" and bringing in a storm, or, that the barometric pressure is "rising" so sunny days are forecast.

## Vacuum

Vacuum is simply a pressure that is less than the surrounding atmospheric pressure. Essentially it is a difference in pressure, or differential, that can be used to do work. Since vacuum is by definition a negative pressure, the common terminology of high-vacuum and low-vacuum can be confusing. The preferred terminology is deep-vacuum or shallow-vacuum. Both of which are relative to local atmospheric pressure. The units of measure for positive pressure and vacuum pressure are the same but a minus sign (-) or the word "vacuum" signifies a negative pressure relative to atmosphere.

A vacuum gauge has a calibrated mechanism that is referenced to local atmospheric pressure so the value displayed is the amount that the measured pressure is below atmospheric pressure. This is convenient since the measured "gauge" vacuum level is the vacuum pressure differential that is available to do work and can thus be used directly for calculations of vacuum force which is directly proportional to vacuum pressure and the sealed area upon which it acts.



## Pressure Relationships

The relationship between atmospheric pressure, positive gauge pressure, sub-atmospheric pressure (vacuum) and absolute zero is shown in the previous drawing. An absolute measurement is always positive because it is referenced from absolute zero. A sub-atmospheric pressure line is shown where the absolute pressure is constant over a three-day period. A sine curve represents the normal variation in atmospheric pressure that could occur over the same three-day period. Vacuum pressure is measured from the atmospheric pressure curve down to the sub-atmospheric pressure line and it can be readily seen that the magnitude of available vacuum pressure is different for each of the three days. In effect, the ability to do work (pressure differential), changes in accordance with the atmospheric (barometric) pressure. This is why we recommend using a mid-range rather than a deep vacuum pressure when designing vacuum systems.

On Earth, a vacuum is not self-sustaining since seals leak and most materials are minutely permeable. Over time, enough air molecules will be pulled through the material that the vacuum will be “lost” due to equalization with atmospheric pressure. To maintain a vacuum for a long time period, a vacuum pump must periodically evacuate air molecules to maintain a desired vacuum pressure. Depending on material permeability (porosity), continuous evacuation may be required to maintain a desired vacuum pressure.

## Vacuum Flow

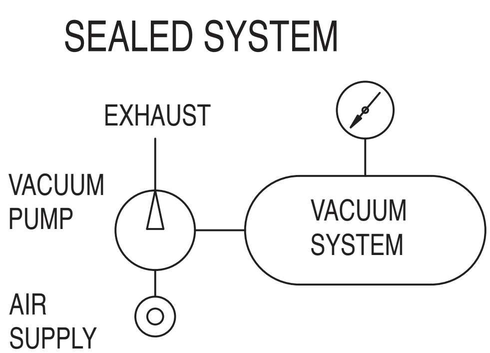
The performance of a vacuum pump is defined by its’ performance curve which is simply a plot of the vacuum flow rate that it is capable of producing at a particular vacuum pressure. As vacuum pressure increases, it becomes more difficult to remove (pump out) additional air molecules, so vacuum flow rate decreases until it becomes zero at the deepest attainable vacuum pressure. Vacuum flow rate will always be highest at atmospheric pressure (zero vacuum) where the pump is under no load. Many pump manufacturers advertise the efficiency of their pumps with this misleading number. In reality this specification is meaningless since force can’t be developed and work can’t be done unless vacuum pressure is being created.

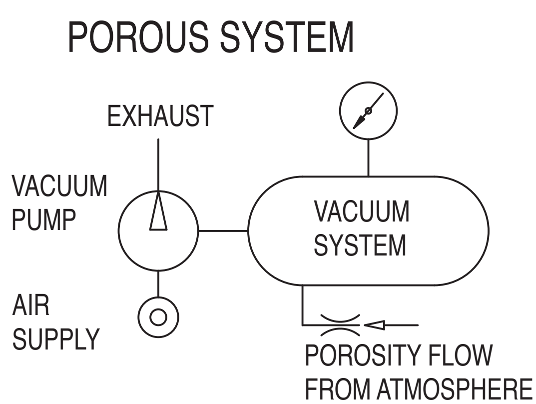
Vacuum pressure determines the amount of force that can be developed to hold a work piece or to carry a load. For a sealed system with no leakage, the two main concerns are; how much vacuum pressure is needed and how quickly can the system be evacuated to the required vacuum pressure? Since the system is sealed, using a larger vacuum pump will reduce evacuation time but will not increase the system vacuum pressure since, given enough time, even a small vacuum pump will attain maximum vacuum pressure. A larger vacuum pump will consume more energy without increasing the system load capacity so it is important to not over-specify vacuum pump capacity for a sealed system.

However, when the work piece is porous (permeable) or the system otherwise leaks, the vacuum pump must produce enough vacuum flow rate to overcome the leakage and still attain the necessary vacuum pressure. The pump must also have enough excess capacity to overcome possible future variations in work piece porosity. We have found corrugated board porosity variations of 4:1 among vendors supplying boxes to the same end user.

System porosity flow increases directly with increased vacuum pressure while pump flow decreases with increased vacuum pressure in accordance with its’ performance characteristics. As a result, doubling the vacuum pump capacity in a porous system will double the energy usage (air consumption) but will only cause a smaller incremental increase in vacuum pressure. At deeper system vacuum pressures the diminishing-returns effect becomes more pronounced so this is another reason to design systems for proper operation at mid-vacuum pressure by simply increasing the effective area upon which the vacuum pressure acts.

We offer free porosity evaluation and assistance with vacuum pump selection. EDCO USA will do the calculations for you and help you select the correct pump for your application.



## Air-Powered Vacuum Generators

A vacuum pump is a device that is capable of evacuating (removing) air molecules from a closed volume so that a less-than-atmospheric pressure condition is attained. Compressed air-powered vacuum pumps are also called vacuum generators and can be simple mono-stage pumps (venturi), or more complex high-flow multi-stage, multi-ejector designs. EDCO USA manufactures both types, so we can recommend the best pump for your application without bias.

Vacuum pumps are designed to be capable of evacuating a specific percentage of air molecules to attain a vacuum pressure that is dependent upon the available atmospheric pressure. For example; a pump that is capable of attaining an 80% vacuum will develop 23.9" Hg (608mm Hg) when the barometric pressure is 29.9" Hg (760mm Hg), but the same pump will only develop 20.7" Hg (524mm Hg)at 4000 feet above sea level where the local barometric pressure is only 25.8" Hg (655mm Hg). Local weather conditions can also reduce vacuum pressure, as, for example, when barometric pressure drops from 29.9" Hg to 28" Hg during a storm. It is important to realize that vacuum pressure fluctuations are a normal characteristic of vacuum systems and are not necessarily caused by a vacuum pump problem.

To minimize the effect of vacuum pressure variations, we recommend that systems be designed for mid-range vacuum levels of 12-18" Hg (305-457mm Hg) that are consistently attainable no matter what the weather conditions may be.

Air-powered vacuum pumps are compact and lightweight so they should be mounted close to the point of vacuum usage to minimize the internal volume of vacuum hose and tubing. Vacuum is produced immediately when compressed air flows into the pump, so it is not necessary to turn the pump on long before contacting a work piece as is common with electro-mechanical pump systems.

## Electro-Mechanical Vacuum Pumps

Premature wear will result from frequent starting and stopping of an electro-mechanical vacuum pump so they are primarily suited for systems requiring constant, or nearly constant, vacuum flow so the pump is powered continuously. Most types are also not suited for operating at maximum vacuum and zero flow conditions which causes poor lubrication and over-heating of the pumping mechanism.

Electro-mechanical vacuum pumps tend to be noisy, bulky, heavy and hot so they are usually mounted some distance away from the point of vacuum use. In order to be used in a pick & place system (pick something from one location and place in another), several additional components are required such as a motor starter, vacuum relief valve, exhaust muffler, large diameter vacuum hoses and a 3-way vacuum control valve.

Collectively these components, and the associated assembly labor, add substantially to the installed cost of the vacuum system and each is an additional potential failure mode when evaluating system reliability. Operating costs will also be increased because electro-mechanical pumps are high-maintenance items and must be overhauled frequently.

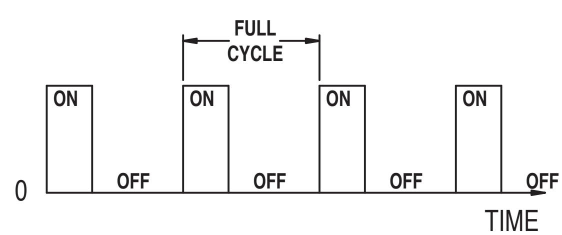
Electro-mechanical pumps efficiently convert electrical power into vacuum flow and pressure, but, because they must run continuously, they can't take advantage of the system duty-cycle to reduce overall energy consumption. However, for systems requiring constant large vacuum flows, they may be the best solution.

## Duty Cycle & Energy Consumption

During a pick & place cycle, a vacuum source is turned on for the "pick" and remains on during the traverse to the place location and then turns off to "place" the work piece. Vacuum is not necessary for the traverse back to home position nor for the dwell time before the next "pick" is required. If vacuum is on for 1/4 of the full machine cycle then the duty-cycle is 25%. An air-powered vacuum pump consumes compressed air only while it is creating vacuum. In this example the average air consumption would be reduced to 25% of the cataloged pump air consumption rate whereas an electro-mechanical vacuum pump must run continuously and consumes energy 100% of the time.

A good rule-of-thumb is to consider an air-powered vacuum pump whenever an adequate supply of compressed air is available, especially if the system has an intermittent vacuum requirement or duty-cycle.

ON/OFF CONTROL:
DUTY CYCLE = PUMP ON TIME / CYCLE TIME



## Air-Powered Vacuum Generator Controls

Air-powered pumps can be simply controlled by a single air valve. When air is supplied to the pump, vacuum is supplied to the system and when the air supply is stopped, atmospheric air is drawn into the vacuum system through the pump exhaust to dissipate vacuum and release the work piece. A 3-way valve mounted close to the pump is recommended for fast operation.

## Release / Blow-Off

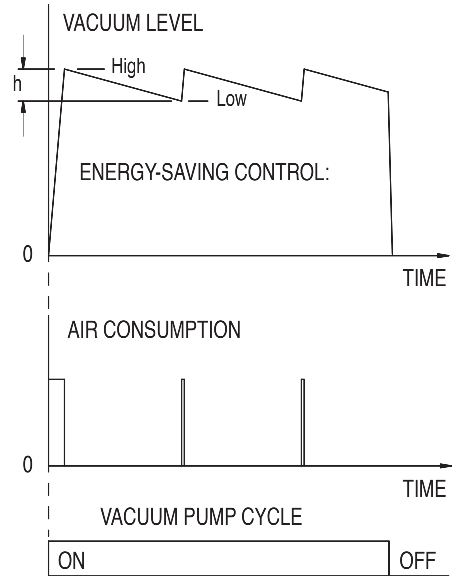
A compressed air assist will provide a faster part release for high-speed systems. A stored-volume automatic blow-off is commonly used for small systems and consists of a volume chamber that is charged with the same air supply that operates the vacuum pump. When the 3-way air supply valve is turned off, a brief pressurized air pulse from the chamber is directed into the vacuum system so the part is quickly released. For larger systems, or those requiring a greater degree of control, an air valve can be connected to the vacuum system via a Release Check valve that prevents loss of vacuum through the blow-off air valve. The blow-off pulse duration is controlled by how long the blow air valve is left on. During the blow-off mode a flow path exists from the vacuum system to atmosphere via the pump exhaust port, so it is normal for air to escape at this point. This also means that no significant positive pressure can be developed in the vacuum system so long restrictive tubing lengths to suction cups may cause part release delays, especially when bellows style cups with higher internal volumes are used.

## Energy Saving

For sealed vacuum systems, a non-return vacuum check valve can be added to prevent back-flow from the pump exhaust when the pump air supply is stopped. This allows the vacuum pump to be cycled on until a desired vacuum pressure is achieved and then turned off to conserve energy (compressed air). A vacuum switch senses when vacuum pressure has decreased and cycles the pump on to restore the vacuum pressure. A separate vacuum volume chamber can be added to decrease the "leak-down" rate but proper ES system operation still entirely depends on maintaining a sealed system. If the system will handle a porous work piece, do not use an Energy Saving control.

## Vacuum Cups

Suction cup is the usual industrial term for a vacuum cup. Most cups are round because that is a strong shape that resists collapse under vacuum pressure and it efficiently distributes load forces through the cup walls to the fitting. A circular shape also provides the greatest area for the amount of space it occupies. Industrial cups usually employ a metal fitting for mounting the cup and for connecting a vacuum source to allow the inner volume to be evacuated.




Suction cups are made of rubber and include a flared lip to form a flexible seal against a work piece to allow the cup to be evacuated with a vacuum pump. Several cups can be connected to a central pump, or a small vacuum pump can be used for each cup. When the cup is evacuated an attraction force is developed that holds the cup to the surface of the work piece, which for a vertical cup axis is the same as "lifting" capacity. However, if the load is perpendicular to the cup axis (shear load) then the attractive force must be multiplied by the appropriate coefficient of friction to determine an allowable shear load. In either case, an additional factor-of-safety must be applied for prudent design. When rapid movement occurs in automation systems, a designer must consider the combined magnitude of both lifting and shear loads when selecting components.

Depending on the contours of the work piece the allowable cup diameter may be limited, so multiple cups may be required to increase the total area and achieve a desired load capacity plus a generous factor-of-safety. We do not recommend increasing the required vacuum level to make a system work. Instead, increase the number or size of cups so the total effective area is large enough for proper system design. Suction cups are relatively inexpensive so additional cups are cheap insurance against potential system failure.

The vacuum force equation F = P x A (Force = Pressure times Area) is difficult to apply to rubber suction cups because cups are approximately sized according to the outer lip diameter which is misleading because it is much larger than the actual effective diameter that the vacuum pressure acts upon.

A rubber cup also changes shape under load, so the effective area varies somewhat depending on the vacuum level inside the cup. Because of this, it is more expedient to use the rated force at a particular vacuum pressure from a table of suction cup specifications. For instance, EDCO tabulates rated loads at 6 and 18" Hg (152 and 457mm Hg). Loads at other vacuum pressures are directly proportional so, for example, the load at 15" Hg is simply 15/18 times the rated load for 18" Hg.

The force equation can be useful for vacuum "clamps" where a cavity with a seal formed around its' perimeter is used to hold flat work pieces such as wood or stone. The area within the seal can be calculated with some degree of accuracy so the force equation F = P x A calculation is straightforward. Of course, the equation units must be consistent with each other, so vacuum pressure must be converted to an appropriate unit of measure.

## Vacuum Cup Selection

Total load capacity of a vacuum system can be increased in two ways. (1) Increase the required system vacuum pressure, or (2) increase the total area that the vacuum pressure acts upon by either using larger suction cups, or a greater number of suction cups, or both. As explained previously, increasing the required vacuum pressure above a comfortable mid-range vacuum level is not a good practice. Increasing the suction cup area is the favored method. Refer to the table for selection of suction cup type by work piece characteristics. These are typical guidelines and there can be exceptional cases. Every application is a little different so sometimes a trial is the only way to determine what works best.

## Vacuum Cup Selection

For economy, always use the lowest cost material unless there is a good reason not to. AMERIFLEX (50A) is an outstanding replacement for competitors blue vinyl (PVC) cups in moderate, factory temperature, applications – Excellent wear resistance and lower priced than nitrile. DURAMAX (45A) is a soft and supple non-marking (no residue) material for moderate temperature applications including glass and other high gloss surfaces. NITRILE (50A) is a general purpose material with good wear characteristics, making it well suited for most industrial room-temperature environments. SILICONE (50A) has a very wide temperature range and is suitable for both sub-freezing applications and for elevated temperatures. Silicone is inherently more supple than other rubbers so it may seal better on textured surfaces. Silicone also has the reputation for causing problems with painted or plated parts so some plants will not allow it to be used. CONDUCTIVE SILICONE (50A) provides a conductive path to dissipate static electrical charges so electronic components will not be damaged. VITON (60A) provides the highest temperature rating but is also harder so sealing on textured surfaces may be affected.

## General Rules

Three points define a plane. So, for good stability use three or more cups that are spaced apart as far as possible. Start with the largest cup size that can be reliably placed on the work piece and then increase the number of cups until a suitable factor of safety is achieved. For handling boxes and other containers, apply the suction cups in corners and near the outer vertical walls. Remember, the box contents sit on the box bottom so the weight load is transferred to the box top via the side walls.

| | B - Bellows | 2B - Double Bellows | BL - Multi-Bellows | BF - Bellows Flat | D - Deep | F - Flat | FC - Flat Concave | U - Universal | OC - Oval Concave | OF - Oval Flat |
|---|---|---|---|---|---|---|---|---|---|---|
| Work Surface | Cup Style | | | | | | | | | |
| Flat | X | X | X | X | | X | | X | X | X |
| Concave - Slight | X | X | | X | | | | X | | |
| Convex | X | X | X | X | X | | X | X | X | |
| Compound | X | X | X | X | | | | X | | |
| Spherical | X | X | | | X | | X | | | |
| Cylindrical | X | X | X | | X | | | X | X | X |
| Flexible | X | X | X | | | | | X | | |
| Plastic Flim | | | X | | | | | | | |
| Shear Loads | X | X | | X | | X | X | | | X |

## Thread Systems

ISO Thread:
- Cylindrical Metric Thread - Designated with the letter M. (Example: M5x0.8)
- Cylindrical Inch Thread (Unified) - Designated with the letters UN. (Example: 10-32 UNC)

Dry Seal Thread (American System Pipe Thread):
- Conical Thread - Designated with NPT or NPTF. (Example: 1/4-18 NPTF)
- Cylindrical Thread - Designated with NPSF. (Example: 1/2-14 NPSF)

G Thread (Whitworth Pipe Thread):
- Cylindrical thread designated with the letter G. (Example: G 1/4-19)
- BSPP is a tighter tolerance G thread. We use G threads on our products unless otherwise noted.

## Thread Compatibility

Some combinations of G (BSPP) threads and NPT threads will mate if the engagement length is short. EDCO uses an odd thread description such as G 1/8” NPSF for a female thread to indicate that either 1/8” NPTF or G 1/8” male threads will mate with it. By using straight threads, the fitting shoulder will bottom out against the mating surface so that all cups are at the same installed height. If tapered threads were used, the cup installed height would vary depending on the length of thread engagement after tightening. Pipe dope sealant is usually unnecessary but will positively eliminate even small leaks. Tape sealant can shred slivers that tend to migrate and cause problem so it’s best to avoid using it.

Please note, some thread sizes in different systems do not always fit.

| | M5 Male | M5 Female | G 1/8 Male | G 1/8 Female | G 1/4 Male | G 1/4 Female | G 3/8 Male | G 3/8 Female | G 1/2 Male | G 1/2 Female | G 3/4 Male | G 3/4 Female | G 1 Male | G 1 Female | G 2 Male |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10-32 UNF Male or Female | • | ••• | | | | | | | | | | | | | |
| 1/8 NPSF Female | | | • | | | | | | | | | | | | |
| 1/8 NPT Male or Female | | | X | • | | | | | | | | | | | |
| 1/4 NPSF Female | | | | | • | | | | | | | | | | |
| 1/4 NPT Male or Female | | | | | X | X | | | | | | | | | |
| 3/8 NPSF Female | | | | | | | X | | | | | | | | |
| 3/8 NPT Male or Female | | | | | | | X | X | | | | | | | |
| 1/2 NPSF Female | | | | | | | | | • | | | | | | |
| 1/2 NPT Male or Female | | | | | | | | | X | • | | | | | |
| 3/4 NPSF Female | | | | | | | | | | | • | | | | |
| 3/4 NPT Male or Female | | | | | | | | | | | X | • | | | |
| 1 NPT Male or Female | | | | | | | | | | | | | X | X | |
| 2 NPT Male or Female | | | | | | | | | | | | | | | X |

••• Fits

• Fits w/ Short Thread Engagment

X Does Not Fit