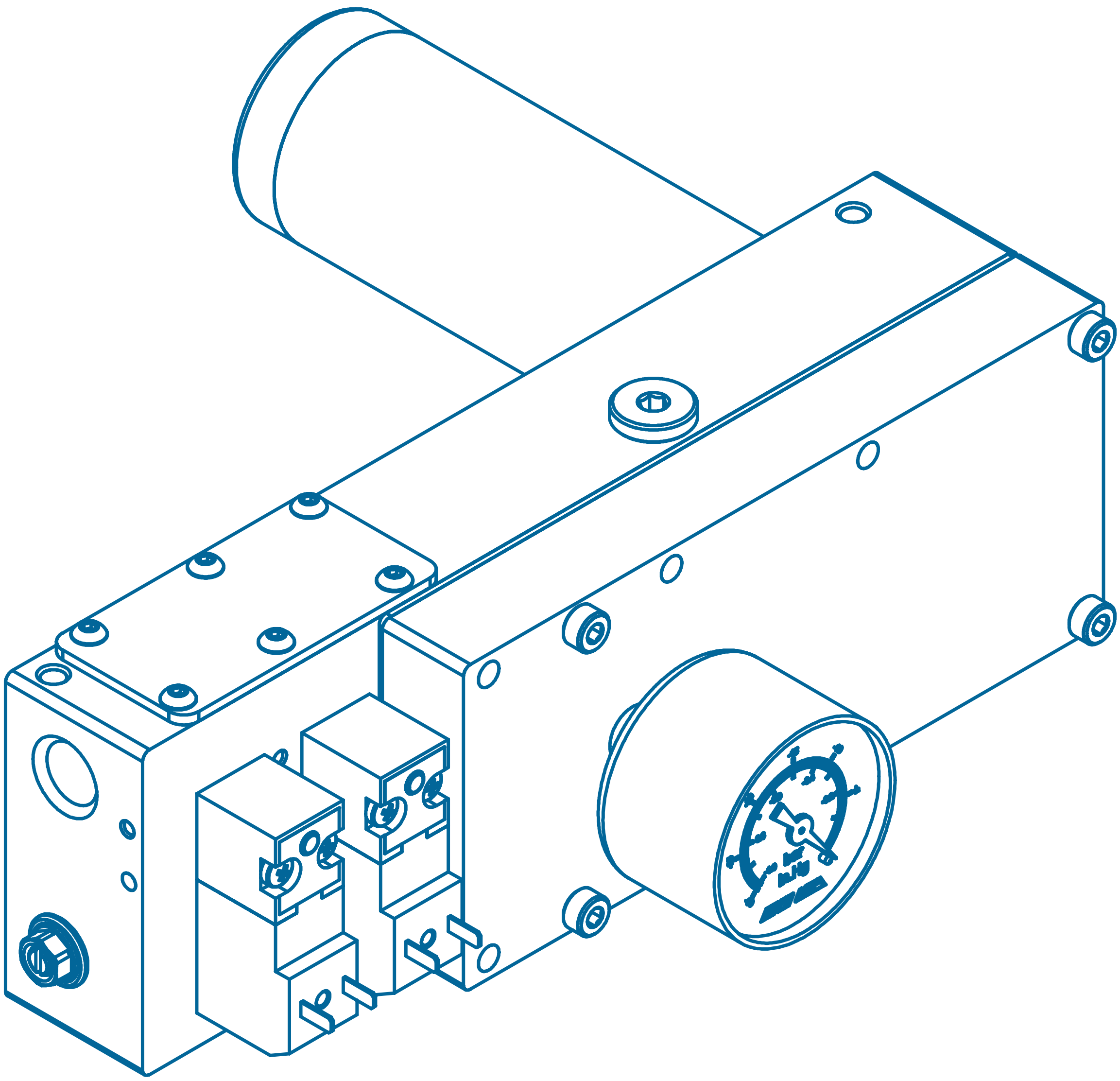
EDCO USA®

CATALOG 8



EDCO USA®

Table of Contents

When navigating our catalog, it's always easist to use this table of contents to find the section a product category is located in first. Next, use the second page of that section to find the exact page of the specific product you're looking for.

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.

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.

Have it your way!

EDCO vacuum pump bodies are machined from aircraft grade aluminum billet and while we have included extra air pressure and vacuum ports as well as twelve tapped holes and four through holes for mounting versatility, you may need something different. Our flexible modular construction allows customization to suit your specific OEM requirements.

We continually develop new products and customized designs that may not appear in our catalog. Give us a call if you don't find what you are looking for. We may already have a solution for you.

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

EDCO can provide private labeling for OEM customers at no extra charge. Simply provide us with your dxf or vector file of your logo, part number, and any additional information desired. Initial orders must be for at least 5 units but additional orders can be for any quantity.

Warranties

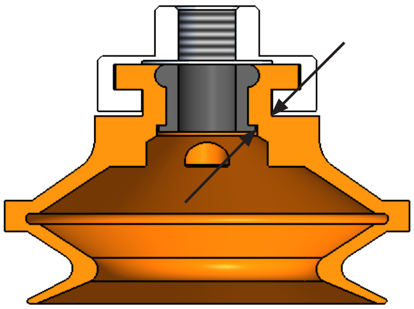
EDCO USA products are warranted to be free of defects in workmanship and materials for a period of 5 years from the date of purchase.

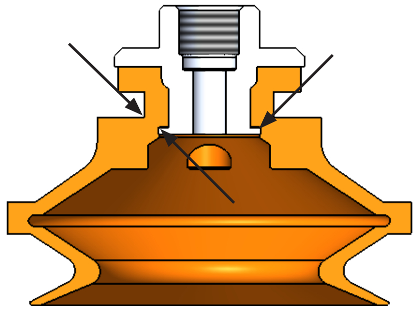
While products found by EDCO USA to be defective will be replaced, no liability is assumed beyond such replacement and there are no other warranties of any sort expressed or implied.

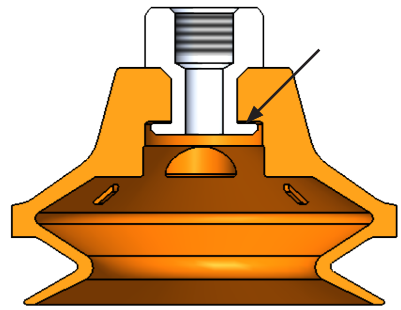
The specifications in this catalog are believed to be accurate and reliable. However, it is the responsibility of the purchaser / user to determine the suitability of EDCO USA's products for specific use and to apply those products safely.

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.

Better Vacuum Products by Design







Competition 2-Piece Fitting

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.

Competition 1-Piece Fitting

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

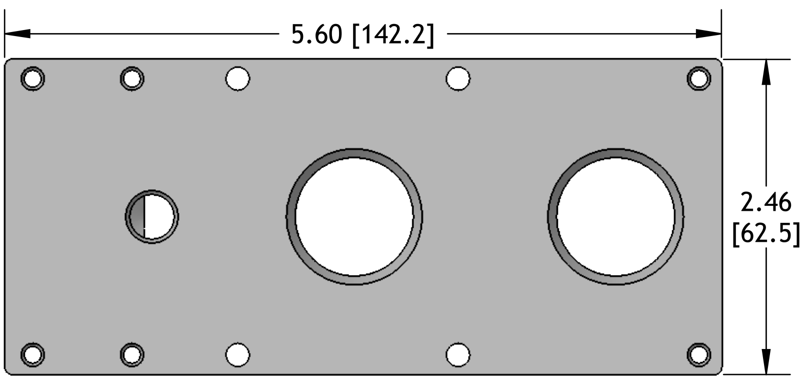
EDCO USA 1-Piece Fitting

The EDCO flange has 2-1/2 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.

EDCO USA vacuum cup rubber is specially formulated to be non-marking and no mold agent is used in the manufacturing process to eliminate surface residue. Vacuum cups in other compounds may be special ordered in quantities as low as 100 pieces.

EDCO USA rugged anodized aluminum fittings provide full load capacity and may be repeatedly used to save money.

EDCO USA Classic Pump



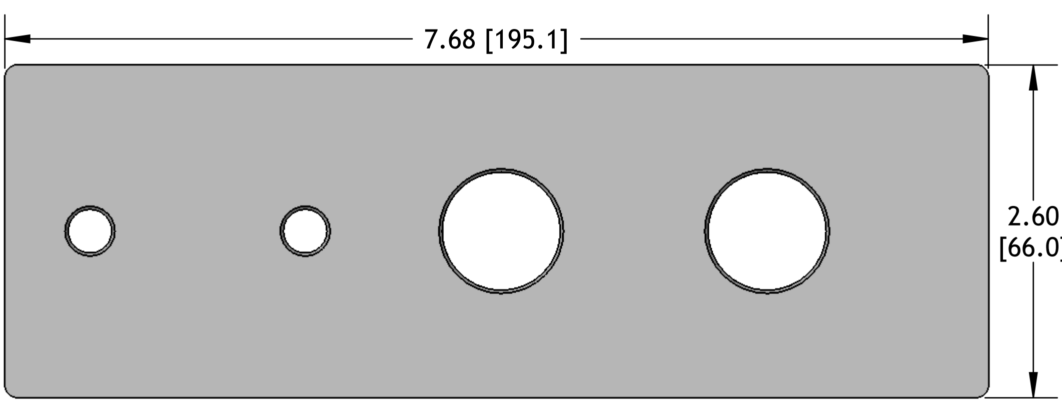
EDCO offers 6 ejector series.
(A, E, L, M, ML & X)

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

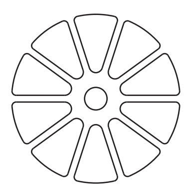
EDCO offers 8 pump capacities.

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

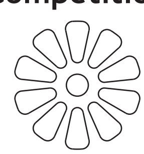
Competition Classic Style Pump



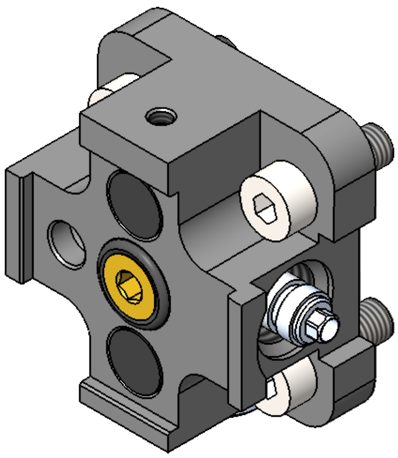
EDCO Valve



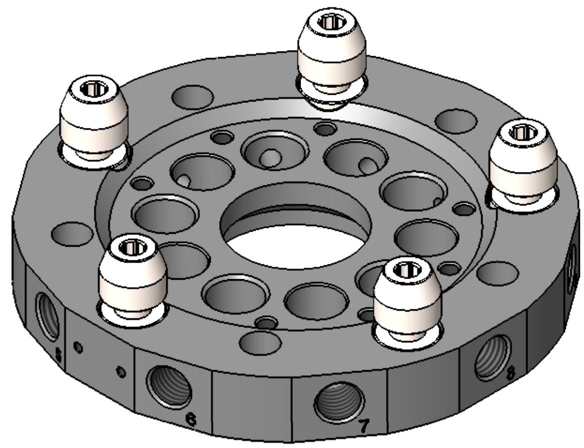
Competition



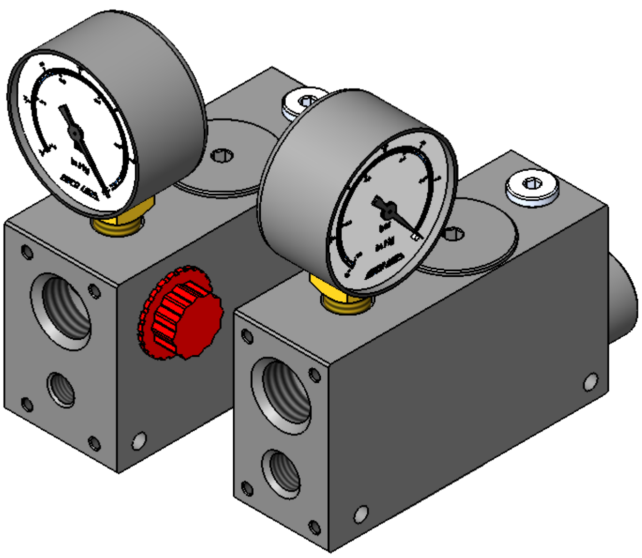
New Products



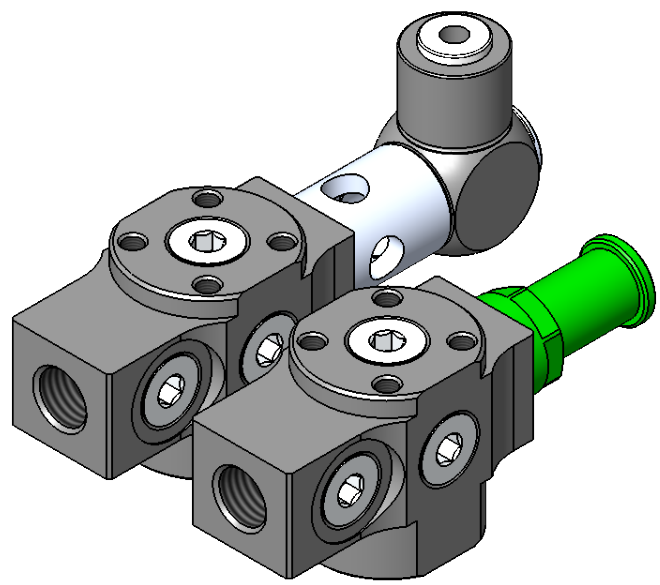
RQCP
Section 17



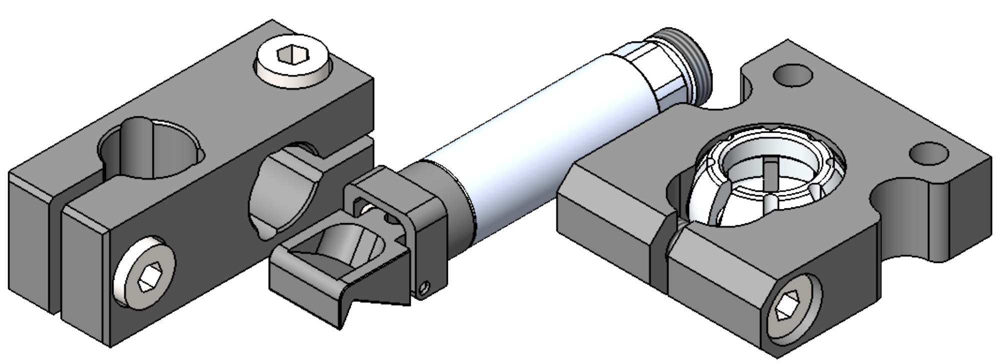
Quick Changer Tooling Base
Section 17



VG & VQ Series Pumps
Section 9



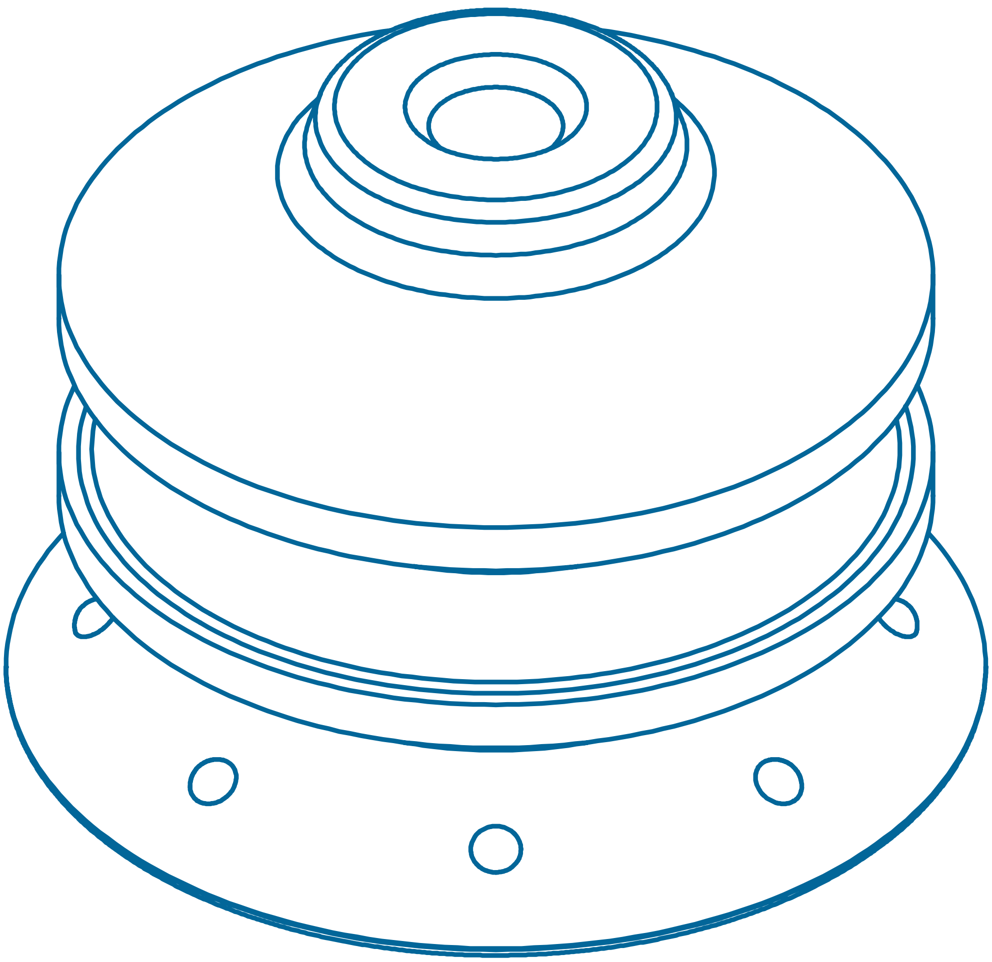
Vacuum Gripper Pumps
Section 11

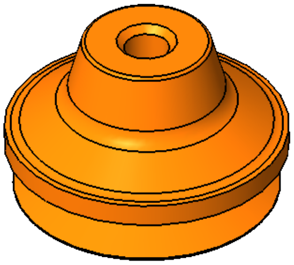


Micro-Tooling
Section 17

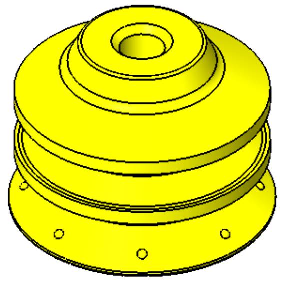
SECTION 2

VACUUM CUPS

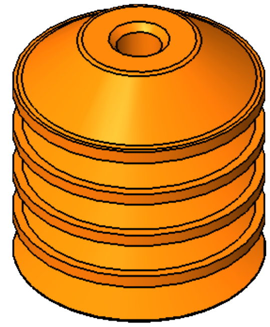




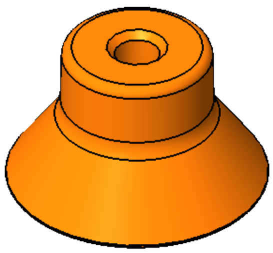
Bellows



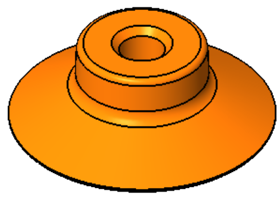
Double Bellows



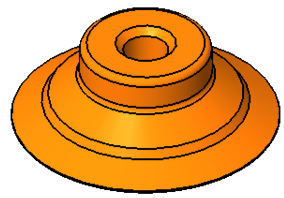
Multi-Bellows



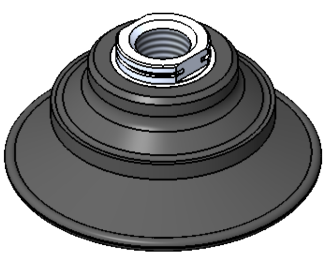
Deep



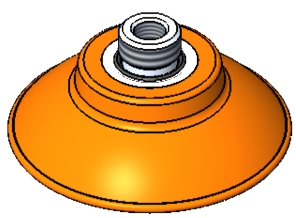
Flat



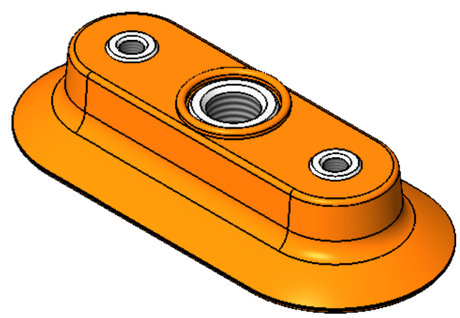
Universal



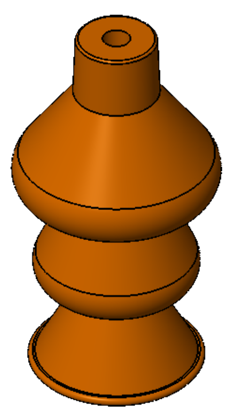
Bellows Flat



Flat-Concave



Oval

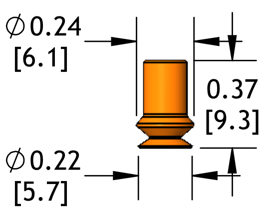


Special

Bellows Vacuum Cups

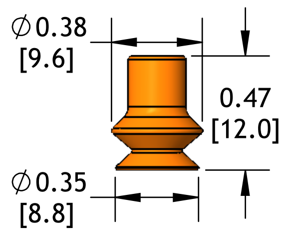
	Cup Size		Cup Material[1]		Cup Fitting		Filter	
XP-B	15		CS		-10M		-FD	
	5	Ø 5 mm	A	Ameriflex[4]	(Blank)	None	(Blank)	None
	8	Ø 8 mm	CS	Conductive Silicone[3]	See cup fittings for available threads.		-FD	PE Filter Disc
	10	Ø 10 mm	D	Duramax[4]			-FS	SS Filter Screen
	15	Ø 15 mm	N	Nitrile			See cup fittings for availability.	
	20	Ø 20 mm	S	Silicone				
			V	Viton				

[1]All cups are available in Nitrile and Silicone. Check availability for other materials before ordering.
[2]All figures for shear load are 18"Hg. 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.
[3]Not available on XP-B15 or XP-B20.
[4]Not available on XP-B5, XP-B8, XP-B10, or XP-B15.



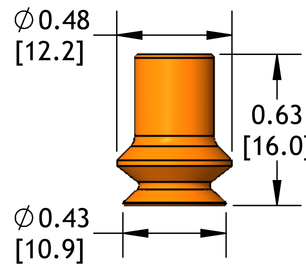
XP-B5

Cup Diameter: in [mm]	5 mm
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[2]: lb [n]	0.05 [0.2]



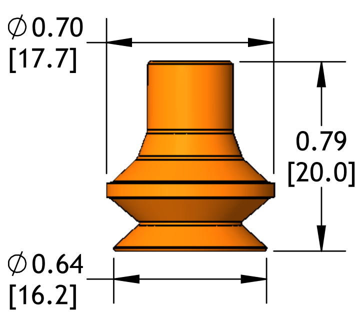
XP-B8

Cup Diameter: in [mm]	8 mm
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[2]: lb [n]	0.18 [0.8]



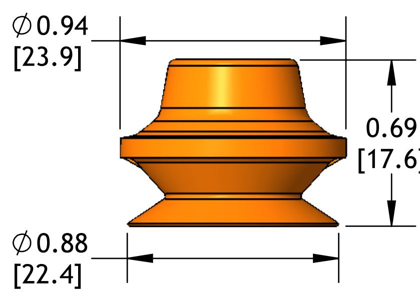
XP-B10

Cup Diameter: in [mm]	10 mm
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[2]: lb [n]	0.4 [1.7]



XP-B15

Cup Diameter: in [mm]	15 mm
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[2]: lb [n]	0.70 [3.1]



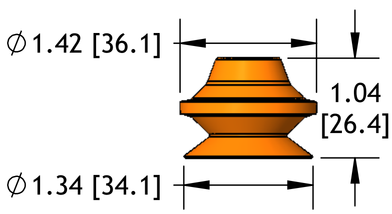
XP-B20

Cup Diameter: in [mm]	20 mm
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[2]: lb [n]	1.10 [4.8]

Bellows Vacuum Cups

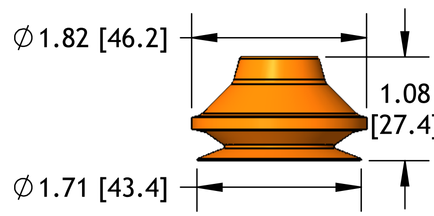
	Cup Size		Cup Material[1]		Cup Fitting		Filter Option	
XP-B	50		V		-38F		-FS	
	30	Ø 30 mm	A	Ameriflex	(Blank)	None	(Blank)	None
	40	Ø 40 mm	D	Duramax	See cup fittings for available threads.		-FD	PE Filter Disc
	50	Ø 50 mm	N	Nitrile			-FS	SS Filter Screen
	65	Ø 65 mm	S	Silicone[3]			See cup fittings for availability.	
			V	Viton[3]				

[1]All cups are available in Nitrile and Silicone. Check availability for other materials before ordering.
[2]All figures for shear load are 18"Hg. 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.
[3]Not available on XP-B65.



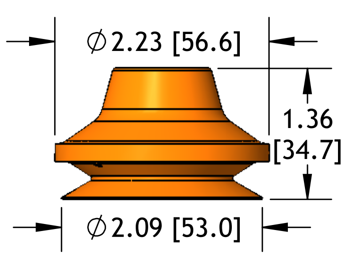
XP-B30

Cup Diameter: in [mm]	30 mm
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[2]: lb [n]	2.50 [11.1]



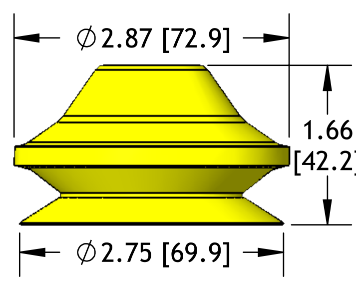
XP-B40

Cup Diameter: in [mm]	40 mm
Thru Hole: in [mm]	0.29 [7.4]
Stroke: in [mm]	0.59 [14.9]
Cup Weight: oz [g]	0.40 [11.3]
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[2]: lb [n]	4.40 [19.5]



XP-B50

Cup Diameter: in [mm]	50 mm
Thru Hole: in [mm]	0.36 [9.1]
Stroke: in [mm]	0.79 [20.0]
Cup Weight: oz [g]	0.75 [21.3]
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[2]: lb [n]	7.30 [32.4]



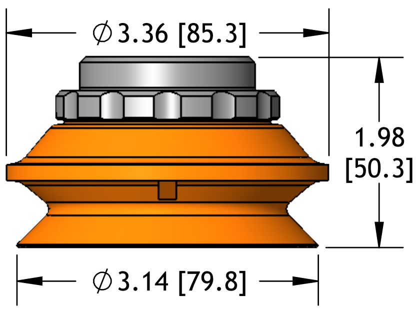
XP-B65

Cup Diameter: in [mm]	65 mm
Thru Hole: in [mm]	0.50 [12.7]
Stroke: in [mm]	0.90 [22.9]
Cup Weight: oz [g]	1.29 [36.5]
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[2]: lb [n]	13.1 [58.3]

Bellows Vacuum Cups

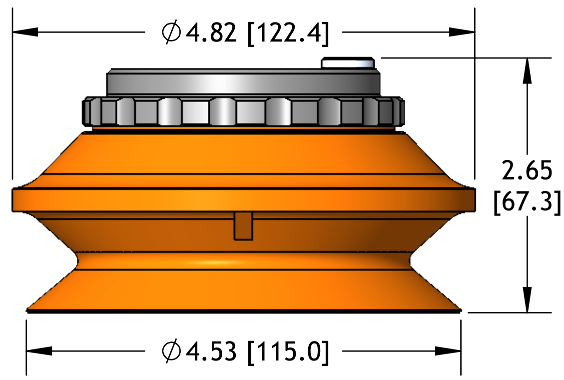
	Cup Size		Cup Material		Cup Fitting	
XP-B	75		S		-12F	
	75	Ø 75 mm	N	Nitrile	(Blank)	None
	110	Ø 110 mm	S	Silicone	See cup fittings for available threads.	
	150	Ø 150 mm	V	Viton		

[2]All figures for shear load are 18"Hg. 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.



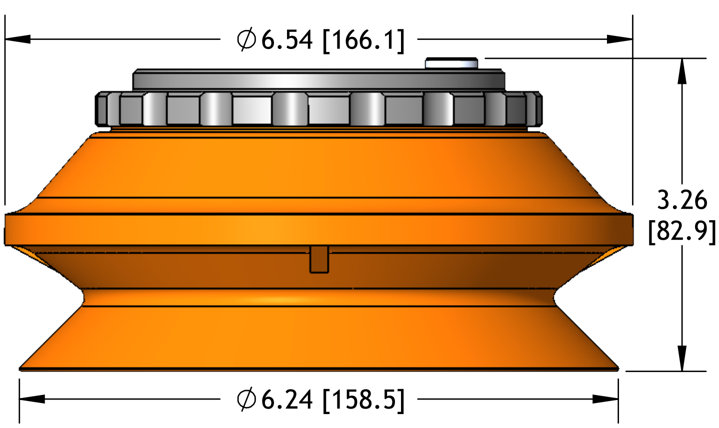
XP-B75

Cup Diameter: in [mm]	75 mm
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[2]: lb [n]	19.00 [84.5]



XP-B110

Cup Diameter: in [mm]	110 mm
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[2]: lb [n]	39.00 [173.5]



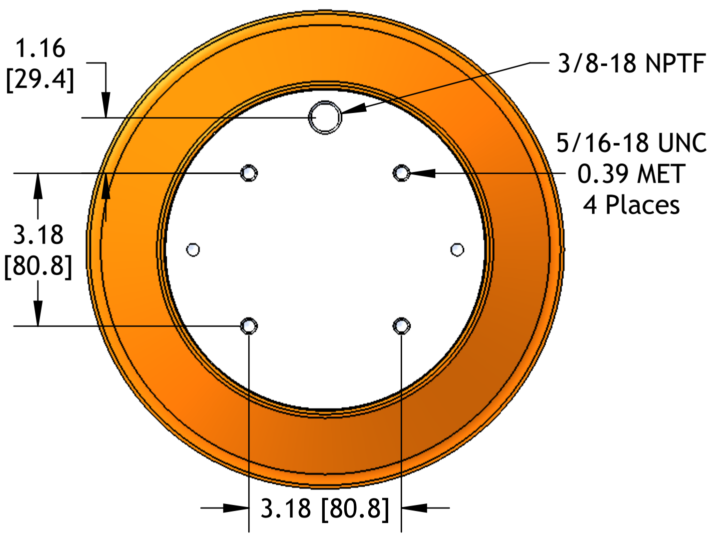
XP-B150

Cup Diameter: in [mm]	150 mm
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[2]: lb [n]	77.00 [342.0]

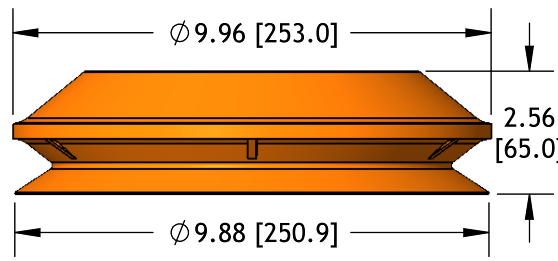
Bellows Vacuum Cups

	Cup Material		Mount
XP-B250	N	-	AQ
	N — Nitrile		AQ — Quad Mount, Side Port
	S — Silicone		P — Quad Mount, Centered Port

[2]All figures for shear load are 18"Hg. 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.

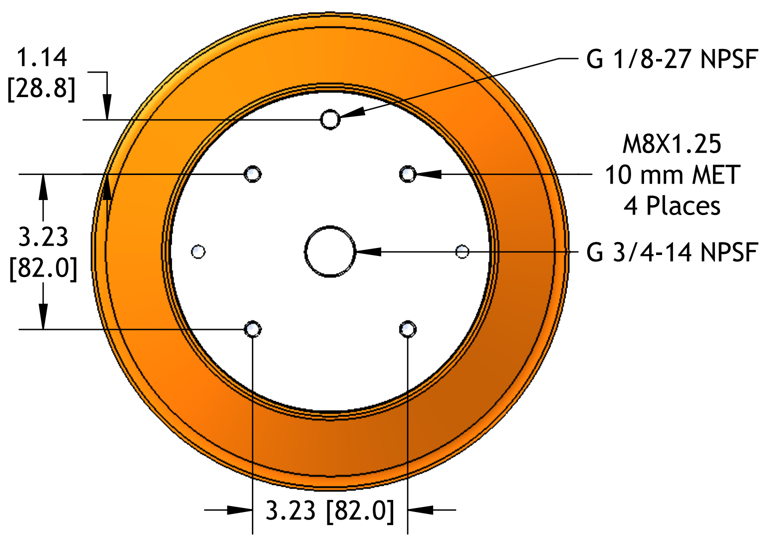


AQ Mount

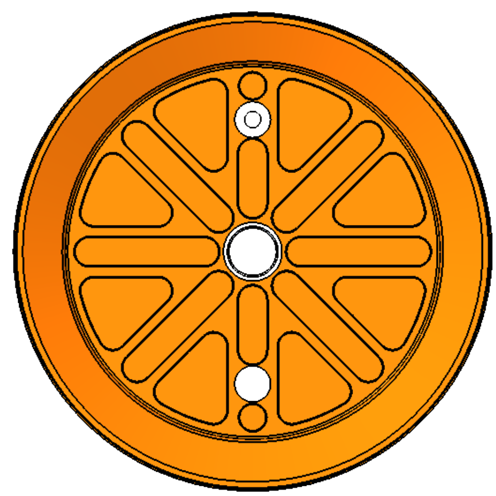


XP-B250

Cup Diameter: in [mm]	250 mm
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[2]: lb [n]	225.00 [1001.0]



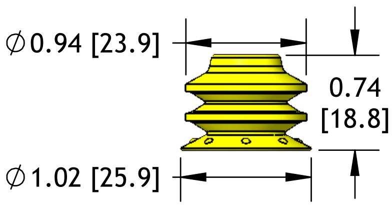
P Mount



Bottom View

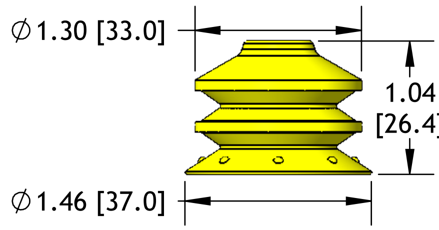
Double Bellows Vacuum Cups

	Cup Size		Cup Material		Cup Fitting		Filter	
XP-2B	65		D		-18MS			
	25	Ø 25 mm	A	Ameriflex	(Blank)	None	(Blank)	None
	35	Ø 35 mm	D	Duramax	See cup fittings for available threads.		-FD	PE Filter Disc
	50	Ø 50 mm	N	Nitrile			-FS	SS Filter Screen
	65	Ø 65 mm					See cup fittings for availability.	



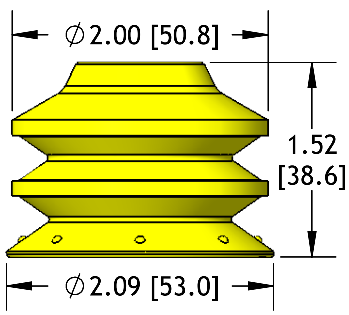
XP-2B25

Cup Diameter: in [mm]	25 mm
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]



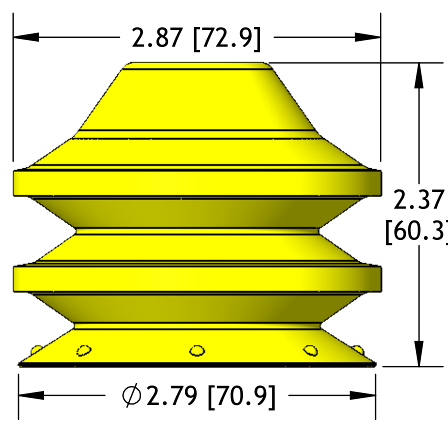
XP-2B35

Cup Diameter: in [mm]	35 mm
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
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]

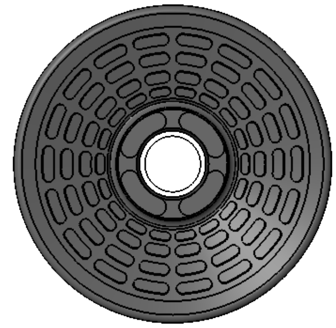


XP-2B65

Cup Diameter: in [mm]	65 mm
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]

Bellows Flat Vacuum Cups

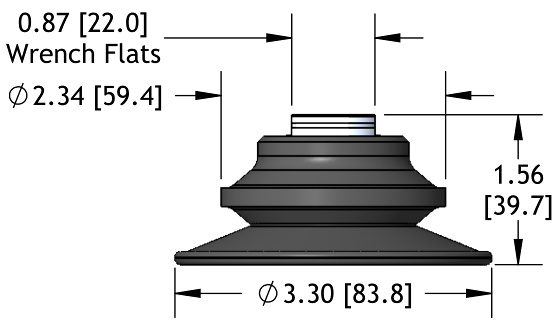
The Bellows Flat style vacuum cups combine the versatility of a Bellows cup with a large anti-skid tread pattern to provide maximum holding power and high resistance to shear loads even when lubrication is present. BF Cups are ideal for feeding sheet metal blanks to stamping presses or other robotic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

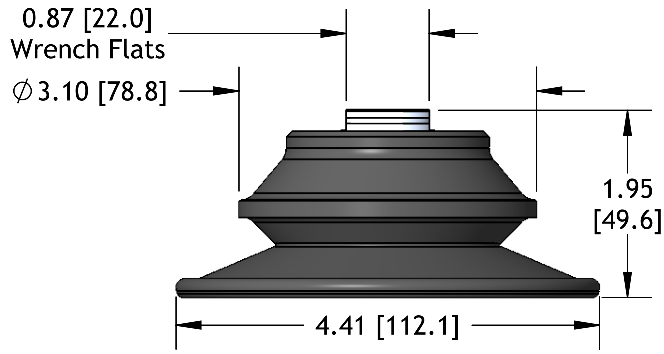


Bottom View

[2]All figures for shear load are 18"Hg. 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.

	Cup Size		Cup Material		Fitting	
XP-BF	80		N		-38F	
	80	Ø 80 mm	N	Nitrile	-38F	3/8-18 NPSF Female
	100	Ø 100 mm				





XP-BF80

Cup Diameter: in [mm]	80 mm
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]

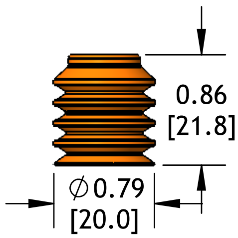
XP-BF100

Cup Diameter: in [mm]	100 mm
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]

Multi-Bellows Vacuum Cups

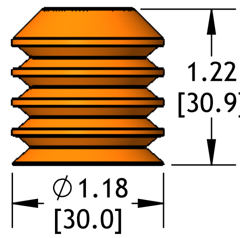
	Cup Size		Cup Material[1]		Cup Fitting		Filter	
XP-BL	30		A		-G14F		-FS	
	20	Ø 20 mm	A	Ameriflex	(Blank)	None	(Blank)	None
	30	Ø 30 mm	D	Duramax	See cup fittings for available threads.		-FD	PE Filter Disc
	40	Ø 40 mm	N	Nitrile			-FS	SS Filter Screen
	50	Ø 50 mm	S	Silicone			See cup fittings for availability.	

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



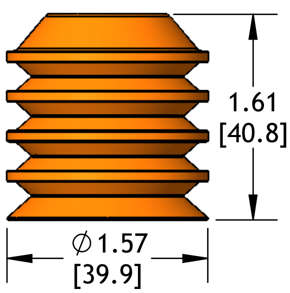
XP-BL20

Cup Diameter: in [mm]	20 mm
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]



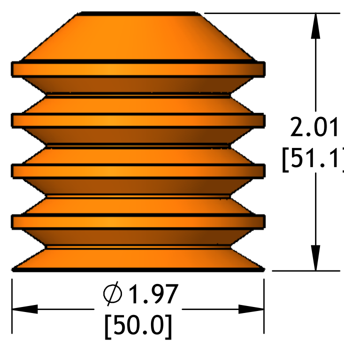
XP-BL30

Cup Diameter: in [mm]	30 mm
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
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]

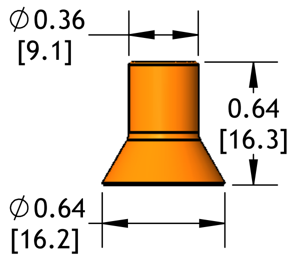


XP-BL50

Cup Diameter: in [mm]	50 mm
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]

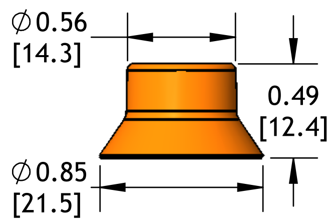
Deep Vacuum Cups

	Cup Size		Cup Material		Cup Fitting		Filter	
XP-D	15		S		-5F			
	15	Ø 15 mm	N	Nitrile	(Blank)	None	(Blank)	None
	20	Ø 20 mm	S	Silicone	See cup fittings for available threads.		-FD	PE Filter Disc
	30	Ø 30 mm					-FS	SS Filter Screen
	40	Ø 40 mm					See cup fittings for availability.	
	50	Ø 50 mm						



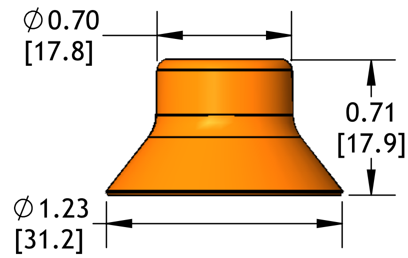
XP-D15

Cup Diameter: in [mm]	15 mm
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]



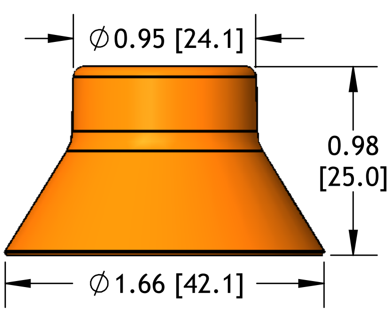
XP-D20

Cup Diameter: in [mm]	20 mm
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]



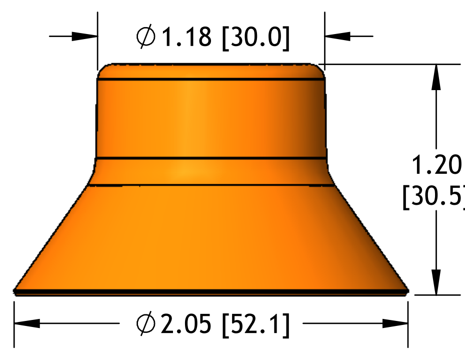
XP-D30

Cup Diameter: in [mm]	30 mm
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
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]

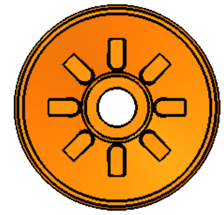


XP-D50

Cup Diameter: in [mm]	50 mm
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]

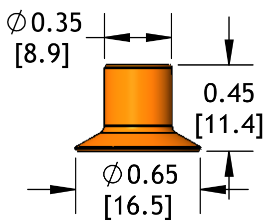
Flat Vacuum Cups

	Cup Size		Cup Material[1]		Cup Fitting		Filter	
XP-F	20		A		-14M		-FS	
	15	Ø 15 mm	A	Ameriflex[3]	(Blank)	None	(Blank)	None
	20	Ø 20 mm	D	Duramax[3]	See cup fittings for available threads.		-FD	PE Filter Disc
	25	Ø 25 mm	N	Nitrile			-FS	SS Filter Screen
	30	Ø 30 mm	S	Silicone			See cup fittings for availability.	
			V	Viton				



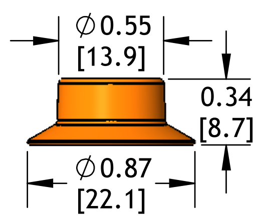
Bottom View
All Flat Cups have cleats.

[1]All cups are available in Nitrile and Silicone. Check availability for other materials before ordering.
[2]All figures for shear load are 18"Hg. 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.
[3]Not available on XP-F15.



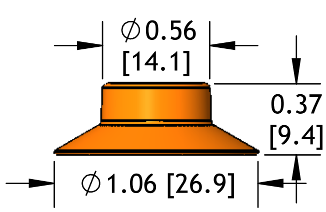
XP-F15

Cup Diameter: in [mm]	15 mm
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[2]: lb [n]	0.90 [4.0]



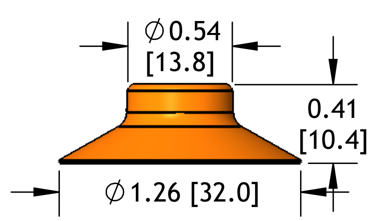
XP-F20

Cup Diameter: in [mm]	20 mm
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[2]: lb [n]	1.70 [7.6]



XP-F25

Cup Diameter: in [mm]	25 mm
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[2]: lb [n]	2.10 [9.3]



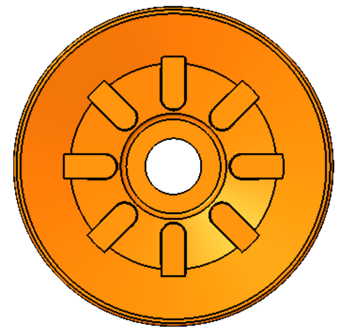
XP-F30

Cup Diameter: in [mm]	30 mm
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[2]: lb [n]	2.80 [12.5]

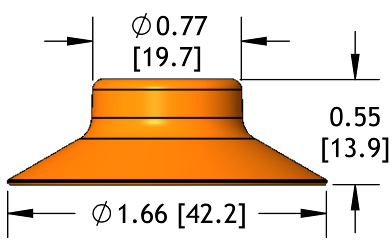
Flat Vacuum Cups

	Cup Size		Cup Material[1]		Cup Fitting		Filter	
XP-F	50		D		-38M		-FS	
	40	Ø 40 mm	A	Ameriflex	(Blank)	None	(Blank)	None
	50	Ø 50 mm	D	Duramax	See cup fittings for available threads.		-FD	PE Filter Disc
	65	Ø 65 mm	N	Nitrile			-FS	SS Filter Screen
			S	Silicone[3]			See cup fittings for availability.	
			V	Viton[3]				

[1]All cups are available in Nitrile and Silicone. Check availability for other materials before ordering.
[2]All figures for shear load are 18”Hg. 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.
[3]Not available on XP-F65.

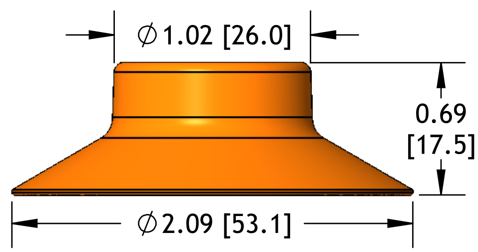


Bottom View
All Flat Cups have cleats.



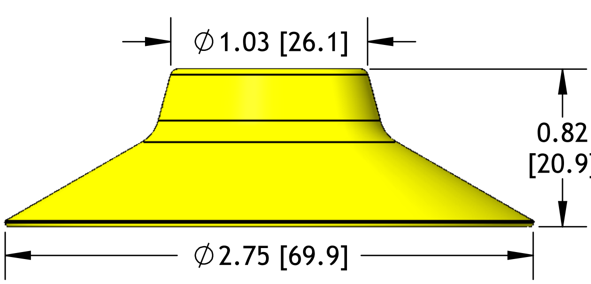
XP-F40

Cup Diameter: in [mm]	40 mm
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[2]: lb [n]	4.50 [20.0]



XP-F50

Cup Diameter: in [mm]	50 mm
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[2]: lb [n]	8.30 [36.9]



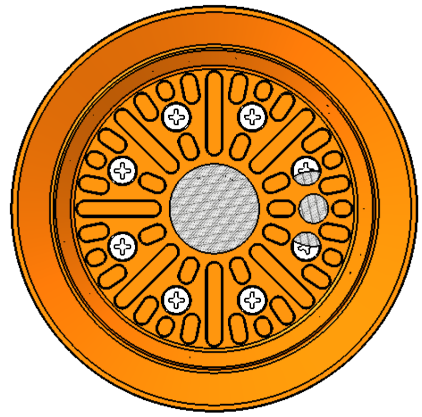
XP-F65

Cup Diameter: in [mm]	65 mm
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[2]: lb [n]	11.00 [49.0]

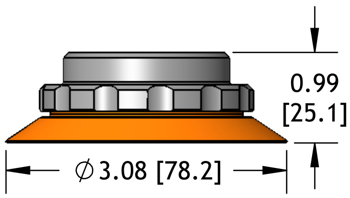
Flat Vacuum Cups

	Cup Size		Cup Material		Cup Fitting	
XP-F	110		S		-38F	
	75	Ø 75 mm	A	Ameriflex	(Blank)	None
	110	Ø 110 mm	N	Nitrile	See cup fittings for available threads.	
	150	Ø 150 mm	S	Silicone		
			V	Viton		

[2]All figures for shear load are 18"Hg. 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.

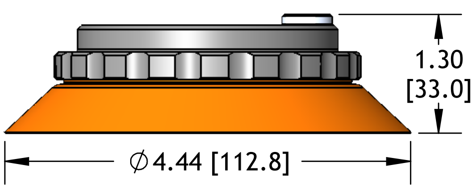


Bottom View
All Flat Cups have cleats.



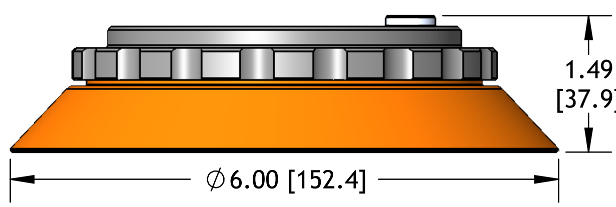
XP-F75

Cup Diameter: in [mm]	75 mm
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[2]: lb [n]	23.00 [102.0]



XP-F110

Cup Diameter: in [mm]	110 mm
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[2]: lb [n]	47.00 [209.0]



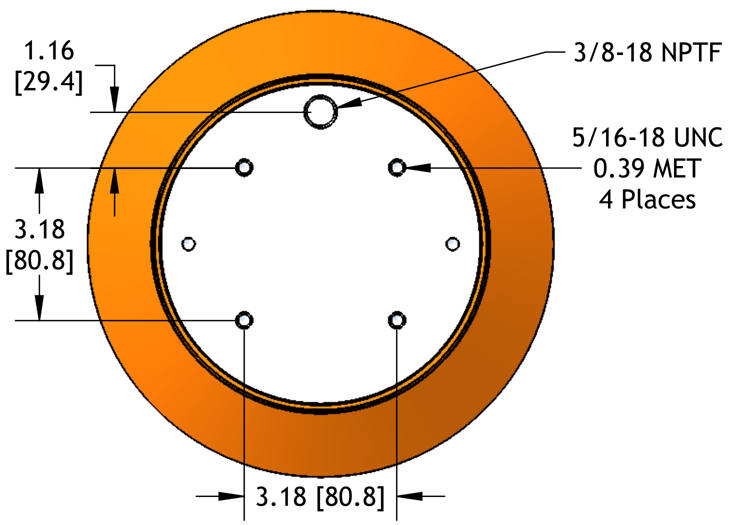
XP-F150

Cup Diameter: in [mm]	150 mm
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[2]: lb [n]	95.00 [422.0]

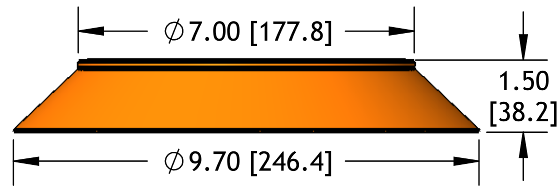
Flat Vacuum Cups

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

[2]All figures for shear load are 18”Hg. 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.

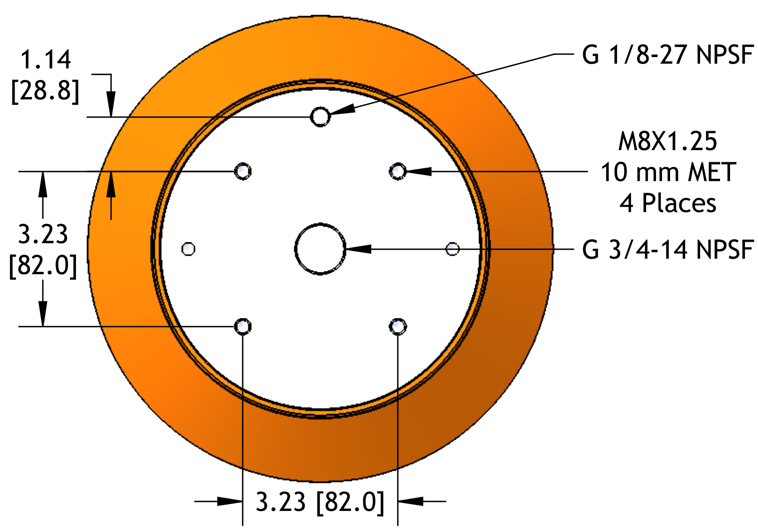


AQ Mount

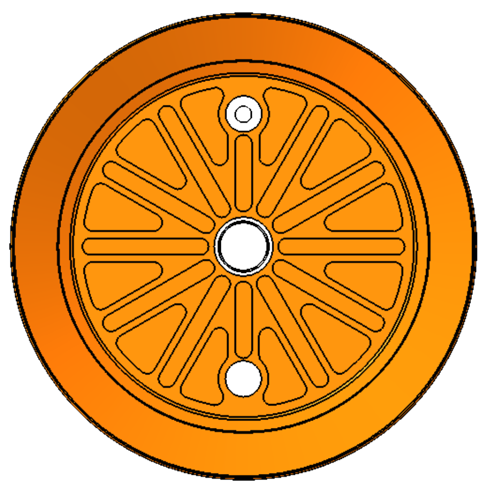


XP-F240

Cup Diameter: in [mm]	240 mm
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[2]: lb [n]	225.00 [1001.0]



P Mount

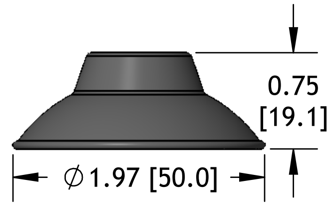


Bottom View
All Flat Cups have cleats.

Flat-Concave Vacuum Cups

	Cup Material		Cup Fitting		Filter	
XP-FC50	A		-14F		-FD	
	A	Ameriflex	(Blank)	None	(Blank)	None
	N	Nitrile	See cup fittings for available threads.		-FD	PE Filter Disc
					-FS	SS Filter Screen
					See cup fittings for availability.	

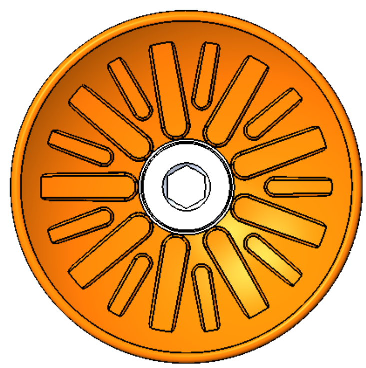
²All figures for shear load are 18"Hg. using a 0.5 coefficient of friction. Adjust coefficient of friction to suit your conditions, then apply a generous factor of safety (3:1 or greater) to shear loads.



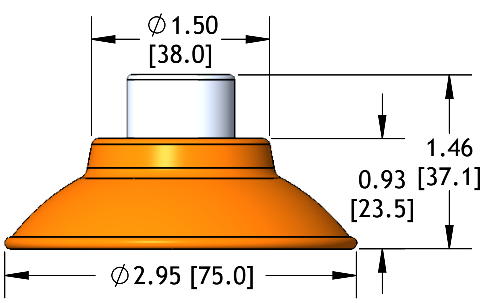
Cup Diameter: in [mm]	50 mm
Thru Hole: in [mm]	0.36 [9.1]
Stroke: in [mm]	0.25 [6.4]
Cup Weight: oz [g]	0.30 [7.9]
Internal Volume: cu in [cc]	0.70 [11.5]
Force @ 6 inHG: lb [n]	7.80 [34.7]
Force @ 18 inHG: lb [n]	19.00 [84.5]
Minimum Radius: in [mm]	2.09 [53.1]
Shear Load²: lb [n]	10.00 [44.5]

	Cup Material		-	Fitting	
XP-FC75	S		-	38F	
	N	Nitrile		38F	3/8-18 NPSF Female
	S	Silicone		G38M	G 3/8-19 Male

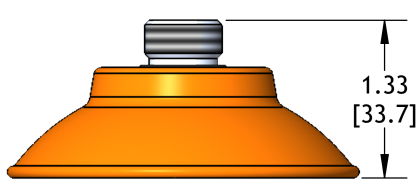
²All figures for shear load are 18"Hg. using a 0.5 coefficient of friction. Adjust coefficient of friction to suit your conditions, then apply a generous factor of safety (3:1 or greater) to shear loads.



Bottom View
Concave cleats on bottom.
8 mm Hex Socket



XP-FC75-38F



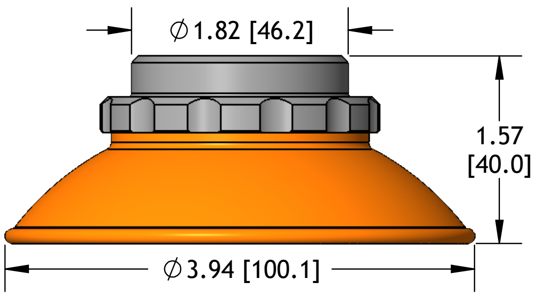
XP-FC75-G38M

Cup Diameter: in [mm]	75 mm
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 Load²: lb [n]	45.00 [200.0]

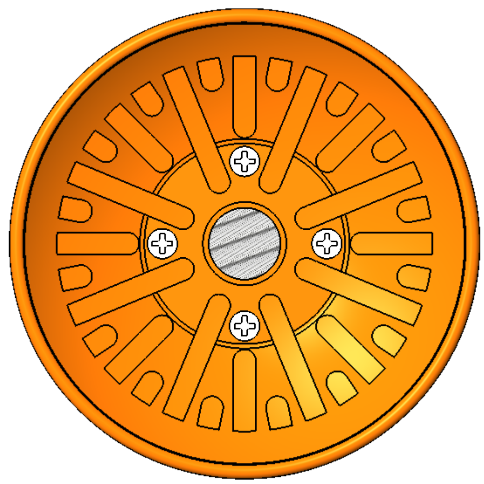
Flat-Concave Vacuum Cups

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

[2]All figures for shear load are 18"Hg. 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.



Cup Diameter: in [mm]	100 mm
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[2]: lb [n]	53.00 [236.0]

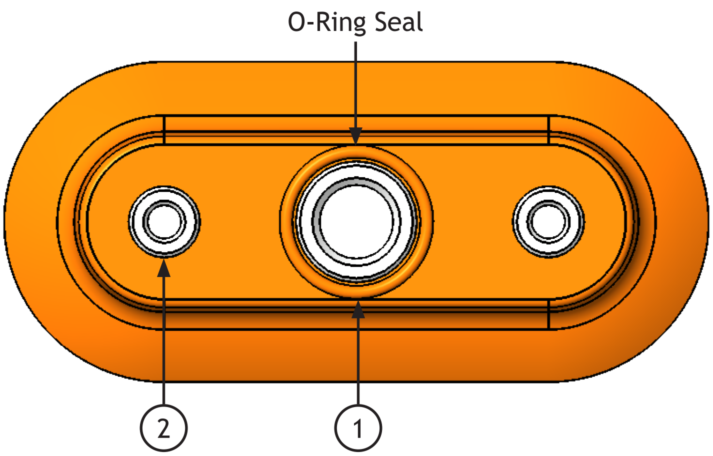


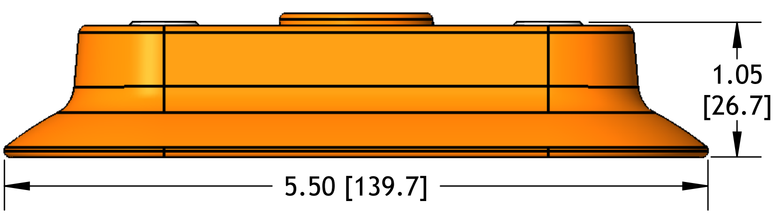
Bottom View
Concave cleats on bottom.

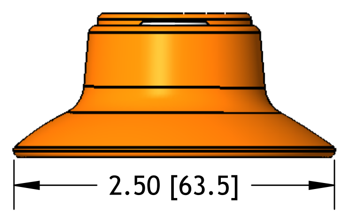
Oval Vacuum Cups

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

[2]All figures for shear load are 18"Hg. 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.

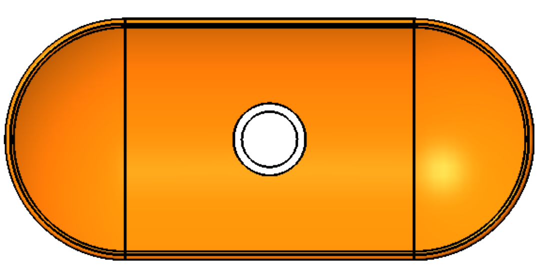




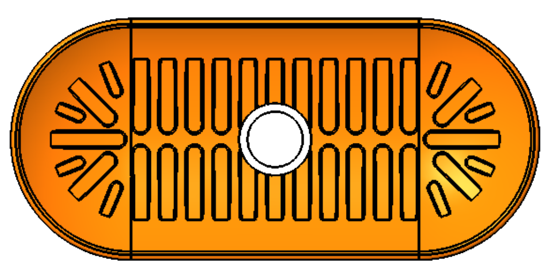


	OC	OF
Cup Dimensions: in [mm]	60 mm X 140 mm	
Stroke: in [mm]	0.29 [7.4]	0.18 [4.6]
Cup Weight: oz [g]	4.10 [116.0]	4.20 [119.0]
Internal Volume: cu in [cc]	3.20 [52.4]	3.00 [49.2]
Force @ 6 inHG: lb [n]	29.00 [129.0]	
Force @ 18 inHG: lb [n]	83.00 [369.0]	
Minimum Radius: in [mm]	1.50 [38.1]	3.00 [76.2]
Shear Load[2]: lb [n]	41.00 [182.0]	

Code	Function	NPTF	G
1	Vacuum Port	3/8-18 NPTF	G 3/8-19
2	Mounting Holes	5/16-18 UNC	M8X1.25



OC-60X140

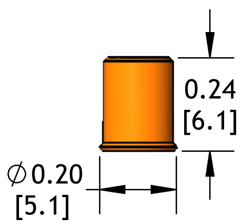


OF-60X140

Universal Vacuum Cups

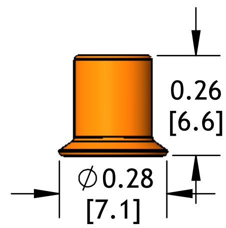
	Cup Size		Cup Material[1]		Cup Fitting		Filter	
XP-U	8		S		-10M			
	4	Ø 4 mm	N	Nitrile	(Blank)	None	(Blank)	None
	6	Ø 6 mm	S	Silicone	See cup fittings for available threads.		-FD	PE Filter Disc
	8	Ø 8 mm	V	Viton[2]			-FS	SS Filter Screen
	10	Ø 10 mm					See cup fittings for availability.	
	15	Ø 15 mm						

[1]All cups are available in Nitrile and Silicone. Check availability for other materials before ordering.
[2]Not available for XP-U15.



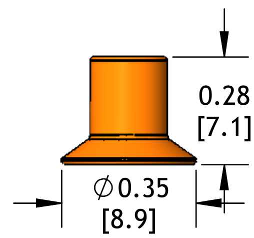
XP-U4

Cup Diameter: in [mm]	4 mm
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]



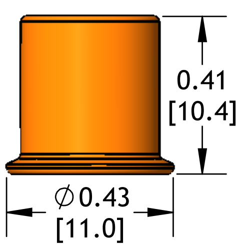
XP-U6

Cup Diameter: in [mm]	6 mm
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]



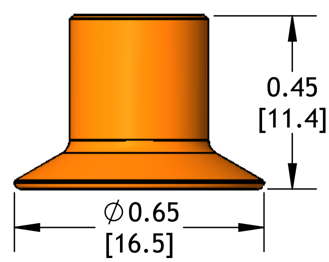
XP-U8

Cup Diameter: in [mm]	8 mm
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
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]



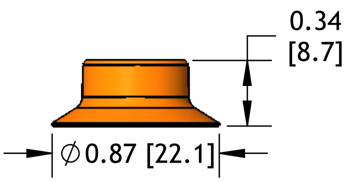
XP-U15

Cup Diameter: in [mm]	15 mm
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

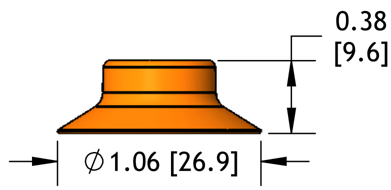
	Cup Size		Cup Material[1]		Cup Fitting		Filter	
XP-U	25		N		-14M		-FS	
	20	Ø 20 mm	N	Nitrile	(Blank)	None	(Blank)	None
	25	Ø 25 mm	S	Silicone	See cup fittings for available threads.		-FD	PE Filter Disc
	30	Ø 30 mm					-FS	SS Filter Screen
	40	Ø 40 mm					See cup fittings for availability.	
	50	Ø 50 mm						

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



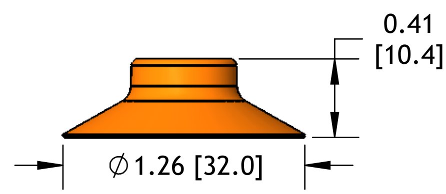
XP-U20

Cup Diameter: in [mm]	20 mm
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]



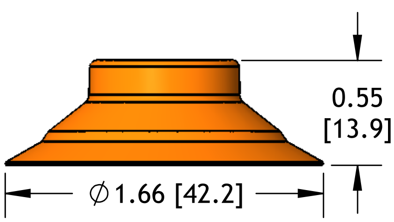
XP-U25

Cup Diameter: in [mm]	25 mm
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]



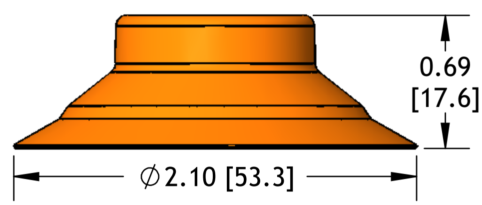
XP-U30

Cup Diameter: in [mm]	30 mm
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
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]

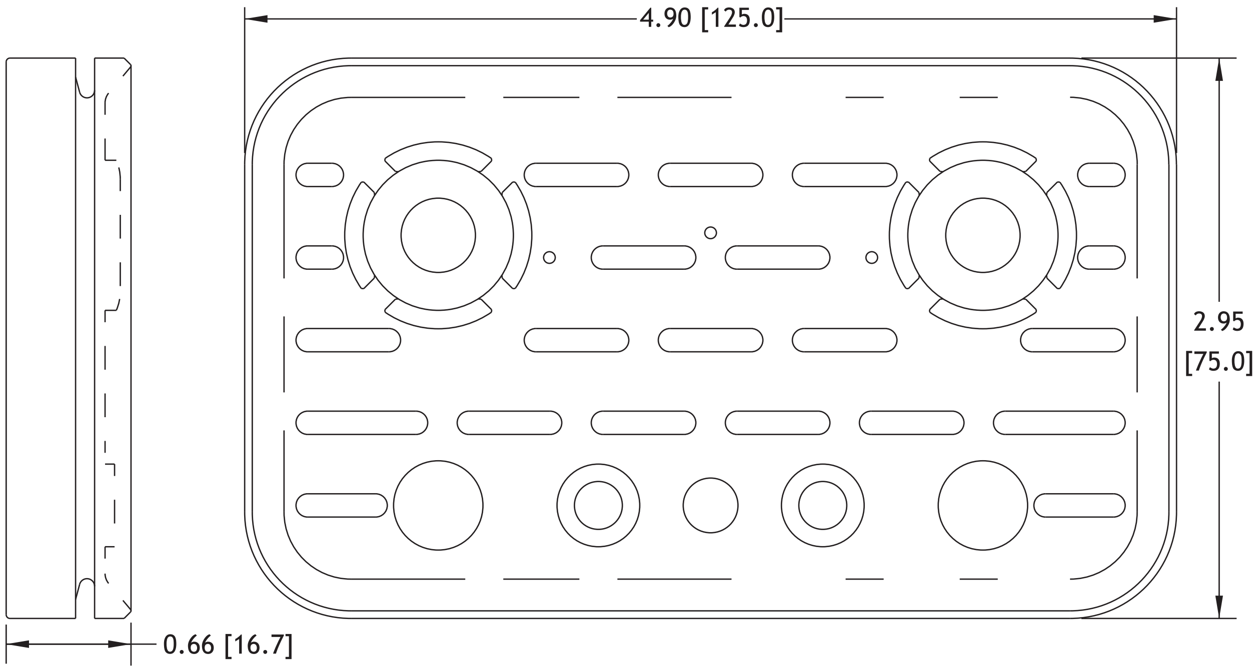


XP-U50

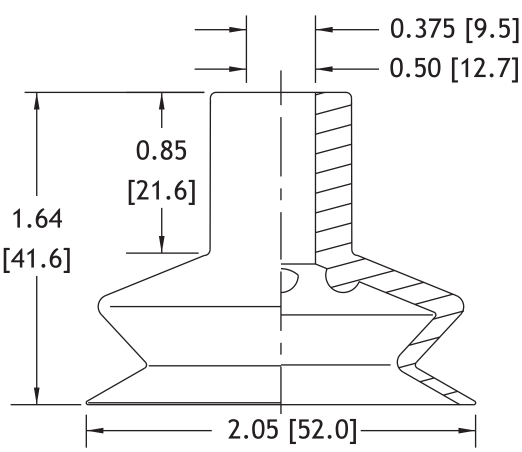
Cup Diameter: in [mm]	50 mm
Thru Hole: in [mm]	0.36 [9.1]
Stroke: in [mm]	0.24 [6.1]
Cup Weight: oz [g]	0.35 [9.9]
Internal Volume: cu in [cc]	0.73 [12.0]
Force @ 6 inHG: lb [n]	7.90 [35.1]
Force @ 18 inHG: lb [n]	16.40 [73.0]
Minimum Radius: in [mm]	1.38 [35.1]

Specialty Vacuum Cups

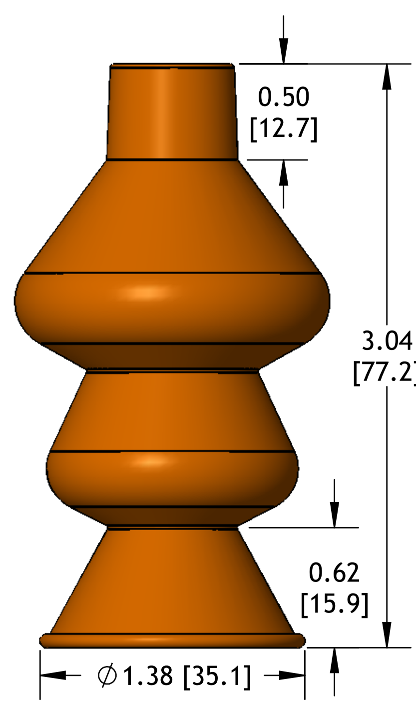
11-0079N
Nitrile Wood Working Clamp Pad
Replaces # 4-011-11-0079



V32-38B
Blue PVC Bellows Cup, 3/8 Stem
Replaces VC-32



EC34S-30R
Egg Cup



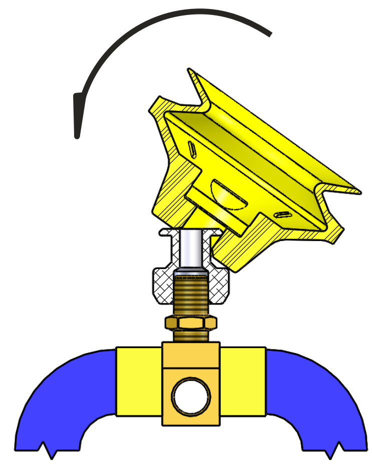
Vacuum Cup Fitting Assembly

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

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

Elastomer Selection

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 (N)
For general-purpose, normal ambient temperature applications.

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.

[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 denatured alcohol to wipe cups clean after installation and periodically afterward to remove airborne contaminants.

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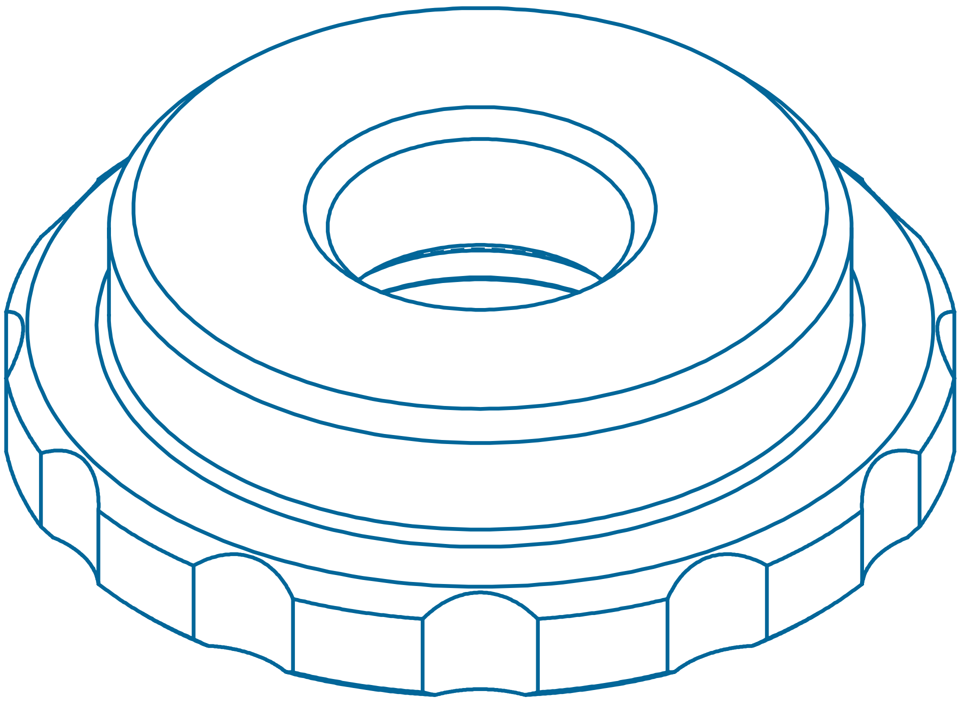
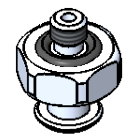
SECTION 3

VACUUM CUP FITTINGS

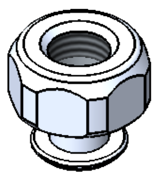


Ø 4-8 mm Cups

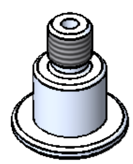
Ø 10-15 mm Cups



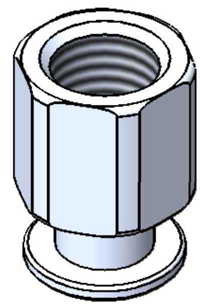
Ø 20-35 mm Cups



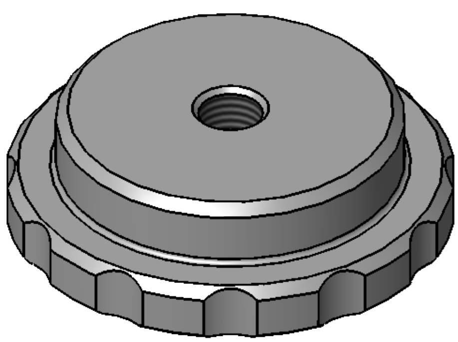
Ø 40 mm Cups



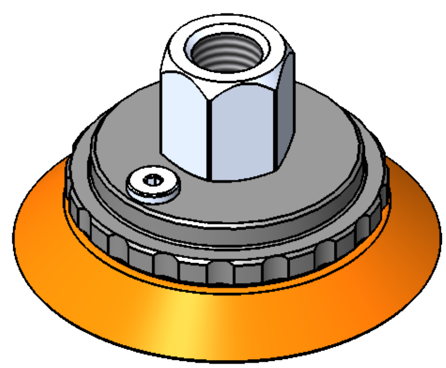
Ø 50 mm Cups



Ø 65 mm Cups

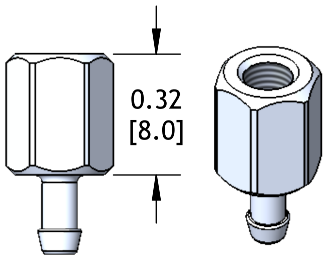


Ø 75 - 150 mm Cups



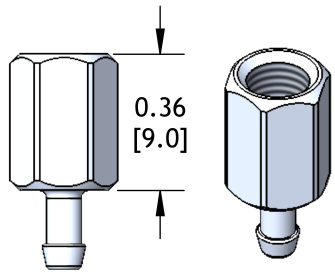
Accessories

Ø 4-8 mm Cups - Standard



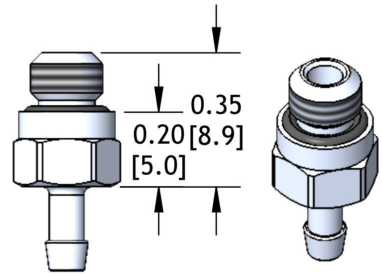
8-4F

Assembly Suffix:	-4F
Threads:	M4X0.7 Female
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]
PE Filter:	N/A
SS Filter:	N/A



8-5F

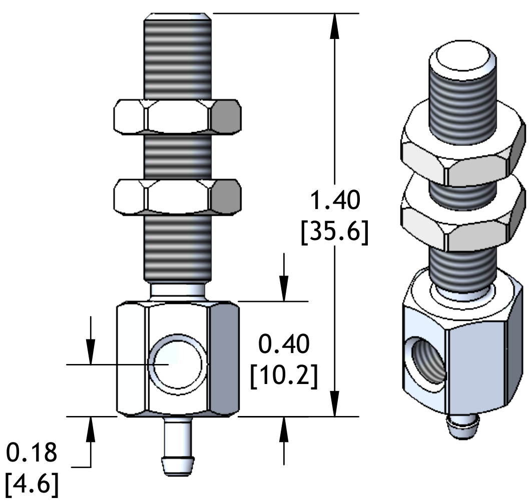
Assembly Suffix:	-5F
Threads:	M5X0.8 Female
Thread Depth: in [mm]	0.25 [6.4]
Weight: oz [g]	0.04 [1.1]
Thru Hole: in [mm]	0.06 [1.5]
Hex Size: in [mm]	0.31 [8.0]
PE Filter:	N/A
SS Filter:	N/A



8-10M

Assembly Suffix:	-10M
Threads:	10-32 Male
Weight: oz [g]	0.08 [2.3]
Thru Hole: in [mm]	0.06 [1.4]
Hex Size: in [mm]	0.25 [6.4]
PE Filter:	N/A
SS Filter:	N/A

Ø 4-8 mm Cups - Side Vacuum Port w/ Male Post

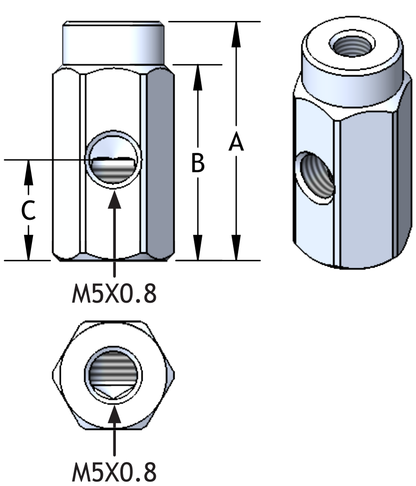


8-S5F-6M

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]
PE Filter:	N/A
SS Filter:	N/A

JN-M6X1.0 - Jam Nut - 2 Included

Ø 4-8 mm Cups - Side Vacuum Port w/ Female Port



Technical Data

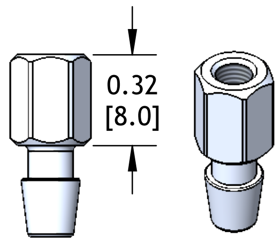
Fitting	Assembly Suffix	Weight oz [g]	Hex Size in [mm]	PE Filter	SS Filter
5F-S5F-4F	-S5F-4F	0.13 [3.7]	0.38 [9.5]	N/A	N/A
5F-S5F-5F	-S5F-5F	0.13 [3.7]	0.38 [9.5]	N/A	N/A
5F-S5F-6F	-S5F-8F	0.18 [5.0]	0.44 [11.1]	N/A	N/A

Dimensions

Fitting	A in [mm]	B in [mm]	C in [mm]	Thread	Thread Depth in [mm]
5F-S5F-4F	0.83 [21.0]	0.68 [17.3]	0.35 [8.9]	M4X0.7	0.22 [5.6]
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]

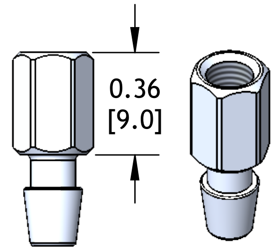
For use with 8-10M and 10-10M fittings.

Ø 10-15 mm Cups - Standard



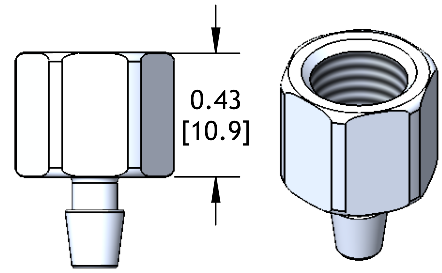
10-4F

Assembly Suffix:	-4F
Threads:	M4X0.7 Female
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]
PE Filter:	N/A
SS Filter:	N/A



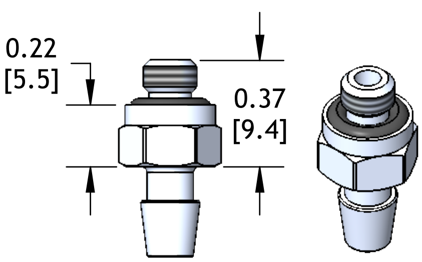
10-5F

Assembly Suffix:	-5F
Threads:	M5X0.8 Female
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]
PE Filter:	N/A
SS Filter:	N/A



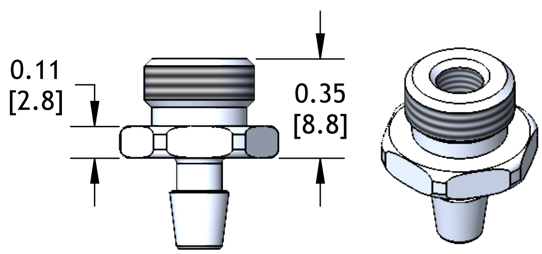
10-18F

Assembly Suffix:	-10M
Threads:	G 1/8-27 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]
PE Filter:	FD339
SS Filter:	FS350



10-10M

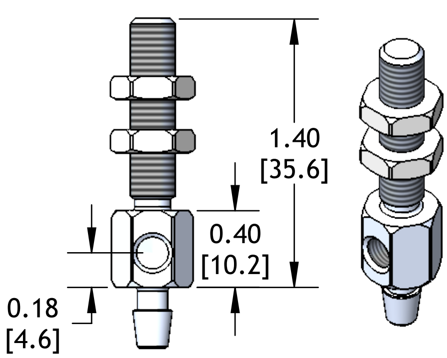
Assembly Suffix:	-10M
Threads:	10-32 Male
Weight: oz [g]	0.10 [2.8]
Thru Hole: in [mm]	0.10 [2.5]
Hex Size: in [mm]	0.31 [8.0]
PE Filter:	N/A
SS Filter:	N/A



10-18M

Assembly Suffix:	-18M
Male Threads:	G 1/8-28 Male
Female Threads:	M5X0.8 Female
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]
PE Filter:	N/A
SS Filter:	N/A

Ø 10-15 mm Cups - Side Vacuum Port w/ Male Post

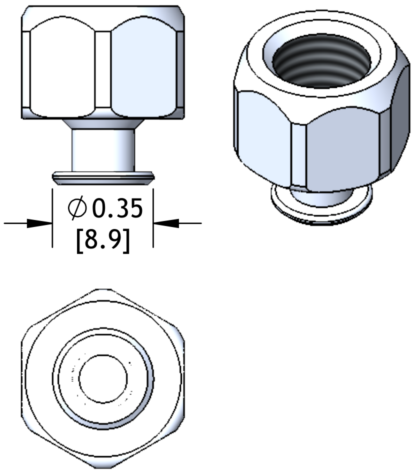


10-S5F-6M

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]
PE Filter:	N/A
SS Filter:	N/A

JN-M6X1.0 - Jam Nut - 2 Included

Ø 20-35 mm Cups - Female



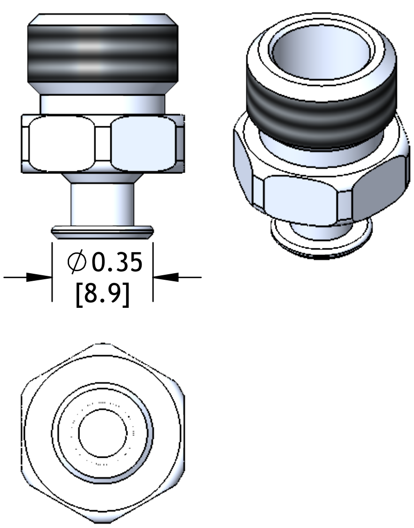
Technical Data

Fitting	Assembly Suffix	Weight oz [g]	PE Filter	SS Filter
32-5F	-5F	0.09 [2.6]	N/A	N/A
32-6F	-6F	0.23 [6.5]	N/A	N/A
32-8F	-8F	0.20 [5.7]	N/A	N/A
32-18F	-18F	0.12 [3.4]	FD339	FS350
32-G14F	-G14F	0.26 [7.3]	N/A	FS500

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 Cups - Male



Technical Data

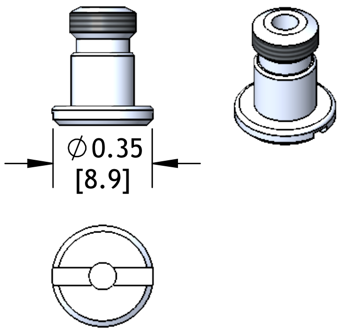
Fitting	Assembly Suffix	Weight oz [g]	PE Filter	SS Filter
32-5M	-5M	0.09 [2.6]	N/A	N/A
32-6M	-6M	0.11 [3.2]	N/A	N/A
32-8M	-8M	0.12 [3.4]	N/A	N/A
32-18M[1]	-18M	0.08 [2.3]	N/A	FS285
32-14M	-14M	0.18 [5.1]	N/A	FS350
32-G14M	-G14M	0.16 [4.5]	N/A	FS350

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]

[1]32-18M also has M5X0.8 Female threads 0.22 [5.7] deep.

Ø 20-35 mm Cups - Male Stud



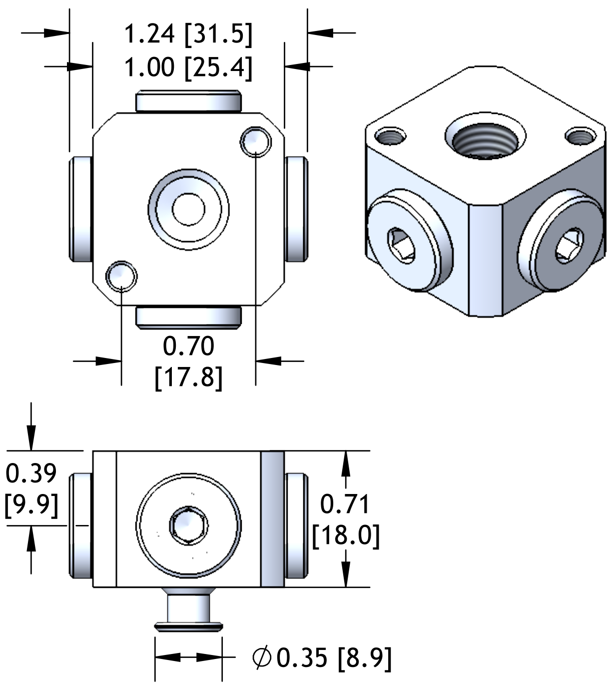
Technical Data

Fitting	Assembly Suffix	Weight oz [g]	PE Filter	SS Filter
32-6MS	-6MS	0.02 [0.7]	N/A	N/A
32-10MS	-10MS	0.02 [0.7]	N/A	N/A

Dimensions

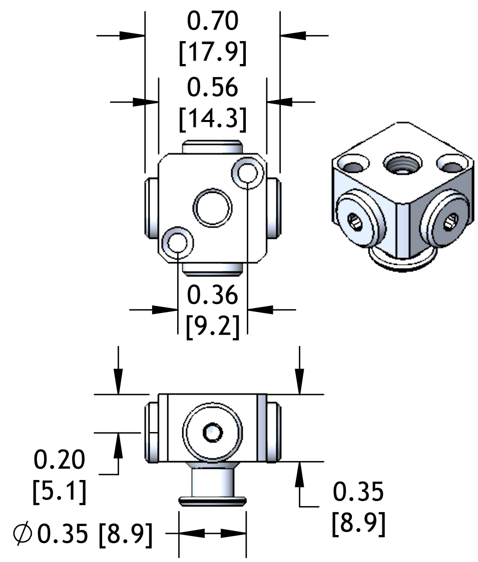
Fitting	Slot Width in [mm]	Thru Hole in [mm]	Thread	Thread Length in [mm]	Total Height in [mm]
32-6MS	0.06 [1.5]	0.09 [2.3]	M6X1.0	0.16 [4.1]	0.41 [10.4]
32-10MS	0.06 [1.5]	0.09 [2.3]	10-32	0.16 [4.1]	0.41 [10.4]

Ø 20-35 mm Cups - Cross Fittings



32-5X18F

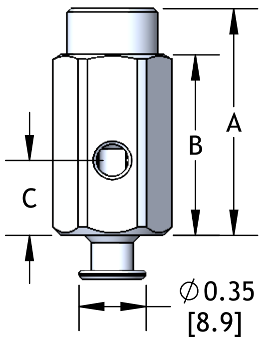
Assembly Suffix:	-5X18F
Threads:	G 1/8 NPSF (5)
Mount Threads:	M4X0.7 (2)
Weight: oz [g]	1.00 [28.3]
Thru Hole: in [mm]	0.17 [4.2]
PE Filter:	N/A
SS Filter:	N/A

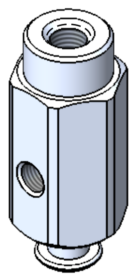


32-5X5F

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]
PE Filter:	N/A
SS Filter:	N/A

Ø 20-35 mm Cups - M5 Female Side Vacuum Port w/ Female Mount





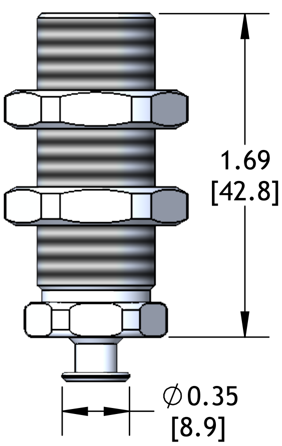
Technical Data

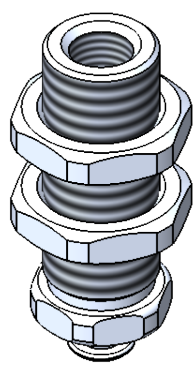
Fitting	Assembly Suffix	Weight oz [g]	Hex Size in [mm]	PE Filter	SS Filter
32-S5F-5F	-S5F-5F	0.34 [9.6]	0.56 [14.3]	N/A	N/A
32-S5F-6F	-S5F-6F	0.43 [12.8]	0.56 [14.3]	N/A	N/A
32-S5F-8F	-S5F-8F	0.41 [11.0]	0.56 [14.3]	N/A	N/A

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 Cups - Tool Mount



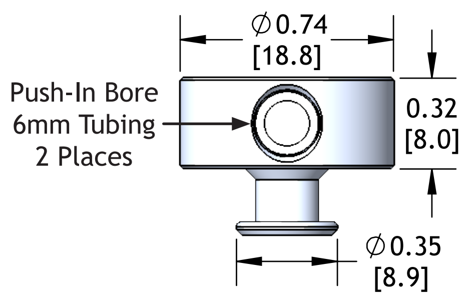


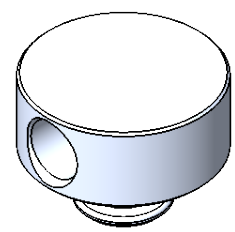
32-18FX40

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]
PE Filter:	FD339
SS Filter:	FS350

JN-M16X1 - Jam Nut - 2 Included

Ø 20-35 mm Cups - Die Cutting

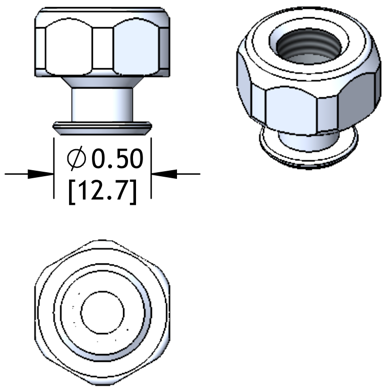




32-DC75X31

Assembly Suffix:	-DC75X31
Weight: oz [g]	0.18 [5.2]
Thru Hole: in [mm]	0.16 [4.1]
PE Filter:	N/A
SS Filter:	N/A

Ø 40 mm Cups - Female



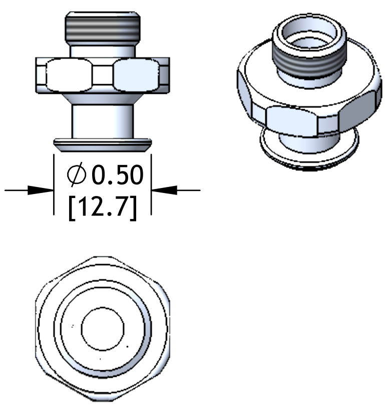
Technical Data

Fitting	Assembly Suffix	Weight oz [g]	PE Filter	SS Filter
40-6F	-6F	0.38 [10.8]	N/A	N/A
40-8F	-8F	0.34 [9.6]	N/A	N/A
40-18F	-18F	0.20 [5.7]	FD339	FS350
40-38F	-38F	0.46 [13.2]	N/A	N/A
40-G14F	-G14F	0.26 [7.3]	N/A	FS500

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 Cups - Male



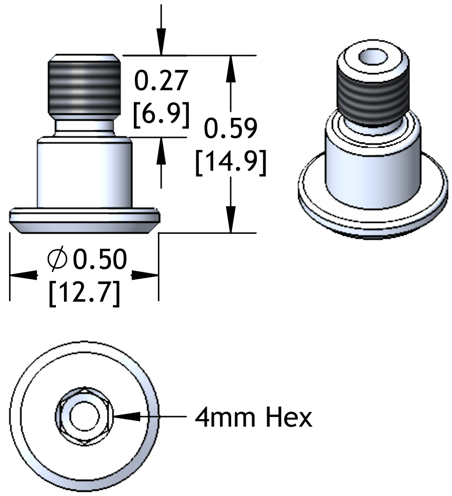
Technical Data

Fitting	Assembly Suffix	Weight oz [g]	PE Filter	SS Filter
40-6M	-6M	0.38 [10.8]	N/A	N/A
40-8M	-8M	0.19 [5.4]	N/A	N/A
40-18M	-18M	0.16 [4.5]	N/A	FS285
40-14M	-14M	0.19 [5.4]	N/A	FS350
40-38M	-38M	0.27 [7.7]	N/A	FS350
40-G14M	-G14M	0.21 [5.9]	N/A	FS350
40-G38M	-G38M	0.27 [7.7]	N/A	FS350

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]

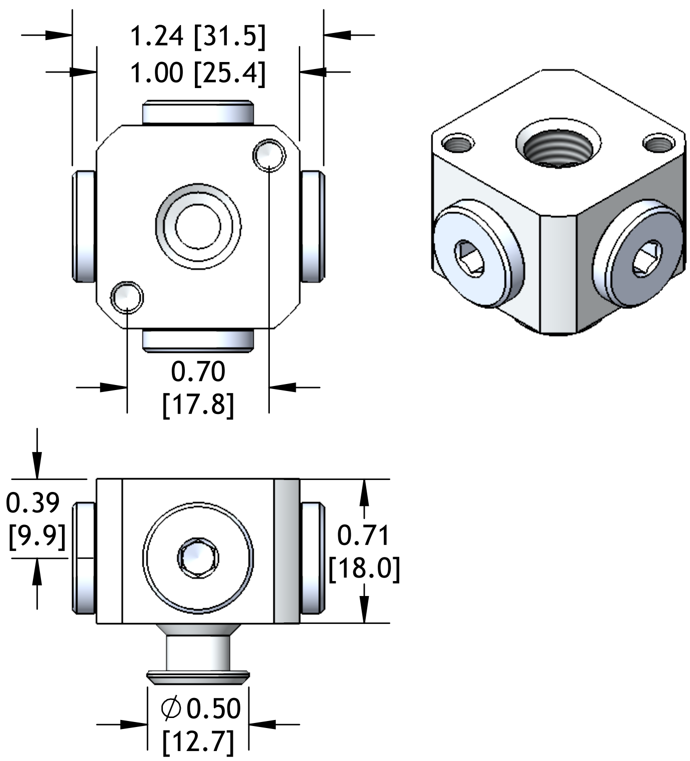
Ø 40 mm Cups - Male Stud

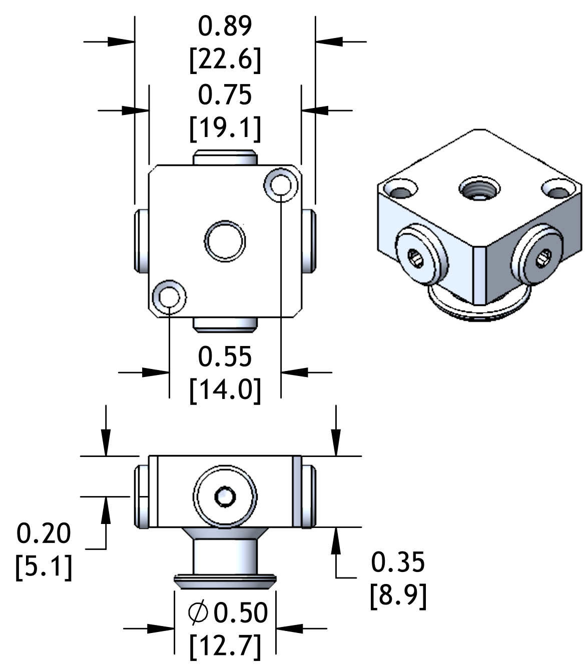


40-6MS

Assembly Suffix:	-6MS
Thread:	M6X1.0
Weight: oz [g]	0.07 [1.9]
Thru Hole: in [mm]	0.09 [2.4]
PE Filter:	N/A
SS Filter:	N/A

Ø 40 mm Cups - Cross Fittings





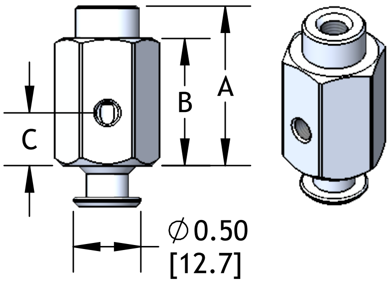
40-5X18F

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]
PE Filter:	N/A
SS Filter:	N/A

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]
PE Filter:	N/A
SS Filter:	N/A

Ø 40 mm Cups - M5 Female Side Vacuum w/ Female Port



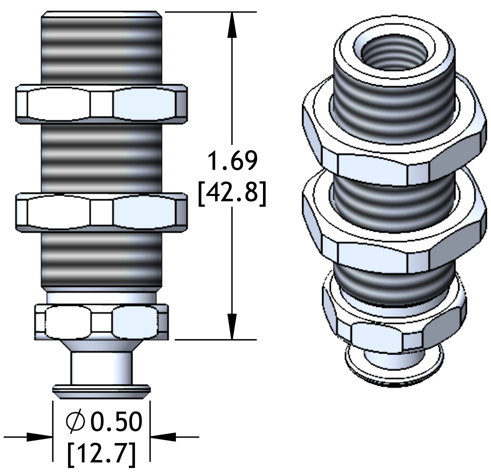
Technical Data

Fitting	Assembly Suffix	Weight oz [g]	Hex Size in [mm]	PE Filter	SS Filter
40-S5F-6F	-S5F-6F	0.69 [19.6]	0.69 [17.5]	N/A	N/A
40-S5F-8F	-S5F-8F	0.63 [17.9]	0.69 [17.5]	N/A	N/A

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 Cups - Tool Mount

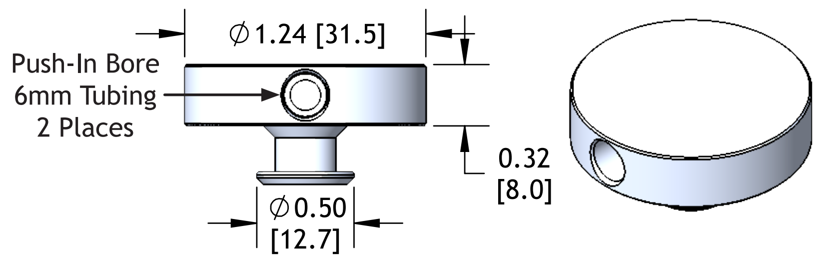


40-18FX40

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]
PE Filter:	FD339
SS Filter:	FS350

JN-M16X1 - Jam Nut - 2 Included

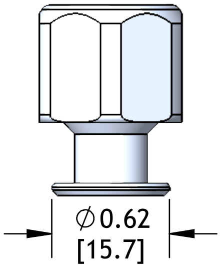
Ø 40 mm Cups - Die Cutting

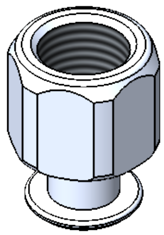


40-DC125X31

Assembly Suffix:	-DC125X31
Weight: oz [g]	0.58 [16.3]
Thru Hole: in [mm]	0.16 [4.0]
PE Filter:	N/A
SS Filter:	N/A

Ø 50 mm Cups - Female





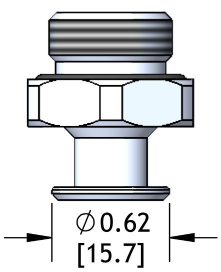
Technical Data

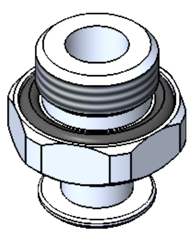
Fitting	Assembly Suffix	Weight oz [g]	PE Filter	SS Filter
50-6F	-6F	0.42 [11.9]	N/A	N/A
50-8F	-8F	0.38 [10.8]	N/A	N/A
50-18F	-18F	0.23 [6.5]	FD339	FS350
50-14F	-14F	0.36 [10.2]	FD500	FS500
50-38F	-38F	0.51 [14.5]	N/A	N/A
50-G14F	-G14F	0.37 [10.5]	FD500	FS500

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 Cups - Male





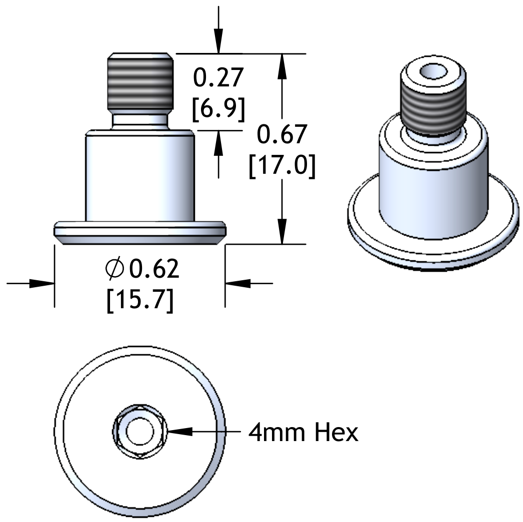
Technical Data

Fitting	Assembly Suffix	Weight oz [g]	PE Filter	SS Filter
50-6M	-6M	0.23 [6.5]	N/A	N/A
50-8M	-8M	0.23 [6.5]	N/A	N/A
50-18M	-18M	0.20 [5.7]	N/A	FS285
50-14M	-14M	0.23 [6.5]	N/A	FS350
50-38M	-38M	0.31 [8.8]	N/A	FS350
50-G14M	-G14M	0.25 [7.1]	N/A	FS350
50-G38M	-G38M	0.31 [8.8]	N/A	FS350
50-N18M	-N18M	0.20 [5.7]	N/A	FS285

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]

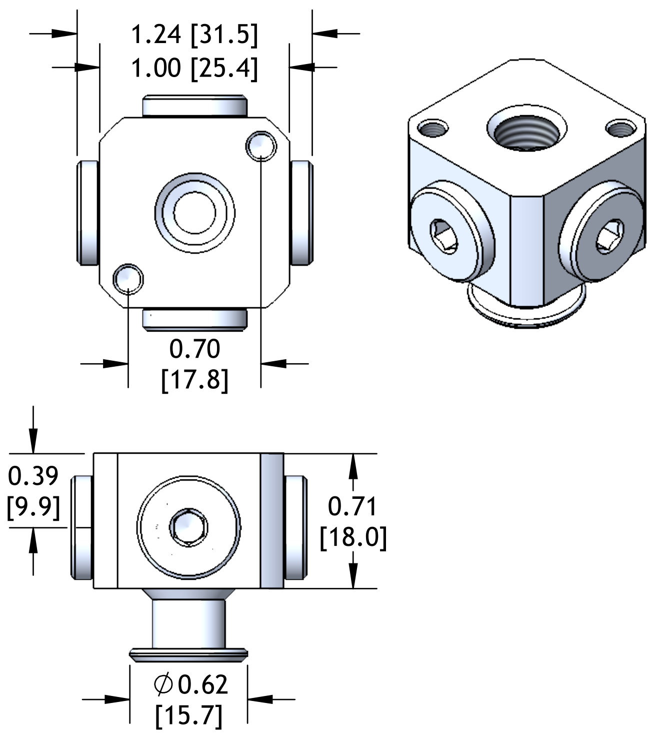
Ø 50 mm Cups - Male Stud

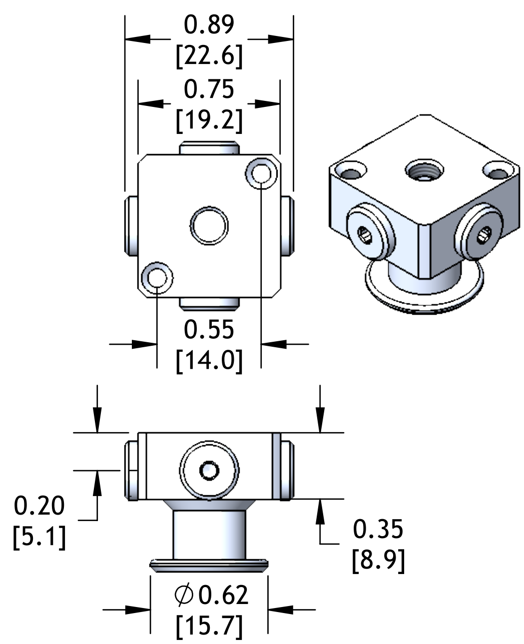


50-6MS

Assembly Suffix:	-6MS
Thread:	M6X1.0
Weight: oz [g]	0.12 [3.4]
Thru Hole: in [mm]	0.02 [2.5]
PE Filter:	N/A
SS Filter:	N/A

Ø 50 mm Cups - Cross Fittings





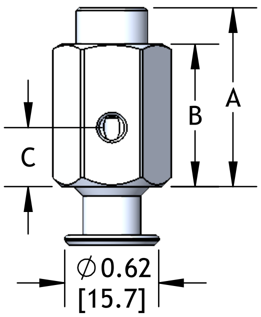
50-5X18F

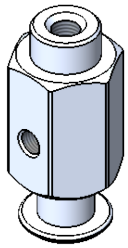
Assembly Suffix:	-5X18F
Threads:	G 1/8 NPSF (5)
Mount Threads:	M4X0.7 (2)
Weight: oz [g]	1.00 [29.7]
Thru Hole: in [mm]	0.22 [5.6]
PE Filter:	N/A
SS Filter:	N/A

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]
PE Filter:	N/A
SS Filter:	N/A

Ø 50 mm Cups - M5 Female Side Vacuum w/ Female Port





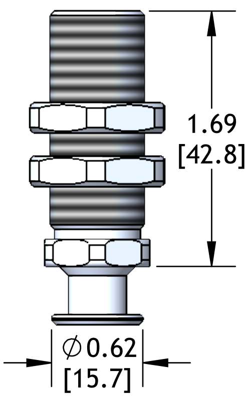
Technical Data

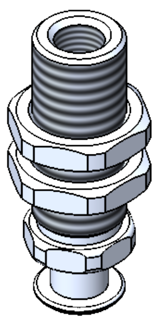
Fitting	Assembly Suffix	Weight oz [g]	Hex Size in [mm]	PE Filter	SS Filter
50-S5F-6F	-S5F-6F	0.74 [21.0]	0.69 [17.5]	N/A	N/A
50-S5F-8F	-S5F-8F	0.68 [19.3]	0.69 [17.5]	N/A	N/A

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 Cups - Tool Mount



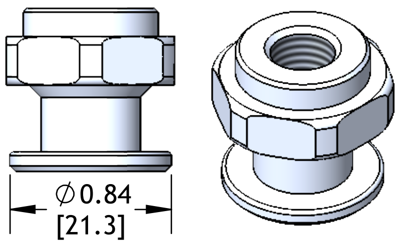


50-18FX40

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]
PE Filter:	FD339
SS Filter:	FS350

JN-M16X1 - Jam Nut - 2 Included

Ø 65 mm Cups - Female



Technical Data

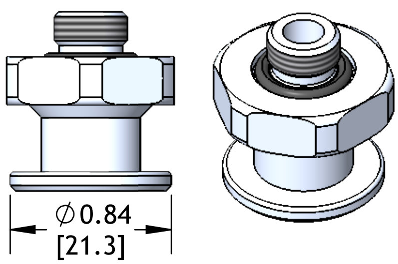
Fitting	Assembly Suffix	Weight oz [g]	PE Filter	SS Filter
65-18F	-18F	0.43 [12.2]	FD339	FS350
65-38F	-38F	0.66 [18.6]	N/A	N/A
65-G14F	-G14F	0.45 [12.7]	N/A	FS500

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 Cups - Male



Technical Data

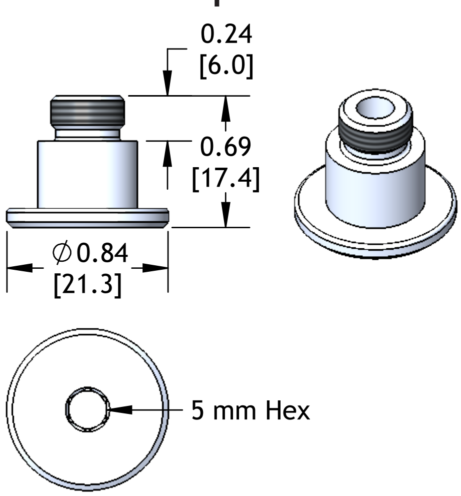
Fitting	Assembly Suffix	Weight oz [g]	PE Filter	SS Filter
65-18M	-18M	0.43 [12.3]	N/A	FS385
65-14M	-14M	0.45 [12.7]	N/A	FS350
65-38M	-38M	0.45 [12.7]	N/A	FS350
65-G14M	-G14M	0.45 [12.7]	N/A	FS350
65-G38M	-G38M	0.45 [12.7]	N/A	FS350

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

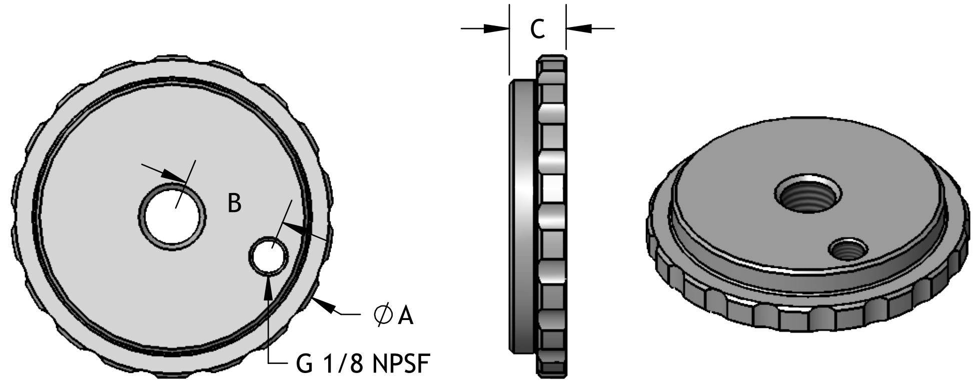
Ø 65 mm Cups - Male Stud



65-18MS

Assembly Suffix:	-18MS
Thread:	G 1/8 NPSF
Weight: oz [g]	0.21 [5.9]
Thru Hole: in [mm]	0.2 [5.0]
PE Filter:	N/A
SS Filter:	N/A

Ø 75 - 150 mm Cups



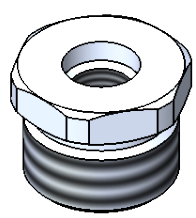
Fitting	Assembly Suffix	Weight oz [g]	A in [mm]	B in [mm]	C in [mm]	Thread	Filter PE	Filter SS
75-18F	-18F	2.80 [79.4]	2.36 [60.0]	N/A	0.68 [17.3]	G 1/8 NPSF	N/A	FS25
75-14F	-14F	2.70 [76.5]	2.36 [60.0]	N/A	0.68 [17.3]	1/4 NPSF	N/A	FS25
75-G14F	-G14F	2.70 [76.5]	2.36 [60.0]	N/A	0.68 [17.3]	G 1/4	N/A	FS25
75-38F	-38F	2.70 [76.5]	2.36 [60.0]	N/A	0.68 [17.3]	3/8 NPSF	N/A	FS25
75-G38F	-G38F	2.70 [76.5]	2.36 [60.0]	N/A	0.68 [17.3]	G 3/8	N/A	FS25
75-12F	-12F	2.60 [73.7]	2.36 [60.0]	N/A	0.68 [17.3]	G 1/2 NPSF	N/A	FS25
110-38F	-38F	5.10 [145.0]	3.35 [85.1]	1.10 [27.9]	0.59 [15.0]	3/8 NPSF	N/A	FS30
110-12F	-12F	5.10 [145.0]	3.35 [85.1]	1.10 [27.9]	0.59 [15.0]	G 1/2 NPSF	N/A	FS30
150-38F	-38F	8.50 [241.0]	4.72 [120.0]	1.38 [25.0]	0.56 [14.2]	3/8 NPSF	N/A	FS30
150-12F	-12F	8.50 [241.0]	4.72 [120.0]	1.38 [25.0]	0.56 [14.2]	G 1/2 NPSF	N/A	FS30

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

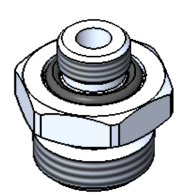
For use with 75-12F, 110-12F, and 150-12F fittings.

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]



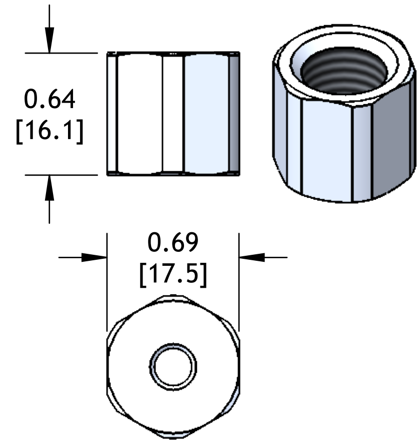
Cup Fitting Adapters

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



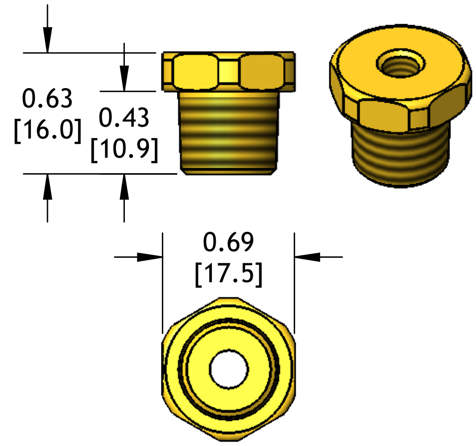
Male Stud Adapters

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



6F-G14F

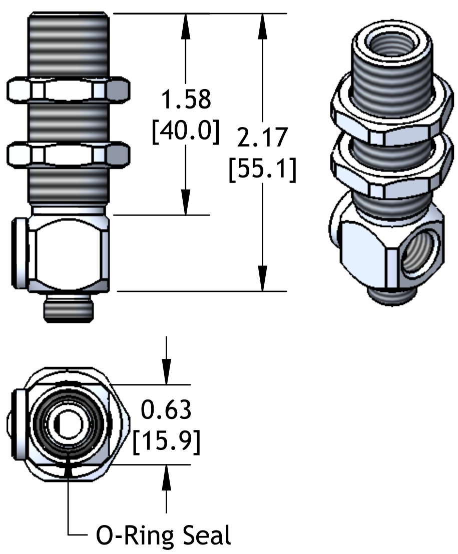
Thread 1:	G 1/4
Thread 2:	M6X1.0
Weight: oz [g]	0.28 [7.9]
PE Filter:	N/A
SS Filter:	N/A



6F-14M

Thread 1:	1/4 NPTF
Thread 2:	M6X1.0
Weight: oz [g]	0.68 [19.3]
PE Filter:	N/A
SS Filter:	N/A

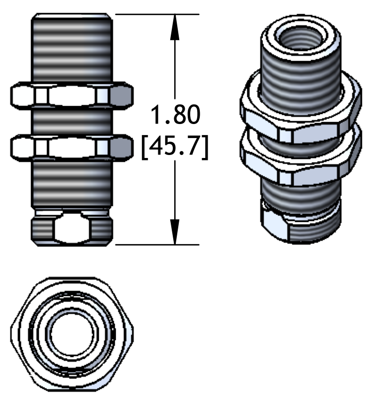
Tool Mount Adapters



TT18-16X40

Port Threads:	G 1/8 NPSF (3)
Post Threads:	M16X1.0
Connection Threads:	G 1/8 NPS
Weight: oz [g]	1.10 [31.2]
PE Filter:	N/A
SS Filter:	N/A

JN-M16X1 - Jam Nut - 2 Included

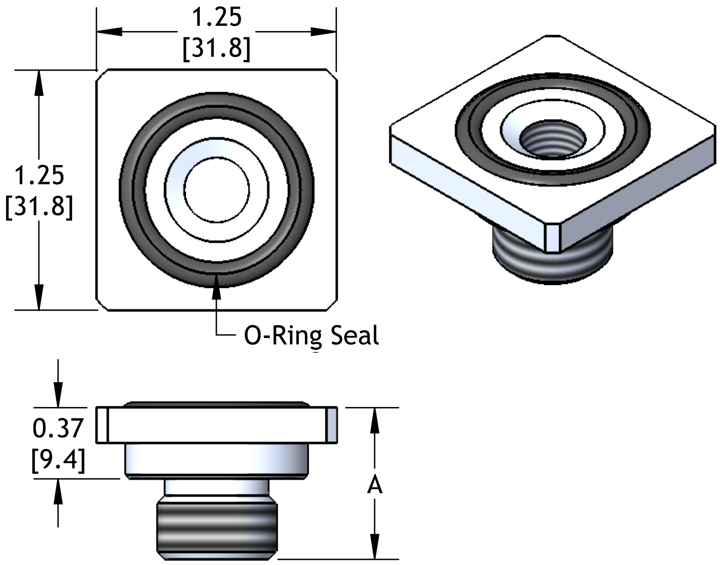


18F-16X40

Port Threads:	G 1/8 NPSF
Post Threads:	M16X1.0
Weight: oz [g]	1.10 [31.2]
PE Filter:	N/A
SS Filter:	N/A

JN-M16X1 - Jam Nut - 2 Included

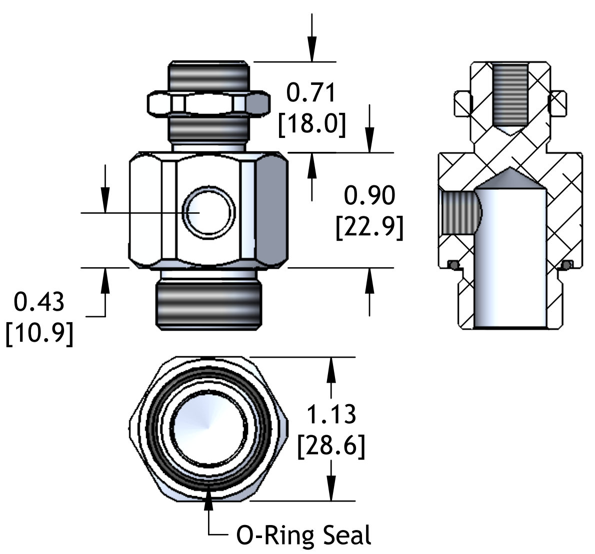
T-Slot Adapters

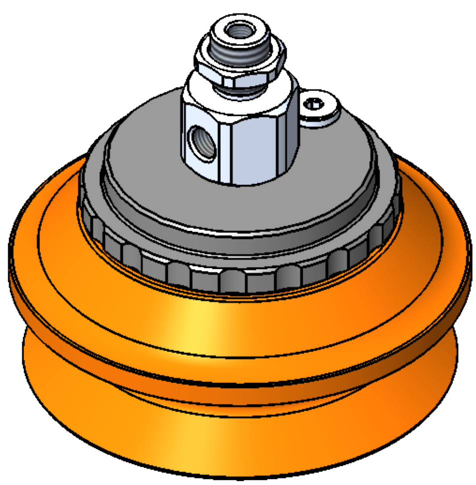


Adapter	A in [mm]	Thread	Weight oz [g]
TSA-18M	0.61 [15.5]	G 1/8 NPS	0.75 [21.3]
TSA-38M	0.79 [20.0]	3/8 NPSF	0.68 [19.3]
TSA-12M	0.79 [20.0]	G 1/2 NPS	0.59 [16.7]

Side Vacuum Port Adapter

For use with 75-12F, 110-12F, and 150-12F fittings.
JN-M16X1 Jam Nut (1) 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]

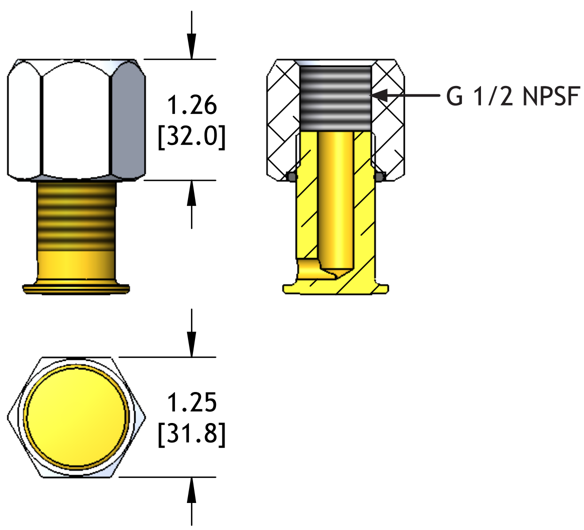
SS-12 - Sheet Separator

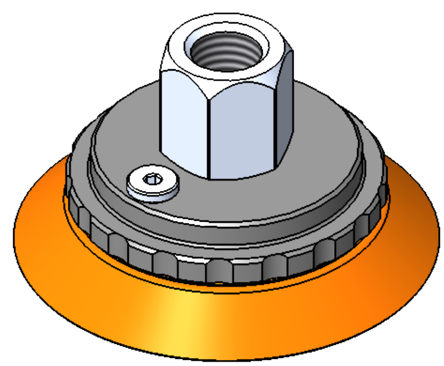
Sheet Separators can be ordered on their own to add to your cup by using the SS-12 part number. To order a sheet separator with a cup already attached, use the chart below. Sheet Separators are compatible with XP-F110 and XP-F150 cups using 12F fittings.

	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	

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.

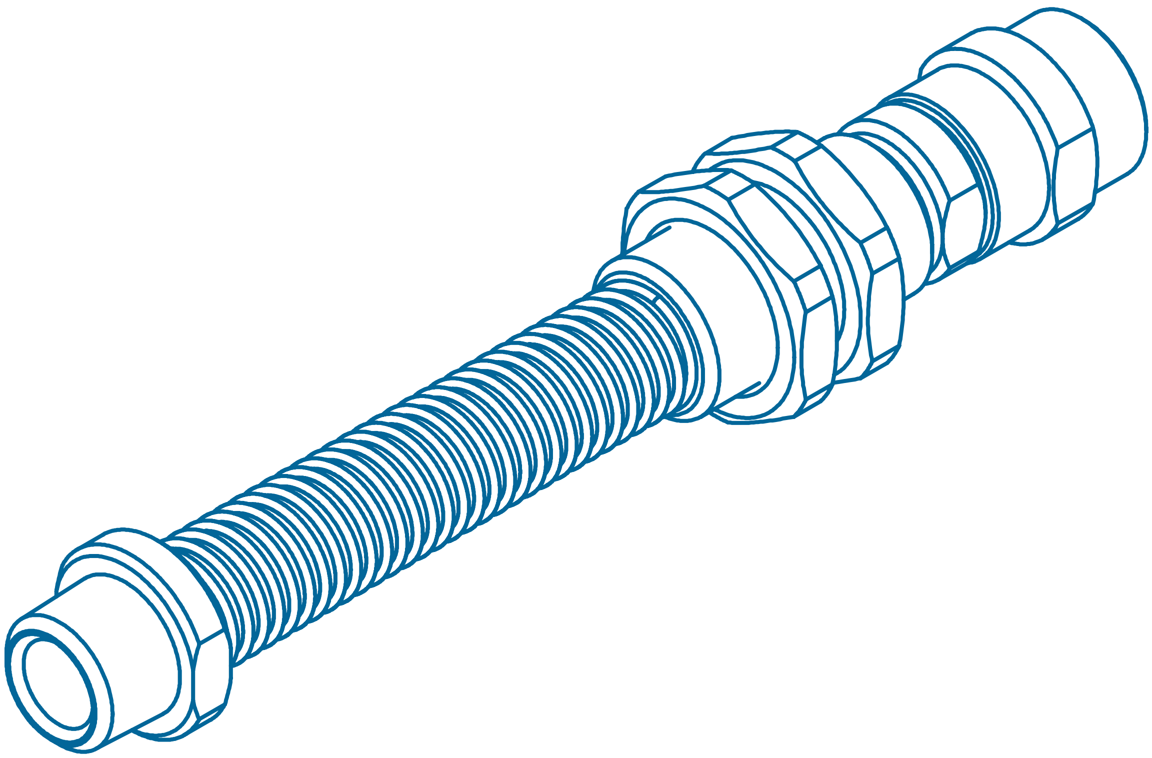
Depending on the size and thickness of sheet material, more units may be required. The degree of the warp can be adjusted by changing the projection distance of the center post from the cup cleats or the amount of vacuum applied to the vacuum cup. A 150 mm size cup produces a very large force and should only be used with thicker materials to prevent marking the product.



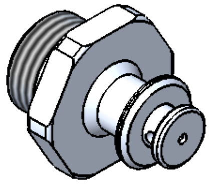


SECTION 4

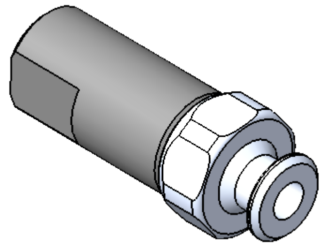
CUP ACCESSORIES



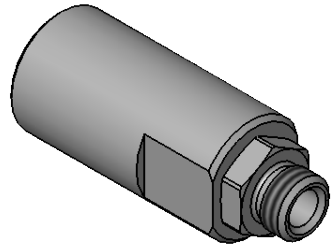
EDCO USA®



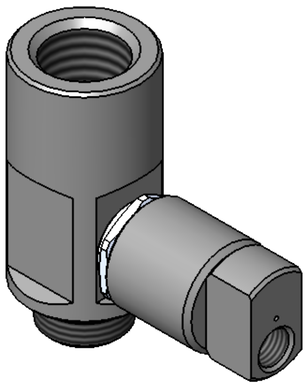
Dual-Flow Valves



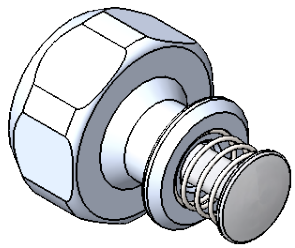
Tri-Flow Valves



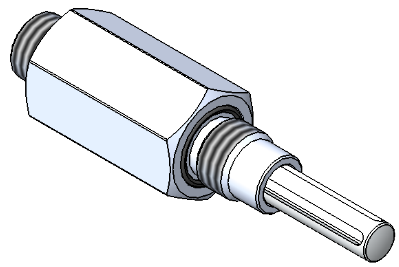
Flow-Sensor-Valves



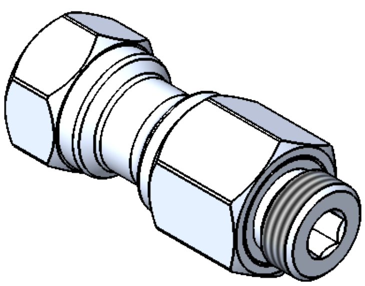
Check Valves



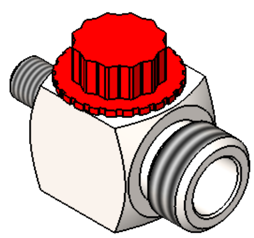
Cone Valves



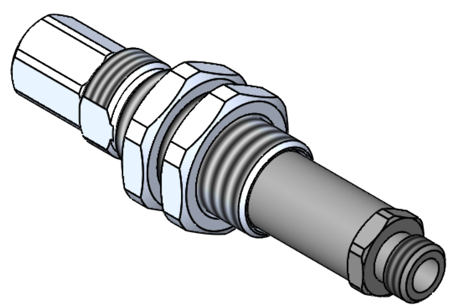
Mechanical Valves



Swivel Joints



Tee Adapters



Level Compensators

UPDATED 02/25/19

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

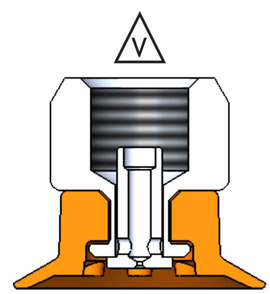
Dual-Flow Fitting	Assembly Suffix	Weight oz [g]	Flow & 18 inHg [81 kPa] SCFM [Nl/m]	Connection Threads
50-18FDF	-18FDF	0.25 [7.1]	0.60 [17.0]	G 1/8 NPS (F)
50-18MDF	-18MDF	0.20 [5.7]	0.60 [17.0]	G 1/8 NPS (M)
50-14MDF	-14MDF	0.25 [7.1]	0.60 [17.0]	1/4 NPT (M)
50-38FDF	-38FDF	0.51 [14.5]	0.60 [17.0]	3/8 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

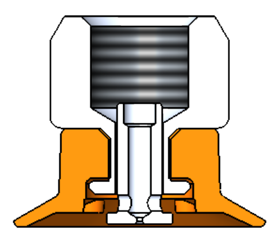
Using the tables, determine the orifice flow at your system's maximum vacuum operating level. Multiply this by the maximum number of non-sealing cups in the system. Select a pump that will give this total flow-rate at the system vacuum level with an additional factor of safety.

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.

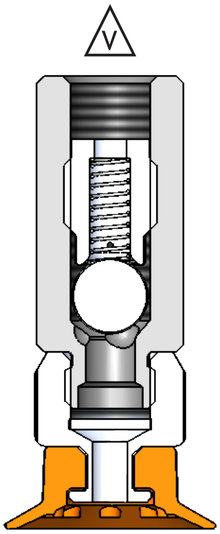


Orifice Flow

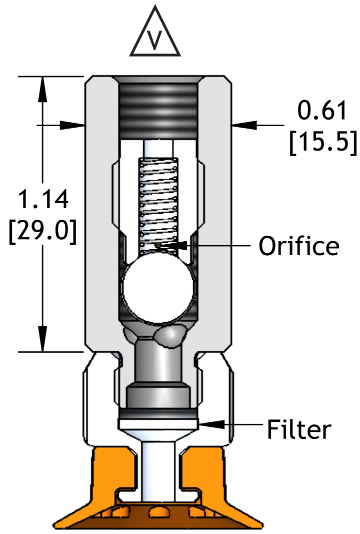


Reverse Flow

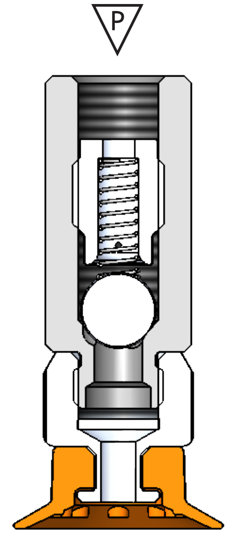
Tri-Flow Valves



Fully Open
0.5 SCFM Flow-Rate



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



Reverse Flow

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.)

Tri-Flow Valve In-line	Weight oz [g]	Tri-Flow Valve w/ Cup Fitting	Weight oz [g]	Flow @ 18 inHg	Closing Flow
TF18F-0.4	0.43 [12.2]	32-18FTF	0.55 [15.7]	0.2 SCFM	0.4 SCFM
TF18F-0.5	0.43 [12.2]	40-18FTF	0.63 [17.2]	0.4 SCFM	0.5 SCFM
TF18F-0.6	0.43 [12.2]	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.

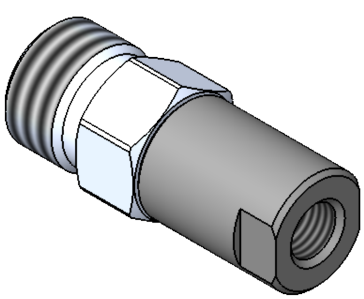
The FSV will automatically reset when the vacuum is turned off for a short period of time. If desired, a pressure pulse can be used to back flow the FSV to clean off the inlet filter. This blow-off pulse will reset the FSV and will quickly release the work piece.

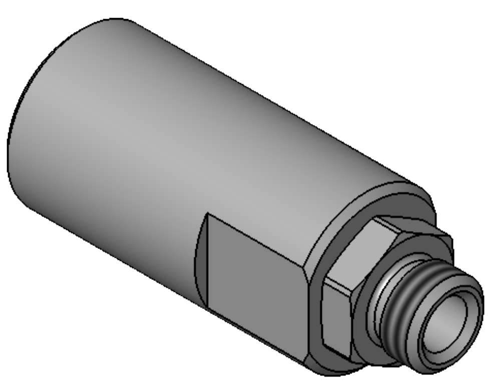
The FSVM version includes a monitor port where a vacuum sensor can be used to monitor whether the FSV is open or closed.

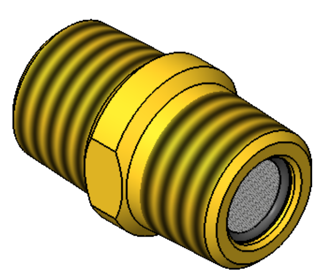
The FSV-12 is a larger 1/2” NPT version that is for use with large vacuum cups but is functionally the same as the FSV-18.

The FSV-10 is for use with 15 mm and smaller vacuum cups but is functionally the same as the FSV-18.

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



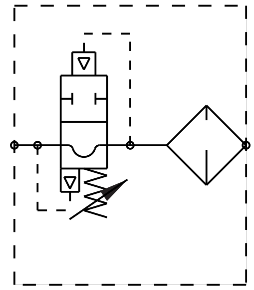


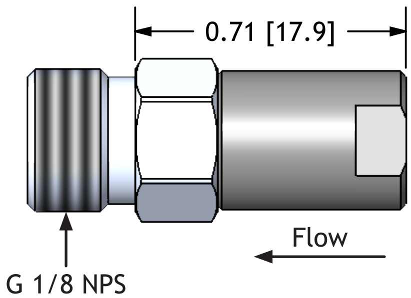


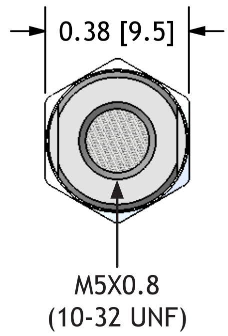
FSV-10

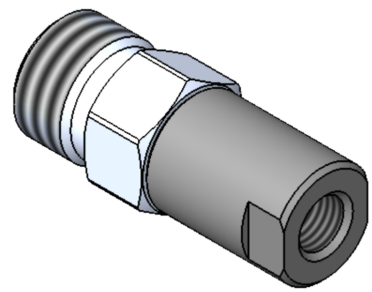
Basic Flow Sensor Valve

	Set Point[1]	Connection Type	
FSV-10-	02	-10	
	0.1 - 0.6 SCFM	(Blank)	None - M5X0.8 Female
	[1]0.1 Increments	-8	4-8 mm Cup Size
		-10	10-15 mm Cup Size
		-32MS	25-35 mm Cup Size

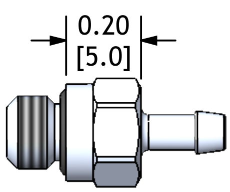




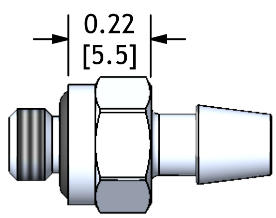




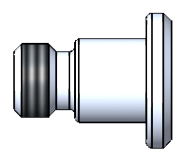
Weight: oz [g]
0.16 [4.4]



-8
8-10M Cup Fitting



-10
10-10M Cup Fitting

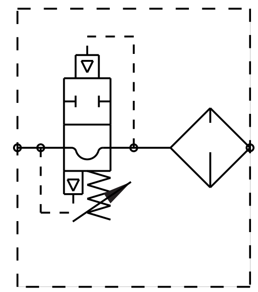


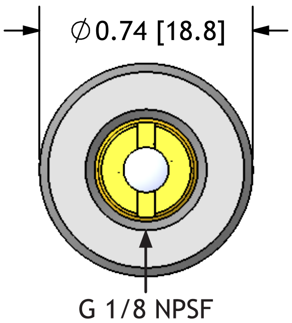
-32MS
8-10M Cup Fitting

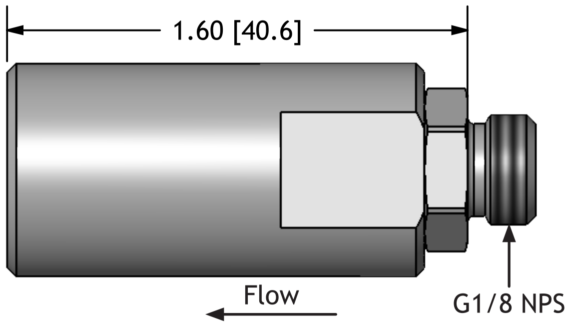
FSV-18

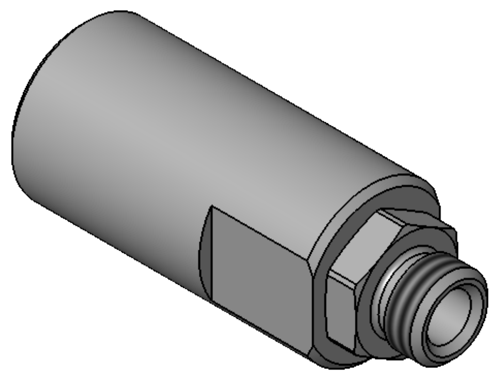
Basic Flow Sensor Valve

	Set Point[1]	Connection Type	
FSV-18-	17	-50	
	0.3 - 2.3 SCFM	(Blank)	None - M5X0.8 Female
	[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

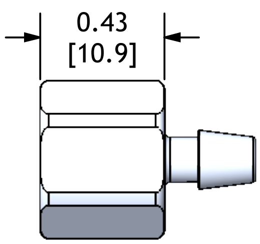




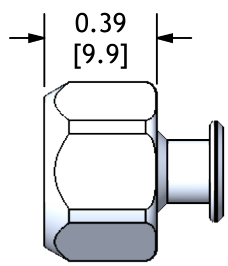




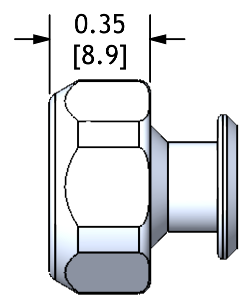
Weight: oz [g]
0.99 [28.2]



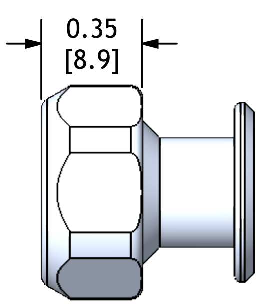
-10
10-18F Cup Fitting



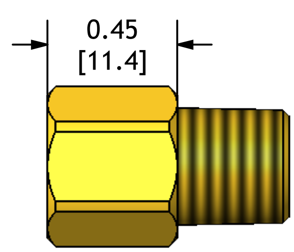
-32
32-18F Cup Fitting



-40
40-18F Cup Fitting



-50
50-18F Cup Fitting

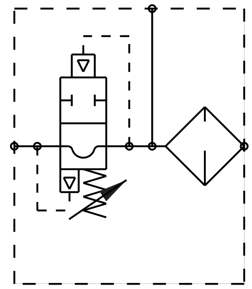


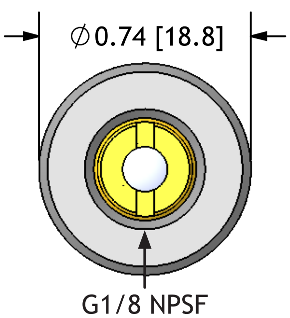
-18M
1/8 NPT Male Fitting

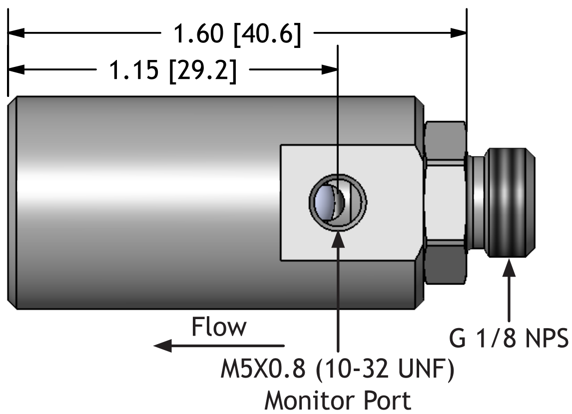
FSVM-18

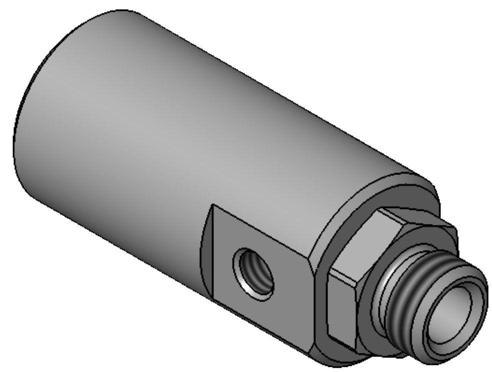
Flow Sensor Valve withing monitor port.

	Set Point[1]	Connection Type	
FSVM-18-	21	-18M	
	0.3 - 2.3 SCFM	(Blank)	None - M5X0.8 Female
	[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







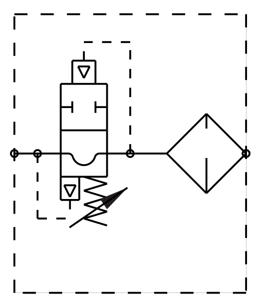


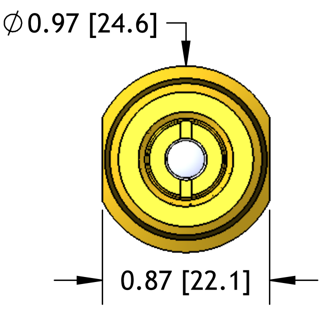
Weight: oz [g]
0.99 [28.2]

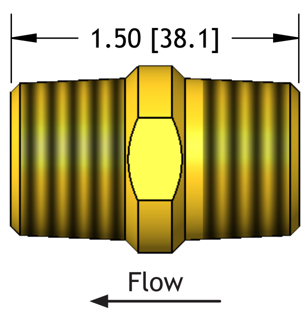
FSV-12

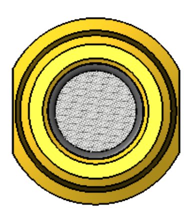
Basic Flow Sensor Valve - 1/2 NPT

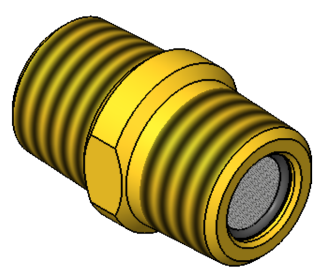
	Set Point[1]
FSV-12-	40
	0.5 - 6.0 SCFM
	[1]0.1 Increments









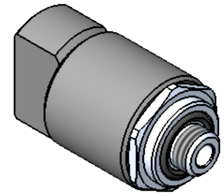


Weight: oz [g]
3.26 [92.6]

Release Check Valves

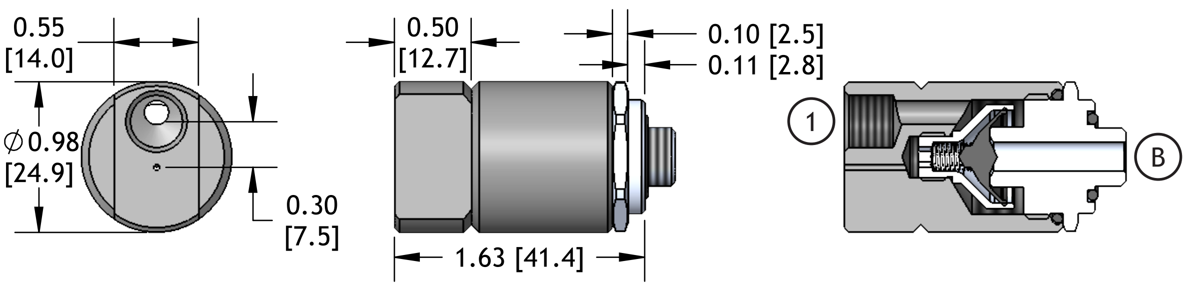
RC18A

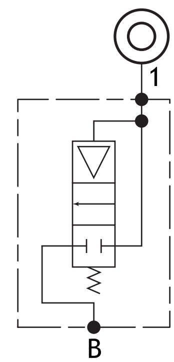
The RC18A release check valve employs a normally closed valve to seal against pump vacuum without leaking. When a compressed air supply is applied, the release valve shifts to open at only 5 psi (0.3 bar) so that a full-flow burst of air can quickly dissipate (blow-off) system vacuum (minimum 5 psi air 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.

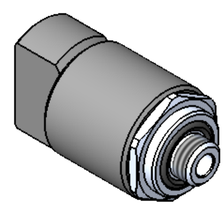




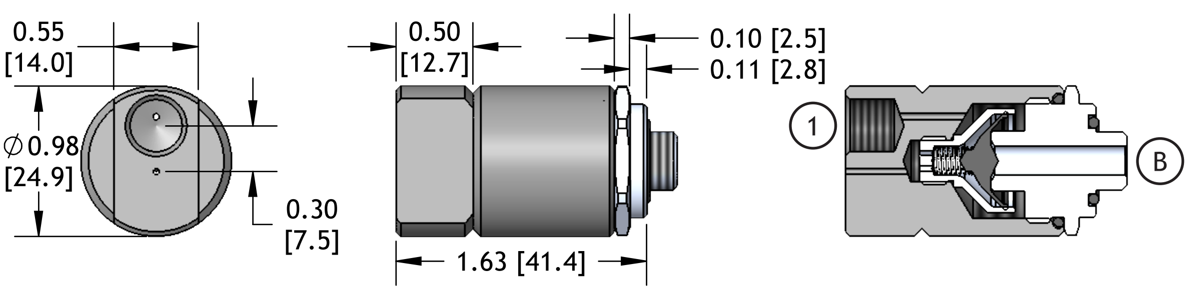
Code	Function	Ports
B	Blow-Off	G 1/8 NPSF
1	Air Supply (5 psi min)	G 1/8 NPSF

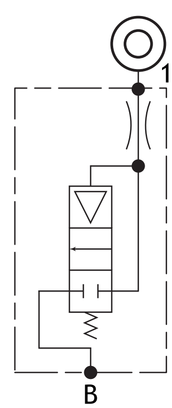
RC18-040A

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	Air Supply (5 psi min)	G 1/8 NPSF

Vacuum Check Valves

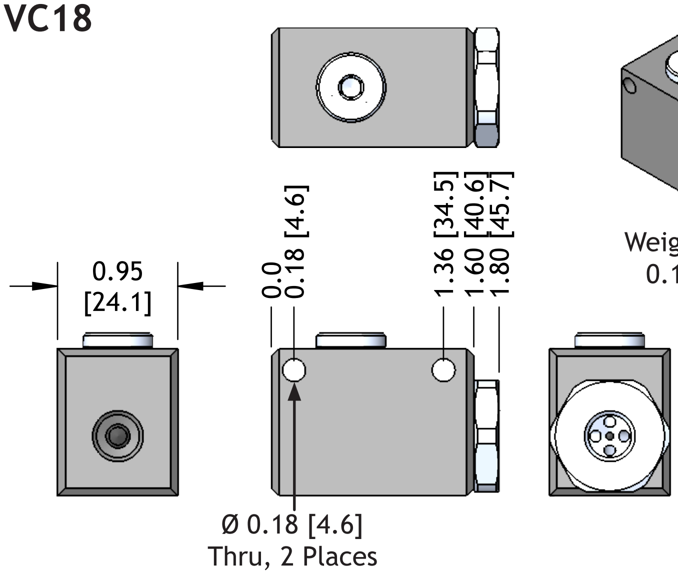
The Vacuum Check valve is designed to prevent the reverse flow of ambient air into a vacuum system. Vacuum Check valves are used to hold vacuum downstream whenever the vacuum source is removed or lost. Internally, a normally closed valve allows vacuum flow in the pump direction but seals off when vacuum 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.

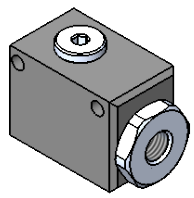
One application for the Vacuum Check valve is for energy saver circuits using a vacuum storage tank to accumulate and store vacuum for high-volume, short duration flow rate requirements.

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.

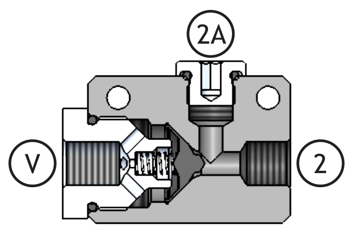
The VC18 should be used with cup diameters of 50 MM and smaller. The VC12 should be used with cup diameters of 75 MM and larger that are available with G1/2 NPS female fittings.

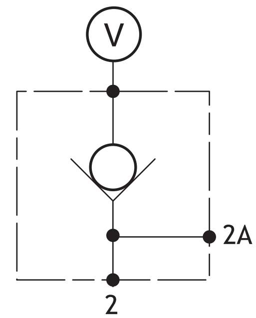
VC18





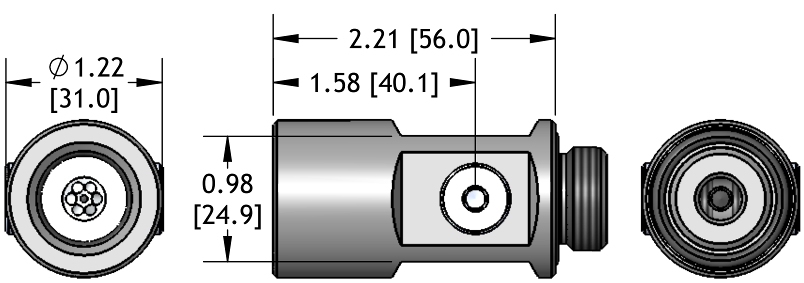
Weight: lbs [g]
0.15 [68.0]

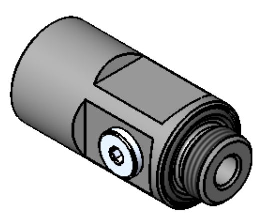




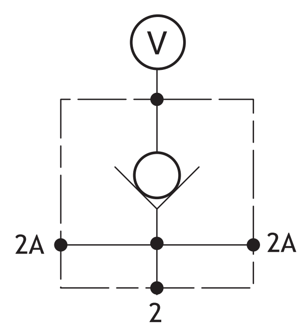
Code	Function	Ports
V	Vacuum Source	G 1/8 NPSF
2	Vacuum	G 1/8 NPSF
2A	Alternate Vacuum	G 1/8 NPSF

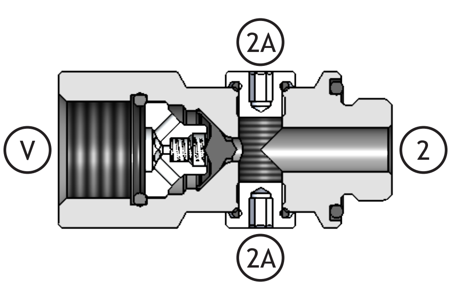
VC12





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

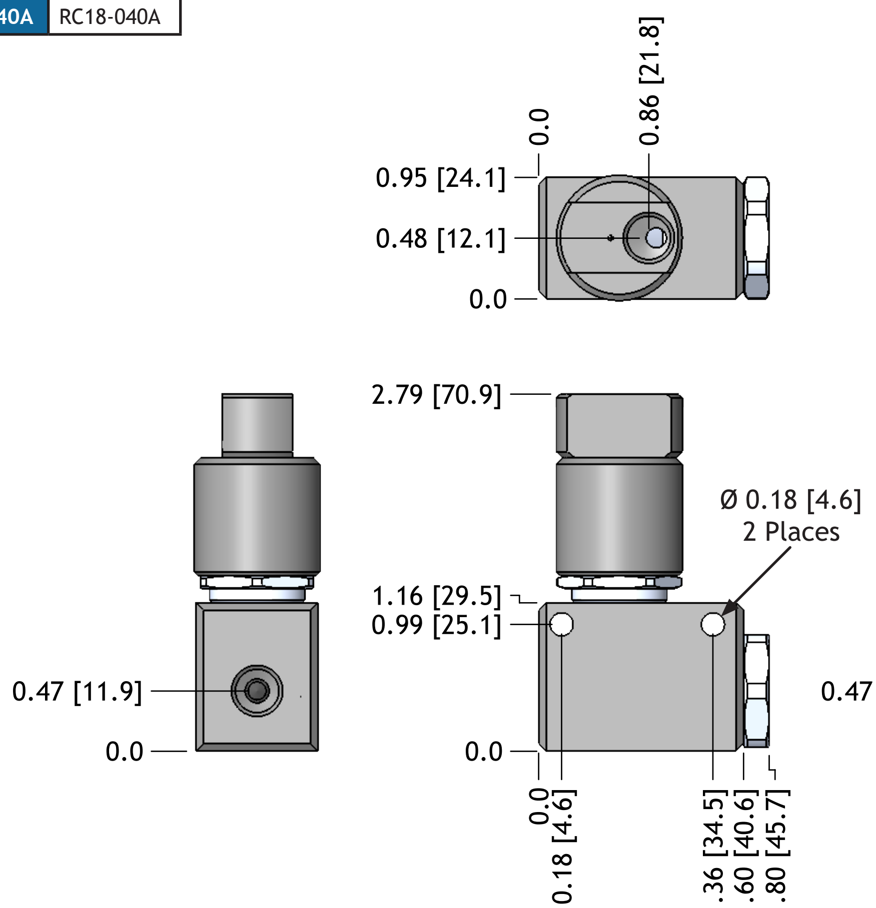
Vacuum Check Valves w/ Release Check Valve

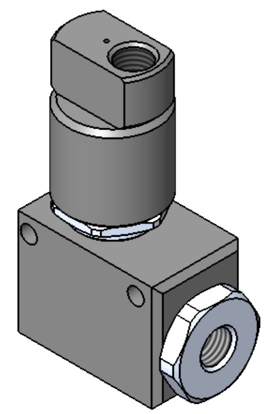
The vacuum check valve with release check valve is used with a single vacuum cup so a non-porous, high value work piece won't be immediately dropped if the system vacuum source is lost. The vacuum trapped by the vacuum check valve will eventually leak down. The rate at which the vacuum diminishes will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

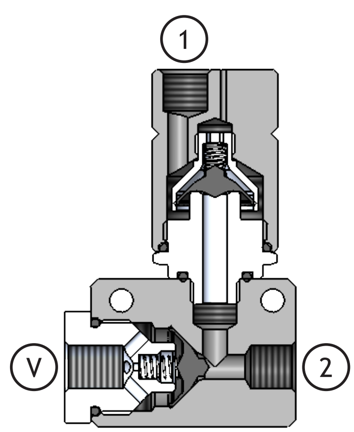
		Release Check Valve
VC18-		RCA
	RCA	RC18A
	RC040A	RC18-040A

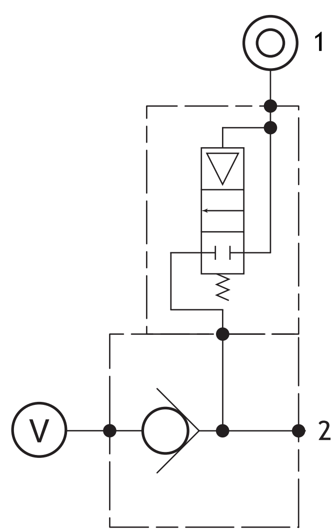




Weight: lbs [g]
0.28 [126.0]

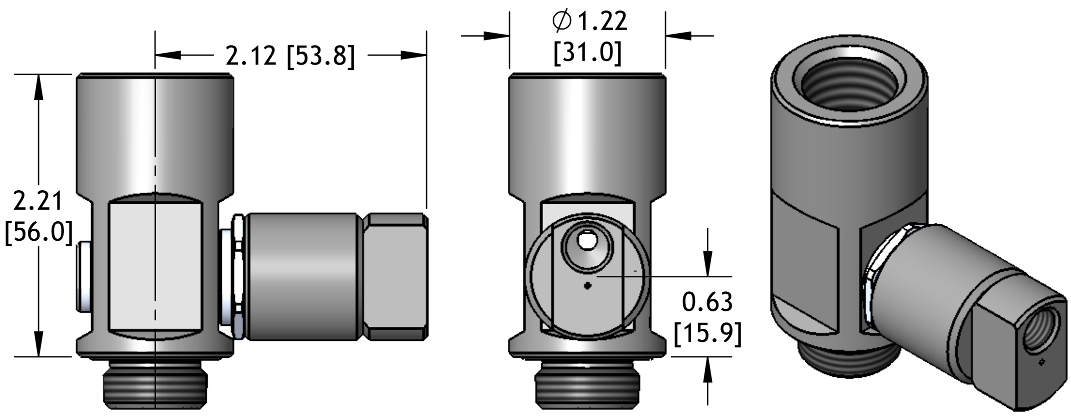
Code	Function	Ports
1	Air Supply (5 psi min)	G 1/8 NPSF
V	Vacuum Source	G 1/8 NPSF
2	Vacuum	G 1/8 NPSF

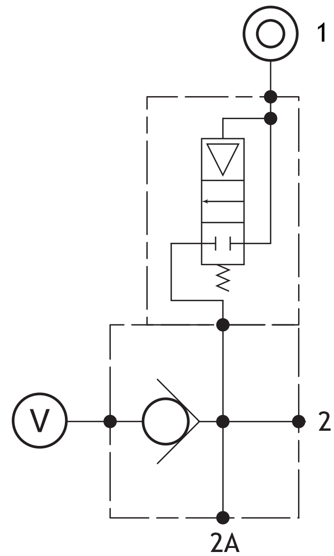


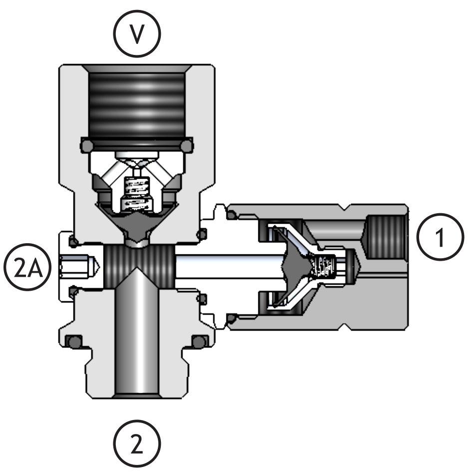


Vacuum Check Valves w/ Release Check Valve

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







Code	Function	Ports
V	Vacuum Source	G 1/2 NPSF
1	Air Supply (5 psi min)	G 1/8 NPSF
2	Vacuum	G 1/2 NPSF
2A	Alternate Vacuum	G 1/8 NPSF

Low-Profile Cone Valves

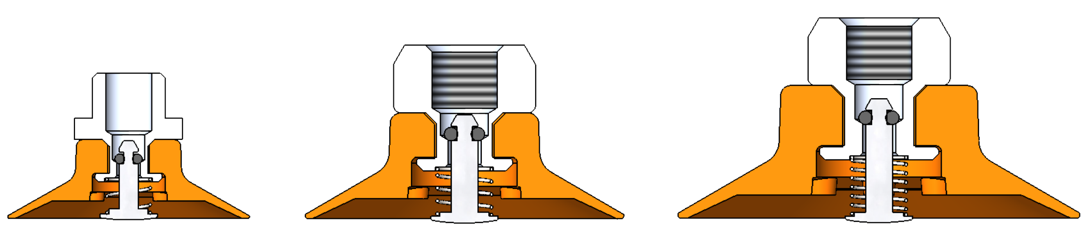
	Cup Size	Cup Material[1]		Cup Fitting	
XP-F	50	A	-	18M	-CV

Cup Size	
30	Ø 4 mm
40	Ø 6 mm
50	Ø 8 mm

Cup Material	
A	Ameriflex
D	Duramax
N	Nitrile
S	Silicone
V	Viton

Cup Fitting	
18M	G 1/8 NPSF Male 30 mm Cup Only
18F	G 1/8 NPSF Female 40 & 50 mm Cup Only

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



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 Valves for XP-B50 and XP-2B50 Vacuum Cups

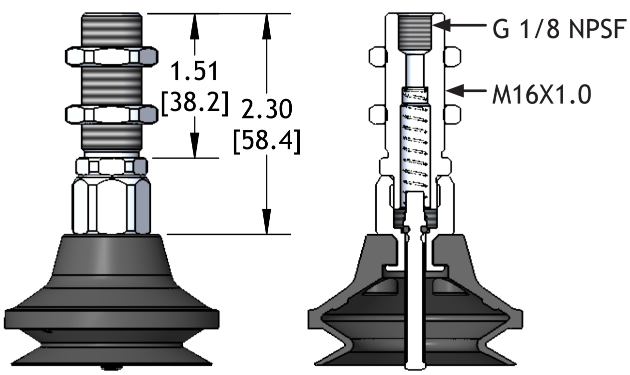
To order full assembly with vacuum cup:

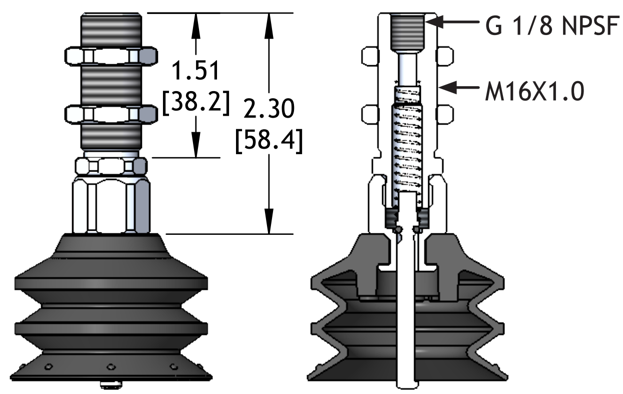
	Cup Size	Cup Material	
XP-	B50	N	-16X40MV

Cup Size	
B50	XP-B50
2B50	XP-2B50

Cup Material	
A	Ameriflex[1]
D	Duramax[1]
N	Nitrile
S	Silicone
V	Viton

[1]Not available on 2B50.





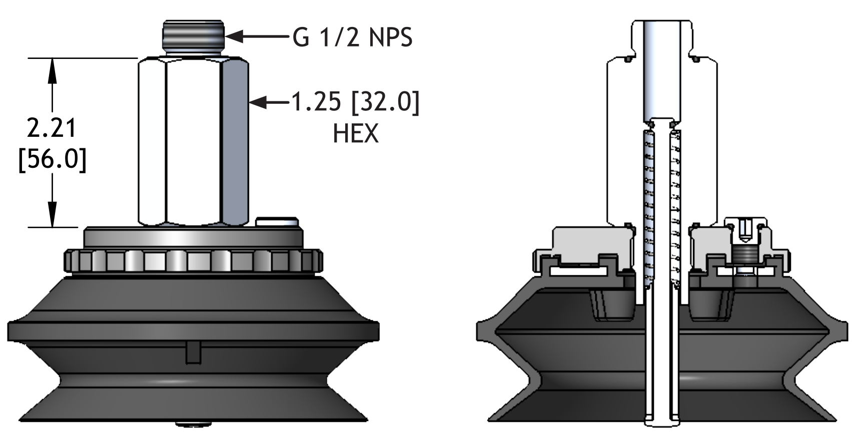
MV-B110

Mecanical Valves for XP-B110 Vacuum Cups

To order full assembly with vacuum cup:

	Cup Material	
XP-B110	N	-12F-MV

Cup Material	
N	Nitrile
S	Silicone
V	Viton



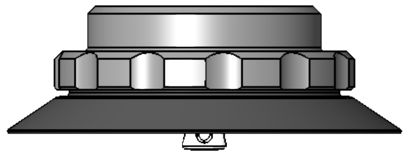
MV-F75

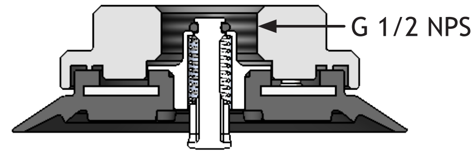
Mechanical Valves for XP-F75 Vacuum Cups

To order full assembly with vacuum cup:

	Cup Material	
XP-F75	N	-12F-MV

Cup Material	
N	Nitrile
S	Silicone
V	Viton





MV-F110 & MV-F150

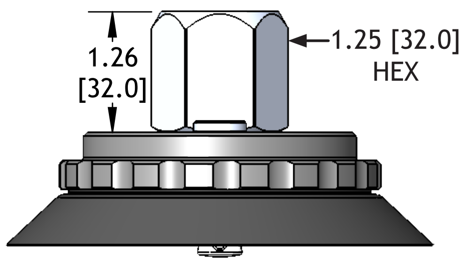
Mechanical Valves for XP-F110 and XP-F150 Vacuum Cups

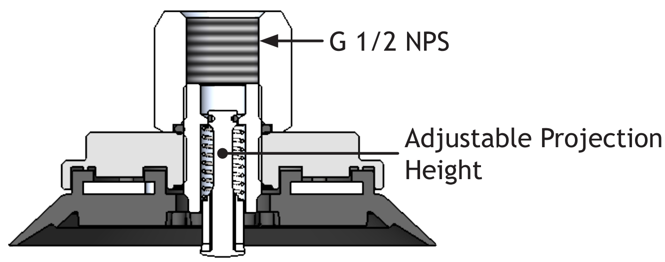
To order full assembly with vacuum cup:

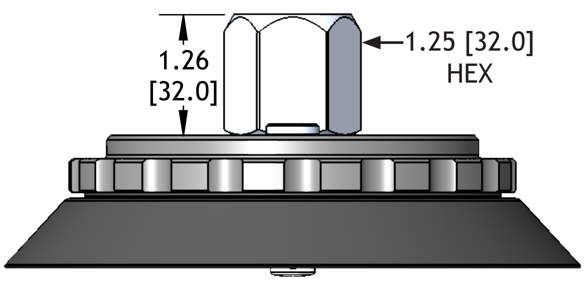
	Cup Size	Cup Material	
XP-	F110	N	-12F-MV

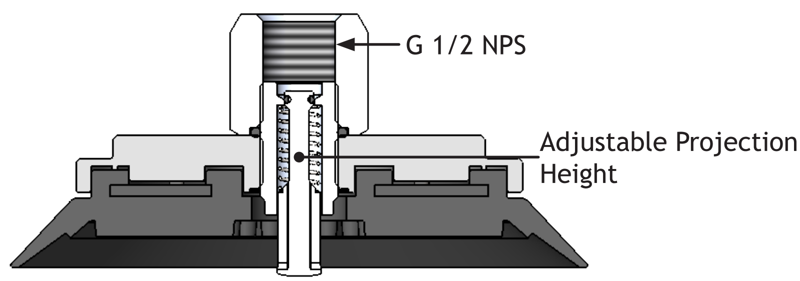
Cup Size	
F110	XP-F110
F150	XP-F150

Cup Material	
N	Nitrile
S	Silicone
V	Viton





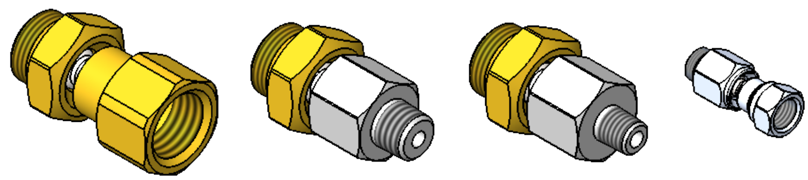




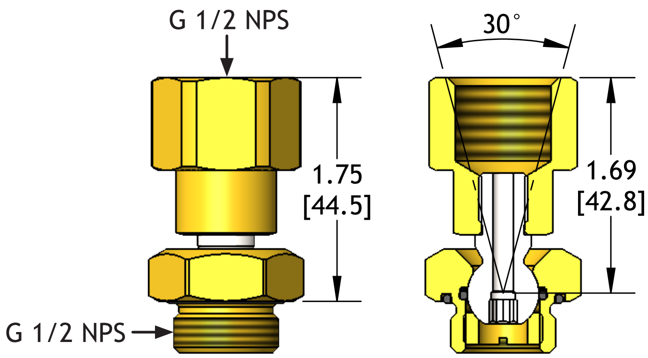
UPDATED 02/25/19

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.

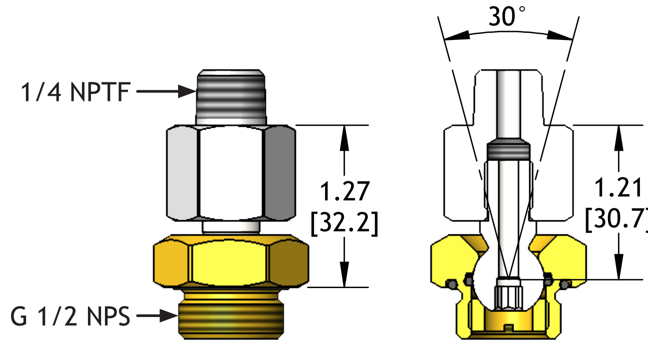


SJ12



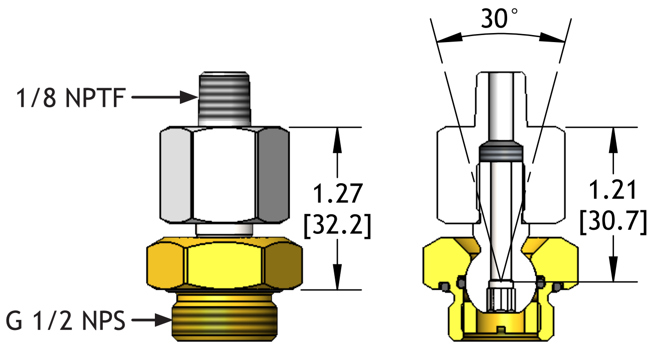
Weight: lbs [g]
0.34 [5.4]

SJ12-14M



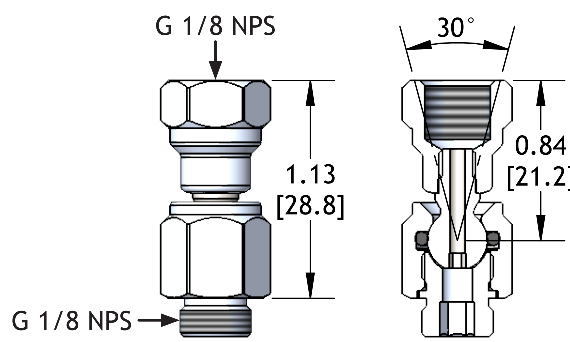
Weight: lbs [g]
0.31 [5.0]

SJ12-18M



Weight: lbs [g]
0.30 [4.8]

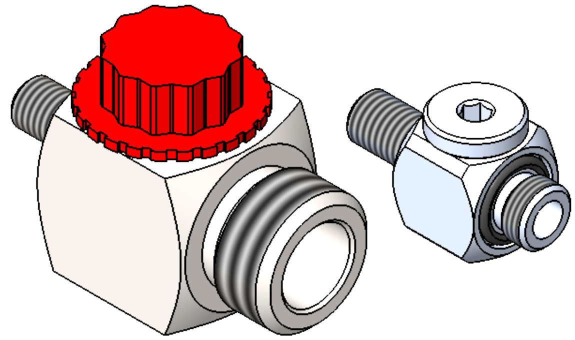
SJ18



Weight: lbs [g]
0.02 [0.3]

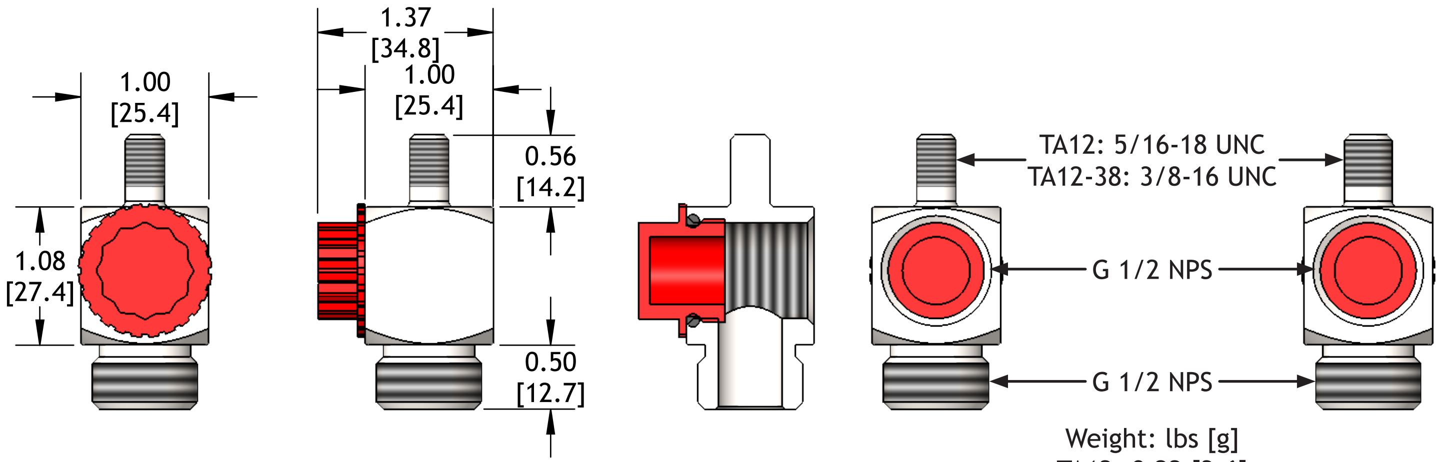
Tee Adapters

Tee adapters can be used in a similar way as side vacuum port vacuum cup fittings. A post is used for mounting while connecting ports run perpendicular to the vacuum cup connection. 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 & TA12-38

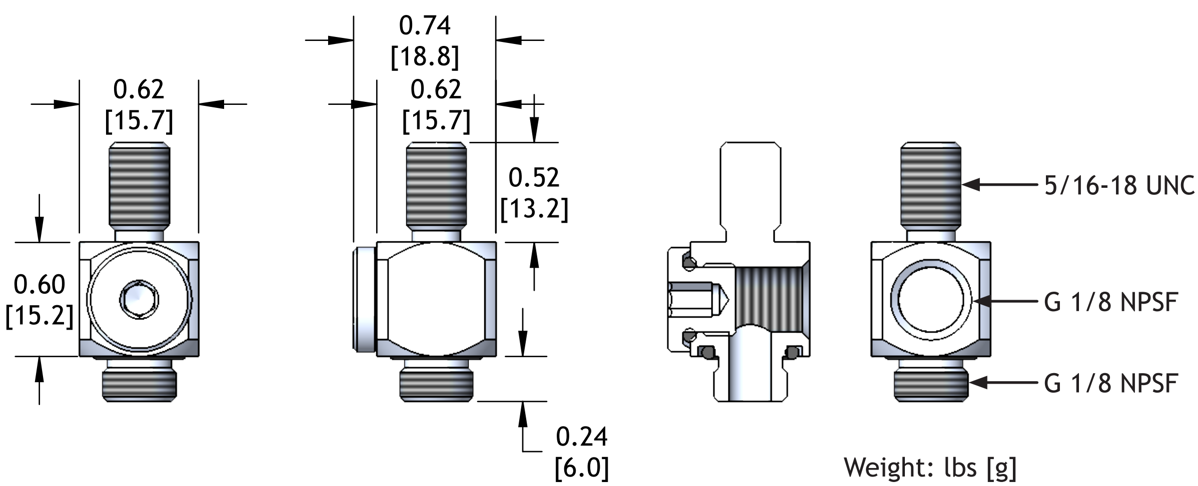
Construction: Zinc Chromate
Removable G 1/2 NPT Plug (Plastic)



Weight: lbs [g]
TA12: 0.22 [3.6]
TA12-38: 0.23 [3.6]

TA18

Construction: Anodized Aluminum
Removable G 1/8 NPSF Plug (P18)



Weight: lbs [g]
0.02 [0.3]

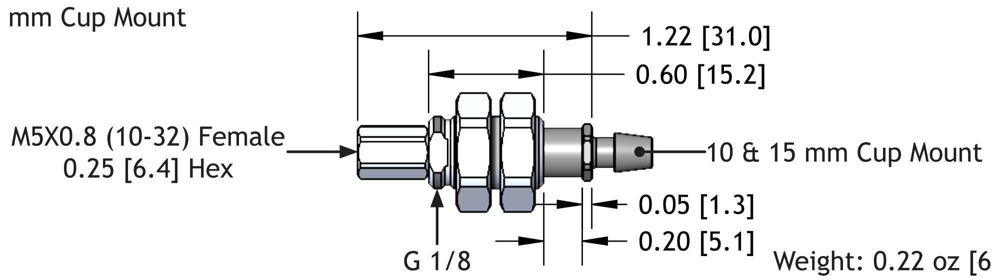
Level Compensators

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%.

LC10X5-10

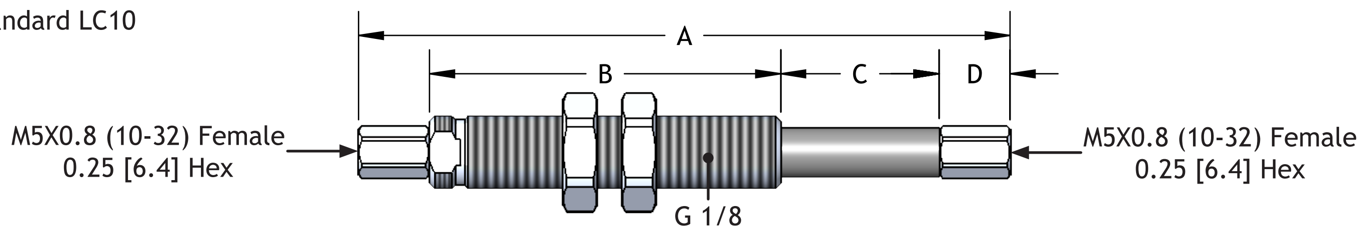
LC10 with 10-15 mm Cup Mount



Weight: 0.22 oz [6.4 g]

LC10

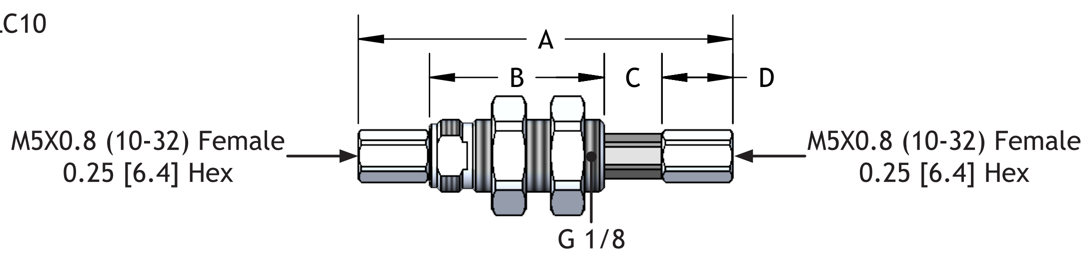
Standard LC10



Part Number	A in [mm]	B in [mm]	C in [mm]	D in [mm]	Weight oz [g]
LC10	1.70 [43.2]	0.76 [19.3]	0.30 [7.6]	0.28 [7.1]	0.25 [7.2]
LC10X20	3.40 [86.4]	1.83 [46.5]	0.83 [21.0]	0.37 [9.4]	0.44 [12.5]
LC10X30	4.17 [106.0]	2.23 [56.6]	1.20 [30.5]	0.37 [9.4]	0.51 [14.6]
LC10X50	5.78 [146.7]	3.03 [77.0]	2.01 [50.9]	0.37 [9.4]	1.17 [33.1]

LC10-NR

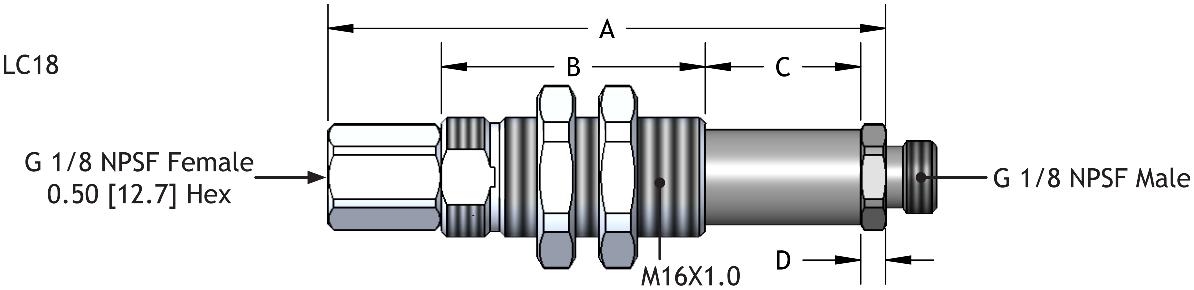
Non-Rotating LC10



Part Number	A in [mm]	B in [mm]	C in [mm]	D in [mm]	Weight oz [g]
LC10-NR	1.95 [49.5]	0.91 [23.1]	0.30 [7.6]	0.37 [9.4]	0.28 [7.9]

LC18

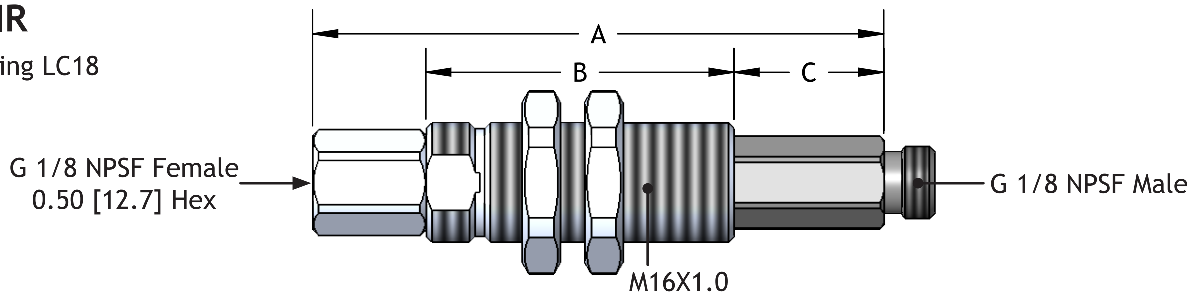
Standard LC18



Part Number	A in [mm]	B in [mm]	C in [mm]	D in [mm]	Weight oz [g]
LC18	2.89 [73.4]	1.38 [35.1]	0.79 [20.1]	0.13 [3.3]	1.06 [30.1]
LC18X35	4.47 [114.0]	2.33 [59.2]	1.40 [35.6]	0.13 [3.3]	1.49 [42.2]
LC18X50	5.75 [146.0]	2.97 [75.4]	2.00 [50.8]	0.13 [3.3]	1.83 [52.0]

LC18-NR

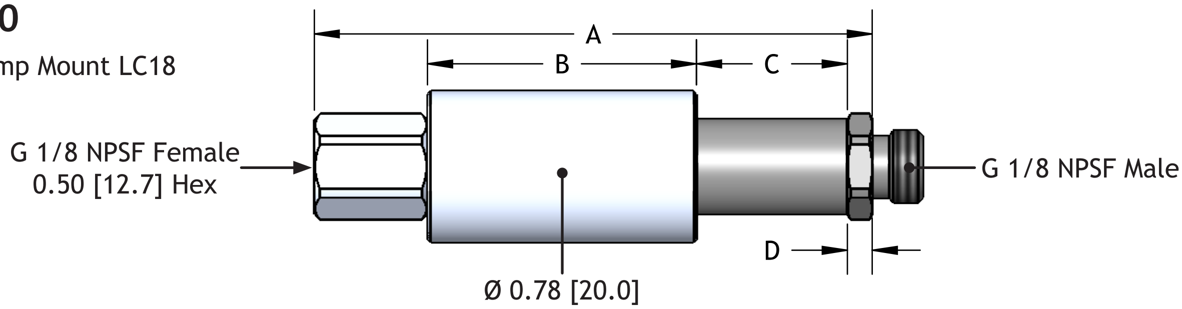
Non-Rotating LC18



Part Number	A in [mm]	B in [mm]	C in [mm]	Weight oz [g]
LC18-NR	2.98 [75.6]	1.61 [40.8]	0.78 [19.8]	1.06 [30.1]
LC18X35-NR	4.54 [115.2]	2.56 [64.9]	1.39 [35.3]	1.46 [41.5]
LC18X50-NR	5.84 [148.3]	3.21 [81.5]	2.04 [51.8]	1.78 [50.5]

LC18-20

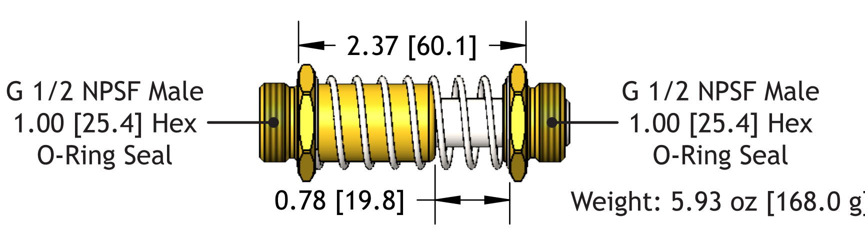
20mm Clamp Mount LC18



Part Number	A in [mm]	B in [mm]	C in [mm]	D in [mm]	Weight oz [g]
LC18	2.89 [73.4]	1.38 [35.1]	0.79 [20.1]	0.13 [3.3]	1.15 [32.6]
LC18X35	4.47 [114.0]	2.33 [59.2]	1.40 [35.6]	0.13 [3.3]	1.94 [55.1]
LC18X50	5.75 [146.0]	2.97 [75.4]	2.00 [50.8]	0.13 [3.3]	2.48 [70.1]

LC12

Standard LC12



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.

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

Inlet Thread

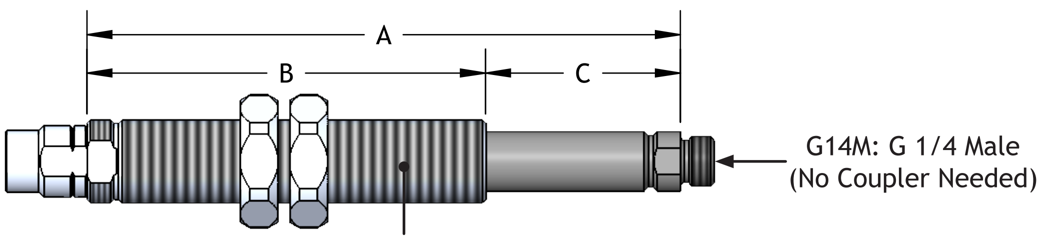
14F	1/4 NPT Female
38M	3/8 NPTF Male
12M	1/2 NPTF Male
G14F	G 1/4 Female
G38M	G 3/8 Male
G12M	G 1/2 Male

Stroke Length

X25	25 mm
X50	50 mm

Cup End Thread

14F	1/4 NPT 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

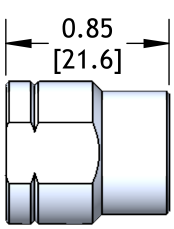


Stroke	A in [mm]	B in [mm]	C in [mm]	Weight oz [g]
25 mm	3.43 [87.1]	2.40 [61.0]	1.03 [25.0]	3.35 [94.9]
50 mm	6.18 [157]	4.15 [105.0]	2.03 [51.6]	5.13 [145.5]

Base weight calculated without couplers.

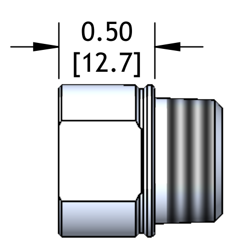
Couplers

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



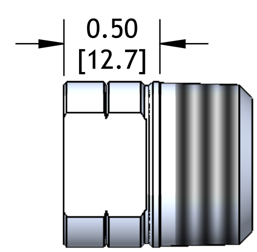
14F

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



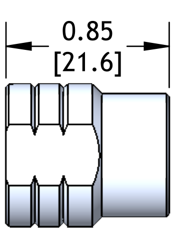
38M

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



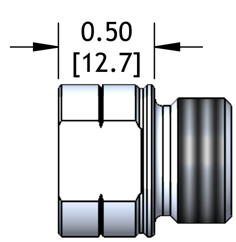
12M

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



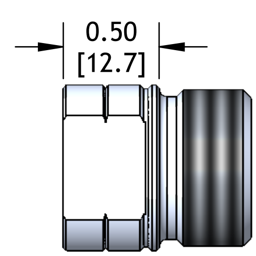
G14F

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

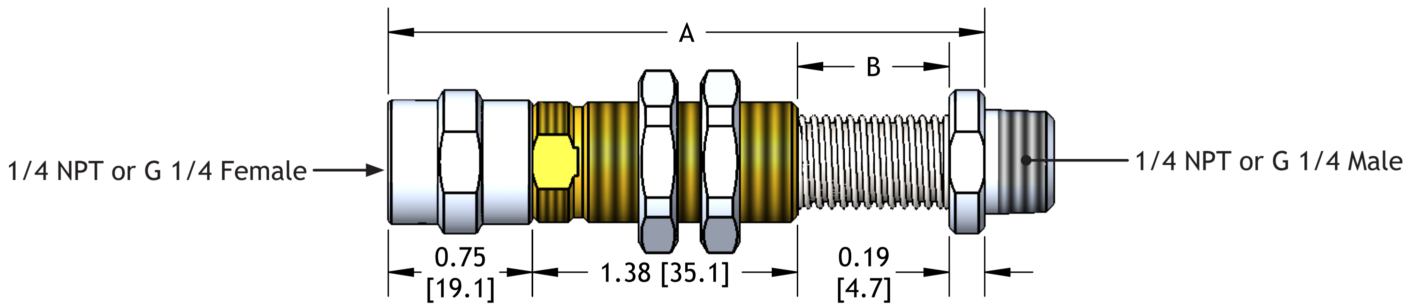
Threads:	G 1/2 Male
Weight: oz [g]	0.51 [14.4]

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 - Male Connection

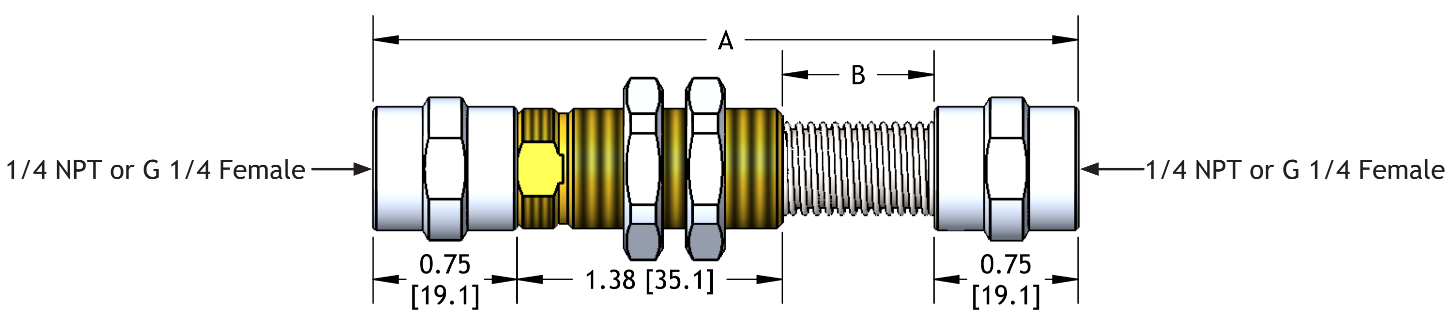
	Sleeve Threads			Stroke Length		Threads	
LCE	F		14X	10			
	F	Fine - M16X1.0		10	10 mm	(Blank)	NPT
	C	Coarse - M16X1.5		30	30 mm	-G	G
				50	50 mm		
				70	70 mm		



Part Number		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 - Female Connection

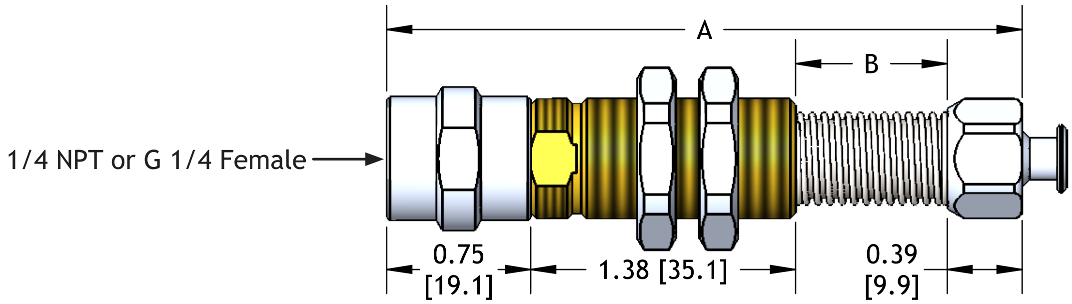
	Sleeve Threads			Stroke Length			Threads	
LCE	F		14X	10		-14F		
	F	Fine - M16X1.0		10	10 mm		(Blank)	NPT
	C	Coarse - M16X1.5		30	30 mm		-G	G
				50	50 mm			
				70	70 mm			



Part Number		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]

LCE - Integral Cup Fitting

	Sleeve Threads			Stroke Length			Cup Size		Threads	
LCE	F		14X	10		-	32			
	F	Fine - M16X1.0		10	10 mm		32	Ø 20-30 mm	(Blank)	NPT
	C	Coarse - M16X1.5		30	30 mm		40	Ø 40 mm	-G	G
				50	50 mm		50	Ø 50 mm		
				70	70 mm					



Part Number		A	B	Weight
Fine - M16X1.0	Coarse - M16X1.5	in [mm]	in [mm]	oz [g]
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]

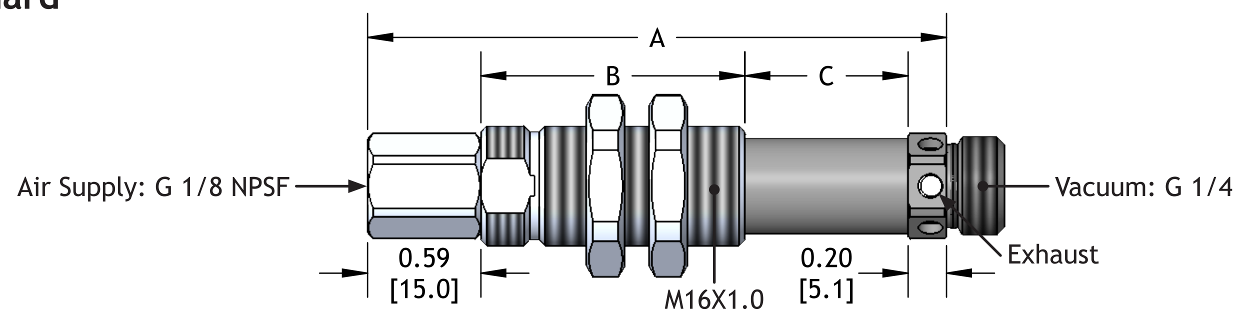
Weights calculated using -32 cup fitting.

LCP - Level Compensator Pumps

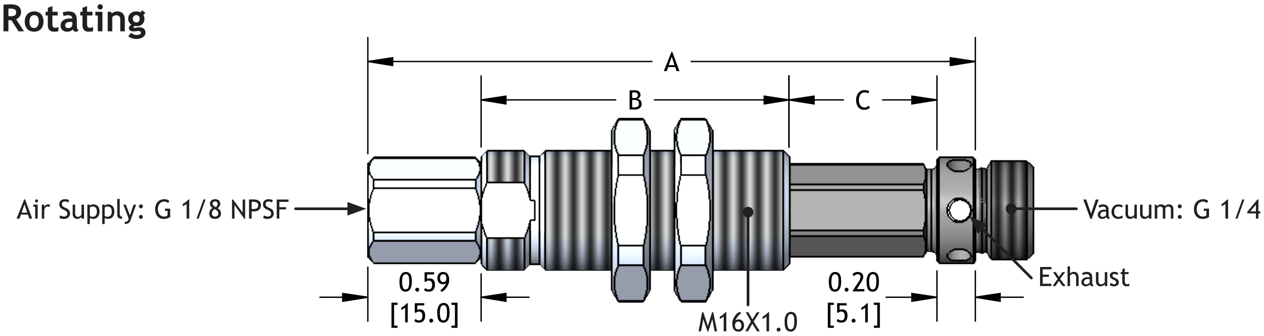
A vacuum pump integrated within a level compensator provides a simple point-of-use system that is easier to apply than two components separately. While the level compensator provides compliance, vacuum is generated directly at the vacuum cup, improving response time for both attaching to and detaching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

	Venturi Size			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

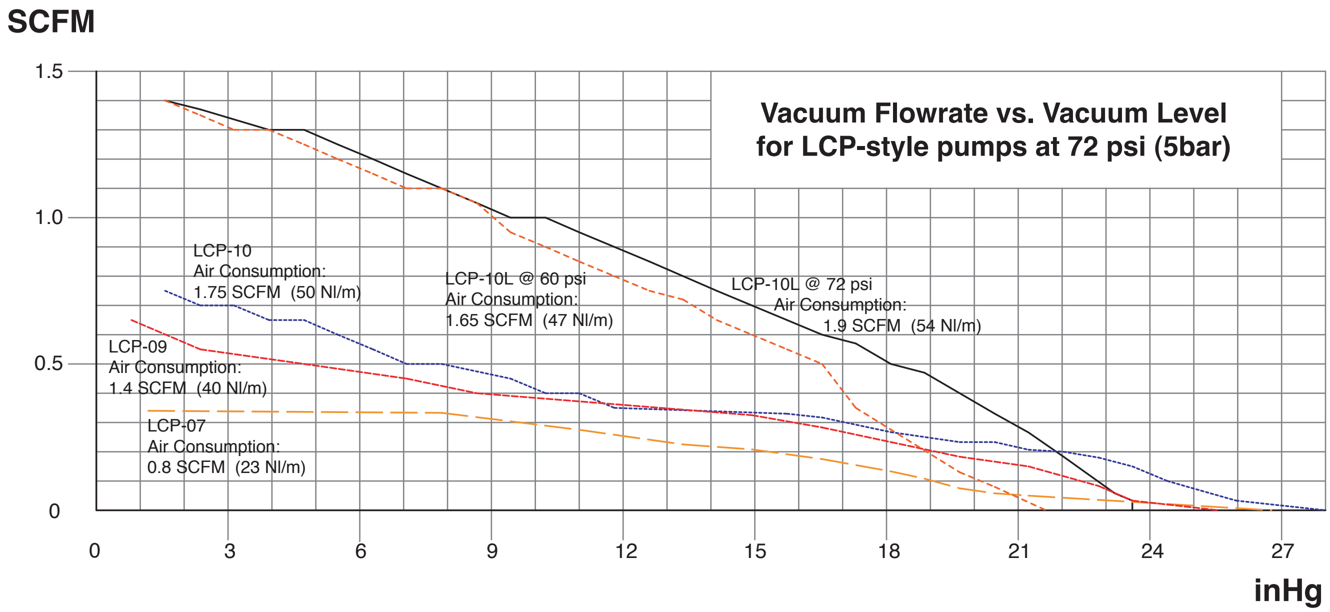


Non-Rotating



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 - 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.

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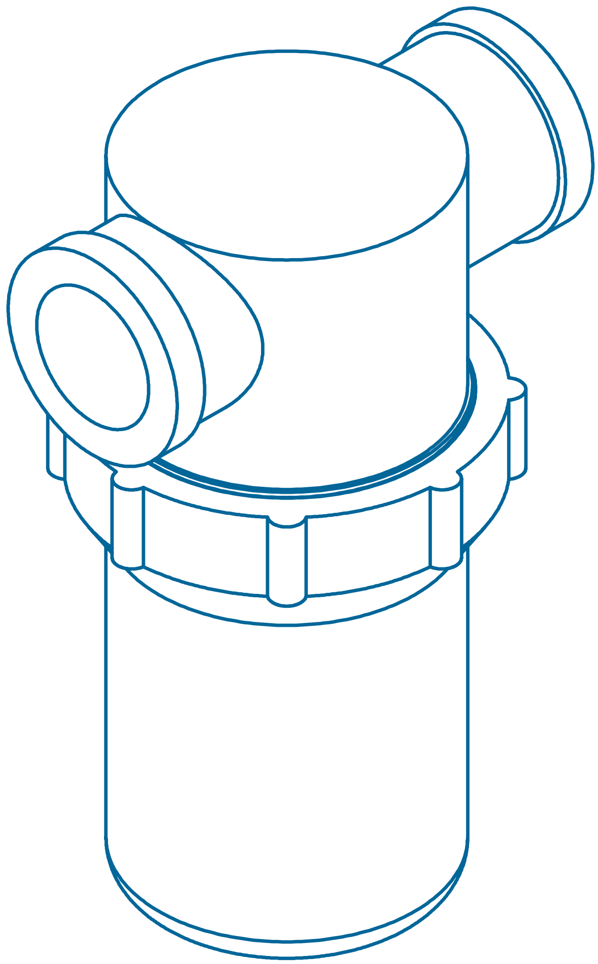
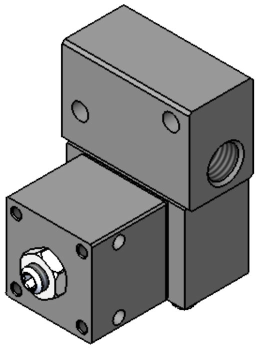
SECTION 5

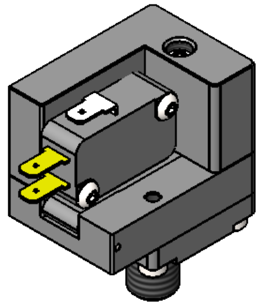
SYSTEM ACCESSORIES



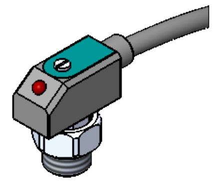
EDCO USA®



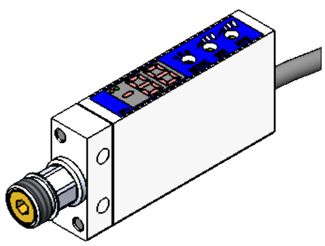
Vacustat



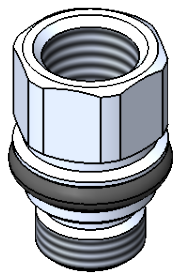
Mechanical Switches



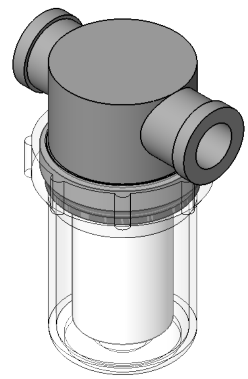
Electronic Sensors



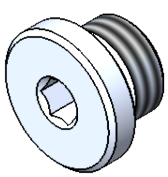
Digital Sensors



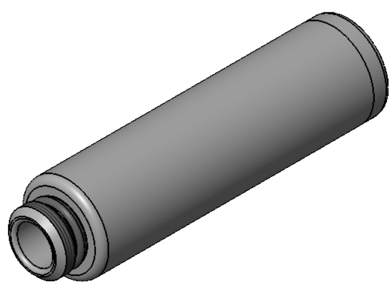
Vacuum Switch Protector



Filters



Pipe Plugs

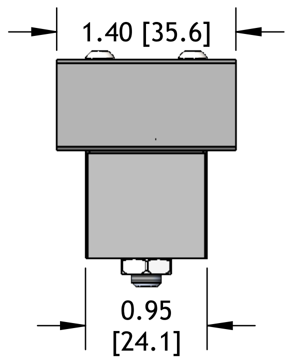


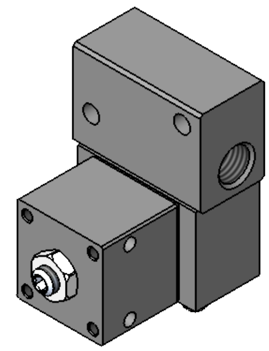
Silencers

Vacustat: VU-18F

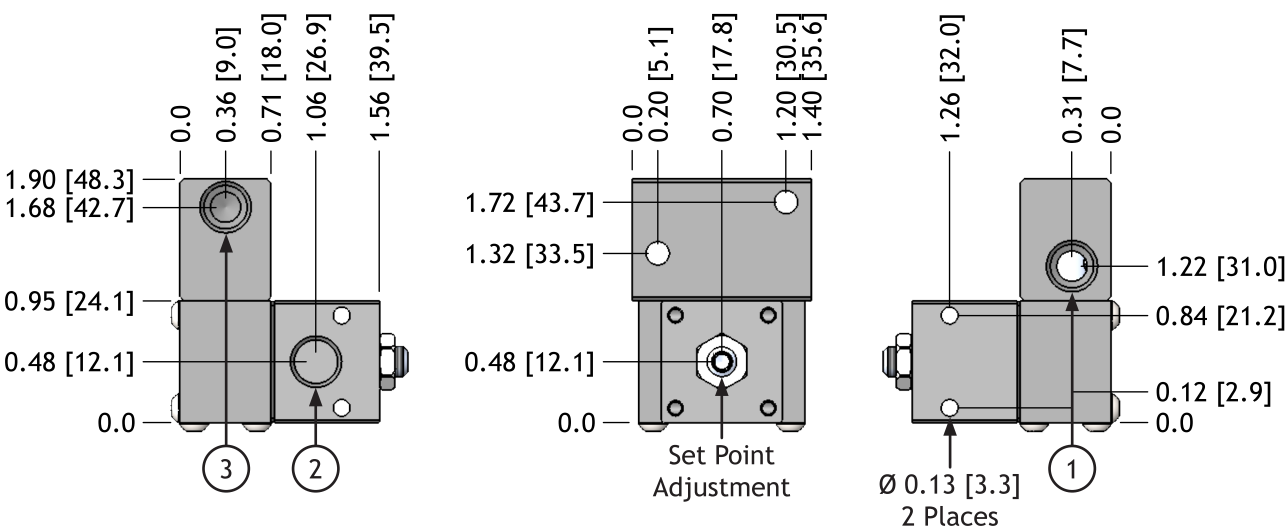
The Vacustat is the basis for energy-save controls and is used with any suitable vacuum pump in conjunction with a vacuum check valve. Vacuum pumps that are equipped with an integral, non-return valve or a vacuum pump and external vacuum check valve, such as VC18, fit the requirements for a Vacustat control. As always, energy-saver controls can only be used in leak-free systems and some provision must be made to dissipate the checked vacuum and release the work-piece when desired.

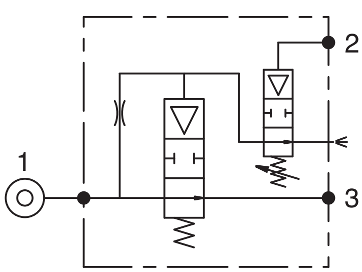
VU-18F is an adjustable, vacuum-controlled 2/2 valve that supplies compressed air to the vacuum pump whenever system vacuum level is shallower than the Vacustat set-point. When the set-point is achieved, the Vacustat shuts off the pump air-supply until system vacuum level requires replenishment.





Weight: lbs [g]
0.23 [105.7]





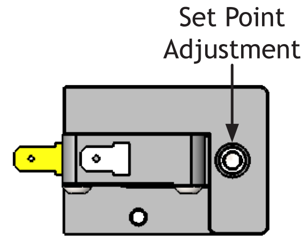
Code	Function	Ports
1	Air Supply - Main	G 1/8 NPSF
V	Vacuum Sense Port	G 1/8 NPSF
2	Air Supply to Pump	G 1/8 NPSF

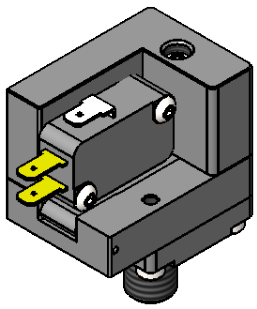
Mechanical Pressure Switches

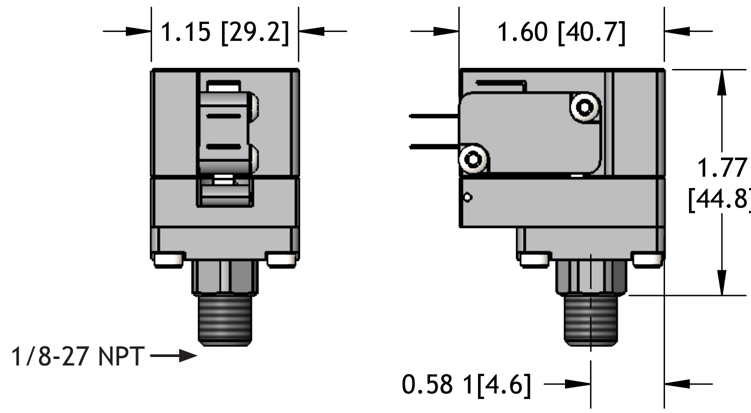
PSA18-E - Electrical Output

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, nylon reinforced Nitrile diaphragm





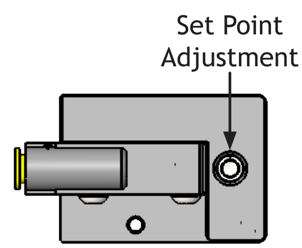


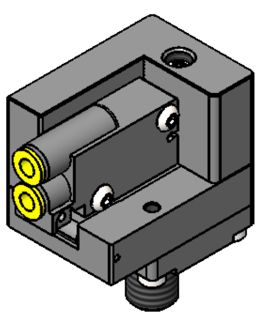
PSA18-NOP / PSA18-NCL - Pneumatic Output

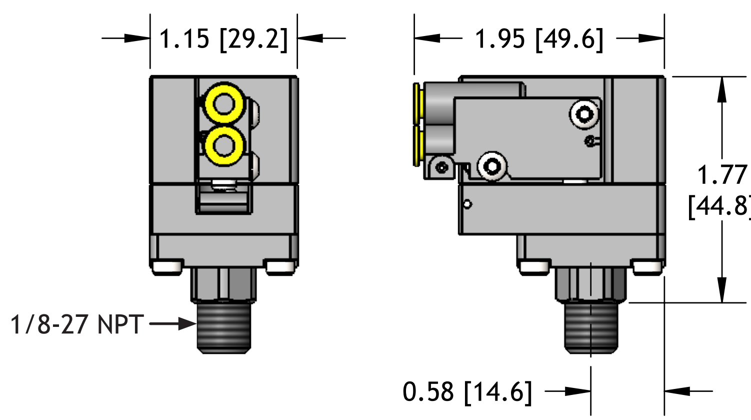
Pneumatic Vacuum Sensors are available in normally-closed (NCL) and normally-open (NOP) versions. NCL sensors are open to pass air when the desired set point is achieved. NCL sensors close to block air when the desired set point is achieved. Both versions have integral 5/32 in (4 mm) tube connectors.

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

Port 1- Air Supply
Port 2 - Output Signal







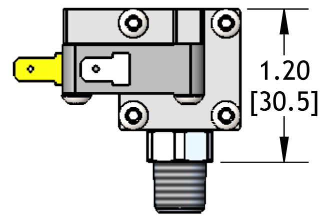
Vacuum Adjustment Range:	10 to 140 psi [0.69 to 9.65 bar]
Temperature Range:	-20°F to 140°F [-29°C to 60°C]
Electrical:	5 Amp @ 125 V AC, 250 V AC Max
Air Valve:	20 to 115 psi [1.4 to 7.9 bar]; Cv = 0.06; 2.5 SCFM [71 Nl/m]
Weight:	3.20 oz [90.7 g]

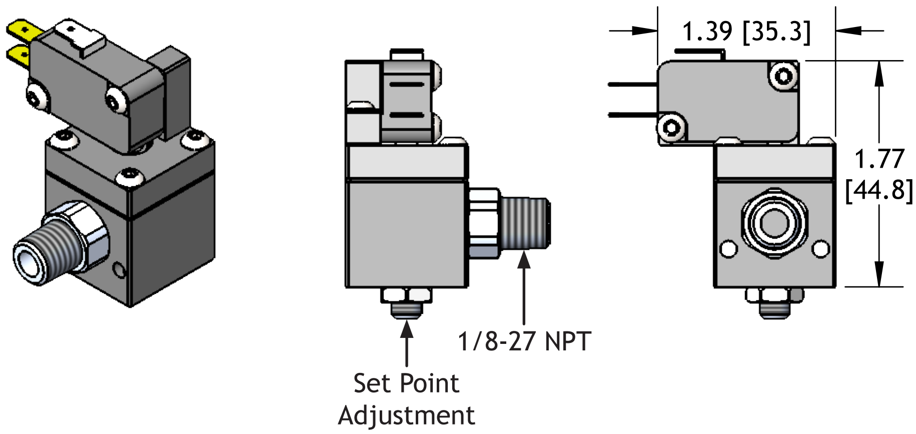
Mechanical Vacuum Switches

VSA18-E - Electrical Output

Electrical Vacuum 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



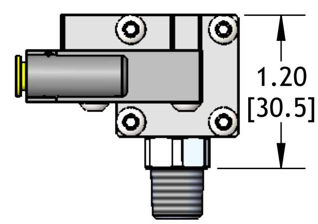


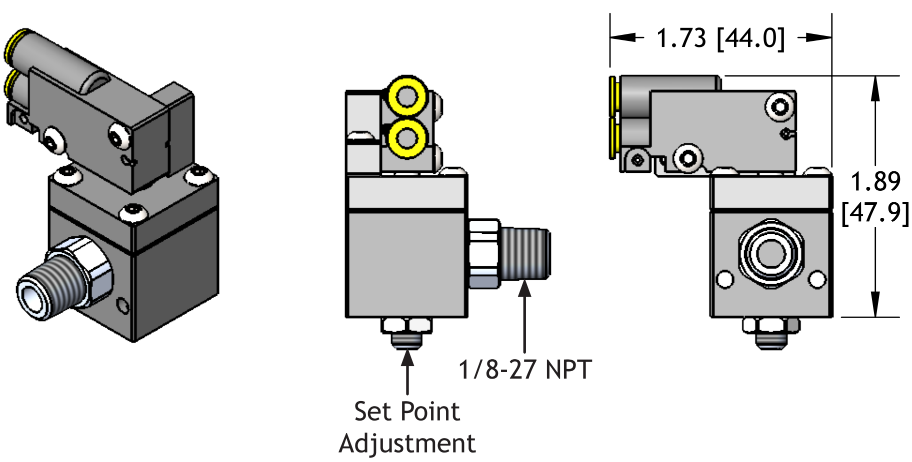
VSA18-NOP / VSA18-NCL - Pneumatic Output

Pneumatic Vacuum Sensors are available in normally-closed (NCL) and normally-open (NOP) versions. NCL sensors are open to pass air when the desired set point is achieved. NCL 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]

Electronic Sensors

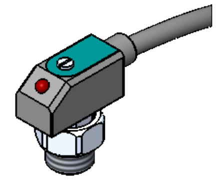
	Output		Connector	Mounting Thread
V	P	-	4	-18M

Output	
A[1]	Analog
N	NPN
P	PNP

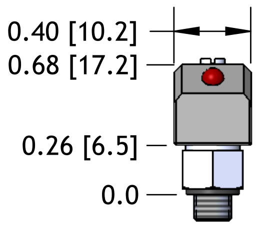
Connector	
3	3-Pin
4	4-Pin

Mounting Thread	
(Blank)	M5X0.8 Male (10-32)
-18M	G 1/8-27 NPSF Male

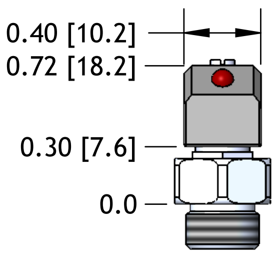
[1]3-Pin Only

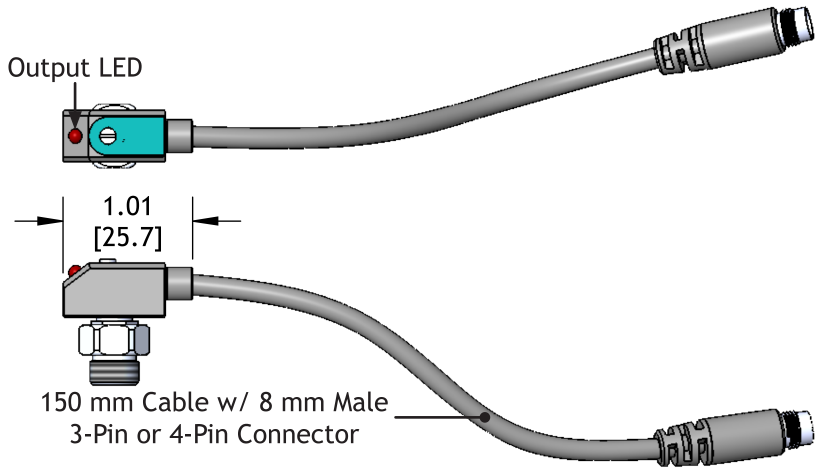


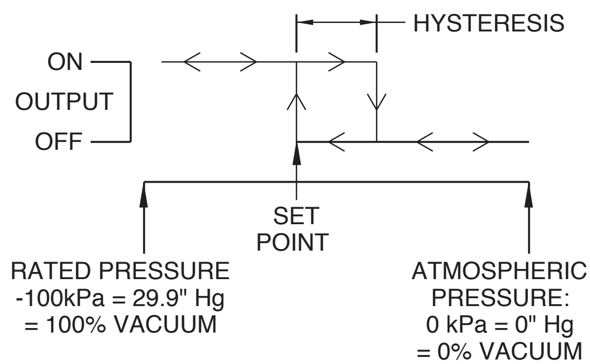
(Blank)



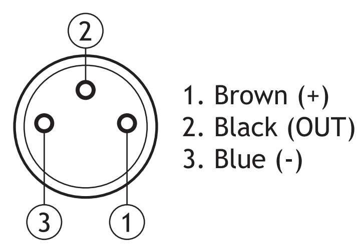
-18M



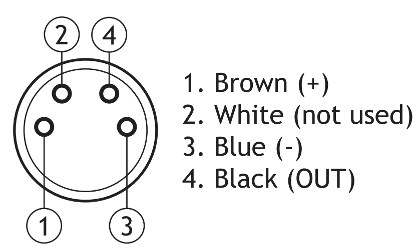




Media:	Non-Lubricated Air, Non-Corrosive Gas
Maximum Pressure:	29 psi [200 kPa]
Rated Pressure Range:	0 to -29.5 inHG [0 to 100 kPa]
Operating Pressure:	14°F to 122°F [-10°C to 60°C]
Storage Temperature:	-4°F to 158°F [-20°C to 70°C]
Humidity:	35% to 85% RH
Electrical Connection:	-3 = 3-Pin Pico 8 mm Connector -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 -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)

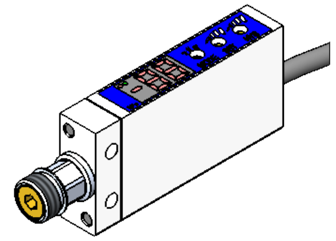
Order Cables Separately

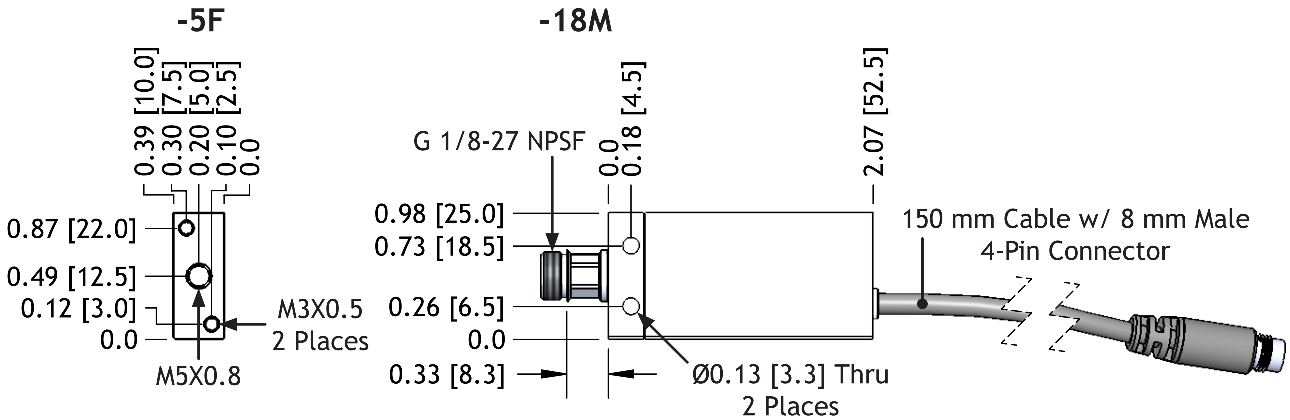
Part Number	Description
3QD2	3-Pin Quick Disconnect, 2 M
3QD5	3-Pin Quick Disconnect, 5 M
4QD2	4-Pin Quick Disconnect, 2 M
4QD5	4-Pin Quick Disconnect, 5 M

UPDATED 02/25/19

Digital Sensors

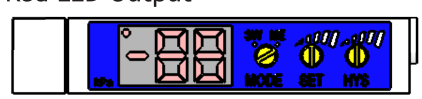
	Output		Output		Mounting Thread
DV	P	-	61	-	18M
	N NPN		61 1 Output + Analog		5F M5X0.8 Female (10-32)
	P PNP				18M G 1/8-27 NPSF Male

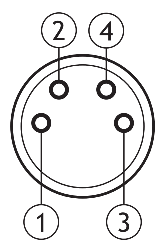




Media:	non-lubricated air, non-corrosive gas
Maximum Pressure:	29 psi [200 kPa]
Rated Pressure Range:	0 to -29.5 inHG [0 to 100 kPa]
Operating Pressure:	14°F to 140°F [-10°C to 60°C]
Storage Temperature:	-4°F to 158°F [-20°C to 70°C]
Humidity:	35% to 85% RH
Electrical Connection:	4-Pin Pico 8 mm Male 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. 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/s^2, 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 -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

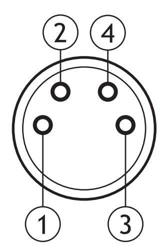
Part Number	Description
4QD2	4-Pin Quick Disconnect, 2 M
4QD5	4-Pin Quick Disconnect, 5 M

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_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 max. load current: 100mA max. supply voltage: 30 V DC residual voltage: ≤ 1V	PNP: open collector 2 outputs max. load current: 100mA max. supply voltage: 24 V DC 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, 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)	



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

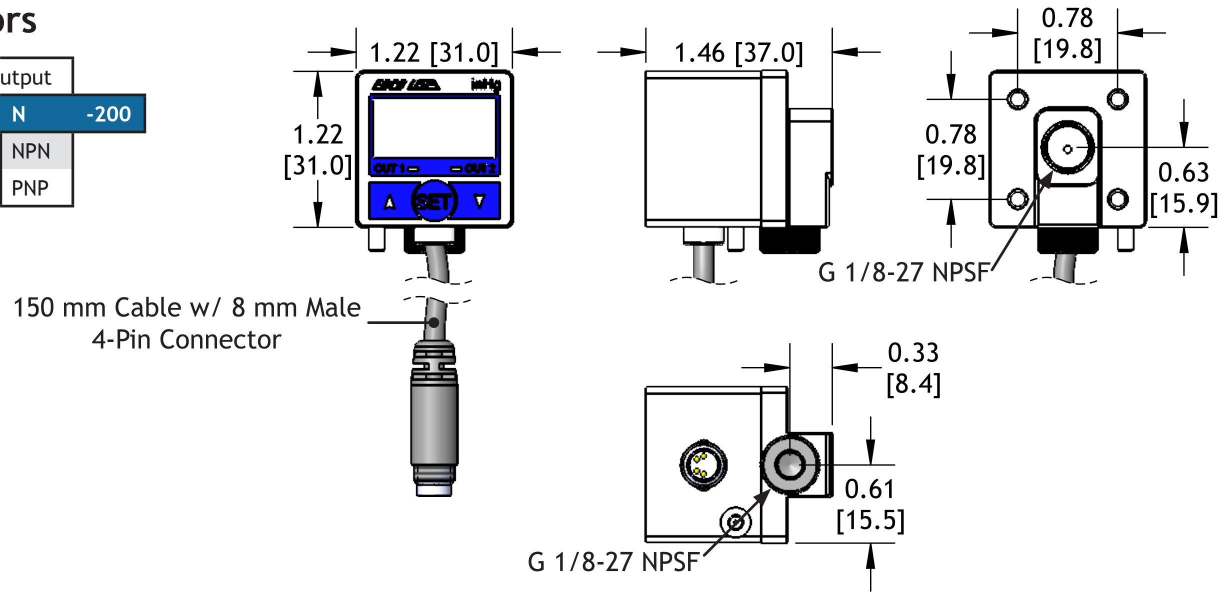
Order Cables Separately

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

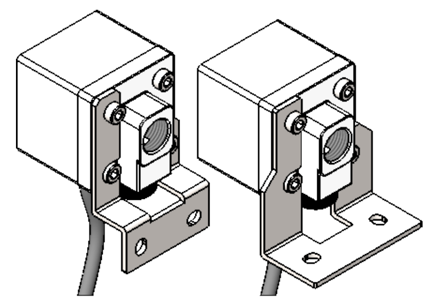
Full data sheet with specs, wiring diagram, and operation procedures available at www.edcousa.net.

Digital Sensors

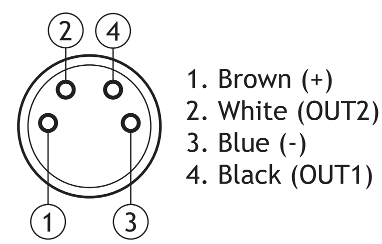
<table>
<tr><td></td><td colspan="2">Style</td><td colspan="2">Output</td><td></td></tr>
<tr><td>D</td><td colspan="2">V</td><td colspan="2">N</td><td>-200</td></tr>
<tr><td></td><td>V</td><td>Vacuum</td><td>N</td><td>NPN</td><td></td></tr>
<tr><td></td><td>P</td><td>Pressure</td><td>P</td><td>PNP</td><td></td></tr>
</table>



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



BT200-A
Optional Mounting Brackets



Order Cables Separately

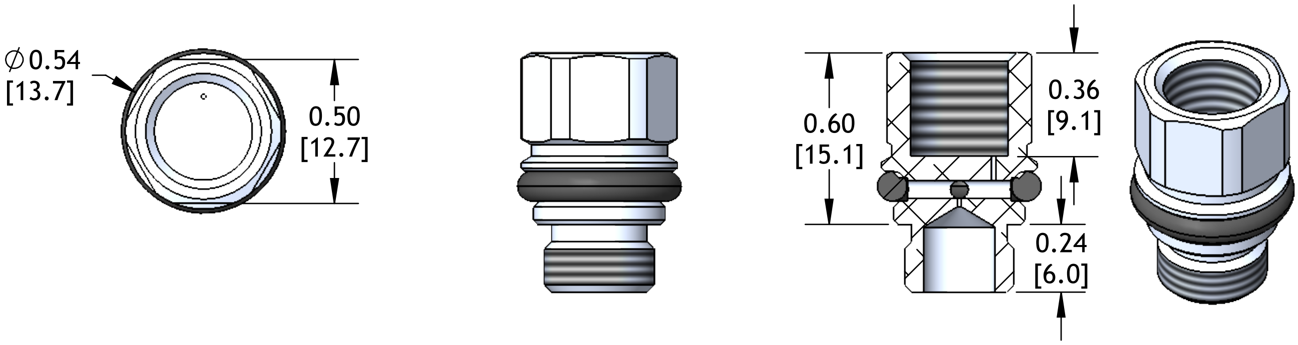
Part Number	Description
4QD2	4-Pin Quick Disconnect, 2 M
4QD5	4-Pin Quick Disconnect, 5 M

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

VSP-18 - Vacuum Switch Protector

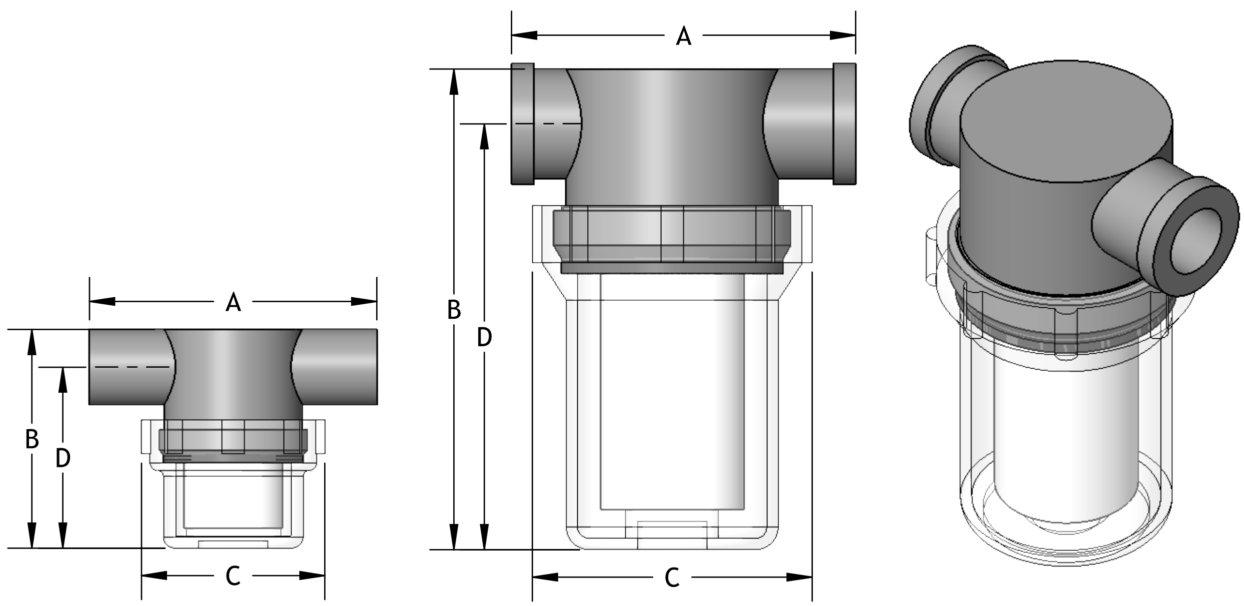
Bi-directional VSP-18 protects vacuum switches or gauges from positive pressure spikes by relieving pressure in excess of 10 psi [0.7 bar] to atmosphere.

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 6/6 body with a transparent 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

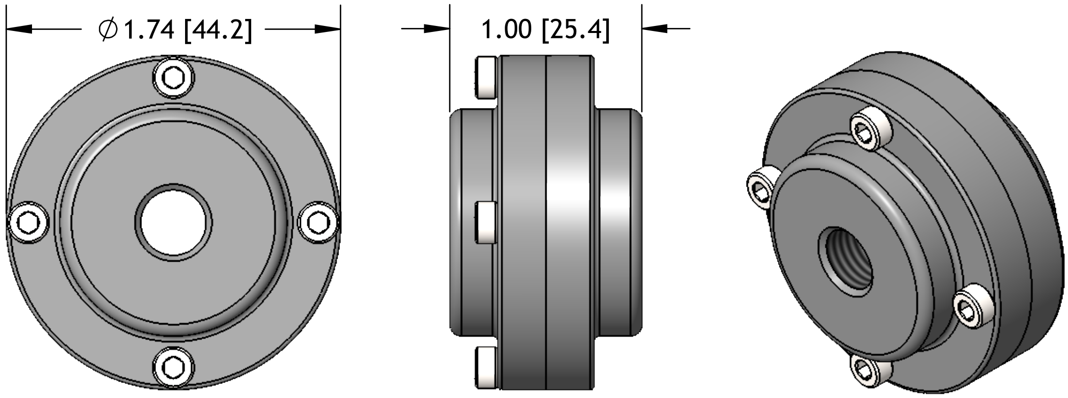
[1]These sizes are available in polypropylene. Add suffix -PP for polypropylene body and bowl. Bowl will be opaque, NOT transparent.

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

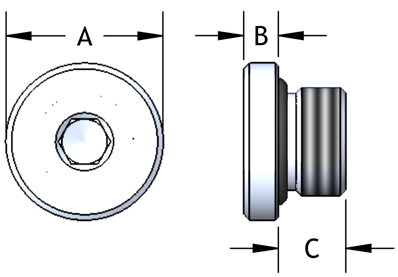
Replacement Filter Disk: FD-116



Weight: 0.14 lb [61.3 g]

Pipe Plugs

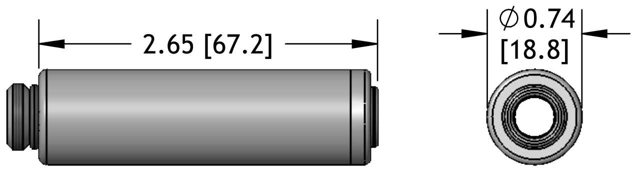
All pipe plugs are nickel plated aluminum with a Nitrile o-ring seal except for the P12 which is nickel plated brass.



Part Number	Fits Threads	A in [mm]	B in [mm]	C in [mm]	Hex Wrench	Weight oz [g]
P10	M5X0.8 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 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 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 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 G 1/2-14	0.95 [24.0]	0.12 [3.0]	0.43 [11.0]	10 mm	0.98 [28.0]

Silencers

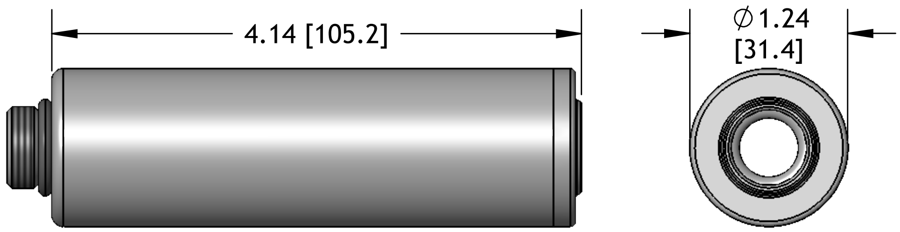
STA - Straight Thru Silencers - Ø 0.74 [18.8]



Part Number	Threads
STA18M	G 1/8 NPS
STA14M	G 1/4 NPT

Weight: 0.56 oz [15.8 g]

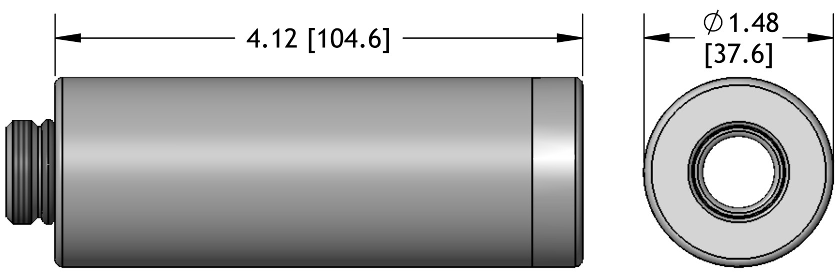
STB - Straight Thru Silencers - Ø 1.24 [31.5]



Part Number	Threads
STB38M	G 3/8 NPT
STA12M	G 1/2 NPS

Weight: 2.11 oz [59.9 g]

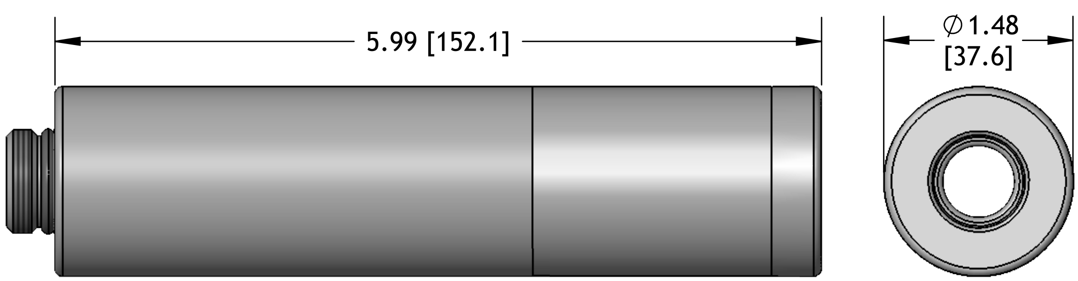
STC - Straight Thru Silencers - Ø 1.48 [37.6]



Part Number	Threads
STC12M	G 1/2 NPS
STC34M	G 3/4 NPT
STC10M	G 1 NPT

Weight: 1.18 oz [33.6 g]
STC10M - 1.35 oz [38.3 g]

STC-6 - Straight Thru Silencers - Ø 1.48 [37.6], Extended Length

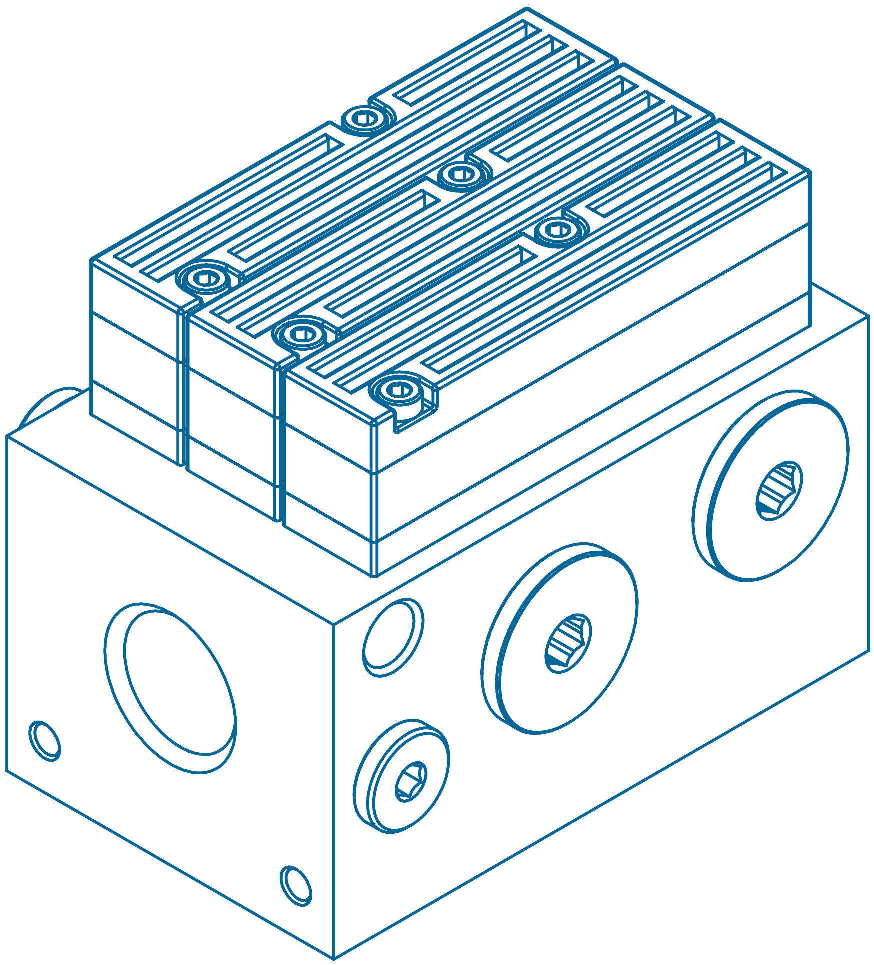


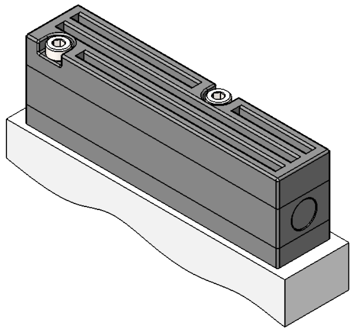
Part Number	Threads
STC12M-6	G 1/2 NPS
STC34M-6	G 3/4 NPT
STC10M-6	G 1 NPT

Weight: 1.65 oz [46.76 g]
STC10M - 1.82 oz [51.5 g]

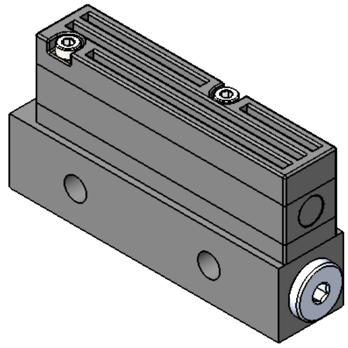
SECTION 6

AX PUMPS

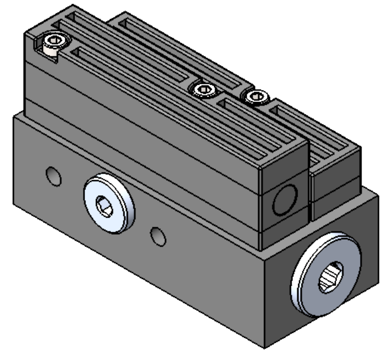




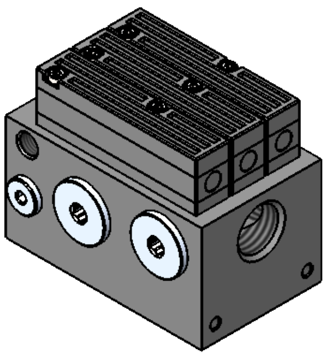
Z Option



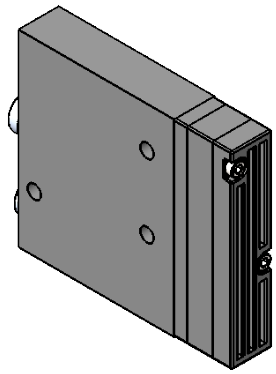
G 1/8 NPSF Bases



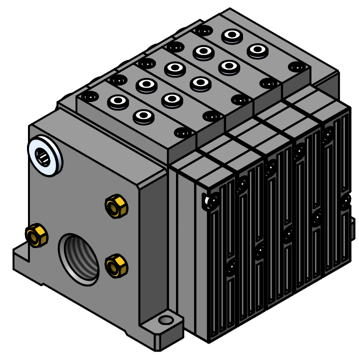
G 1/2 NPSF Bases



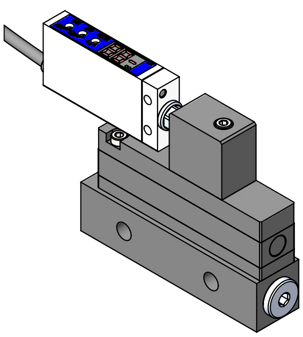
G 1/2 NPSF Bases
Large Capacity



G 1/8 NPSF Bases
w/ Integral Filter



Pump Manifolds



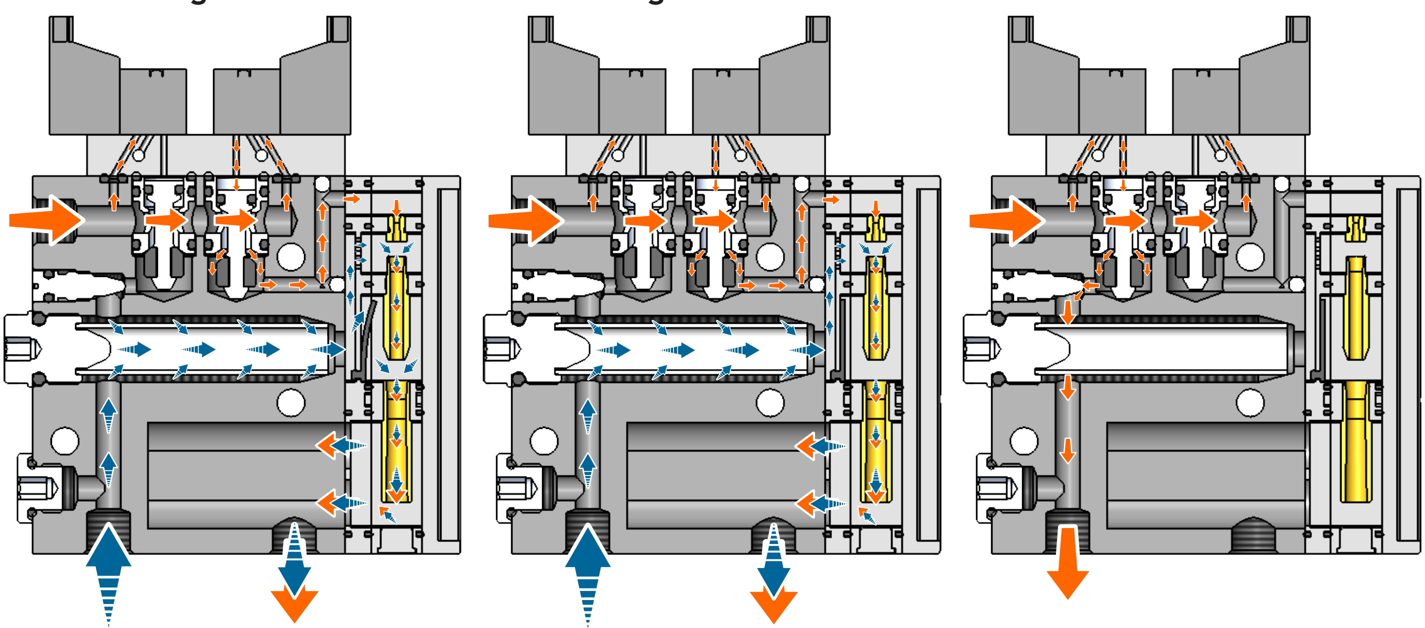
Sensor Options

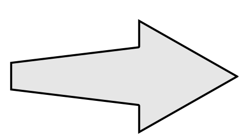
AX Series Vacuum Pumps

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



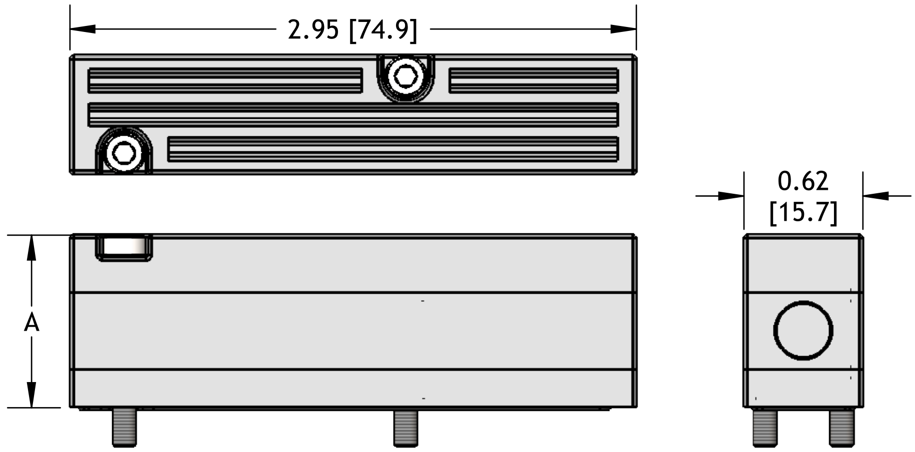


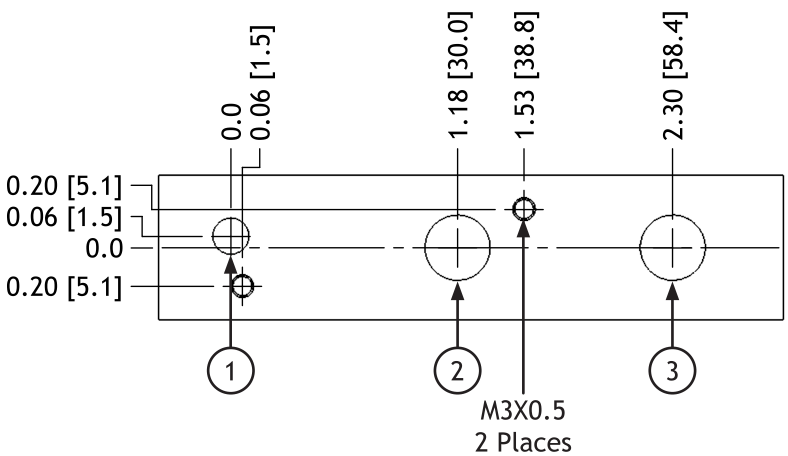
Compressed Air Flow Induced Vacuum Flow Exhaust Flow

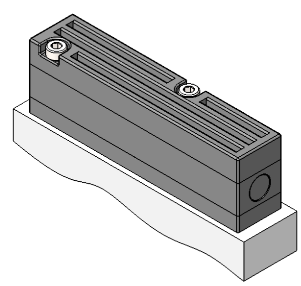
AX Pump - Z Option (Zero / No Base)

- 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	
AX	L		1		N		-Z
	L	L-Series	1	1 Ejector		(Blank)	No
	M	M-Series	2	2 Ejectors		R	Non-Return

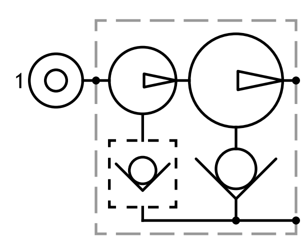






Capacity	A in [mm]	Weight oz [g]
1	0.90 [22.9]	1.71 [48.4]
2	1.30 [33.1]	2.44 [69.3]

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]



AX Pump - 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.

AX	Series	Capacity		Non-Return Option	Sensor Option	Silencer Option
AX	L	1	N		-18	

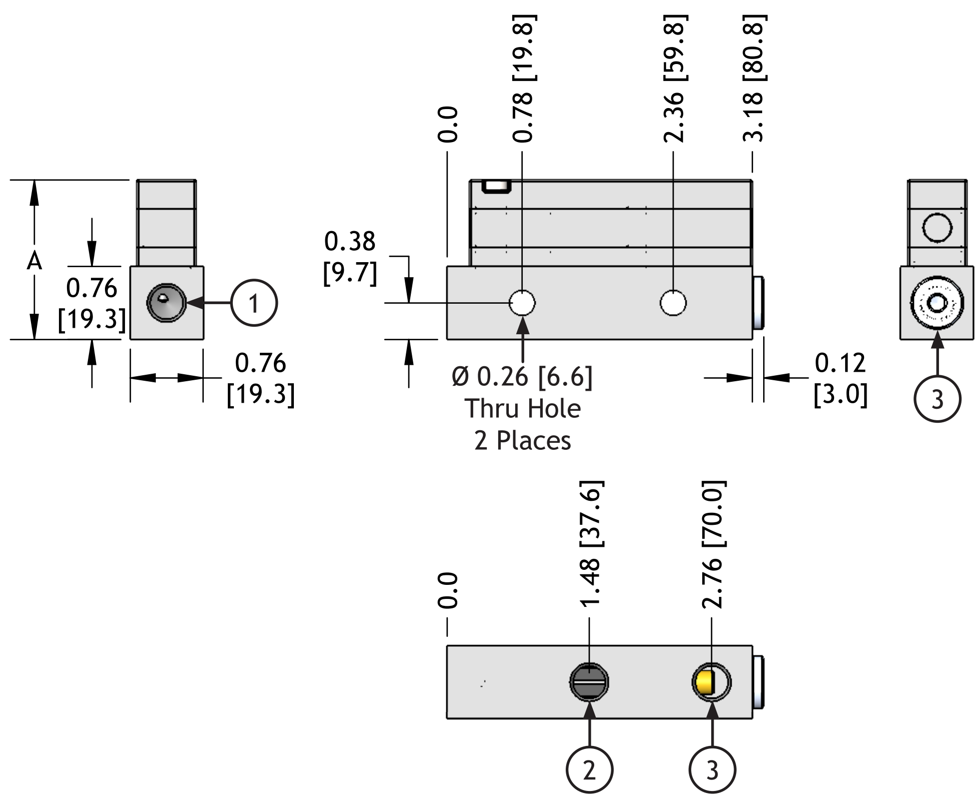
Series	
L	L-Series
M	M-Series

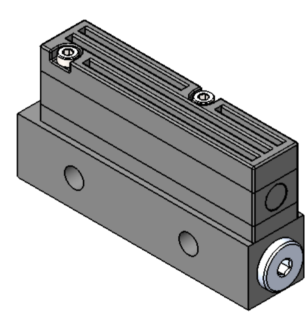
Capacity	
1	1 Ejector
2	2 Ejectors

Non-Return Option	
(Blank)	No
R	Non-Return

Sensor Option	
(Blank)	None
-VA3	VA-3
-VN3	VN-3
-VN4	VN-4
-VP4	VP-4
-61N	DVN-61-18M
-61P	DVP-61-18M
-62N	DVN-62-18M
-100N	DVN-100
-100P	DVP-100

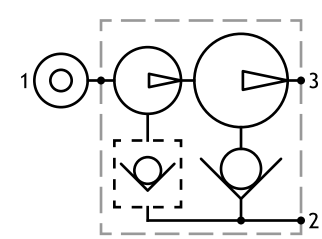
Silencer Option	
(Blank)	None
-ST	STA18M





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]

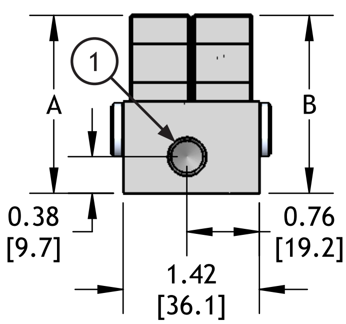
Code	Function	Ports
1	Air Supply	G 1/8 NPSF
2	Vacuum	G 1/8 NPSF
3	Exhaust	G 1/8 NPSF

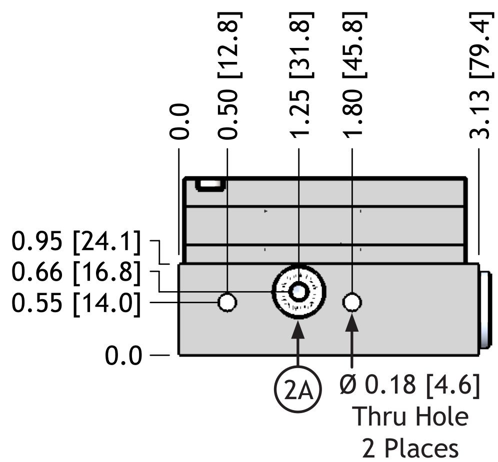


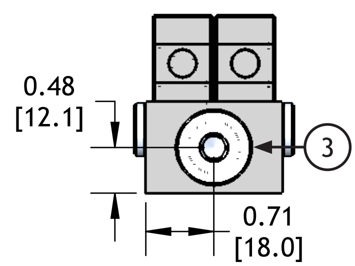
AX Pump - G 1/2 NPSF Base

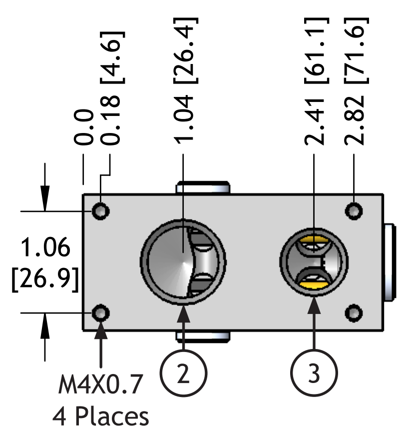
- Basic pump includes two exhaust ports at 90° - use the port most suitable for your application.
- Configurable with one to four pump modules for more vacuum flow capacity.
- Two side auxiliary vacuum ports are included.

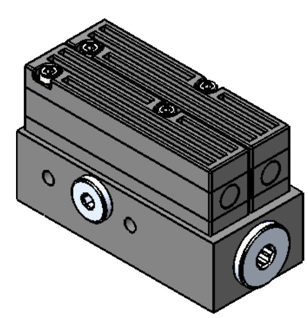
Series		Capacity		Non-Return Option		Sensor Option		Silencer Option	
AX	L	2		N		-12			
L	L-Series	1	1 Ejectors	(Blank)	None	(Blank)	None	(Blank)	None
M	M-Series	2	2 Ejectors	R	Non-Return	-VA3	VA-3	-ST	STB38M
		3	3 Ejectors			-VN3	VN-3		
		4	4 Ejectors			-VN4	VN-4		
						-VP4	VP-4		
						-61N	DVN-61-18M		
						-61P	DVP-61-18M		
						-62N	DVN-62-18M		
						-100N	DVN-100		
						-100P	DVP-100		





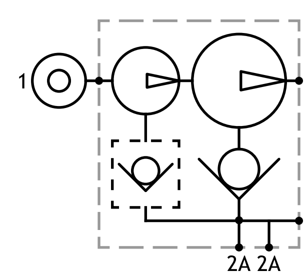






Capacity	A in [mm]	B in [mm]	Weight oz [g]
1	1.85 [47.0]	1.45 [66.8]	8.03 [227.8]
2	1.85 [47.0]	1.85 [47.0]	8.73 [247.6]
3	2.25 [57.2]	1.85 [47.0]	9.43 [267.4]
4	2.25 [57.2]	2.25 [57.2]	10.13 [287.2]

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



AX Pump - G 1/2 NPSF Base w/ Solenoid 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 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		Sensor Option	Silencer Option
AX	L	2	N		-12S24D		

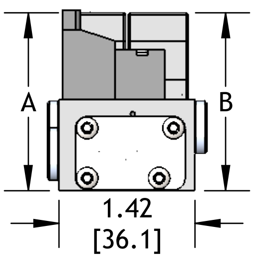
Series	
L	L-Series
M	M-Series

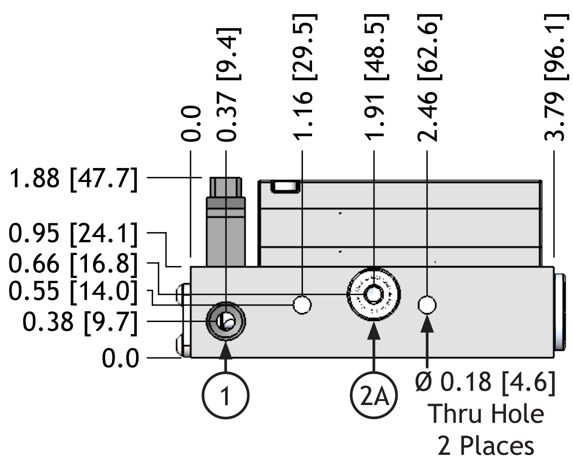
Capacity	
1	1 Ejectors
2	2 Ejectors
3	3 Ejectors
4	4 Ejectors

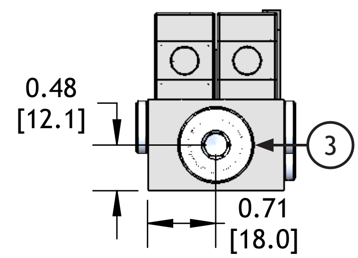
Non-Return Option	
(Blank)	None
R	Non-Return

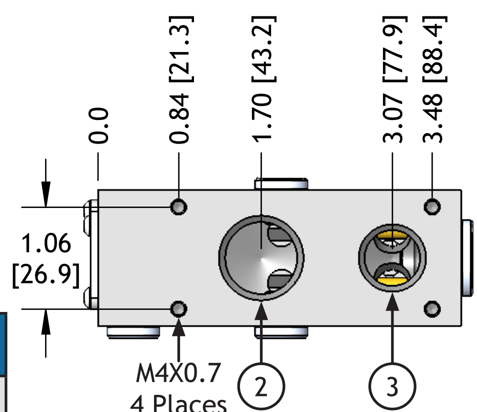
Sensor Option	
(Blank)	None
-VA3	VA-3
-VN3	VN-3
-VN4	VN-4
-VP4	VP-4
-61N	DVN-61-18M
-61P	DVP-61-18M
-62N	DVN-62-18M
-100N	DVN-100
-100P	DVP-100

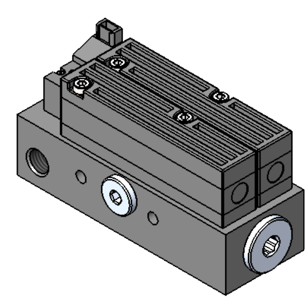
Silencer Option	
(Blank)	None
-ST	STB38M





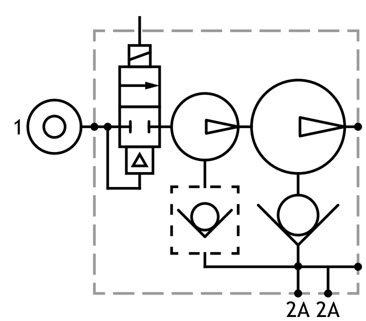






Capacity	A in [mm]	B in [mm]	Weight oz [g]
1	1.85 [47.0]	1.45 [66.8]	9.78 [277.4]
2	1.85 [47.0]	1.85 [47.0]	10.48 [297.2]
3	2.25 [57.2]	1.85 [47.0]	11.18 [316.9]
4	2.25 [57.2]	2.25 [57.2]	11.88 [336.7]

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



AX Pump - G 1/2 NPSF Base for Large Capacities

- 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 Option	Sensor Option	Silencer Option
AX	L	3	N	-312	

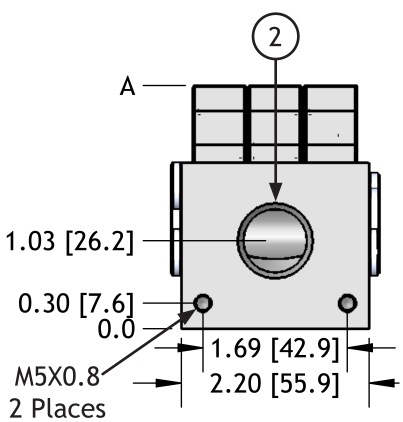
Series	
L	L-Series
M	M-Series

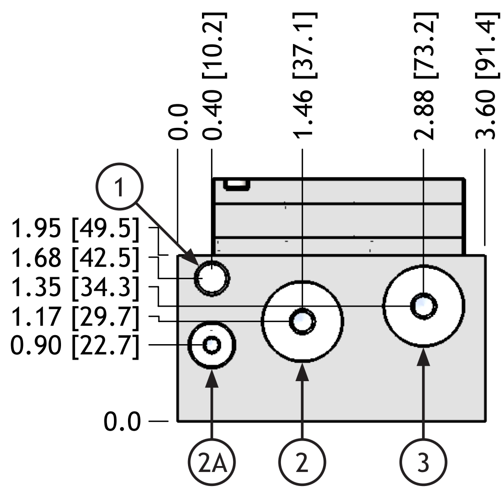
Capacity	
2	2 Ejectors
3	3 Ejectors
4	4 Ejectors
5	5 Ejectors
6	5 Ejectors

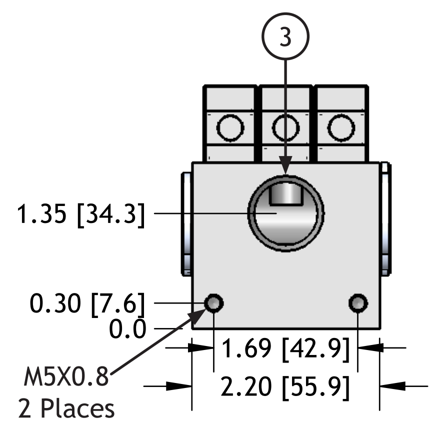
Non-Return Option	
(Blank)	None
R	Non-Return

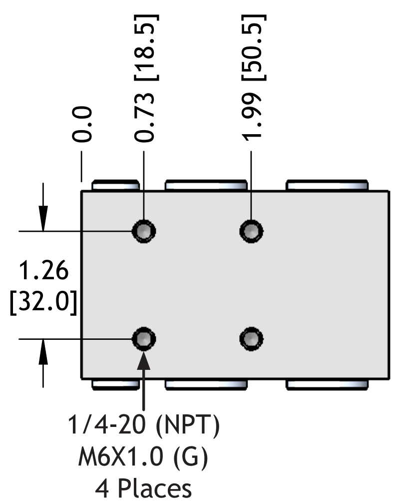
Sensor Option	
(Blank)	None
-VA3	VA-3
-VN3	VN-3
-VN4	VN-4
-VP4	VP-4
-61N	DVN-61-18M
-61P	DVP-61-18M
-62N	DVN-62-18M
-100N	DVN-100
-100P	DVP-100

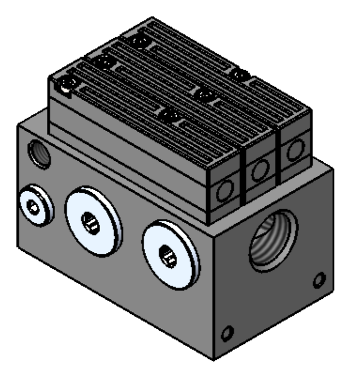
Silencer Option	
(Blank)	None
-ST	STC12M

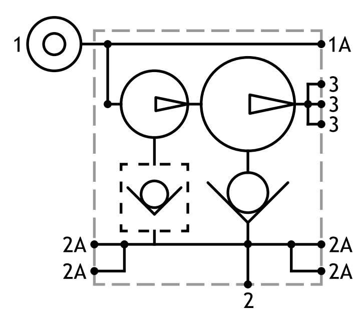












Capacity	A in [mm]	Weight oz [g]
2	1.85 [47.0]	686.11 [24.2]
3	1.85 [47.0]	705.9 [24.9]
4	2.25 [57.2]	725.68 [25.6]
5	2.25 [57.2]	745.47 [26.3]
6	2.25 [57.2]	765.25 [27.0]

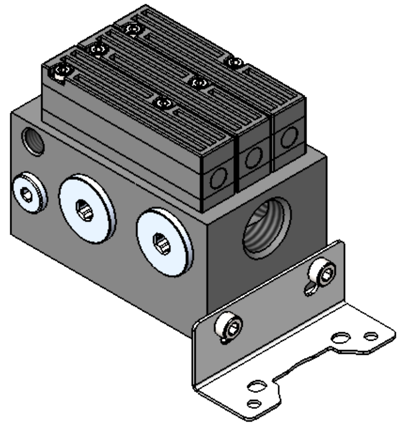
Code	Function	Ports
1	Air Supply	G 1/8 NPSF
2	Vacuum - Main	1/2 NPTF or G 1/2 NPSF
2A	Vacuum - Alternate	G 1/8 NPSF
3	Exhaust	1/2 NPTF or G 1/2 NPSF

AX-312 Base Mounting Brackets

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

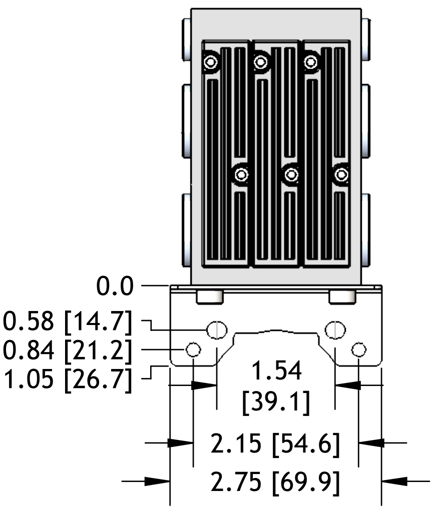
M5 SHCS (X2) Included for easy mounting.

Additional Weight: 1.29 oz [36.4 g]

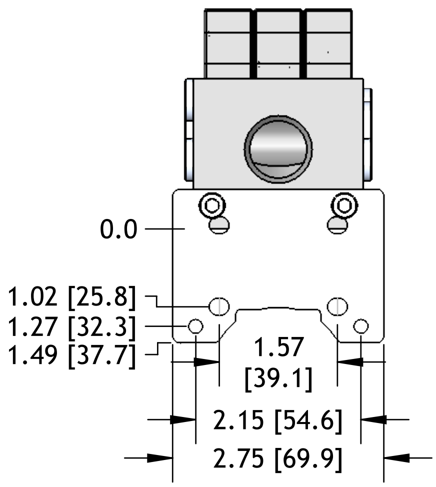


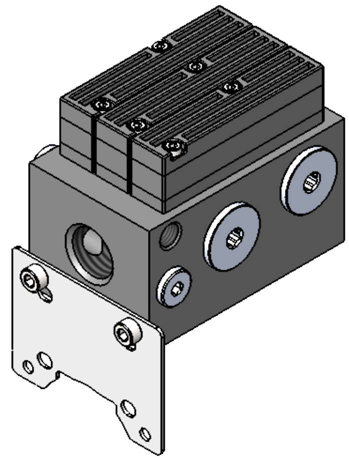
	Style	
AX-312-BKT-	90	
	90	90° Bracket
	180	180° Bracket

AX-312-BKT-90



AX-312-BKT-180





AX Pump - 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	Sensor Option	Silencer Option
AX	L	1	N		-F18	

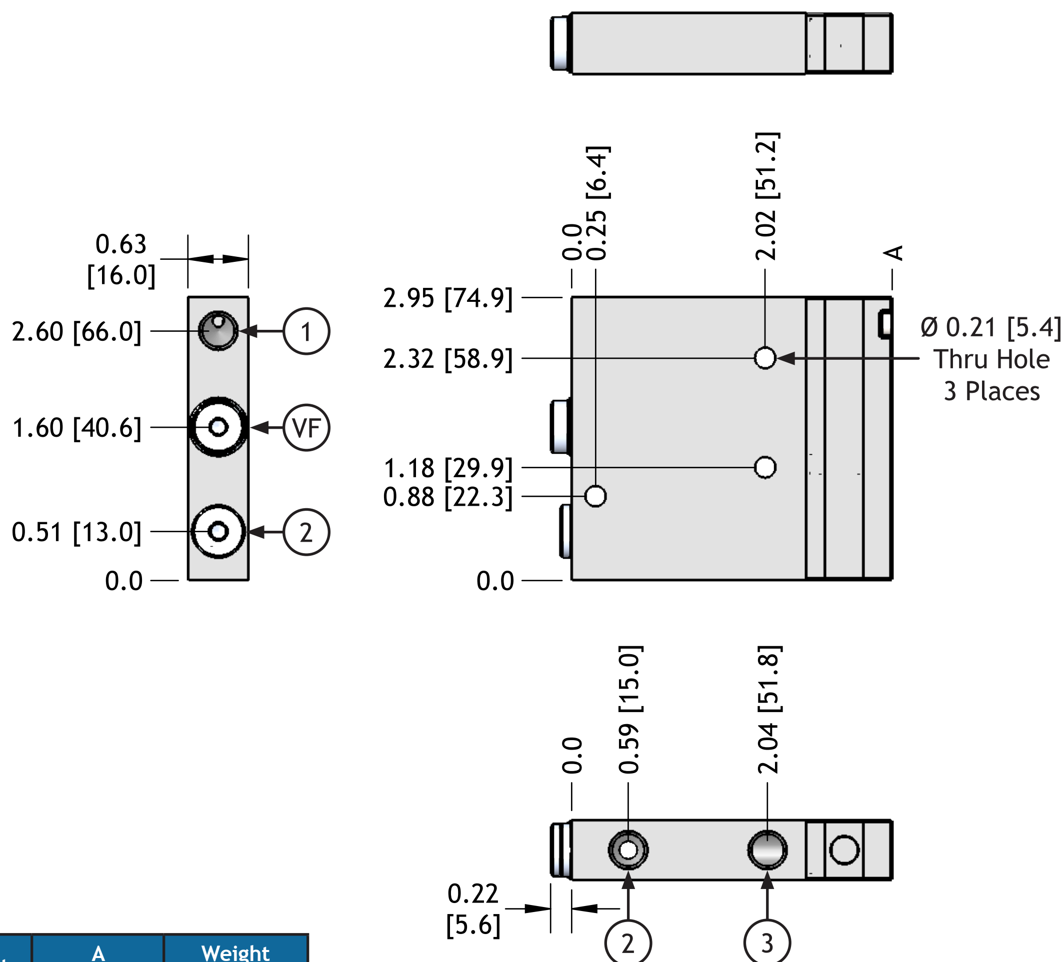
Series	
L	L-Series
M	M-Series

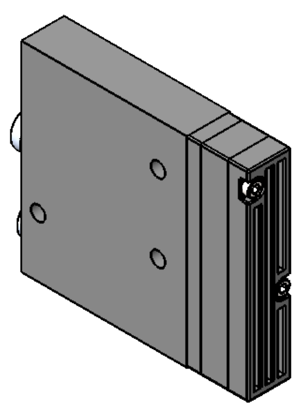
Capacity	
1	1 Ejector
2	2 Ejectors

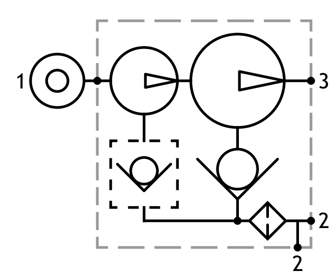
Non-Return Option	
(Blank)	None
R	Non-Return

Sensor Option	
(Blank)	None
-VA3	VA-3
-VN3	VN-3
-VN4	VN-4
-VP4	VP-4
-61N	DVN-61-18M
-61P	DVP-61-18M
-62N	DVN-62-18M
-100N	DVN-100
-100P	DVP-100

Silencer Option	
(Blank)	None
-ST	STA18M







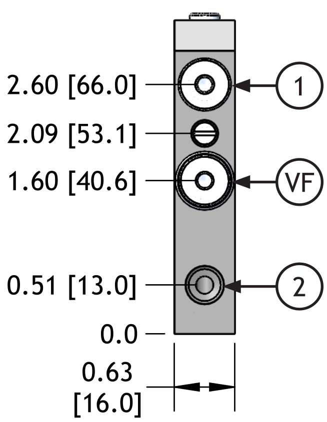
Capacity	A in [mm]	Weight oz [g]
1	3.34 [84.8]	7.00 [198.7]
2	3.74 [95.0]	7.71 [218.5]

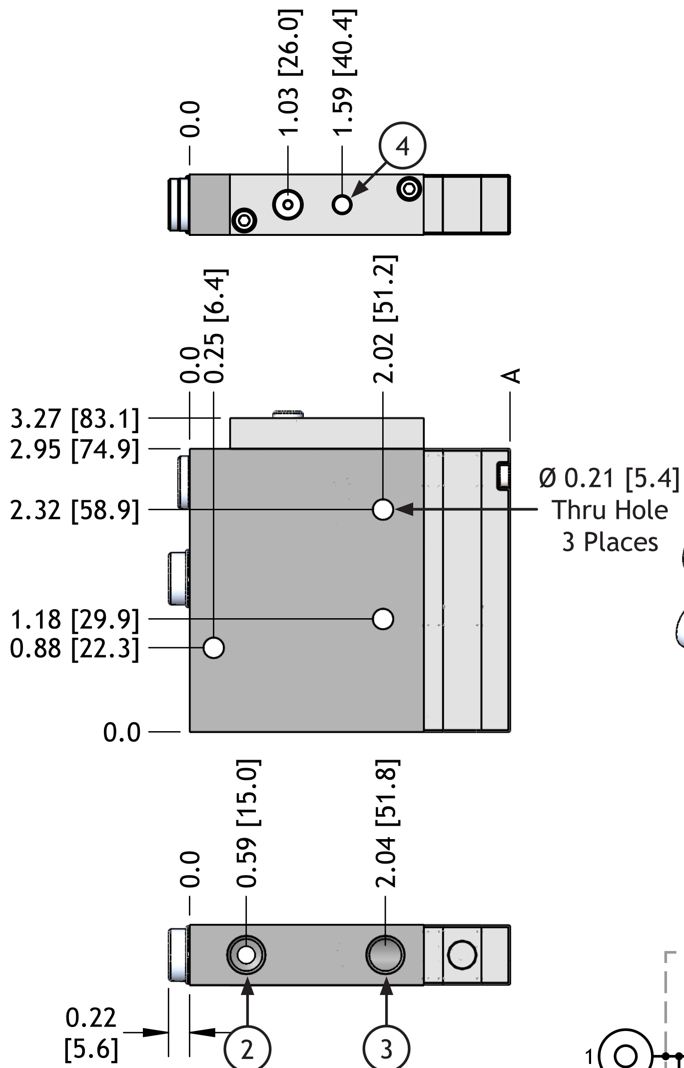
Code	Function	Ports
1	Air Supply	G 1/8 NPSF
2	Vacuum	G 1/8 NPSF
3	Exhaust	G 1/8 NPSF
VF	Vacuum Filter	-

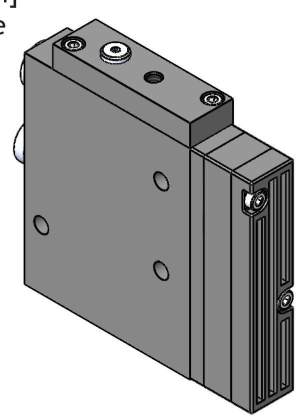
AX Pump - G 1/8 NPSF Base w/ Integral Filter & Piloted Supply

- 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.

AX	Series	Capacity	N	Non-Return Option	-F18PS	Sensor Option	Silencer Option
	L	1					
	L L-Series	**1** 1 Ejector		**(Blank)** None		**(Blank)** None	**(Blank)** None
	M M-Series	**2** 2 Ejectors		**R** Non-Return		**-VA3** VA-3	**-ST** STA18M
						-VN3 VN-3	
						-VN4 VN-4	
						-VP4 VP-4	
						-61N DVN-61-18M	
						-61P DVP-61-18M	
						-62N DVN-62-18M	
						-100N DVN-100	
						-100P DVP-100	

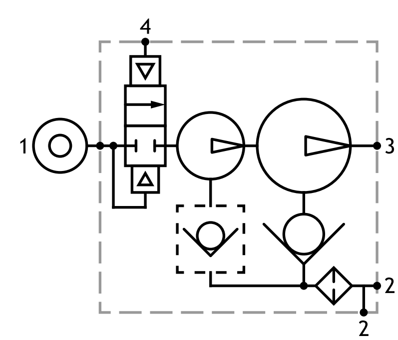






Capacity	A in [mm]	Weight oz [g]
1	3.34 [84.8]	7.44 [211.0]
2	3.74 [95.0]	8.14 [230.8]

Code	Function	Ports
1	Air Supply	G 1/8 NPSF
2	Vacuum	G 1/8 NPSF
3	Exhaust	G 1/8 NPSF
4	Pilot for Vacuum Control	M5X0.8 (10-32)
VF	Vacuum Filter	-



AX Pump - G 1/8 NPSF Base w/ Integral Filter & Piloted Supply & Blow-Off

- 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 Option	Silencer Option
AX	L	1	N		-F18PSB		

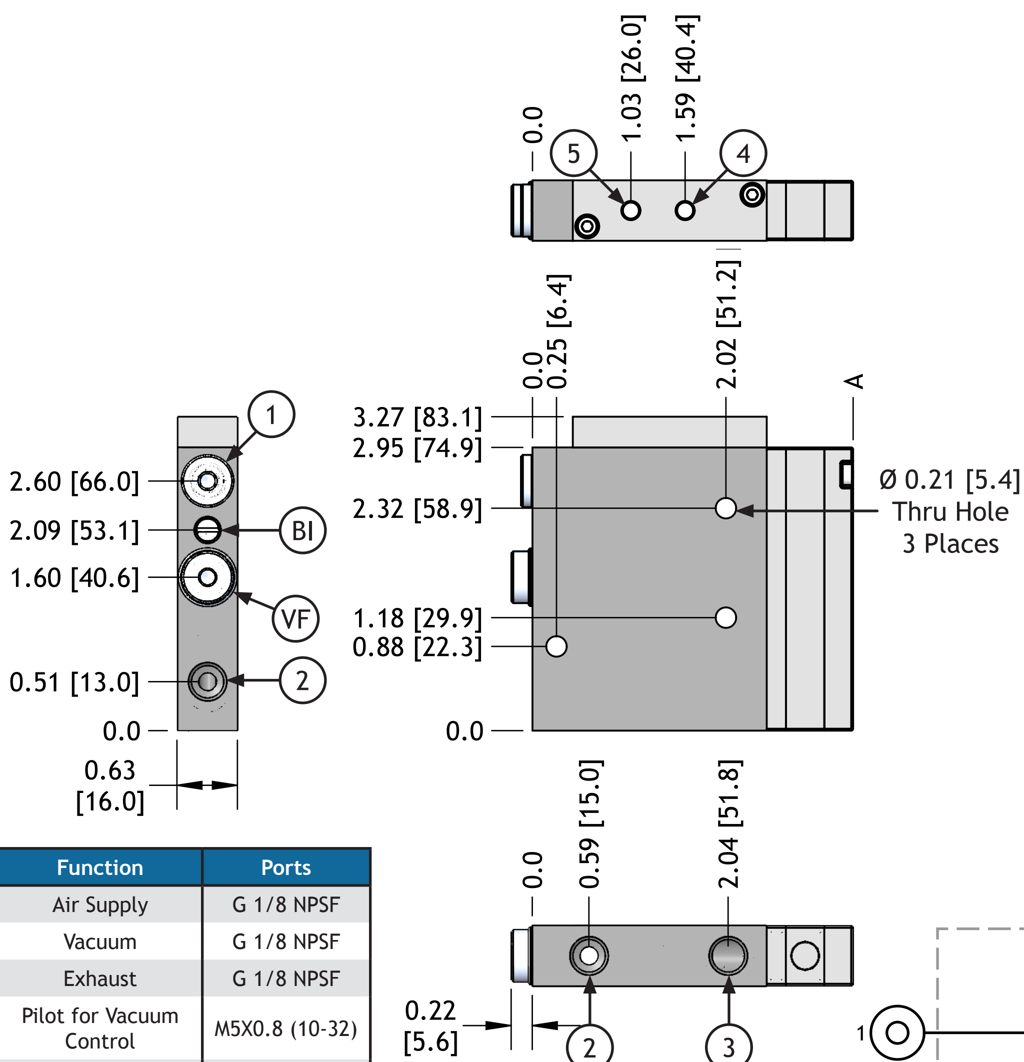
Series	
L	L-Series
M	M-Series

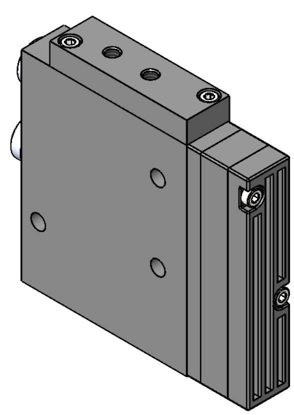
Capacity	
1	1 Ejector
2	2 Ejectors

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

Sensor Option	
(Blank)	None
-VA3	VA-3
-VN3	VN-3
-VN4	VN-4
-VP4	VP-4
-61N	DVN-61-18M
-61P	DVP-61-18M
-62N	DVN-62-18M
-100N	DVN-100
-100P	DVP-100

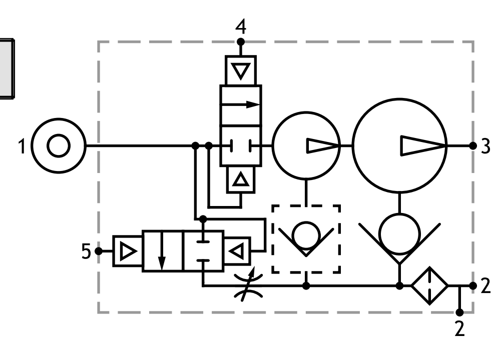
Silencer Option	
(Blank)	None
-ST	STA18M





Code	Function	Ports
1	Air Supply	G 1/8 NPSF
2	Vacuum	G 1/8 NPSF
3	Exhaust	G 1/8 NPSF
4	Pilot for Vacuum Control	M5X0.8 (10-32)
5	Pilot for Blow-Off Control	M5X0.8 (10-32)
BI	Blow-Off Intensity Adjustment	-
VF	Vacuum Filter	-

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]



UPDATED 02/25/19

AX Pump - G 1/8 NPSF Base w/ Integral Filter & Solenoid 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.

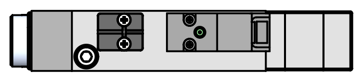
	Series	Capacity		Non-Return Option		Sensor Option	Silencer Option
AX	L	1	N		-F18S24D		

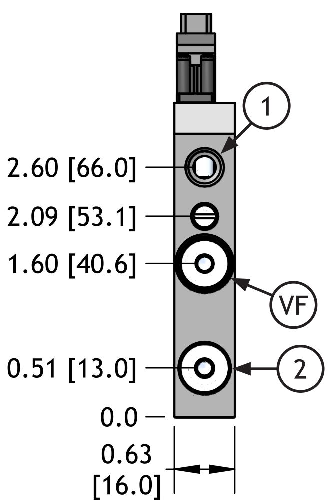
Series		Capacity	
L	L-Series	1	1 Ejector
M	M-Series	2	2 Ejectors

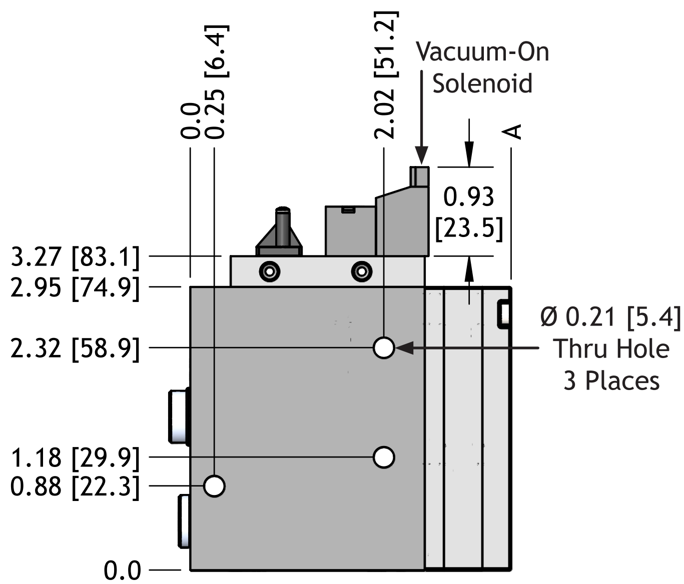
Non-Return Option	
(Blank)	None
R	Non-Return

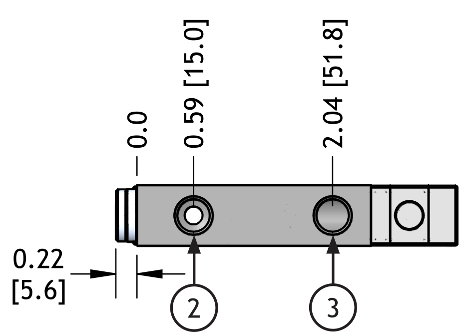
Sensor Option	
(Blank)	None
-VA3	VA-3
-VN3	VN-3
-VN4	VN-4
-VP4	VP-4
-61N	DVN-61-18M
-61P	DVP-61-18M
-62N	DVN-62-18M
-100N	DVN-100
-100P	DVP-100

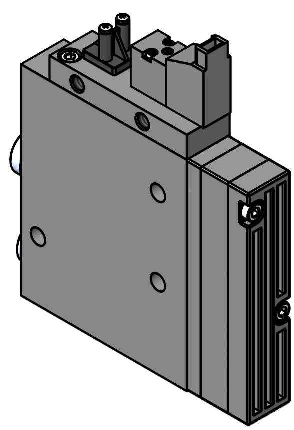
Silencer Option	
(Blank)	None
-ST	STA18M





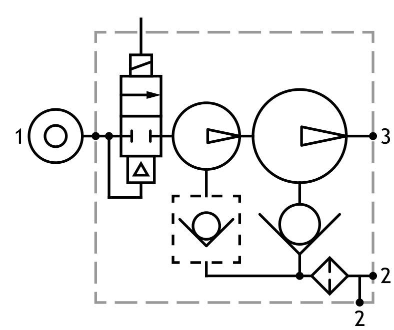






Capacity	A in [mm]	Weight oz [g]
1	3.34 [84.8]	7.58 [214.9]
2	3.74 [95.0]	8.28 [234.7]

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



AX Pump - G 1/8 NPSF Base w/ Integral Filter & Solenoid Supply & Blow-Off

- 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 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.

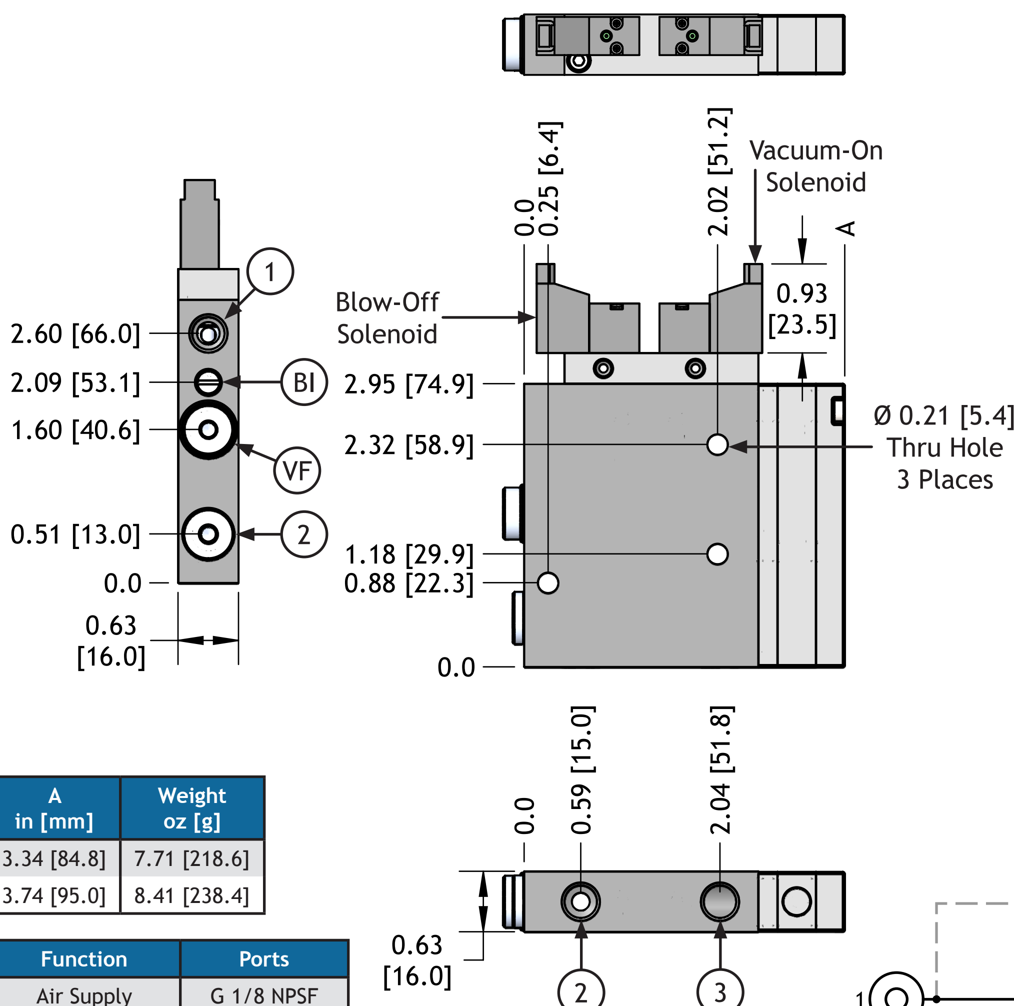
	Series	Capacity		Non-Return Option		Sensor Option	Silencer Option
AX	L	1	N		-F18SB24D		

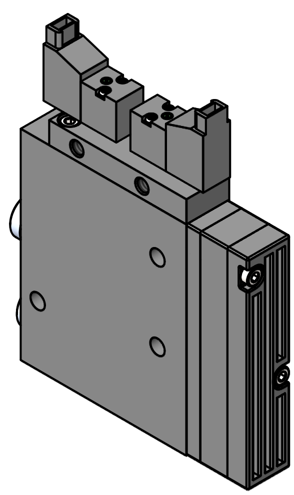
Series		Capacity	
L	L-Series	1	1 Ejector
M	M-Series	2	2 Ejectors

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

Sensor Option	
(Blank)	None
-VA3	VA-3
-VN3	VN-3
-VN4	VN-4
-VP4	VP-4
-61N	DVN-61-18M
-61P	DVP-61-18M
-62N	DVN-62-18M
-100N	DVN-100
-100P	DVP-100

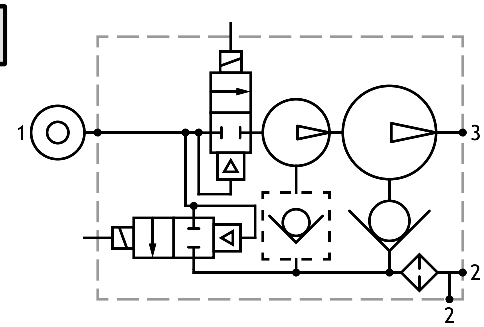
Silencer Option	
(Blank)	None
-ST	STA18M





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
BI	Blow-off Intensity Adjustment	-
VF	Vacuum Filter	-



AX Pump - G 1/8 NPSF Base w/ Integral Filter & Solenoid Supply (N.O.)

- 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.

	Series	Capacity	Non-Return Option		Sensor Option	Silencer Option
AX	L	1	N	-F18OS24D		

Series

L	L-Series
M	M-Series

Capacity

1	1 Ejector
2	2 Ejectors

Non-Return Option

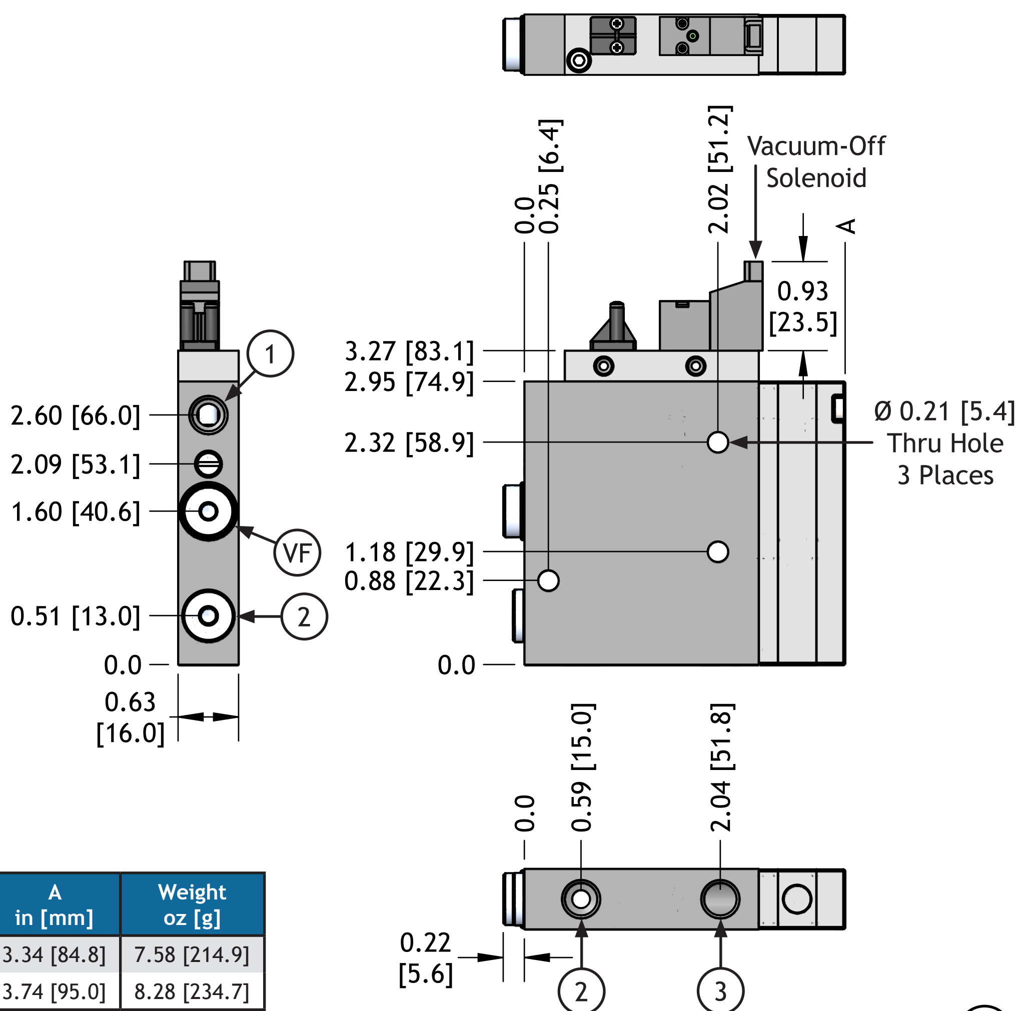
(Blank)	None
R	Non-Return

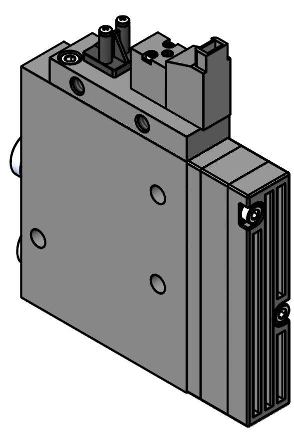
Sensor Option

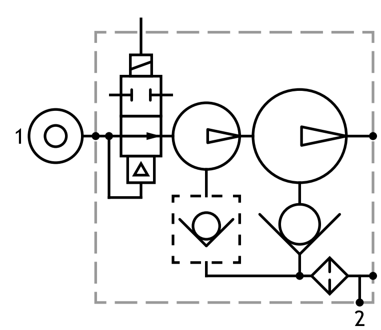
(Blank)	None
-VA3	VA-3
-VN3	VN-3
-VN4	VN-4
-VP4	VP-4
-61N	DVN-61-18M
-61P	DVP-61-18M
-62N	DVN-62-18M
-100N	DVN-100
-100P	DVP-100

Silencer Option

(Blank)	None
-ST	STA18M







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
VF	Vacuum Filter	-

AX Pump - G 1/8 NPSF Base w/ Integral Filter & Solenoid Supply (N.O.) & Blow-Off

- 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 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

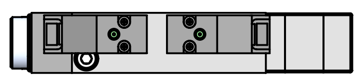
(Blank)	None
R	Non-Return

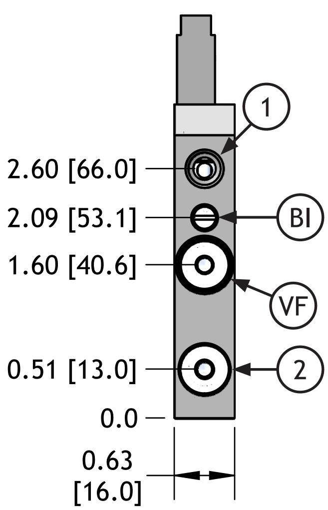
Sensor Option

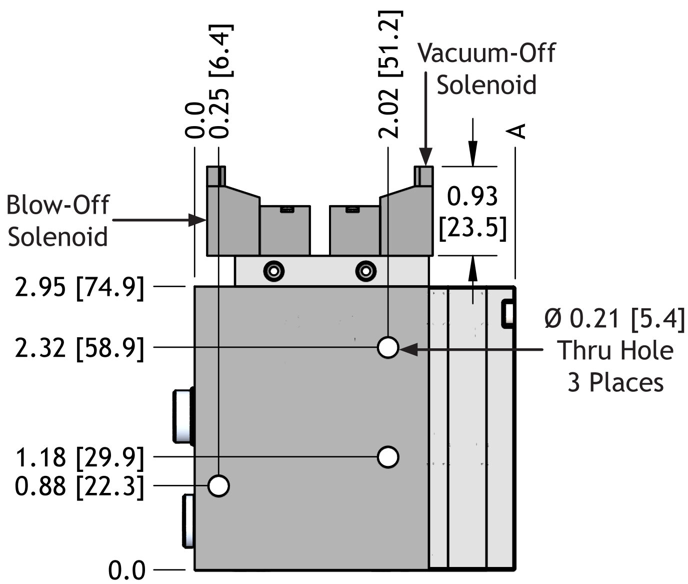
(Blank)	None
-VA3	VA-3
-VN3	VN-3
-VN4	VN-4
-VP4	VP-4
-61N	DVN-61-18M
-61P	DVP-61-18M
-62N	DVN-62-18M
-100N	DVN-100
-100P	DVP-100

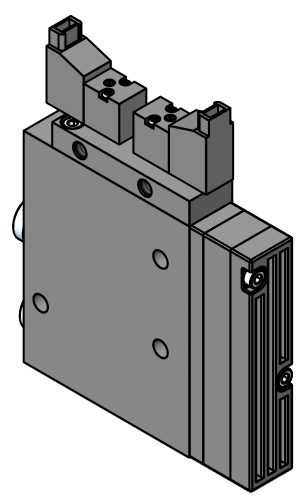
Silencer Option

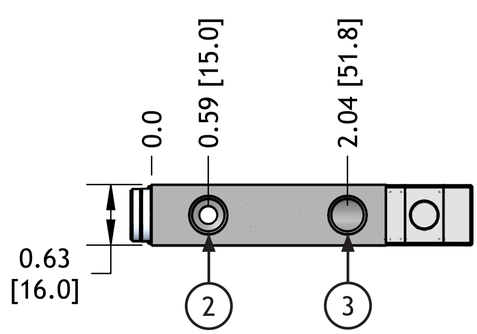
(Blank)	None
-ST	STA18M

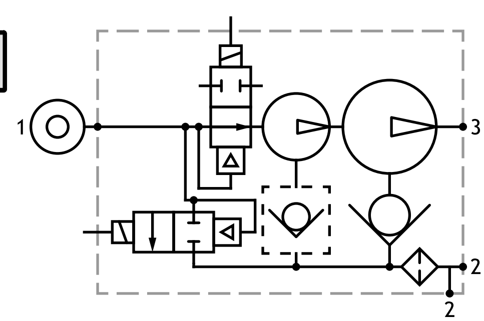










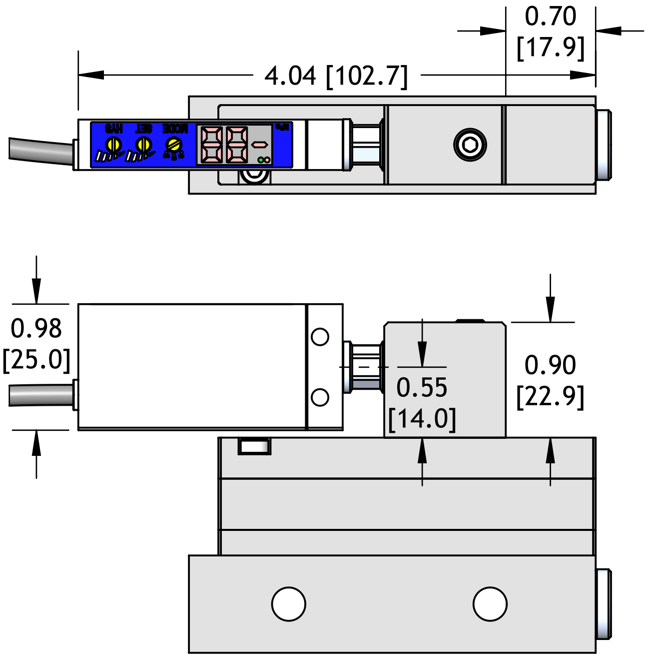


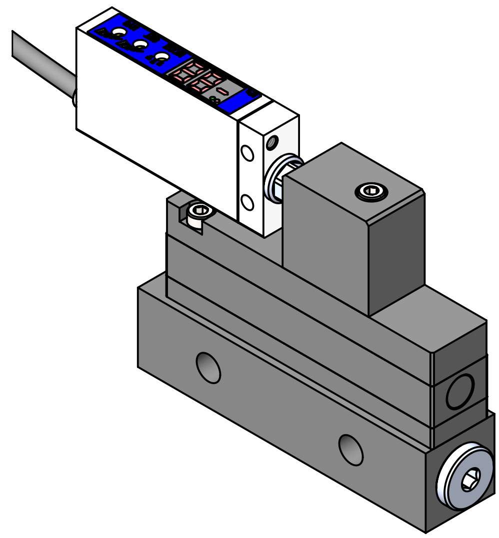
Capacity	A in [mm]	Weight oz [g]
1	3.34 [84.8]	7.71 [218.6]
2	3.74 [95.0]	8.41 [238.4]

Code	Function	Ports
1	Air Supply	G 1/8 NPSF
2	Vacuum	G 1/8 NPSF
3	Exhaust	G 1/8 NPSF
BI	Blow-off Intensity Adjustment	-
VF	Vacuum Filter	-

AX Series Vacuum Pump Sensor Options

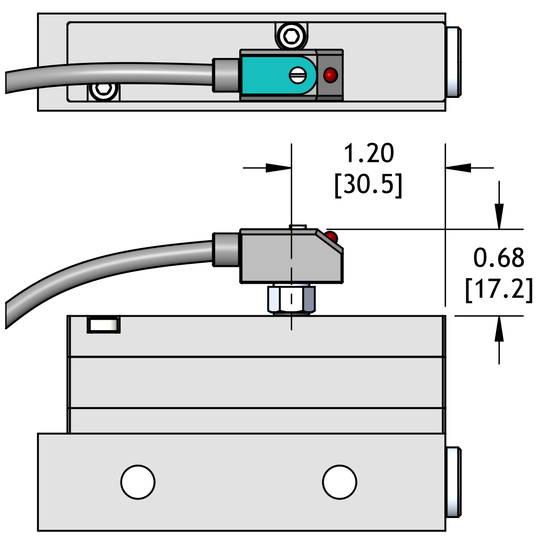
-61 / -62 Series Sensor Options

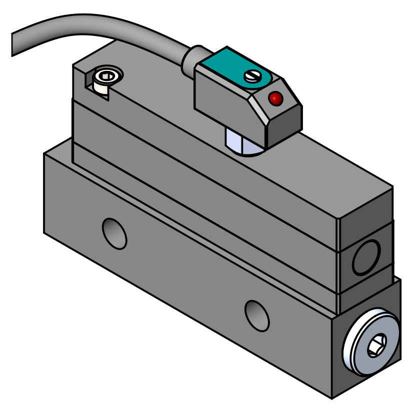




Additional Weight: 0.45 oz [12.8 g]

V Series Sensor Options





Additional Weight: 1.74 oz [49.4 g]

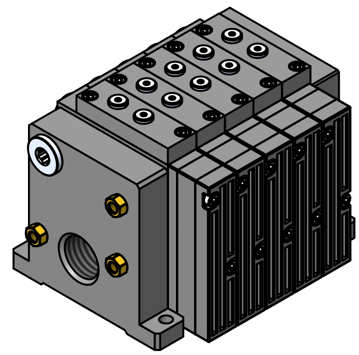
AX Series Vacuum Pump Manifolds

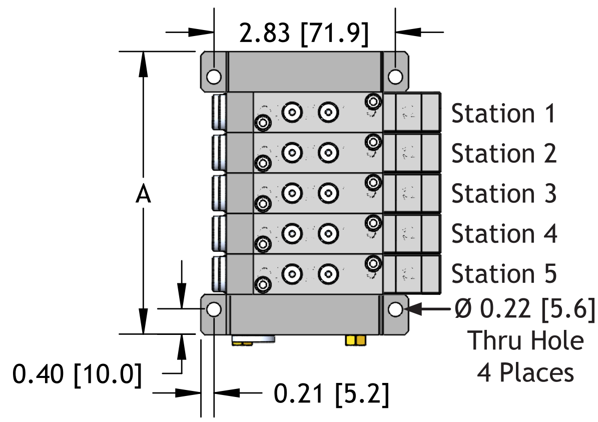
AX Series Vacuum Pumps can be used as a multi pump module manifold. All of our G 1/8 NPSF bases with integral filters (F18 models) can be used in these manifolds. To order a manifold, first, select your AX Manifold End Plate assembly. Next, decide which AX Manifold Pump Module(s) you'd like to use. Order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

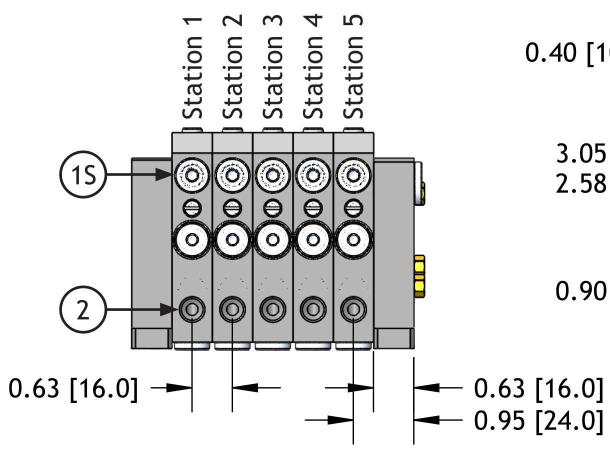
AX Manifold End Plate

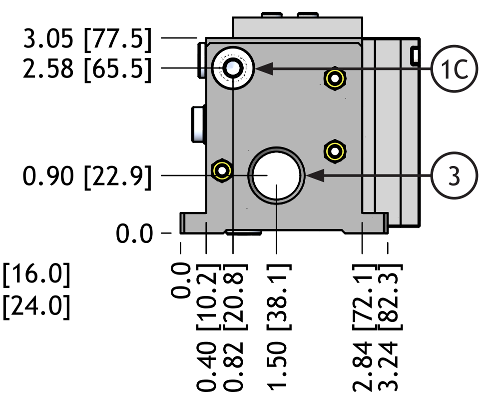
	Threads		Air-Supply Options		Number of Modules		Silencer Options[1]	
AX-E	N		C		5		-2ST90	
	N	NPTF	C	Common	1	1 Station	(Blank)	None
	G	G	S	Separate	2	2 Stations	-ST	1 STC12M
					3	3 Stations	-2ST[1]	2 STC12M
					4	4 Stations	-ST90	1 STB38M w/ 90° Adapter
					5[1]	5 Stations	-2ST90[1]	2 STB38M w/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

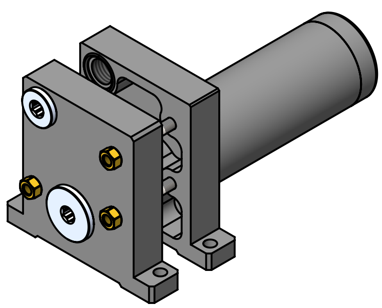
Code	Function	NPT	G
1C	Main Air Supply - Common	1/4 NPTF	G 1/4
1S	Main Air Supply - Separate	G 1/8 NPSF	
2	Vacuum	G 1/8 NPSF	
3	Exhaust - Common	G 1/2 NPSF	

AX Series Vacuum Pump Manifold Module

	Series		Capacity		Non-Return Option		Air-Supply		Module Style		Sensor Option	
AX	L		1		N	-	C		18			
	L	L Series	1	1 Ejector	(Blank)	No	C	Common	18	Standard	(Blank)	None
	M	M Series	2	2 Ejectors	R	Non-Return	S	Separate	18PS	Piloted Supply	-VA3	VA-3
									18PSB	Piloted Supply & Blow-Off	-VN3	VN-3
									18S24D	Solenoid Supply	-VN4	VN-4
									18SB24D	Solenoid Supply & Blow-Off	-VP4	VP-4
									18OS24D	Solenoid Supply (N.O.)	-61N	DVN-61-18M
									18OSB24D	Solenoid Supply (N.O.) & Blow-Off	-61P	DVP-61-18M
											-62N	DVN-62-18M
											-100N	DVN-100
											-100P	DVP-100

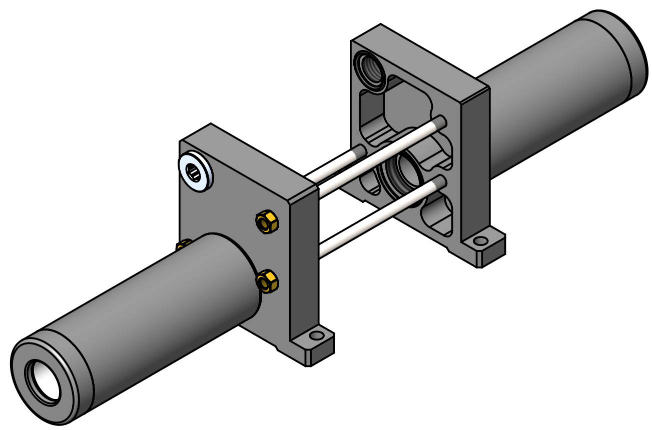
[1]DVN-100 and DVP-100 switches can only be used on every other module on AX manifolds. 100 Series switches are too wide for use on adjacent modules.

AX Manifold Silencer Options



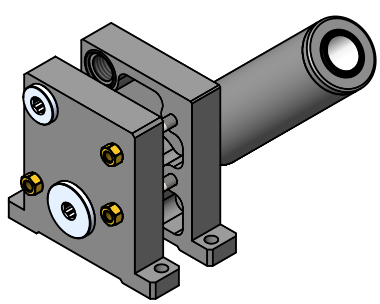
-ST

Additional Weight: 3.36 oz [95.3 g]



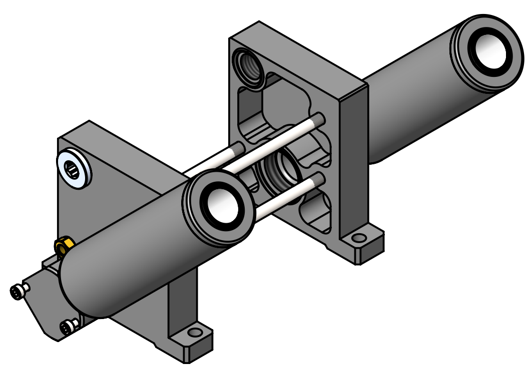
-2ST

Additional Weight: 6.72 oz [190.6 g]



-ST90

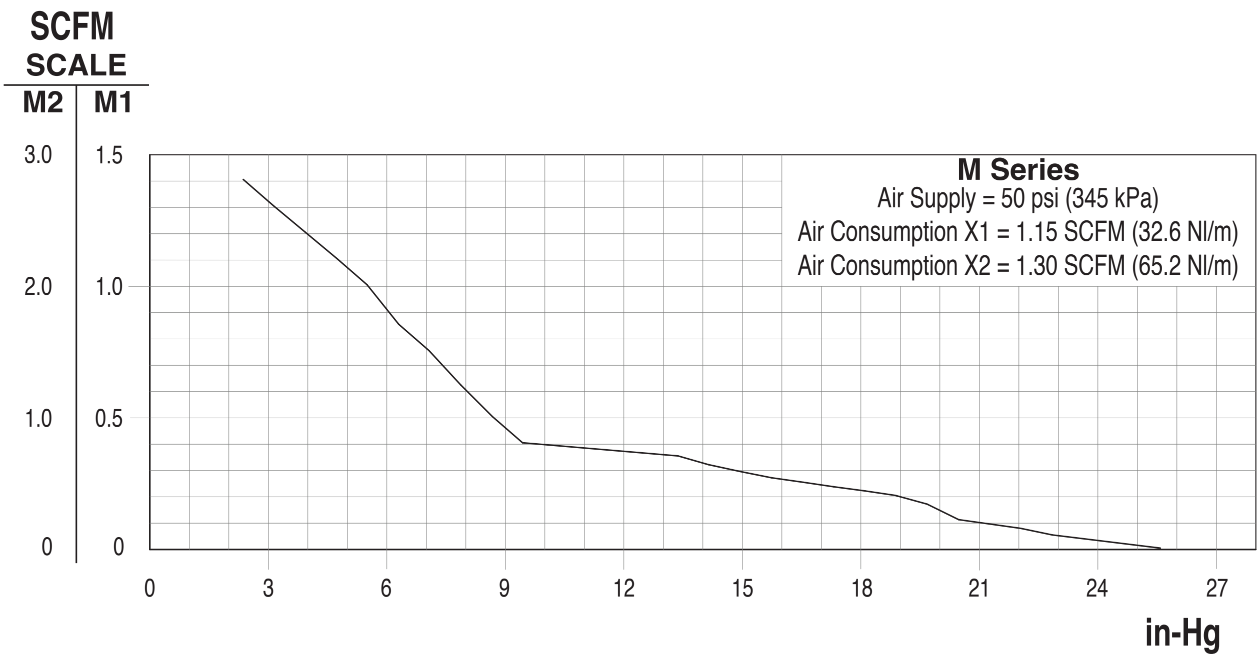
Additional Weight: 4.03 oz [114.4 g]

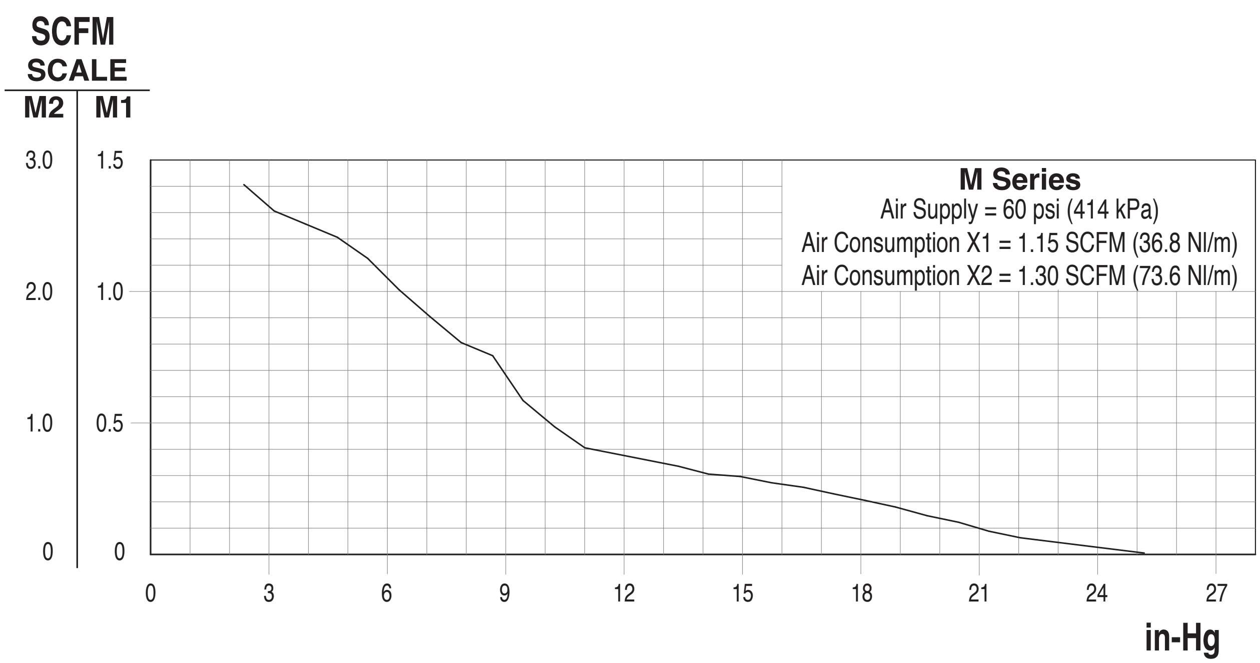


-2ST90

Additional Weight: 8.06 oz [228.8 g]

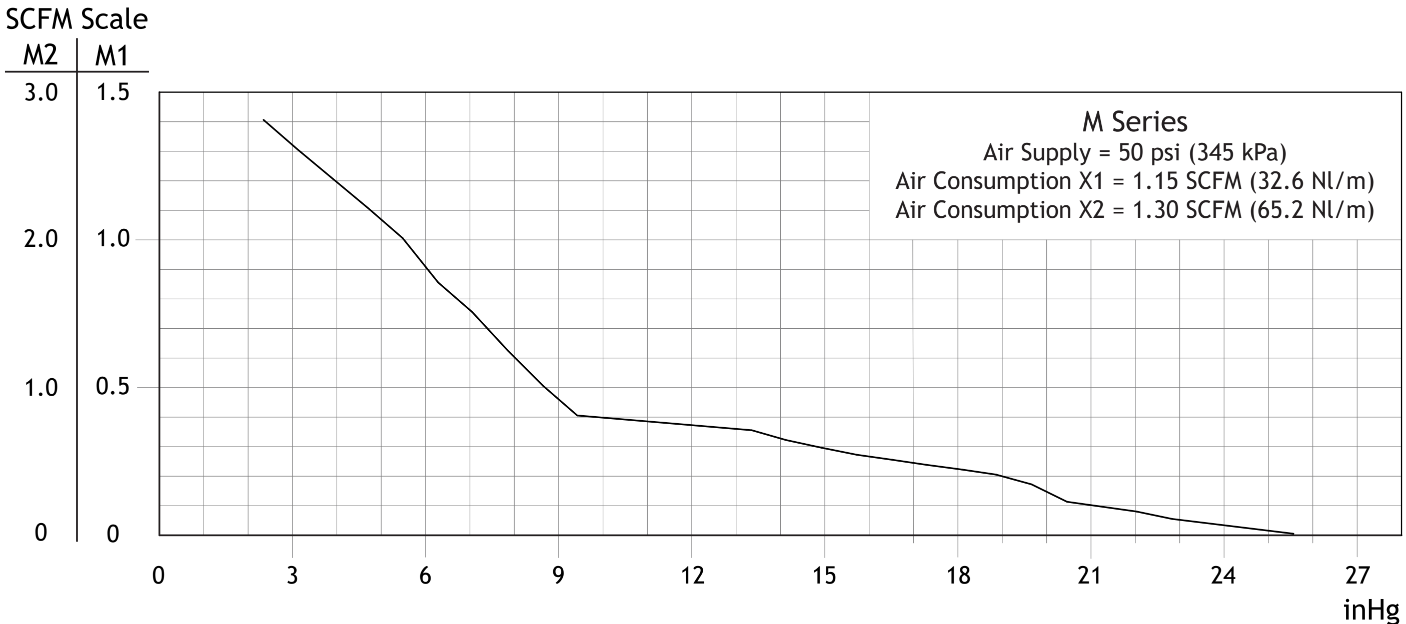
AX Series Vacuum Pumps - Performance

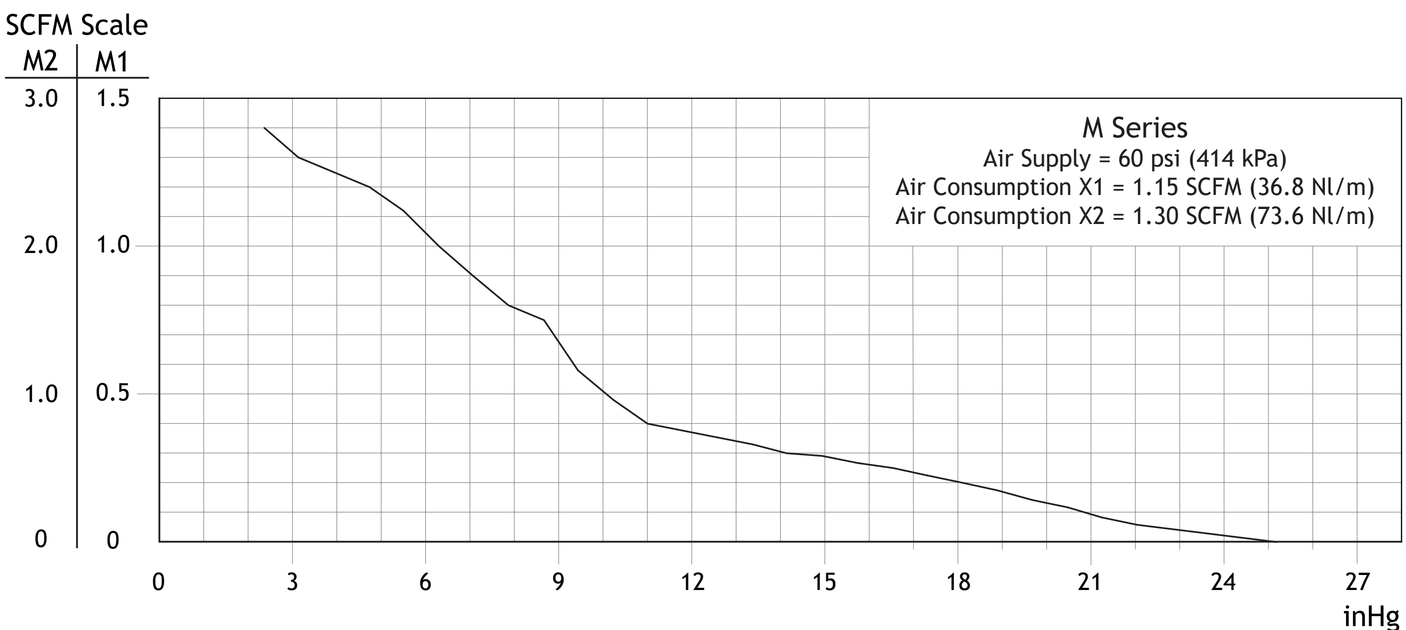




All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.

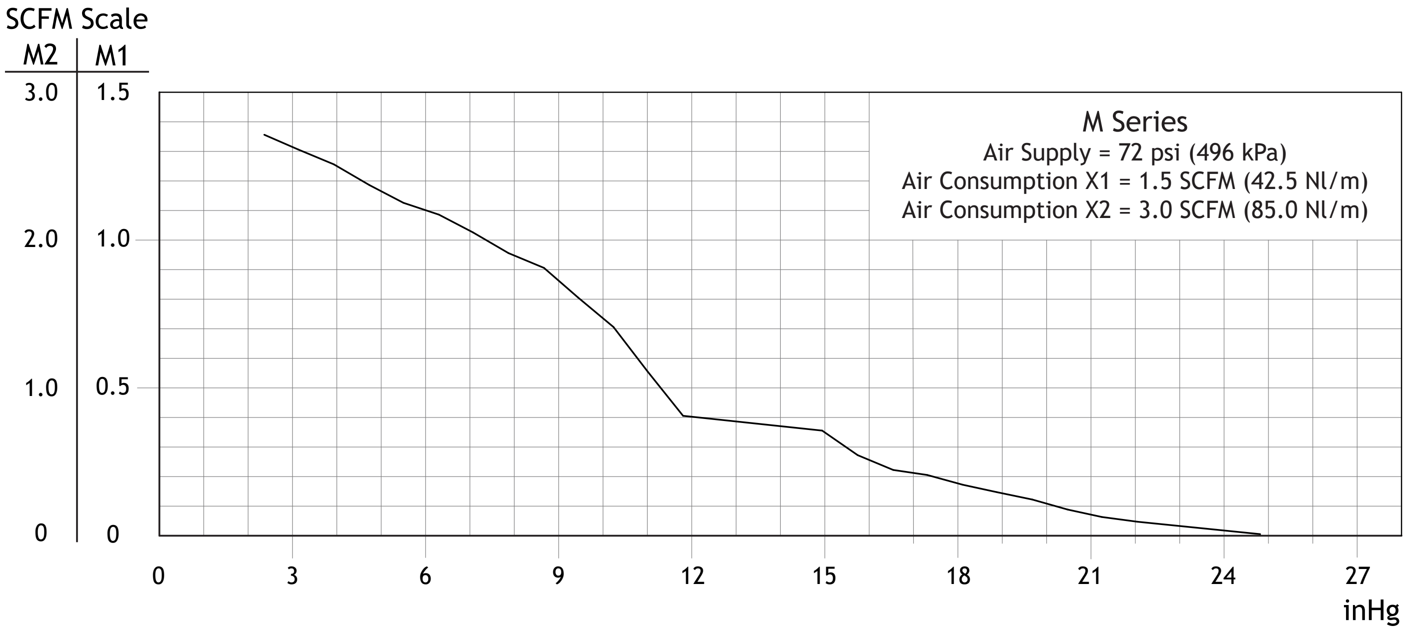
AX Series Vacuum Pumps - Performance

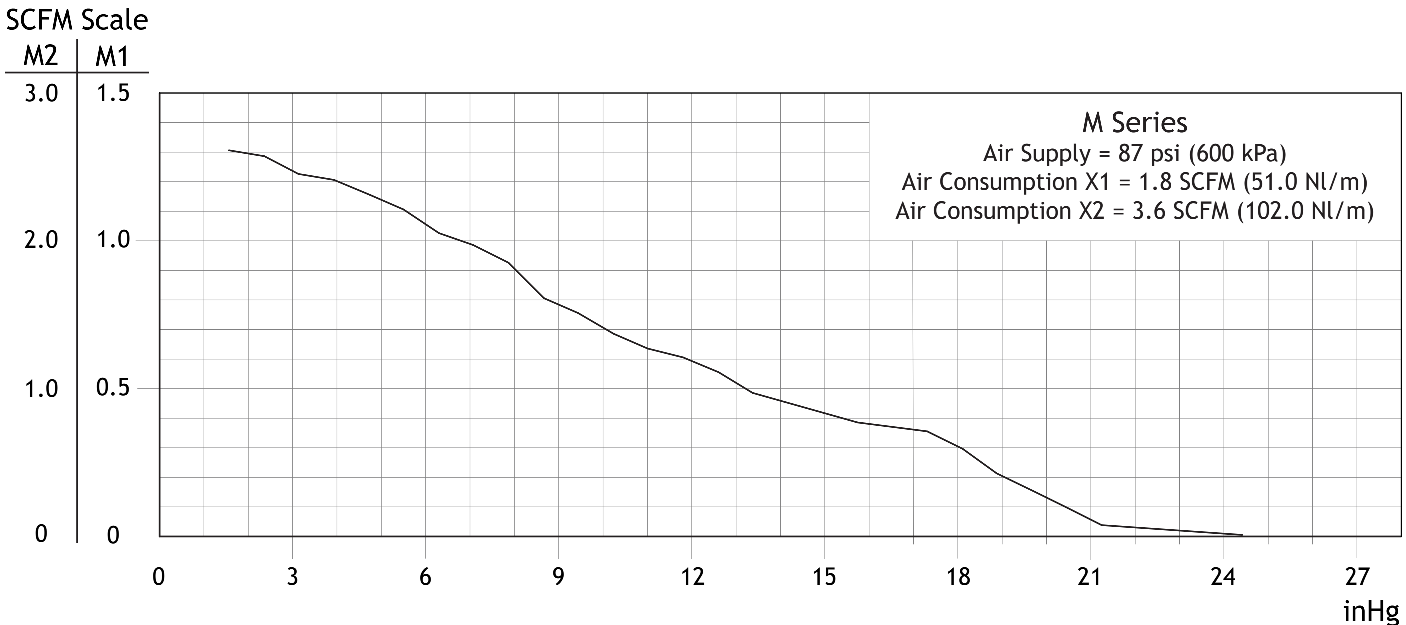




All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.

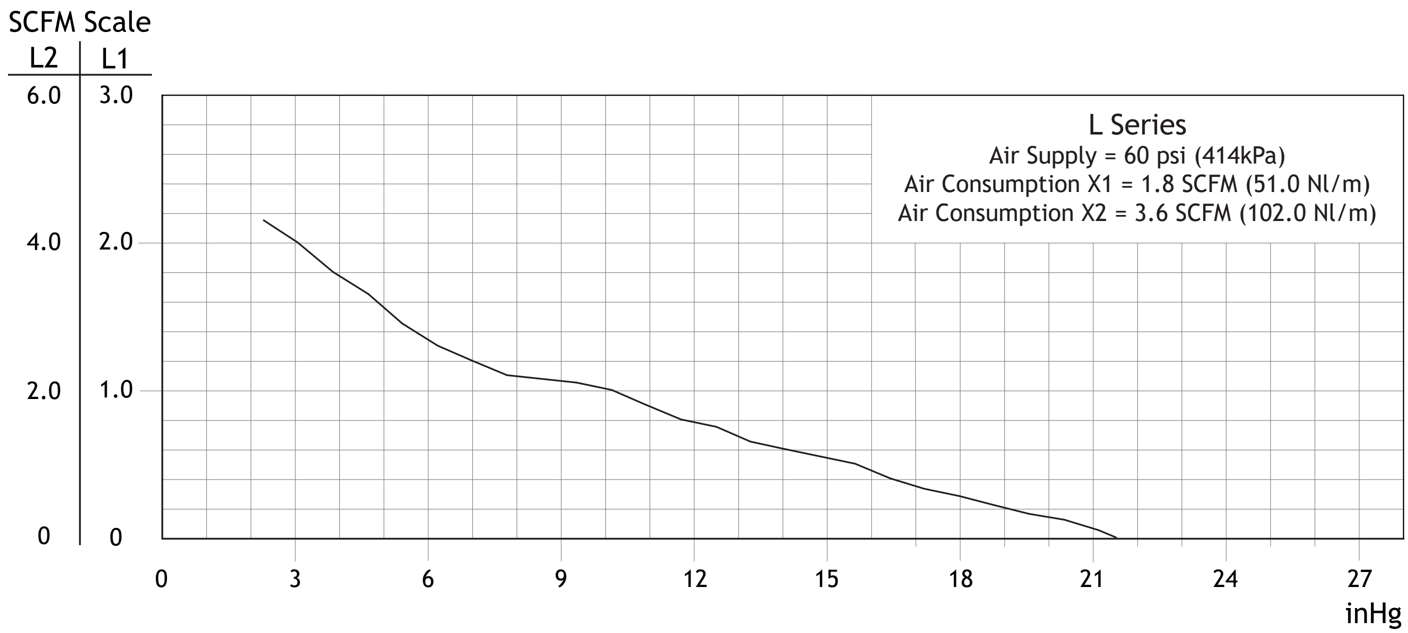
AX Series Vacuum Pumps - Performance





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.

AX Series Vacuum 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
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	24.4	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	24.4	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.

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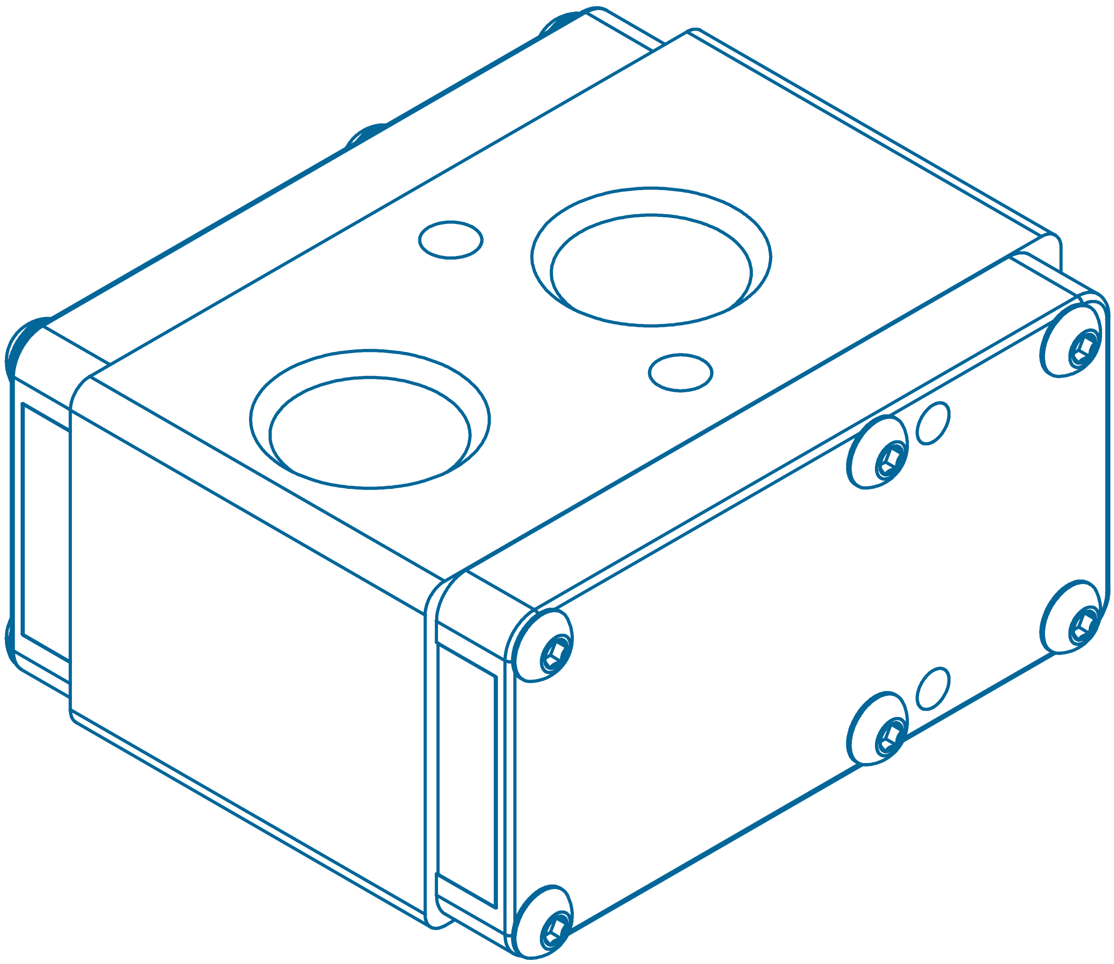
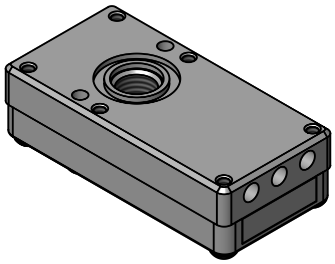
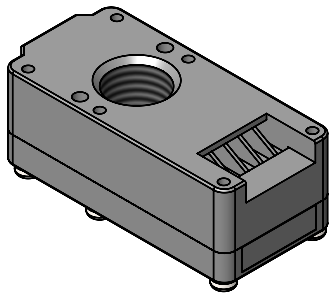
SECTION 7

CHIP PUMPS

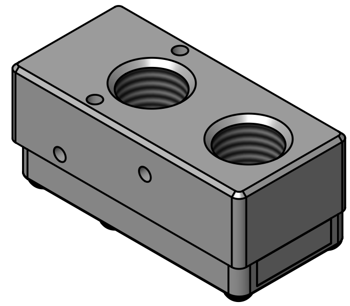




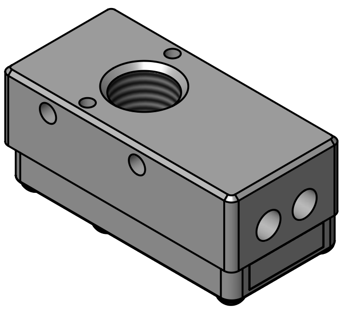
AA Base



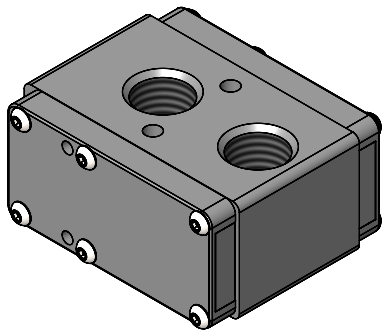
A & B Base



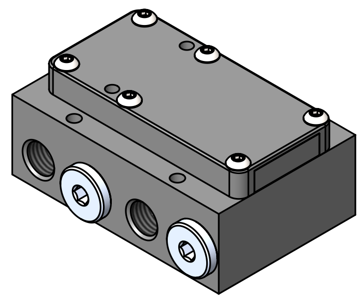
C Base



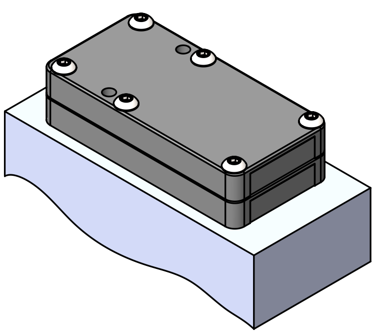
D Base



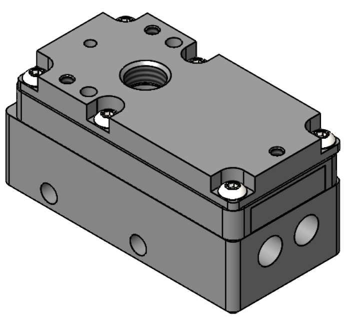
G Base



M Base



Z & ZS Option



Options

Chip Pumps

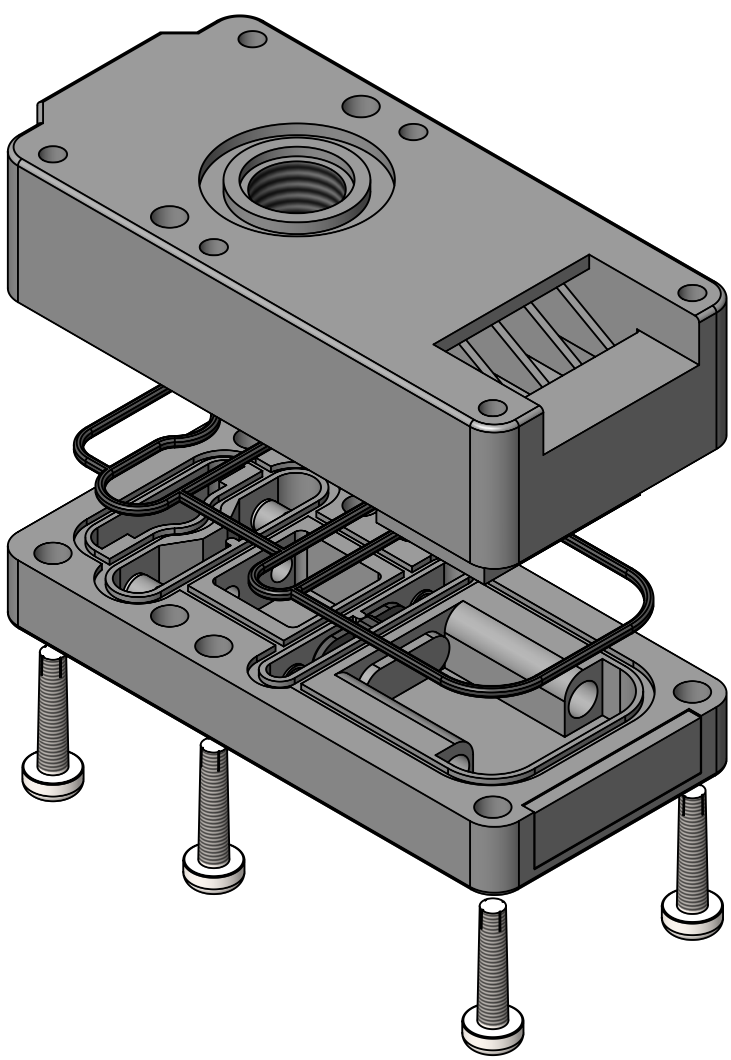
EDCO Vacuum Chip Pumps were named after electronic circuit chips whose small size and versatility have made modern products more efficient, compact, and affordable. Our low-cost Chip Pumps will do the same thing for your vacuum systems.

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.



Chip Pumps

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

Code	Description
N	Nitrile
E	EPDM
V	Viton[1]

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

Material 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.

Chip Pumps - “AA” Base

PPS Pump Module w/ Aluminum Base

	Series	Capacity	Seal Material	Non-Return Option		Options
C	6M	10	N		-AA	

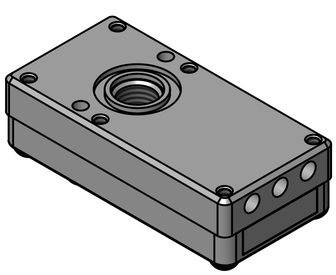
Series	Capacity
4M	M Series
6M	10
5L	E & L Series
6E	14

Seal Material	
E	EPDM
N	Nitrile
V	Viton[1]

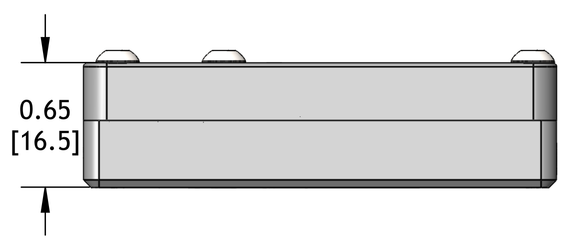
Non-Return Option	
(Blank)	None
R	Non-Return

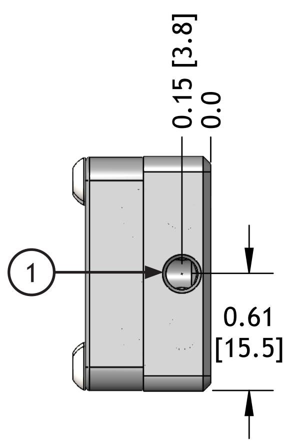
Options	
(Blank)	None
-PA5F	Port Adapter, M5X0.8
-PA18F	Port Adapter, G 1/8 NPSF
-RC18A	Release Check Valve
-RC18A-040	Release Check Valve
-PFC[2]	Pump w/ Filter Combo
-VA3	VA-3 Sensor, NPN, 3-Pin
-VN3	VN-3 Sensor, NPN, 3-Pin
-VN4	VN-4 Sensor, NPN, 4-Pin
-VP3	VP-3 Sensor, PNP, 3-Pin
-VP4	VP-4 Sensor, PNP, 4-Pin

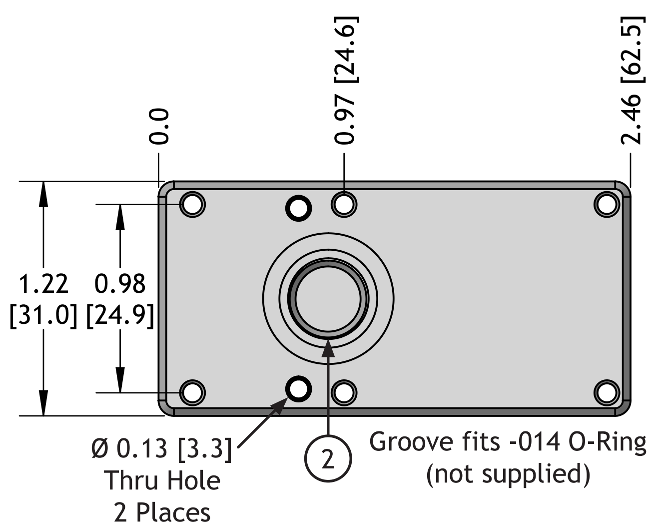
[1]Viton is a registered trademark of DuPont Dow.
[2]Includes a t-style vacuum filter and replacement filter elements (qty 3).

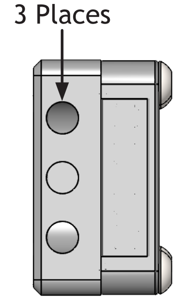


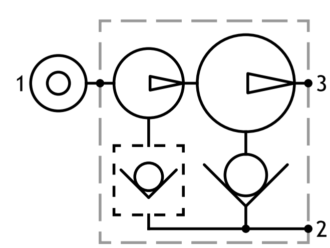
Weight: 2.36 oz [66.8 g]











Code	Function	Ports
1	Air Supply	M5X0.8 (10-32 UNF)
2	Vacuum	G 1/8 NPSF

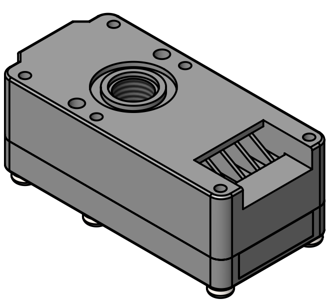
Chip Pumps - “A” & “B” Bases

PPS Pump Module & Base

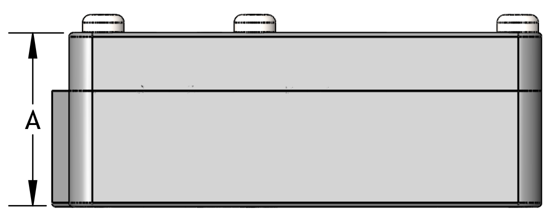
	Series	Capacity	Seal		Non-Return Option		Base		Options		Threads	
C	5L	14	V				-A					
	4M	M Series	E	EPDM	(Blank)	None	-A	A Base	(Blank)	None	(Blank)	NPSF
	6M	10	N	Nitrile	R	Non-Return	-B	B Base	-PA5F	Port Adapter, M5X0.8	-G[3]	G Threads
	5L	20	V	Viton[1]					-PA18F	Port Adapter, G 1/8 NPSF		
	6E	E & L Series							-RC18A	Release Check Valve		
		14							-RC18A-040	Release Check Valve		
		28							-PFC[2]	Pump w/ Filter Combo		
									-VA3	VA-3 Sensor, NPN, 3-Pin		
									-VN3	VN-3 Sensor, NPN, 3-Pin		
									-VN4	VN-4 Sensor, NPN, 4-Pin		
									-VP3	VP-3 Sensor, PNP, 3-Pin		
									-VP4	VP-4 Sensor, PNP, 4-Pin		

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

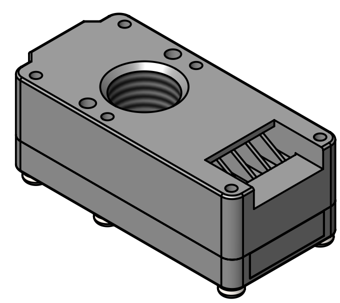
A Base

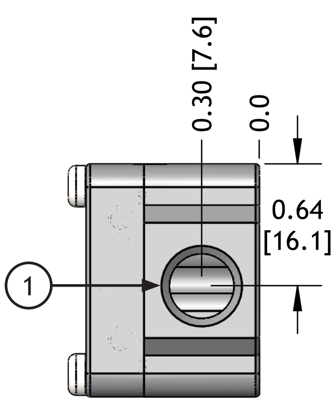


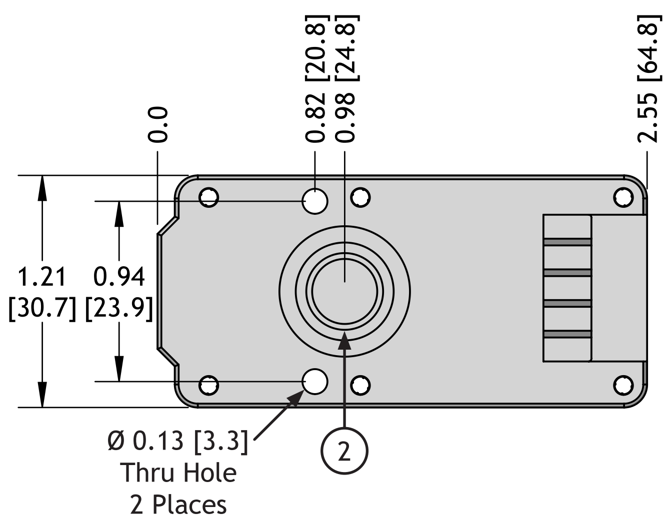
Groove fits -014 O-Ring
(not supplied)

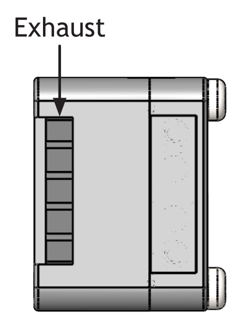


B Base



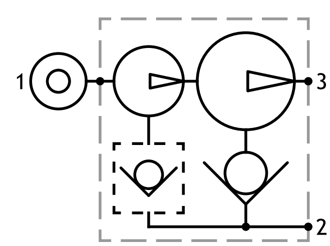






Capacity		A in [mm]	A - Weight oz [g]	B - Weight oz [g]
M	E & L			
14	10	0.90 [22.9]	3.00 [85.0]	2.88 [81.6]
28	20	1.20 [30.5]	3.85 [109.1]	3.73 [105.7]

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



Chip Pumps - “C” Base

PPS Pump Module w/ Aluminum Base

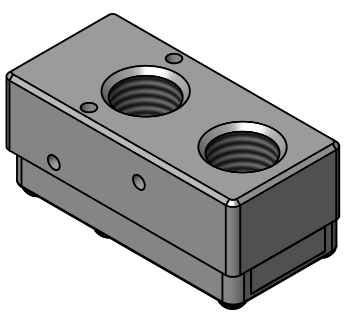
	Series	Capacity	Seal	Non-Return Option		Silencer	Options
C	6E	14	E	R	-C		

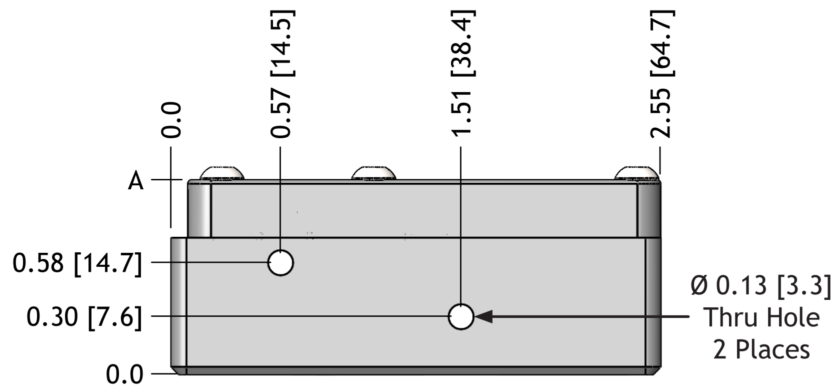
Series	Capacity		Seal		Non-Return Option	
4M	M Series		E	EPDM	(Blank)	None
6M	10		N	Nitrile	R	Non-Return
5L	20		V	Viton[1]		
6E	30					
	40					
	E & L Series					
	14					
	28					
	42					
	56					

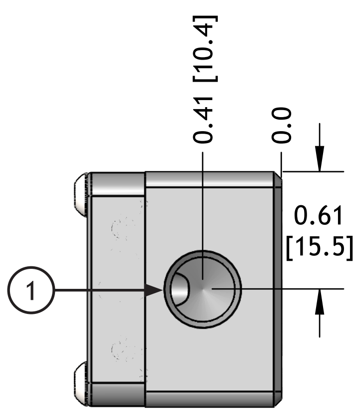
Silencer	
(Blank)	None
-ST	STB38M

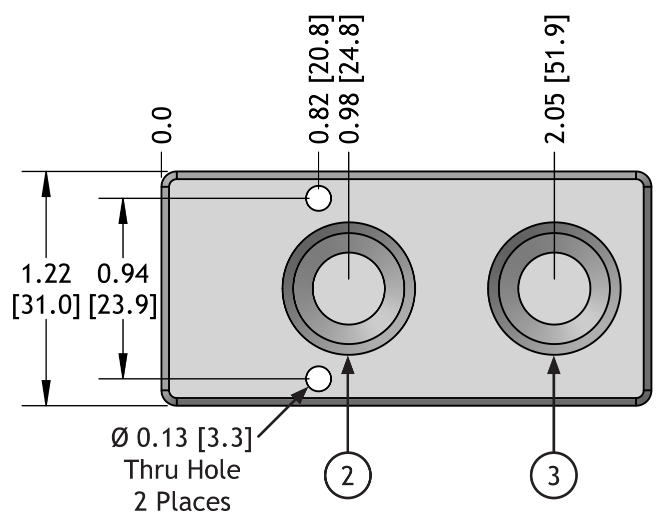
Options	
(Blank)	None
-PA5F	Port Adapter, M5X0.8
-PA18F	Port Adapter, G 1/8 NPSF
-RC18A	Release Check Valve
-RC18A-040	Release Check Valve
-PFC[2]	Pump w/ Filter Combo
-VA3	VA-3 Sensor, NPN, 3-Pin
-VN3	VN-3 Sensor, NPN, 3-Pin
-VN4	VN-4 Sensor, NPN, 4-Pin
-VP3	VP-3 Sensor, PNP, 3-Pin
-VP4	VP-4 Sensor, PNP, 4-Pin

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



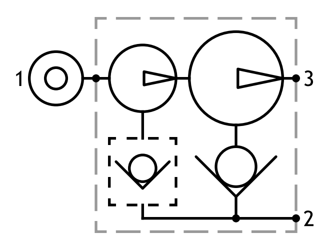






Capacity M	Capacity E & L	A in [mm]	Weight oz [g]
10	14	1.01 [25.7]	3.73 [105.8]
20	28	1.31 [33.3]	4.58 [130.0]
30	42	1.61 [40.9]	5.44 [154.1]
40	56	1.91 [48.5]	6.29 [178.2]

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



Chip Pumps - “D” Base

PPS Pump Module w/ Aluminum Base

	Series	Capacity	Seal	Non-Return Option	Options	Threads
C	5L	14	N	-D		-G

Series
4M
6M
5L
6E

Capacity
M Series
10
20
30
E & L Series
14
28
42

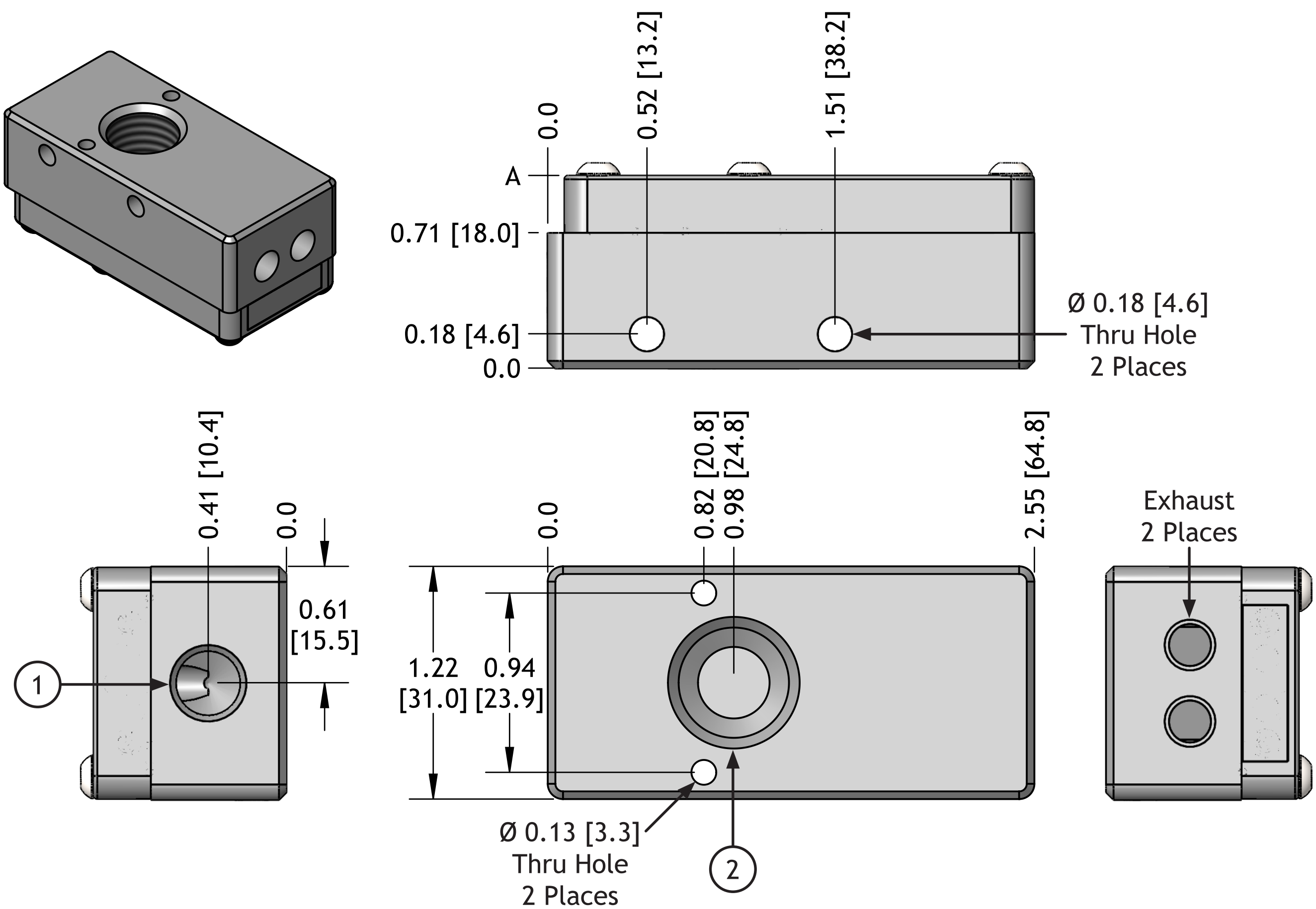
Seal	
E	EPDM
N	Nitrile
V	Viton[1]

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

Options	
(Blank)	None
-PA5F	Port Adapter, M5X0.8
-PA18F	Port Adapter, G 1/8 NPSF
-RC18A	Release Check Valve
-RC18A-040	Release Check Valve
-PFC[2]	Pump w/ Filter Combo
-VA3	VA-3 Sensor, NPN, 3-Pin
-VN3	VN-3 Sensor, NPN, 3-Pin
-VN4	VN-4 Sensor, NPN, 4-Pin
-VP3	VP-3 Sensor, PNP, 3-Pin
-VP4	VP-4 Sensor, PNP, 4-Pin

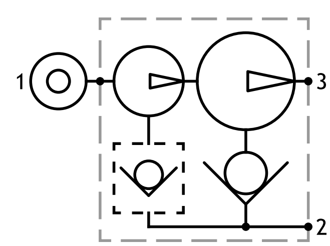
Threads	
(Blank)	NPSF
-G	G Threads

[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	1.01 [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



UPDATED 02/25/19

Chip Pumps - “G” Base

PPS Pump Module w/ Aluminum Base

Example: C 4M 20 N -G

Series	Capacity	Seal	Non-Return Option	Silencer	Options
C 4M	20	N		-G	

Series
4M
6M
5L
6E

Capacity
M Series
20
30
40
50
60
E & L Series
28
42
56
70
84

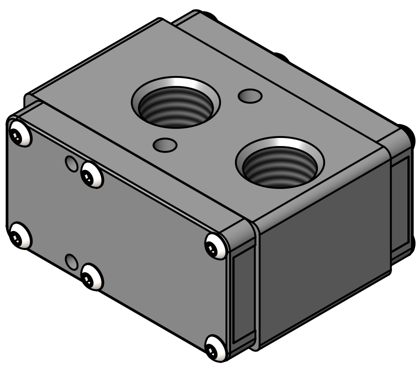
Seal	
E	EPDM
N	Nitrile
V	Viton[1]

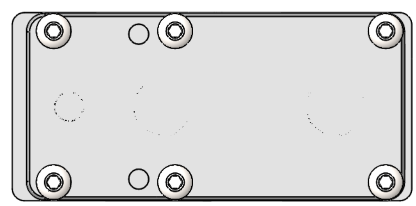
Non-Return Option	
(Blank)	None
R	Non-Return

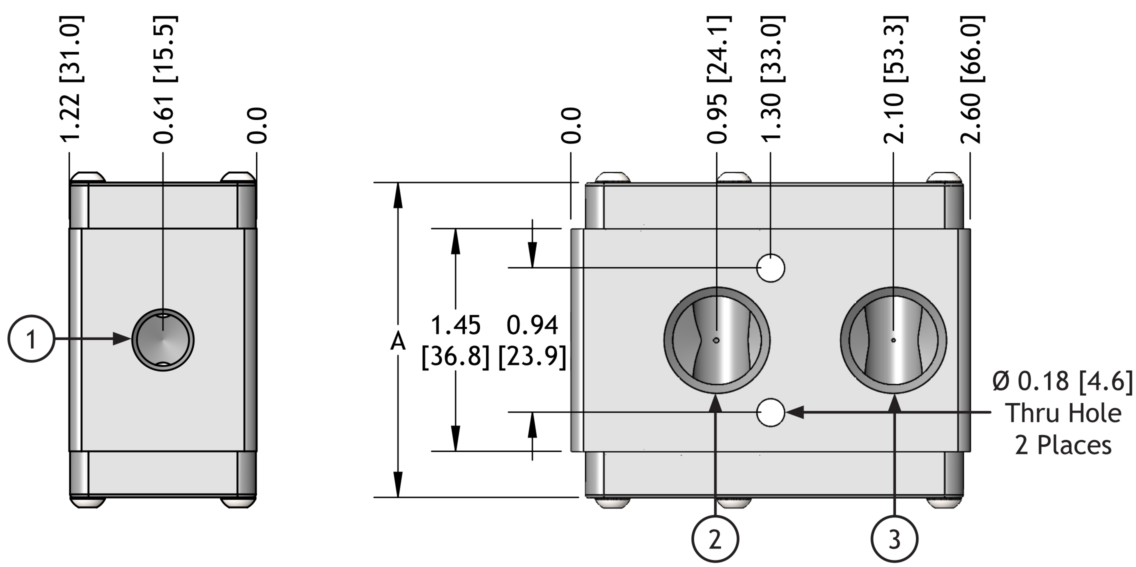
Silencer	
(Blank)	None
-ST	STB38M

Options	
(Blank)	None
-PA5F	Port Adapter, M5X0.8
-PA18F	Port Adapter, G 1/8 NPSF
-RC18A	Release Check Valve
-RC18A-040	Release Check Valve
-PFC[2]	Pump w/ Filter Combo
-VA3	VA-3 Sensor, NPN, 3-Pin
-VN3	VN-3 Sensor, NPN, 3-Pin
-VN4	VN-4 Sensor, NPN, 4-Pin
-VP3	VP-3 Sensor, PNP, 3-Pin
-VP4	VP-4 Sensor, PNP, 4-Pin

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

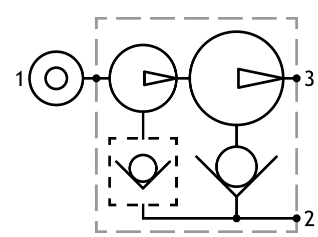






Capacity M	Capacity E & L	A in [mm]	Weight oz [g]
20	28	1.82 [46.2]	8.06 [228.4]
30	42	2.12 [53.8]	8.91 [252.5]
40	56	2.42 [61.5]	9.76 [276.6]
50	70	2.72 [69.1]	10.61 [300.7]
60	84	3.02 [76.7]	11.46 [324.8]

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

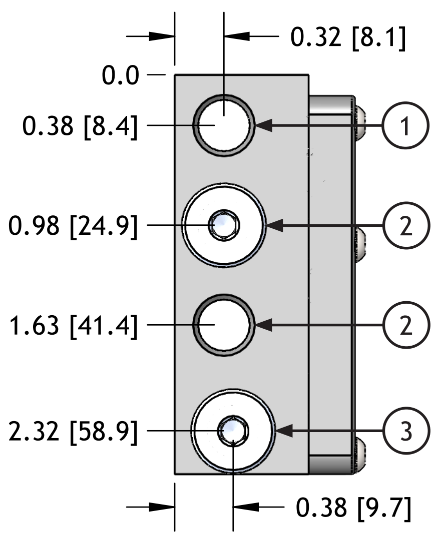


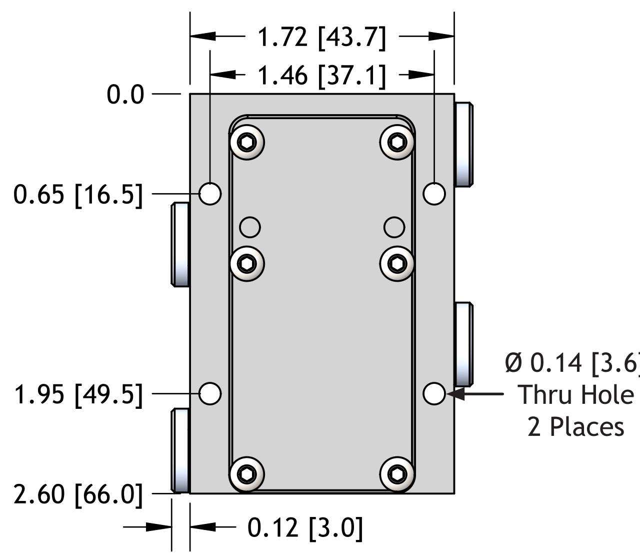
Chip Pumps - “M” Base

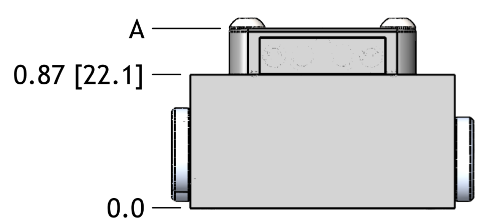
PPS Pump Module w/ Aluminum Base

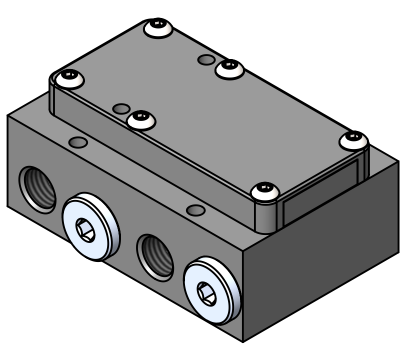
	Series	Capacity	Seal		Non-Return Option			Silencer		Options	
C	4M	20	N				-M				
	4M	M Series	E	EPDM	(Blank)	None		(Blank)	None	(Blank)	None
	6M	10	N	Nitrile	R	Non-Return		-ST	STA18M	-PA5F	Port Adapter, M5X0.8
	5L	20	V	Viton[1]						-PA18F	Port Adapter, G 1/8 NPSF
	6E	E & L Series								-RC18A	Release Check Valve
		14								-RC18A-040	Release Check Valve
		28								-PFC[2]	Pump w/ Filter Combo
										-VA3	VA-3 Sensor, NPN, 3-Pin
										-VN3	VN-3 Sensor, NPN, 3-Pin
										-VN4	VN-4 Sensor, NPN, 4-Pin
										-VP3	VP-3 Sensor, PNP, 3-Pin
										-VP4	VP-4 Sensor, PNP, 4-Pin

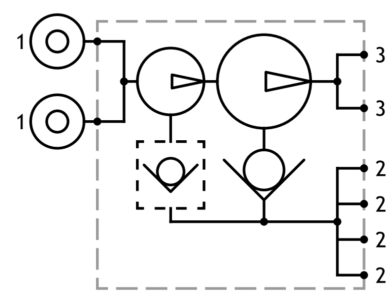
[1]Viton is a registered trademark of DuPont Dow.
[2]Includes a t-style vacuum filter and replacement filter elements (qty 3).











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]

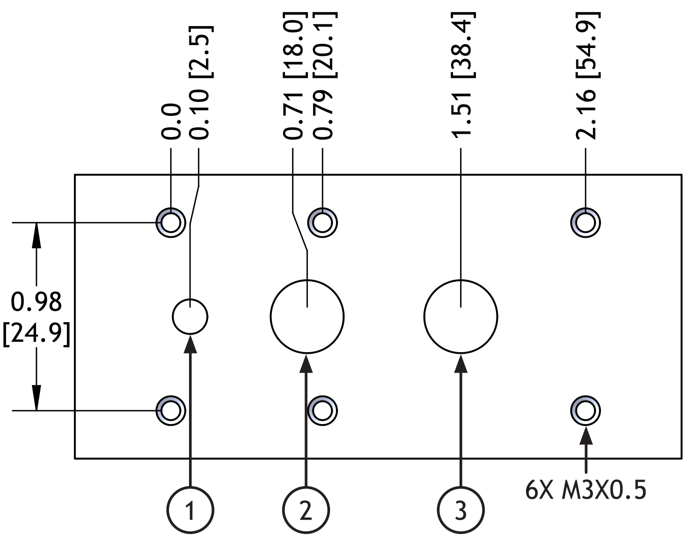
Code	Function	Ports
1	Air Supply	G 1/8 NPSF
2	Vacuum	G 1/8 NPSF
3	Exhaust	G 1/8 NPSF

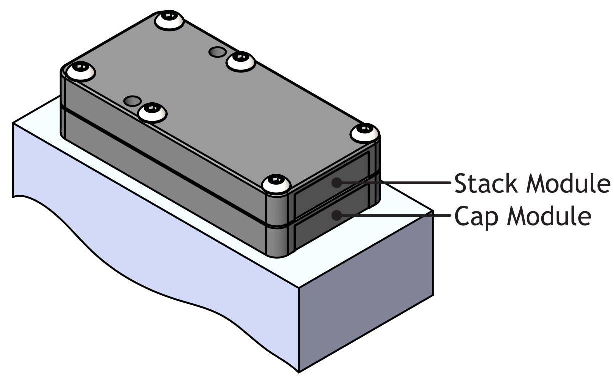
Chip Pumps - “Z” Base

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						

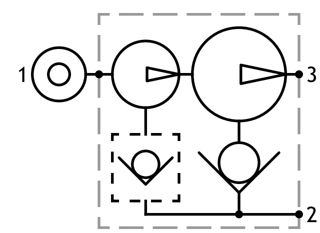
[1]Viton is a registered trademark of DuPont Dow.





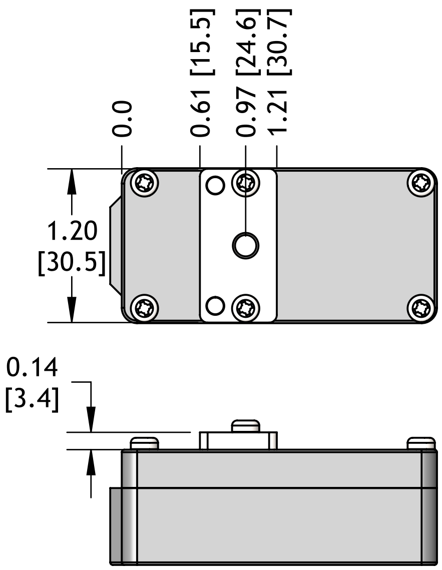
Weight: 0.86 oz [24.3 g]

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]

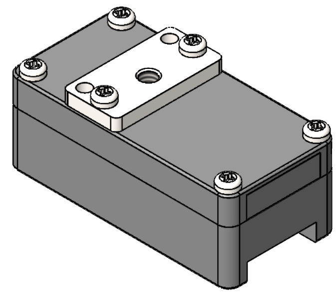


Chip Pumps - M5 Port Options (-PA5F)

An additional vacuum port allows for vacuum monitoring.

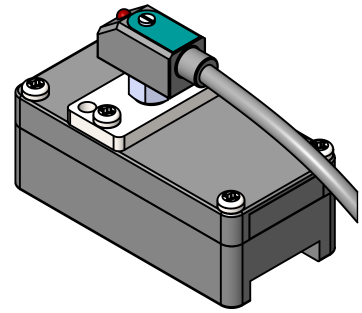


-PA5F



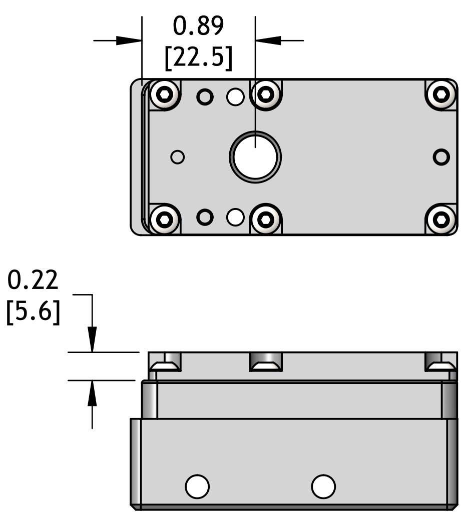
Additional Weight: 0.38 oz [10.7 g]

-VN3, -VN4, -VP3, -VP4

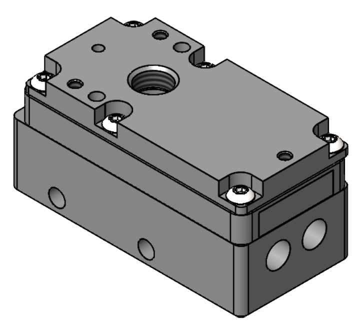


Chip Pumps - G 1/8 NPSF Port Options (-PA18F)

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

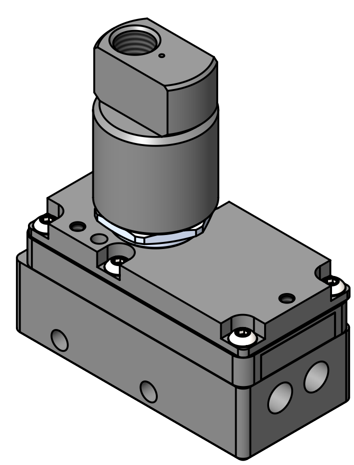


-PA18F



Additional Weight: 0.88 oz [25.0 g]

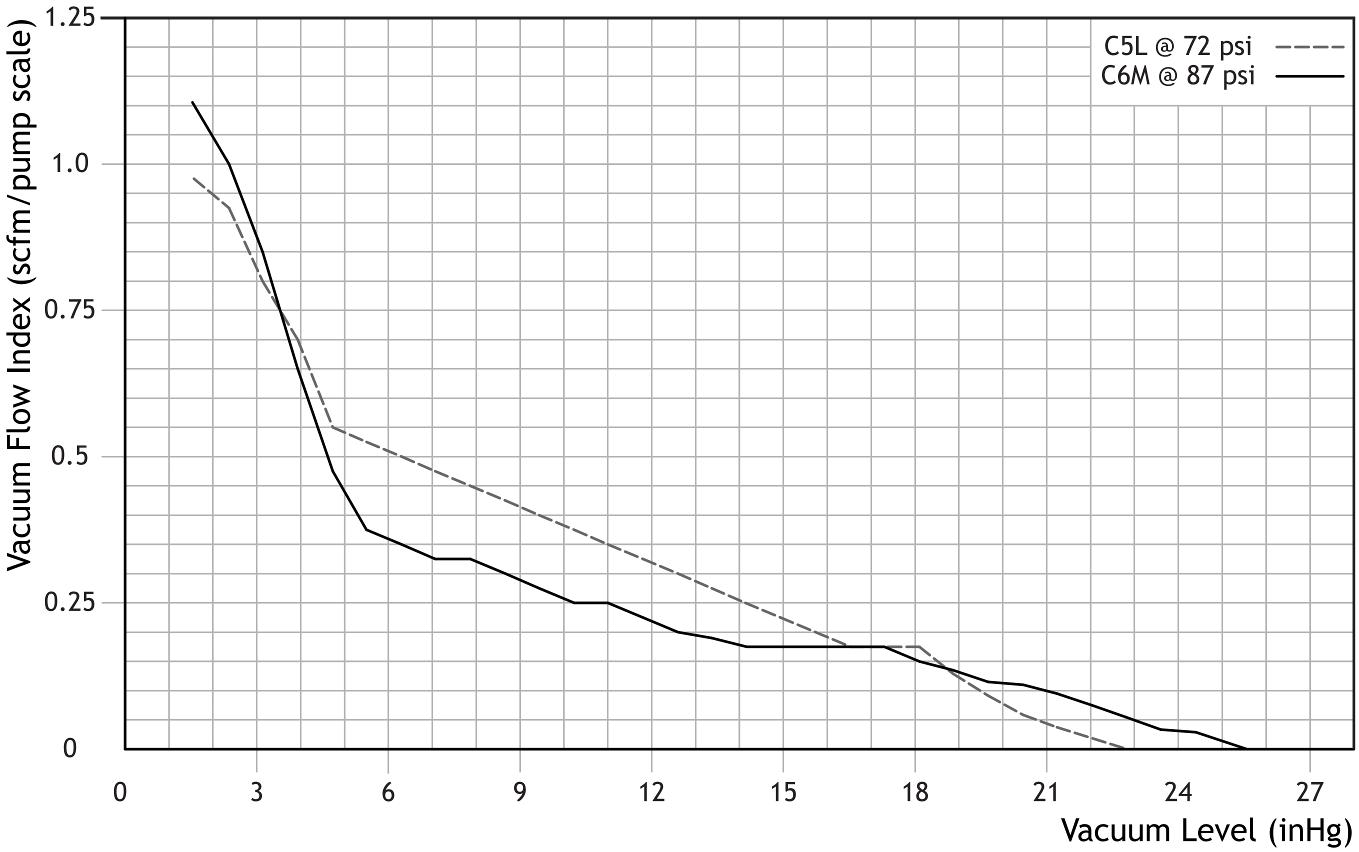
-RC18A, -RC18A-040

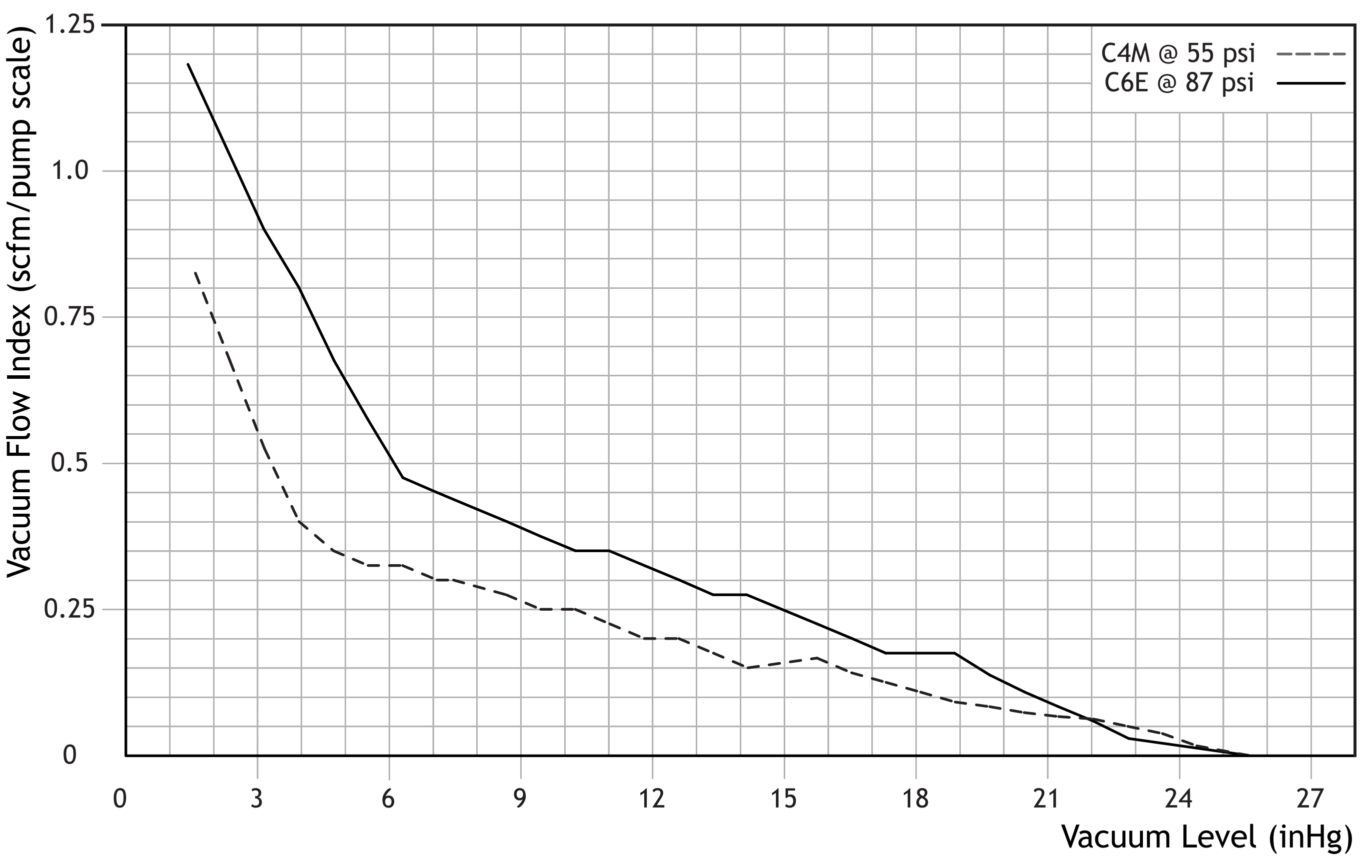


Chip Pumps - Performance

C5l & 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.

Chip Pumps - 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 in³

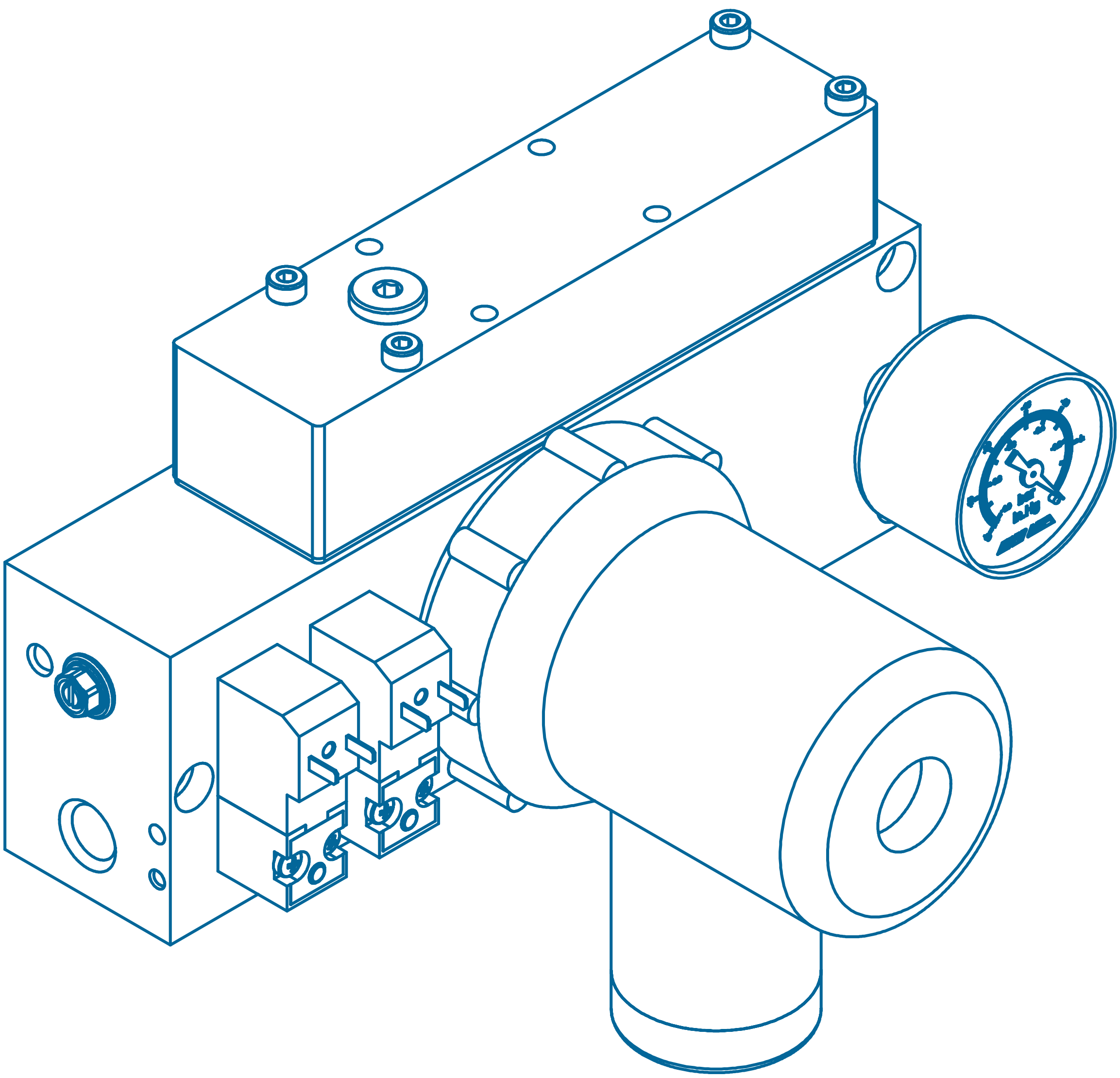
Model	Air Supply PSI	Air Consum SCFM	Max Vacuum inHg	SCFM at Vacuum Level							
				3 inHg	6 inHg	9 inHg	12 inHg	15 inHg	18 inHg	21 inHg	24 inHg
C5L14	72	2.0	23.6	0.14	0.39	0.77	1.4	2.3	3.9	6.8	-
C5L28	72	4.0	23.6	0.07	0.2	0.39	0.68	1.2	1.9	3.4	-
C5L42	72	6.0	23.6	0.05	0.13	0.26	0.45	0.76	1.3	2.3	-
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

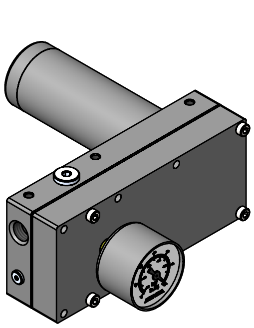
sec / 100 in³ X 0.61 = sec / l

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.

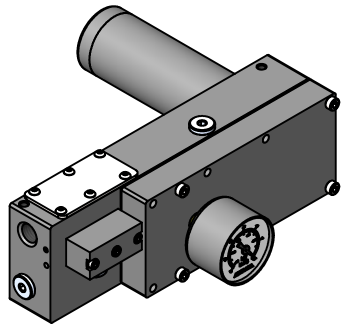
SECTION 8

CLASSIC PUMPS

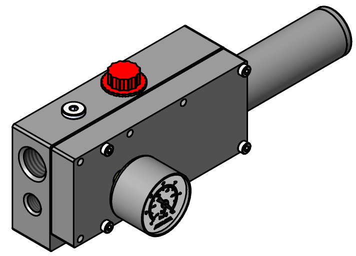




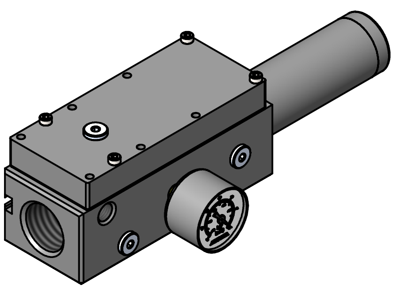
Basic



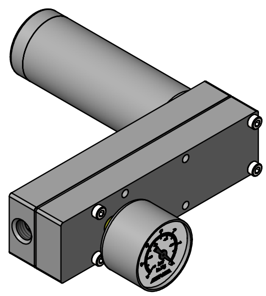
Control Options



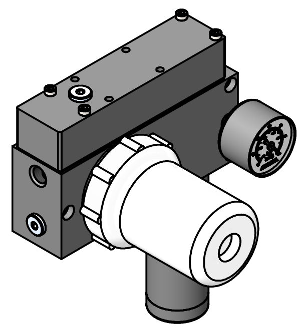
SM & SMS



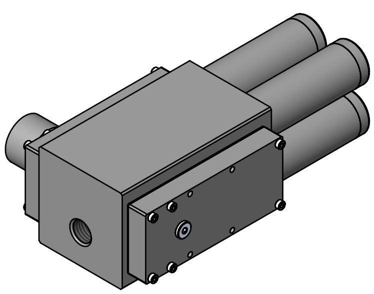
6010 & 6034



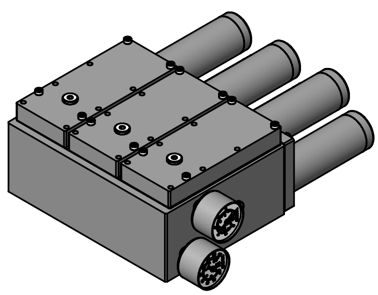
Mini-Classic



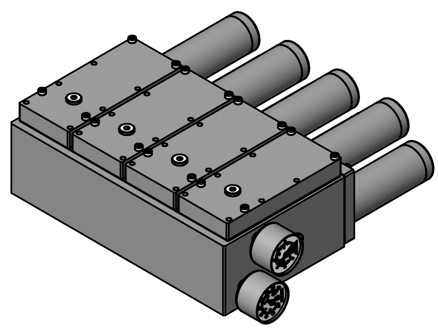
Integrated Filter



Dual-Base



Triple-Base

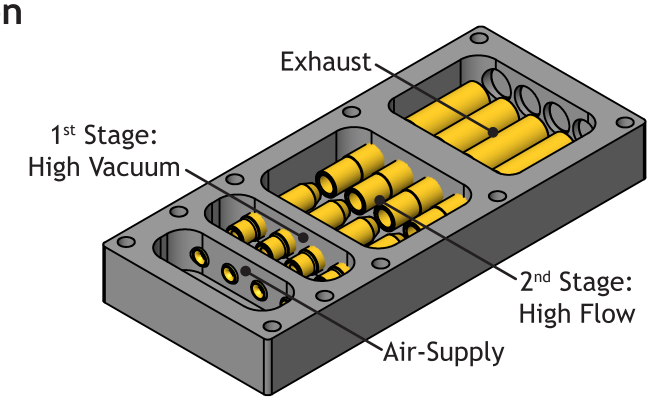


Quadruple-Base

Classic Series Pumps: Principles of Operation

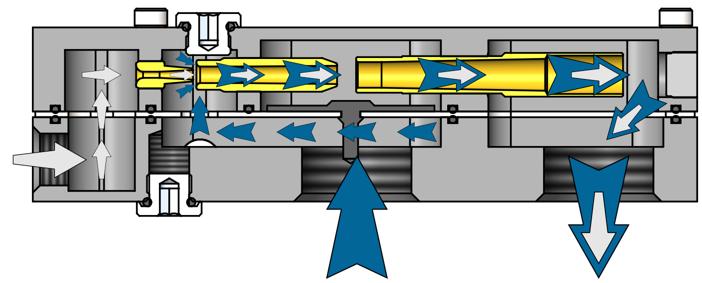
Mult-Ejector

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.



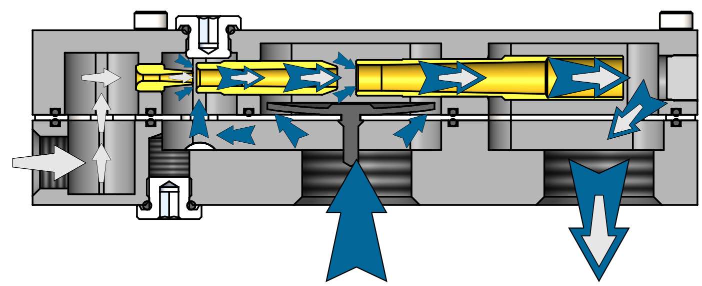
High-Flow Mode

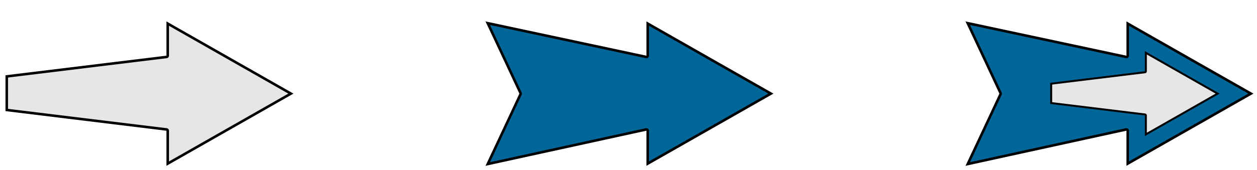
An air supply to the pump is turned on and high-pressure air flows thru the first nozzle, generating a vacuum flow when it passes into the second nozzle. As air is evacuated from the system, induced air flows into the vacuum port and is drawn into the first stage ejector (gap between first and second 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.

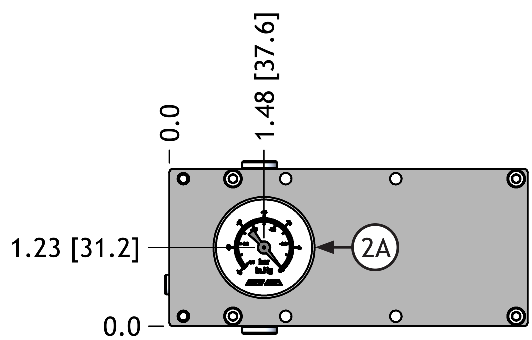


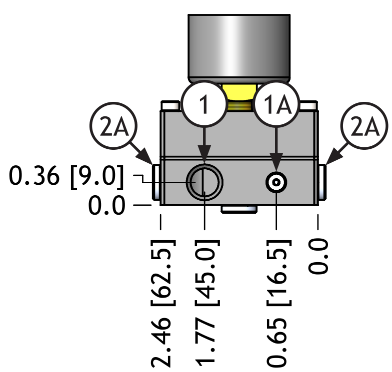


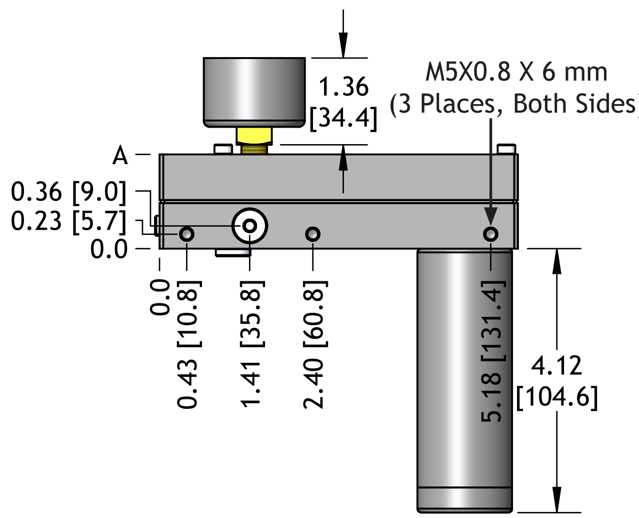
Classic Series Pumps: Basic Pump

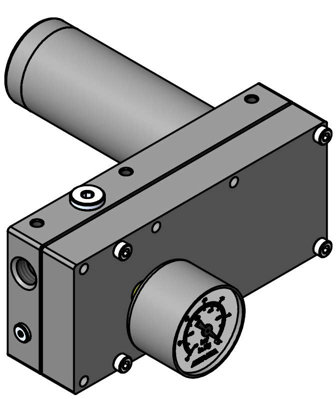
Basic pump controlled via air supply through the pump base inlet port.

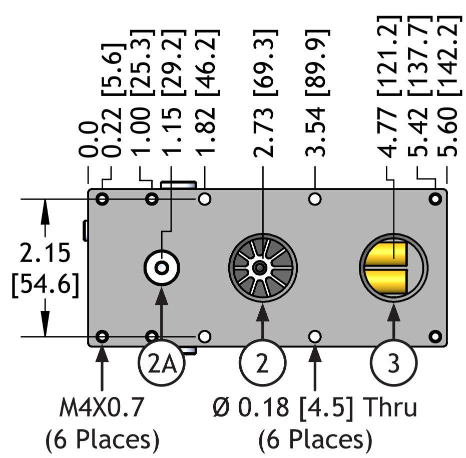
Series	Capacity	Seal		Ports		Valve Options		Filter Option	
ML	100	N							
E	25 (40)	E	EPDM	(Blank)	NPTF Threads	(Blank)	Standard	(Blank)	Standard
L	50 (80)	N	Nitrile	-G	G Threads	-NR	Non-Return	-PFC	Filter Combo
M	75 (120)	S	Silicone			-LV	No Valve		
ML	100 (160)	V	Viton[2]						
X	125 (200)								
	150 (240)								
	175 (280)								
	200 (320)								
	(X Series)								

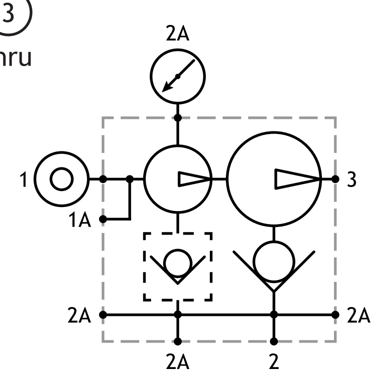












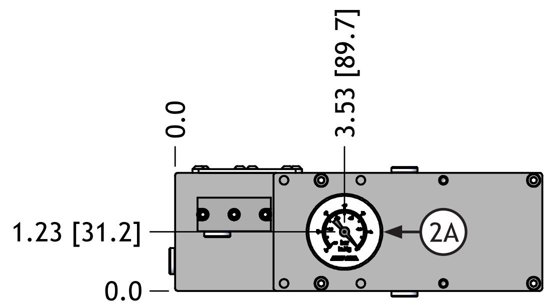
Code	Function	NPTF	G
1	Air-Supply	1/4 NPTF	G 1/4
1A	Alternate Air-Supply	M5X0.8 (10-32)	
2	Vacuum	3/4 NPTF	G 3/4
2A	Alternate Vacuum	G 1/8 NPSF	
3	Exhaust	3/4 NPTF	G 3/4

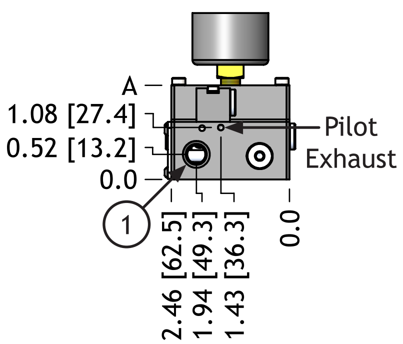
Capacity	A in [mm]	A - Weight lb [g]
25-100	1.47 [37.3]	1.63 [739]
125-200	2.18 [55.4]	2.21 [1002]

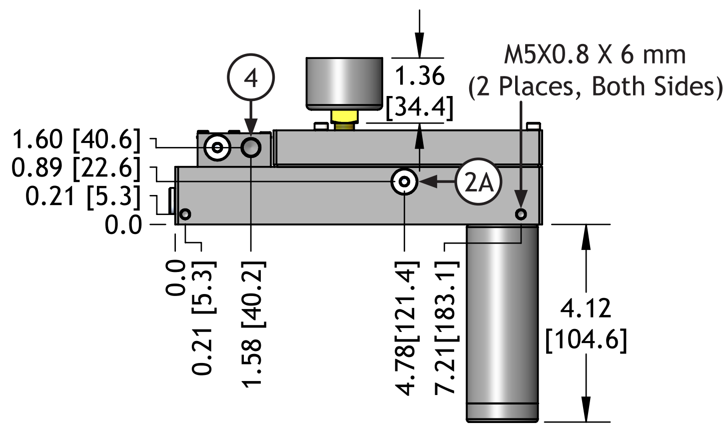
Classic Series Pumps: Piloted Air-Supply (-2PS)

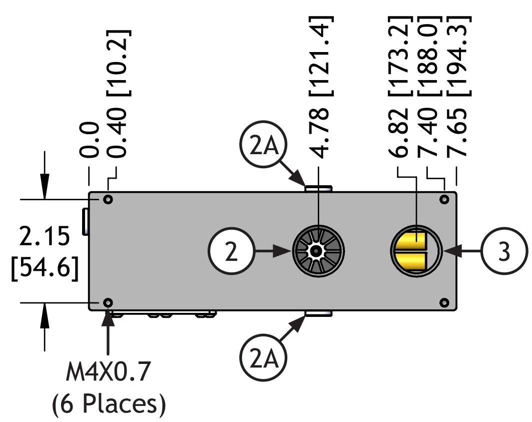
The pump base contains an integral, pilot-operated, 3-way air valve which controls vacuum on/off via pneumatic pilot signal. When the pilot signal is presented, the vacuum is turned on. When the pilot signal is exhausted, the pump turns off.

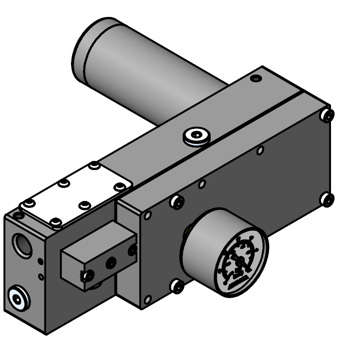
Series	Capacity	Seal		Ports		Valve Options		Filter Option	
ML	100	N		-2PS					
E	25 (40)	E	EPDM	(Blank)	NPTF Threads	(Blank)	Standard	(Blank)	Standard
L	50 (80)	N	Nitrile	-G	G Threads	-NR	Non-Return	-PFC	Filter Combo
M	75 (120)	S	Silicone			-LV	No Valve		
ML	100 (160)	V	Viton[2]						
X	125 (200)								
	150 (240)								
	175 (280)								
	200 (320)								
	(X Series)								

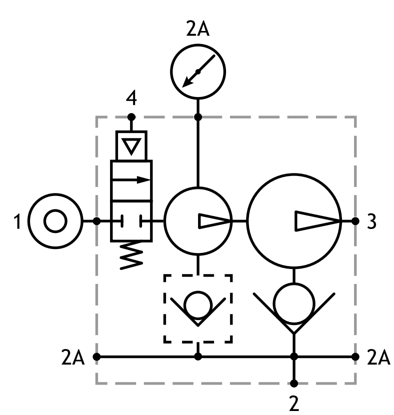












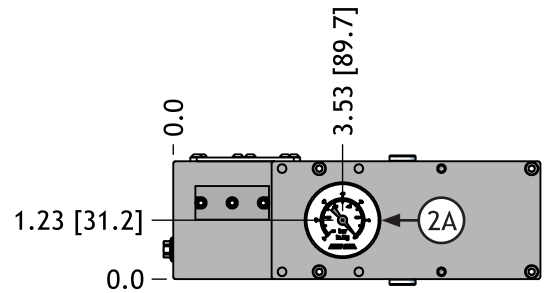
Code	Function	NPTF	G
1	Air-Supply	1/4 NPTF	G 1/4
2	Vacuum	3/4 NPTF	G 3/4
2A	Vacuum - Alternate	G 1/8 NPSF	
3	Exhaust	3/4 NPTF	G 3/4
4	Pilot Signal - Air-Supply	G 1/8 NPSF	

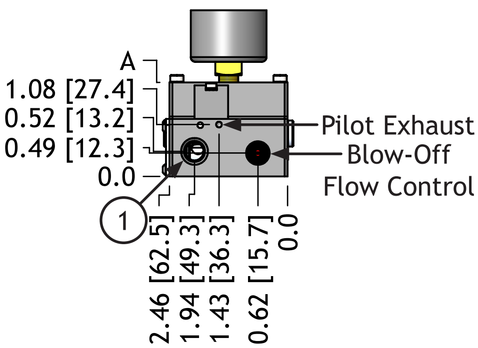
Capacity	A in [mm]	A - Weight lb [g]
25-100	1.96 [49.8]	2.81 [1275.0]
125-200	2.67 [67.8]	3.41 [1547.0]

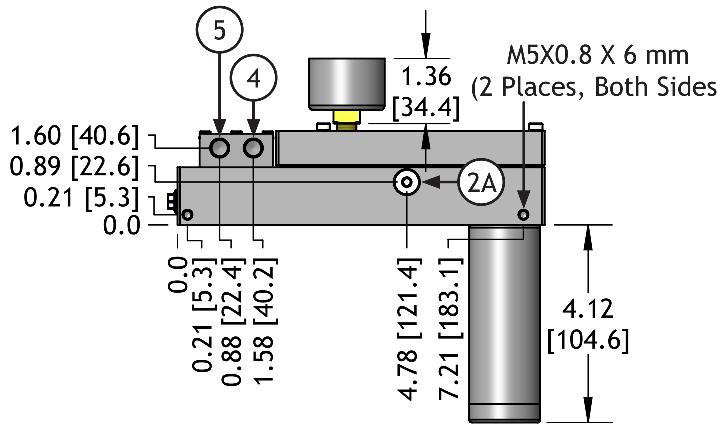
Classic Series Pumps: Piloted Air-Supply & Blow-Off (-2PSB)

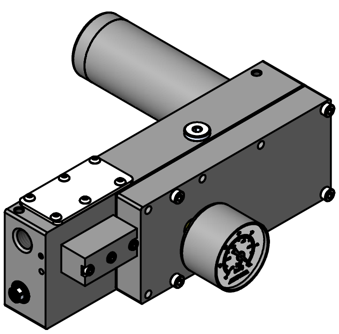
The pump base contains two integral, pilot-operated, 3-way air valves which provide full pump control via two externally supplied pneumatic pilot signals. With a constant air-supply to the pump base, one pilot signal controls vacuum on/off while a second pilot signal controls blow-off air to dissipate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

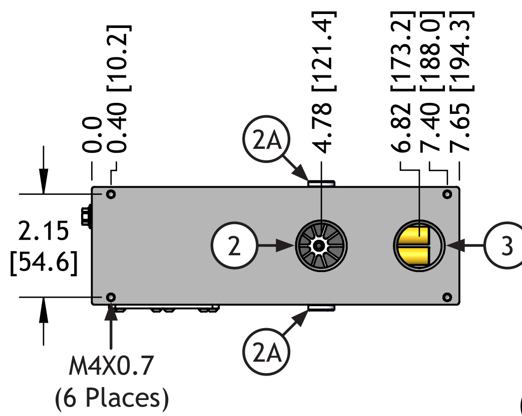
Series	Capacity	Seal		Ports		Valve Options		Filter Option	
ML	100	N		-2PSB					
E	25 (40)	E	EPDM	(Blank)	NPTF Threads	(Blank)	Standard	(Blank)	Standard
L	50 (80)	N	Nitrile	-G	G Threads	-NR	Non-Return	-PFC	Filter Combo
M	75 (120)	S	Silicone			-LV	No Valve		
ML	100 (160)	V	Viton[2]						
X	125 (200)								
	150 (240)								
	175 (280)								
	200 (320)								
	(X Series)								





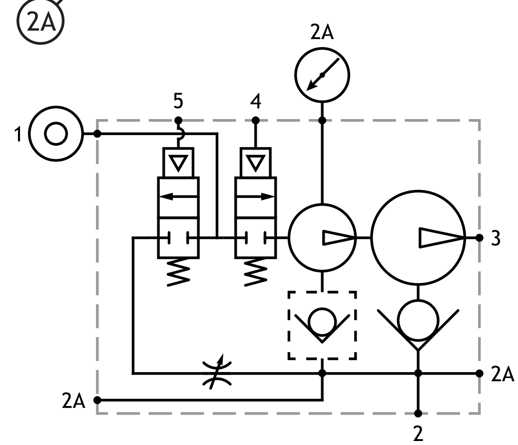






Capacity	A in [mm]	A - Weight lb [g]
25-100	1.96 [49.8]	2.81 [1275.0]
125-200	2.67 [67.8]	3.41 [1547.0]

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
4	Pilot Signal - Air-Supply	G 1/8 NPSF	
5	Pilot Signal - Blow-Off	G 1/8 NPSF	



Classic Series Pumps: Solenoid Controlled Air-Supply

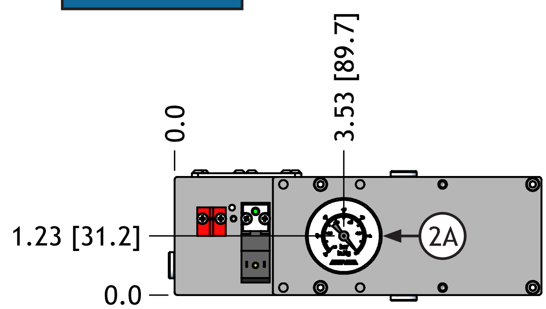
The pump base contains an integral, pilot-operated, 3-way air valve which controls vacuum on/off via a solenoid valve. When the solenoid valve is energized, the vacuum pump turns on. When the solenoid valve is de-energized, the pump turns off.

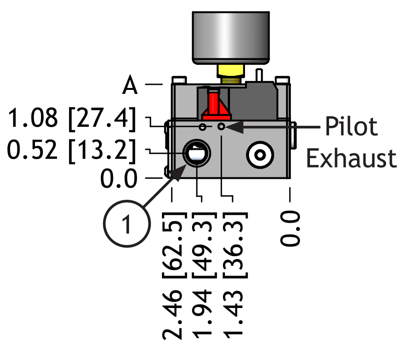
-2S24D: 24V DC, 2.3 W Solenoid Control Valve (**-2OS24D** for N.O. Supply)
-2S110A: 20V AC 60 Hz (110V AC 50 Hz), 2.3 W Solenoid Control Valve (**-2OS110A** for N.O. Supply)

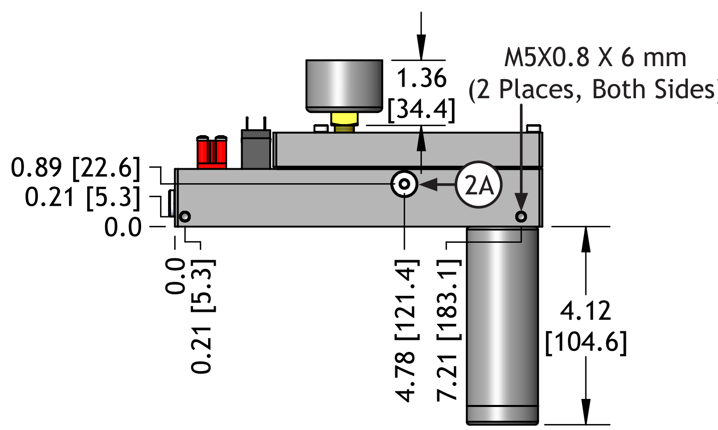
Series	Capacity	Seal		Ports		Solenoid Option	Valve Options		Filter Option	
ML	100	N				-2S24D				
E	25 (40)	E	EPDM	(Blank)	NPTF Threads	-2S24D	(Blank)	Standard	(Blank)	Standard
L	50 (80)	N	Nitrile	-G	G Threads	-2S110A	-NR	Non-Return	-PFC	Filter Combo
M	75 (120)	S	Silicone			-2OS24D	-LV	No Valve		
ML	100 (160)	V	Viton[2]			-2OS110A				
X	125 (200)									
	150 (240)									
	175 (280)									
	200 (320)									

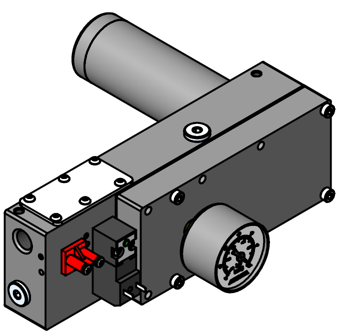
(X Series)

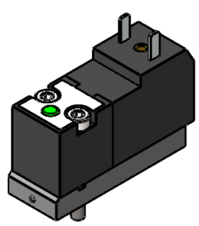
Order DIN T-9 Molded Cords Separately:
923-2M01: Std. 2M
923-2M31: L.E.D. 0-50V, 2M
923-2M81: L.E.D.70-250V, 2M



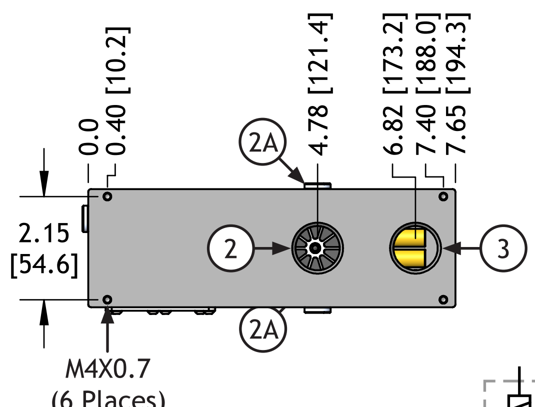






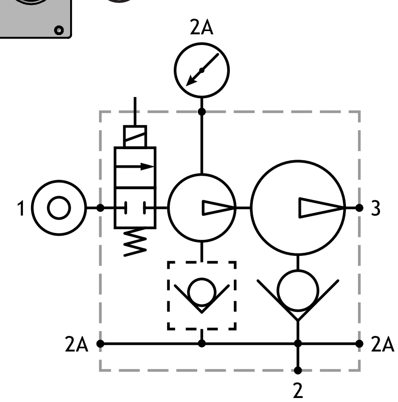


N.O. Supply Option
Weight: 0.02 [9.1]



Capacity	A in [mm]	A - 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



Classic Series Pumps: Solenoid Controlled Air-Supply & Blow-Off

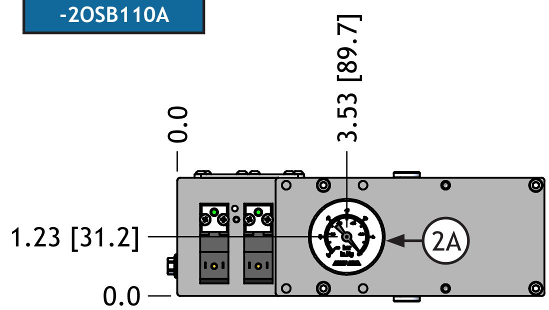
The pump base contains two integral, pilot-operated, 3-way air valves which provide full pump control via two solenoid valves. With a constant air-supply to the pump base, one solenoid valve controls vacuum on/off while a second solenoid valve controls blow-off air to dissipate vacuum for faster system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

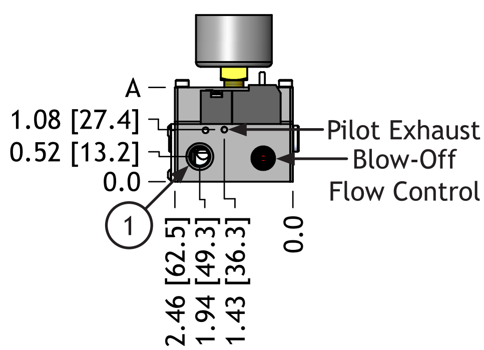
-2SB24D: 24V DC, 2.3 W Solenoid Control Valve (**-2OSB24D** for normally open supply)
-2SB110A: 20V AC 60 Hz (110V AC 50 Hz), 2.3 W Solenoid Control Valve (**-2OS110A** for normally open supply)

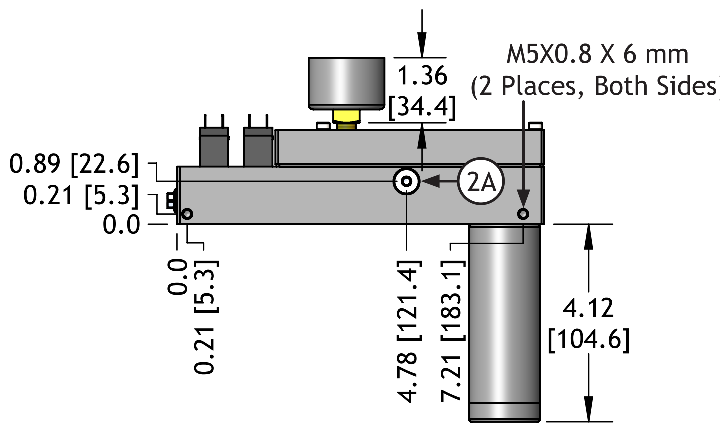
Series	Capacity	Seal		Ports		Solenoid Option	Valve Options		Filter Option	
ML	100	N				-2SB24D				
E	25 (40)	E	EPDM	(Blank)	NPTF Threads	-2BS24D	(Blank)	Standard	(Blank)	Standard
L	50 (80)	N	Nitrile	-G	G Threads	-2SB110A	-NR	Non-Return	-PFC	Filter Combo
M	75 (120)	S	Silicone			-2OSB24D	-LV	No Valve		
ML	100 (160)	V	Viton[2]			-2OSB110A				
X	125 (200)									
	150 (240)									
	175 (280)									
	200 (320)									

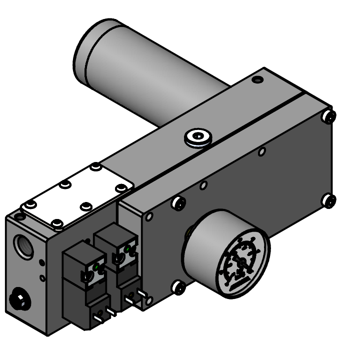
(X Series)

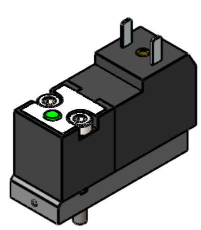
Order DIN T-9 Molded Cords Separately:
923-2M01: Std. 2M
923-2M31: L.E.D. 0-50V, 2M
923-2M81: L.E.D.70-250V, 2M



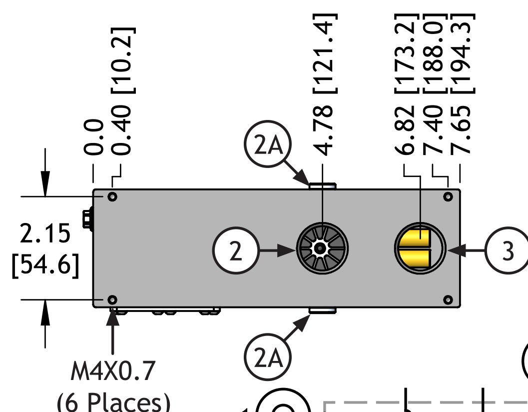




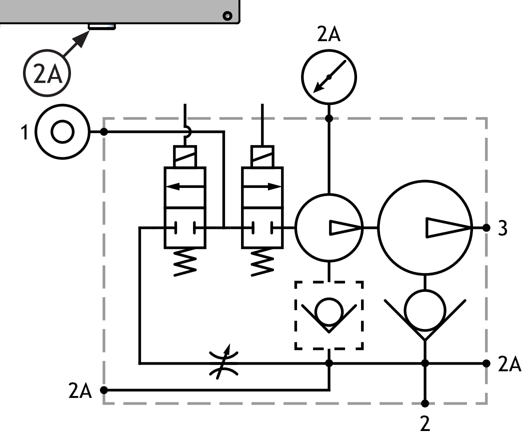




N.O. Supply Option
Weight: 0.02 [9.1]



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



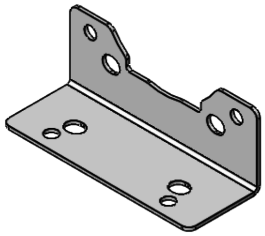
Code	Function	NPTF	G
1	Air-Supply	1/4 NPTF	G 1/4
2	Vacuum	3/4 NPTF	G 3/4
2A	Vacuum - Alternate	G 1/8 NPSF	
3	Exhaust	3/4 NPTF	G 3/4

Classic Series Pumps: Mounting Brackets

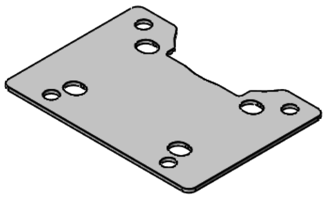
Stainless steel mounting brackets come in 90° and 180° styles to use in a variety of mounting options. ML-BKT-90 and ML-BKT-180 can be use in side or end orientation on the basic classic pump base and end orientation on pump bases with air-supply or blow-off control options. Dual hole patterns provide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

Weight: 0.06 lbs [131.1 g]

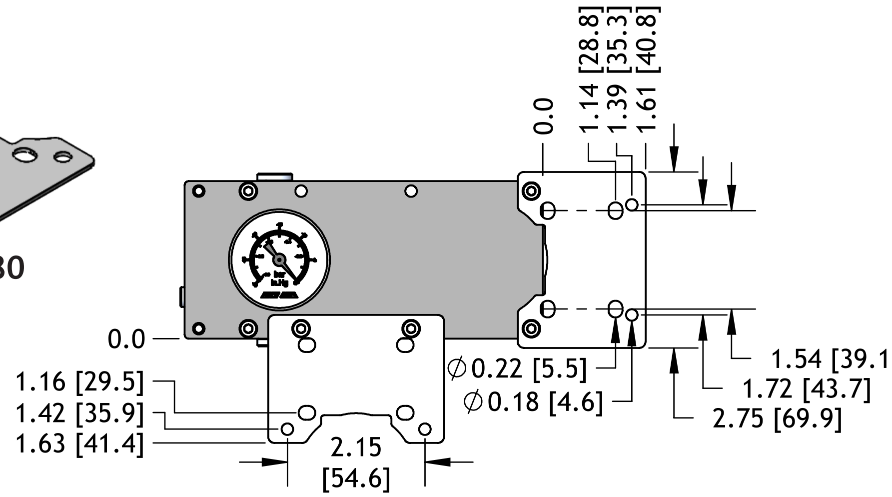
Brackets and fastener kits must be ordered separately. Not available for 6010, 6034, SM, or SMS bases.

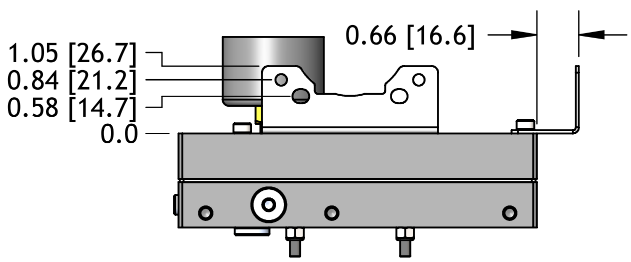


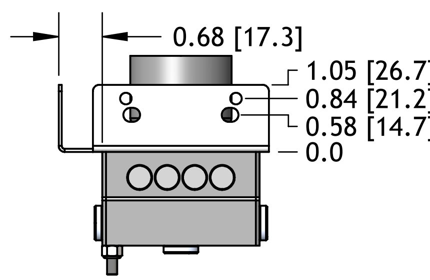
ML-BKT-90



ML-BKT-180







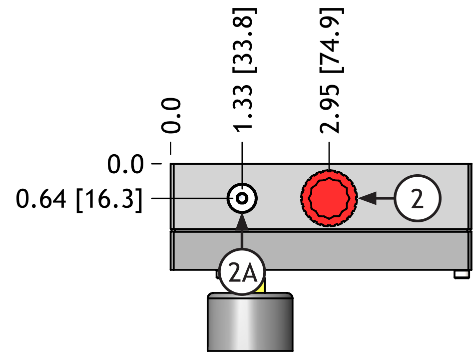
Fastener Kits

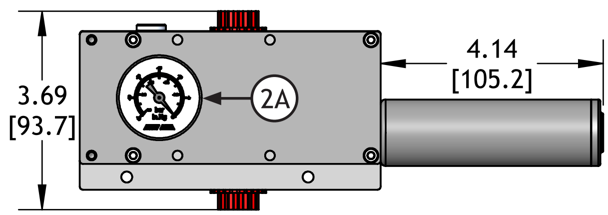
Fastener Kit	Function	NPTF
ML-M4-E1	End Mount, 25-100 Capacity	M4X10 (2) & M4X30 (2)
ML-M4-E2	End Mount, 125-200 Capacity	M4X10 (2) & M4X50 (2)
ML-M4-S1	Side Mount, 25-100 Capacity	M4X50 (2) & M4 Nut (2)
ML-M4-S2	Side Mount, 125-200 Capacity	M4X70 (2) & M4 Nut (2)

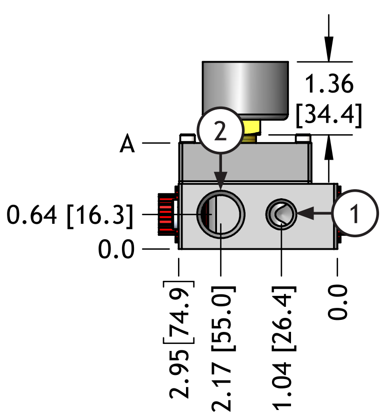
Classic Series Pumps: SM Base

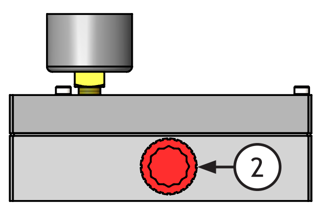
The SM (surface mount) base includes 1/2” vacuum ports at three locations and a flat backside for panel mounting. One to three vacuum lines can be ran directly from the pump base. Unused vacuum ports simply need to be plugged. This design makes this pump configuration ideal for robotic end-effectors.

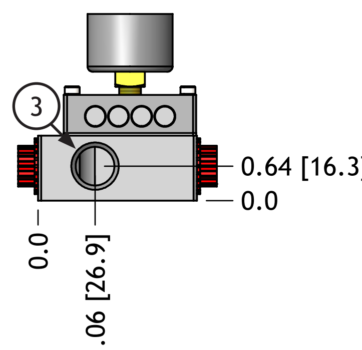
Series	Capacity	Seal		Ports		Gauge Option		Valve Options		Filter Option	
ML	100	N		-SM							
E	25 (40)	E	EPDM	(Blank)	NPTF Threads	-SM	Standard	(Blank)	Standard	(Blank)	Standard
L	50 (80)	N	Nitrile	-G	G Threads	-SMS	Side Gauge	-NR	Non-Return	-PFC	Filter Combo
M	75 (120)	S	Silicone					-LV	No Valve		
ML	100 (160)	V	Viton[2]								
X	125 (200)										
	150 (240)										
	175 (280)										
	200 (320)										
	(X Series)										

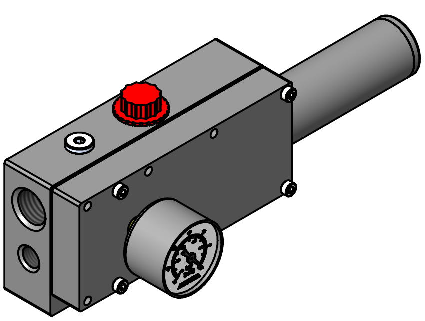


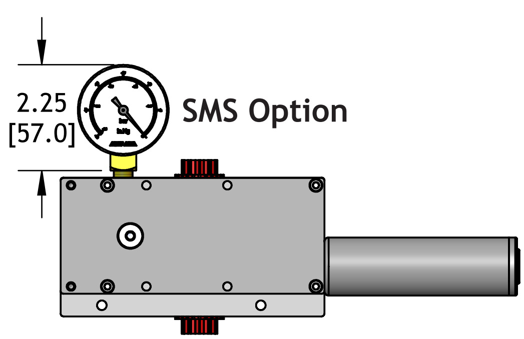




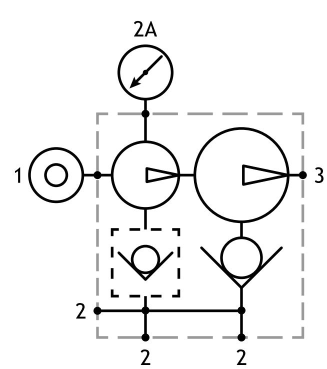








SMS Option



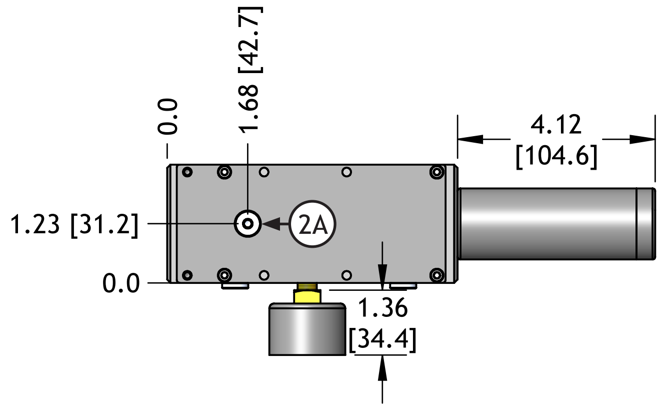
Code	Function	NPT	G
1	Air-Supply	1/4 NPTF	G 1/4
2	Vacuum	3/4 NPTF	G 3/4
2A	Vacuum - Alternate	G 1/8 NPSF	
3	Exhaust	1/2 NPTF	G 1/2

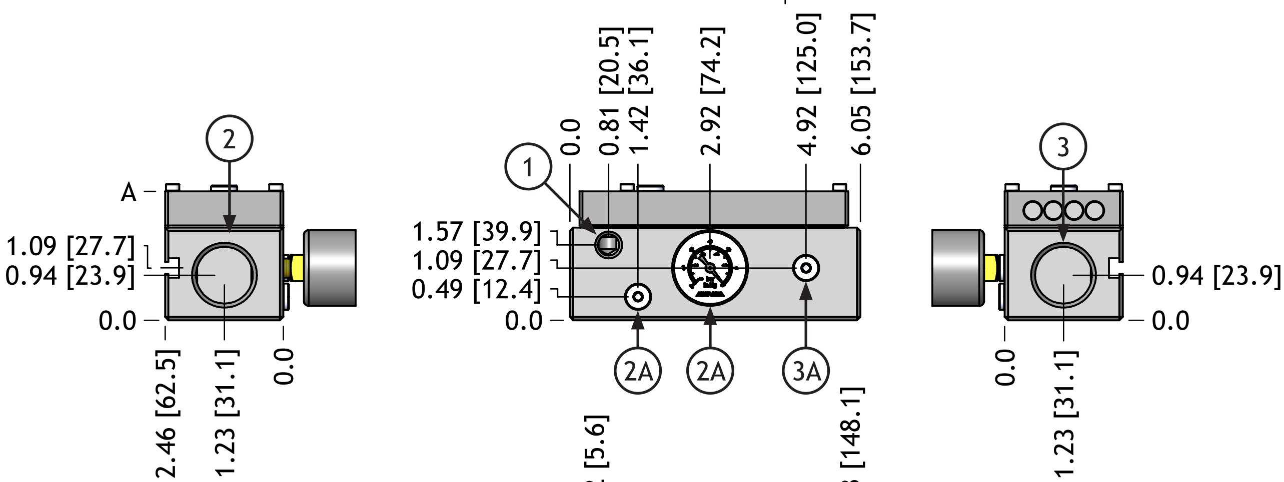
Capacity	A in [mm]	A - Weight lb [g]
25-100	1.97 [50.0]	2.27 [1030.0]
125-200	2.68 [68.1]	3.05 [1383.0]

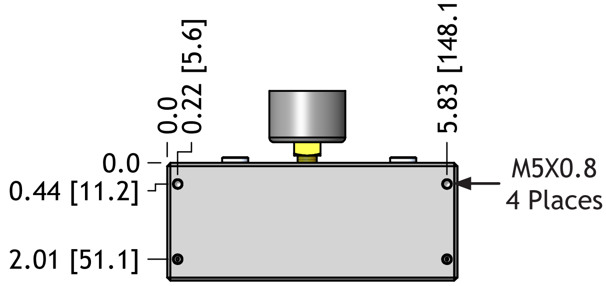
Classic Series Pumps: 6010 Base

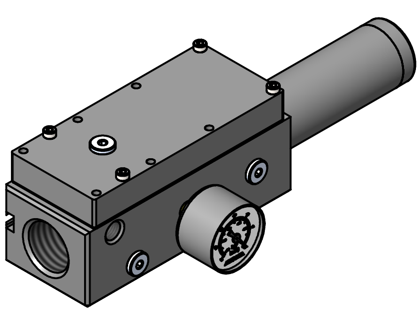
G 1” vacuum and exhaust ports are at opposite ends of the base. The pump is controlled via air-supply through the inlet port. Vacuum gauge, silencer, and full length t-slot are included.

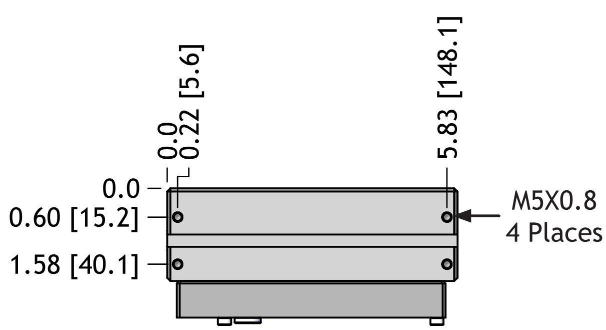
Series	Capacity	Seal			Valve Options		Filter Option	
ML	100	N		-6010				
E	25 (40)	E	EPDM		(Blank)	Standard	(Blank)	Standard
L	50 (80)	N	Nitrile		-NR	Non-Return	-PFC	Filter Combo
M	75 (120)	S	Silicone		-LV	No Valve		
ML	100 (160)	V	Viton²					
X	125 (200)							
	150 (240)							
	175 (280)							
	200 (320)							
	(X Series)							

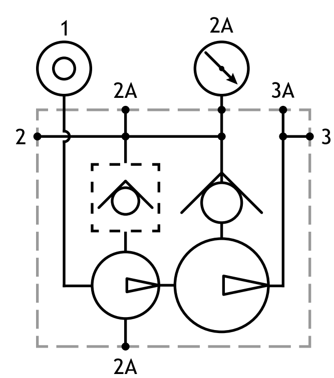












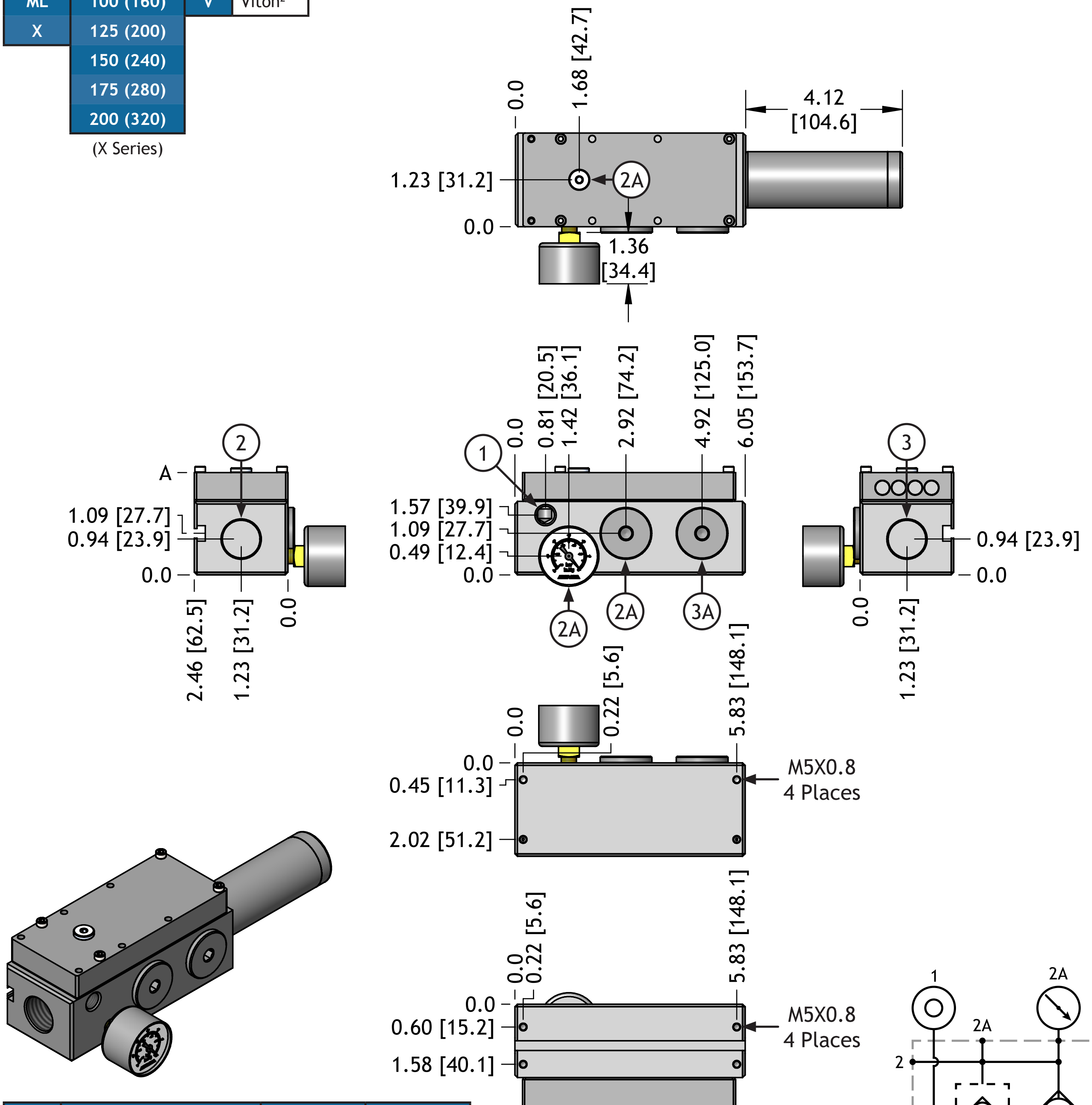
Code	Function	Ports
1	Air-Supply	1/4 NPSF
2	Vacuum	G 1
2A	Vacuum - Alternate	G 1/8 NPSF
3	Exhaust	G 3/4 NPSF
3A	Exhaust - Alternate	G 1/8 NPSF

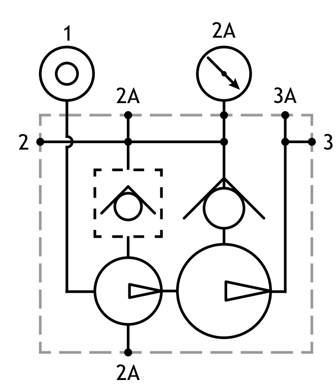
Capacity	A in [mm]	A - Weight lb [g]
25-100	2.69 [68.3]	2.43 [1102.0]
125-200	3.40 [86.4]	3.02 [1370.0]

Classic Series Pumps: 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		Ports			Valve Options		Filter Option	
ML	100	N				-6034				
E	25 (40)	E	EPDM	(Blank)	NPTF Threads		(Blank)	Standard	(Blank)	Standard
L	50 (80)	N	Nitrile	-G	G Threads		-NR	Non-Return	-PFC	Filter Combo
M	75 (120)	S	Silicone				-LV	No Valve		
ML	100 (160)	V	Viton[2]							
X	125 (200)									
	150 (240)									
	175 (280)									
	200 (320)									
	(X Series)									





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	

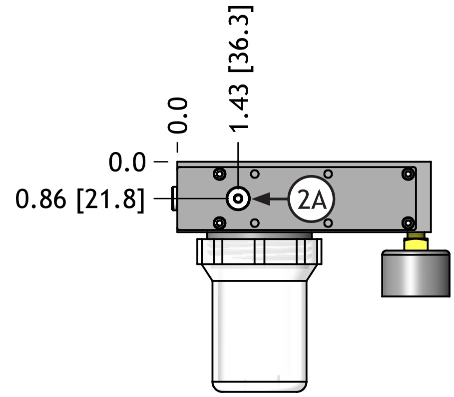
Capacity	A in [mm]	A - Weight lb [g]
25-100	2.69 [68.3]	2.58 [1170.0]
125-200	3.40 [86.4]	3.17 [1438.0]

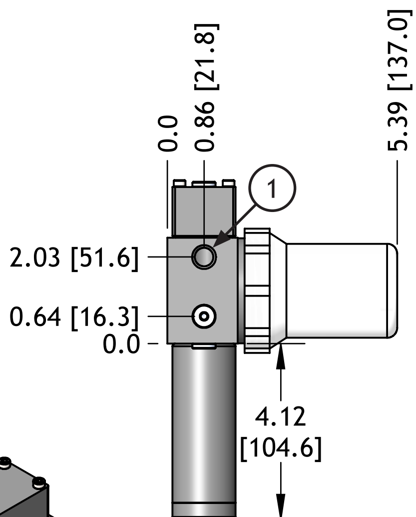
Classic Pump w/ Integrated Filter

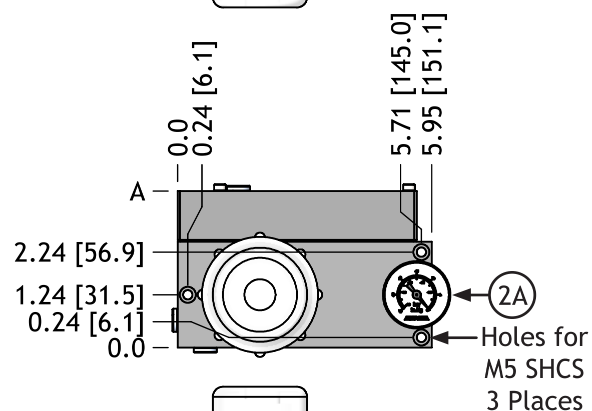
Basic pump controlled via air supply through the pump base inlet port. This pump incorporates the bowl, gasket, and filter element of our t-style filters directly into the pump base eliminating the necessity of incorporating an external filter into the vacuum system.

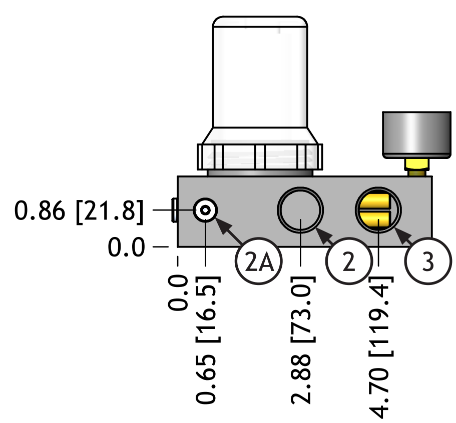
Series	Capacity	Seal		Ports		Valve Options	
ML	100	N			-IF		
E	25 (40)	N	Nitrile	(Blank)	NPTF Threads	(Blank)	Standard
L	50 (80)	V	Viton	-G	G Threads	-NR	Non-Return
M	100 (160)					-LV	No Valve
ML	(X Series)						
X							

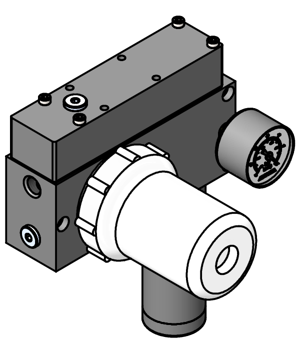
Replacement Parts:
10503: Bowl
10514: Gasket
PPX35RE3: Filter Element (3 Pack)





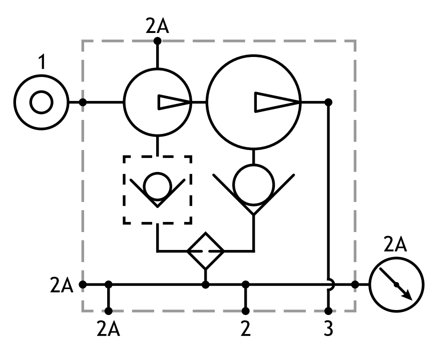






Capacity	A in [mm]	A - Weight lb [g]
25-50	3.24 [82.2]	3.09 [1400.5]
100	3.67 [93.3]	3.36 [1524.6]

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

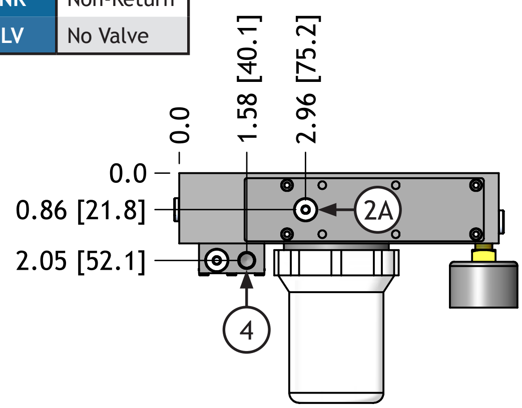


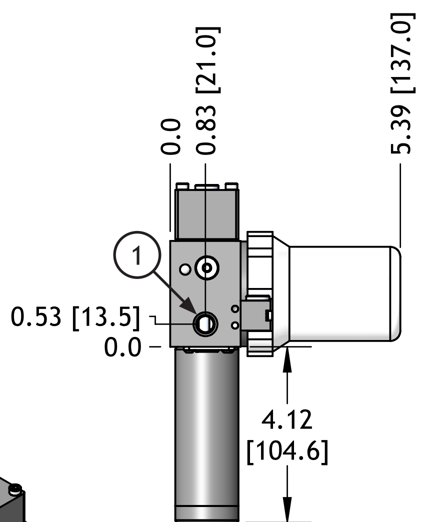
Classic Pump w/ Integrated Filter: Pilot Controlled Air-Supply

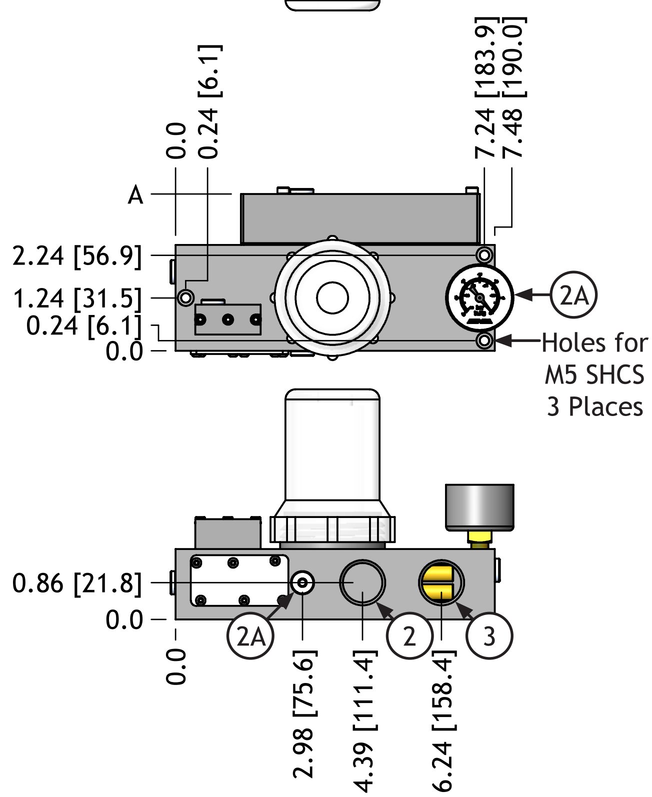
The pump base contains an integral, pilot-operated, 3-way air valve which controls vacuum on/off via pneumatic pilot signal. When the pilot signal is presented, the vacuum is turned on. When the pilot signal is exhausted, the pump turns off. This pump incorporates the bowl, gasket, and filter element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

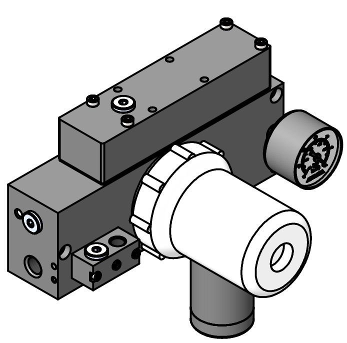
Series	Capacity	Seal		Ports			Valve Options	
ML	100	N				-IF-PS		
E	25 (40)	N	Nitrile	(Blank)	NPTF Threads		(Blank)	Standard
L	50 (80)	V	Viton	-G	G Threads		-NR	Non-Return
M	100 (160)						-LV	No Valve
ML	(X Series)							
X								

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



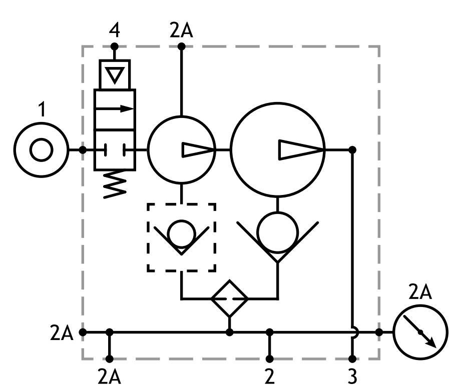






Capacity	A in [mm]	A - Weight lb [g]
25-50	3.24 [82.2]	3.78 [1712.9]
100	3.67 [93.3]	4.04 [1833.1]

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
4	Pilot Signal - Air-Supply	G 1/8 NPSF	

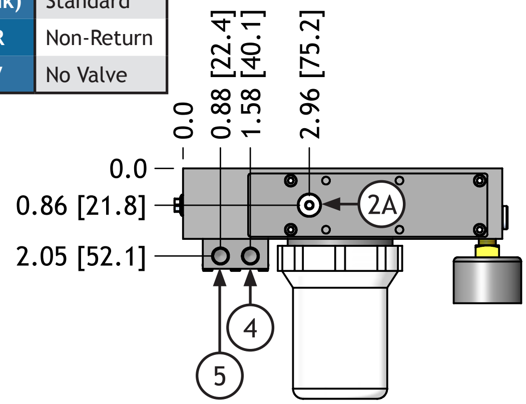


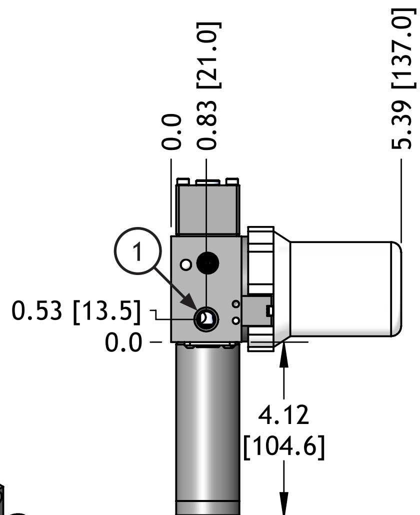
Classic Pump w/ Integrated Filter: Pilot Controlled Air-Supply & Blow-Off

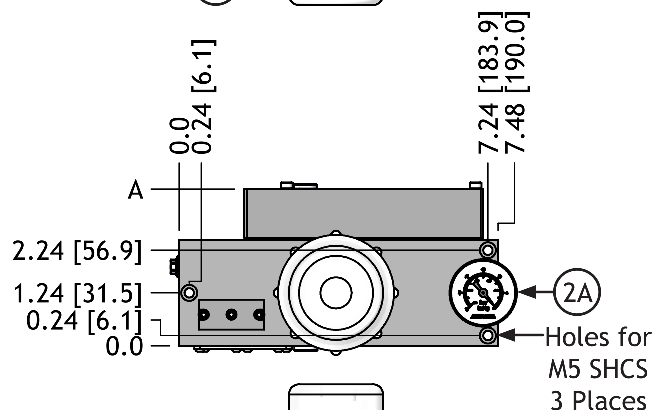
The pump base contains two integral, pilot-operated, 3-way air valves which provide full pump control via two externally supplied pneumatic pilot signals. With a constant air-supply to the pump base, one pilot signal controls vacuum on/off while a second pilot signal controls blow-off air to dissipate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

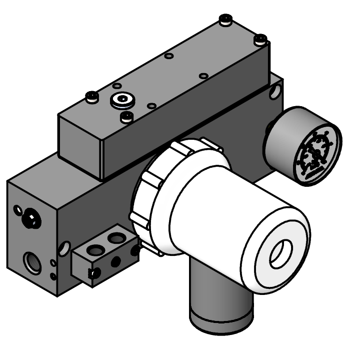
Series	Capacity	Seal		Ports			Valve Options	
ML	100	N				-IF-PSB		
E	25 (40)	N	Nitrile	(Blank)	NPTF Threads		(Blank)	Standard
L	50 (80)	V	Viton	-G	G Threads		-NR	Non-Return
M	100 (160)						-LV	No Valve
ML	(X Series)							
X								

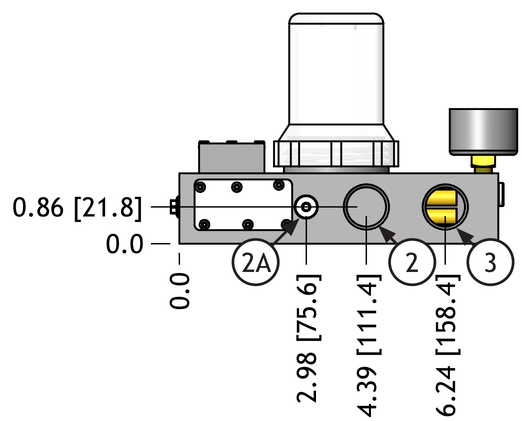
Replacement Parts:
10503: Bowl
10514: Gasket
PPX35RE3: Filter Element (3 Pack)





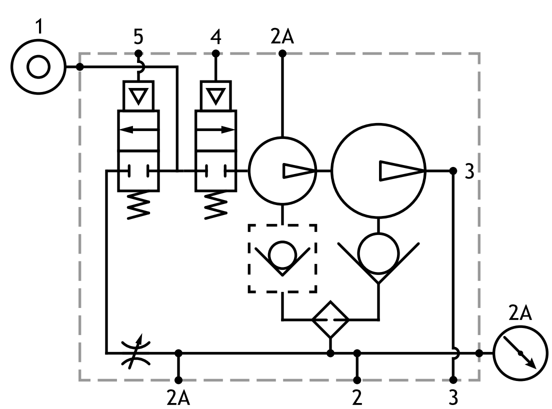






Capacity	A in [mm]	A - Weight lb [g]
25-50	3.24 [82.2]	3.78 [1712.4]
100	3.67 [93.3]	4.04 [1832.5]

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
4	Pilot Signal - Air-Supply	G 1/8 NPSF	
5	Pilot Signal - Blow-Off	G 1/8 NPSF	



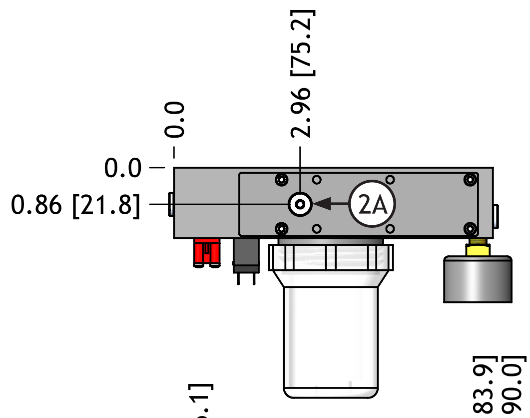
Classic Pump w/ Integrated Filter: Solenoid Controlled Air-Supply

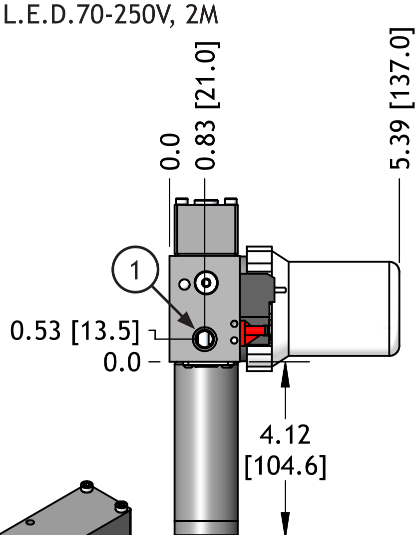
The pump base contains an integral, pilot-operated, 3-way air valve which controls vacuum on/off via a solenoid valve. When the solenoid valve is energized, the vacuum pump turns on. When the solenoid valve is de-energized, the pump turns off. This pump incorporates the bowl, gasket, and filter element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

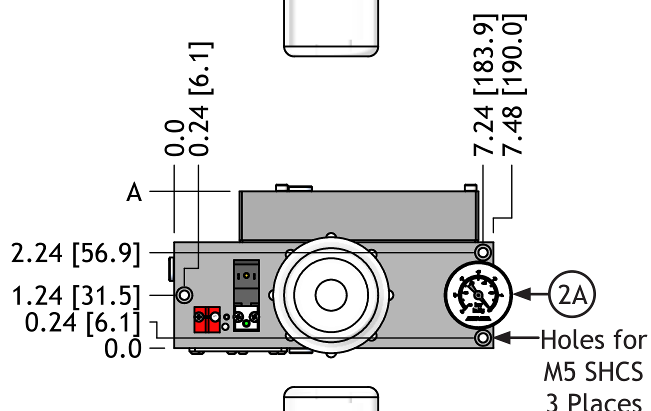
Series	Capacity	Seal		Ports			Solenoid Options		Valve Options	
ML	100	N				-IF	-S24D			
E	25 (40)	N	Nitrile	(Blank)	NPTF Threads		-S24D	24 V DC, 2.3W	(Blank)	Standard
L	50 (80)	V	Viton	-G	G Threads		-S110A	110V AC, 50 Hz	-NR	Non-Return
M	100 (160)								-LV	No Valve
ML	(X Series)									
X										

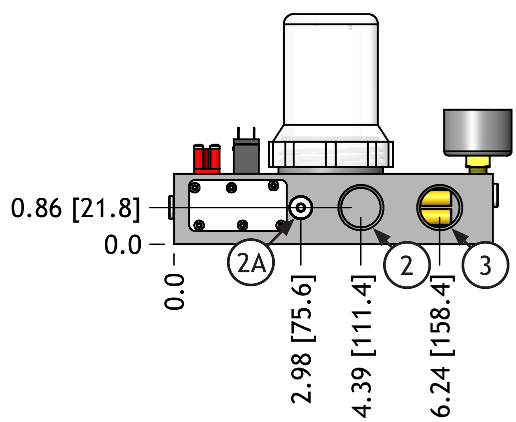
Replacement Parts:
10503: Bowl
10514: Gasket
PPX35RE3: Filter Element (3 Pack)

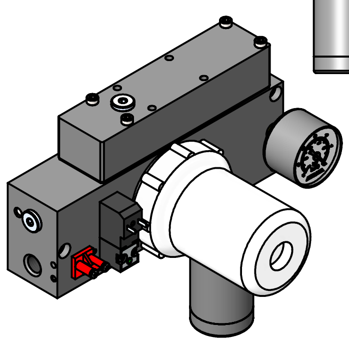
Order DIN T-9 Molded Cords Separately:
923-2M01: Std. 2M
923-2M31: L.E.D. 0-50V, 2M
923-2M81: L.E.D.70-250V, 2M





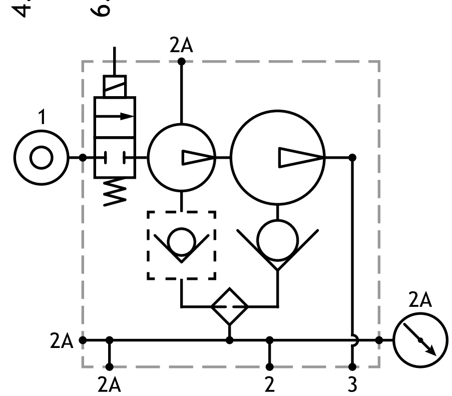






Capacity	A in [mm]	A - Weight lb [g]
25-50	3.24 [82.2]	3.73 [1692.0]
100	3.67 [93.3]	4.00 [1812.2]

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



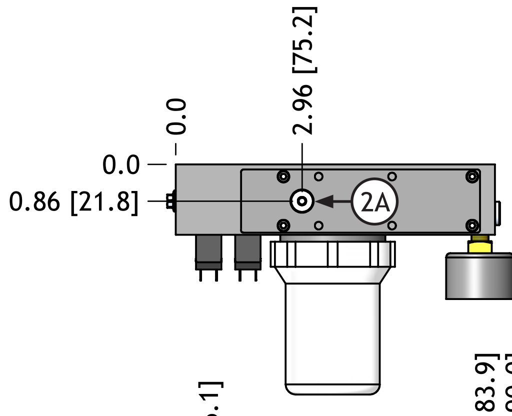
Classic Pump w/ Integrated Filter: Solenoid Controlled Air-Supply & Blow-Off

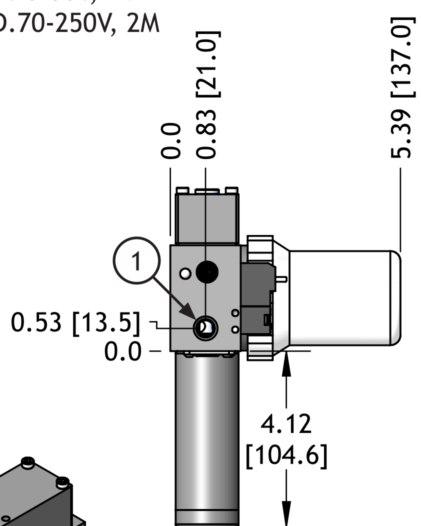
The pump base contains two integral, pilot-operated, 3-way air valves which provide full pump control via two solenoid valves. With a constant air-supply to the pump base, one solenoid valve controls vacuum on/off while a second solenoid valve controls blow-off air to dissipate vacuum for faster system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

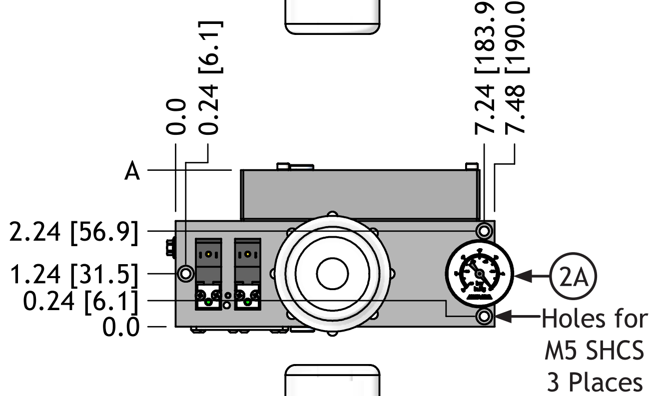
Series	Capacity	Seal		Ports			Solenoid Options		Valve Options	
ML	100	N				-IF	-SB24D			
E	25 (40)	N	Nitrile	(Blank)	NPTF Threads		-SB24D	24 V DC, 2.3W	(Blank)	Standard
L	50 (80)	V	Viton	-G	G Threads		-SB110A	110V AC, 50 Hz	-NR	Non-Return
M	100 (160)								-LV	No Valve
ML	(X Series)									
X										

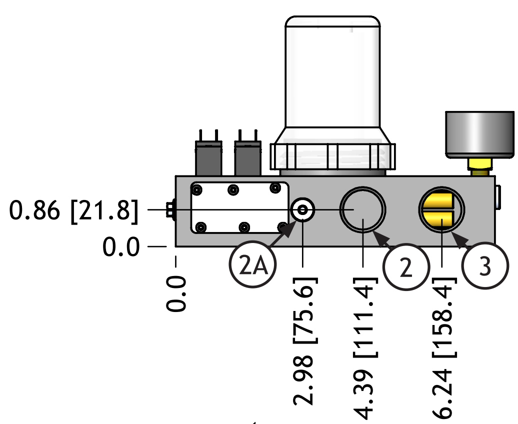
Replacement Parts:
10503: Bowl
10514: Gasket
PPX35RE3: Filter Element (3 Pack)

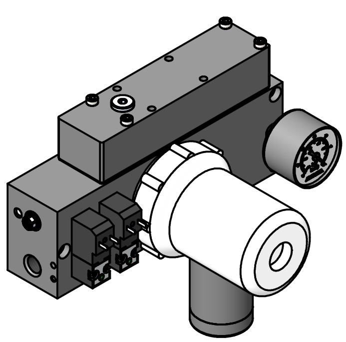
Order DIN T-9 Molded Cords Separately:
923-2M01: Std. 2M
923-2M31: L.E.D. 0-50V, 2M
923-2M81: L.E.D.70-250V, 2M



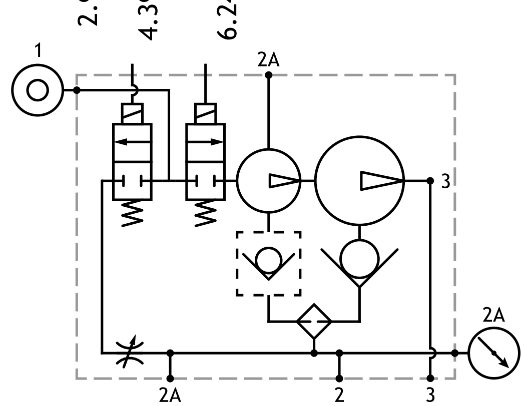








Capacity	A in [mm]	A - Weight lb [g]
25-50	3.24 [82.2]	3.76 [1703.7]
100	3.67 [93.3]	4.02 [1823.9]

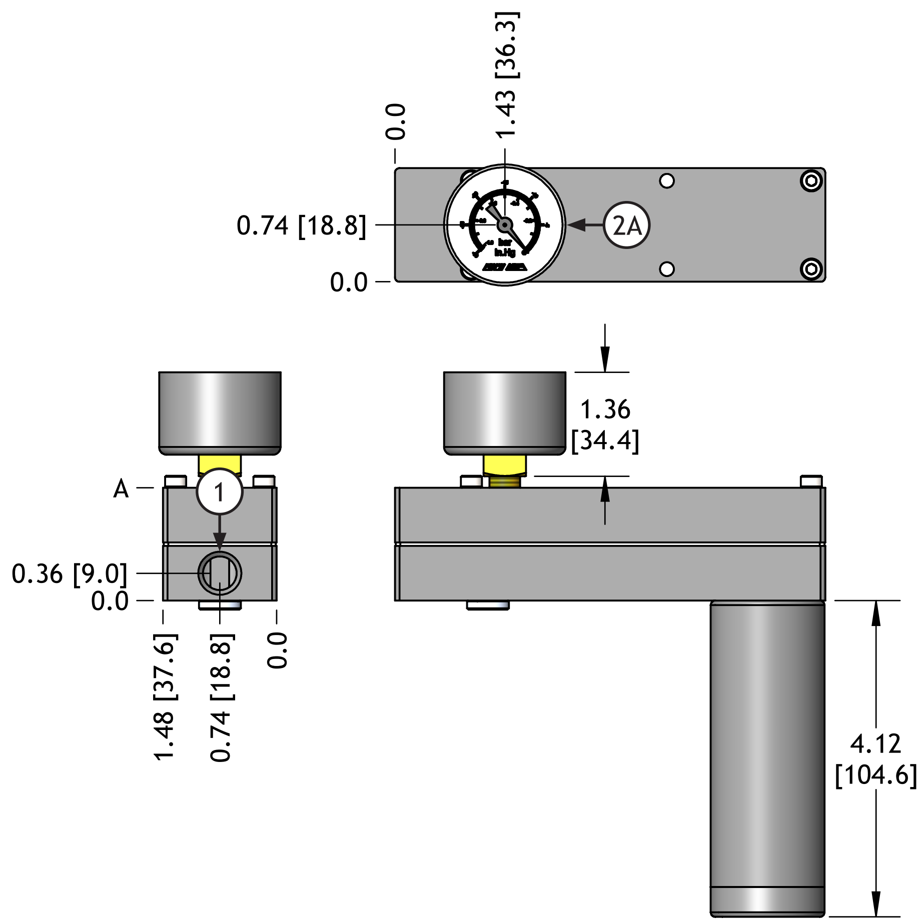


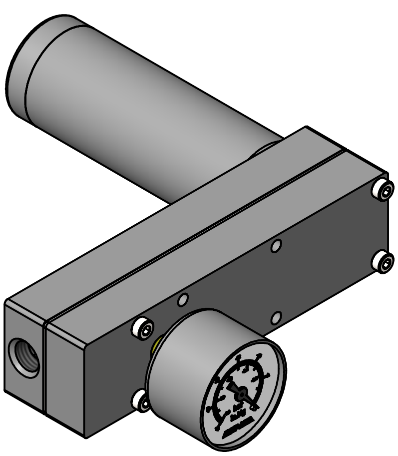
Code	Function	NPTF	G
1	Air-Supply	1/4 NPTF	G 1/4
2	Vacuum	3/4 NPTF	G 3/4
2A	Vacuum - Alternate	G 1/8 NPSF	
3	Exhaust	3/4 NPTF	G 3/4

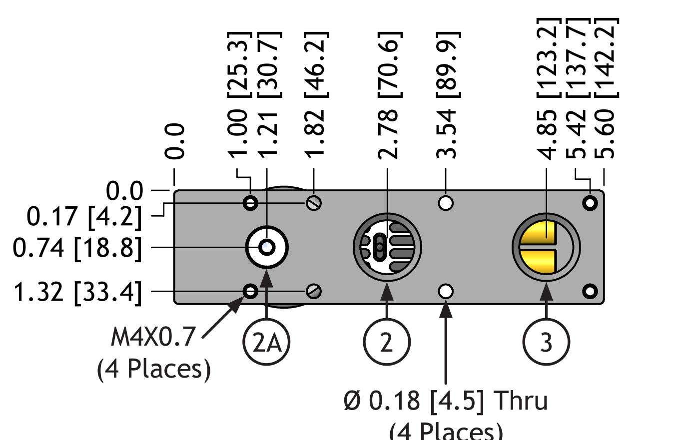
Classic Series Pumps: Mini-Classic

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

Series	Capacity	Seal		Ports			Valve Options	
ML	100	N				-12		
E	25 (40)	N	Nitrile	(Blank)	NPTF Threads		(Blank)	Standard
L	50 (80)	V	Viton	-G	G Threads		-NR	Non-Return
M	100 (160)						-LV	No Valve
ML	(X Series)							
X								

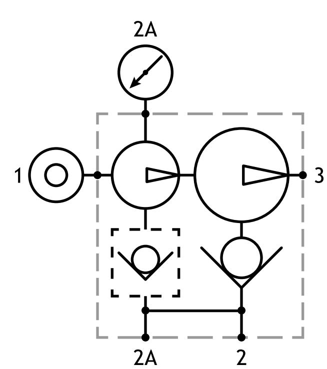






Code	Function	NPTF	G
1	Air-Supply	1/4 NPTF	G 1/4
2	Vacuum	1/2 NPTF	G 1/2
2A	Vacuum - Alternate	G 1/8 NPSF	
3	Exhaust	1/2 NPTF	G 1/2

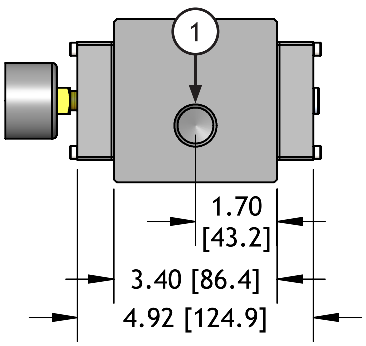
Capacity	A in [mm]	A - Weight lb [g]
25-50	1.47 [37.3]	1.25 [565.7]
100	1.90 [48.3]	1.53 [693.7]

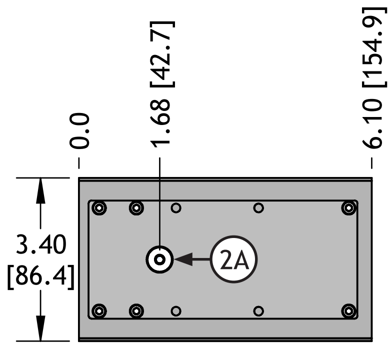


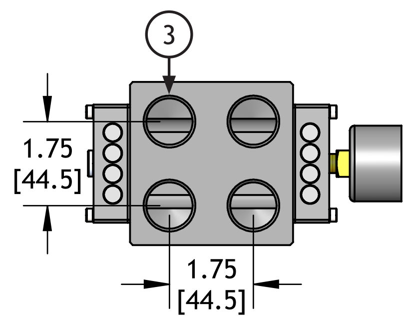
Classic Series Pumps: Dual-Base

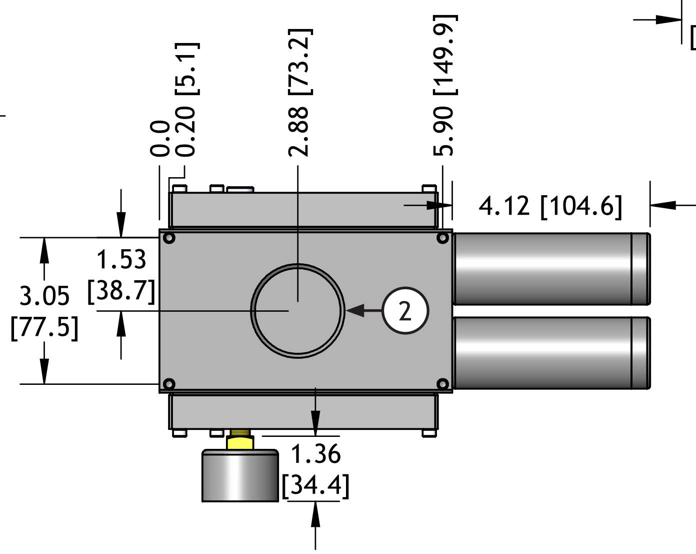
Basic pump controlled via air supply through the pump base inlet port.

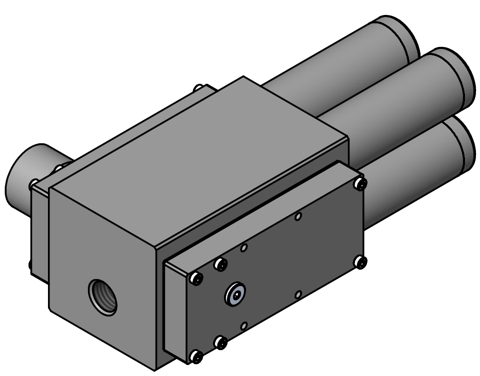
	Series	Capacity	Seal		Valve Options	
D	ML	200	N			
	E	200 (320)	E	EPDM	(Blank)	Standard
	L	300 (480)	N	Nitrile	-NR	Non-Return
	M	400 (640)	S	Silicone	-LV	No Valve
	ML	(X Series)	V	Viton[2]		
	X					

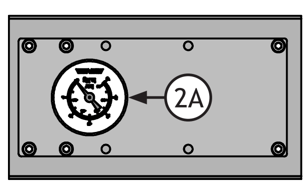


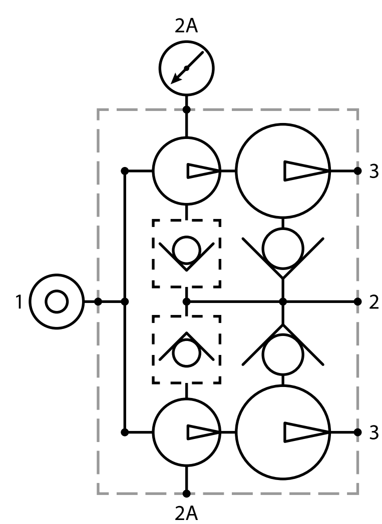












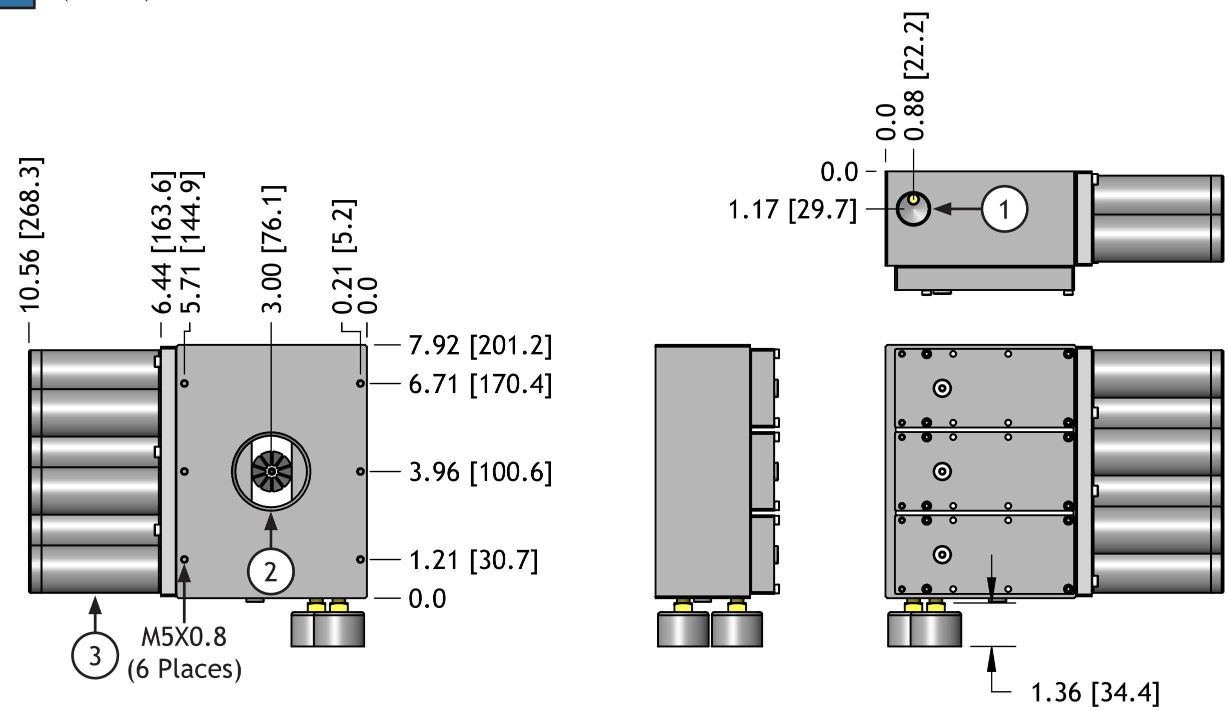
Code	Function	NPTF
1	Air-Supply	G 1/2 NPSF
2	Vacuum	G 1/2 NPSF
2A	Vacuum - Alternate	G 1/8 NPSF
3	Exhaust	G 3/4 NPSF

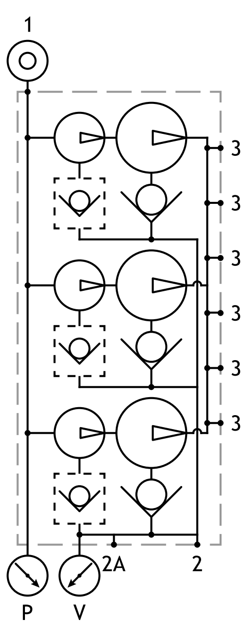
Capacity	A in [mm]	A - Weight lb [g]
200	4.92 [124.9]	6.94 [3146.8]
300	5.63 [142.9]	7.58 [3436.3]
400	6.34 [160.9]	8.21 [3752.9]

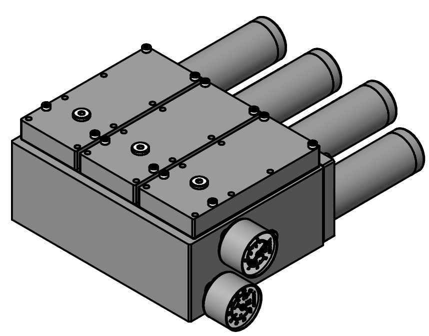
Classic Series Pumps: Triple-Base

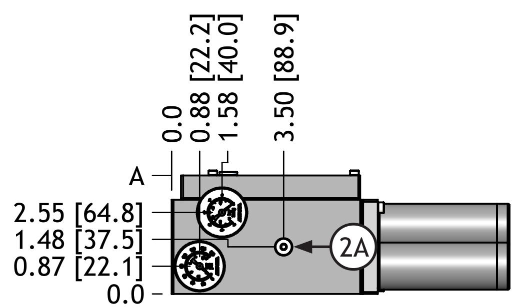
Basic pump controlled via air supply through the pump base inlet port.

	Series	Capacity	Seal		Ports		Valve Options		Exhaust Option	
T	ML	300	N							
	E	300 (480)	E	EPDM	(Blank)	NPTF Threads	(Blank)	Standard	(Blank)	Standard
	L	400 (640)	N	Nitrile	-G	G Threads	-NR	Non-Return	-CE	Captured
	M	500 (800)	S	Silicone			-LV	No Valve		
	ML	600 (960)	V	Viton[2]						
	X	(X Series)								









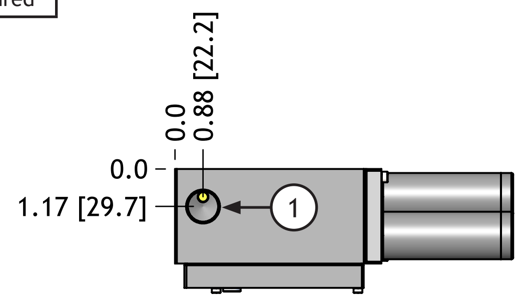
Code	Function	NPTF	G
1	Air-Supply	3/4 NPTF	G 3/4
2	Vacuum	2 NPTF	G 2
2A	Vacuum - Alternate	G 1/8 NPSF	
3	Exhaust	3/4 NPTF	G 3/4

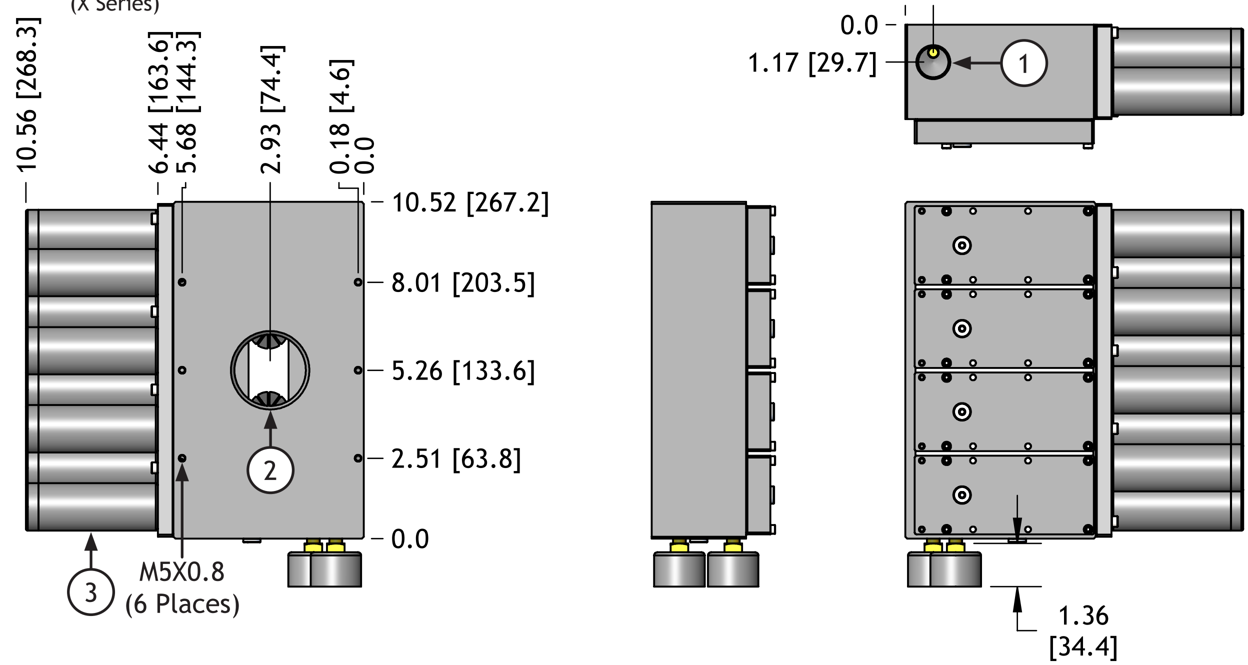
Capacity	A in [mm]	A - Weight lb [g]
300	3.71 [94.2]	12.68 [5749.8]
400	4.42 [112.2]	13.31 [6039.3]
500	4.42 [112.2]	13.95 [6328.8]
600	4.42 [112.2]	14.59 [6618.3]

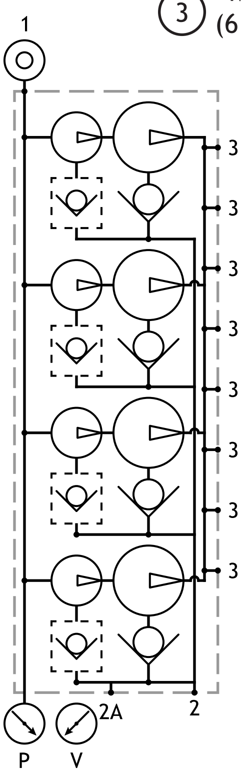
Classic Series Pumps: Quad-Base

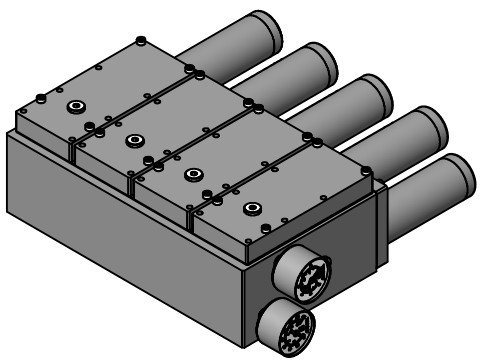
Basic pump controlled via air supply through the pump base inlet port.

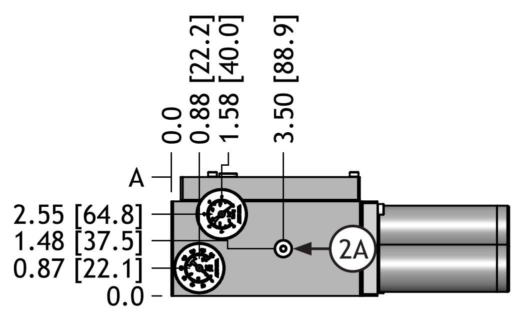
	Series	Capacity	Seal		Valve Options		Exhaust Option	
Q	ML	400	N					
	E	400 (640)	E	EPDM	(Blank)	Standard	(Blank)	Standard
	L	500 (800)	N	Nitrile	-NR	Non-Return	-CE	Captured
	M	600 (960)	S	Silicone	-LV	No Valve		
	ML	700 (1120)	V	Viton[2]				
	X	800 (1280)						
		(X Series)						











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

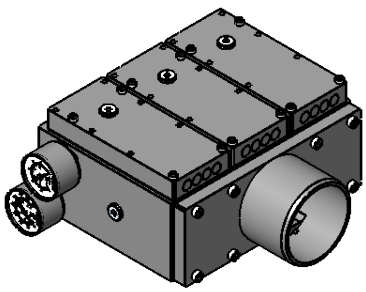
Capacity	A in [mm]	A - Weight lb [g]
400	3.71 [94.2]	16.78 [7610.0]
500	4.42 [112.2]	17.42 [7899.6]
600	4.42 [112.2]	18.05 [8189.1]
700	4.42 [112.2]	18.69 [8478.6]
800	4.42 [112.2]	19.33 [8768.1]

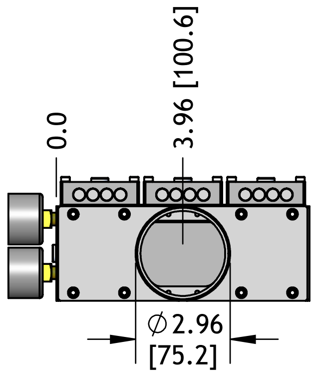
Classic Series Pumps: Captured Exhaust Option

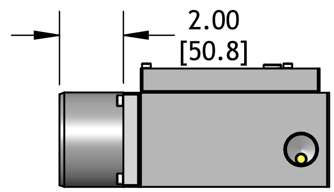
To use the Captured Exhaust Option, use 3.00” (75 mm) inner diamter hose.

Triple-Base

Subtract Weight: 0.97 lb [438.5 g]

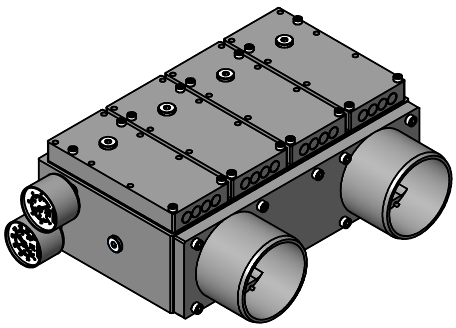


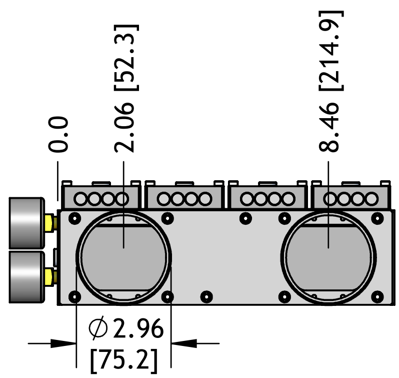


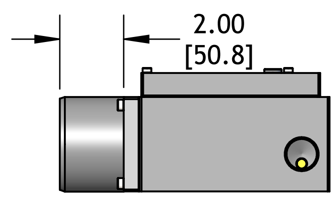


Quad-Base

Subtract Weight: 1.22 lb [553.0 g]







Classic Series Pumps: 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

Code	Description	Working Temperature	Color
E	Ethyl Propylene (E.P.D.M.)	-4°F to 230°F -20°C to 110°C	Black
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

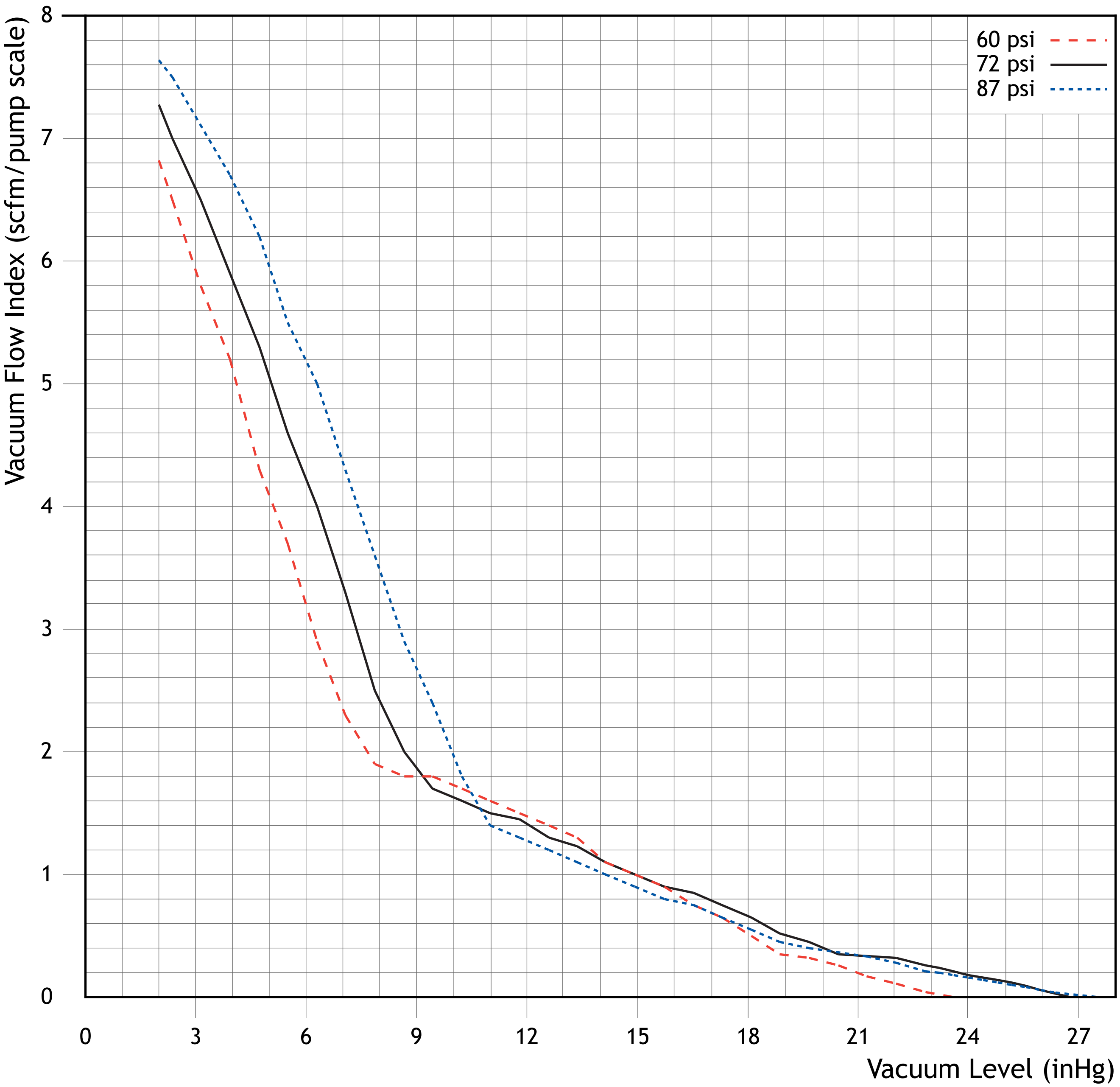
[1]For operating temperatures above 180˚F [82.2˚C]. The pump will be assembled using high-temperature sealant, metal end plugs, and will be supplied without ehaust silencer and vacuum gauge. Available for basic pump style only.

[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.

Classic Series Pumps: 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 in^3

Air Supply PSI	Air Consum SCFM	Max Vacuum inHg	Seconds to Evacuate 1,000 in^3 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 cu in X 0.61 = sec / l

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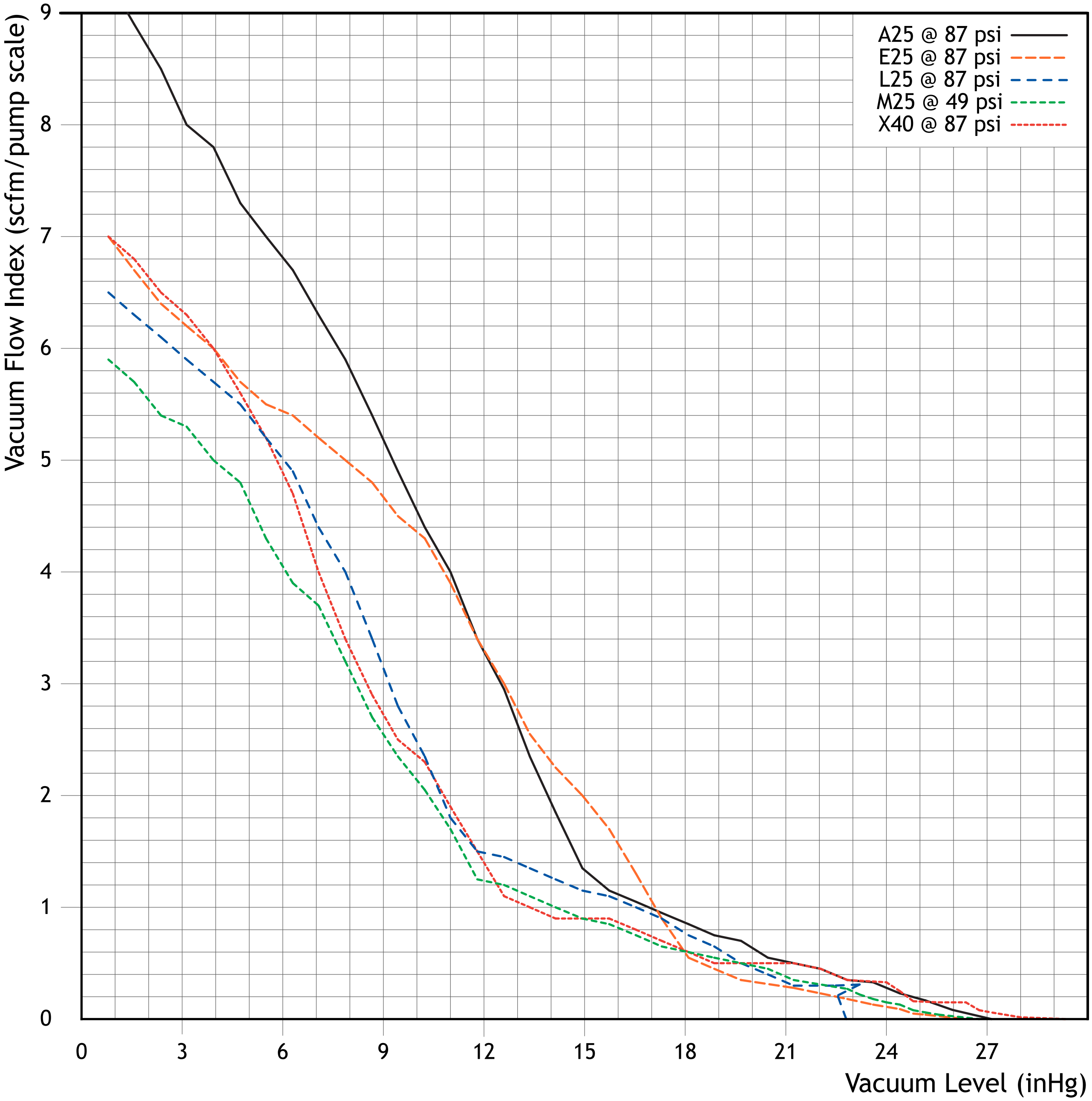
Classic Series Pumps: Performance

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 in^3

Pump Series	Air Supply PSI	Air Consum SCFM	Max Vacuum inHg	Seconds to Evacuate 1,000 in^3 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
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 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 Pumps: 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.

Classic Series Pumps: 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.

Classic Series Pumps: 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
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 / 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.

Classic Series Pumps: Performance

Evacuation Time: sec / ft^3

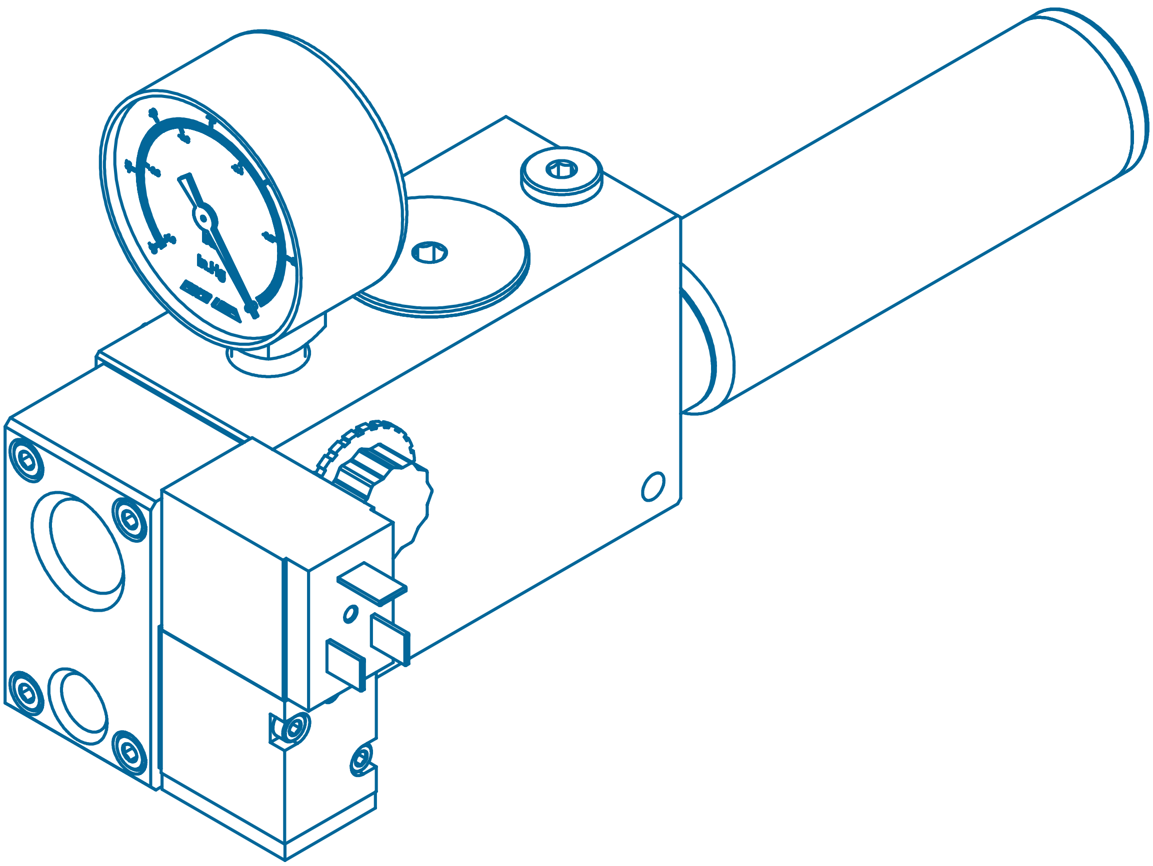
Model	Air Supply PSI	Air Consum SCFM	Max Vacuum inHg	Seconds to Evacuate 1 cu ft to Vacuum Level									
				3 inHg	6 inHg	9 inHg	12 inHg	15 inHg	18 inHg	21 inHg	24 inHg	26 inHg	27 inHg
E400	87	109	26.7	0.044	0.11	0.19	0.33	0.55	0.94	1.69	3.3	5.86	-
E500	87	136	26.7	0.035	0.085	0.16	0.26	0.44	0.75	1.35	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

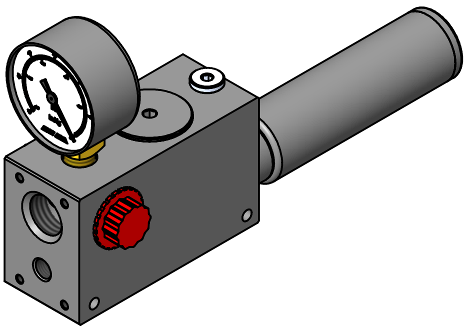
sec / ft^3 X 35.32 = sec / m^3

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.

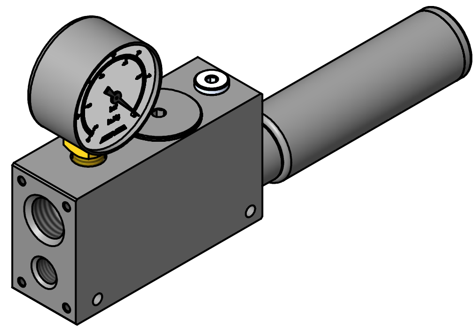
SECTION 9

VG & VQ PUMPS

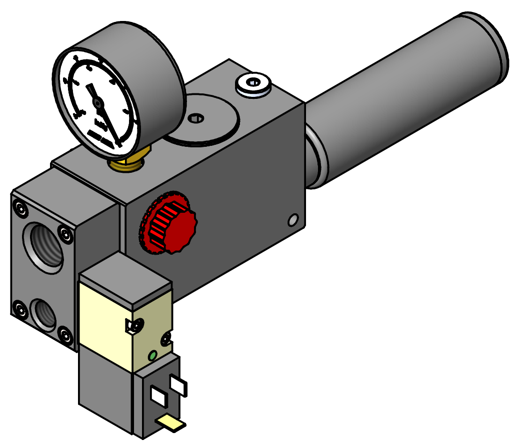




VG Pumps



VQ Pumps



Options

VG & VQ Pumps

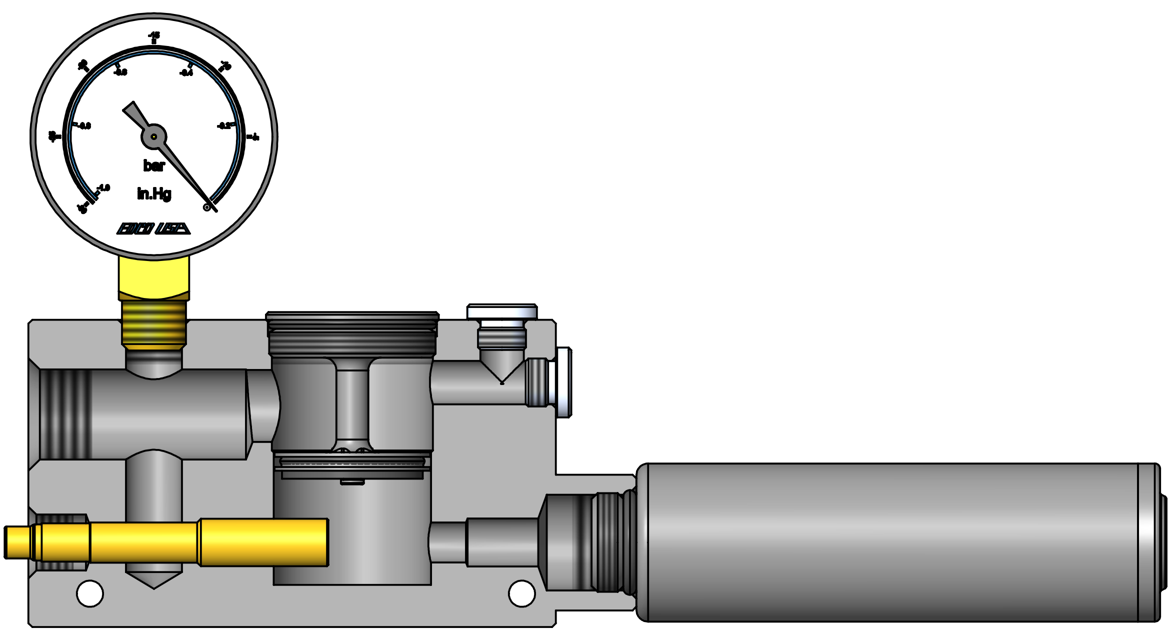
EDCO VG and VQ series vacuum pumps have different bodies to make them directly interchangeable with competitor pumps but utilize the same ejetor nozzles. Performance is the same regardless of which body style you choose. These multi-stage vacuum pumps are designed as direct physical replacements for 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.

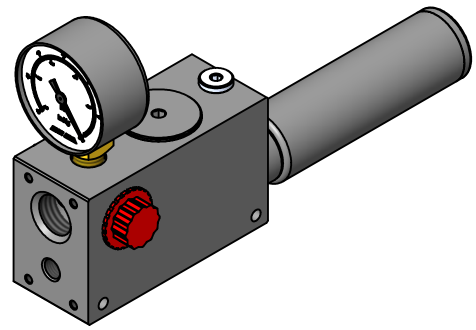
Instead of gang-mounting multiple VG or VQ series pumps to a manifold to obtain a higher flow capacity pump, EDCO offers larger, multi-stage pumps in the classic series (3/4” ports) or dual-base classic series (1-1/2” ports) styles that are much more compact and easier to maintain.



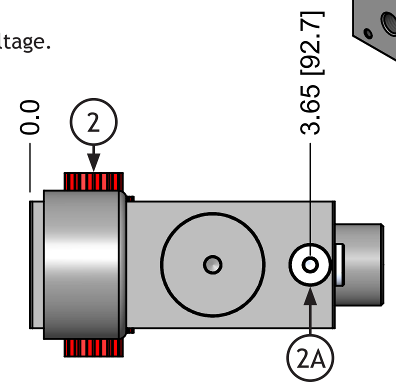
VG Pumps

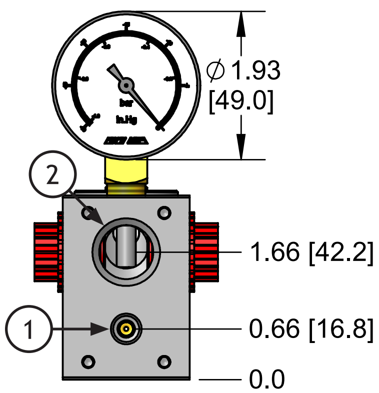
	Capacity	Ports		Solenoid Option		Solenoid Position[1]	
VG-	065						
	065	(Blank)	NPTF	(Blank)	None	(Blank)	n/a
	075	-G	G Threads	-12V	12 Volt DC	-L	Left Side
	130			-24V	24 Volt DC	-R	Right Side
	140						
	260						

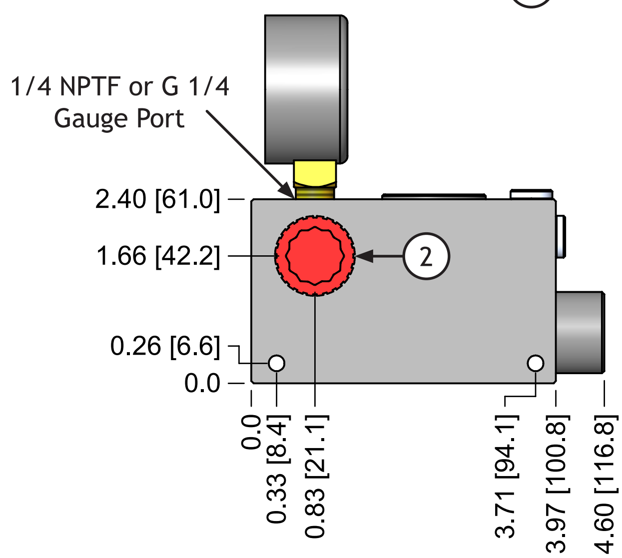
[1]When selecting the solenoid option, you must pick a solenoid voltage. Solenoid will be shipped in the normally closed position.

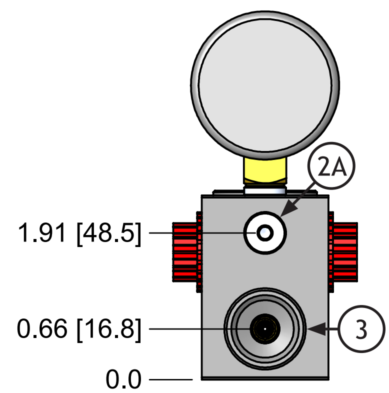


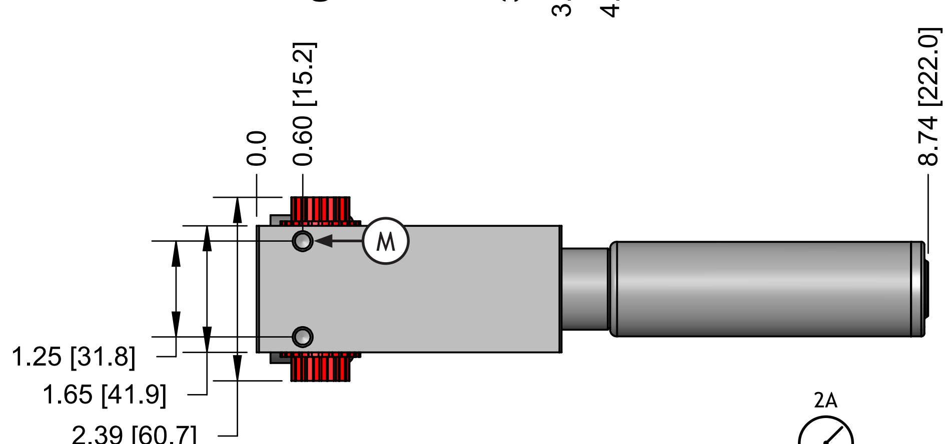
Weight: 1.51 lb [684.9 g]



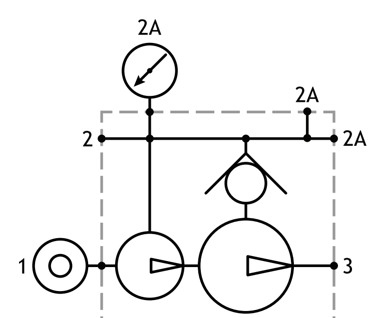








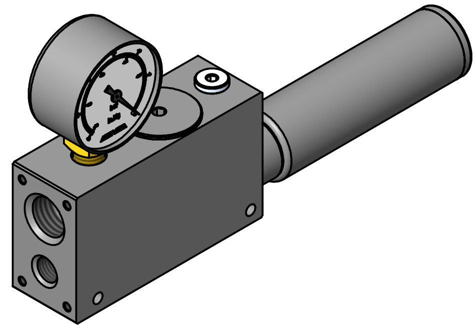
Code	Function	NPTF	G
1	Air Supply	G 1/8 NPSF	
2	Vacuum - Main	1/2 NPTF	G 1/2
2A	Vacuum - Alternate	G 1/8 NPSF	
3	Exhaust	G 1/2 NPSF	
M	Mounting Holes	1/4-20	M6X1.0



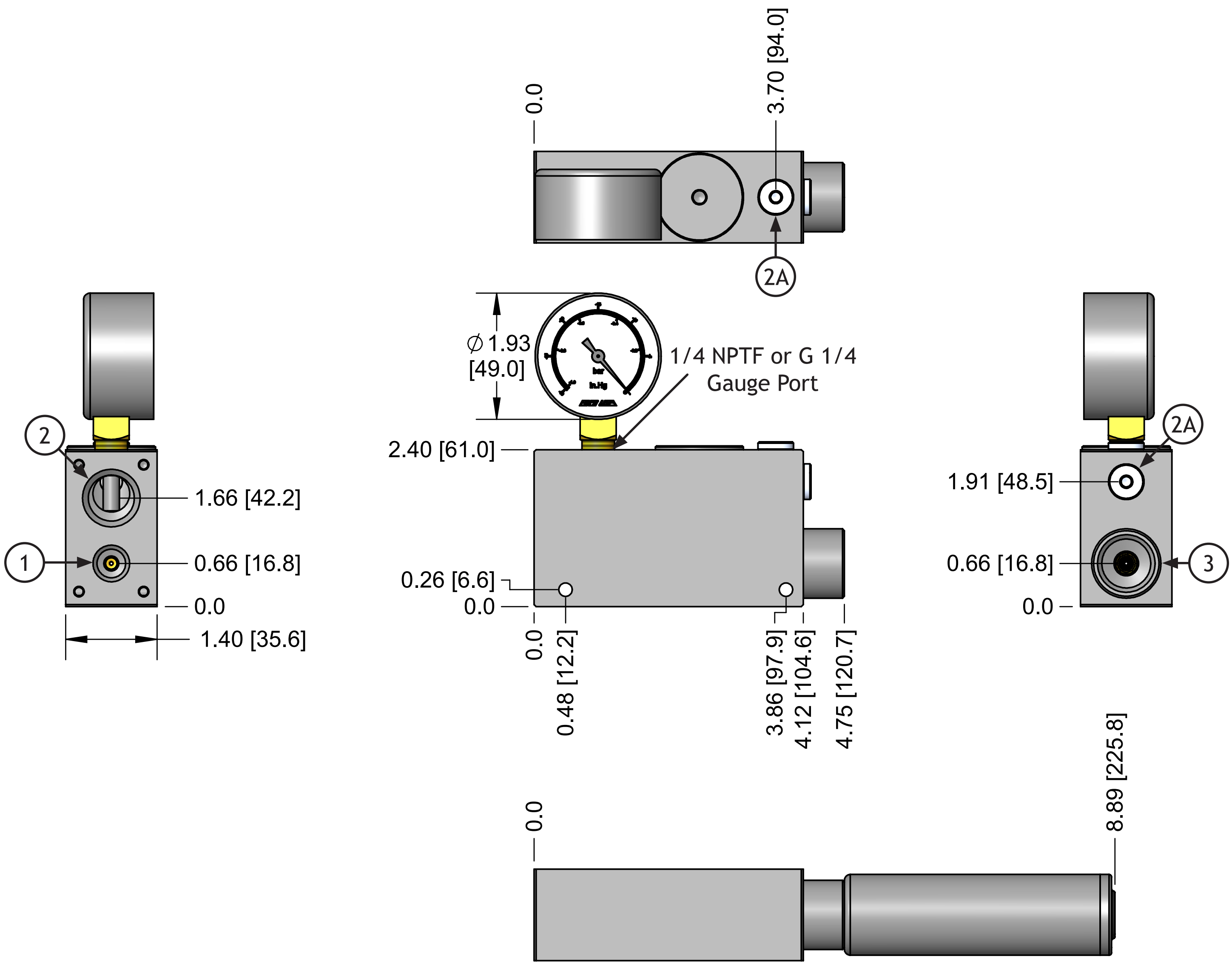
VQ Pumps

	Capacity	Ports		Solenoid Option		Solenoid Position[1]	
VG-	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						

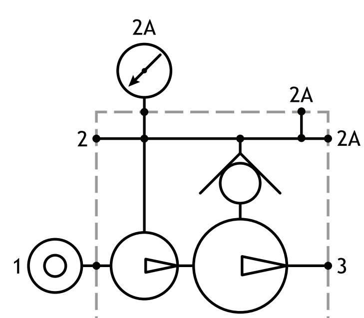
[1]When selecting the solenoid option, you must pick a solenoid voltage.
Solenoid will be shipped in the normally closed position.



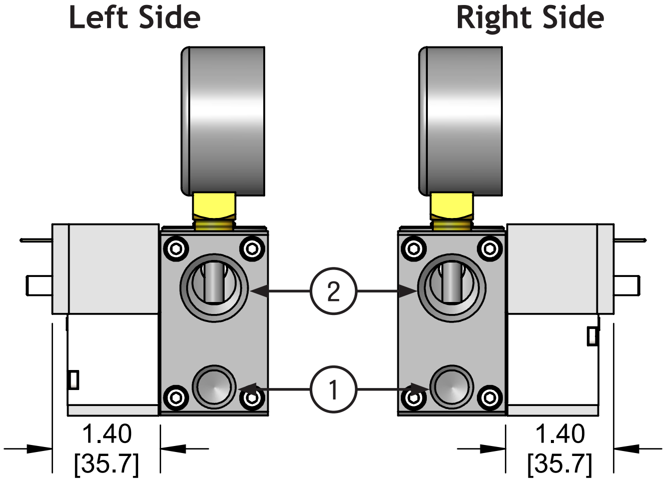
Weight: 1.35 lb [612.3 g]

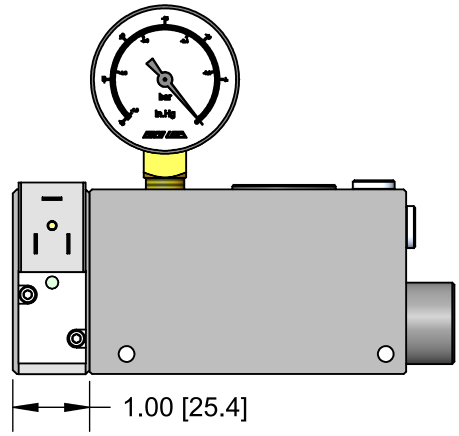


Code	Function	NPTF	G
1	Air Supply	G 1/8 NPSF	
2	Vacuum - Main	1/2 NPTF	G 1/2
2A	Vacuum - Alternate	G 1/8 NPSF	
3	Exhaust	G 1/2 NPSF	



VG & VQ Pump Solenoid Options





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

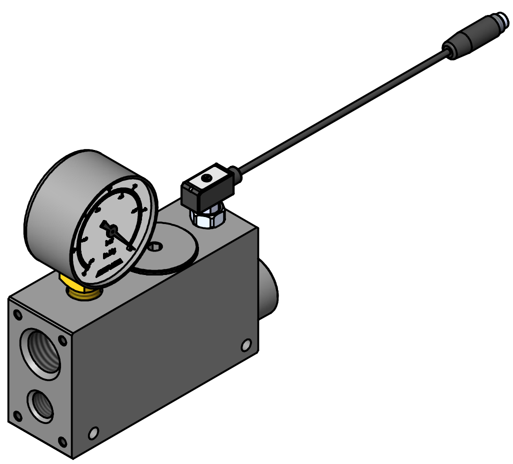
Weight: add 0.40 lb [181.4 g]

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

Additional Options

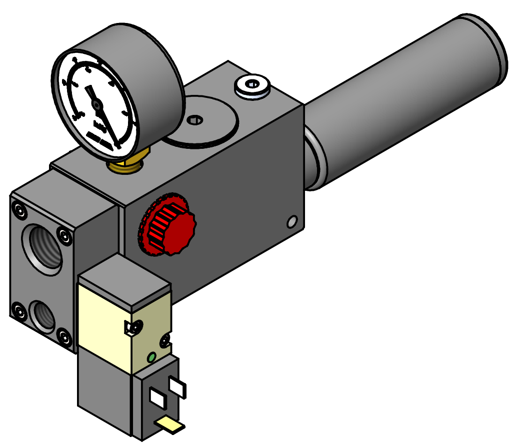
These additional options are shown for demonstration purposes only.

Please order any adittional items needed separately.



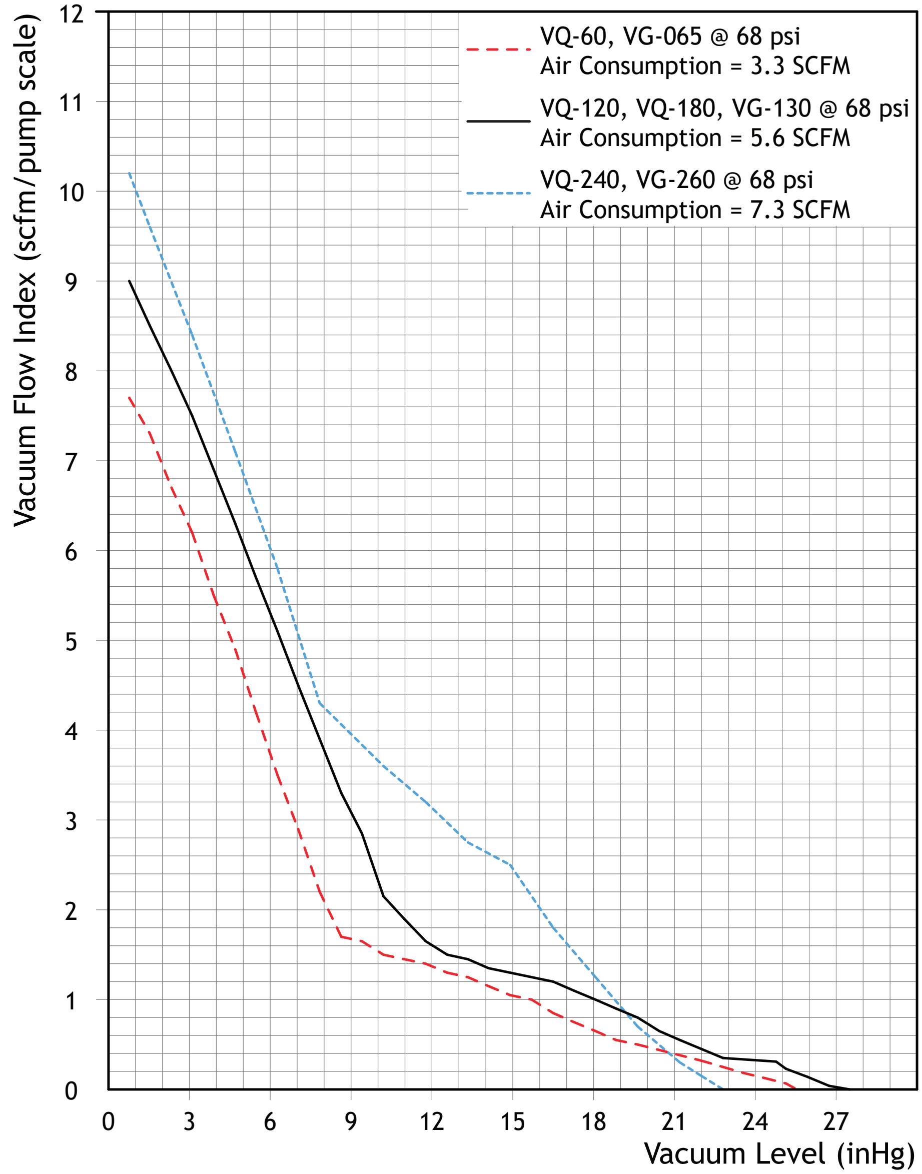
Normally Open Solenoid

Flip solenoid 180° for normally open mode.



DVN-200 Vacuum Switch

VG & VQ Series Pumps: 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
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

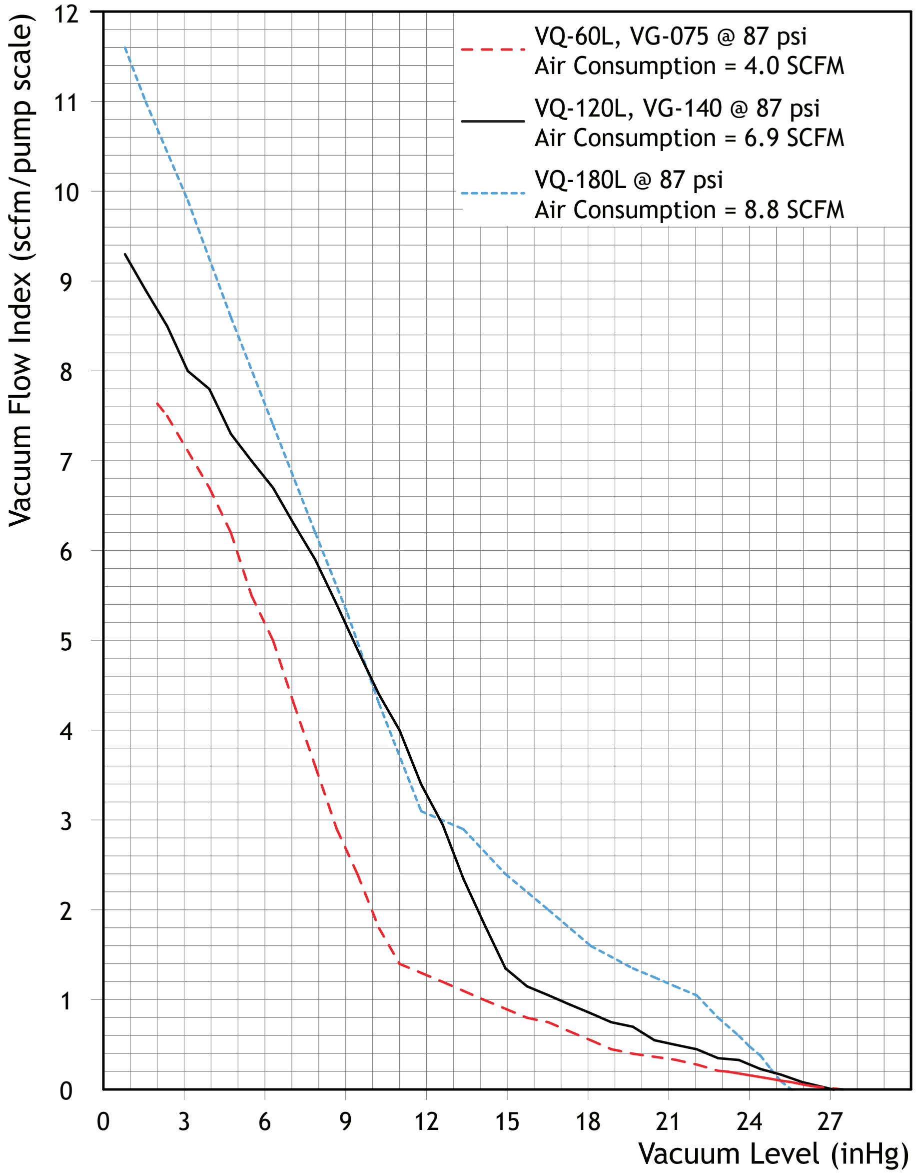
Evacuation Time - sec / ft^3

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.

VG & VQ Series Pumps: 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
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 / ft³

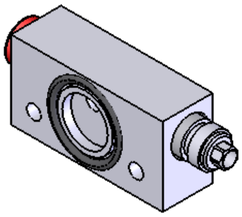
Model		Air Supply PSI	Air Consu SCFM	Max Vacuum inHg	Seconds to Evacuate 1 ft³ to Vacuum Level (inHg)							
					3 sec	6 sec	9 sec	12 sec	15 sec	18 sec	21 sec	24 sec
VG-075	VQ-60L	87	4.0	27.5	0.6	1.5	3.0	5.7	10.2	17.7	32	62
VG-140	VQ-120L	87	6.9	27.0	0.53	1.3	2.5	4.3	7.4	12.8	23	44
-	VQ-180L	87	8.8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

sec / ft³ X 35.32 = sec / m³

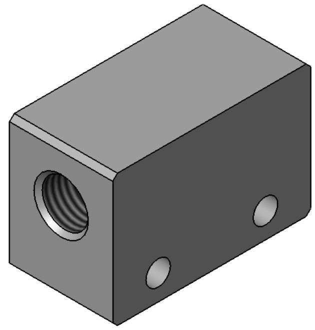
All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.

SECTION 10
ER SERIES PUMPS

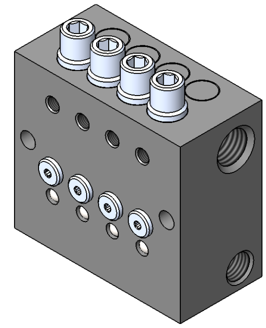
ER SERIES PUMPS



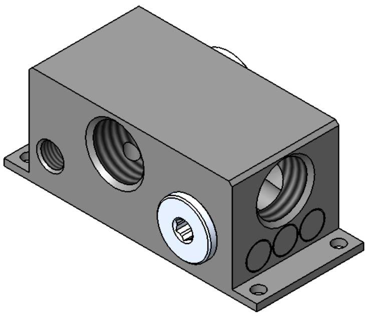
SURFACE MOUNT MICRO PUMP



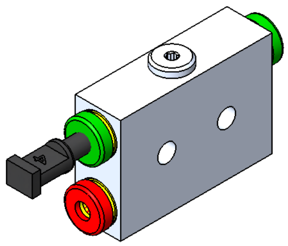
T18F BODY



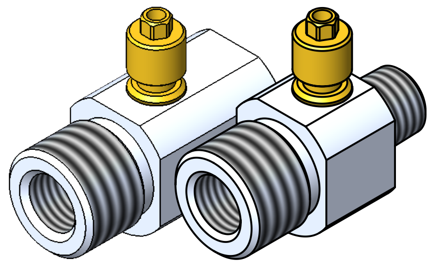
VACUUM BAR



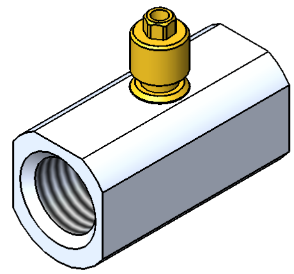
T-BASE



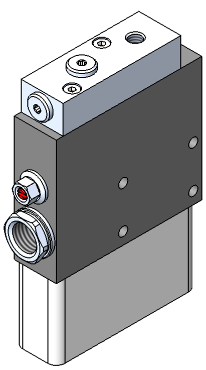
ER2010



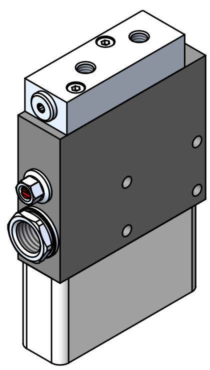
18F / 18M



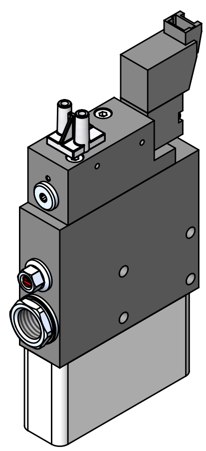
G14F18F



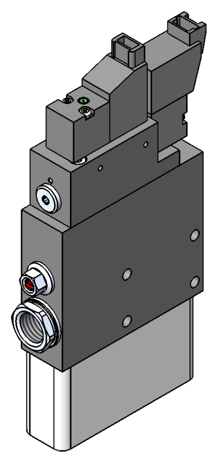
DER18-PS



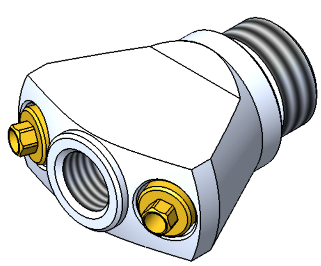
DER18-PSB



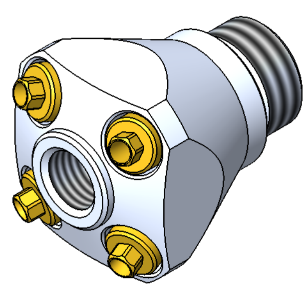
DER18-S24D



DER18-SB24D



X2-18F



X4-18F

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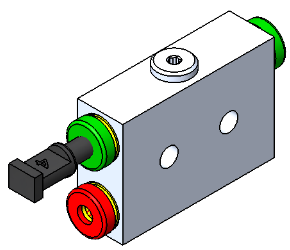
ER2010 MICRO PUMP : M4

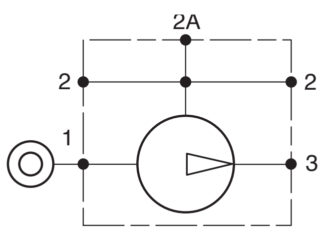
The ER2010 micro-pump has an anodized aluminum body available in two styles. The M4 style micro-pump has 4mm (5/32) push-in tube connectors for the air supply, two vacuum ports and a third M5 x 0.8 (10-32) threaded vacuum port.

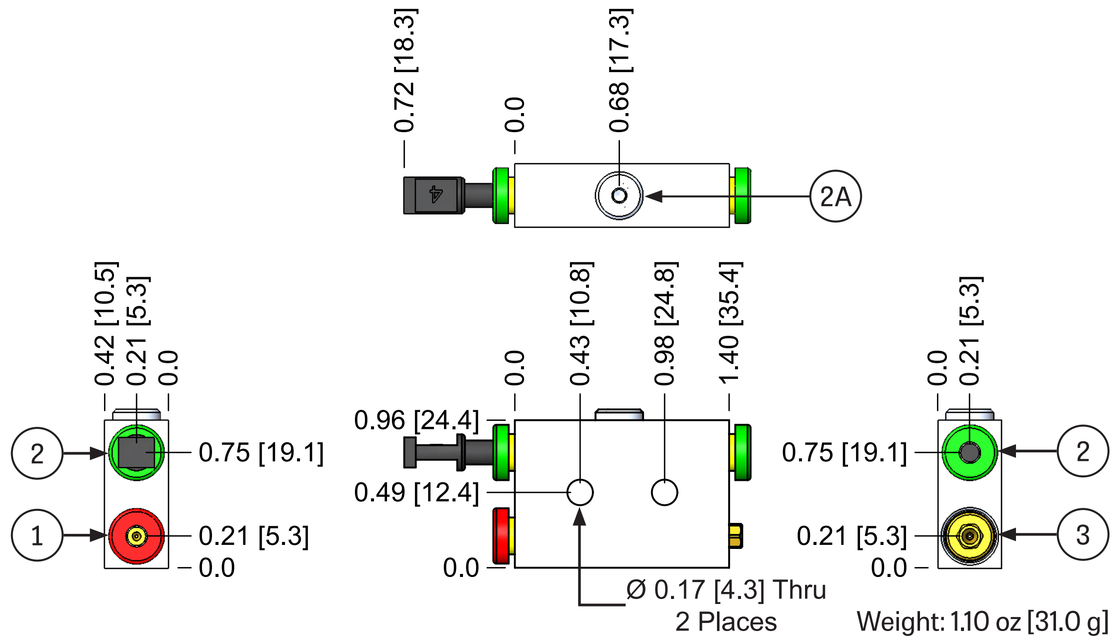
ER2010- [VENTURI SIZE] -M4

VENTURI SIZE
05
07
09
10
08L
10L

CODE	FUNCTION	PORT
1	Air Supply	4 mm (5/32) Tube
2	Vacuum - Main	4 mm (5/32) Tube
2A	Vacuum - Alternate	M5X0.8 (10-32 UNF)
3	Exhaust	-







Weight: 1.10 oz [31.0 g]

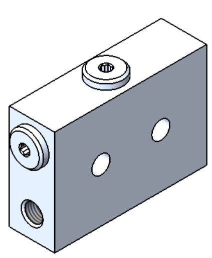
ER2010 MICRO PUMP : 5F

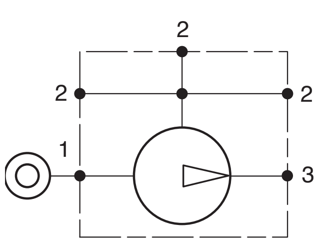
The ER2010 micro-pump has an anodized aluminum body available in two styles. The 5F style micro-pump has M5 x 0.8 (10-32) threaded ports for the air supply and three vacuum ports.

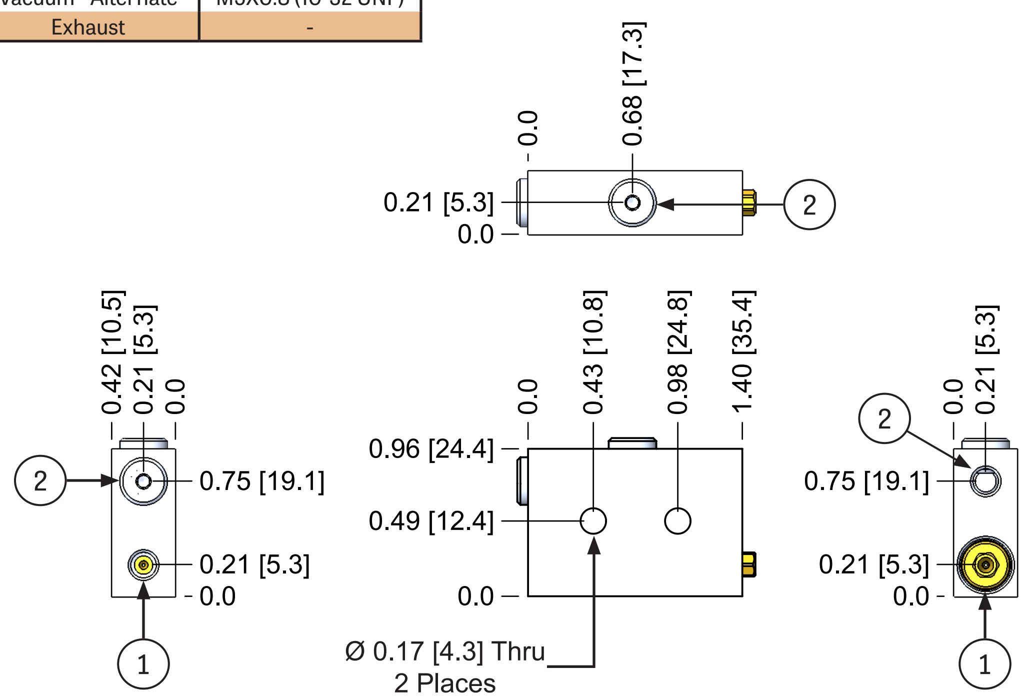
ER2010- [VENTURI SIZE] -5F

VENTURI SIZE
05
07
09
10
08L
10L

CODE	FUNCTION	PORT
1	Air Supply	M5X0.8 (10-32 UNF)
2	Vacuum - Main	M5X0.8 (10-32 UNF)
2A	Vacuum - Alternate	M5X0.8 (10-32 UNF)
3	Exhaust	-







Weight: 0.90 oz [25.0 g]

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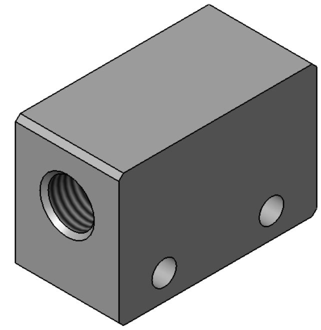
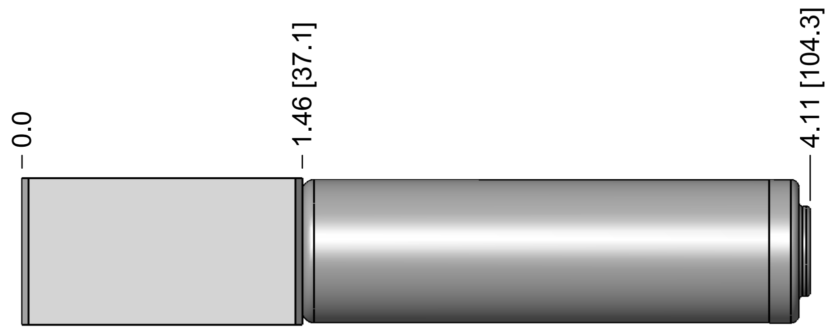
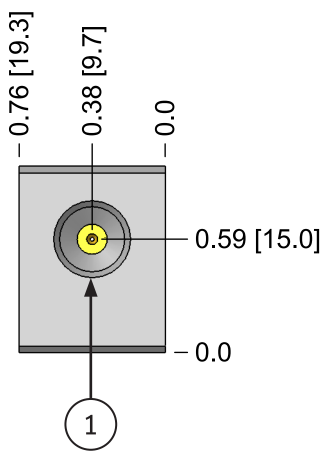
ER SERIES PUMPS
T18F BASE

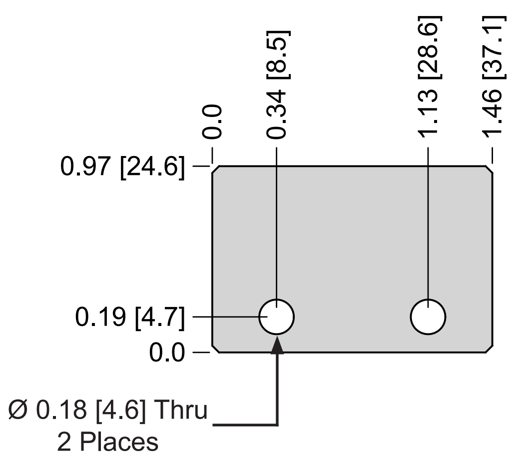
The T18F base places high performance ER pumps in a compact traditional tee-style body with through holes for mounting and a threaded exhaust port for an optional silencer. The tee-style body is ideal for small systems or one-pump-per-suction-cup applications. The T18F base has G1/8 NPSF air supply and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

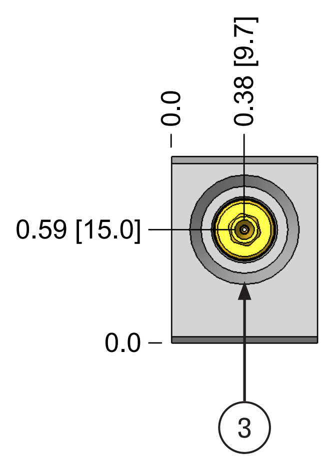


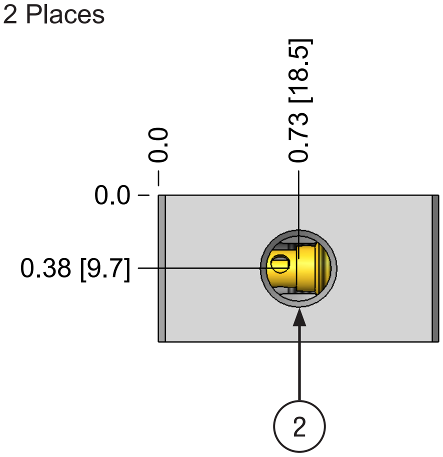
	VENTURI SIZE		SILENCER
ER	05	-T18F-	
	05		(Blank) = None
	07		**ST** = STA14M
	09		
	10		
	08L		
	10L		











CODE	FUNCTION	PORT
1	Air Supply	G1/8 NPSF
2	Vacuum	G1/8 NPSF
3	Exhaust	G 1/4

10

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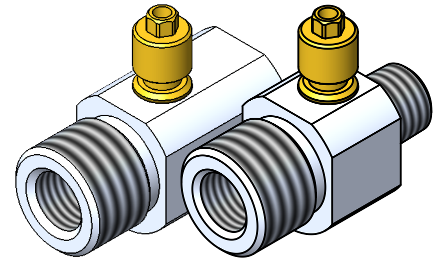
ER SERIES PUMPS

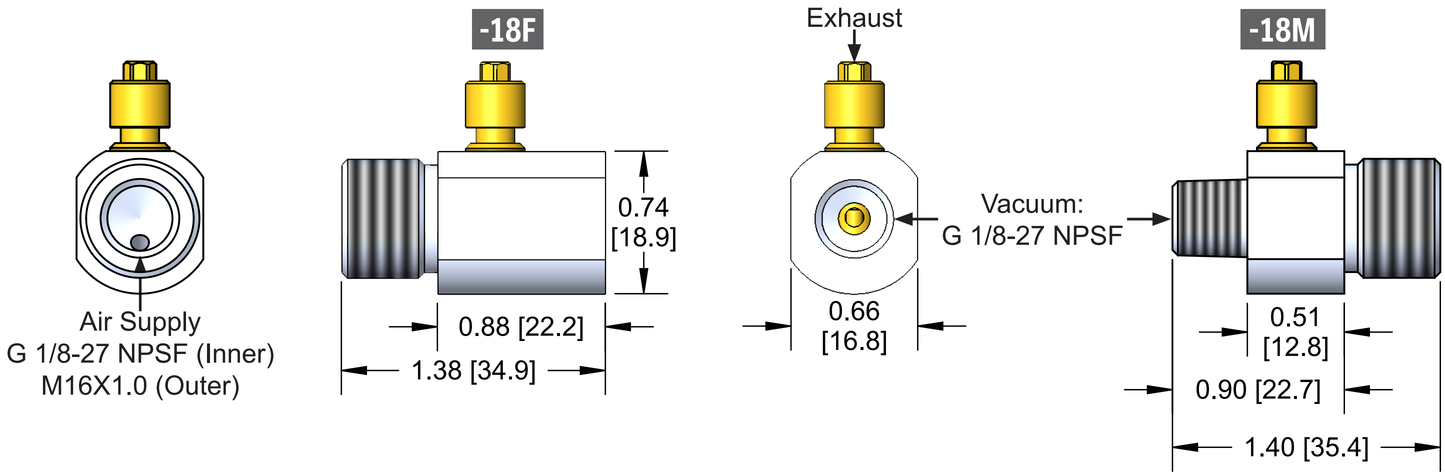
INLINE PUMPS : G1/8 NPSF AIR SUPPLY

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. G 1/8 NPSF air supply and vacuum ports, one-piece anodized aluminum body.

	VENTURI SIZE		BODY
ER	05	-	18F
	05		**18F** = 1/8 NPSF Female
	07		**18M** = 1/8 NPS Male
	09		
	10		
	08L		
	10L		



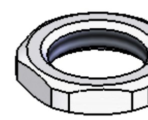
Weight: 0.90 oz [27.0 g]



10

ER VENTURI	AIR CONSUMPTION AT 72 psi [5 bar]	EQUIVALENT VENTURI DIAMETER	IP Series PUMP REPLACEMENT
05	0.51 SCFM [14.4 Nl/m]	0.5 mm	-
07	0.66 SCFM [18.7 Nl/m]	0.7 mm	IP6M-5
09	1.4 SCFM [39.6 Nl/m]	0.9 mm	IP6M-10
10	1.8 SCFM [51 Nl/m]	1.0 mm	-
08L	1.2 SCFM [34 Nl/m]	0.8 mm	-
10L	1.9 SCFM [53.8 Nl/m]	1.0 mm	-

JN-M16X1.0

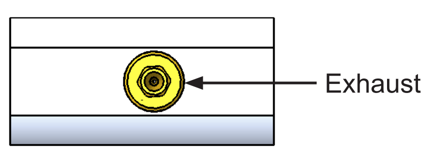


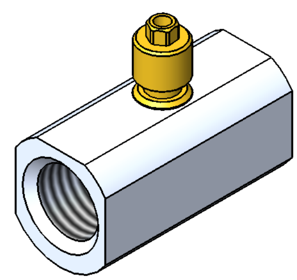
For use with -18F inline pumps.

INLINE PUMPS : G1/4 AIR SUPPLY

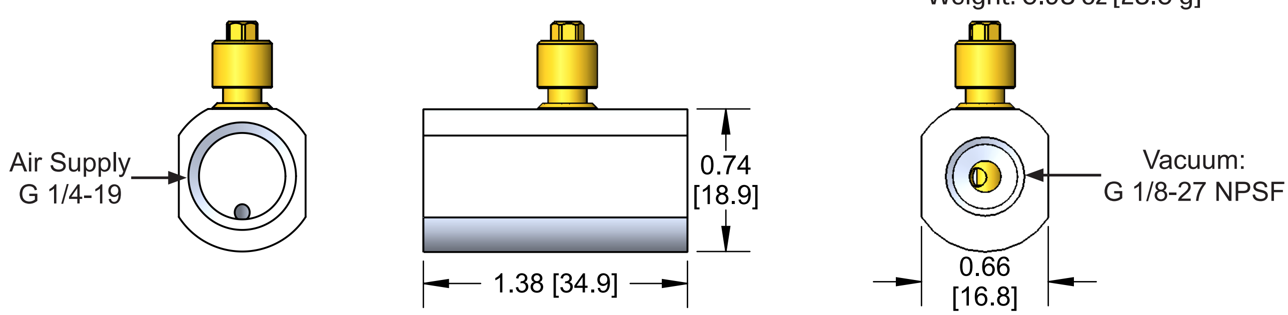
Inline pumps with same features and performance as the -18F body, but with a larger G 1/4 BSPP air supply port. Vacuum port is G 1/8 NPSF.

	VENTURI SIZE	
ER	05	-G14F18F
	05	
	07	
	09	
	10	
	08L	
	10L	



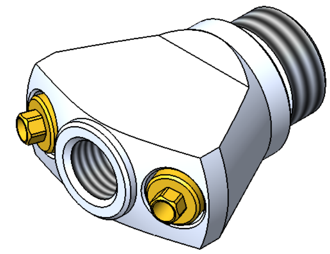


Weight: 0.98 oz [28.0 g]

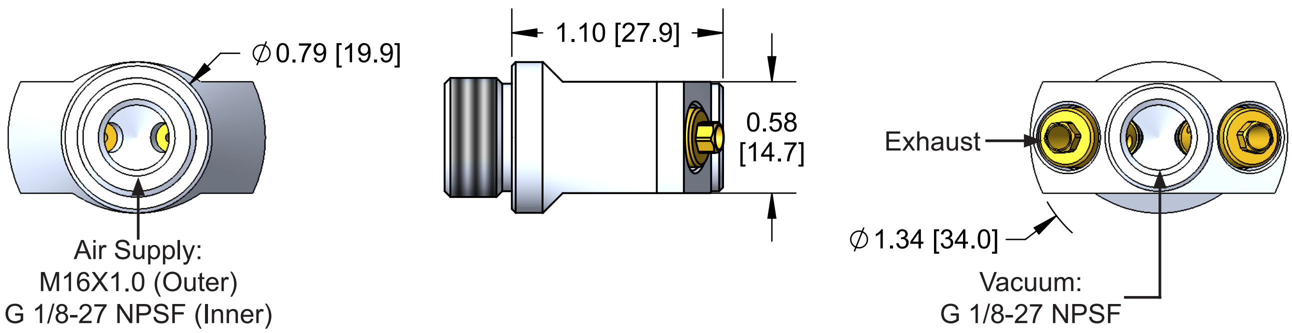


ER SERIES PUMPS
INLINE PUMPS : DOUBLE VENTURI

Inline pumps with two venturis in parallel for additional flow capacity and G1/8 NPSF air supply.



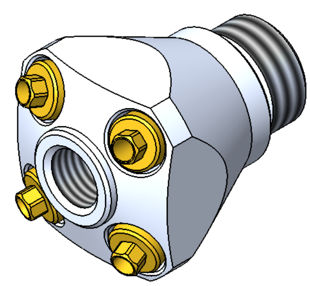
	VENTURI SIZE	
ER	09	X2-18F
	09	
	10	
	08L	
	10L	



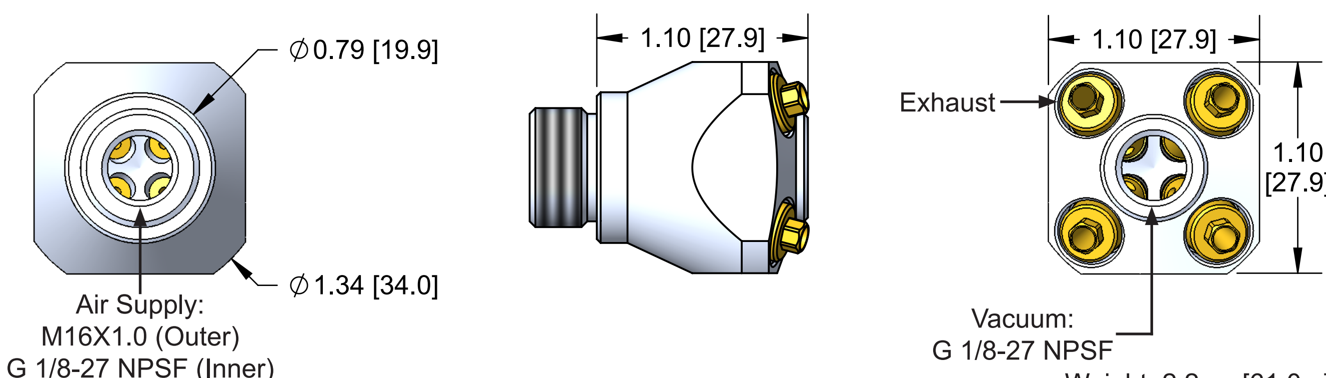
Weight: 1.3 oz [38.0 g]

INLINE PUMPS : QUADRUPLE VENTURI

Inline pumps with four venturis in parallel for additional flow capacity and G1/8 NPSF air supply.



	VENTURI SIZE	
ER	09	X4-18F
	09	
	10	
	08L	
	10L	



Weight: 2.2 oz [61.0 g]

ER VENTURI	AIR CONSUMPTION AT 72 psi [5 bar]	EQUIVALENT VENTURI DIAMETER	IP Series PUMP REPLACEMENT
09X2	2.8 SCFM [79 Nl/m]	1.2 mm	IP6M-20
10X2[1]	3.8 SCFM [108 Nl/m]	1.4 mm	-
08LX2[1]	2.4 SCFM [68 Nl/m]	1.1 mm	IP6M-20
10LX2[1]	3.6 SCFM [102 Nl/m]	1.4 mm	-
09X4	5.6 SCFM [158 Nl/m]	1.8 mm	IP6M-30
10X4[1]	7.2 SCFM [362 Nl/m]	2.0 mm	-
08LX4[1]	4.8 SCFM [136 Nl/m]	1.6 mm	-
10LX4[1]	7.6 SCFM [215 Nl/m]	2.0 mm	-

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

JN-M16X1.0

For use with -18F inline pumps.

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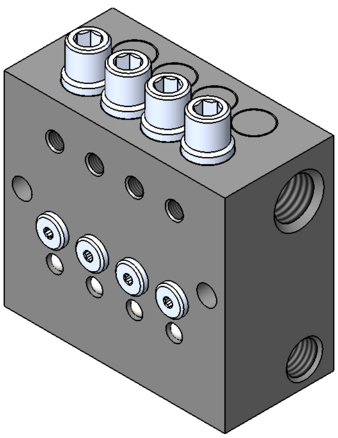
ER SERIES PUMPS
VACUUM BAR PUMP

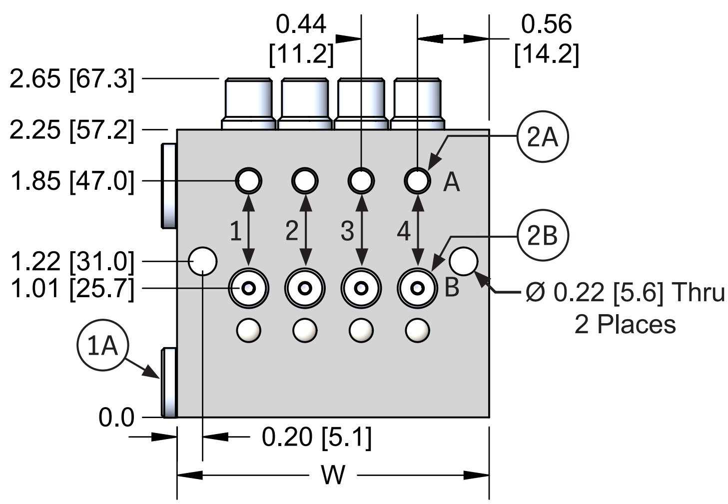
The Vacuum Bar eliminates the clutter and plumbing complexity of small vacuum systems by incorporating multiple vacuum pumps that have common air supply and common exhaust ports within the bar manifold. Vacuum lines can be routed from the pumps directly to individual suction cups.

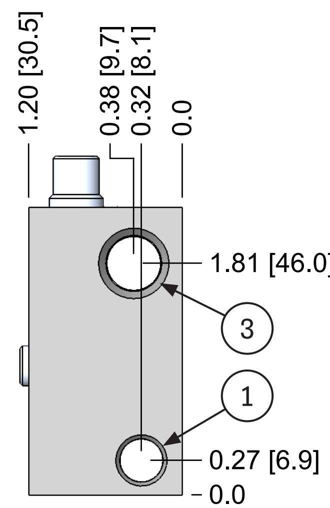
Even though all of the vacuum pumps are operated by one air supply, the pump vacuum ports are independent of one another so it doesn't matter if some vacuum lines are open to atmosphere due to missing work pieces. Vacuum loss in one line doesn't affect performance of the other vacuum pumps.

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.

	NUMBER OF STATIONS		VENTURI SIZE
VB	4	-ER	05
	1		05
	2		07
	3		09
	4		10
	5		08L
	6		10L
	7		
	8		

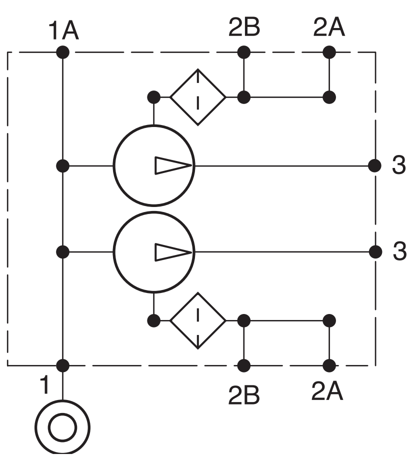


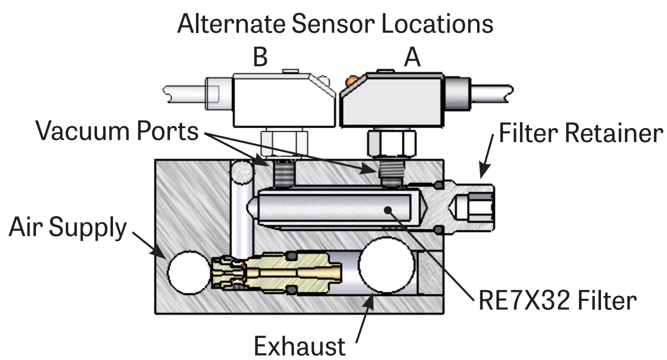




CODE	FUNCTION	PORTS
1	Air Supply - Main	G 1/8 NPSF
1A	Air Supply - Alternate	G 1/8 NPSF
2A	Vacuum - Position A	M5X0.8 (10-32 UNF)
2B	Vacuum - Position B	M5X0.8 (10-32 UNF)
3	Exhaust	G 1/4

NUMBER OF 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	4.2 [106.7]	0.97 [442.0]





Vacuum switch and cables sold separately.

Refer to ER performance graph on page 10:14. Use the X1 values.

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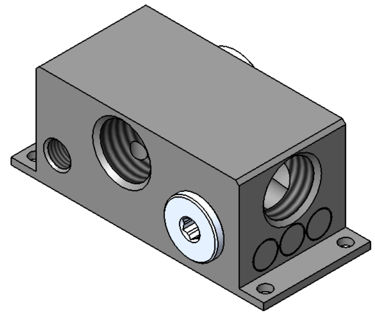
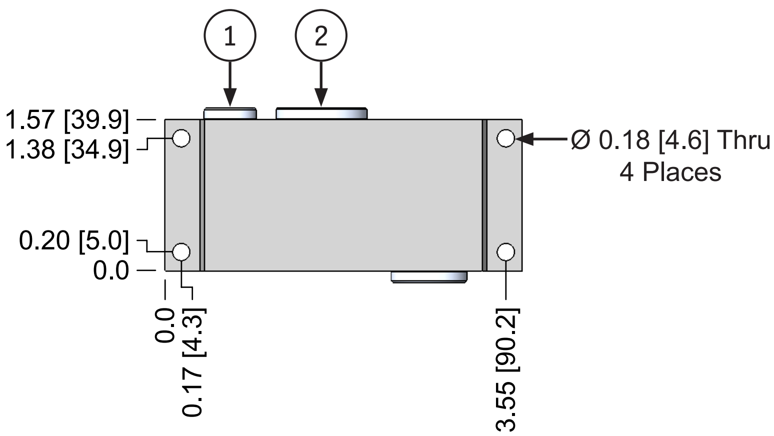
ER SERIES PUMPS
12F T-BASE

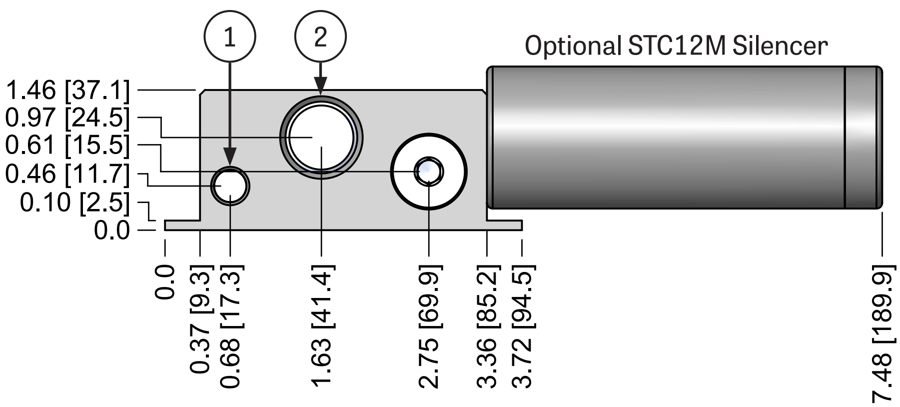
A T-base allows either one, two, or three ER venturis to be internally connected in parallel to obtain a greater combined vacuum flow rate. For total vacuum flow, read the vacuum flow rate at the desired vacuum level from the ER performance graph then multiply by the number of venturis installed in the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

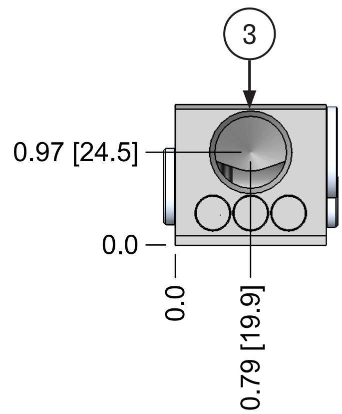


The ER series T-base offers greater vacuum flow in the same foot print as the Chip Pump T-base.

	NUMBER OF STATIONS	NUMBER OF VENTURIS		SILENCER
ER	05	X3	-T12F-	ST
	05	**X2** = 2 Venturis		(Blank) = None
	07	**X3** = 3 Venturis		**ST** = STC12M
	09			
	10			
	08L			
	10L			







SILENCER OPTION	WEIGHT oz [g]
(Blank)	9.60 [271.0]
ST	10.70 [303.0]

CODE	FUNCTION	PORTS
1	Air Supply	G 1/8 NPSF
2	Vacuum	G 1/2 NPSF
3	Exhaust	G 1/2 NPSF

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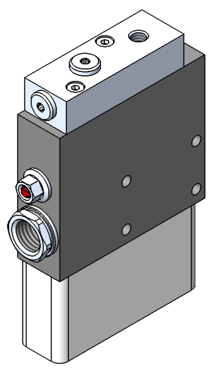
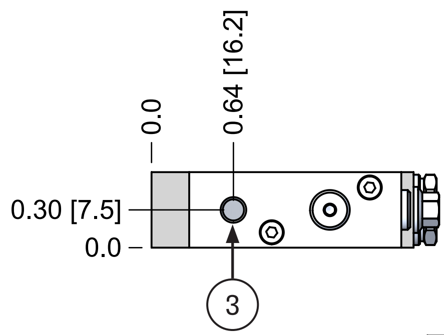
Miniature DER series pumps provide full control features in a compact package. These lightweight pumps can be mounted near the point of vacuum usage to eliminate long vacuum lines and improve system response. DER pumps are available with either one or two coaxial ejectors to match pump performance to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

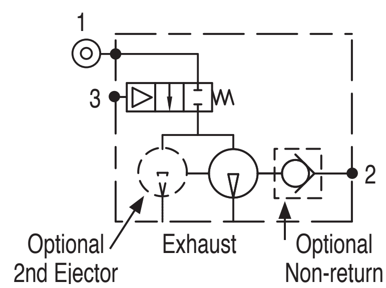
Select from numerous standard options to configure a DER pump to suit your specific application requirements.

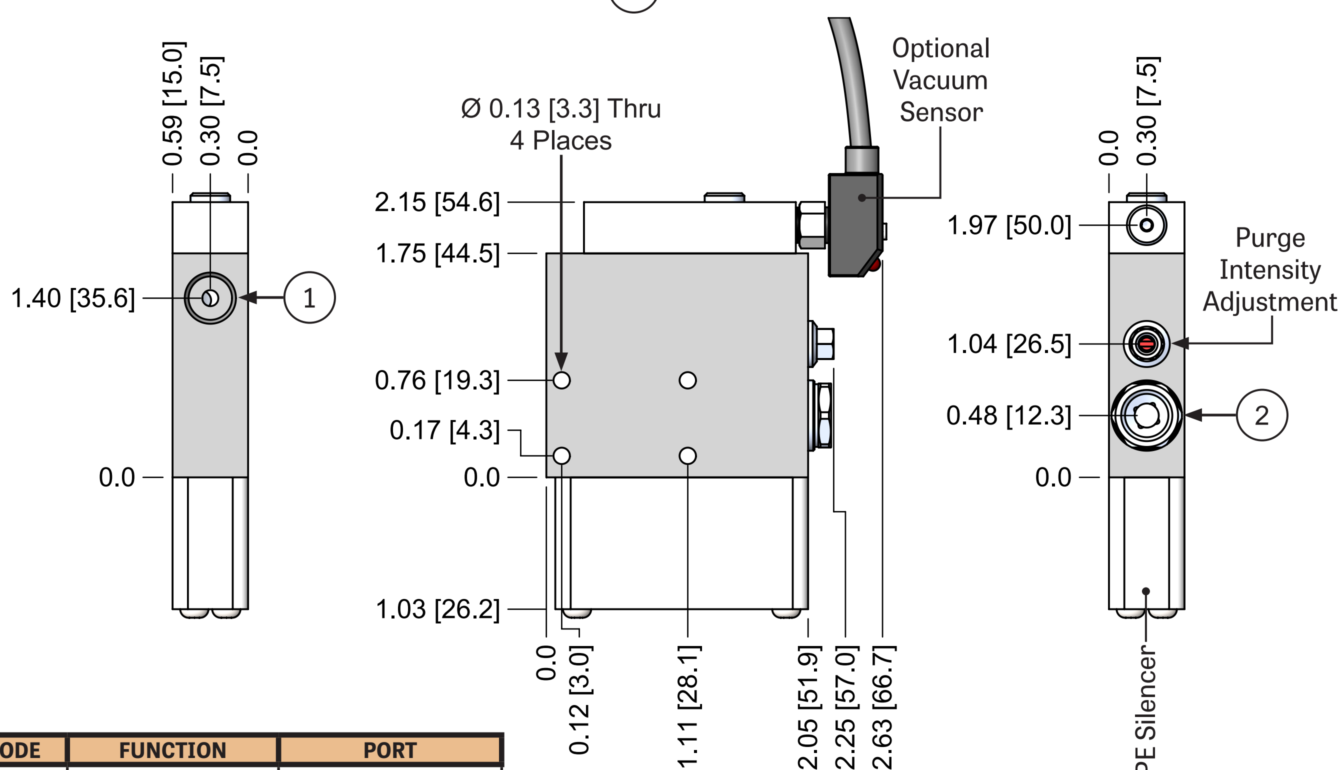
	EJECTOR SIZE	NUMBER OF EJECTORS		OPTIONS		VACUUM SENSOR
DER18-	10L	X1	-PS-		-	VP4
	05	**X1** = 1 Ejector		(Blank) = None		(Blank) = None
	07	**X2** = 2 Ejectors		**NR** = Non-Return		**VA3** = Analog, 3 Wire
	09					**VN3** = NPN, 3 Wire
	10					**VP3** = PNP, 3 Wire
	08L					**VN4** = NPN, 4 Wire
	10L					**VP4** = PNP, 4 Wire



Weight: 4.10 oz. [117.0 g]







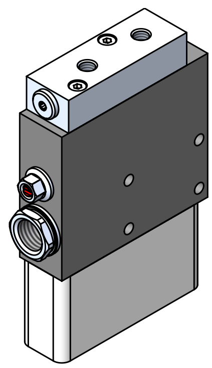
CODE	FUNCTION	PORT
1	Air Supply	G 1/8 NPSF
2	Vacuum	G 1/8 NPSF
3	Pilot - Vacuum	M5X0.8 (10-32 UNF)

ER SERIES PUMPS
DUAL BASE PUMP : PILOTED SUPPLY & BLOW-OFF

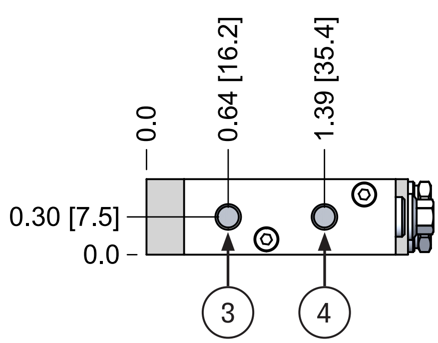
Miniature DER series pumps provide full control features in a compact package. These lightweight pumps can be mounted near the point of vacuum usage to eliminate long vacuum lines and improve system response. DER pumps are available with either one or two coaxial ejectors to match pump performance to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

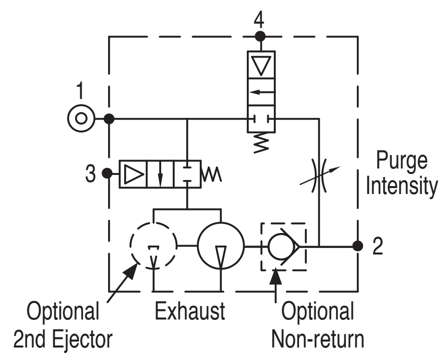
Select from numerous standard options to configure a DER pump to suit your specific application requirements.

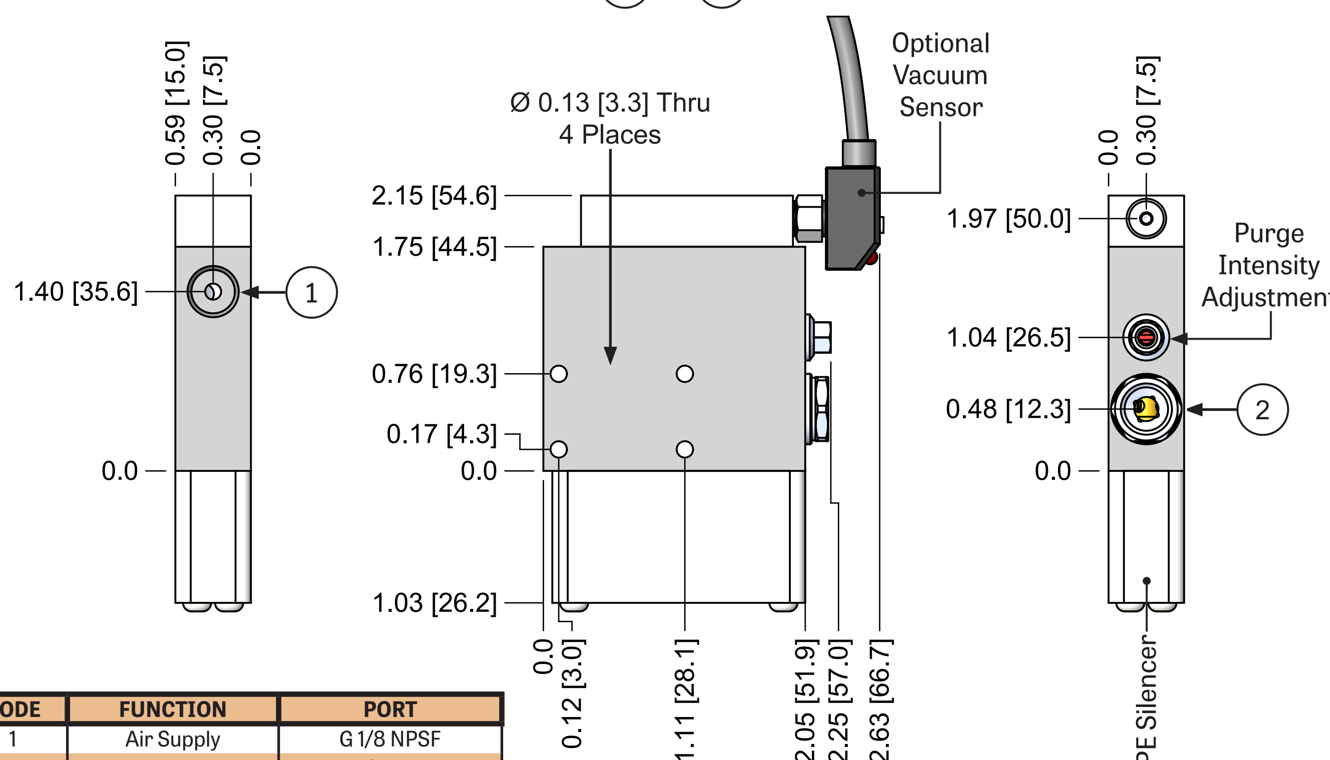
	EJECTOR SIZE	NUMBER OF EJECTORS		OPTIONS		VACUUM SENSOR
DER18-	10L	X1	-PSB-		-	VP4
	05	**X1** = 1 Ejector		(Blank) = None		(Blank) = None
	07	**X2** = 2 Ejectors		**NR** = Non-Return		**VA3** = Analog, 3 Wire
	09					**VN3** = NPN, 3 Wire
	10					**VP3** = PNP, 3 Wire
	08L					**VN4** = NPN, 4 Wire
	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
3	Pilot - Vacuum	M5X0.8 (10-32 UNF)
4	Pilot - Blow-Off	M5X0.8 (10-32 UNF)

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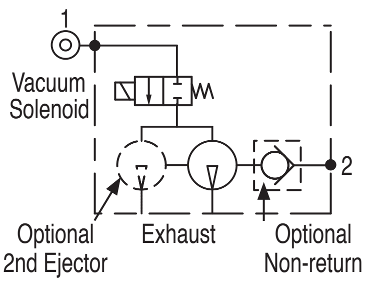
DUAL BASE PUMP : SOLENOID SUPPLY

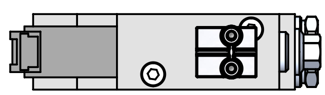
Miniature DER series pumps provide full control features in a compact package. These lightweight pumps can be mounted near the point of vacuum usage to eliminate long vacuum lines and improve system response. DER pumps are available with either one or two coaxial ejectors to match pump performance to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

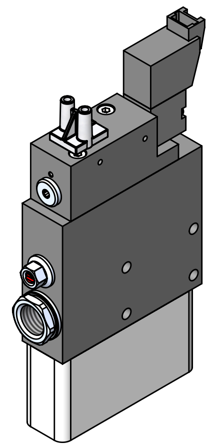
Select from numerous standard options to configure a DER pump to suit your specific application requirements.

Order SV10-QD-1M solenoid cables separately.

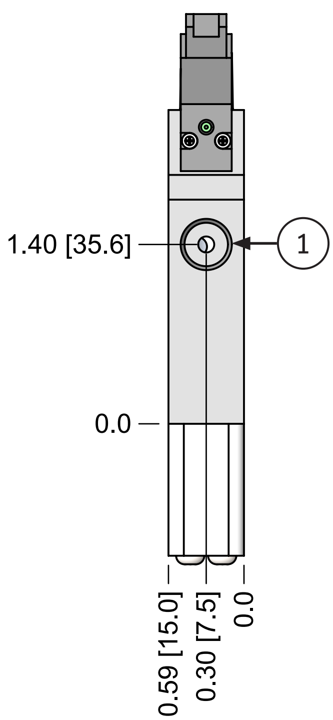
	EJECTOR SIZE	NUMBER OF EJECTORS		OPTIONS		VACUUM SENSOR
DER18-	**10L**	**X1**	**-S24D-**		**-**	**VP4**
	05	**X1** = 1 Ejector		(Blank) = None		(Blank) = None
	07	**X2** = 2 Ejectors		**NR** = Non-Return		**VA3** = Analog, 3 Wire
	09					**VN3** = NPN, 3 Wire
	10					**VP3** = PNP, 3 Wire
	08L					**VN4** = NPN, 4 Wire
	10L					**VP4** = PNP, 4 Wire

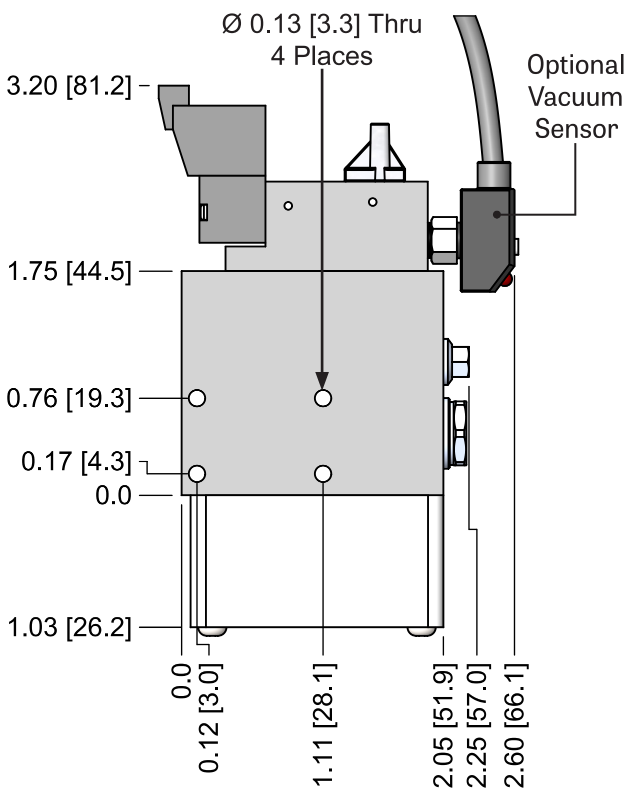


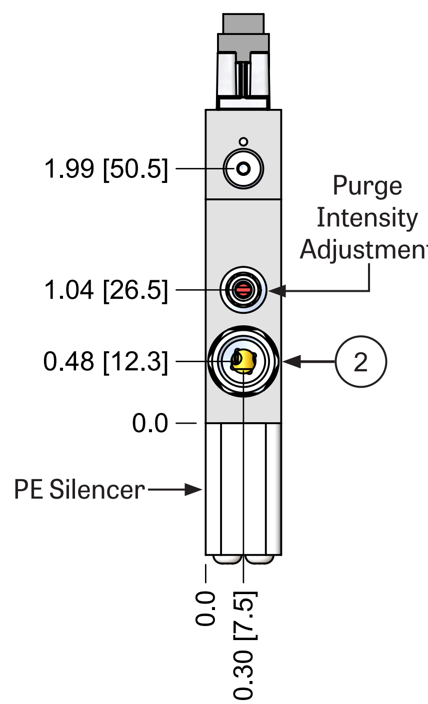




Weight: 4.80 oz [134.0 g]







CODE	FUNCTION	PORT
1	Air Supply	G 1/8 NPSF
2	Vacuum	G 1/8 NPSF

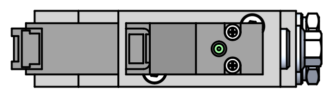
DUAL BASE PUMP : SOLENOID SUPPLY & BLOW-OFF

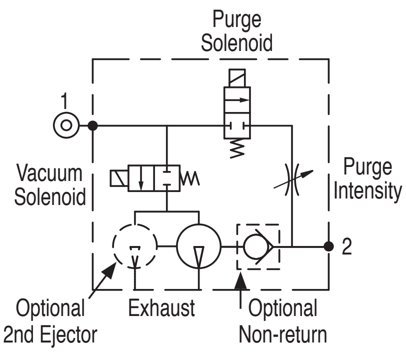
Miniature DER series pumps provide full control features in a compact package. These lightweight pumps can be mounted near the point of vacuum usage to eliminate long vacuum lines and improve system response. DER pumps are available with either one or two coaxial ejectors to match pump performance to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

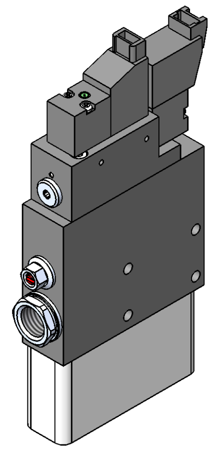
Select from numerous standard options to configure a DER pump to suit your specific application requirements.

Order SV10-QD-1M solenoid cables separately.

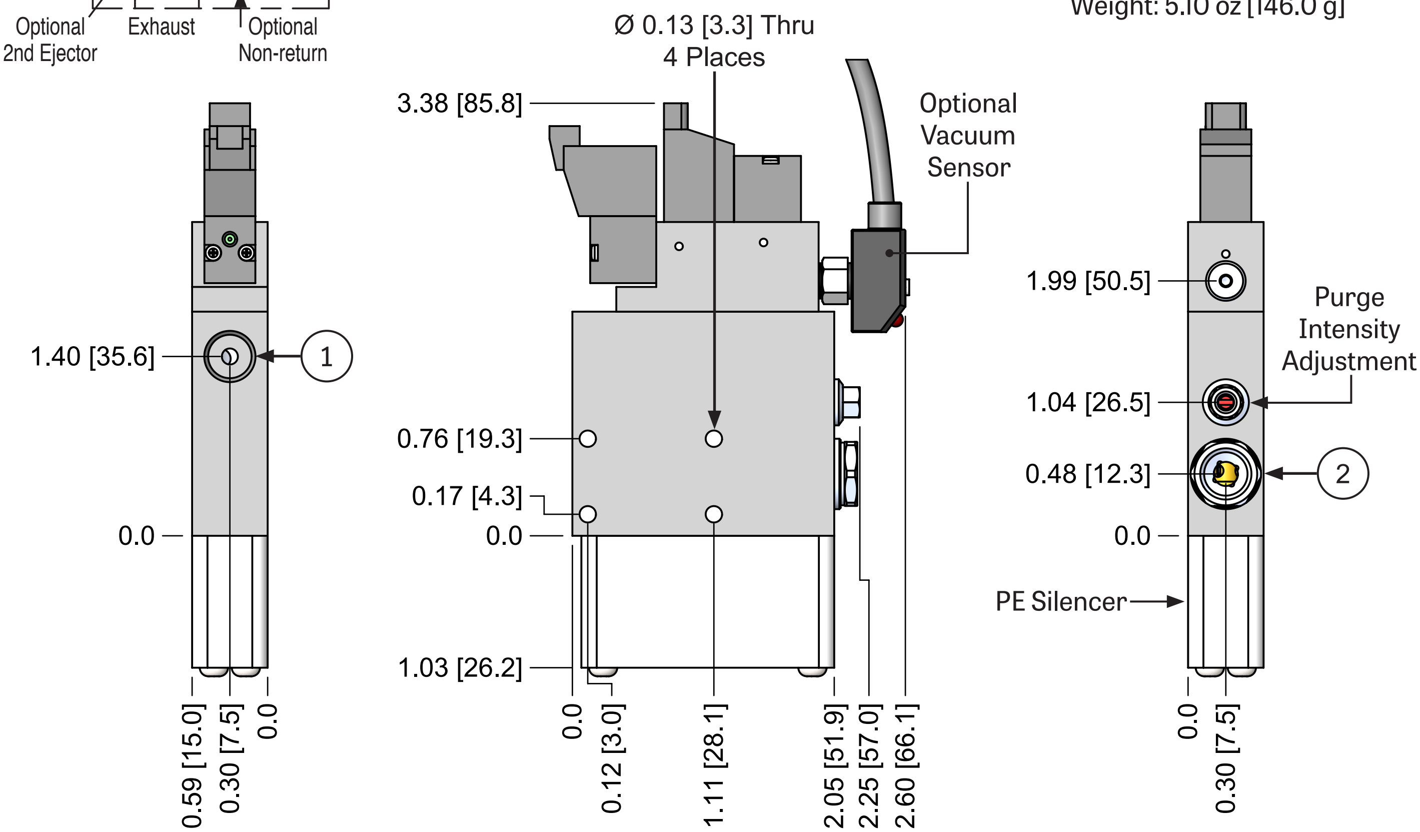
	EJECTOR SIZE	NUMBER OF EJECTORS		OPTIONS		VACUUM SENSOR
DER18-	10L	X1	-SB24D-		-	VP4
	05	**X1** = 1 Ejector		(Blank) = None		(Blank) = None
	07	**X2** = 2 Ejectors		**NR** = Non-Return		**VA3** = Analog, 3 Wire
	09					**VN3** = NPN, 3 Wire
	10					**VP3** = PNP, 3 Wire
	08L					**VN4** = NPN, 4 Wire
	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

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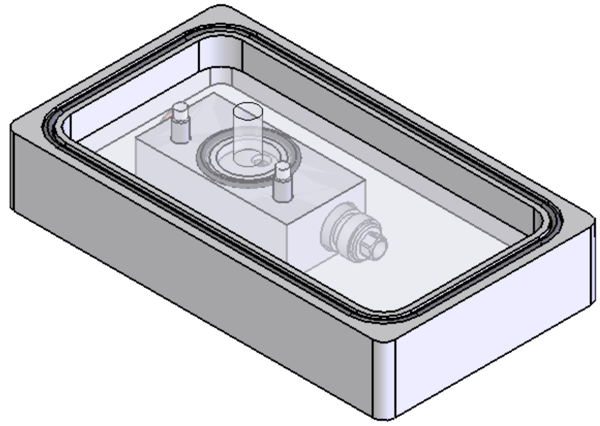
ER SERIES PUMPS
SM PUMP : SURFACE MOUNT MICRO-PUMP

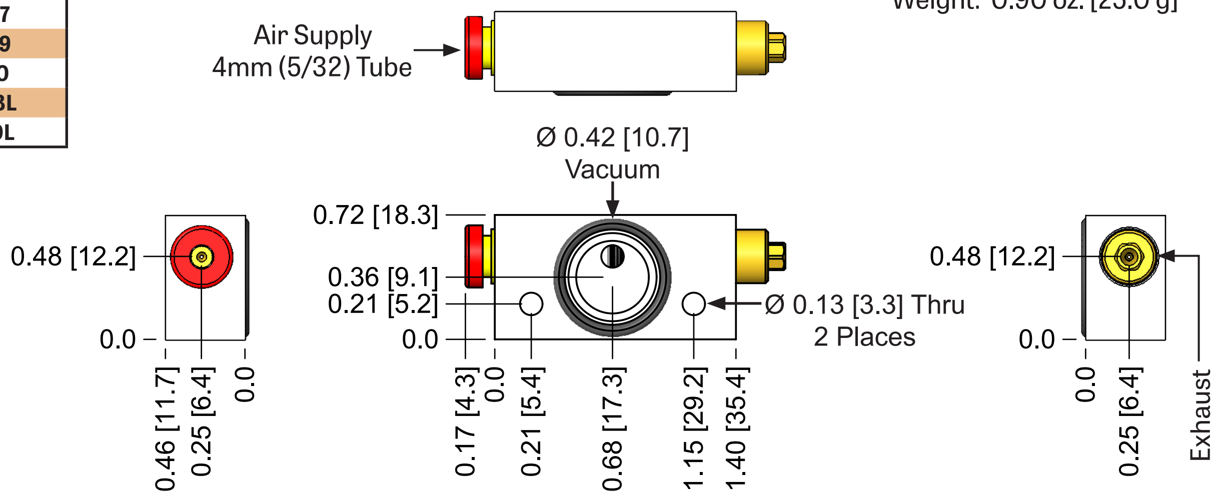
Simply add a vacuum passage and two tapped holes to any flat surface to integrate our micro-vacuum pump into a machine component. An integral push-in 4mm (5/32") tube fitting air supply and an atmospheric exhaust will almost eliminate assembly labor.

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]

	VENTURI SIZE	
ER	05	-SM
	05	
	07	
	09	
	10	
	08L	
	10L	



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
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	0.70	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

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.

EVACUATION TIME - SEC / 100 IN^3

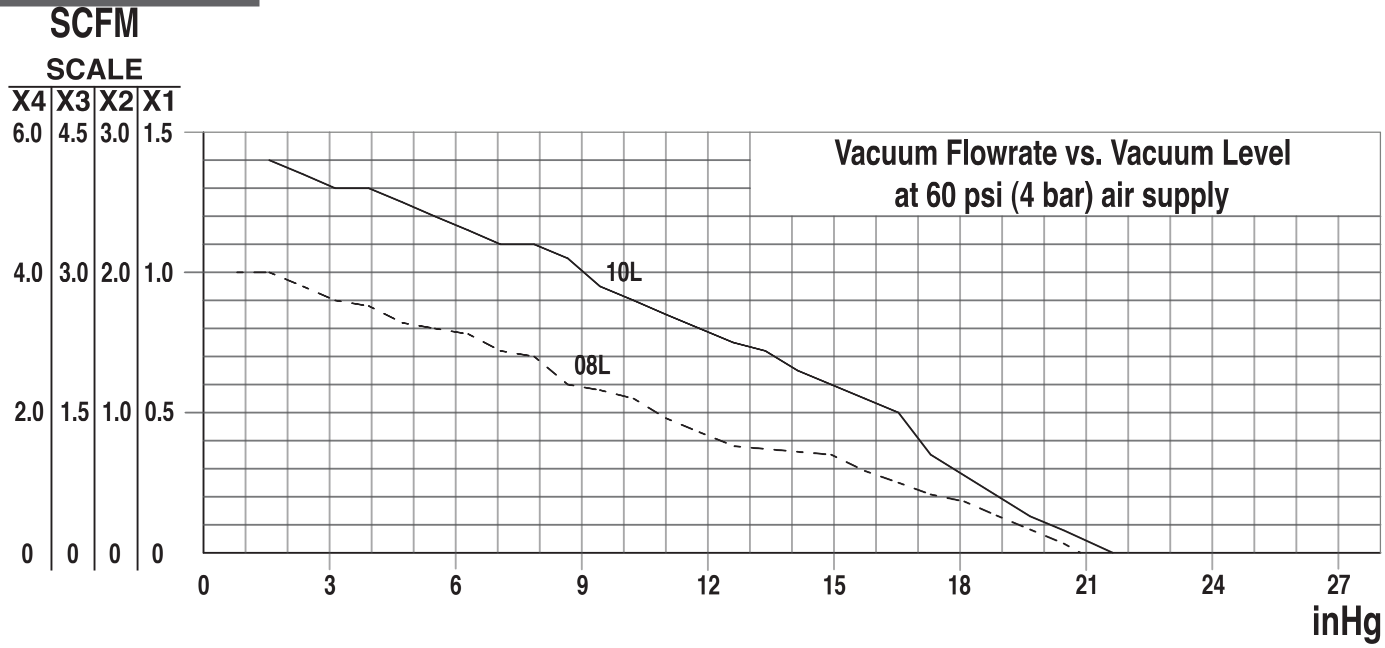
MODEL	AIR SUPPLY PSI	AIR CONS SCFM	MAX VACUUM inHG	SECONDS TO VACUUM LEVEL 3 inHG	6 inHG	9 inHG	12 inHG	15 inHG	18 inHG	21 inHG	24 inHG
ER05	72	0.4	26.7	1	2.5	4.5	7.5	12.5	20	35	-
ER07	72	0.8	26.7	0.8	1.8	3.1	5.1	8.1	13.1	22.8	-
ER09	72	1.4	25.5	0.45	1.1	2	3.4	5.4	8.7	14.8	-
ER10	72	1.8	28	0.36	2.88	1.66	2.8	4.6	7.5	12.7	-
ER08L	72	1.2	23.6	0.28	0.69	1.28	2.2	3.7	6.1	10.5	-
ER10L	72	1.9	23.6	0.2	0.46	0.83	1.38	2.2	3.6	6.1	-
ER08L	60	1.0	20.4	0.28	0.68	1.26	2.1	3.6	6.1	11	-
ER10L	60	1.65	21.6	0.2	0.46	0.82	1.4	2.3	3.8	6.8	-

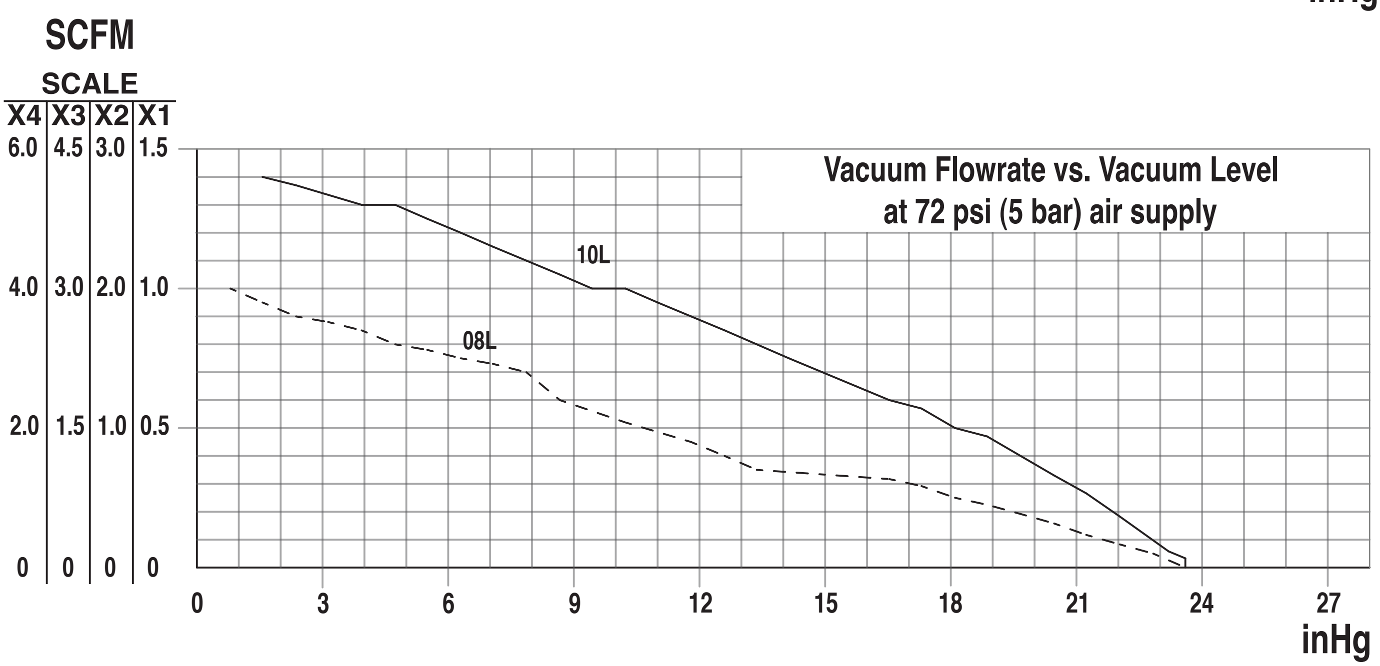
For X2, X3, & X4 evacuation time multiply the value in the table by 2, 3, or 4 respectively.

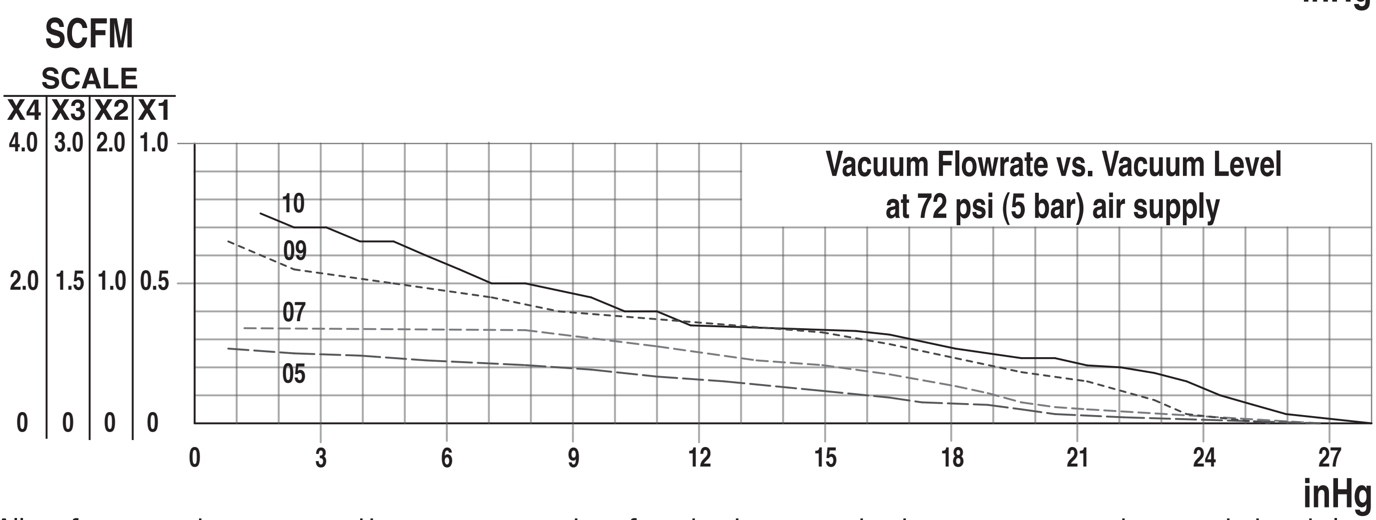
For example, an ER07X2 @ 15 inHg would evacuate 100 cu. in.:
8.1 x 2 = 16.2 seconds.

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

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.







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.

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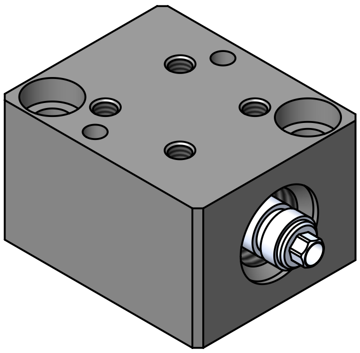
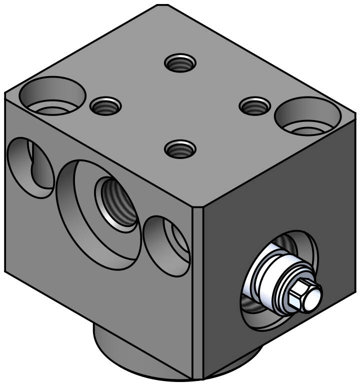
SECTION 11
VACUUM GRIPPERS

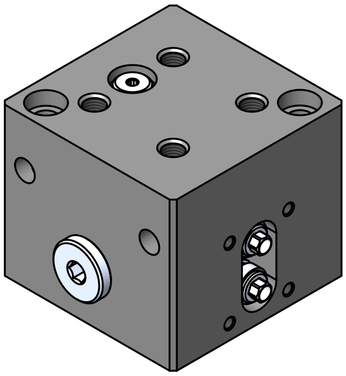
11



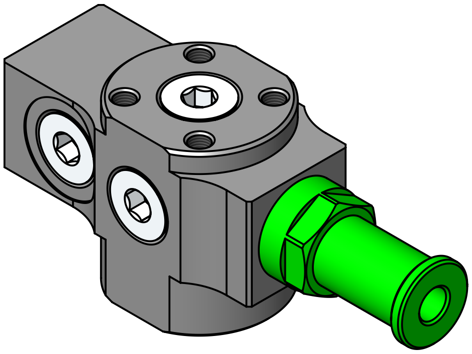
VG18



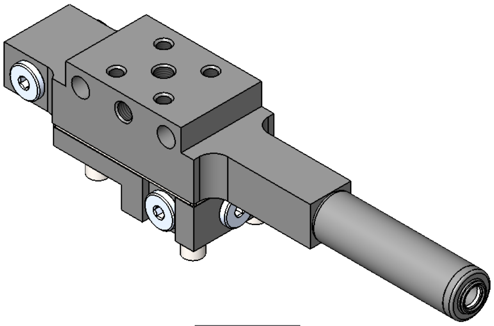
VG38



DVG



VGP



VG-G12

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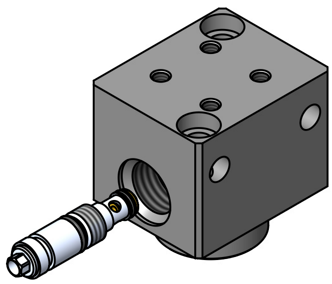
VACUUM GRIPPERS
EDCO ER L-SERIES COAXIAL VENTURI TECHNOLOGY

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 SYSTEMS

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.

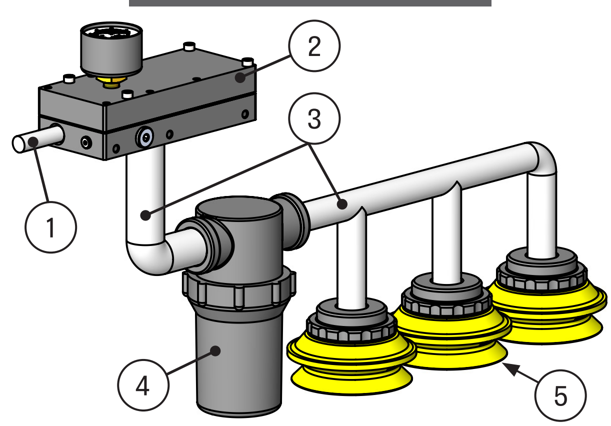
OPERATING PRESSURE

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.

CENTRAL VACUUM SYSTEM



1) Compressed Air Line, 2) Vacuum Generator, 3) Vacuum Line, 4) Vacuum Filter, 5) Vacuum Cup

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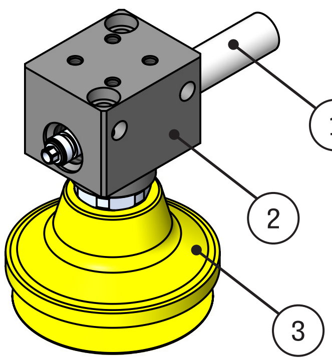
VACUUM GRIPPERS
DISCRETE SYSTEMS

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.



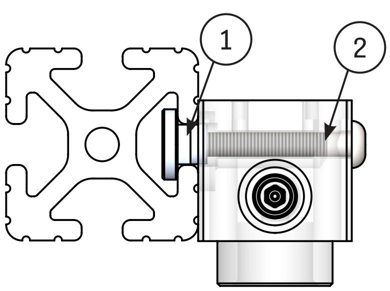
1) Compressed Air Line
2) Vacuum Generator
3) Vacuum Cup

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.

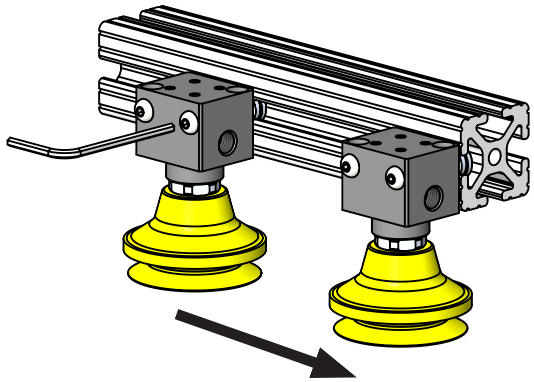
1.) T-Nut - RS-5
2.) M5 Screw

NOT INCLUDED
See page 12:10



SIMPLE INSTALLATION & FLEXIBLE POSITIONING

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.



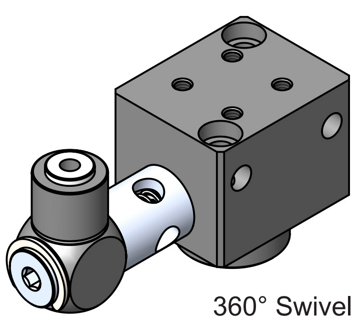
Loosen two screws, and slide the vacuum gripper to the desired location.

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.



360° Swivel

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VACUUM GRIPPERS

	VACUUM PORT		VENTURI		PURGE[1]		SWIVEL MOUNT[2]		SENSOR PORT		SILENCER OPTION[4]		CUP SELECTION
VG	38	-	10L	-	PP	-	A	-	A5F	-	ST	-	B50N
	38 = 3/8 NPSF		**05**		(Blank) = None		(Blank) = None		(Blank) = None		(Blank) = None		(Blank) = None
	18 = G1/8 NPSF		**07**		**LP** = Limited Pressure		**A** = Apple Core		**A5F**		**ST** = STA14M		See information below.
			09		**PP** = Positive Pressure		**B** = Ball Swivel		**B5F**[3]		[4]Not available with purge.		
			10		[1]Only available with 08L & 10L venturi.		[2]Only available with VG38.		[3]Not available with swivel on VG38.				
			08L										
			10L										

DUAL VENTURI VACUUM GRIPPERS

	VENTURI		OPTIONS		SWIVEL MOUNT		SILENCER OPTION		CUP SELECTION
DVG38-	10L	X2-	PP	-	A	-	ST	-	B50N
	05		(Blank) = None		(Blank) = None		(Blank) = None		(Blank) = None
	07		**EA** = Exhaust Adapter		**A** = Apple Core		**ST**[2] = STB38M		See information below.
	09		**LP**[1] = Limited Pressure		**B** = Ball Swivel		[2]Only available with exhaust adapter.		
	10		**PP**[1] = Positive Pressure						
	08L		[1]Only available with 08L & 10L venturi.						
	10L								

VACUUM GRIPPER PUMPS

	VENTURI		OPTIONS		MOUNT	MOUNT POSITION
VGP38-	10L	-	PP	-	M8X27	TE
	08L		(Blank) = Basic		(Blank) = Basic	(Blank) = Not Used
	10L		**LP**[1] = Limited Pressure		**M6X22**	**T** = Top
	10		**PP**[1] = Positive Pressure		**M8X16**	**L** = Left
	09		[1]Only available on 08L & 10L Venturi		**M8X27**	**R** = Right
	07					**TE** = Top Extrude
	05					**LE** = Left Extrude
						RE = Right Extrude

11

VACUUM CUP SELECTION

Choose vacuum cup style, size, and rubber material from section 2 of this catalog and add this information as a suffix to the VG pump model number. For example: VG38-10LPP pump and XP-B50N cup are selected. So, the complete Vacuum Gripper model number would be VG38-10LPP-B50N. For simplified ordering, several Vacuum Gripper model numbers are tabulated, but other combinations are readily available at standard prices. Contact your local EDCO USA distributor or call EDCO for assistance.

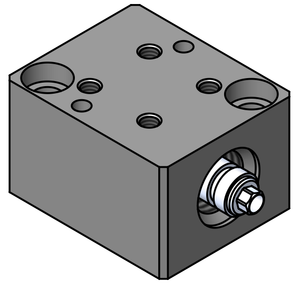
VG18 style pumps should only be used with 10 to 50mm cups due to the availability of fittings required to adapt to the G1/8 NPSF vacuum port.

VG38 style pumps should only be used with 40 to 150mm cups due to the availability of fittings required to adapt to the G 3/8 Vacuum Port.

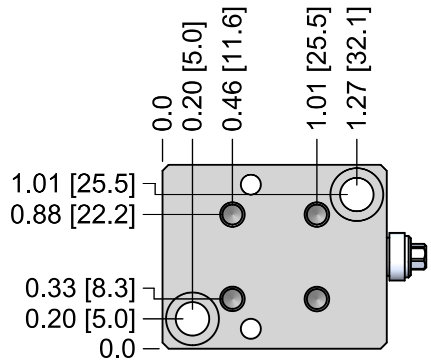
ER-10L PERFORMANCE (NON-POROUS SYSTEMS)										
Cup[1]	B30	B40	B50	B75	B110	BF80	BF100	F75	F110	FC75	FC100
Volume: in^3 [cc]	0.61 [10]	0.9 [14.7]	2.0 [32.8]	6.7 [110]	19.0 [311]	1.8 [29.5]	4.9 [80.3]	1.2 [19.7]	4.3 [70.5]	2.3 [37.6]	4.9 [80.3]
Evacuation Time[2]: sec	0.013	0.02	0.04	0.15	0.42	0.04	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]	35.0 [156]	65.0 [289]	37.5 [167]	78.3 [348]	29.1 [129]	53.3 [237]

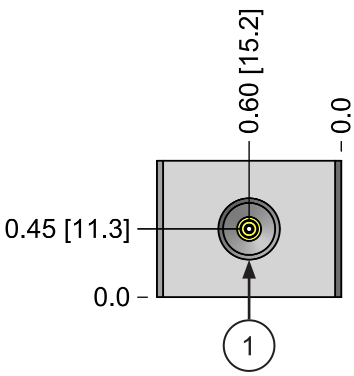
[1]Values apply to all cup materials.
[2]Evacuating to 15 inHG (50.8 -kPa) at 72 psi (5 bar)

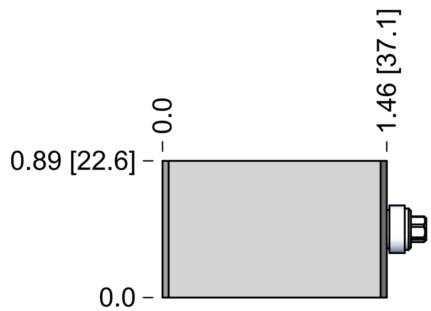
All performance data presented is a representatation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.

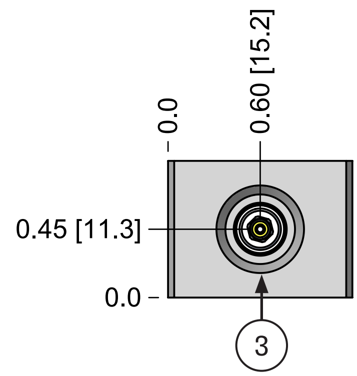


Weight: 0.12 lbs [54.4 g]



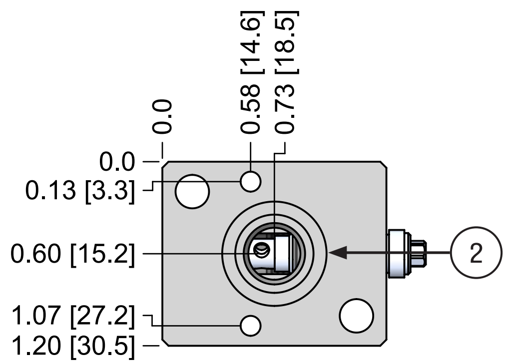




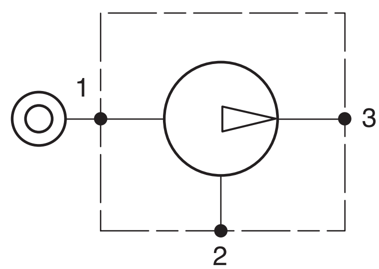


CODE	FUNCTION	CONNECTION
1	Air Supply	G 1/8 NPSF
1A	Pilot Signal - Purge	4 mm (5/32) Tube
2	Vacuum	G 1/8 NPSF
3	Exhaust[1]	G 1/4

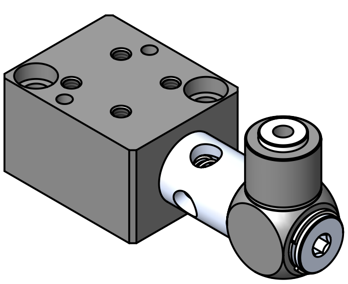
[1]Only available without purge option.



Groove accepts 2-014 standard O-Ring
EDCO Part # N70-014 (o-ring not included)

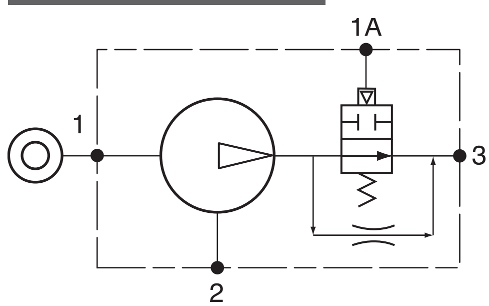


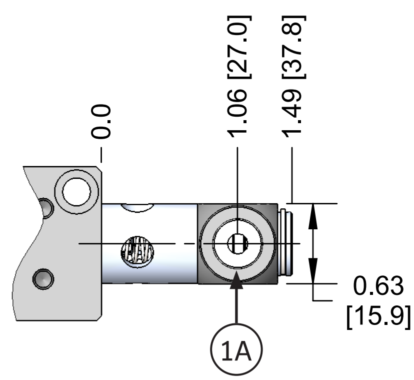
VG18 : PP & LP PURGE OPTION



Weight: 0.17 lbs [78.9 g]

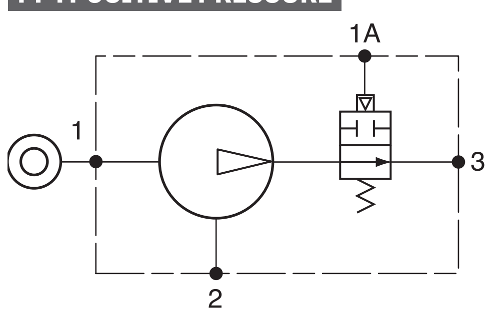
LP : LIMITED PRESSURE

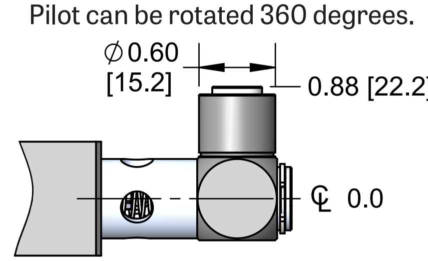




Pilot can be rotated 360 degrees.

PP : POSITIVE PRESSURE





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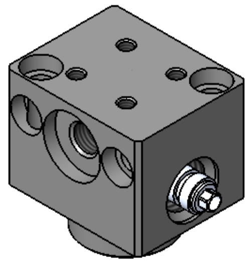
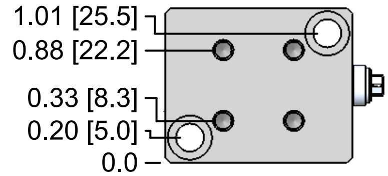
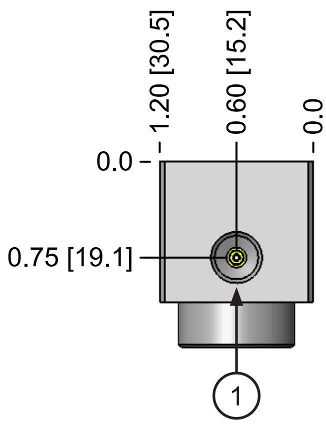
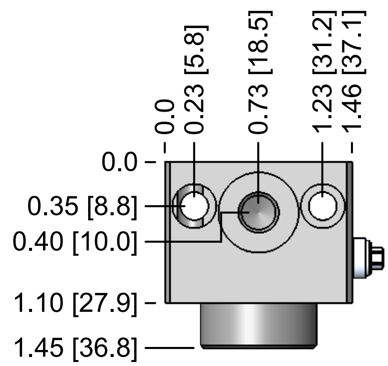
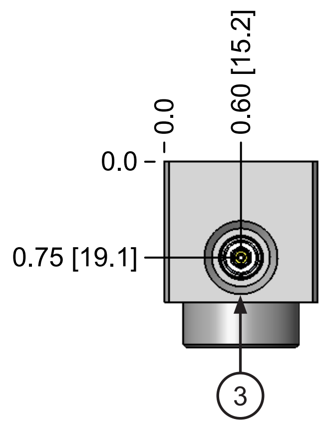


Weight: 0.14 lbs [63.5 g]



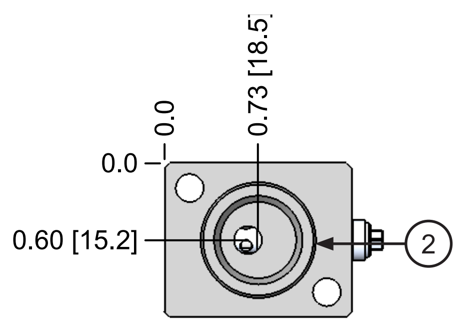


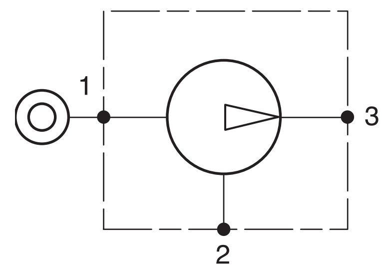




CODE	FUNCTION	CONNECTION
1	Air Supply	G 1/8 NPSF
1A	Pilot Signal - Purge	4 mm (5/32) Tube
2	Vacuum	G 3/8
3	Exhaust[1]	G 1/4

[1]Only available without purge option.





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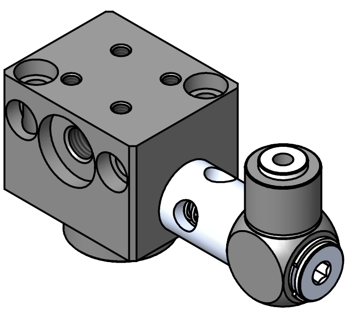
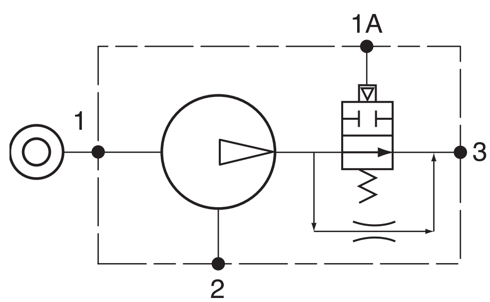
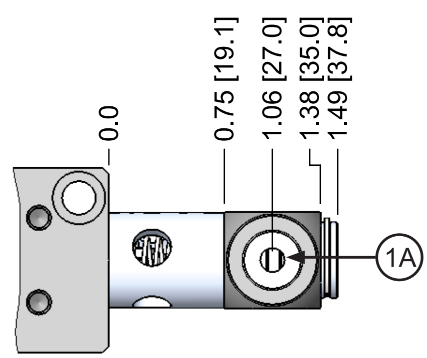
VG38 : PP & LP PURGE OPTION



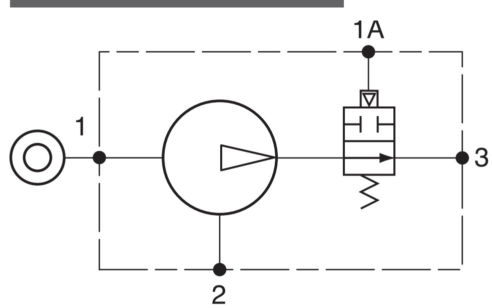
Weight: 0.19 lbs [88.0 g]

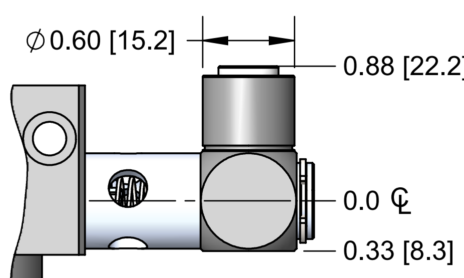
LP : LIMITED PRESSURE





PP : POSITIVE PRESSURE

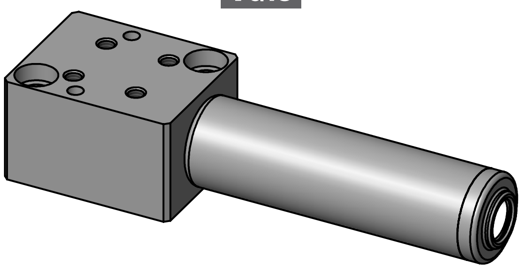




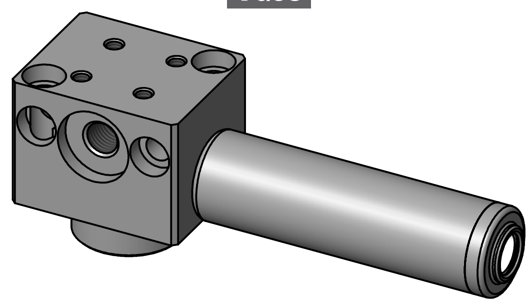
Pilot can be rotated 360 degrees.

VACUUM GRIPPERS
ST : SILENCER OPTION

VG18



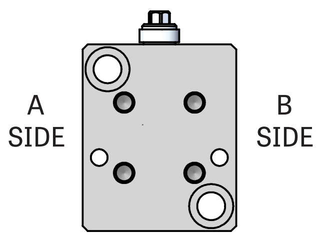
VG38

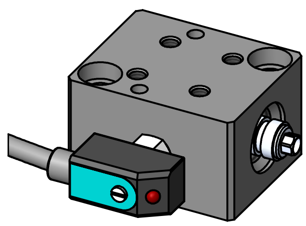


SENSOR PORT OPTION

A5F = M5 Port on side “A”.
B5F[1] = M5 Port on side “B”.

[1]B5F is not available with a swivel mount on the VG38 pump.

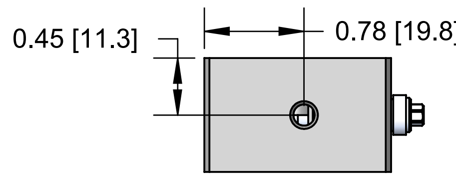




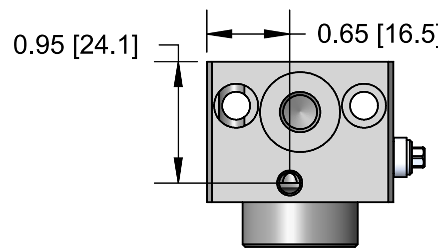
CODE	FUNCTION	VG18	VG38
1	Air Supply	G 1/8 NPSF	G 1/8 NPSF
1A	Pilot Signal - Purge	4 mm (5/32) Tube	4 mm (5/32) Tube
2	Vacuum - Main	G 1/8 NPSF	G 3/8
2A	Vacuum - Alternate	M5X0.8 (10-32 UNF)	M5X0.8 (10-32 UNF)
3	Exhaust[1]	G 1/4	G 1/4

[1]Only available without purge option.

VG18

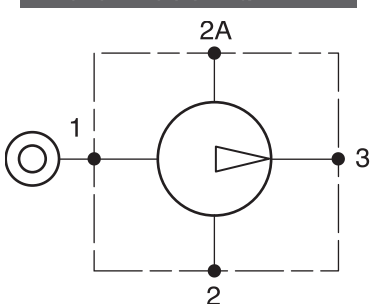


VG38

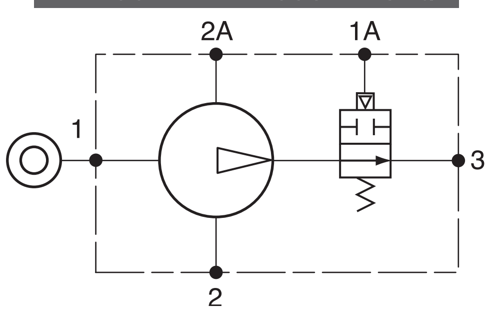


11

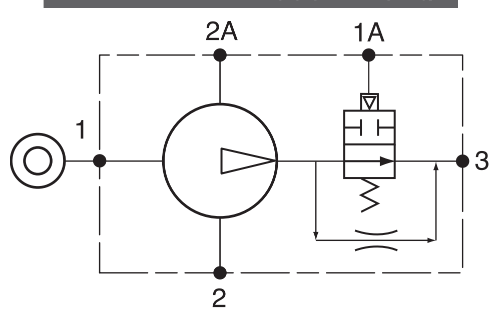
BASIC VACUUM GRIPPER



PP : POSITIVE PRESSURE PURGE



LP : LIMITED PRESSURE PURGE



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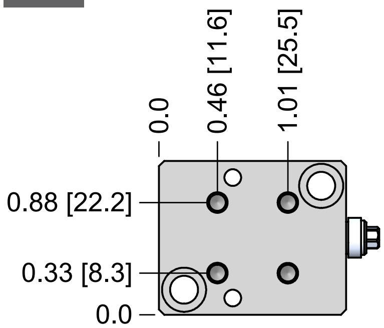
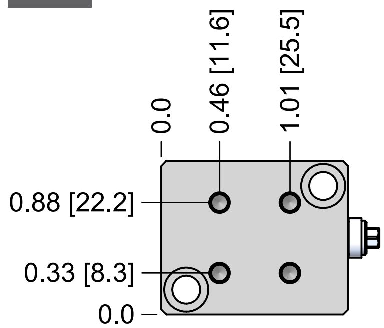
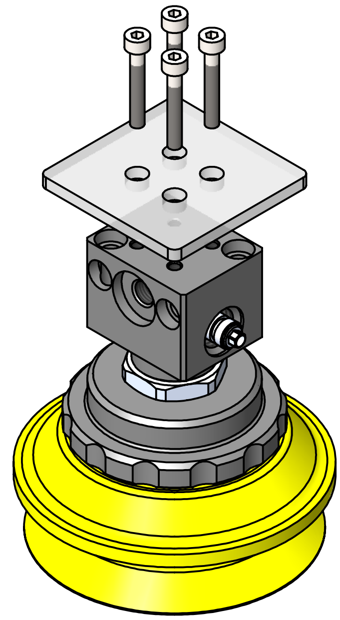
VACUUM GRIPPERS
STANDARD M4 PLATE MOUNT

VG18



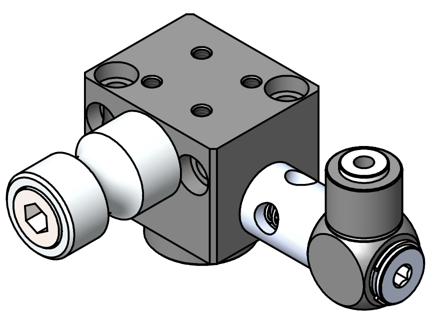
VG38

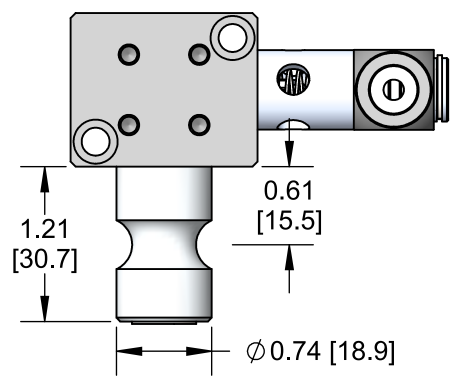




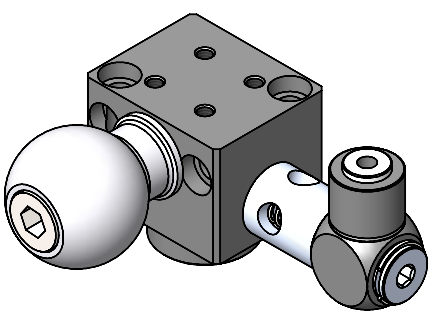
VG38 SWIVEL MOUNTS

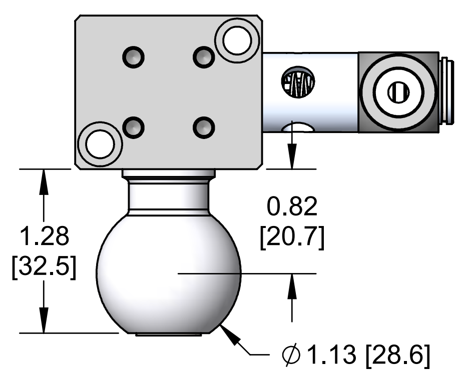
A : APPLE CORE MOUNT





B : BALL SWIVEL MOUNT





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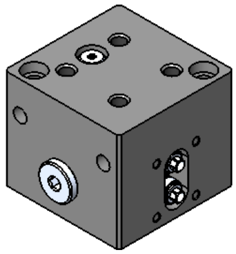
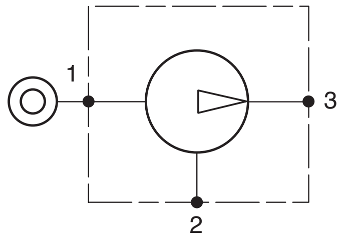
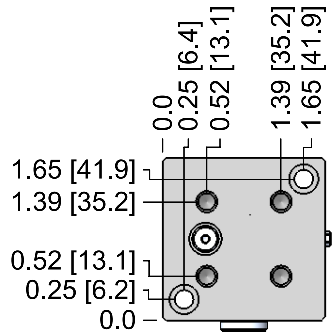
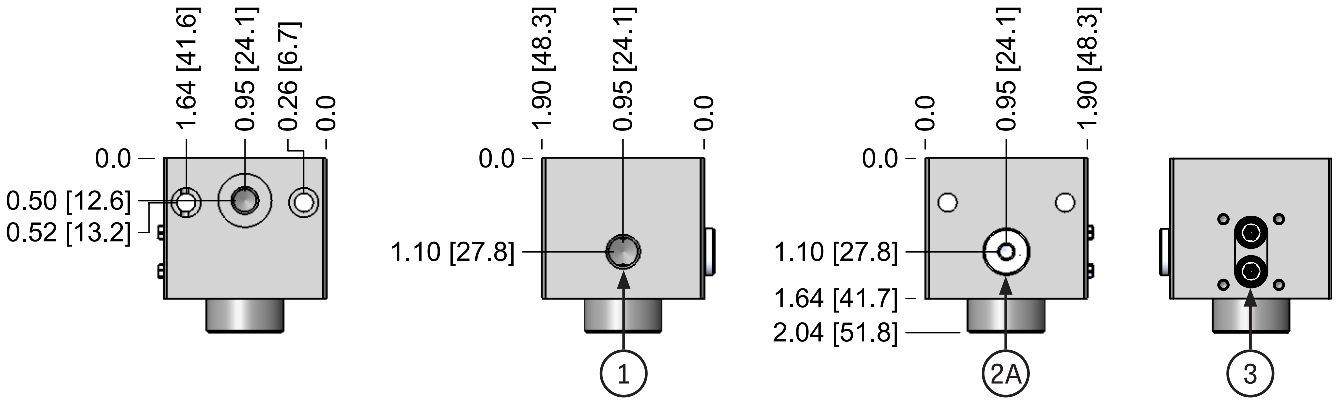
VACUUM GRIPPERS
DVG38: DUAL VENTURI VACUUM GRIPPERS

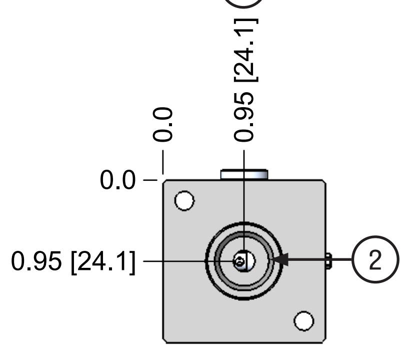


Weight: 0.20 lbs [90.7 g]



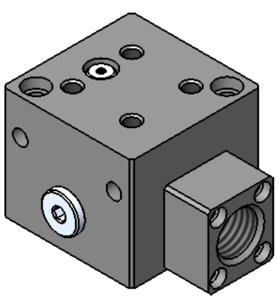


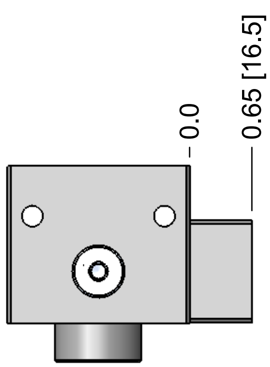


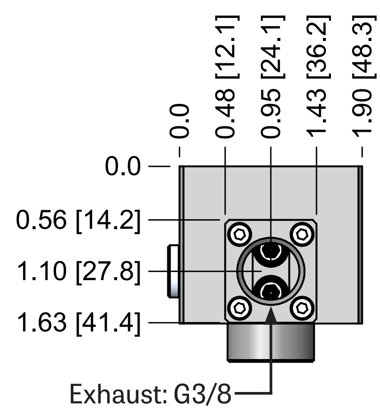


CODE	FUNCTION	CONNECTION
1	Air Supply	G 1/8 NPSF
2	Vacuum - Main	G 3/8
2A	Vacuum - Alternate	G 1/8 NPSF

EA : EXHAUST ADAPTER







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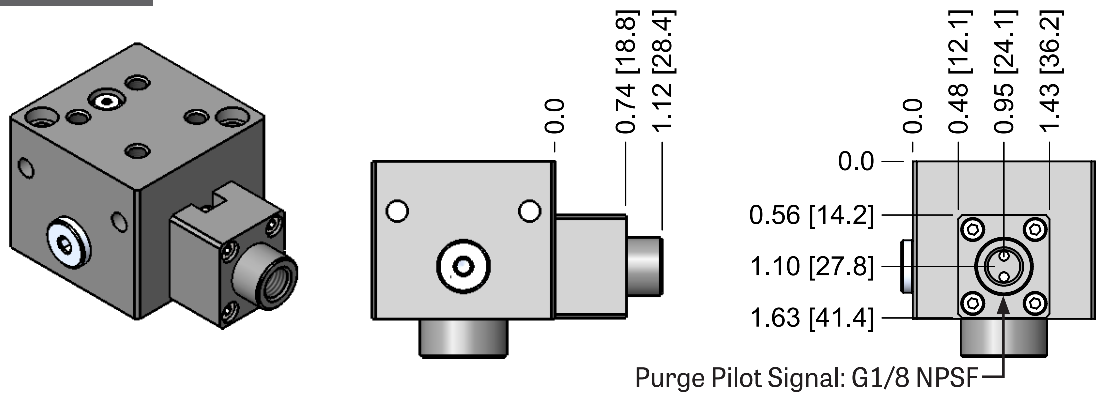
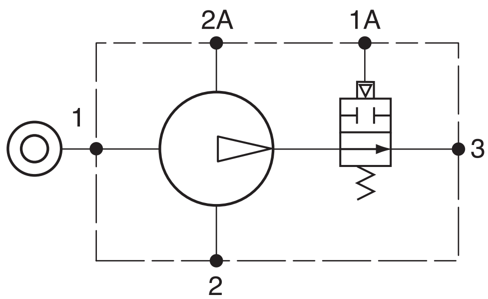
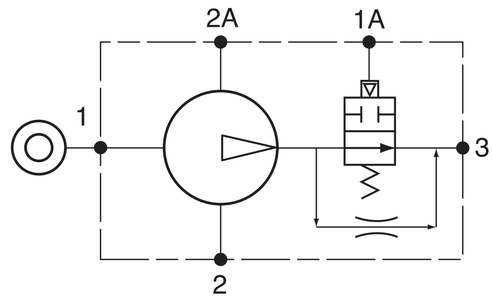


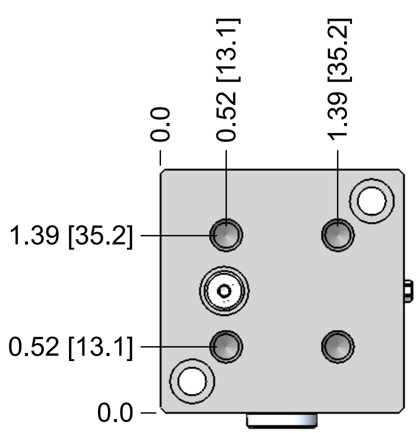
PP : POSITIVE PRESSURE PURGE

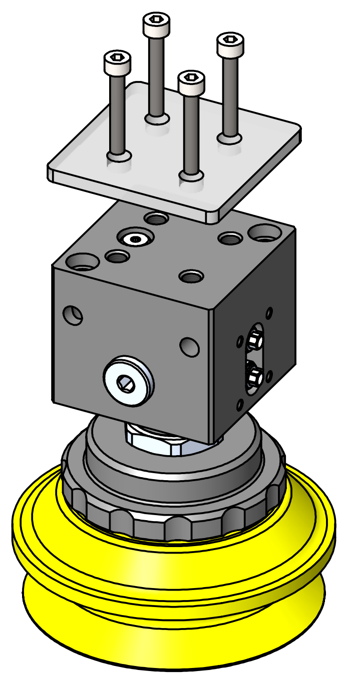


LP : LIMITED PRESSURE PURGE



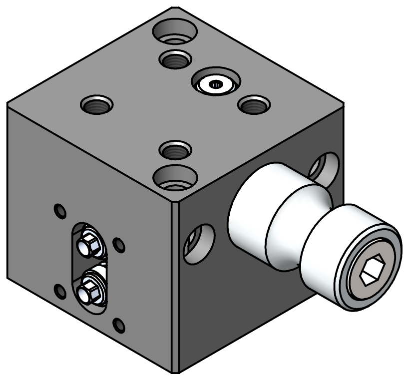
STANDARD M4 PLATE MOUNT

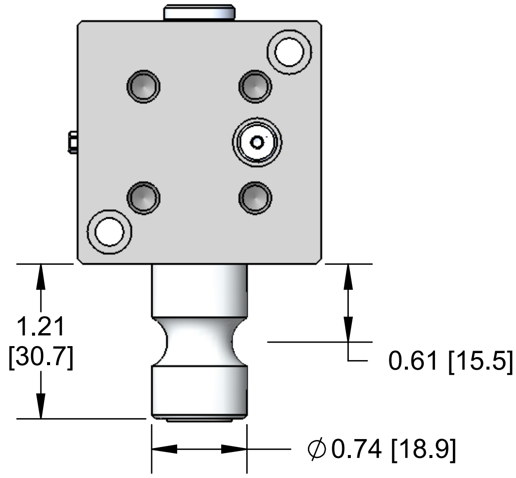




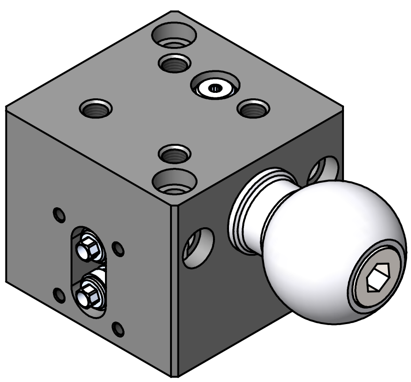
VACUUM GRIPPERS
DVG38 SWIVEL MOUNT

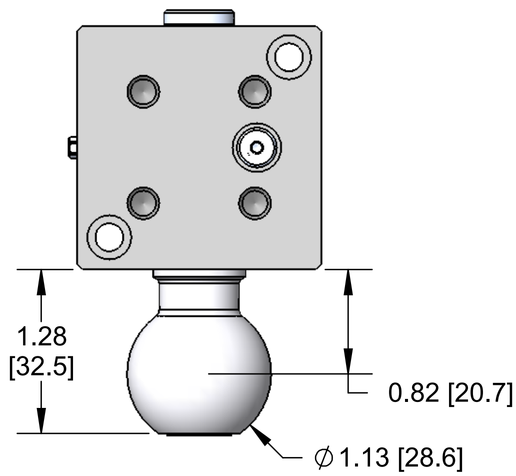
A : APPLE CORE MOUNT





B : BALL SWIVEL MOUNT

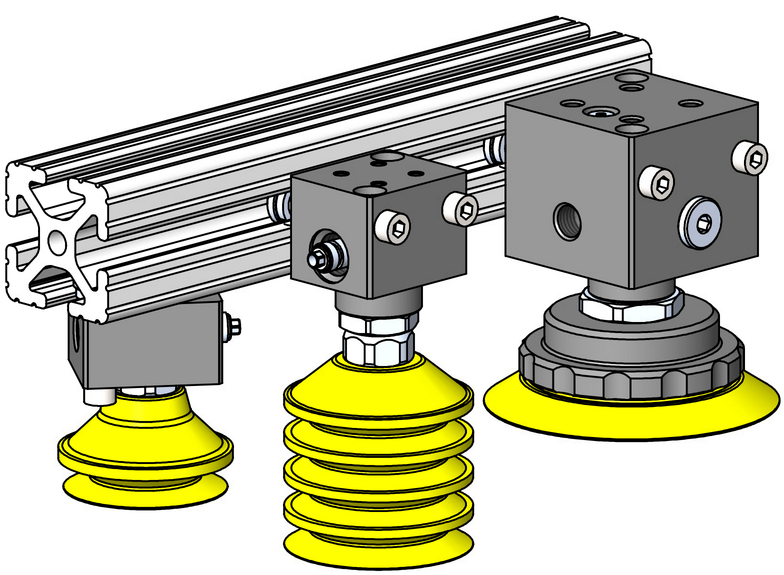




VACUUM GRIPPER T-NUT KITS

EDCO Vacuum Gripper T-Nut kits include two RS-5 T-Nuts and the appropriate M5 screws for your pump model.

PUMP MODEL	
VG18	-TKIT
VG18	
VG38	
DVG38	



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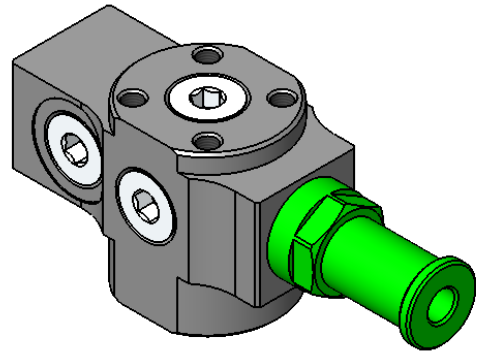
VGP : COAXIAL VENTURI VACUUM GRIPPER PUMPS

EDCO VGP pump are a direct interchange with brand “P” but provide improved vacuum flow (10L) and better reliability because there are no flap valves or filter screens to collect ingested debris.

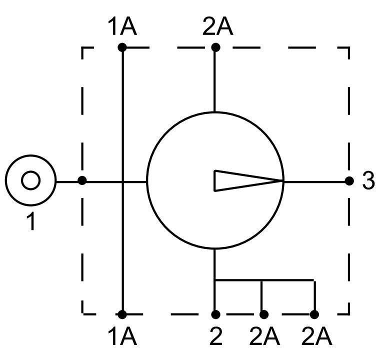


Exhaust extension may be removed to add LP or PP purge options for faster part release or for a true reverse-flow cleaning mode to blow out ingested debris.

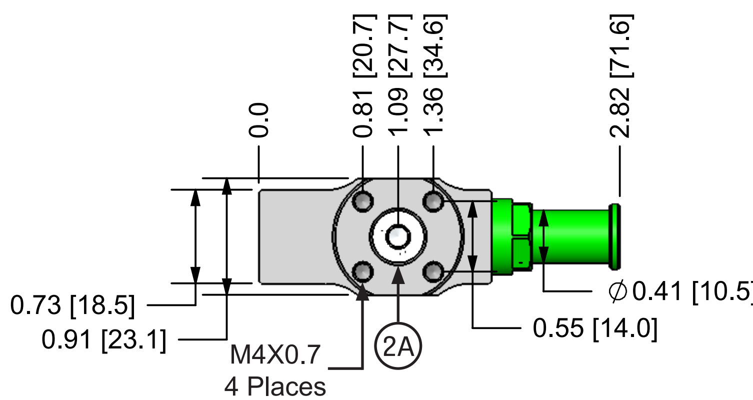
M6 or M8 stud mounting hardware may be installed in A-Side, B-Side, or Top locations.

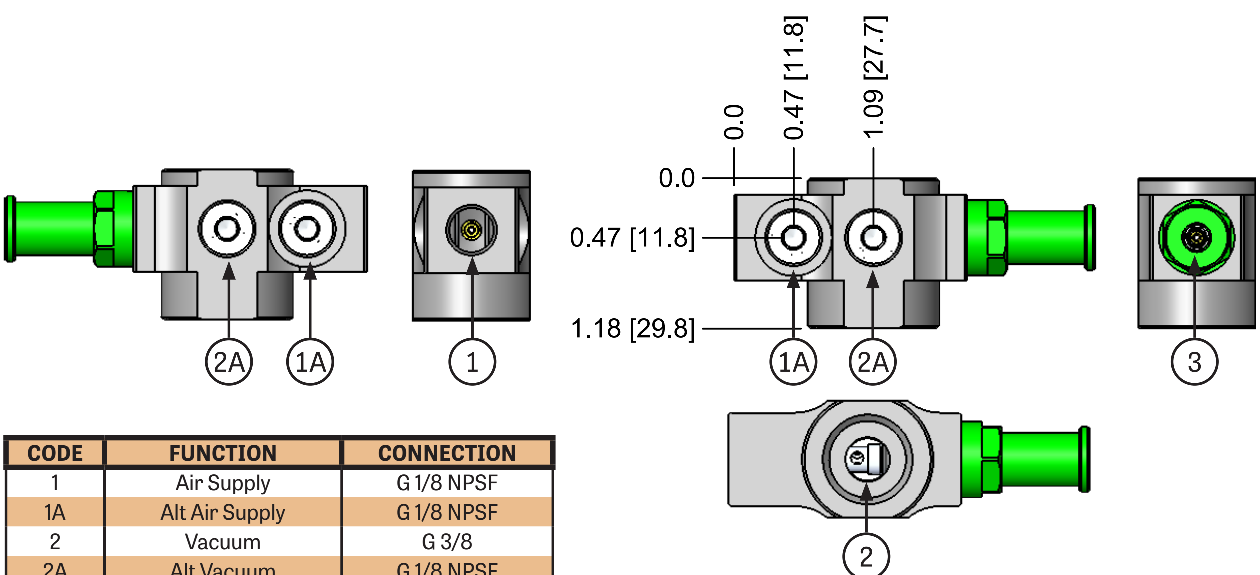
	VENTURI		OPTIONS		MOUNT	MOUNT POSITION
VGP38-	10L	-	PP	-	M8X27	TE
	08L		(Blank) = Basic		(Blank) = Basic	(Blank) = Not Used
	10L		**LP**[1] = Limited Pressure		M6X22	**T** = Top
	10		**PP**[1] = Positive Pressure		M8X16	**L** = Left
	09				M8X27	**R** = Right
	07					**TE** = Top Extrude
	05					**LE** = Left Extrude
						RE = Right Extrude

[1]Only available on 08L & 10L Venturi



Weight: 0.12 lbs [54.4 g]





CODE	FUNCTION	CONNECTION
1	Air Supply	G 1/8 NPSF
1A	Alt Air Supply	G 1/8 NPSF
2	Vacuum	G 3/8
2A	Alt Vacuum	G 1/8 NPSF
3	Exhaust	-

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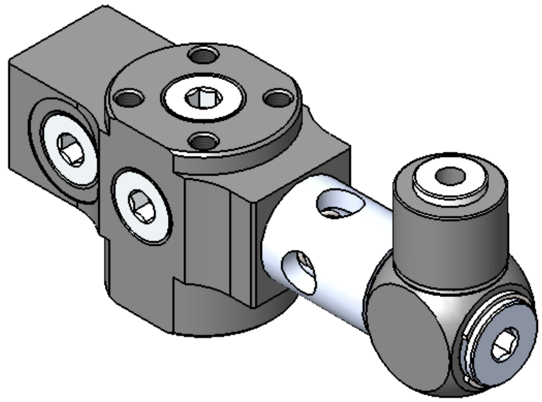
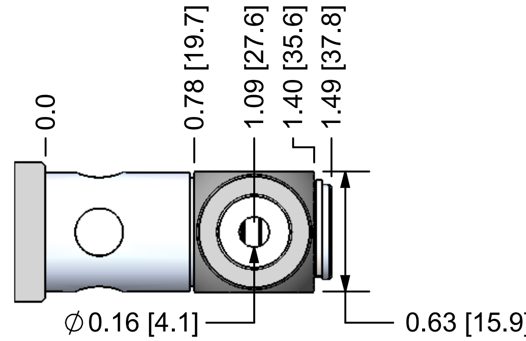
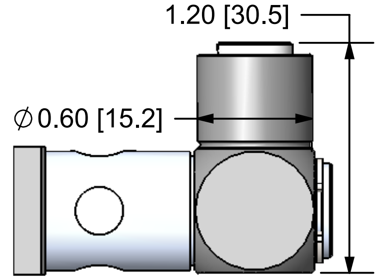
VACUUM GRIPPERS
PP & LP : PURGE OPTION



Weight: 0.15 lbs [68.0 g]



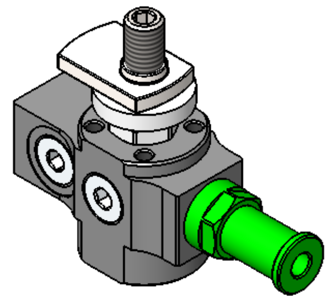


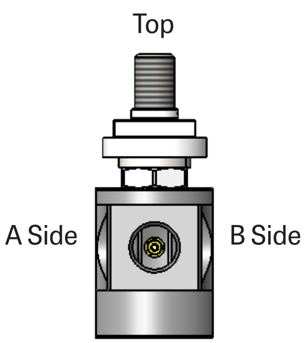
Pilot can be rotated 360°.

MOUNT OPTIONS

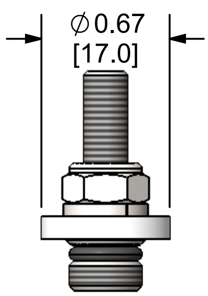
We offer M6 threads by 22 MM length, and M8 threads by 16 and 27 MM lengths. The extrusion mounts come with a T-Nut for mounting to an extrusion.

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.



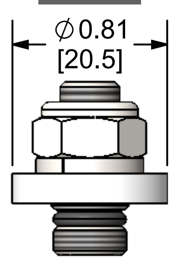


M6X22



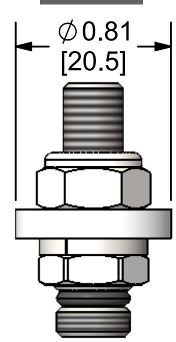
Weight: 0.03 lbs [11.6 g]

M8X16



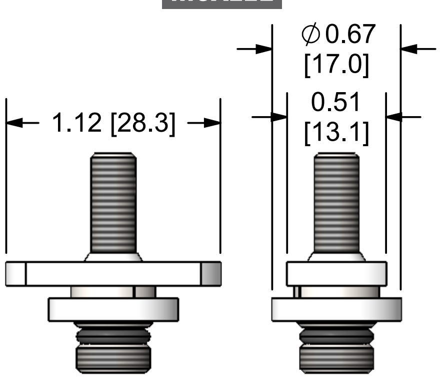
Weight: 0.04 lbs [17.4 g]

M8X27



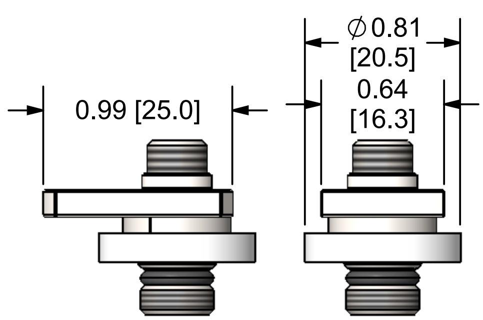
Weight: 0.05 lbs [22.1 g]

M6X22E



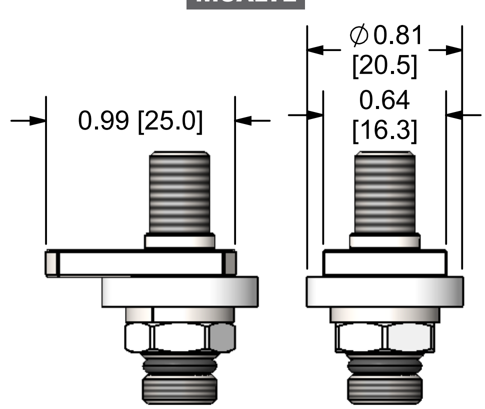
Weight: 0.02 lbs [10.3 g]

M8X16E



Weight: 0.05 lbs [22.1 g]

M8X27E



Weight: 0.06 lbs [26.6 g]

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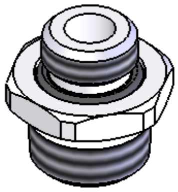
VACUUM GRIPPERS
CUP FITTING ADAPTERS

38MX12M



Weight: 0.03 lbs [15.4 g]

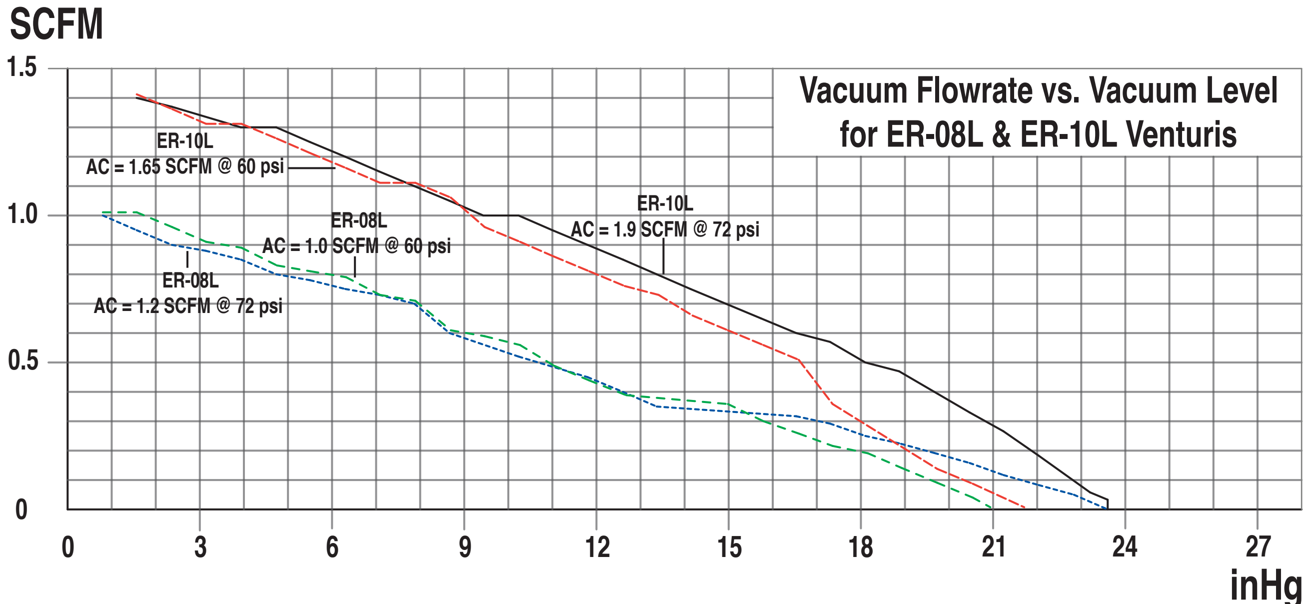
38MX38M

Weight: 0.02 lbs [9.1 g]

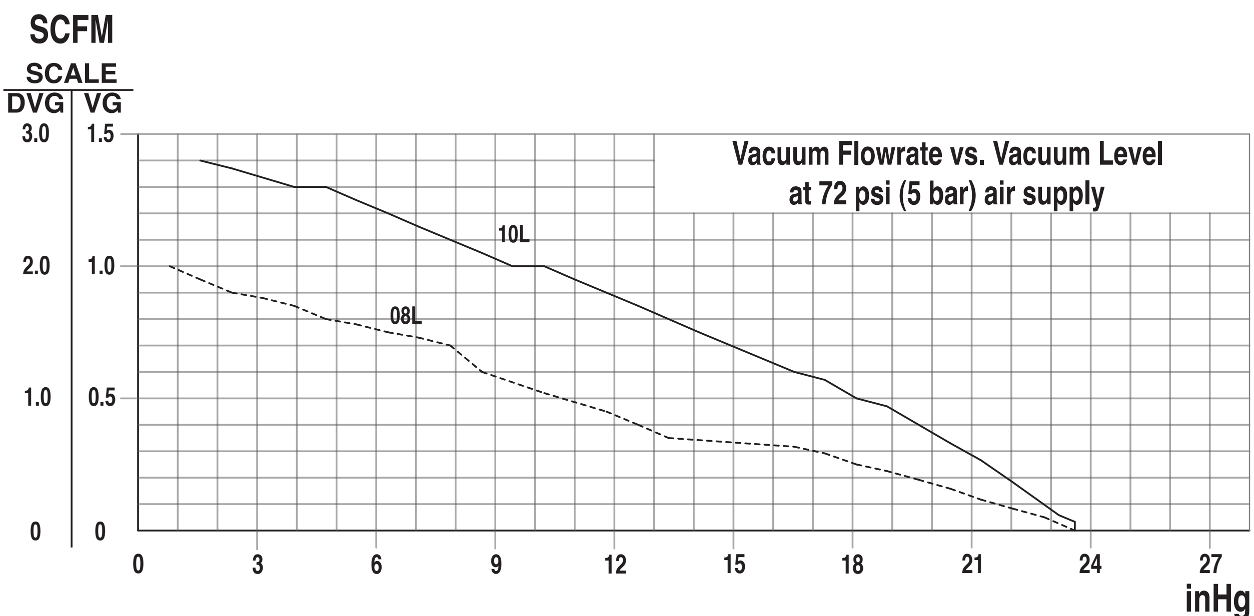
38MX18M

Weight: 0.02 lbs [7.7 g]

PERFORMANCE



For information regarding the performance of our ER-10, ER-09, ER-07, and ER-05 venturis please see the ER series pumps in this catalog.



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.

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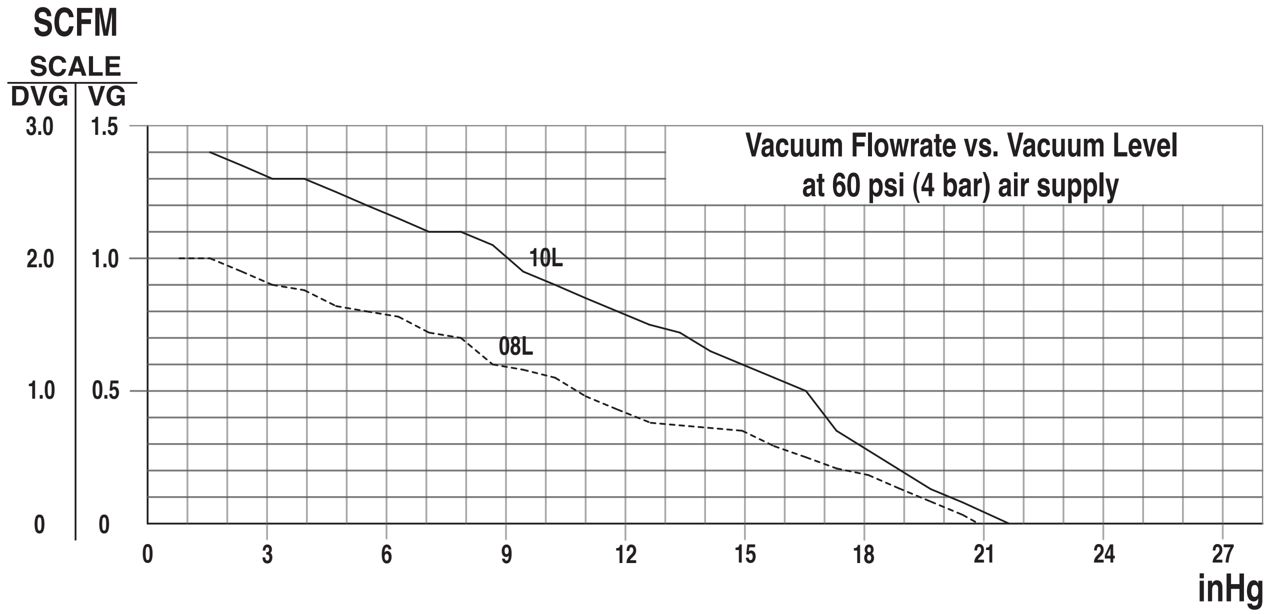

EVACUATION TIME

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 in^3 Time Factor 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/in^3	0.008	0.014	0.022	0.022	0.061

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.

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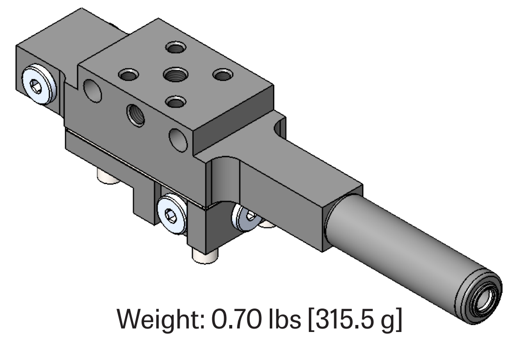
VACUUM GRIPPERS
VG-G12: 1/2" BASE

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.

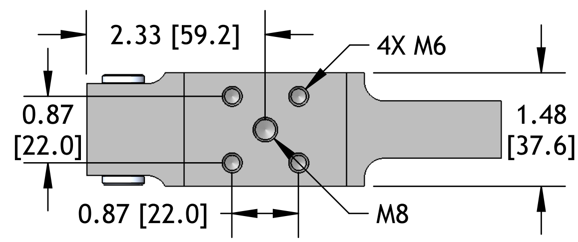
	NOZZLE SERIES	SEAL MATERIAL		OPTIONS
VG-G12-	**A25**	**N**	-	
	A25	**N** = Nitrile		(Blank) = None
	E25	**V** = Viton[1]		**NR** = Non-Return
	M25			
	ML25			
	X40			

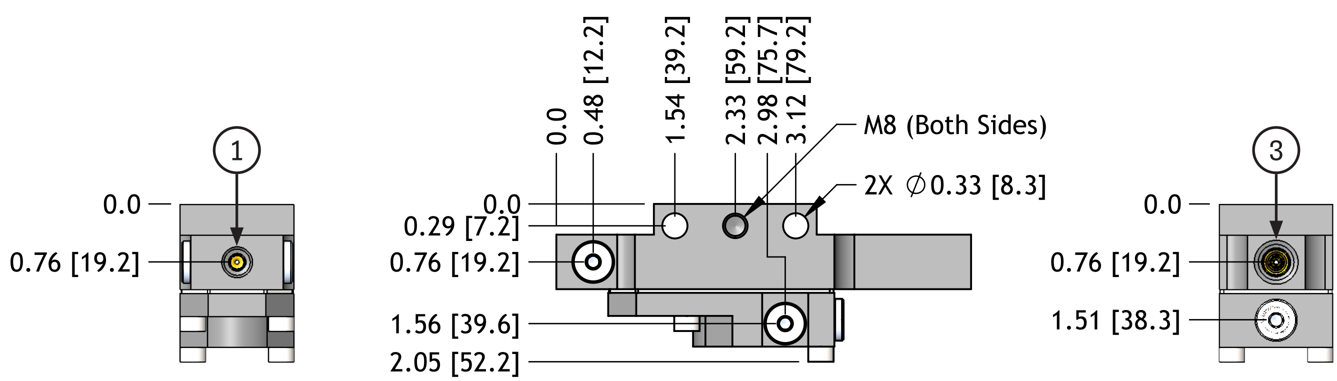


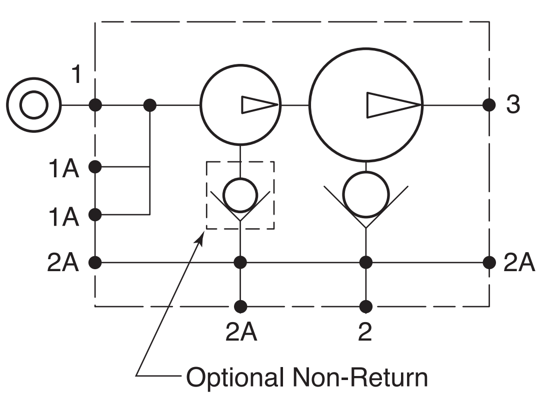
[1]Viton is a registered trademark of DuPont Dow.

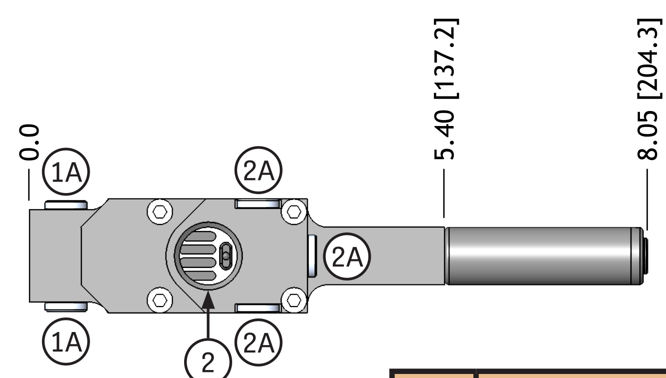
For performance data, see Classic Pump performance.

Weight: 0.70 lbs [315.5 g]









CODE	FUNCTION	CONNECTION
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

VACUUM GRIPPERS
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.

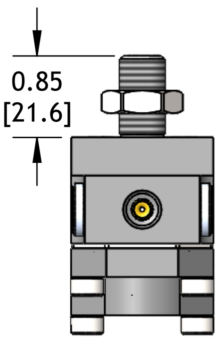
STUD MOUNTS

Kits include stainless steel stud and jam nut.

Weight: .03 lbs [14.2 g]

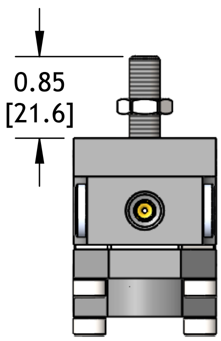
VG-G12-M12

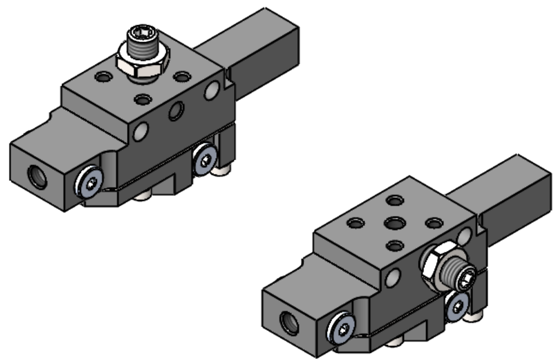
M12X1.75 Stud & Jam Nut



VG-G12-M8

M8X1.25 Stud & Jam Nut



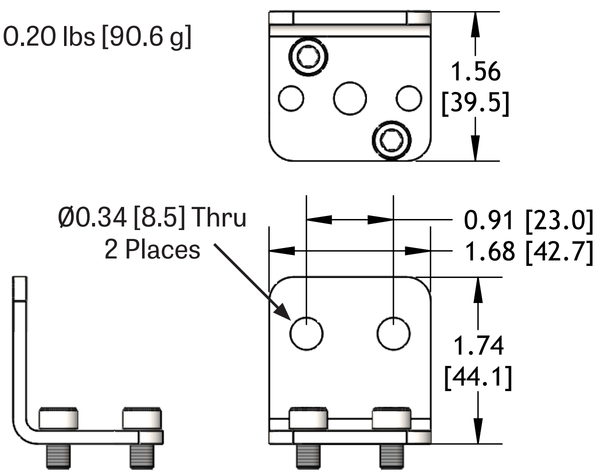


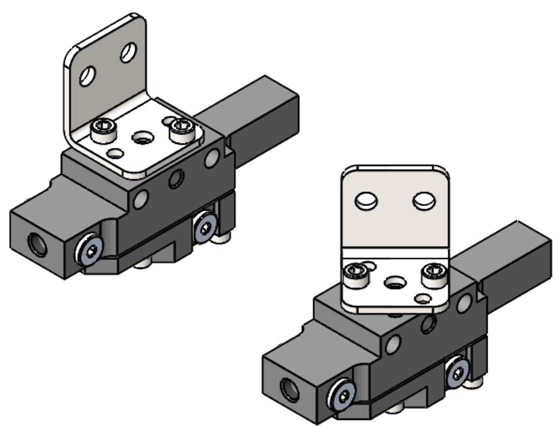
BRACKET MOUNT

VG-G12-BKT-90

Kit includes stainless steel bracket and M6X10 socket head cap screws (2).

Weight: 0.20 lbs [90.6 g]





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SECTION 12
RAIL SYSTEMS

12

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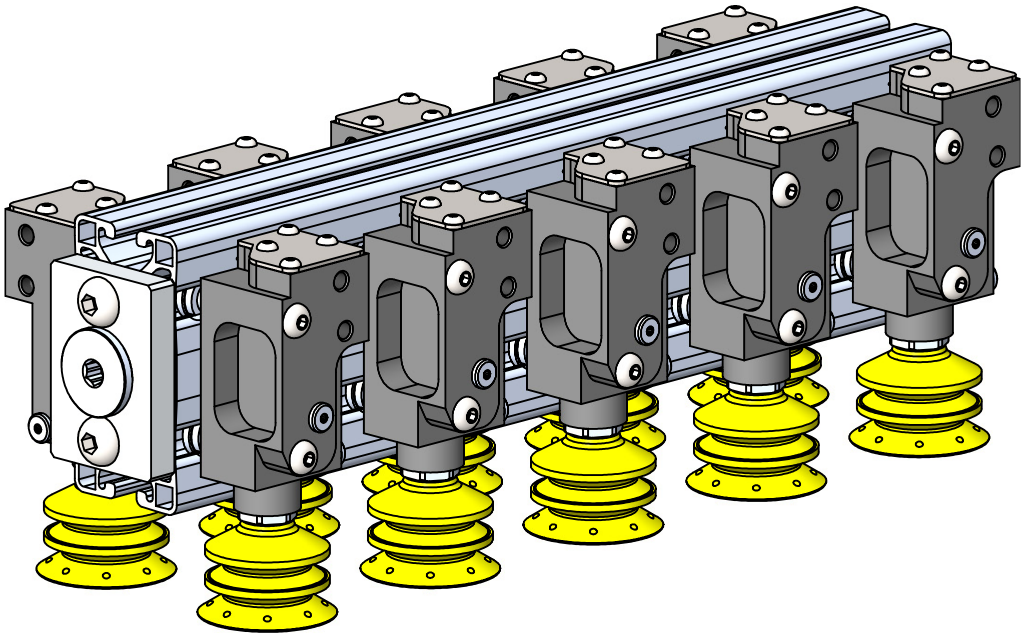
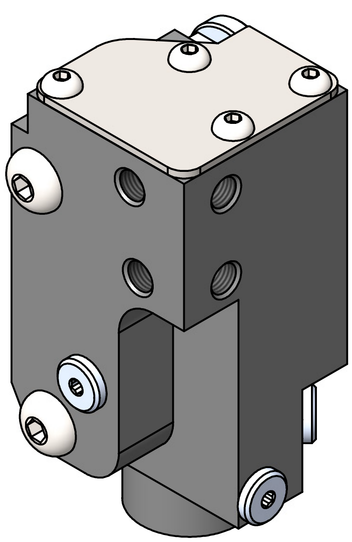


RAIL SYSTEM ASSEMBLIES



RS18

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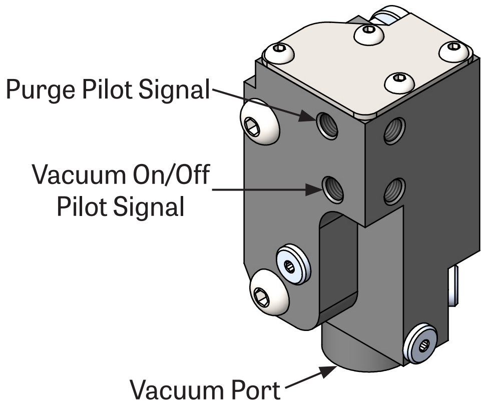
RAIL SYSTEMS
THE ULTIMATE VACUUM GRIPPER SYSTEM

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.

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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

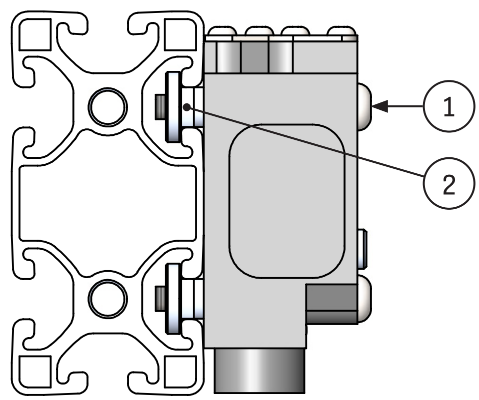
Similar to Positive Purge except it is modified to limit the pressure applied to the suction cup. Purge air flow is not as robust as with the PP option but the pressure is limited so a vacuum switch can be used for part presence detection.

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

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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: in³ (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

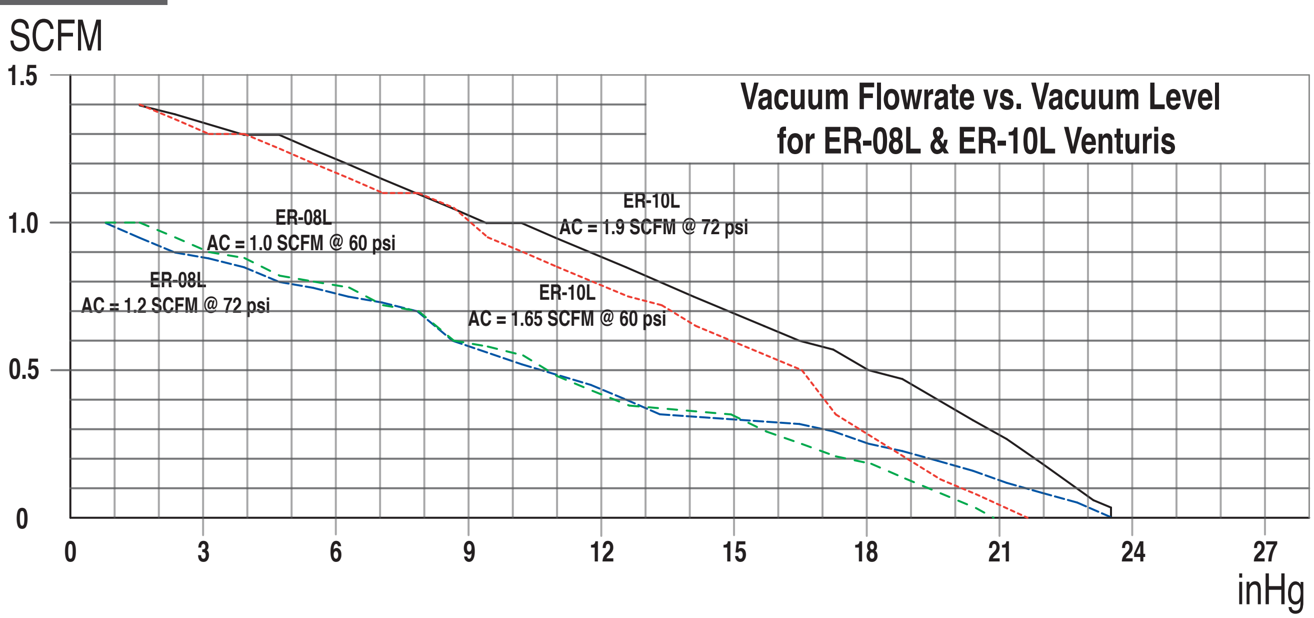
In a non-porous system, evacuation time for any vacuum cup is calculated by multiplying the internal cup volume by the time factor for the desired vacuum level from the Evacuation Time Calculation Table.

For Example: XP-B75 @ 15 inHG (50.8 kPa)

	Volume in³		Time Factor sec/in³		
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.

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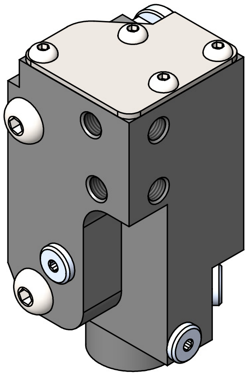
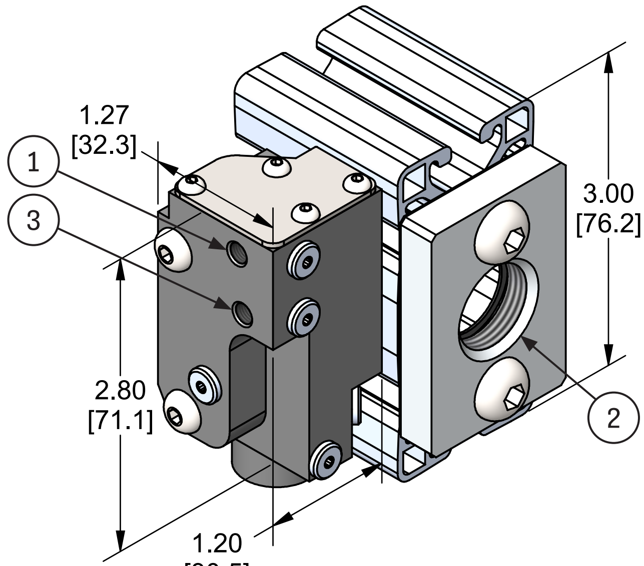
RAIL SYSTEMS

RS18-10L-PP / RS18-10L-LP



Weight: 0.28 lbs [125.0 g]

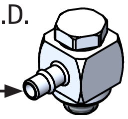


1) Purge Pilot Signal - M5 (10-32 UNF)
2) Air Supply - 3/8 NPSF
3) Vacuum On/Off - M5 (10-32 UNF)

ALUMINUM PILOT FITTINGS

LB25-10 – Elbow
10-32 UNF (M5),
with O-ring seal

4mm (5/32 in) O.D.
Tubing Barb



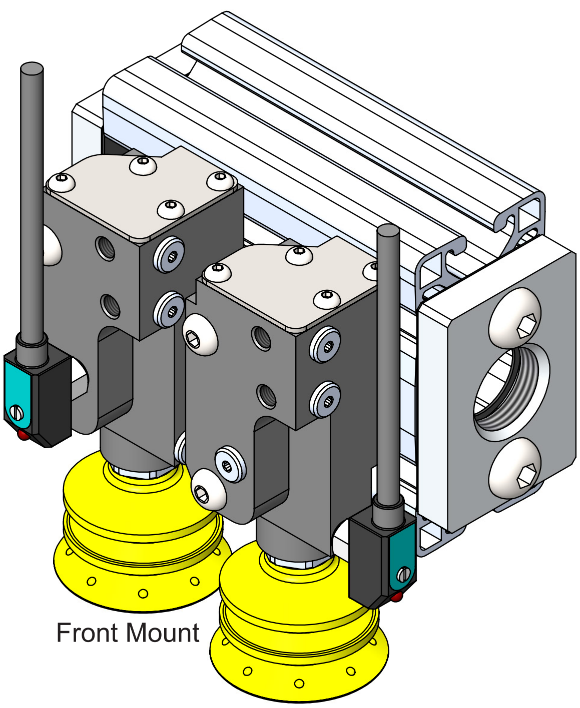
Weight: 0.0045 lbs (2.14 g)

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.

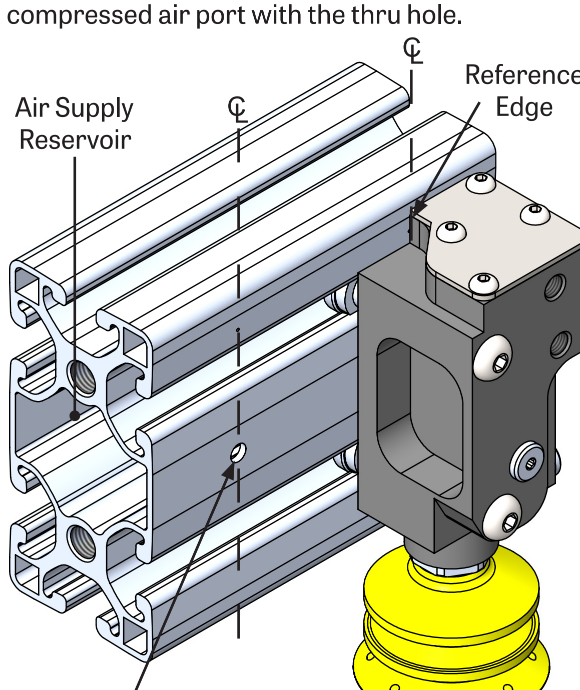


Front Mount

Side Mount

SIMPLE MODULE ALIGNMENT

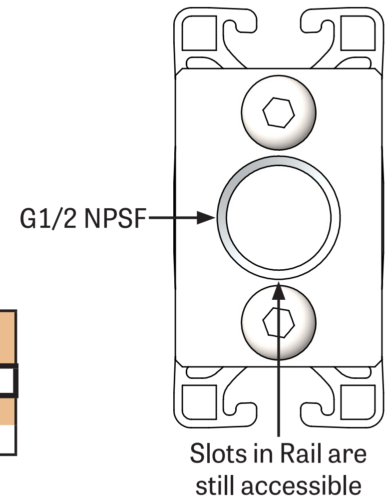
Placing the Reference Face of the module on the center line of the thru hole aligns the compressed air port with the thru hole.



Ø 0.16 [4.1] Thru Hole

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 **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

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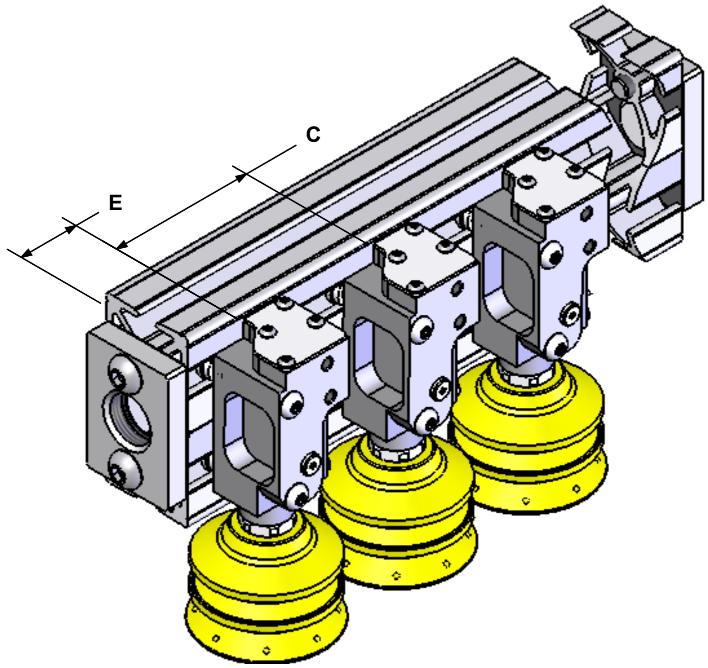
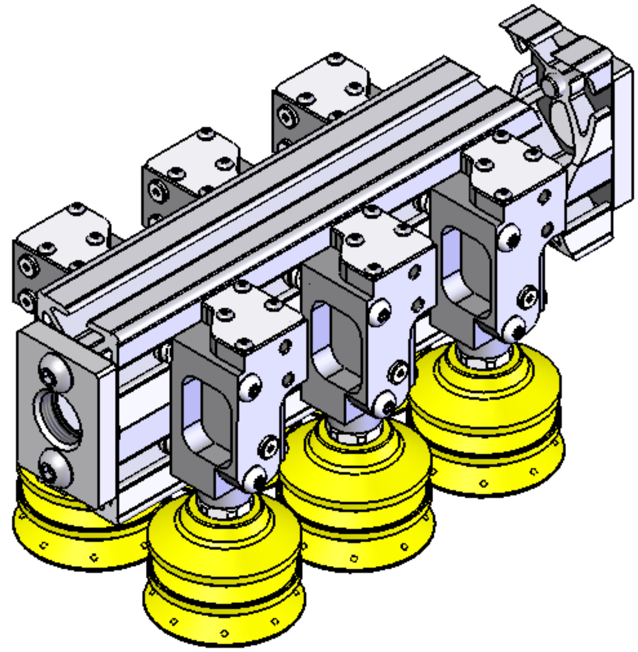
RAIL SYSTEMS
SINGLE SIDED RAIL ASSEMBLY

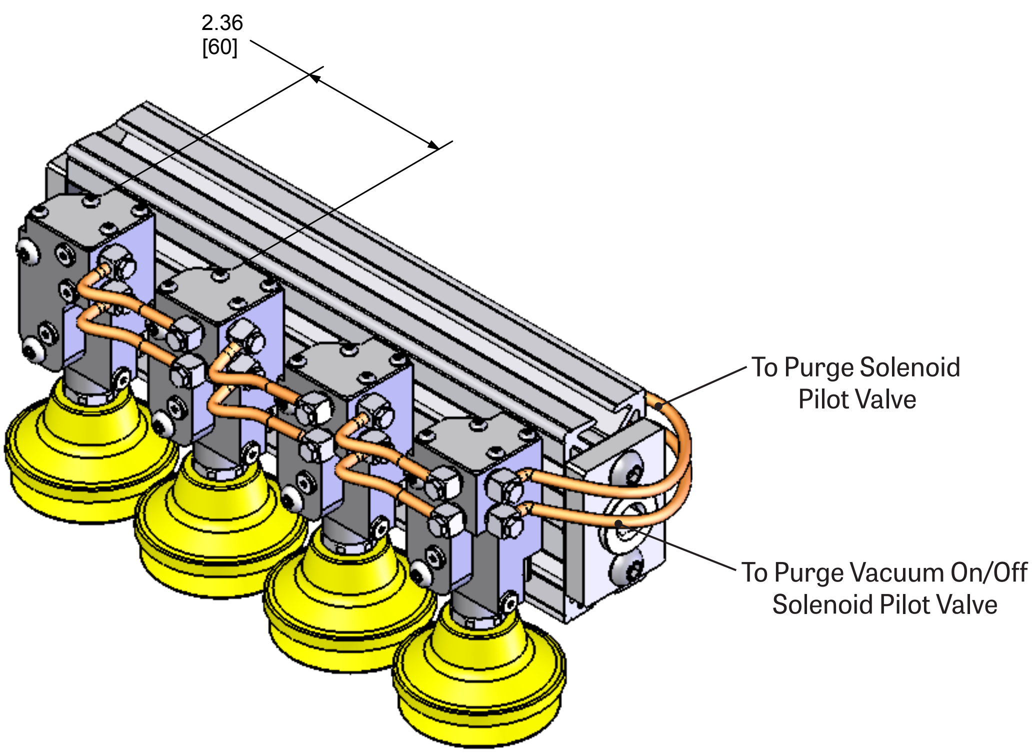


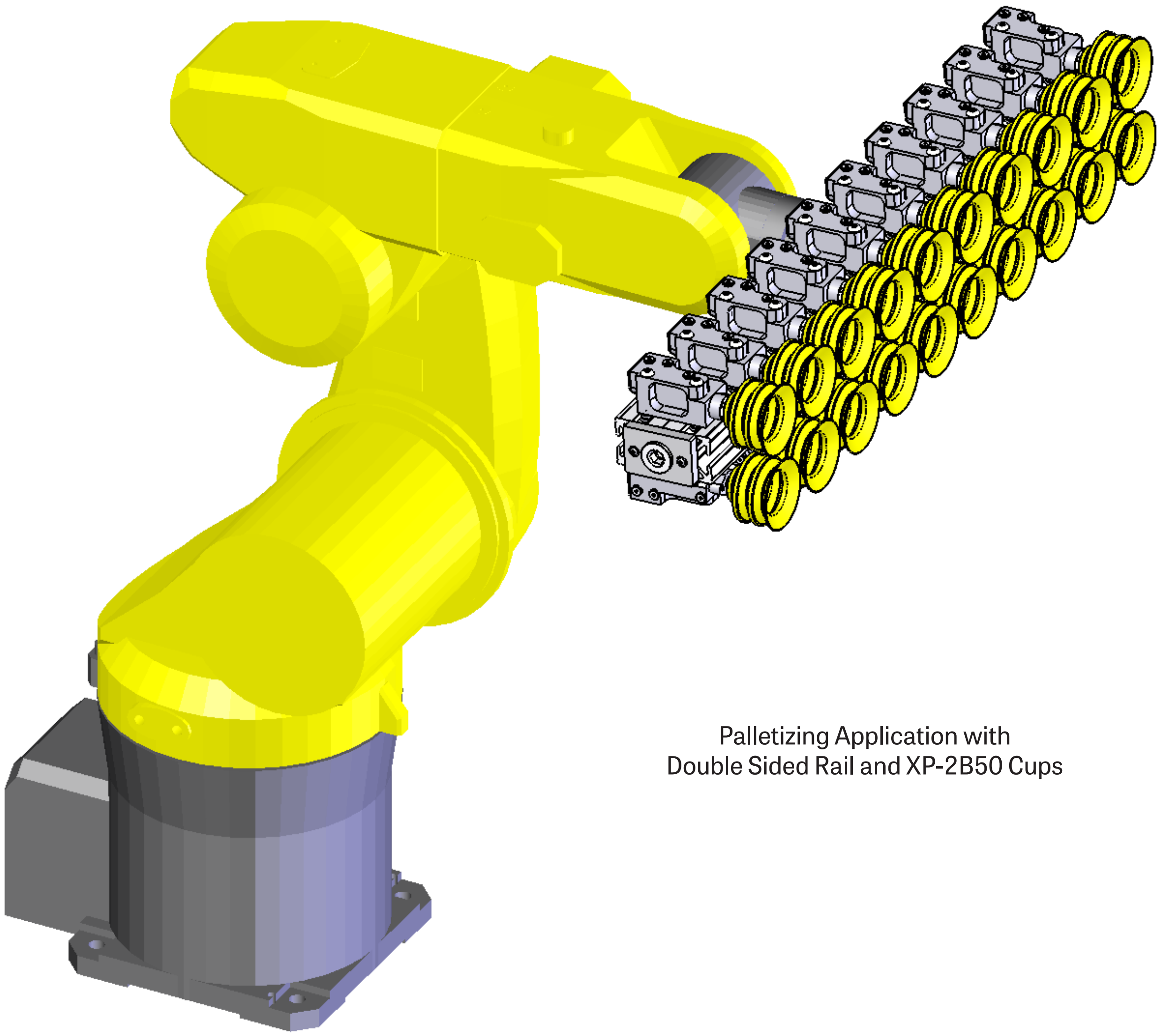
DOUBLE SIDED RAIL ASSEMBLY



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

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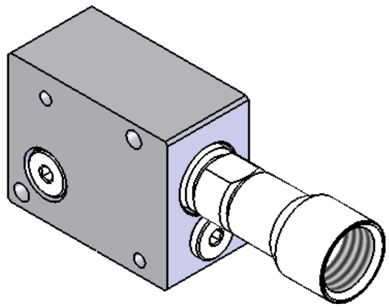
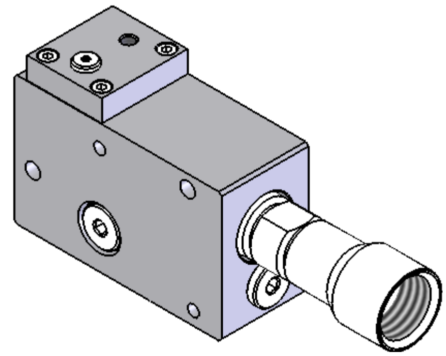
SECTION 13
J SERIES PUMPS

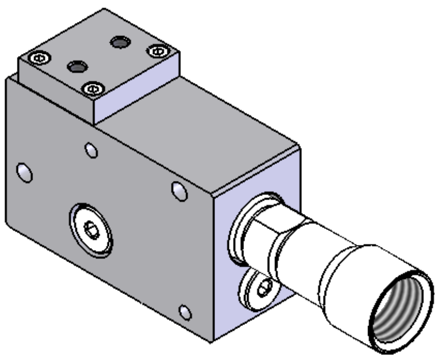
13



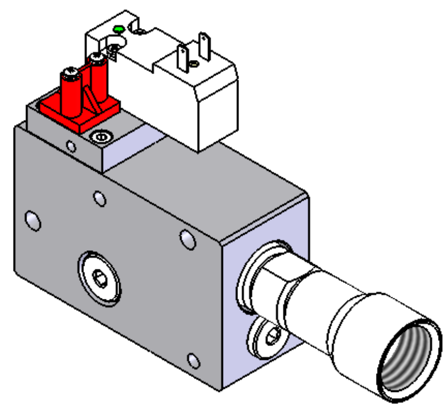
BASIC



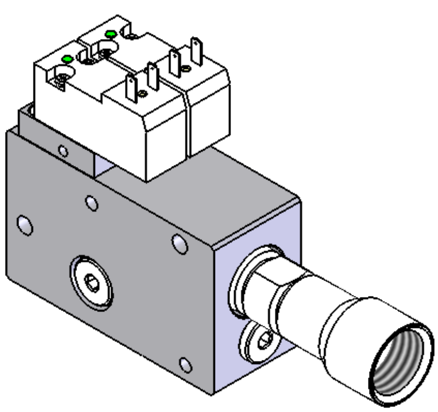
PS



PSB



S24D / S110A



SB24D / SB110A

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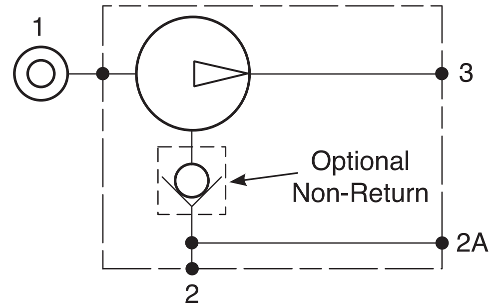
J SERIES PUMPS

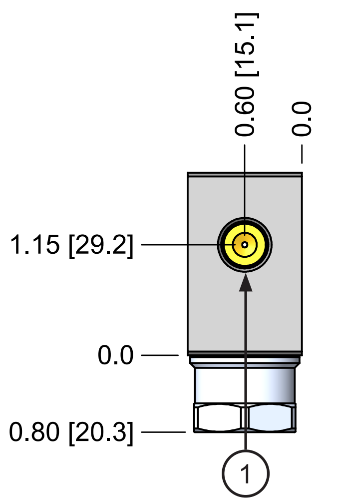
Basic J-series pumps may be ordered with any of five different coaxial ejectors to match pump performance to system requirements. Vacuum on/off control is accomplished via external control valves in the pump air supply. An optional non-return vacuum check valve is available for use in sealed systems, 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.

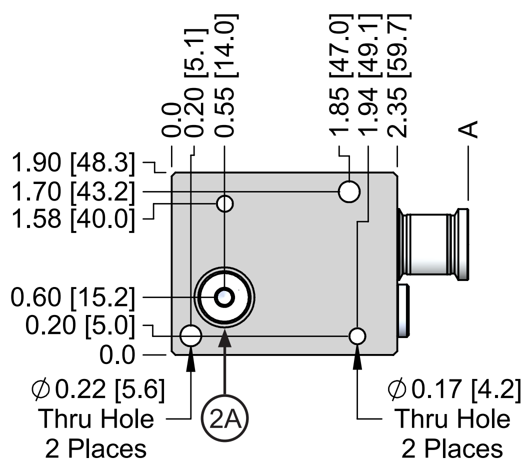


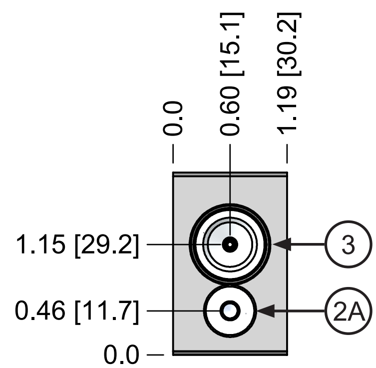
	VENTURI DIAMETER		PORTS		NON RETURN		SILENCER
J	12	H		-		-	
	12 = 1.2 mm		(Blank) = NPTF		(Blank) = No		(Blank) = None
	15 = 1.5 mm		**G** = G Threads		**NR** = Yes		**ST** = STA14M

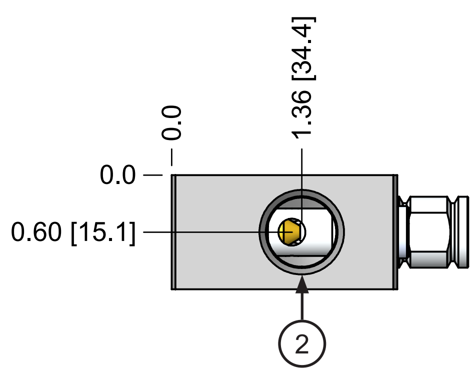
CODE	FUNCTION	NPT	G
1	Air Supply	1/4 NPTF	G 1/4
2	Vacuum - Main	G 1/2 NPSF	G 1/2 NPSF
2A	Vacuum - Alternate	G 1/8 NPSF	G 1/8 NPSF
3	Exhaust	G 1/4 NPSF	G 1/4 NPSF

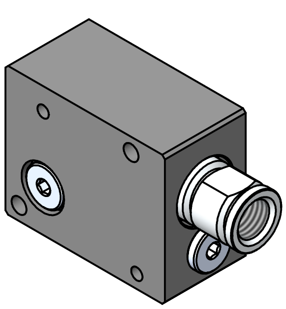
VENTURI DIAMETER	A in [mm]
12	3.09 [78.5]
15	3.49 [88.7]





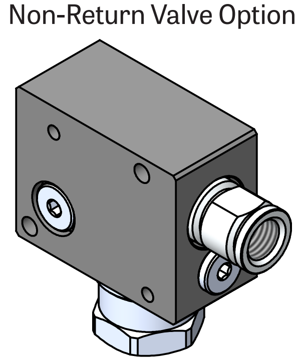






Weight: 0.47 lbs [213.0 g]

Non-Return Valve Option



Weight: 0.52 lbs [236.0 g]

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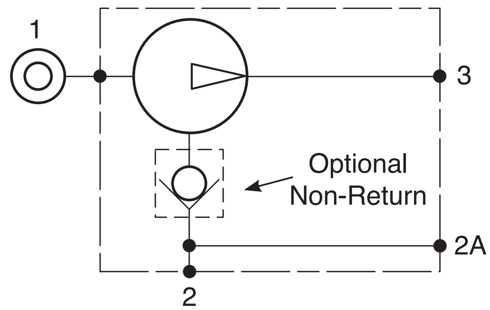
J SERIES PUMPS

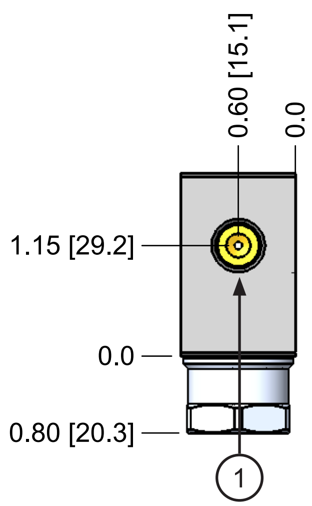
Basic J-series pumps may be ordered with any of five different coaxial ejectors to match pump performance to system requirements. Vacuum on/off control is accomplished via external control valves in the pump air supply. An optional non-return vacuum check valve is available for use in sealed systems, 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.

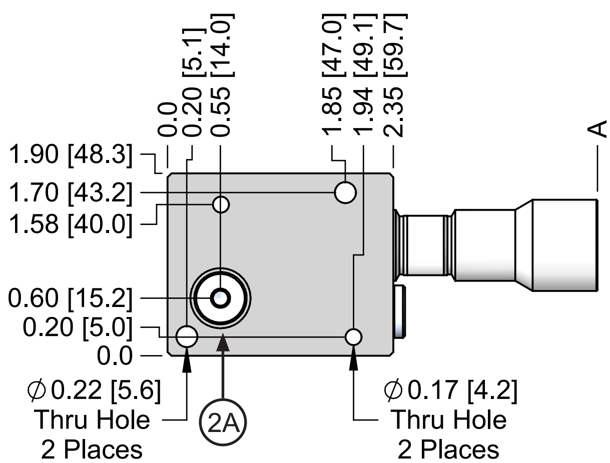


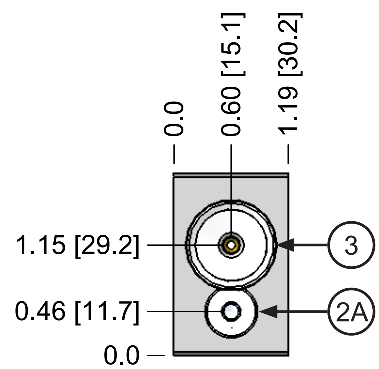
	VENTURI DIAMETER		PORTS		NON RETURN		SILENCER
J	20	H		-		-	
	20 = 2.0 mm		(Blank) = NPTF		(Blank) = No		(Blank) = None
	25 = 2.5 mm		**G** = G Threads		**NR** = Yes		**ST** = STC12M
	30 = 3.0 mm						

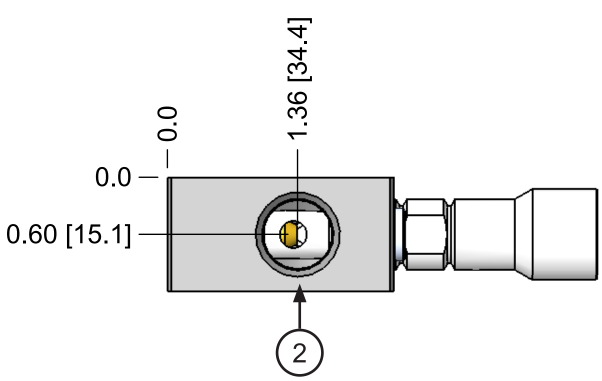
CODE	FUNCTION	NPT	G
1	Air Supply	1/4 NPTF	G 1/4
2	Vacuum - Main	G 1/2 NPSF	G 1/2 NPSF
2A	Vacuum - Alternate	G 1/8 NPSF	G 1/8 NPSF
3	Exhaust	G 1/2 NPSF	G 1/2 NPSF

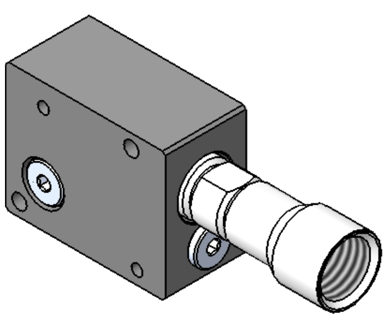
VENTURI DIAMETER	A in (mm)
20	4.47 (113.5)
25	4.87 (123.6)
30	5.71 (144.9)





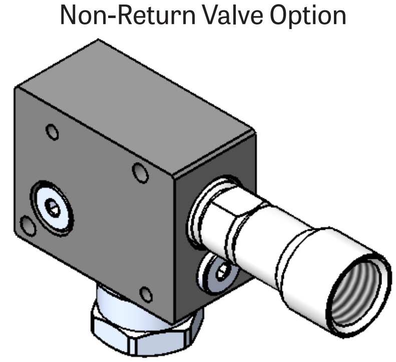






Weight: 0.54 lbs [245.0 g]

Non-Return Valve Option



Weight: 0.59 lbs [268.0 g]

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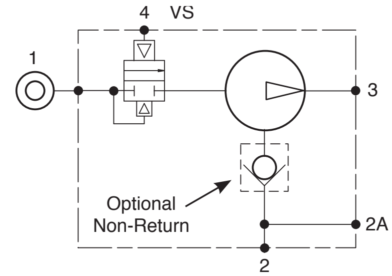
PS : AIR PILOT CONTROLLED VACUUM SUPPLY

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.

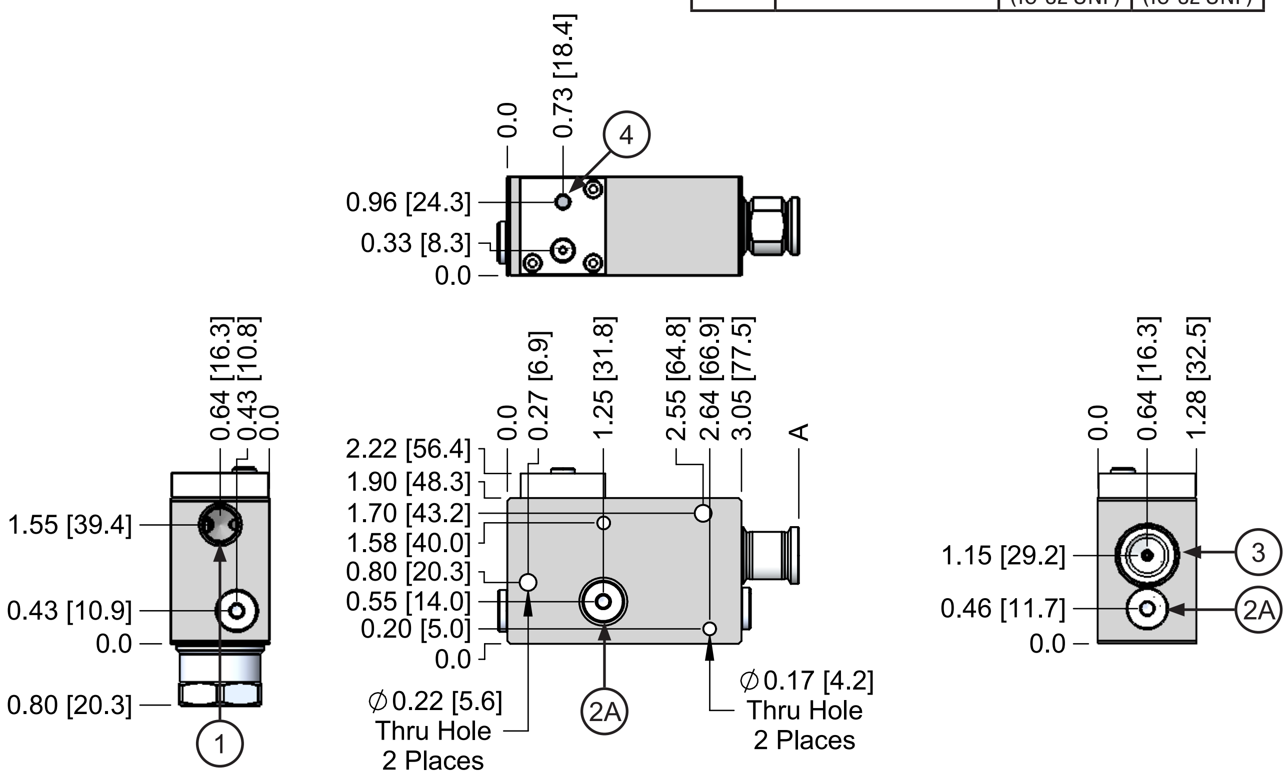
Air-pilot operation simplifies integration into field-bus systems by shifting electrical control to a bank of pneumatic 3-way solenoid valves. Flexing control wires in an automation system are replaced with small diameter air tubing for greater reliability.

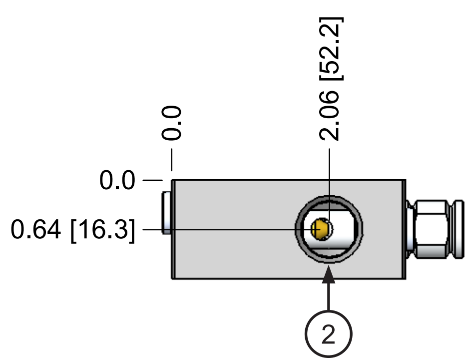


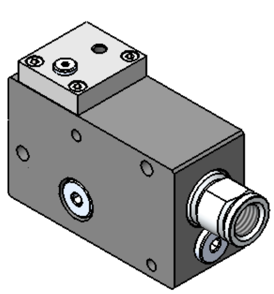
VENTURI DIAMETER	A in (mm)
12	3.09 (78.5)
15	3.49 (88.7)

	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)

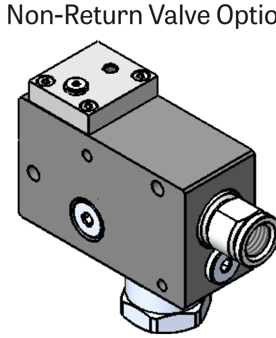






Weight: 0.69 lbs [313.0 g]

Non-Return Valve Option



Weight: 0.74 lbs [336.0 g]

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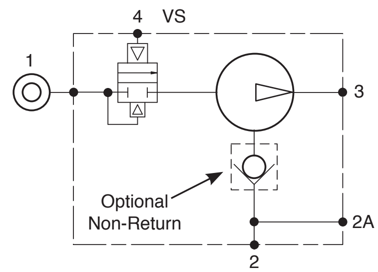
J SERIES PUMPS
PS : AIR PILOT CONTROLLED VACUUM SUPPLY

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.



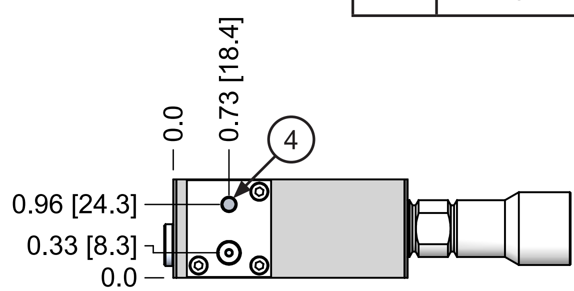
VENTURI DIAMETER	A in (mm)
20	4.47 (113.5)
25	4.87 (123.6)
30	5.71 (144.9)

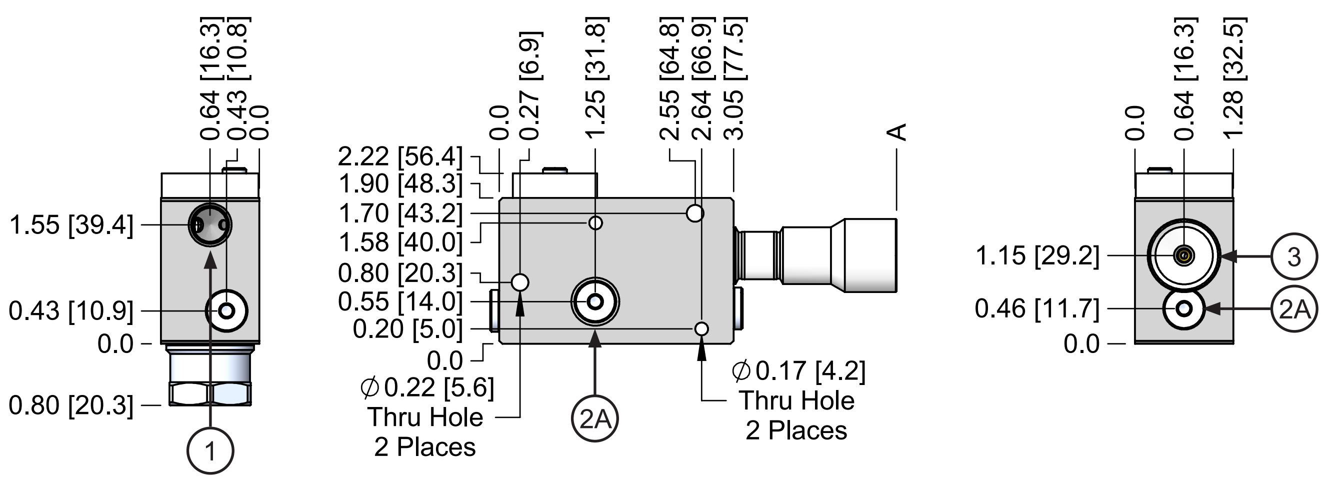
J – VENTURI DIAMETER – H – PORTS – -PS- – NON RETURN – - – SILENCER

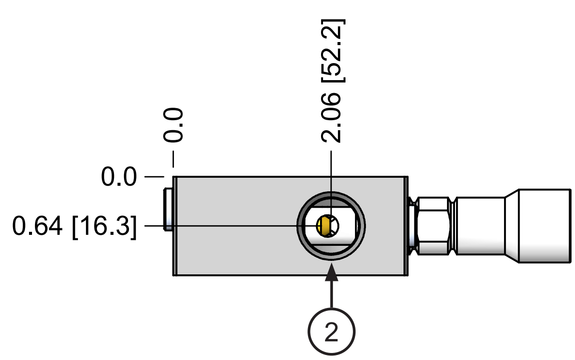
Example: J **20** H

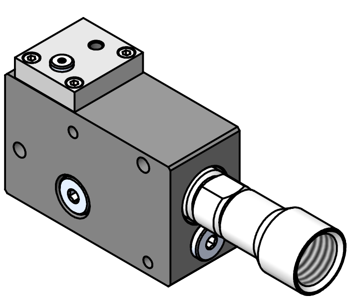
VENTURI DIAMETER	PORTS	NON RETURN	SILENCER
20 = 2.0 mm	(Blank) = NPTF	(Blank) = No	(Blank) = None
25 = 2.5 mm	**G** = G Threads	**NR** = Yes	**ST** = STC12M
30 = 3.0 mm			

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)



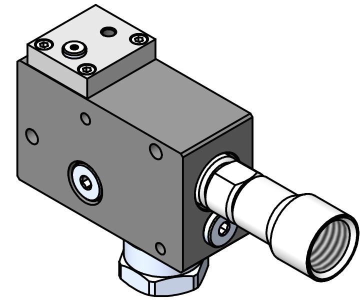






Weight: 0.76 lbs [345.0 g]

Non-Return Valve Option



Weight: 0.81 lbs [367.0 g]

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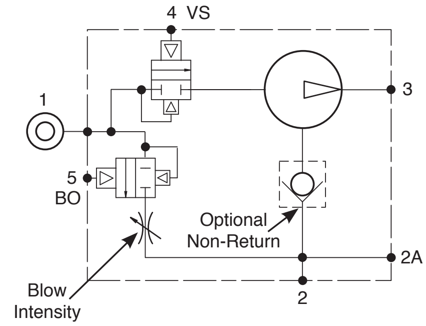
J SERIES PUMPS
PSB : AIR PILOT CONTROLLED VACUUM SUPPLY & BLOW-OFF

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.

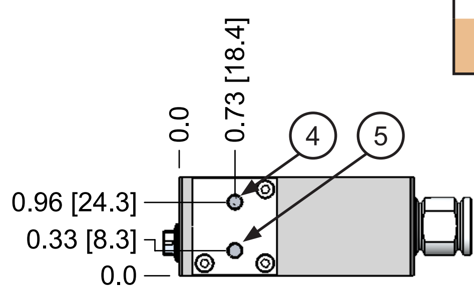
Air-pilot operation simplifies integration into field-bus systems by shifting electrical control to a bank of pneumatic 3-way solenoid valves. Flexing control wires in an automation system are replaced with small diameter air tubing for greater reliability.

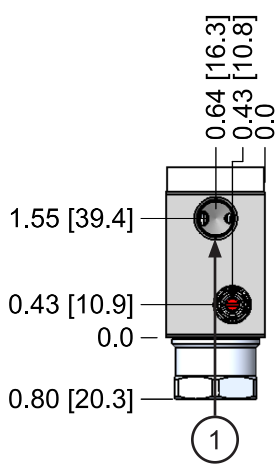


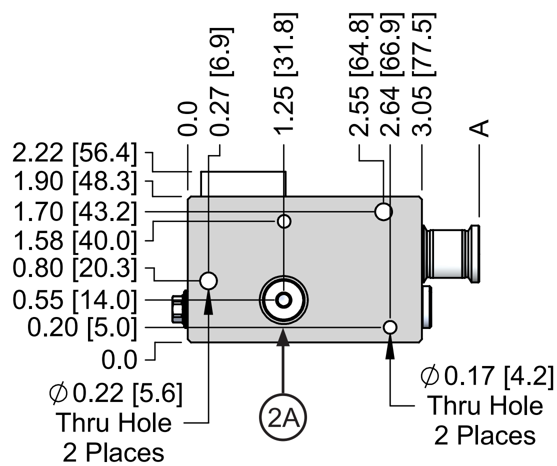
VENTURI DIAMETER	A in (mm)
12	3.09 [78.5]
15	3.49 [88.7]

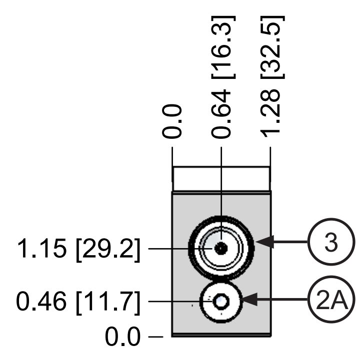
	VENTURI DIAMETER		PORTS		NON RETURN		SILENCER
J	12	H		-PSB-		-	
	12 = 1.2 mm		(Blank) = NPTF		(Blank) = No		(Blank) = None
	15 = 1.5 mm		**G** = G Threads		**NR** = Yes		**ST** = STA14M

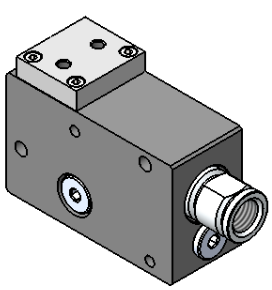
CODE	FUNCTION	NPT	G
1	Air Supply	1/4 NPTF	G 1/4
2	Vacuum - Main	G 1/2 NPSF	G 1/2 NPSF
2A	Vacuum - Alternate	G 1/8 NPSF	G 1/8 NPSF
3	Exhaust	G 1/4 NPSF	G 1/4 NPSF
4	Pilot Signal - Vacuum	M5X0.8 (10-32 UNF)	M5X0.8 (10-32 UNF)
5	Pilot Signal - Blow-Off	M5X0.8 (10-32 UNF)	M5X0.8 (10-32 UNF)

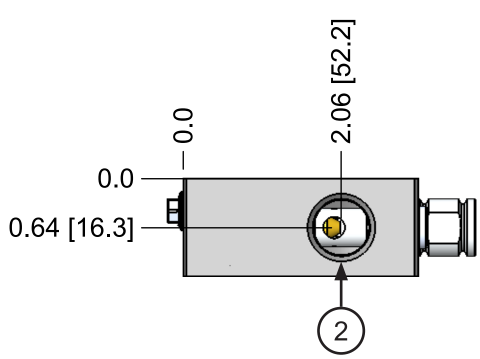




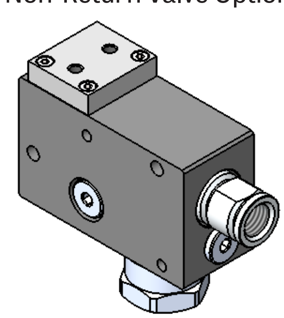








Non-Return Valve Option



Weight: 0.69 lbs [313.0 g]

Weight: 0.74 lbs [336.0 g]

13

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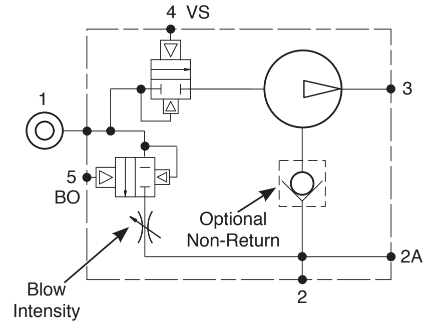
PSB : AIR PILOT CONTROLLED VACUUM SUPPLY & BLOW-OFF

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.

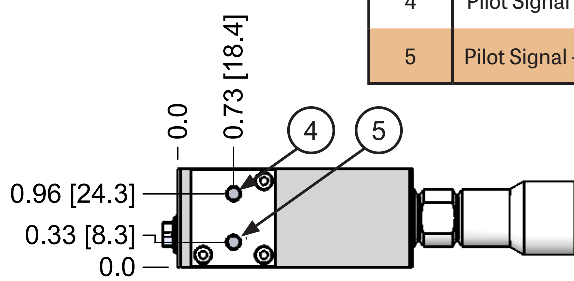
Air-pilot operation simplifies integration into field-bus systems by shifting electrical control to a bank of pneumatic 3-way solenoid valves. Flexing control wires in an automation system are replaced with small diameter air tubing for greater reliability.

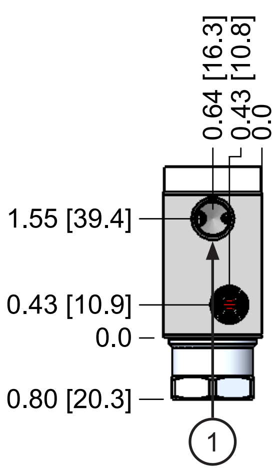


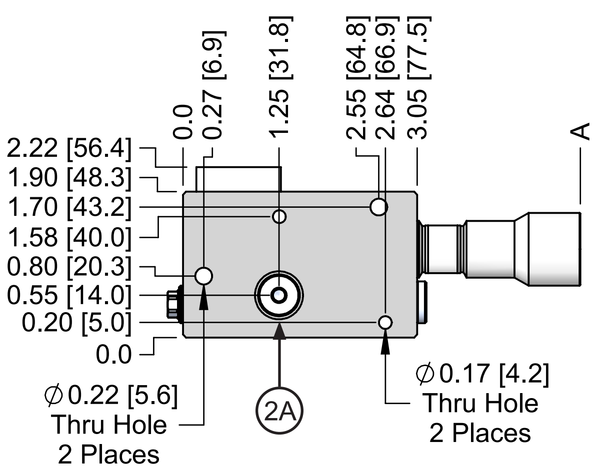
VENTURI DIAMETER	A in (mm)
20	4.47 (113.5)
25	4.87 (123.6)
30	5.71 (144.9)

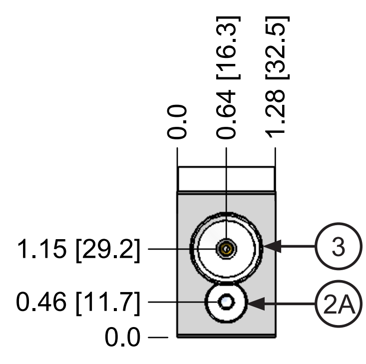
	VENTURI DIAMETER		PORTS		NON RETURN		SILENCER
J	20	H		-PSB-		-	
	20 = 2.0 mm		(Blank) = NPTF		(Blank) = No		(Blank) = None
	25 = 2.5 mm		**G** = G Threads		**NR** = Yes		**ST** = STC12M
	30 = 3.0 mm						

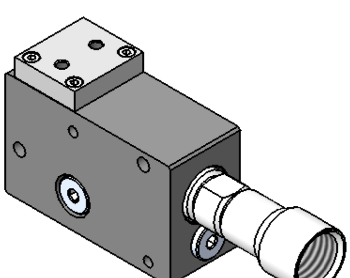
CODE	FUNCTION	NPT	G
1	Air Supply	1/4 NPTF	G 1/4
2	Vacuum - Main	G 1/2 NPSF	G 1/2 NPSF
2A	Vacuum - Alternate	G 1/8 NPSF	G 1/8 NPSF
3	Exhaust	G 1/2 NPSF	G 1/2 NPSF
4	Pilot Signal - Vacuum	M5X0.8 (10-32 UNF)	M5X0.8 (10-32 UNF)
5	Pilot Signal - Blow-Off	M5X0.8 (10-32 UNF)	M5X0.8 (10-32 UNF)



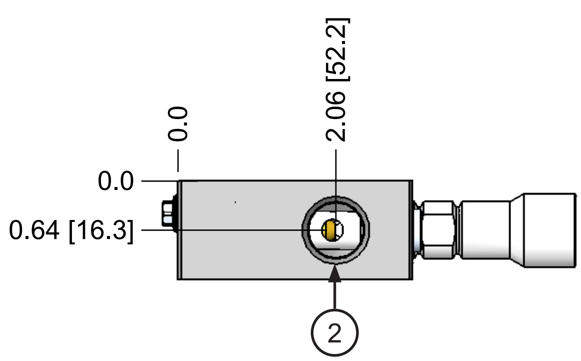




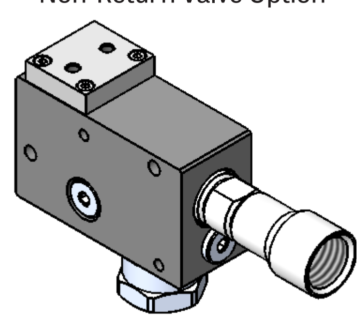




Weight: 0.76 lbs [345.0 g]



Non-Return Valve Option



Weight: 0.81 lbs [367.0 g]

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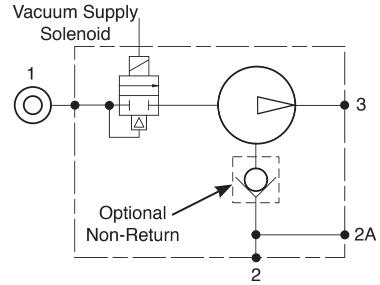
J SERIES PUMPS
S24D / S110A : SOLENOID CONTROLLED VACUUM SUPPLY

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.

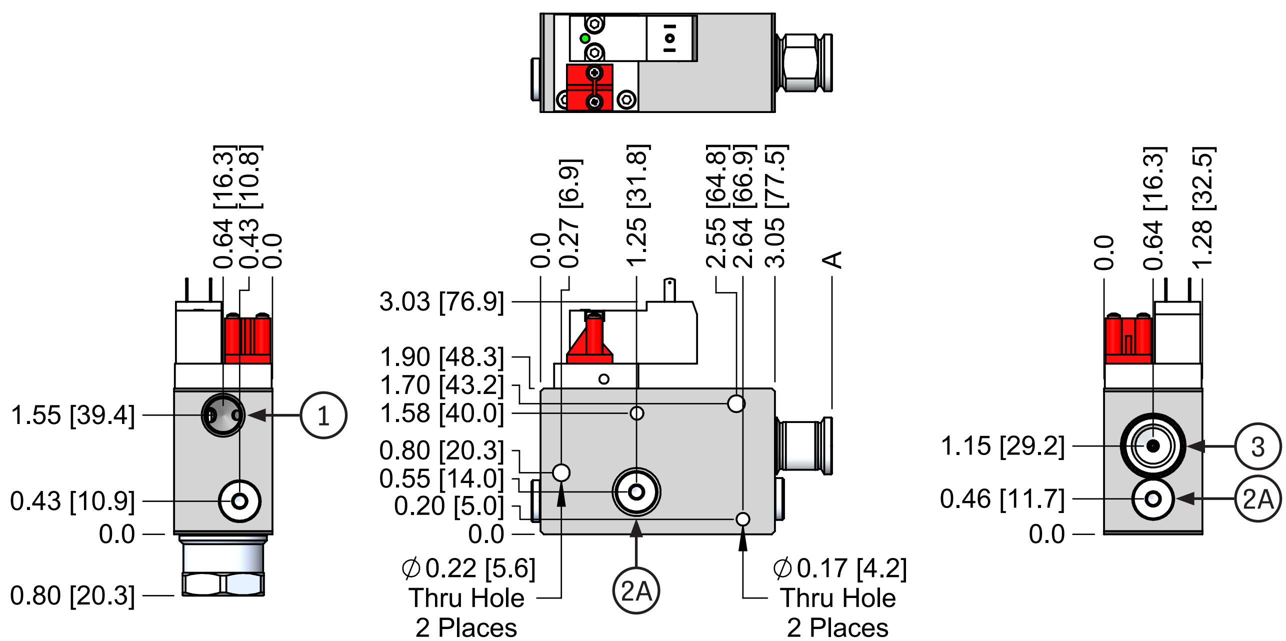


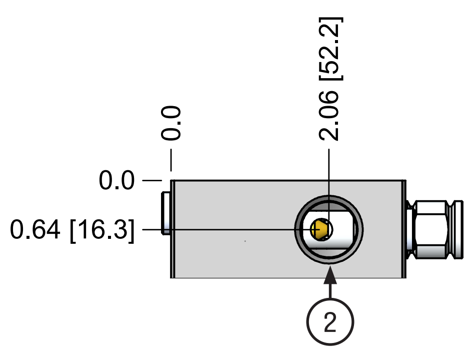
	VENTURI DIAMETER		PORTS		SOLENOID VOLTAGE		NON RETURN		SILENCER
J	12	H		-S	24D	-		-	
	12 = 1.2 mm		(Blank) = NPTF		**24D** = 24V DC		(Blank) = No		(Blank) = None
	15 = 1.5 mm		**G** = G Threads		**110A** = 110V AC		**NR** = Yes		**ST** = STA14M

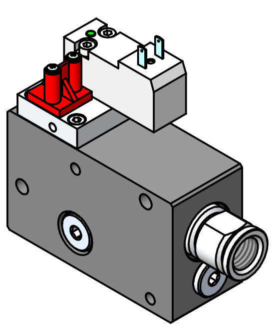
CODE	FUNCTION	NPT	G
1	Air Supply	1/4 NPTF	G 1/4
2	Vacuum - Main	G 1/2 NPSF	G 1/2 NPSF
2A	Vacuum - Alternate	G 1/8 NPSF	G 1/8 NPSF
3	Exhaust	G 1/4 NPSF	G 1/4 NPSF

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

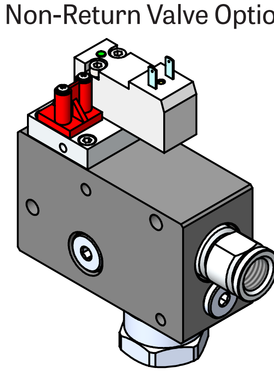






Weight: 0.77 lbs [349.0 g]

Non-Return Valve Option



Weight: 0.82 lbs [372.0 g]

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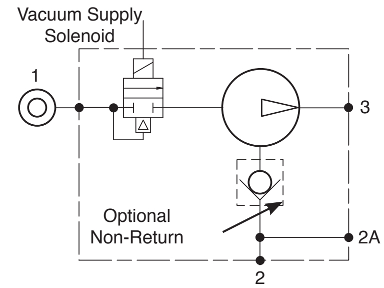
J SERIES PUMPS
S24D / S110A : SOLENOID CONTROLLED VACUUM SUPPLY

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.

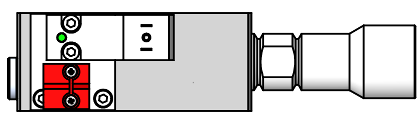


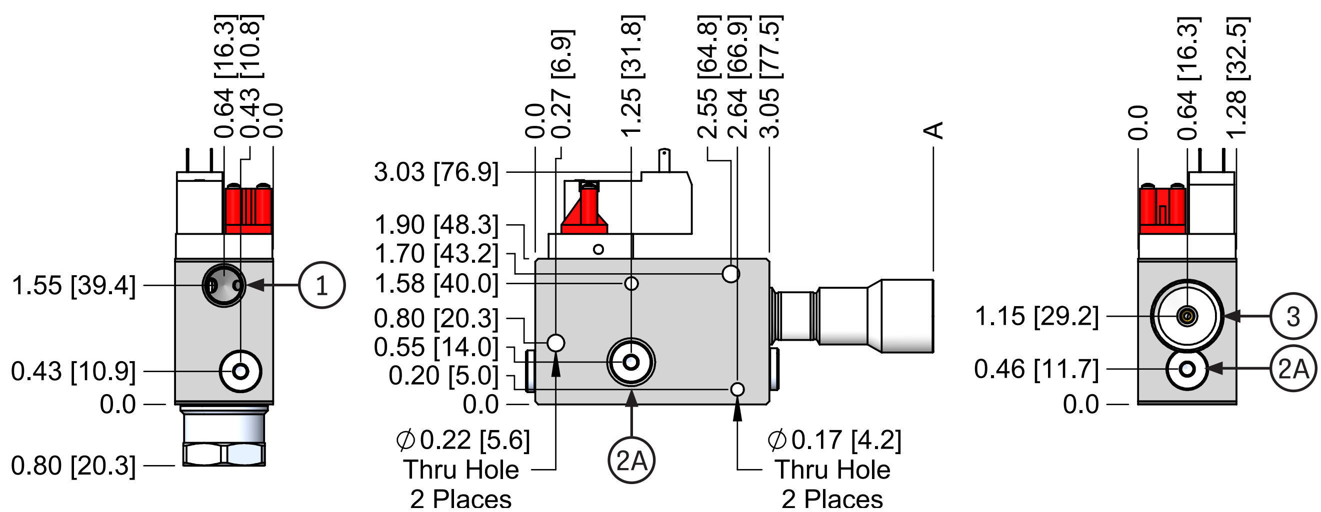
	VENTURI DIAMETER		PORTS		SOLENOID VOLTAGE		NON RETURN		SILENCER
J	25	H		-S	24D	-		-	
	20 = 2.0 mm		(Blank) = NPTF		**24D** = 24V DC		(Blank) = No		(Blank) = None
	25 = 2.5 mm		**G** = G Threads		**110A** = 110V AC		**NR** = Yes		**ST** = STC12M
	30 = 3.0 mm								

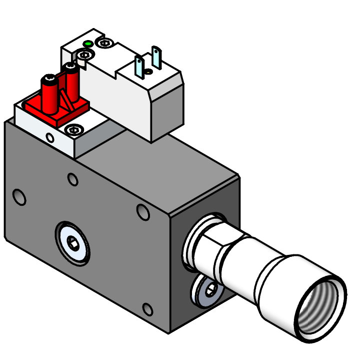
CODE	FUNCTION	NPT	G
1	Air Supply	1/4 NPTF	G 1/4
2	Vacuum - Main	G 1/2 NPSF	G 1/2 NPSF
2A	Vacuum - Alternate	G 1/8 NPSF	G 1/8 NPSF
3	Exhaust	G 1/2 NPSF	G 1/2 NPSF

VENTURI DIAMETER	A in (mm)
20	4.47 (113.5)
25	4.87 (123.6)
30	5.71 (144.9)

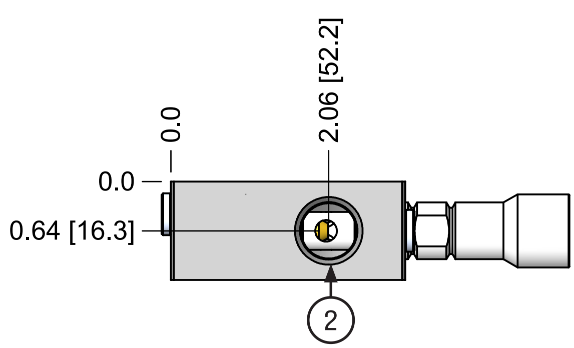
Order DIN T-9 Molded Cords Separately:
923-2M01 = Std. 2M
923-2M31 = L.E.D. 0-50V, 2M
923-2M81 = L.E.D.70-250V, 2M



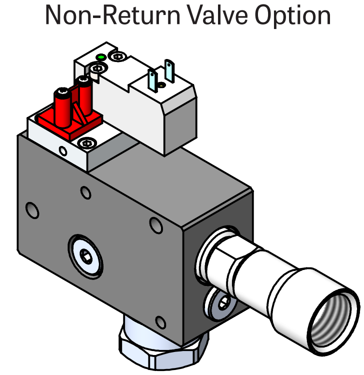




Weight: 0.84 lbs [381.0 g]



Non-Return Valve Option



Weight: 0.89 lbs [404.0 g]

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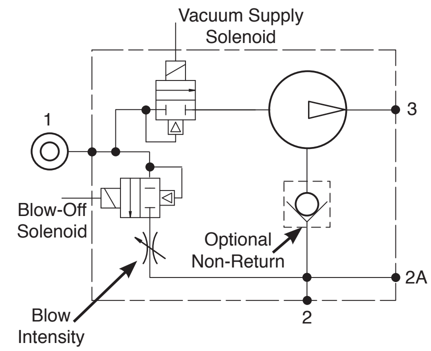
J SERIES PUMPS
SB24D / SB110A : SOLENOID CONTROLLED VACUUM SUPPLY & BLOW-OFF

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.

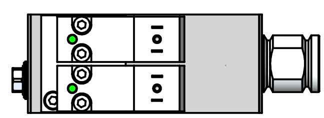


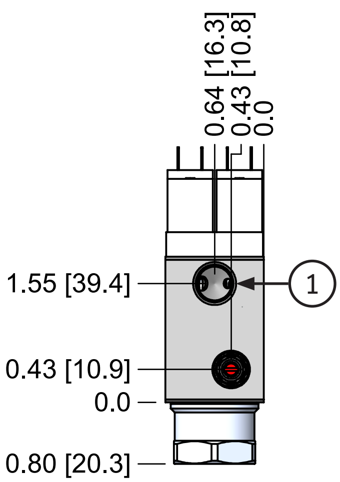
	VENTURI DIAMETER		PORTS		SOLENOID VOLTAGE		NON RETURN		SILENCER
J	12	H		-SB	24D	-		-	
	12 = 1.2 mm		(Blank) = NPTF		**24D** = 24V DC		(Blank) = No		(Blank) = None
	15 = 1.5 mm		**G** = G Threads		**110A** = 110V AC		**NR** = Yes		**ST** = STA14M

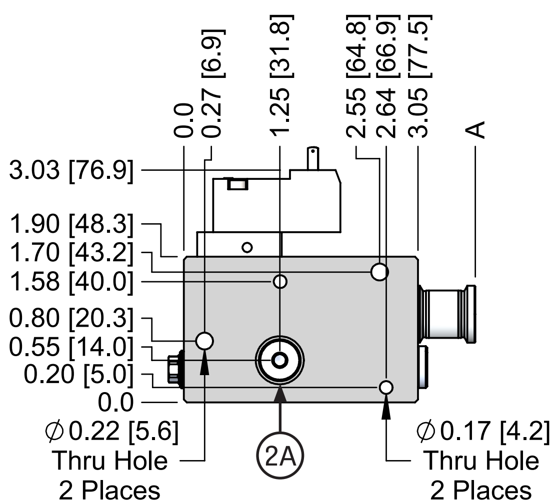
CODE	FUNCTION	NPT	G
1	Air Supply	1/4 NPTF	G 1/4
2	Vacuum - Main	G 1/2 NPSF	G 1/2 NPSF
2A	Vacuum - Alternate	G 1/8 NPSF	G 1/8 NPSF
3	Exhaust	G 1/4 NPSF	G 1/4 NPSF

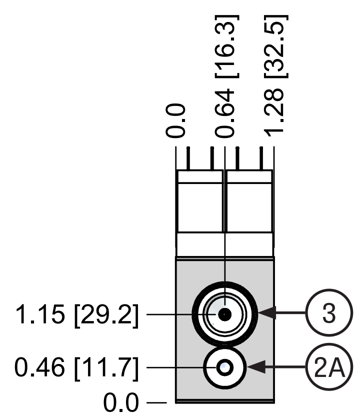
VENTURI DIAMETER	A in (mm)
12	3.09 (78.5)
15	3.49 (88.7)

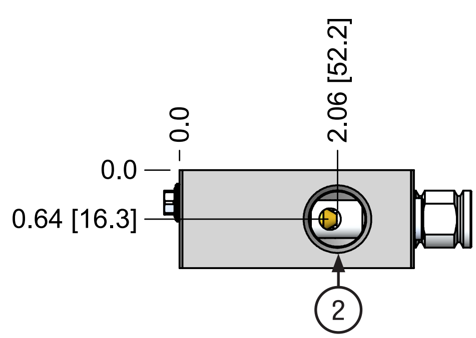
Order DIN T-9 Molded Cords Separately:
923-2M01 = Std. 2M
923-2M31 = L.E.D. 0-50V, 2M
923-2M81 = L.E.D.70-250V, 2M

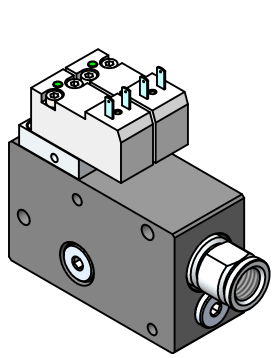






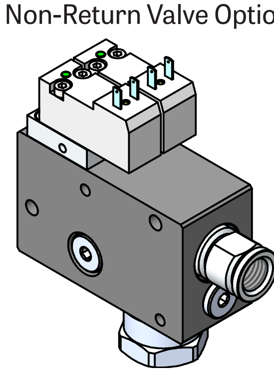






Weight: 0.85 lbs [386.0 g]

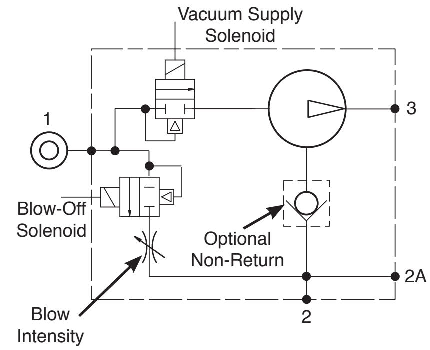
Non-Return Valve Option



Weight: 0.90 lbs [408.0 g]

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.

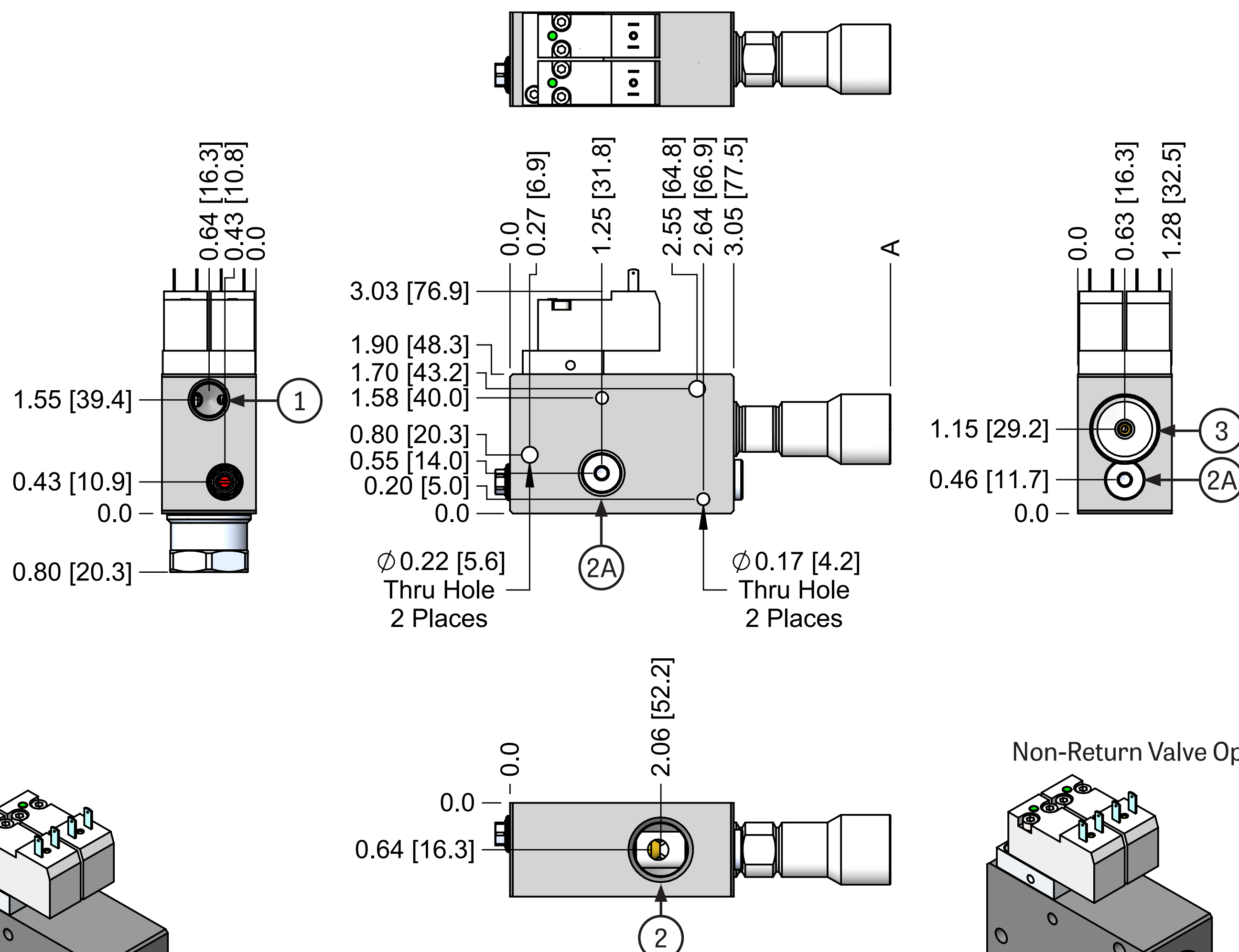


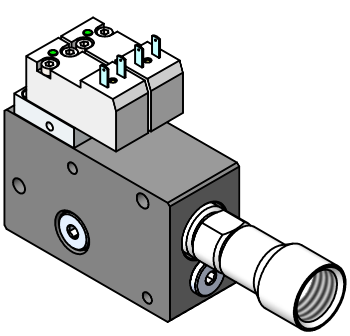
	VENTURI DIAMETER		PORTS		SOLENOID VOLTAGE		NON RETURN		SILENCER
J	25	H		-SB	24D	-		-	
	20 = 2.0 mm		(Blank) = NPTF		**24D** = 24 V DC		(Blank) = No		(Blank) = None
	25 = 2.5 mm		**G** = G Threads		**110A** = 110V AC		**NR** = Yes		**ST** = STC12M
	30 = 3.0 mm								

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)

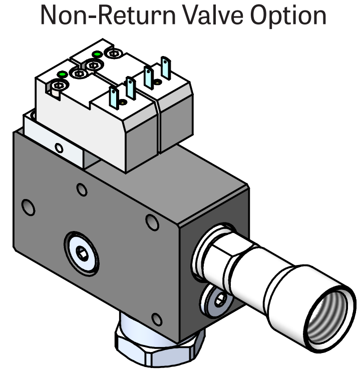
Order DIN T-9 Molded Cords Separately:
923-2M01 = Std. 2M
923-2M31 = L.E.D. 0-50V, 2M
923-2M81 = L.E.D.70-250V, 2M





Weight: 0.92 lbs [417.0 g]

Non-Return Valve Option



Weight: 0.97 lbs [440.0 g]

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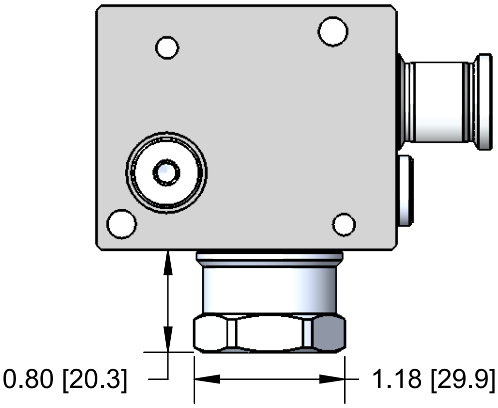
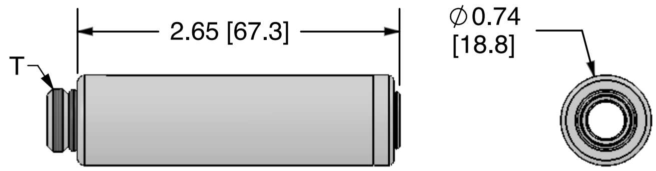
J SERIES PUMPS
OPTIONS

NON-RETURN VALVE



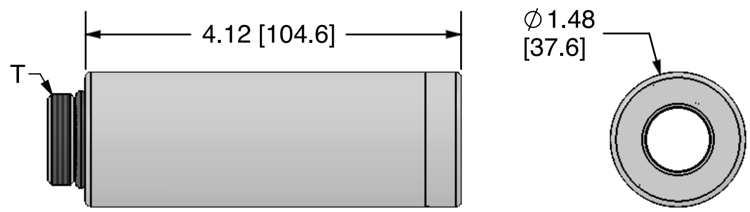
SILENCERS

STA14M



Weight: 0.56 oz [15.8 g]

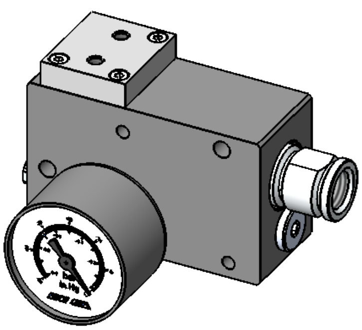
STC12M



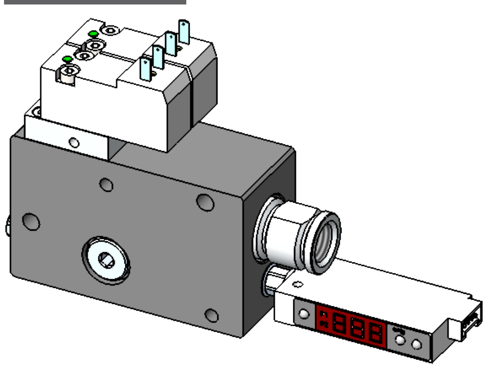
Weight: 1.18 oz [33.6 g]

ACCESSORIES

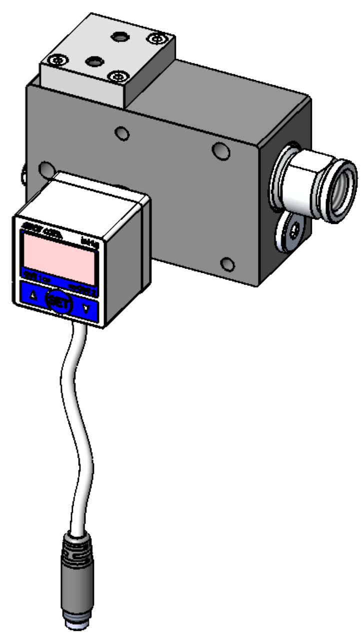
VG15-18CB



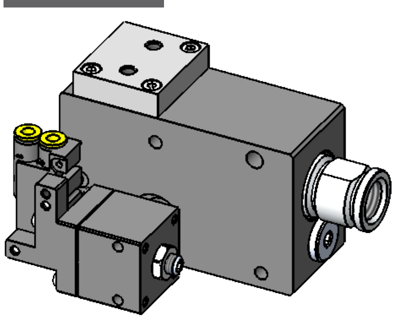
DVN-61-18M



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.

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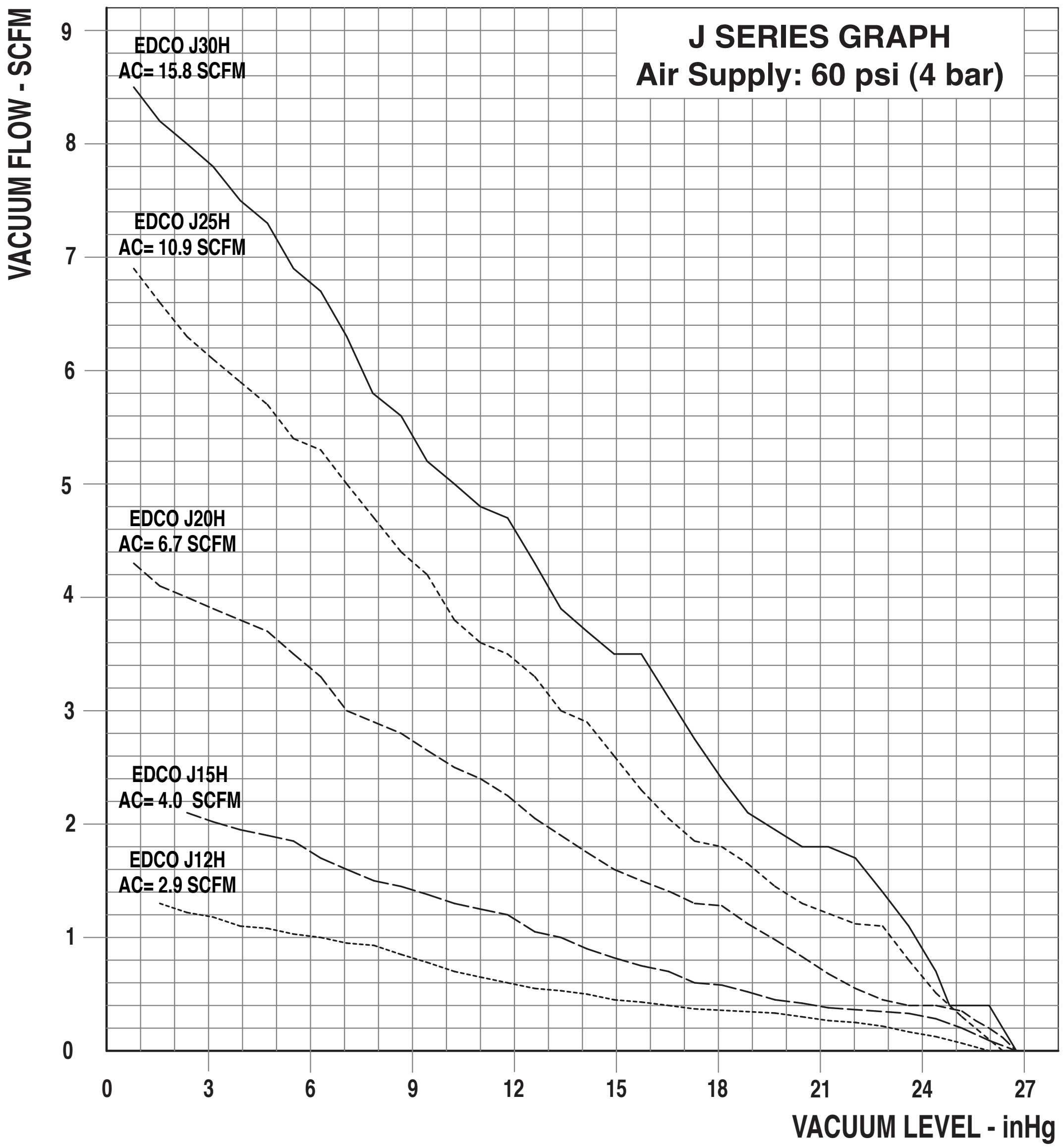
J SERIES PUMPS
PERFORMANCE



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 / FT^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
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

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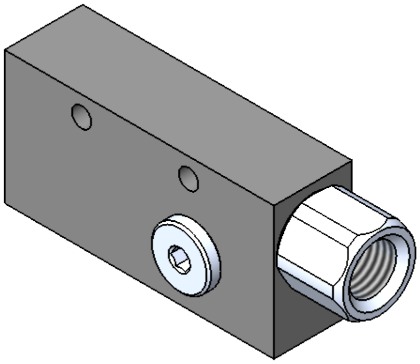
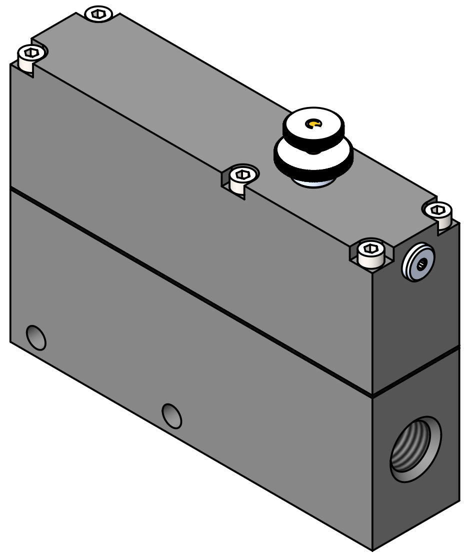
SECTION 14
SINGLE STAGE PUMPS

14

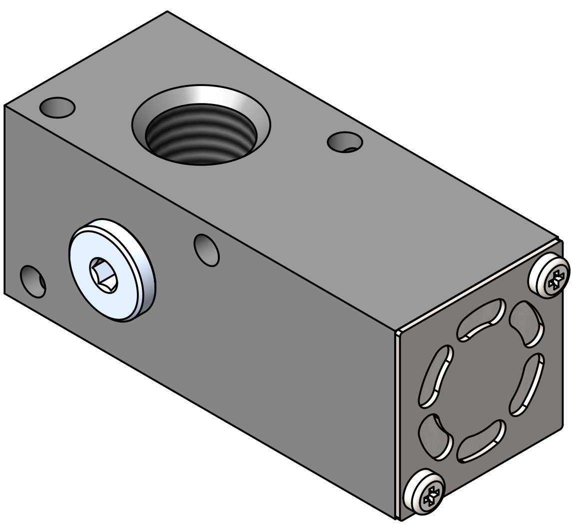
SINGLE-STAGE PUMPS



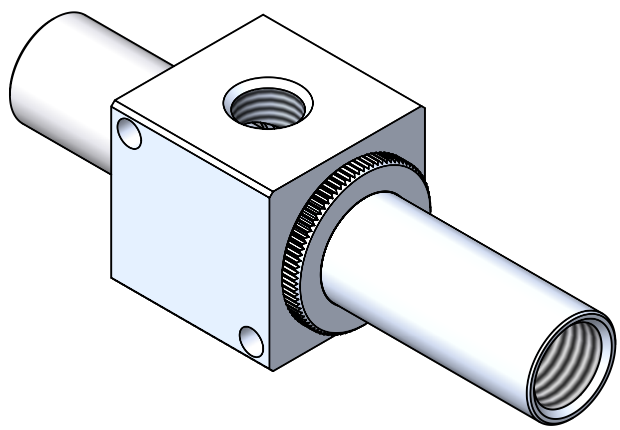
EV SERIES



V SERIES



SM SERIES



VARIABLE DISPLACEMENT PUMPS

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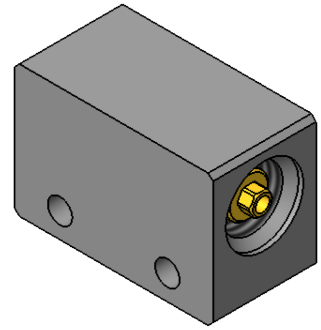
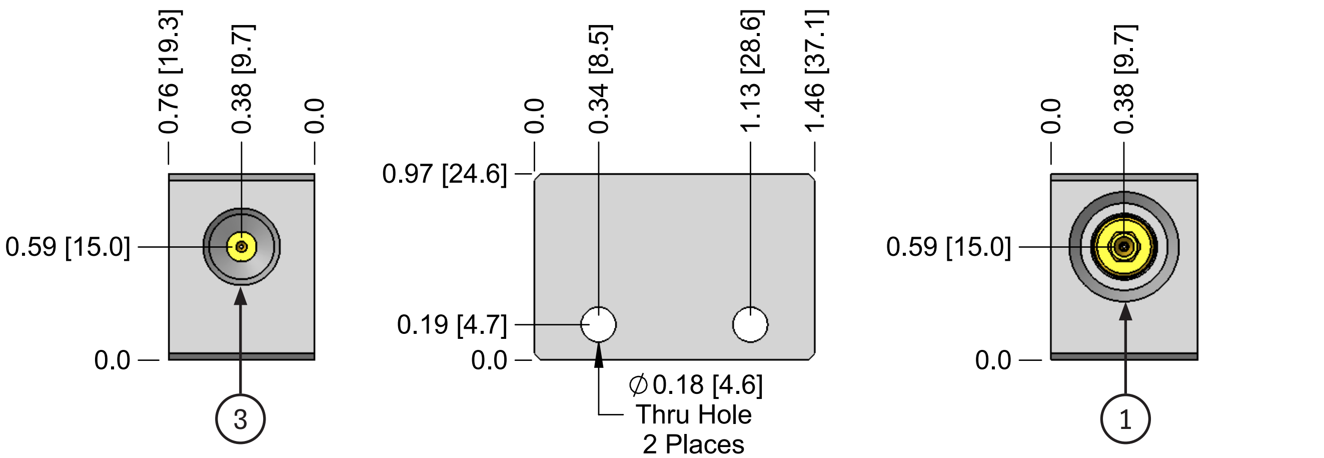
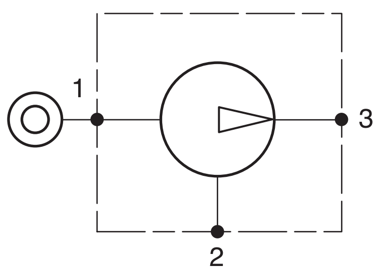
EV mono-stage vacuum generators provide a compact, lightweight, low-cost vacuum source for pick & place and material handling applications. The simple two-piece design allows ingested debris to exit the exhaust port. The optional "ST" straight-through exhaust silencer is a no-clog design that will pass ingested debris to atmosphere.

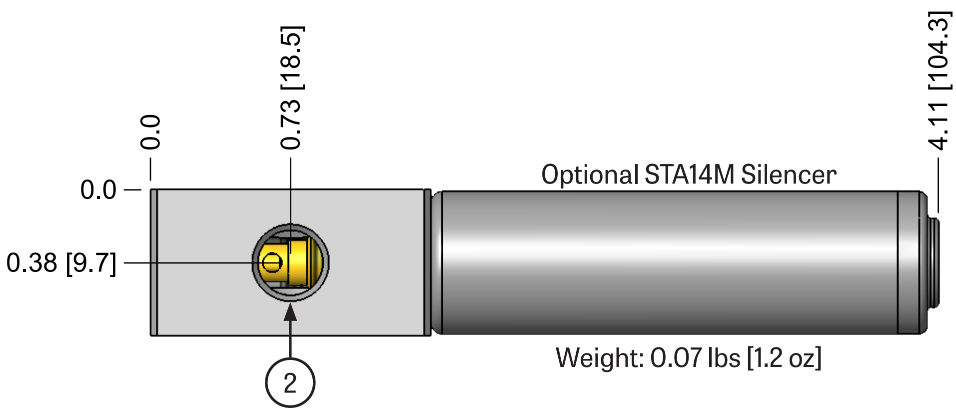


Construction is aluminum with anodized pump body and brass ejectors.

	SILENCER
EV05HS-	
	(Blank) = None
	ST = STA14M







CODE	FUNCTION	PORT
1	Air Supply	G 1/8 NPSF
2	Vacuum	G 1/8 NPSF
3	Exhaust	G 1/4

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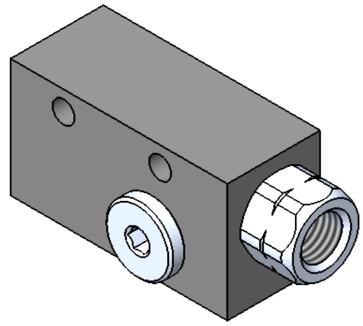
SINGLE-STAGE PUMPS
EV SERIES PUMPS

EV mono-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 G1/8 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.



	SILENCER
EV10HS-	
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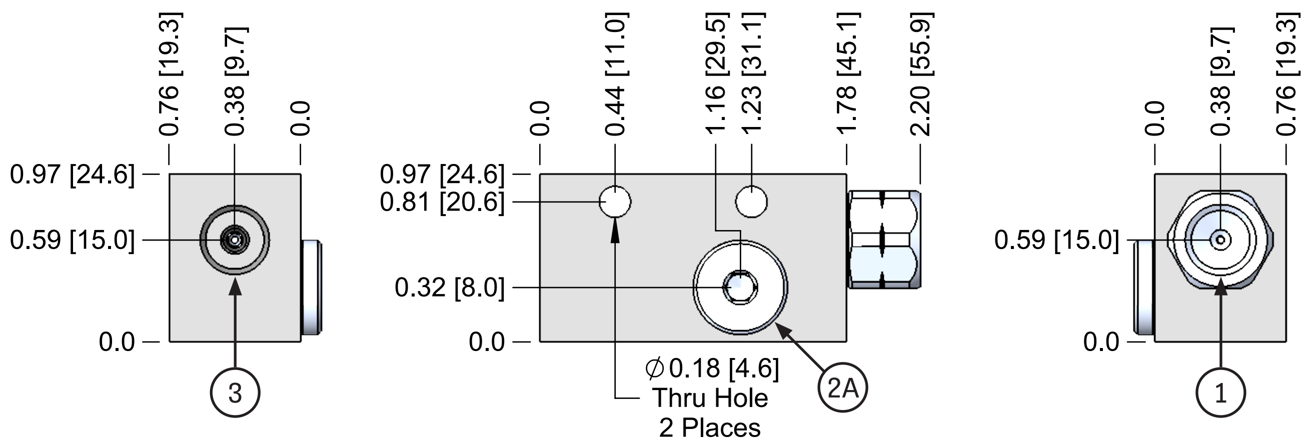
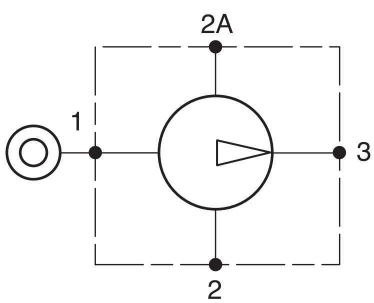
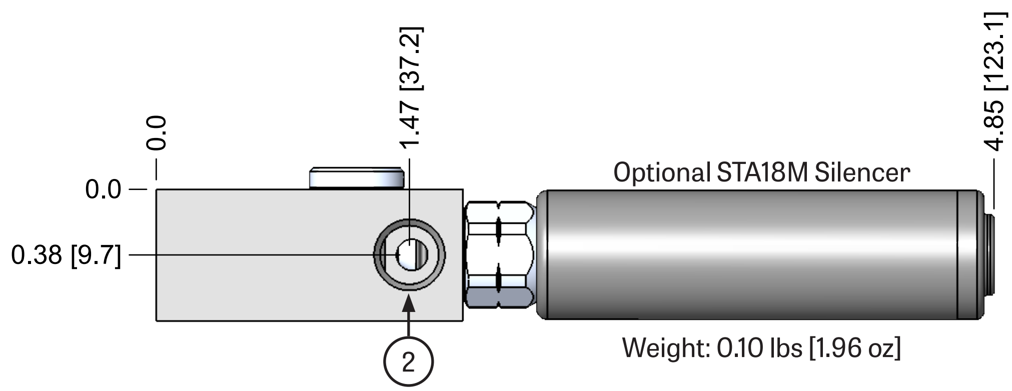
	ST = STA18M







Weight: 0.10 lbs [1.96 oz]

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

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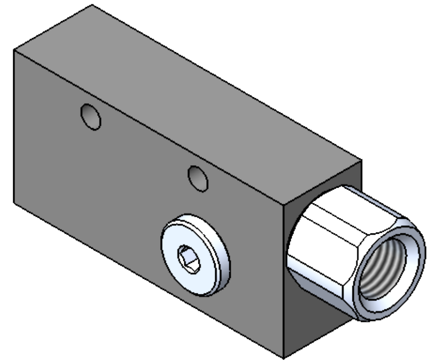
SINGLE-STAGE PUMPS
EV SERIES PUMPS

EV mono-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 G1/8 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.



	THREADS		SILENCER
EV15HS-		-	
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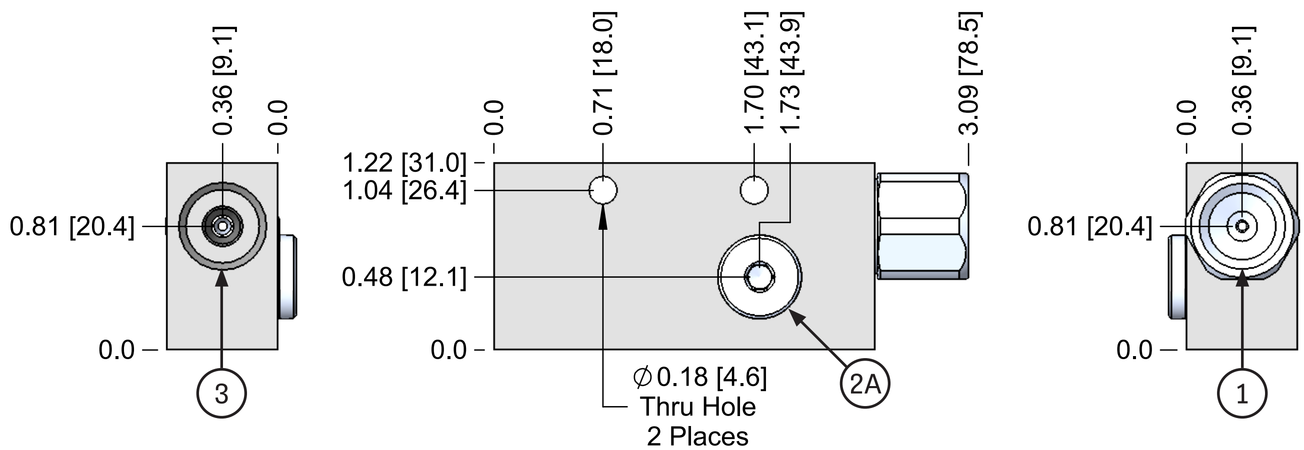
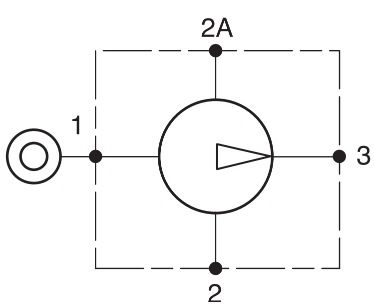
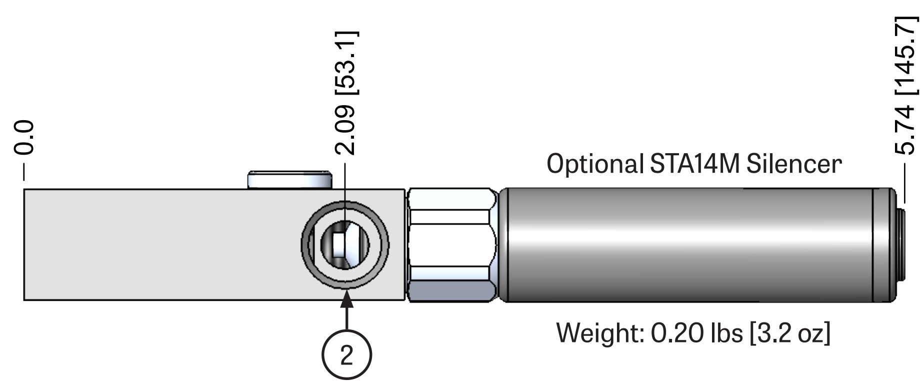
	G = G Threads		**ST** = STA14M







CODE	FUNCTION	NPT	G
1	Air Supply	1/4 NPTF	G 1/4
2	Vacuum	1/4 NPTF	G 1/4
2A	Vacuum - Alternate	G 1/8 NPSF	G 1/8 NPSF
3	Exhaust	1/4 NPTF	G 1/4

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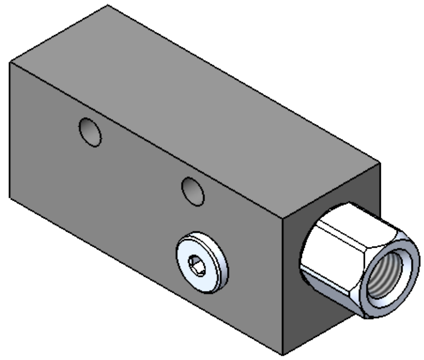
SINGLE-STAGE PUMPS
EV SERIES PUMPS

EV mono-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 G1/8 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.



	THREADS		SILENCER
EV20HS-		-	
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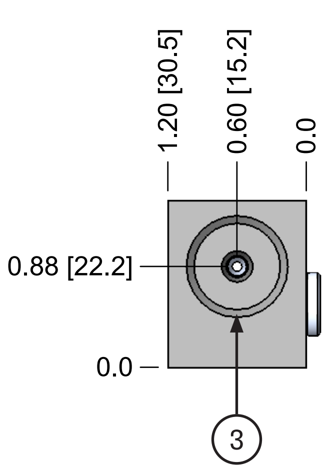
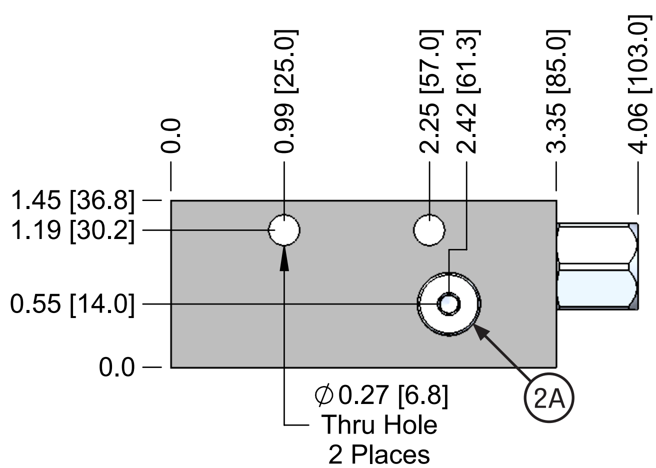
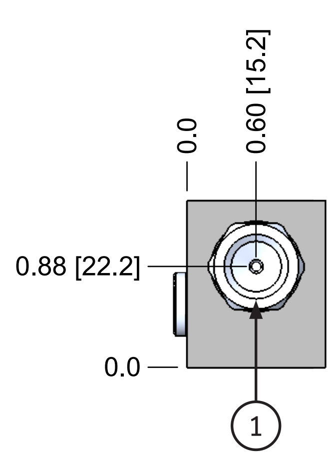
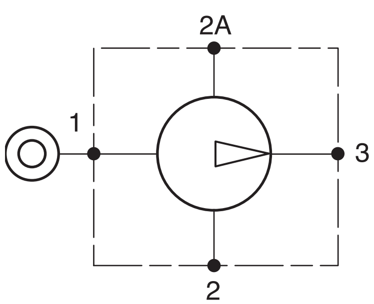
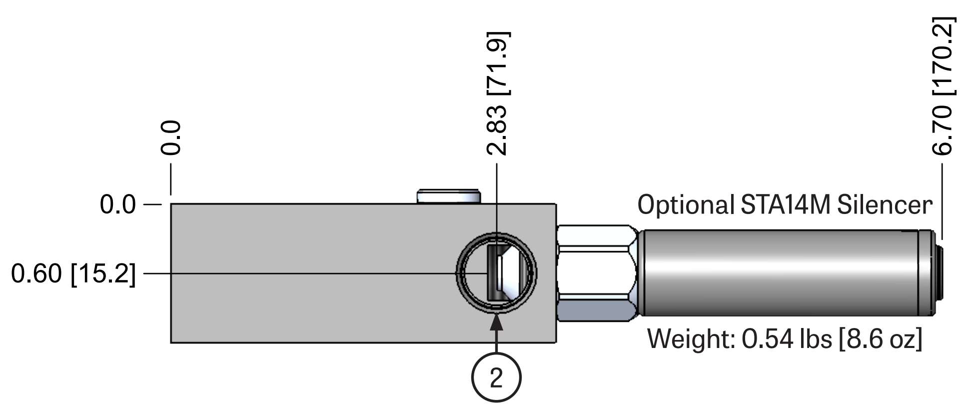
	G = G Threads		**ST** = STA14M











CODE	FUNCTION	NPT	G
1	Air Supply	1/4 NPTF	G 1/4
2	Vacuum	3/8 NPTF	G 3/8
2A	Vacuum - Alternate	G 1/8 NPSF	G 1/8
3	Exhaust	1/4 NPTF	G 1/4

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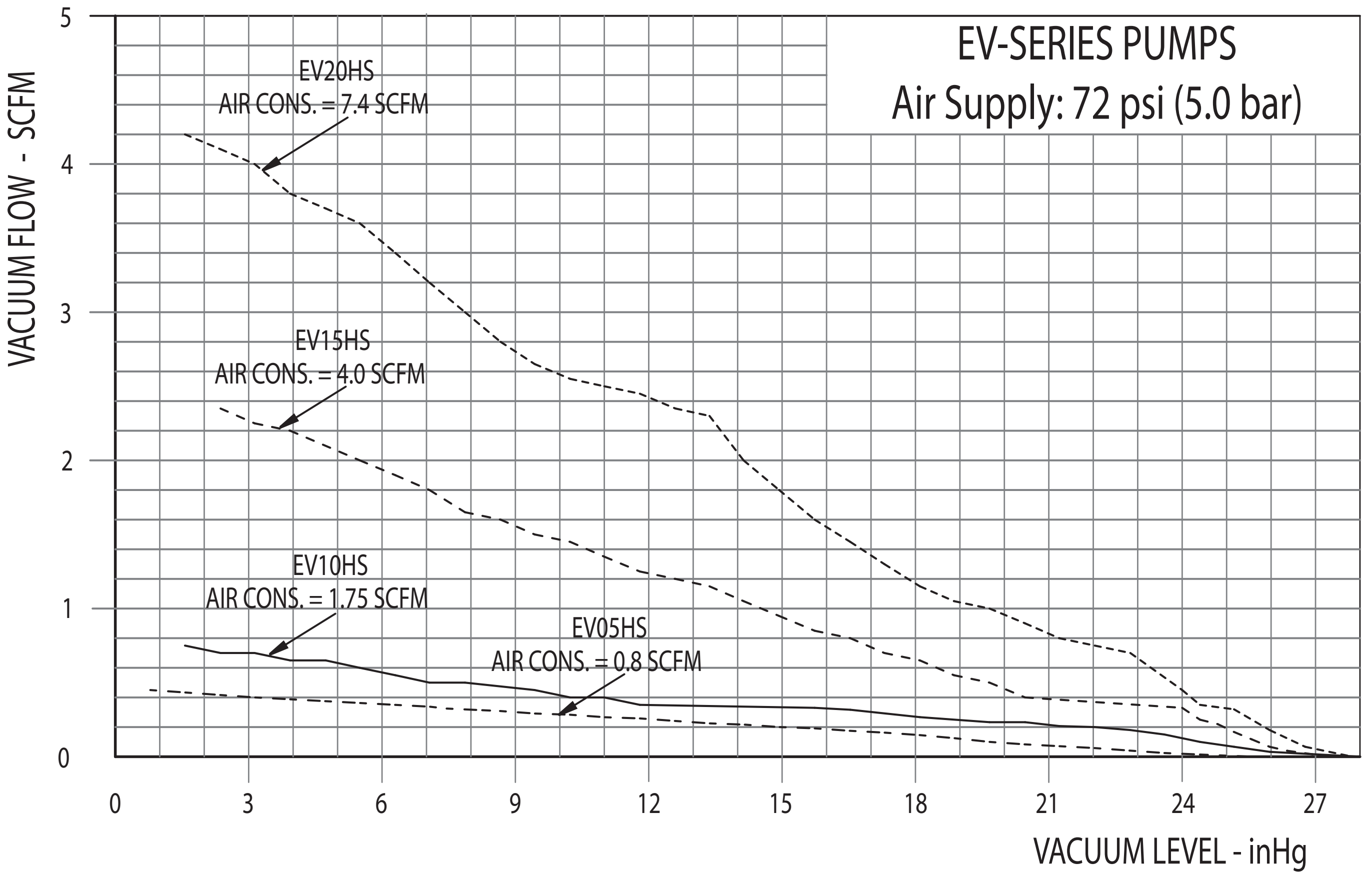


VACUUM FLOW - SCFM

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
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 CU IN

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
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 cu in X 0.61 = sec / l

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.

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.

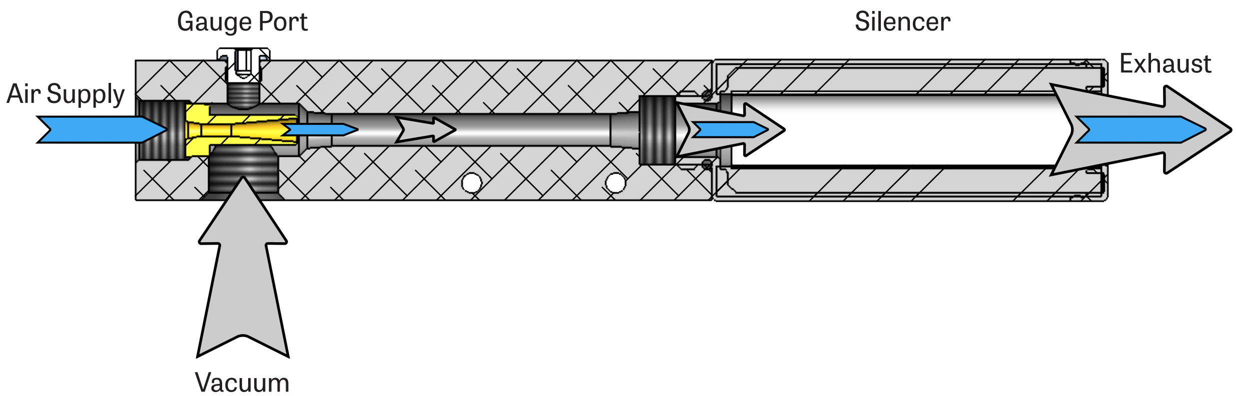
PRINCIPLE OF OPERATION

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.



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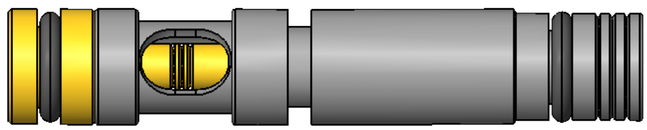
SINGLE-STAGE PUMPS
V SERIES PUMPS

VENTURI CARTRIDGE

V10 and V20 Series Nozzle Sets can be ordered on their own for use in your custom applications.

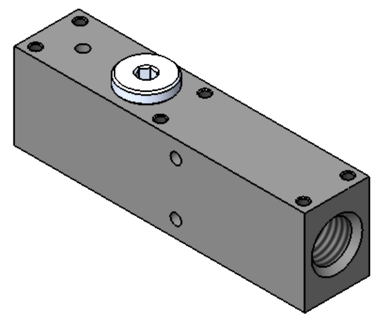
Contact EDCO USA for cavity detail drawing.

	NOZZLE SET	SERIES
V-	60	H
	60	H
	90	H-60
	100	M
	150	M-60

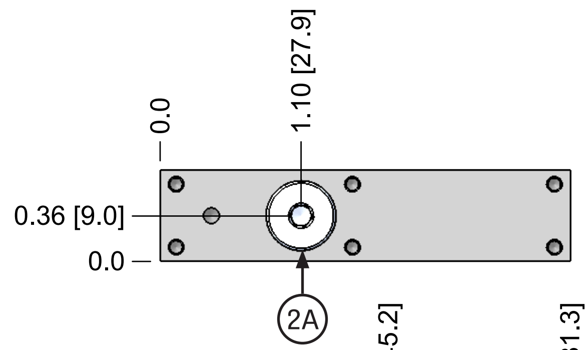


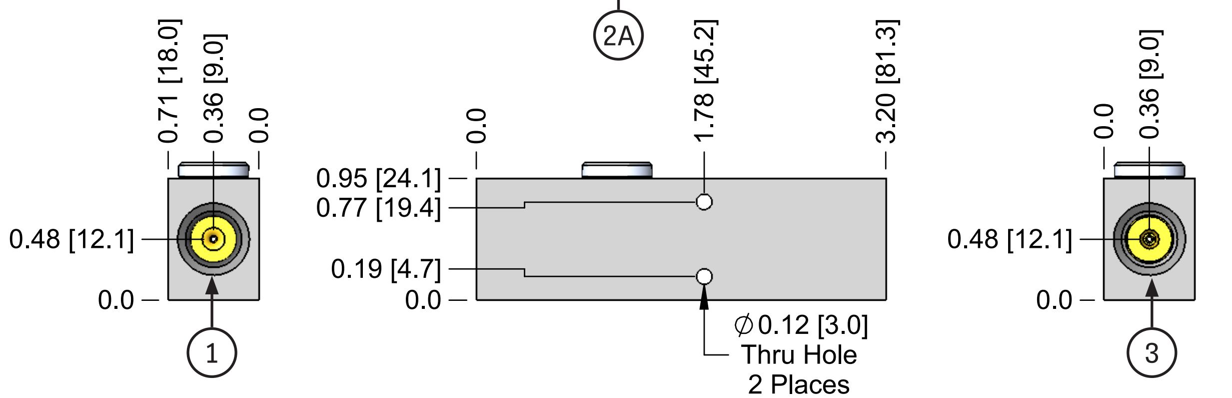
V10 BODY

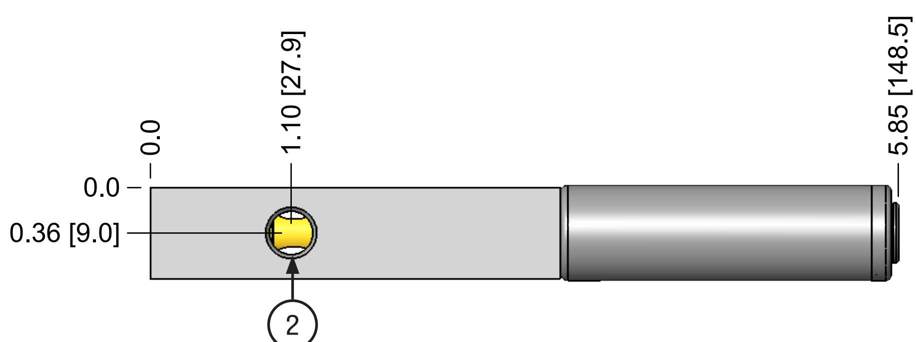
	BLOW-OFF OPTIONS		NOZZLE SET	SERIES		PORTS		SILENCER
V10		-	60	H	-		-	
	(Blank) = None		60	H		(Blank) = NPT		(Blank) = None
	X = Blow-Off		90	H-60		**G** = G Threads		**ST** - STA14M
			100	M				
			150	M-60				



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	G 1/8 NPSF
2A	Vacuum - Alternate	G 1/8 NPSF	G 1/8 NPSF
3	Exhaust	1/4 NPTF	G 1/4

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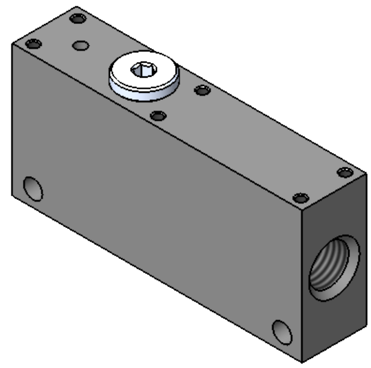
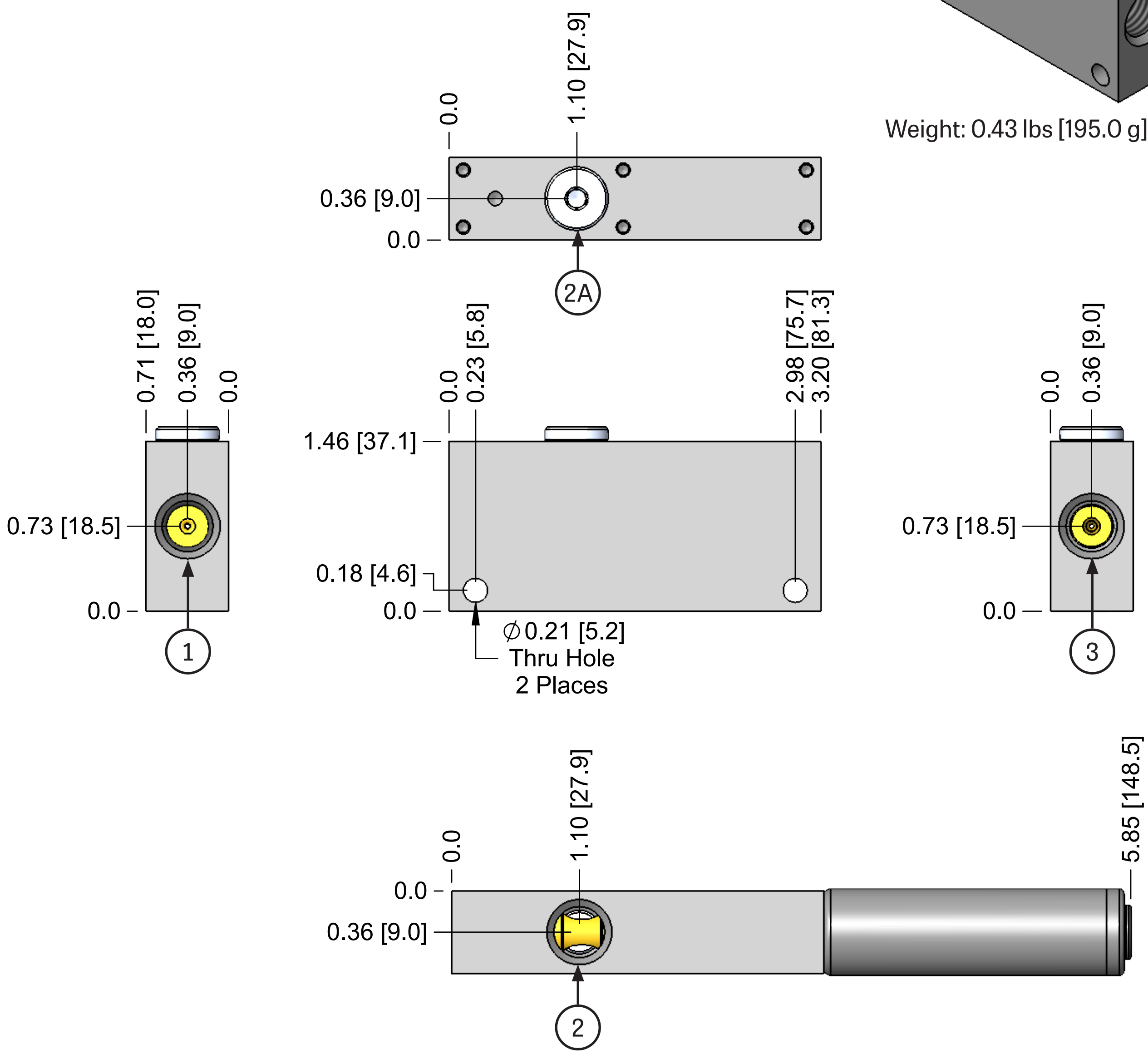
V20 BODY

	BLOW-OFF OPTIONS		NOZZLE SET	SERIES		PORTS		SILENCER
V20		-	90	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 - Alternate	G 1/8 NPSF	G 1/8 NPSF
3	Exhaust	1/4 NPTF	G 1/4

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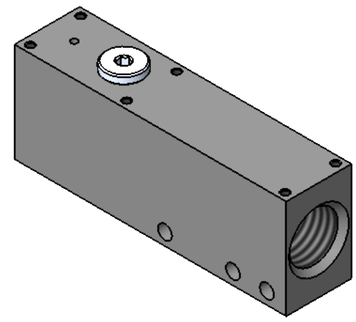
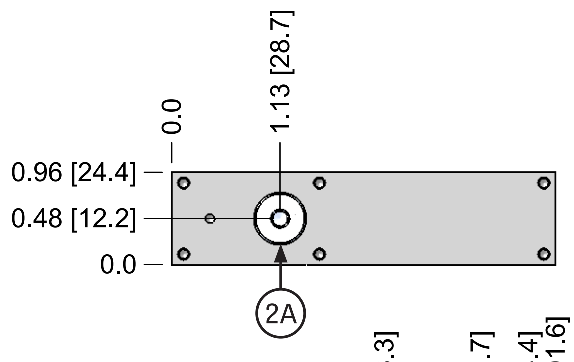
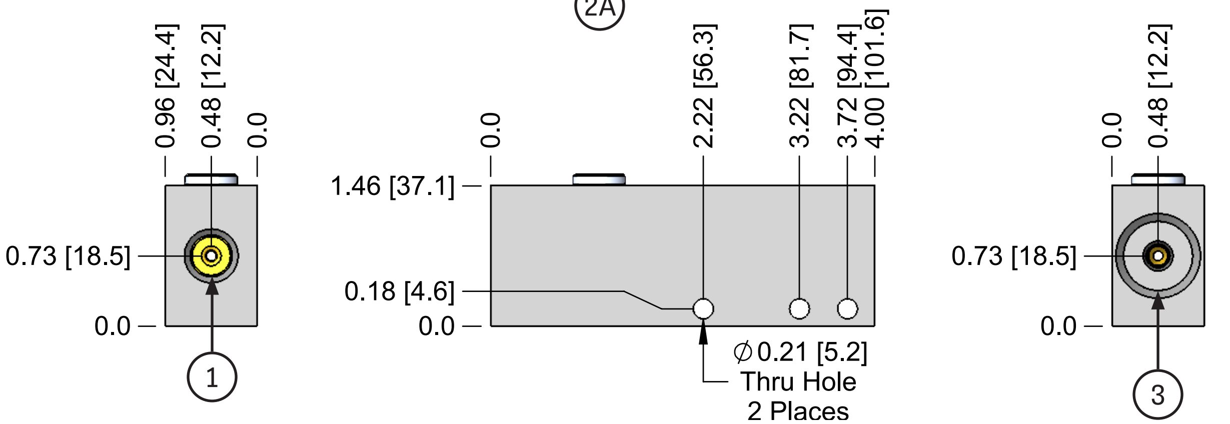
V80 BODY

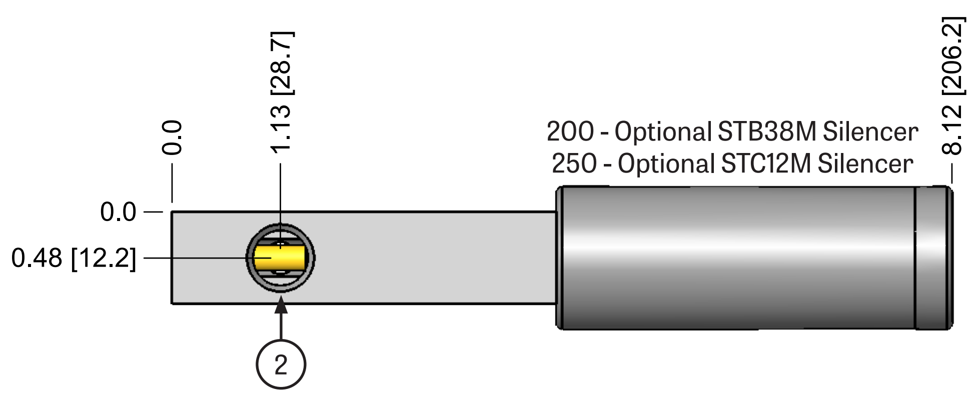
	BLOW-OFF OPTIONS		NOZZLE SET	SERIES		PORTS		SILENCER
V80		-	200	H	-		-	
	(Blank) = None		200	H		(Blank) = NPT		(Blank) = None
	X = Blow-Off		250	H-60		**G** = G Threads		**ST**
				M				
				M-60				



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 - Alternate	G 1/8 NPSF	G 1/8 NPSF	G 1/8 NPSF	G 1/8 NPSF
3	Exhaust	3/8 NPTF	G 3/8	1/2 NPTF	G 1/2

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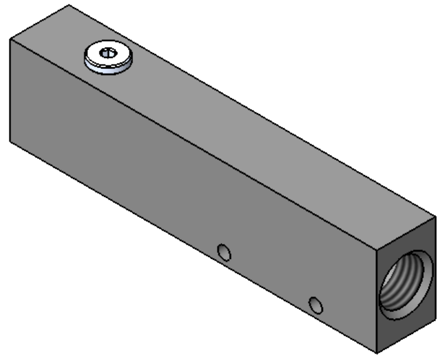
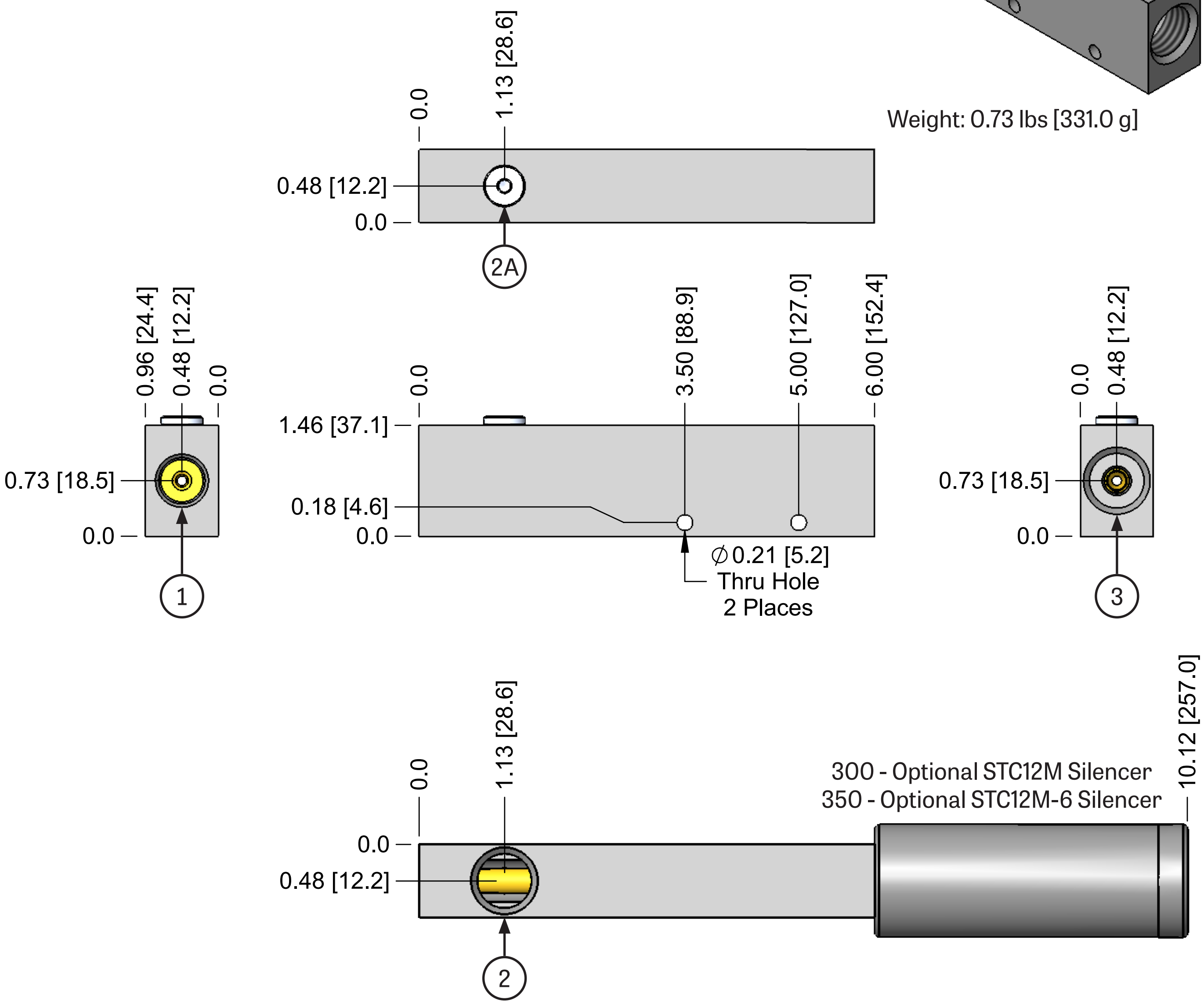
V90 BODY

	NOZZLE SET	SERIES		PORTS		SILENCER
V90-	300	H	-		-	
	300	H		(Blank) = NPT		(Blank) = None
	350	H-60		**G** = G Threads		ST
		M				
		M-60				



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 - Alternate	G 1/8 NPSF	G 1/8 NPSF
3	Exhaust	1/2 NPTF	G 1/2

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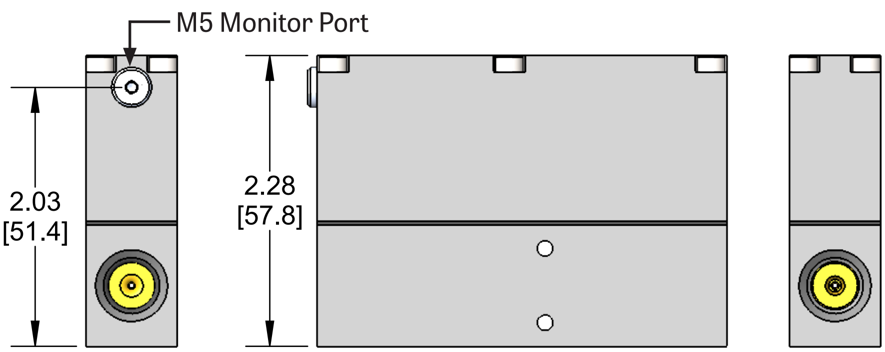
SINGLE-STAGE PUMPS
VX - V PUMPS W/ AUTOMATIC BLOW-OFF

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

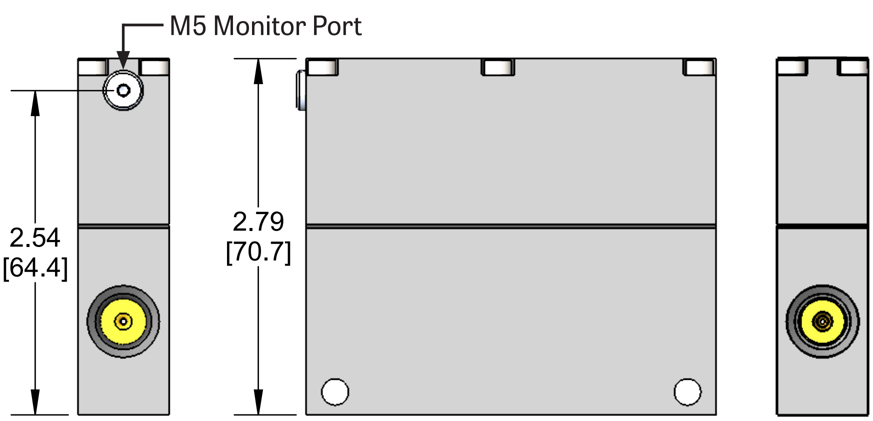
Storage Volume: 1.0 in³ (16.4 ml)



Weight: 0.33 lbs [149.0 g]

V20X

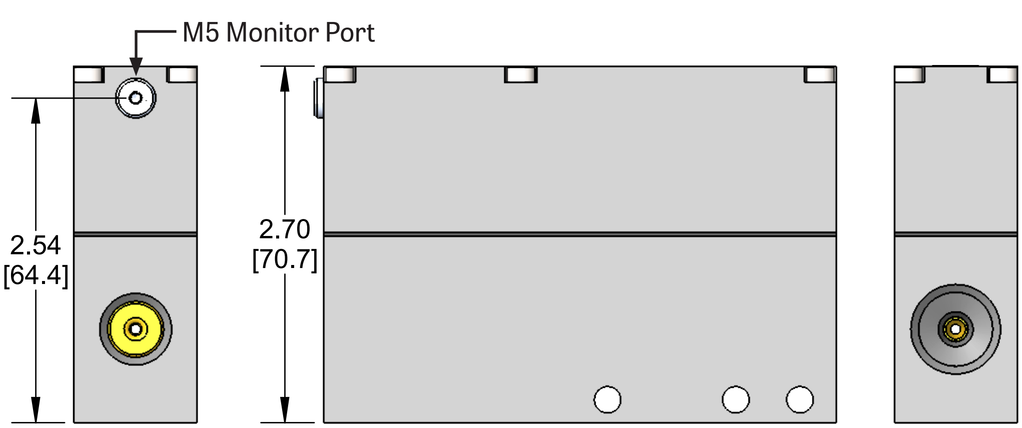
Storage Volume: 1.0 in³ (16.4 ml)



Weight: 0.43 lbs [195.0 g]

V80X

Storage Volume: 2.8 in³ (45 ml)



Weight: 0.71 lbs [322.0 g]

SINGLE-STAGE PUMPS PERFORMANCE

SERIES	DESCRIPTION	MAX VACUUM
M	High Flow	20 inHG
H	High Vacuum	28 inHG

VACUUM FLOW - SCFM

MODEL	AIR CONS SCFM @ 80 PSI	MAX VACUUM 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 VACUUM inHG	SECONDS TO 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 in^3 X 0.61 = sec / l

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.

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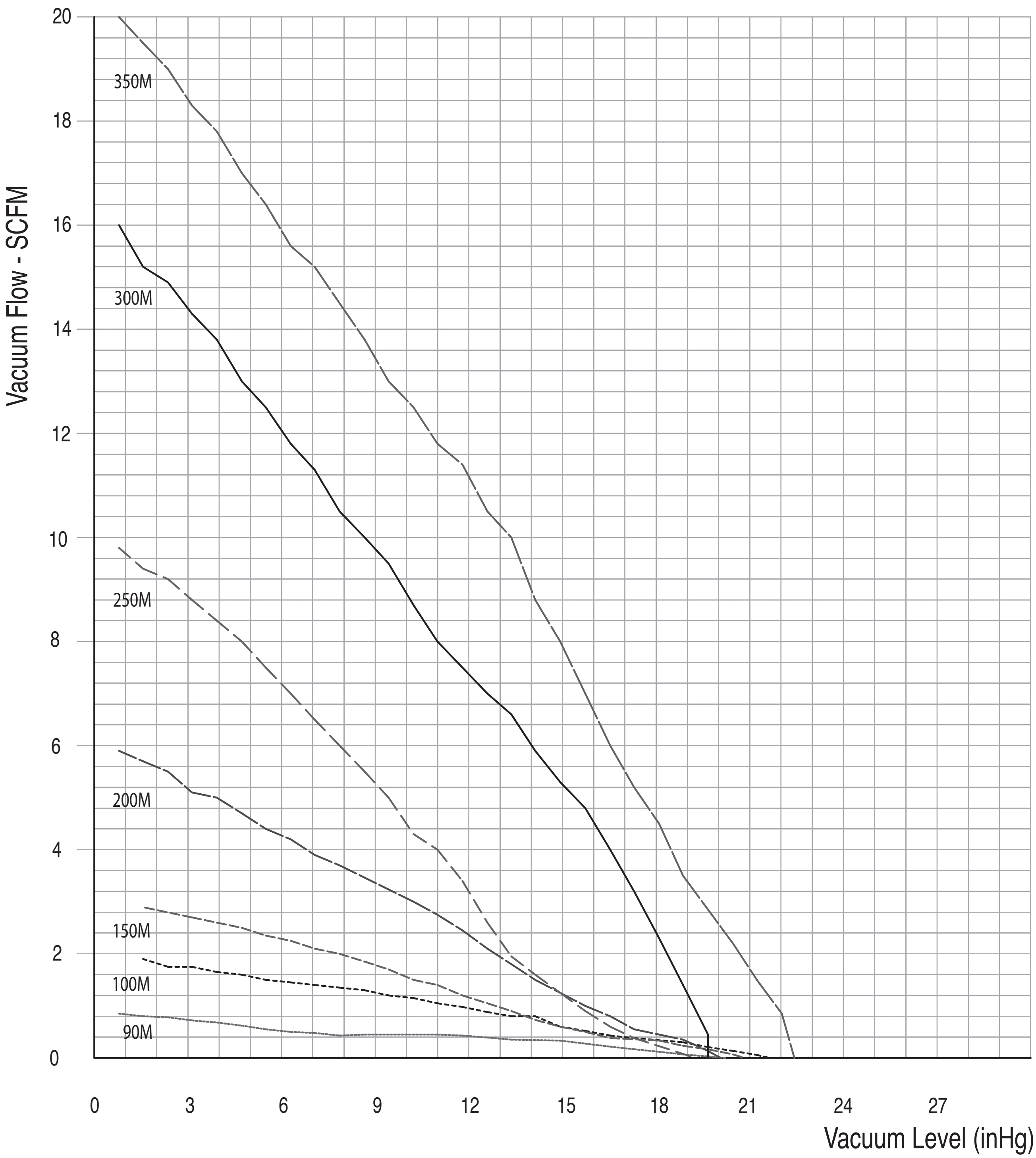

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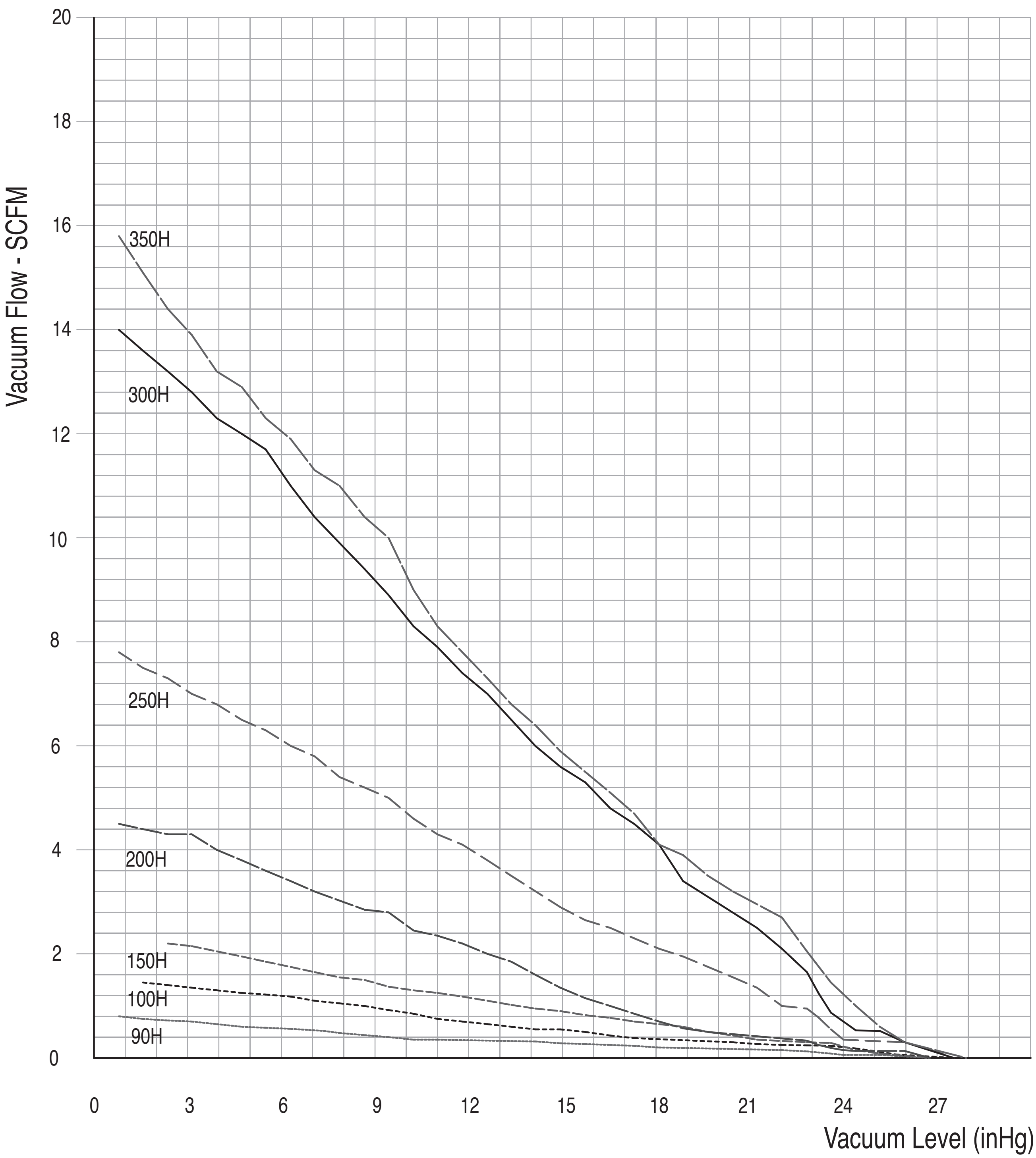

All performance data presented is a representatation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.

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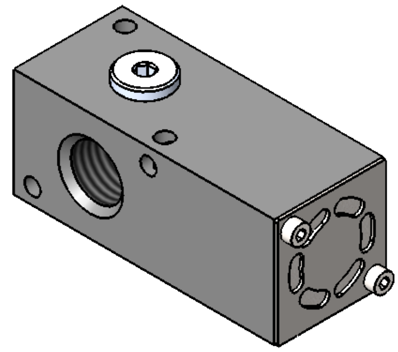
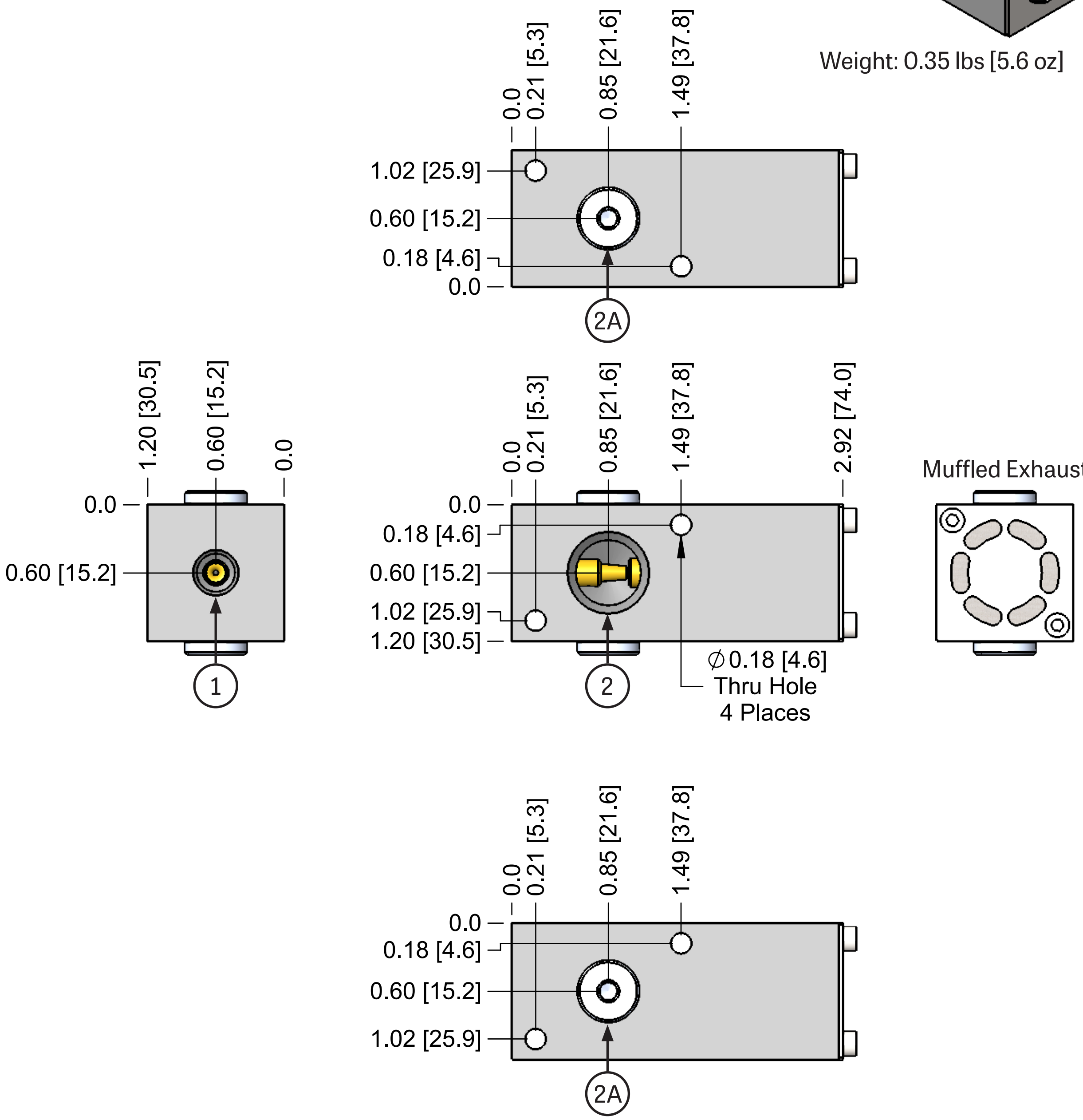
SINGLE-STAGE PUMPS
SM24-38 COMPACT PUMP

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	SIZE
1	Air Supply	G 1/8 NPS
2	Vacuum - Main	3/8 NPS
2A	Vacuum - Alternate	G 1/8 NPS

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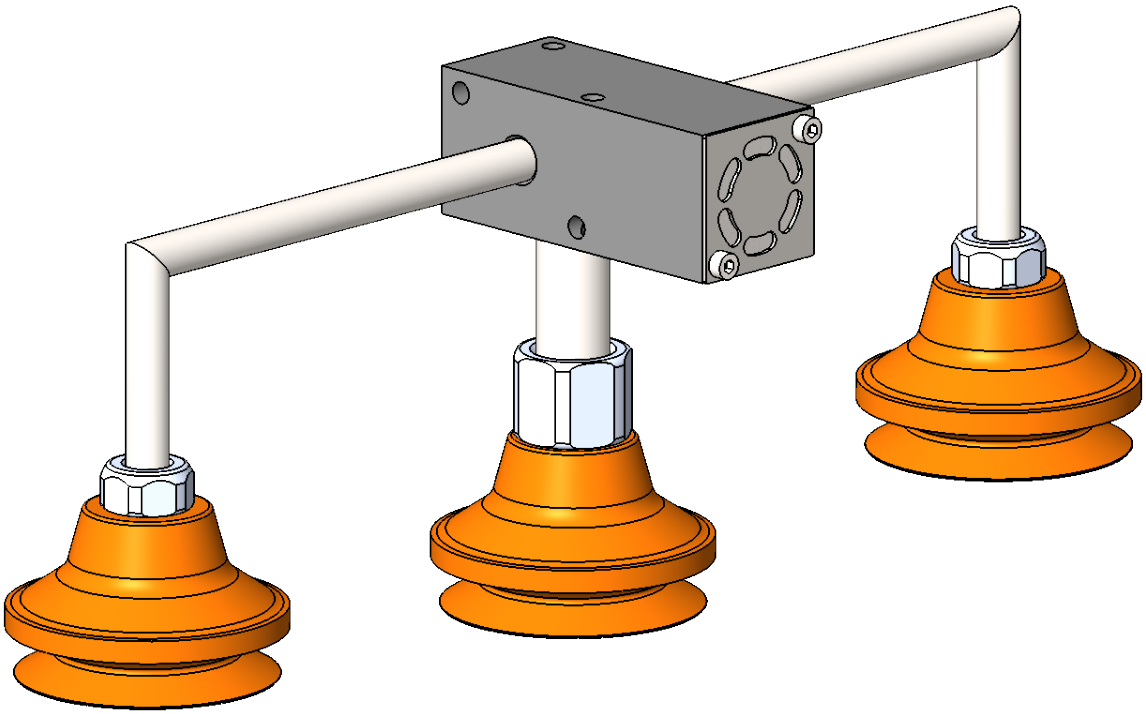
SINGLE-STAGE PUMPS
SM24-38 COMPACT PUMP

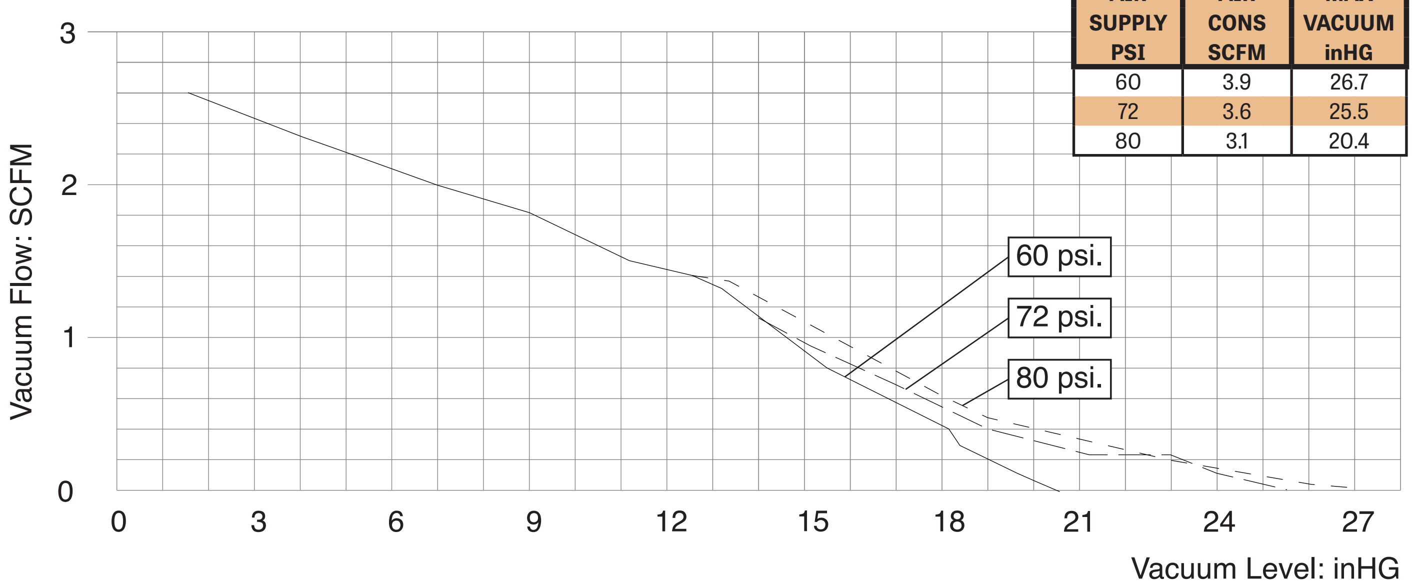
Mini-System pumps are equipped with 3 vacuum ports so separate manifolds can be eliminated from the system.

“Pump-to-Point” plumbing reduces vacuum losses by eliminating extra system fittings.



VACUUM FLOW VS VACUUM LEVEL

AIR SUPPLY PSI	AIR CONS SCFM	MAX VACUUM inHG
60	3.9	26.7
72	3.6	25.5
80	3.1	20.4



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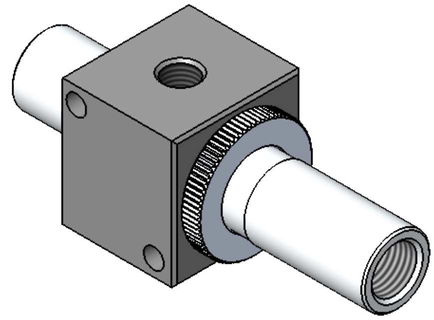
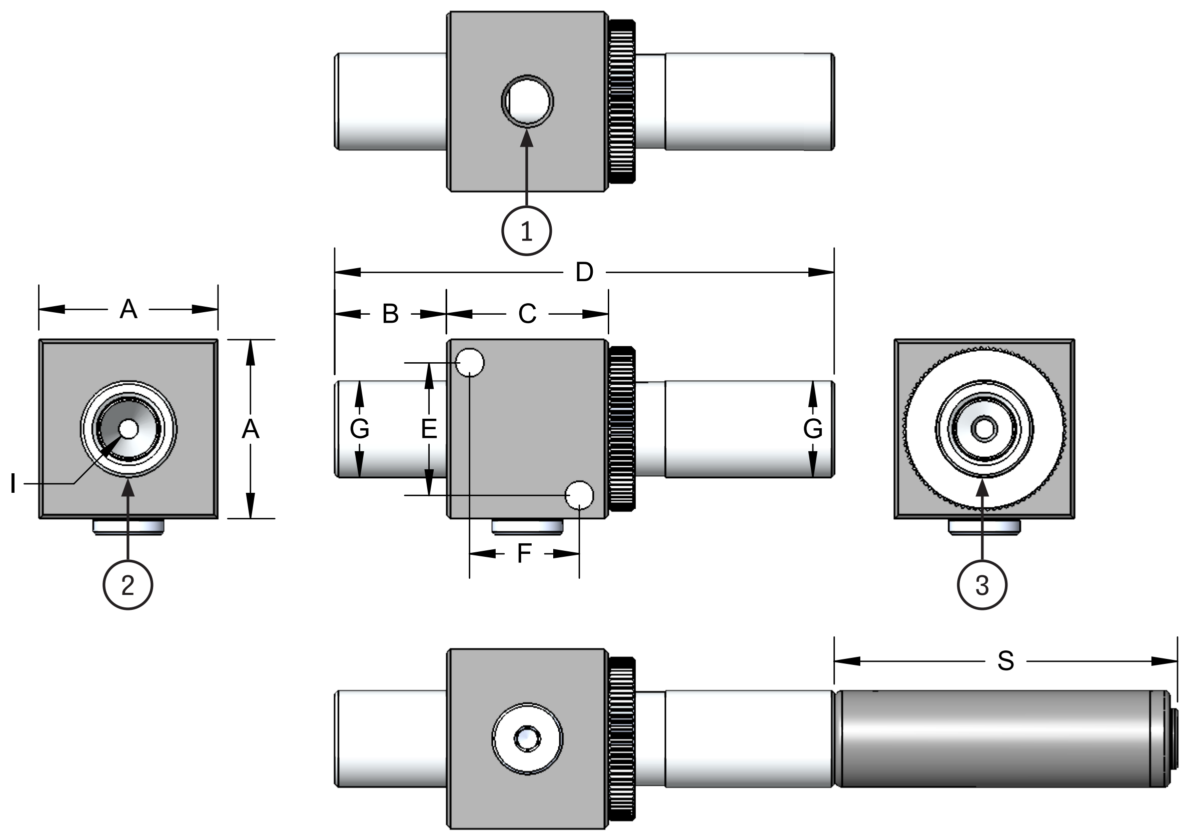
VDS vacuum pumps can provide over 20" Hg (68 kPa) and their straight through non-clog design is ideal for very dusty and dirty applications such as bag filling or handling ceramics or masonry products. The square body and two mounting holes makes the VDS pump easy to attach to any flat surface. An ST 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		PORTS		SILENCER
VDS-	150	-		-	
	150		(Blank) = NPT		(Blank) = None
	200		**G** = G Threads		**ST**
	250				
	375				



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 | G 1/4	1/4 | 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 | G 1/4	1/4 | 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 | G 1/4	1/4 | 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]

MODEL	MAX VAC FLOW SCFM	AIR CONSUMPTION vs VACUUM LEVEL @ 80 PSI						SILENCER
		0 inHG	5 inHG	10 inHG	15 inHG	20 inHG	25 inHG	
VDS-150	3.2	0	1.3	1.7	2.4	3.2	4.5	**STA14M**
VDS-200	6	0	2.4	3.7	4.7	6	6.8	**STA14M**
VDS-250	10	0	4	6	8.3	9.7	12	**STA14M**
VDS-375	30	0	6.2	11.5	17	21	29	**STC12M**

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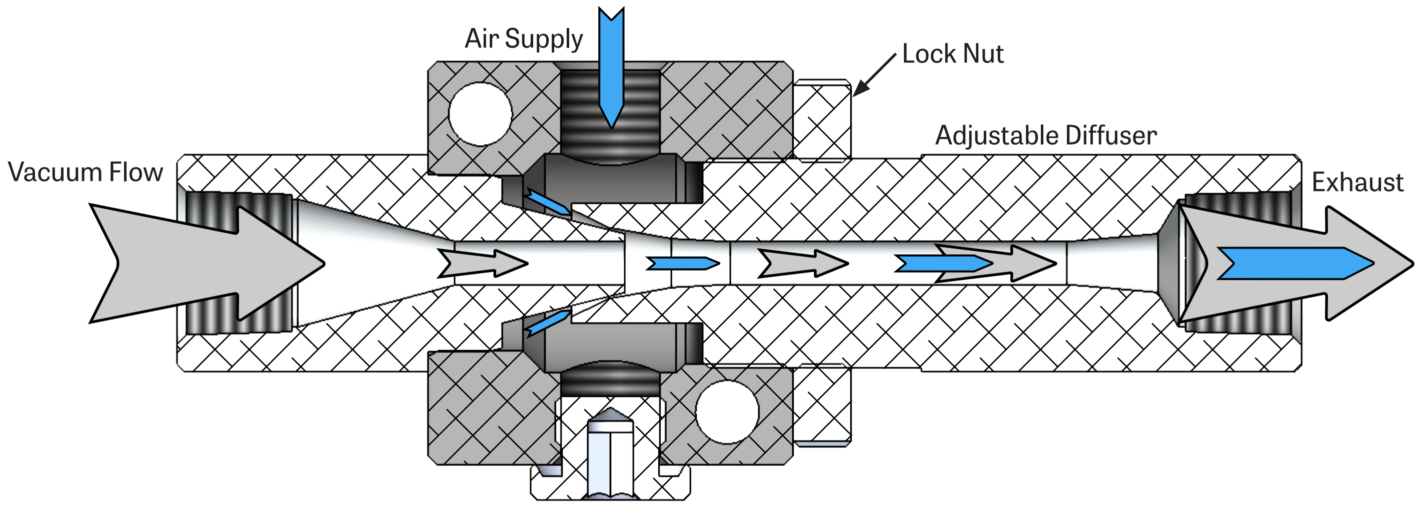
OPERATION

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.



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SECTION 15
AIR AMPLIFIERS & TRANSFER PUMPS

15

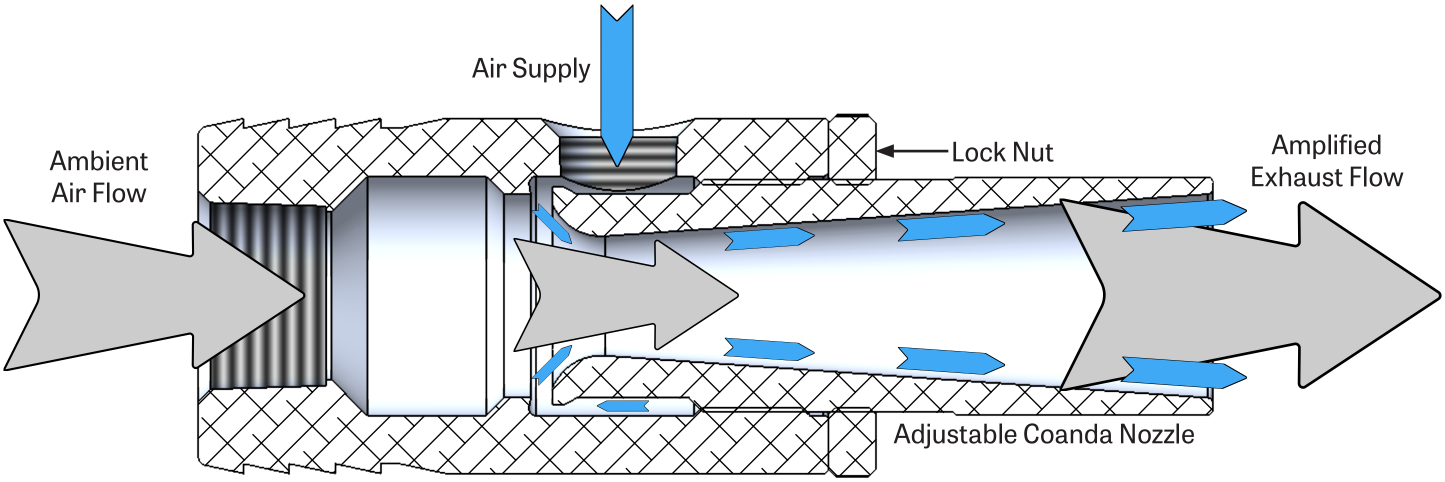
AIR AMPLIFIER

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.

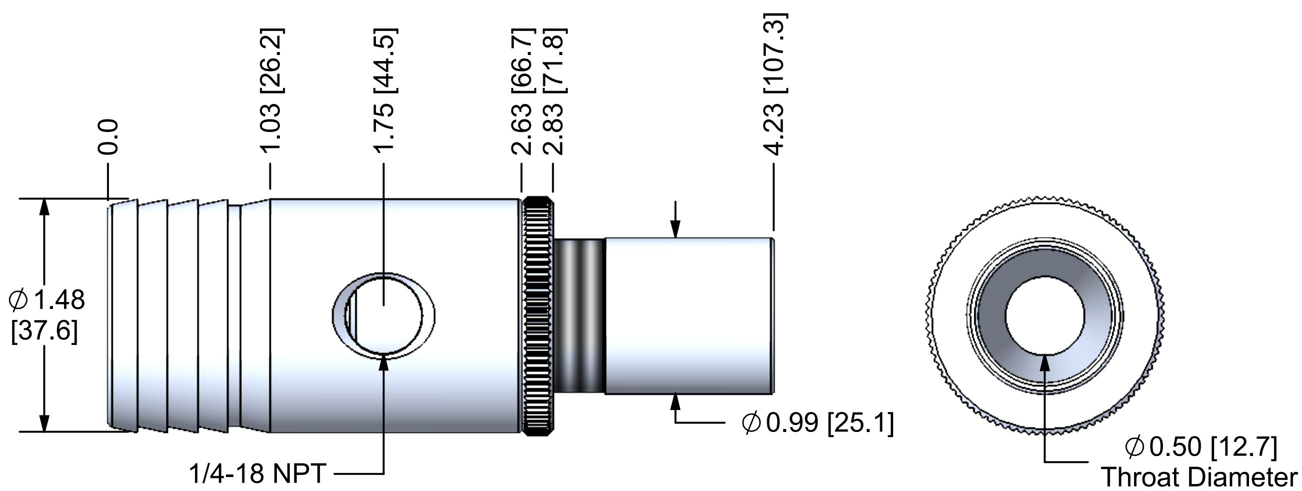
The Coanda principle employs a nozzle that causes high velocity compressed air to cling to its shaped airfoil wall. Ambient air is drawn into the inlet and down into the center of the vortex formed by the Coanda nozzle so that the discharge air flow at the exhaust is much greater than the compressed 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	I.D. 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



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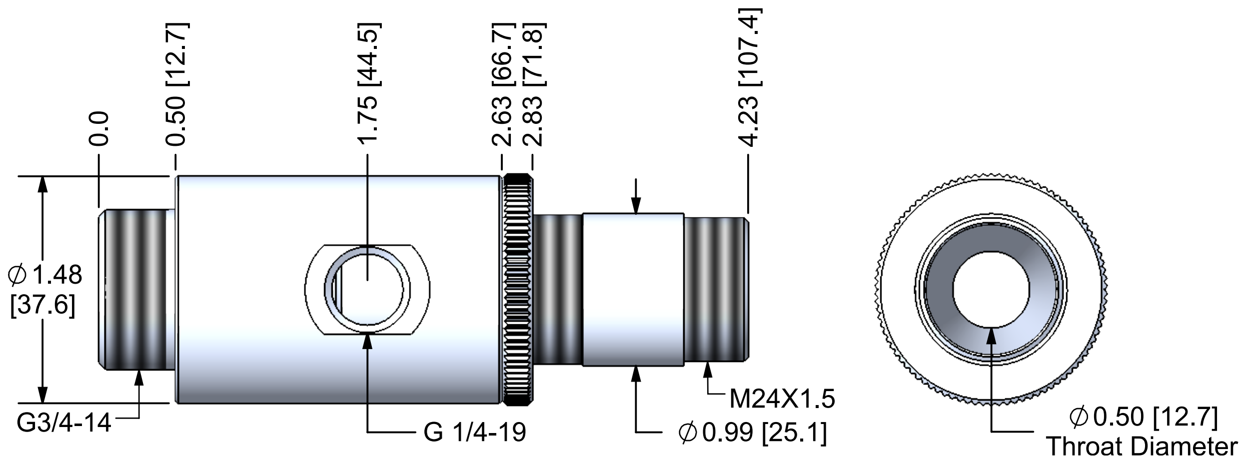
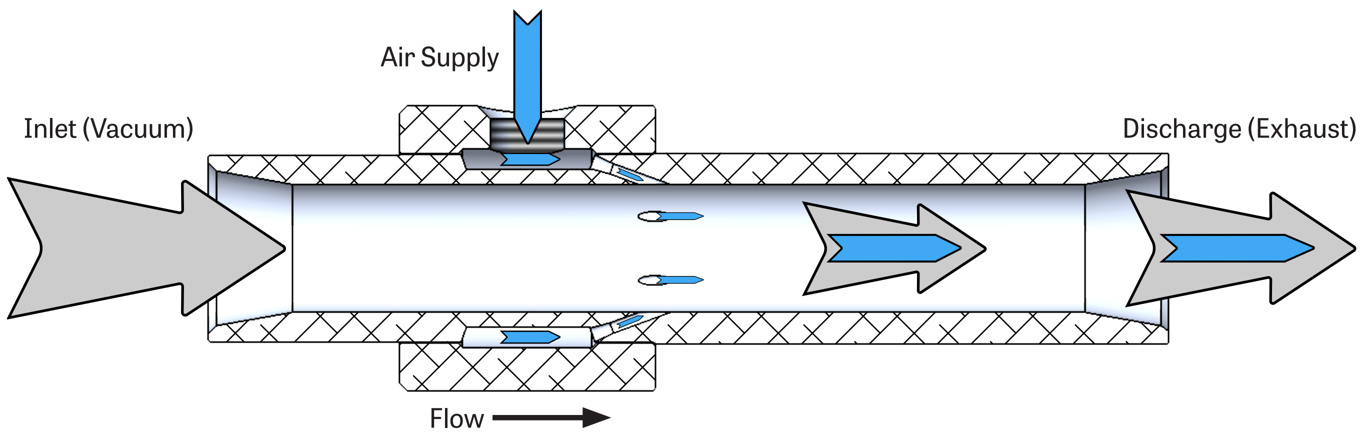
AIR AMPLIFIER
CD-500HG



TRANSFER PUMPS
D-SERIES MATERIAL TRANSFER PUMPS

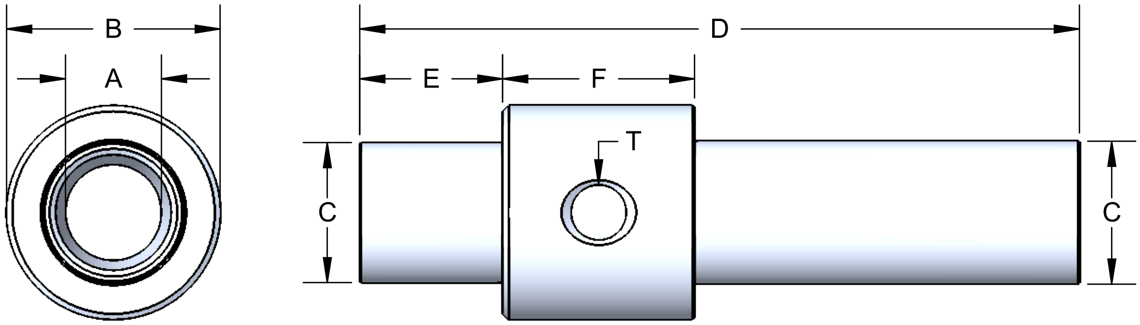


Direct Transfer Pumps use high velocity compressed air to generate a vacuum in the inlet of a smooth bore tubular body to drawn in bulk dry goods and then convey it in a turbulent air stream through a hose attached to the discharge end of the pump. Plastic pellets, powders, beans, peas, sawdust, and 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.

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.



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 SUPPLY THREAD
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 representatation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.

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SECTION 16
EMAT - MODULAR AUTOMATION TOOLING

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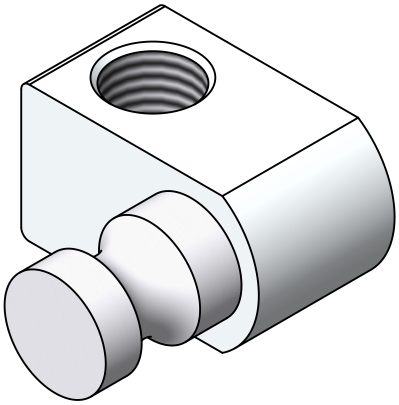
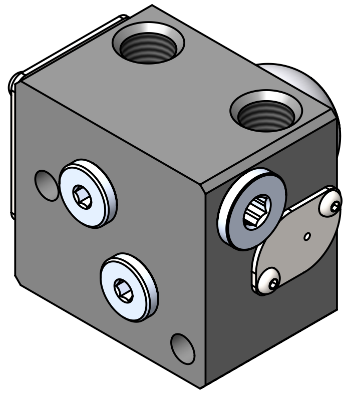
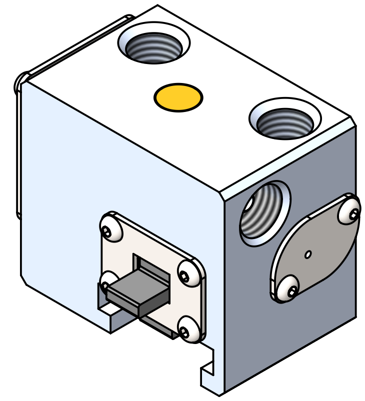
EMAT



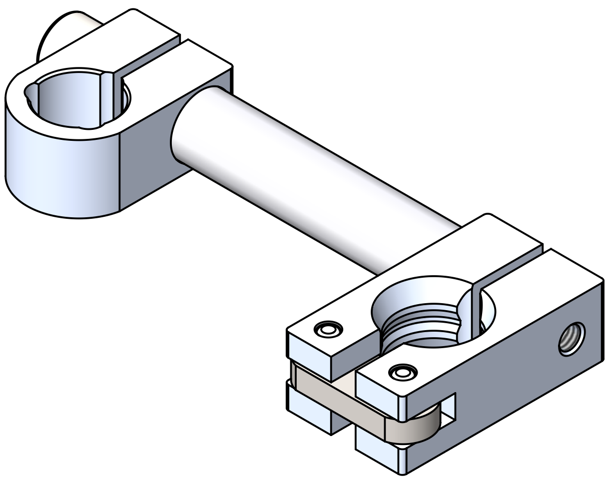
VACUUM CONNECTIONS



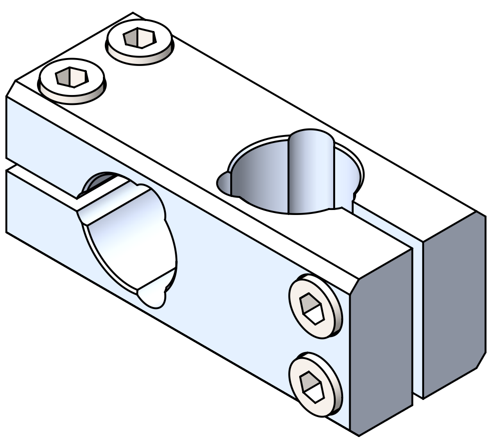
VACLOC ATTACHMENTS



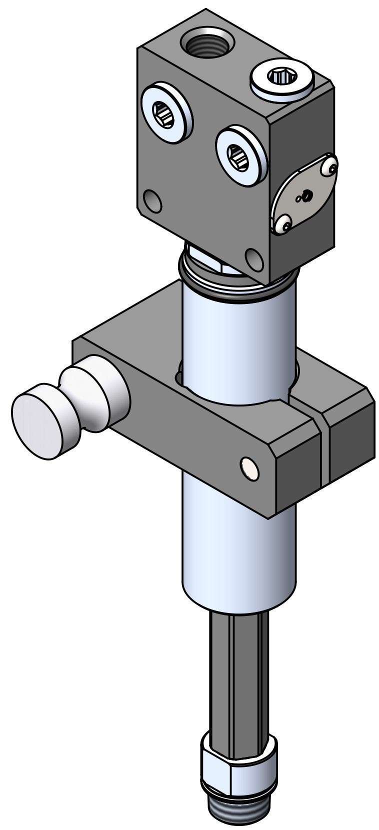
T-SLOT ATTACHMENTS



ARMS



ACCESSORIES



LEVEL COMPENSATORS

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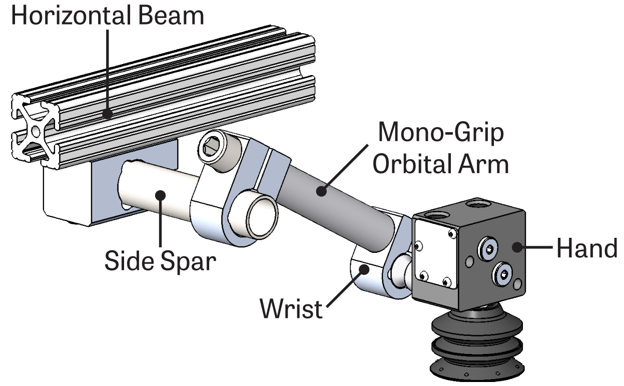
EMAT
EDCO USA MODULAR AUTOMATION TOOLING

EDCO USA Modular Automation Tooling (EMAT) provides an efficient way to construct automation or robotic tools with minimal design time. Rugged, lightweight anodized aluminum EMAT 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 either round tubing or t-slot structural extrusion, plus 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 suction 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 suction cup is the preferred method since a poor seal at one cup can't affect the vacuum level at any other cup. A discrete system also allows splitting the system into several independently controlled zones so that a wider variety of part sizes and shapes can be efficiently handled.

EMAT provides simplicity, adjustability, rigidity, serviceability, energy conservation, coaxial ejector technology and cost-effectiveness in a readily available package.

EDCO USA *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.

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.

Integral ES Energy-Saving controls provide a dramatic reduction in compressed air usage by only turning the vacuum pump on as needed to maintain the selected vacuum level.

EMAT tooling is easily reconfigurable to meet changing application requirements.

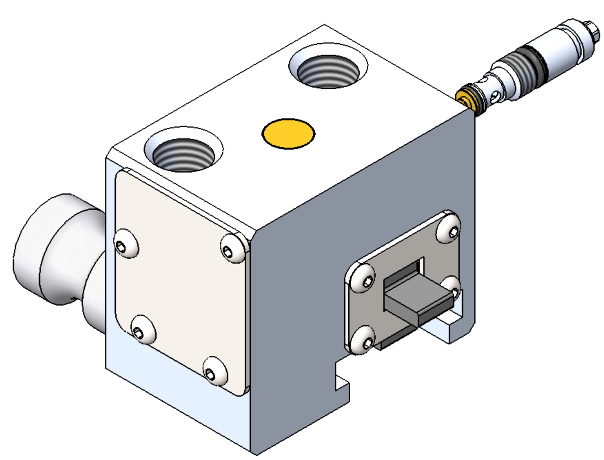
Fast and simple single-bolt arm adjustment (mono-clamp) and tri-arc grip provides superior positional security via higher clamping forces.

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.

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.



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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.

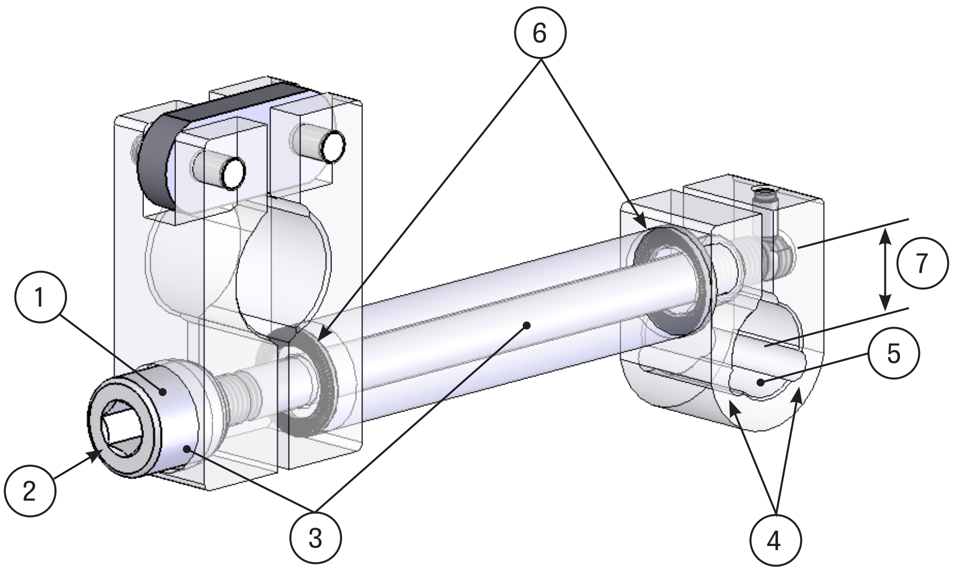
3. A nut and stud configuration more efficiently translates tightening torque into stud tension than a long cap and screw do where much of the torque is absorbed by twisting off the long screw shank.

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.



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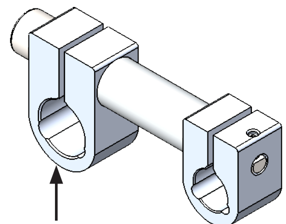
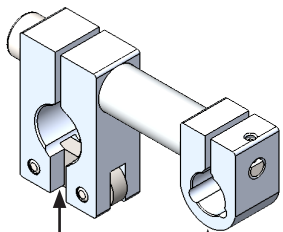
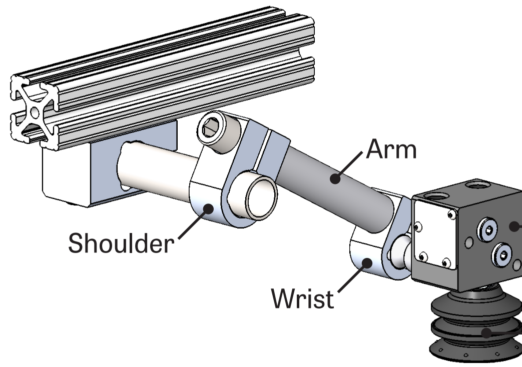
EMAT
SYSTEM EXPLANATION

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.

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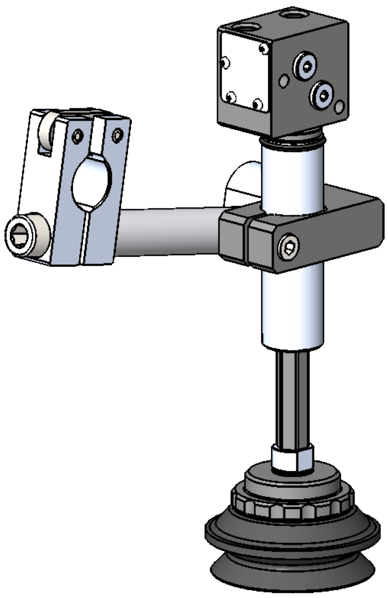
EMAT
COMPLETE ARM ASSEMBLY - SELECTION GUIDE

Complete arm assemblies can be ordered using the following part number layout.

EXAMPLE #1

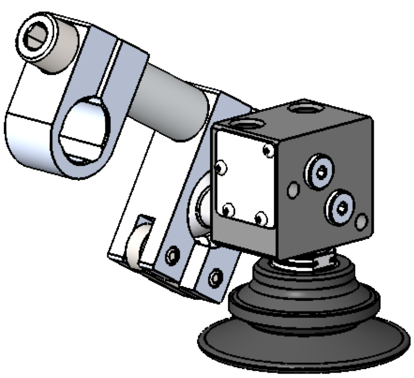


VLP10LC5038MA-B75N-C10X4A

1 2 3 4 5

CODE	MODEL CODE	DESCRIPTION	COMPONENT
1	VLP10L	***VacLoc*** with 10L Pump	Work Attachment
2	C5038M	Level Compensator with 50 mm Stroke and 3/8 NPT Male Cup Connection	Work Attachment
3	A	Apple-Core Pin Style Orbital Wrist Joint	Work Attachment
4	B75N	Bellows Style 75 mm Diameter Silicone Vacuum Cup	Cup
5	C10X4A	Clamp-On Shoulder Joint for 1" Tubing, 4" Arm Length Apple-Core Pin Style Orbital Wrist Joint	Arm

EXAMPLE #2

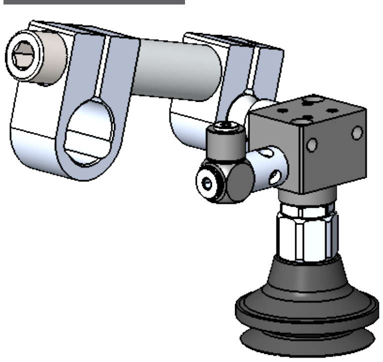


VL38FB-BF80N-S10X2B

1 2 3 4

CODE	MODEL CODE	DESCRIPTION	COMPONENT
1	VL38F	***VacLoc*** with 3/8" NPTF Female Cup Connection	Work Attachment
2	B	Ball Swivel Wrist Joint	Work Attachment
3	BF80N	Bellows Traction Foot style 80 mm Diameter Nitrile Vacuum Cup	Cup
4	S10X2B	Slide-On Shoulder Joint for 1" Tubing, 2" Arm Length Ball Swivel Wrist Joint	Arm

EXAMPLE #3



VG38-10L-PP-A-B50N-S10X2A

1 2 3 4

CODE	MODEL CODE	DESCRIPTION	COMPONENT
1	VG38-10L-PP	Vacuum Gripper with 10L Pump and Positive Purge	Work Attachment
2	A	Apple-Core Pin Style Orbital Wrist Joint	Work Attachment
3	B50N	Bellows Style 50 mm Diameter Ameriflex Vacuum Cup	Cup
4	S10X2A	Slide-On Shoulder Joint for 1" Tubing, 4" Arm Length Apple-Core Pin Style Orbital Wrist Joint	Arm

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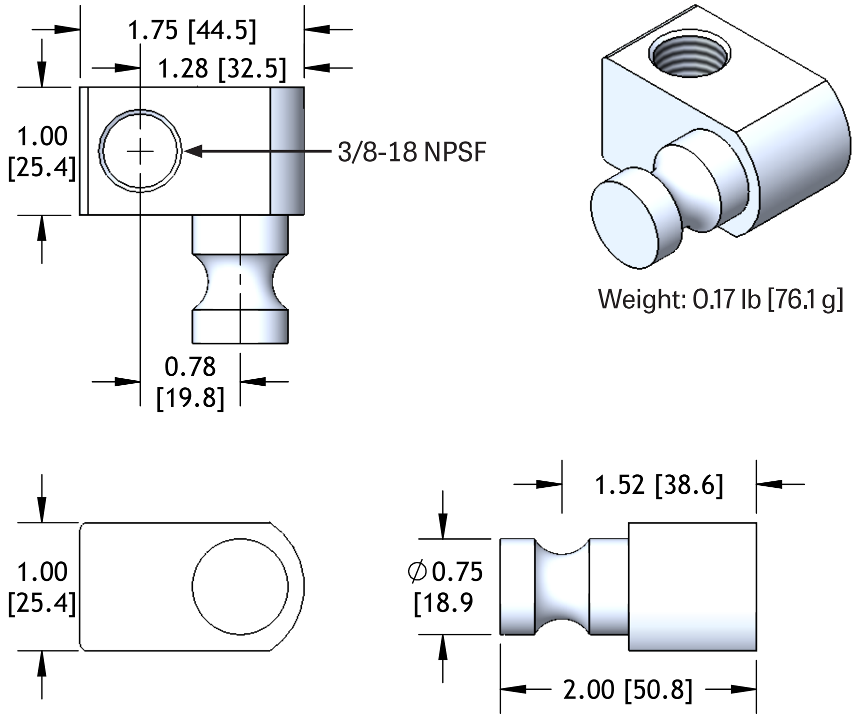
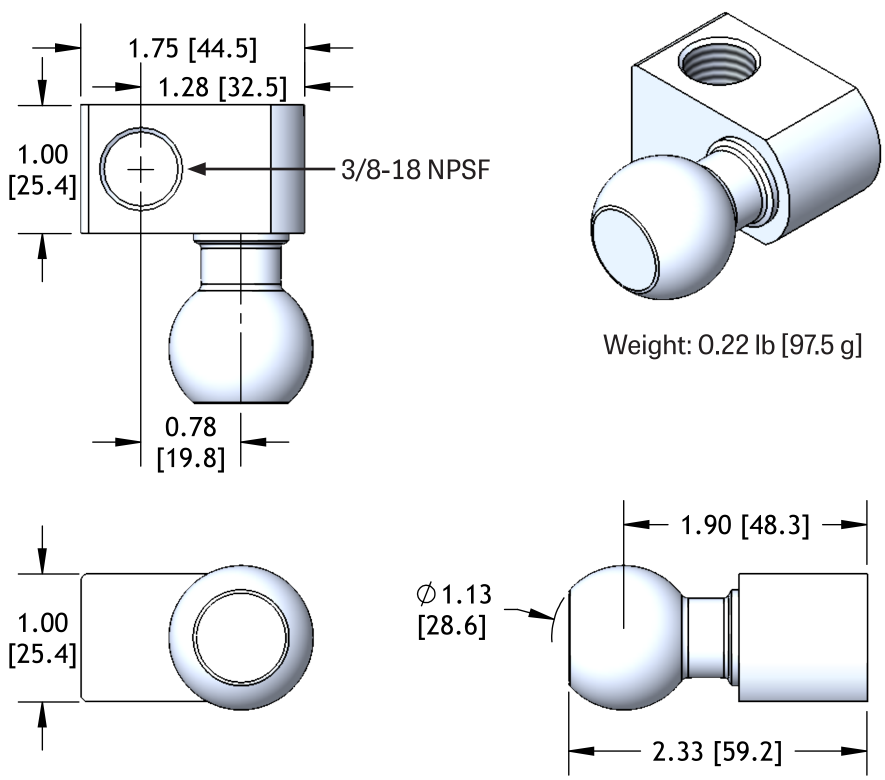
EMAT

V38FA : VACUUM CONNECTION W/ APPLE CORE PIN MOUNT



Weight: 0.17 lb [76.1 g]

V38FB : VACUUM CONNECTION W/ BALL SWIVEL MOUNT



Weight: 0.22 lb [97.5 g]

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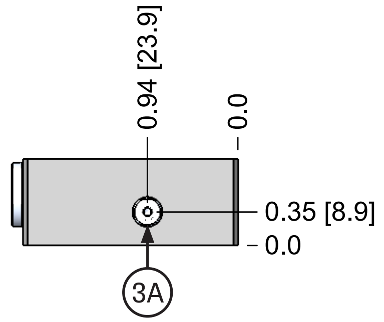
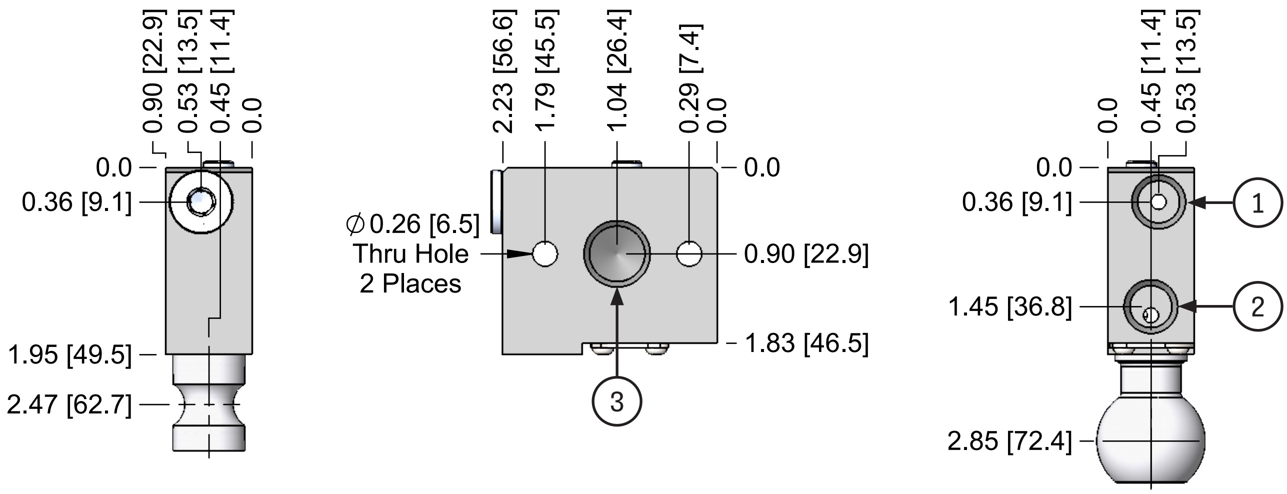
EMAT
LOW PROFILE VACUUM CONNECTION W/ BLOW-OFF

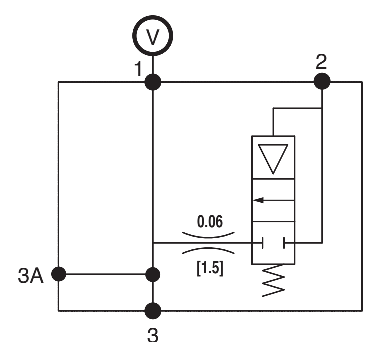
Includes a blow-off sequence valve, provides for mounting a vacuum cup and for connecting a vacuum source. Can be configured with or without a vacuum pump.

	OPTIONS		PORTS
LVB38F	A	-	
	A = Apple Core		(Blank) = NPTF
	B = Ball Swivel		**G** = G Threads
	(Blank) = Level Compensator Mount		

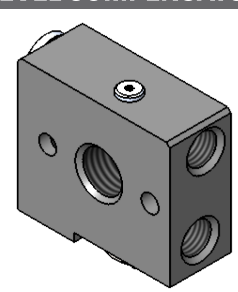




CODE	FUNCTION	NPT	G
1	Air Supply	1/4 NPTF	G 1/4
2	Pilot - Blow Off	1/4 NPTF	G 1/4
3	Vacuum	3/8 NPSF	G 3/8
3A	Sensor Port	M5X0.8 (10-32 UNF)	M5X0.8 (10-32 UNF)

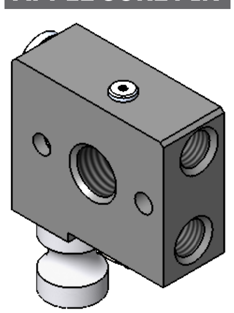


LEVEL COMPENSATOR



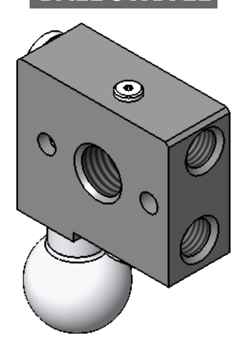
Weight: 0.27 lb [122.0 g]

APPLE CORE PIN



Weight: 0.33 lb [150.0 g]

BALL SWIVEL



Weight: 0.38 lb [172.0 g]

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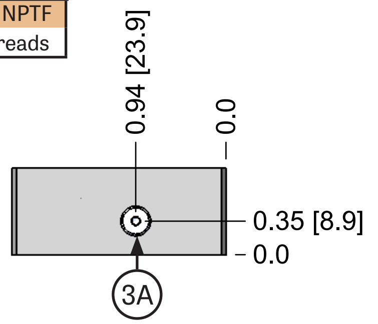
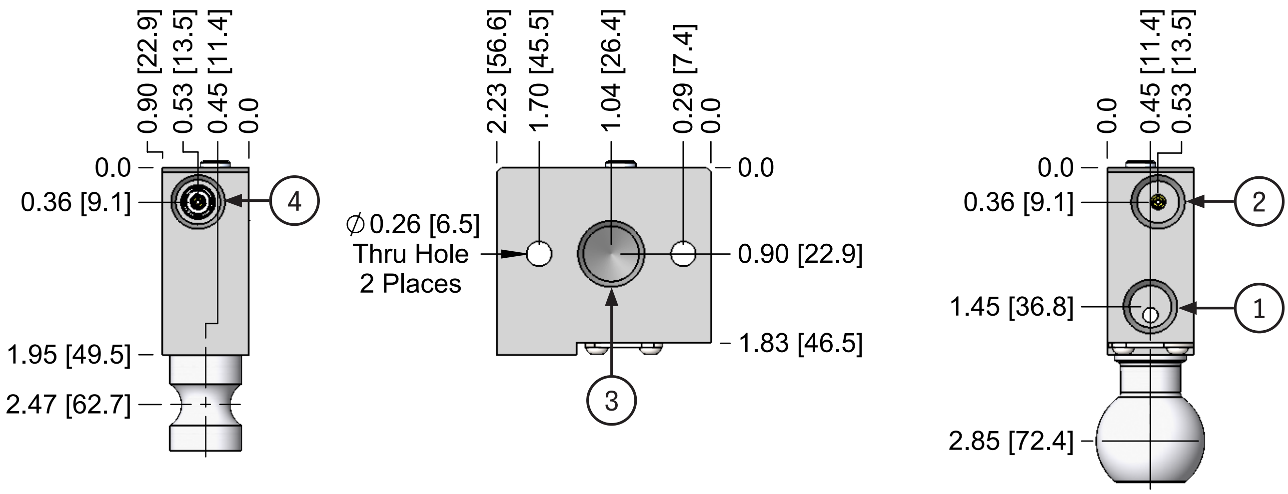
EMAT
LOW PROFILE VACUUM PUMP W/ BLOW-OFF

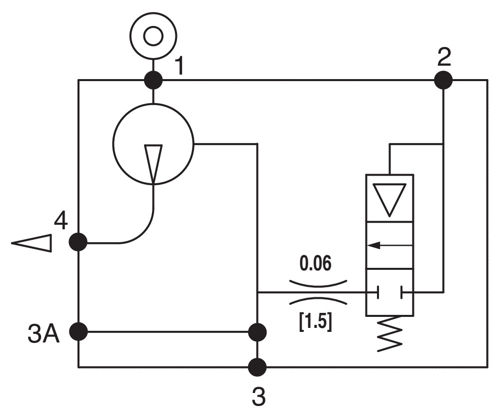
Includes a coaxial vacuum pump, blow-off sequence valve and connection port for mounting a vacuum cup.

	VENTURI SIZE		OPTIONS		PORTS
LPB	10L	-38F		-	
	07		**A** = Apple Core		(Blank) = NPTF
	09		**B** = Ball Swivel		**G** = G Threads
	10		(Blank) = Level Compensator Mount		
	08L				
	10L				

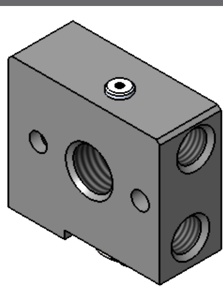




CODE	FUNCTION	NPT	G
1	Air Supply	1/4 NPTF	G 1/4
2	Pilot - Blow Off	1/4 NPTF	G 1/4
3	Vacuum	3/8 NPSF	G 3/8
3A	Vacuum - Alternate	M5X0.8 (10-32 UNF)	M5X0.8 (10-32 UNF)
4	Exhaust	G 1/4	G 1/4

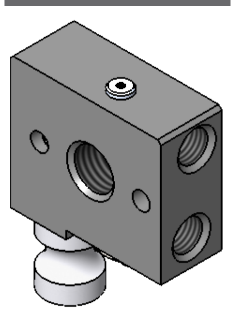


LEVEL COMPENSATOR



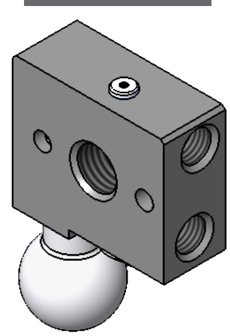
Weight: 0.27 lb [122.0 g]

APPLE CORE PIN



Weight: 0.33 lb [150.0 g]

BALL SWIVEL



Weight: 0.38 lb [172.0 g]

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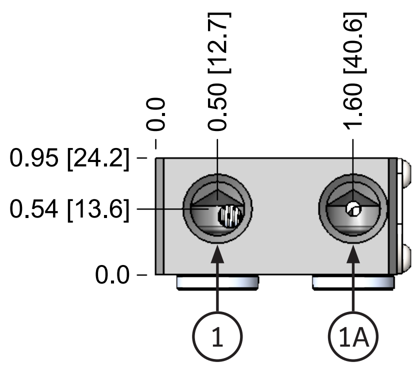
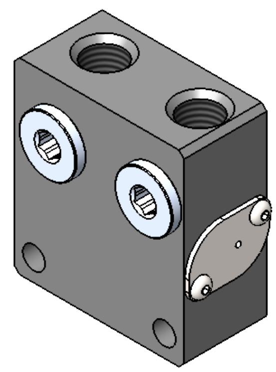
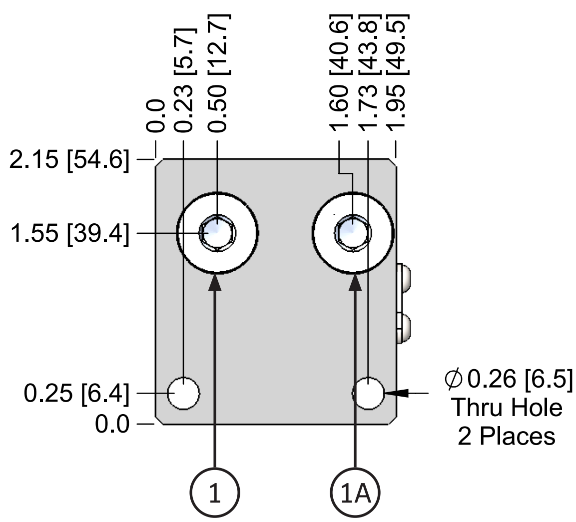
The ***VacLoc*** is a combination modular vacuum check valve and a sequence blow valve incorporated in a perfectly aligned one-piece cartridge body featuring electroless-nickel plated valve seats for long life. An internal orifice provides balanced blow-off air flow so that several units can be supplied and controlled by one solenoid valve.

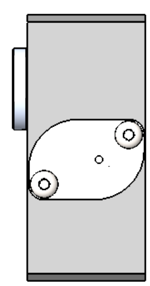
	PORTS
VL38F-	
	(Blank) = NPTF
	G = G Threads

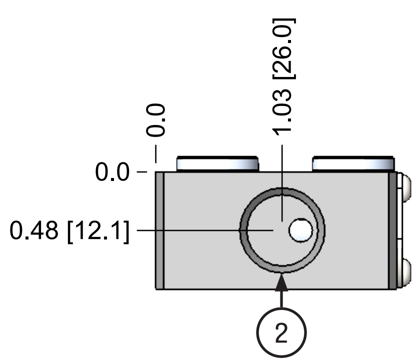


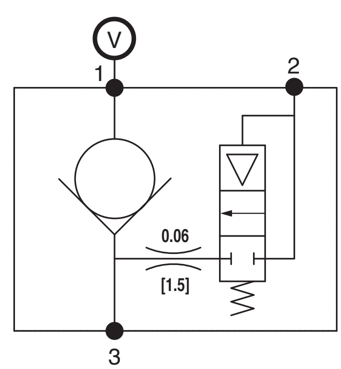


Weight: 0.32 lb [145.0 g]









CODE	FUNCTION	NPT	G
1	Air Supply	1/4 NPTF	G 1/4
2	Pilot - Blow Off	1/4 NPTF	G 1/4
3	Vacuum	3/8 NPSF	G 3/8

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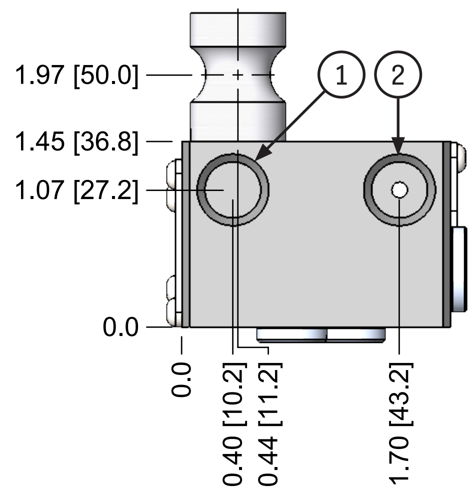
EMAT
VACLOC W/ APPLE CORE PIN OR BALL SWIVEL MOUNT

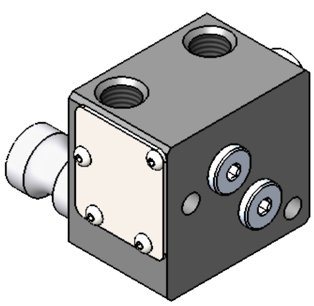
The ***VacLoc*** is a combination modular vacuum check valve and a sequence blow valve incorporated in a perfectly aligned, one-piece cartridge body featuring electroless-nickel plated valve seats for long life. An internal orifice provides balanced blow-off air flow so that several unites can be supplied and controlled by one solenoid valve.

	OPTIONS	-	PORTS
VL38F	A	-	
	A = Apple Core		(Blank) = NPTF
	B = Ball Swivel		**G** = G Threads

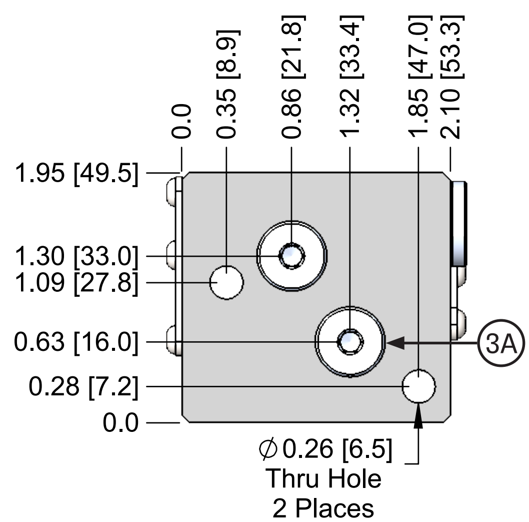
CODE	FUNCTION	NPT	G
1	Air Supply	1/4 NPTF	G 1/4
2	Pilot - Blow Off	1/4 NPTF	G 1/4
3	Vacuum	3/8 NPSF	G 3/8
3A	Vacuum - Alternate	G 1/8 NPSF	G 1/8 NPSF

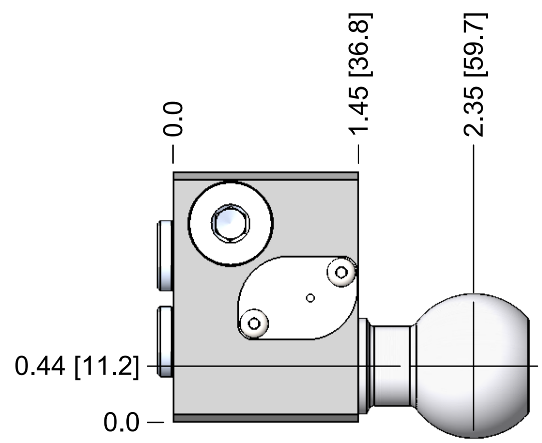


APPLE CORE PIN

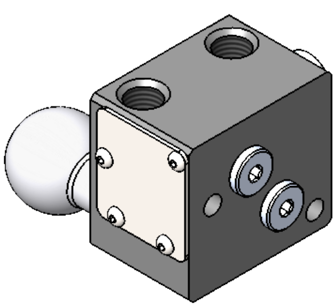


Weight: 0.54 lb [243.0 g]

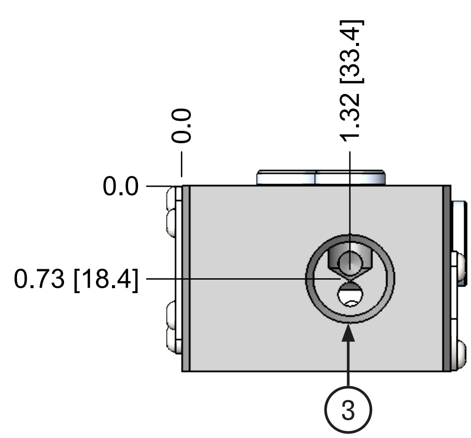


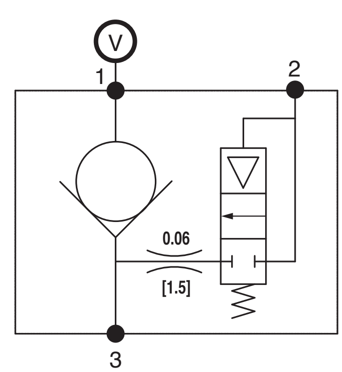


BALL SWIVEL



Weight: 0.59 lb [268.0 g]





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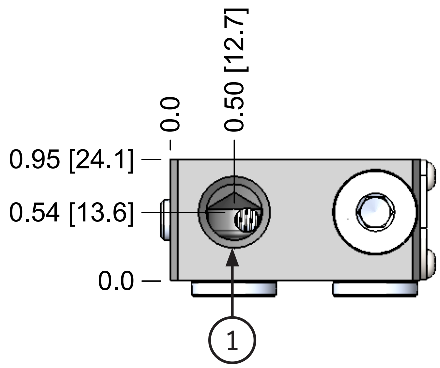
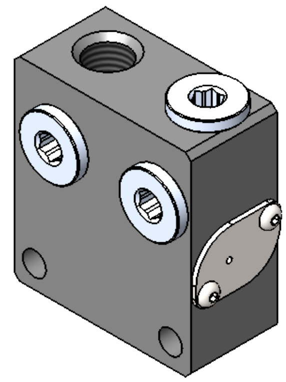
VACLOC W/ CROSS PORT OPTION

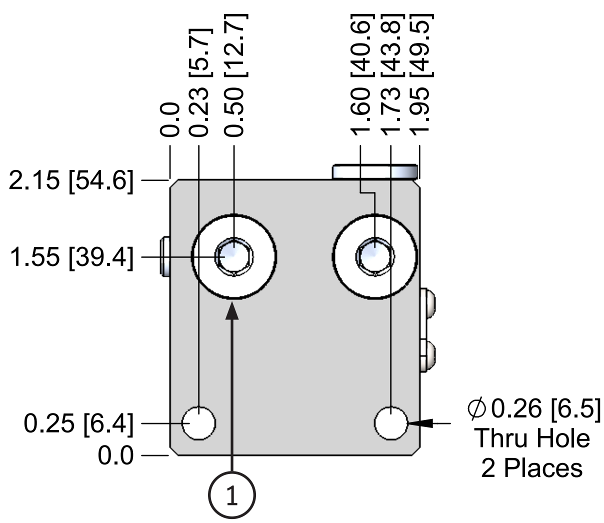
The Cross-Ported ***VacLoc*** option provides all of the features of a standard unit but with both vacuum and blow air being supplied via a single inlet port instead of two. A typical system would consist of multiple VLCP38F supplied through a selector valve that switches between vacuum and blow air.

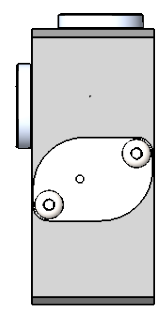
	PORTS
VLCP38F-	
	(Blank) = NPTF
	G = G Threads

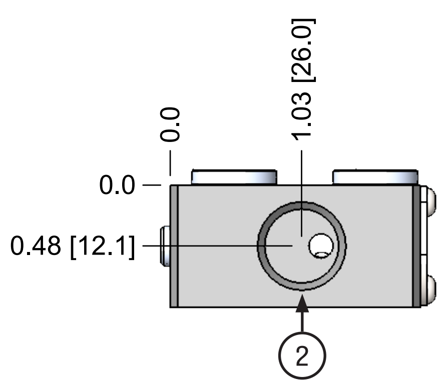


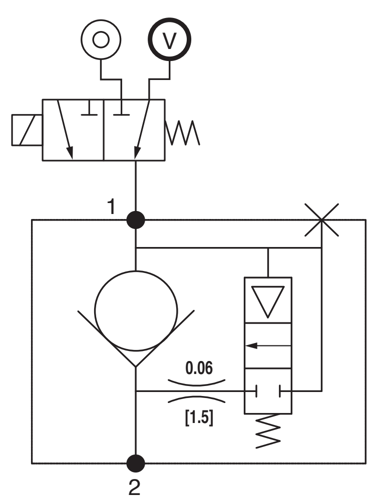


Weight: 0.32 lb [145.0 g]









CODE	FUNCTION	NPT	G
1	Air Supply	1/4 NPTF	G 1/4
2	Vacuum	3/8 NPSF	G 3/8

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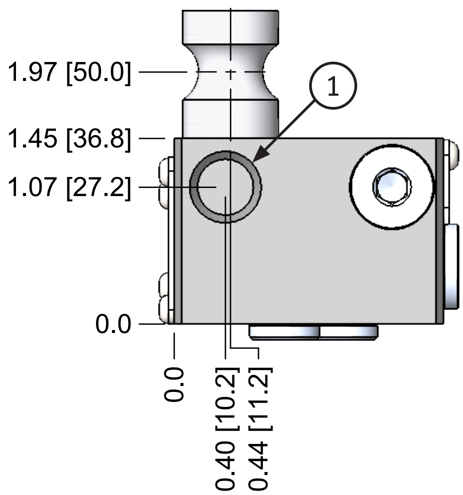
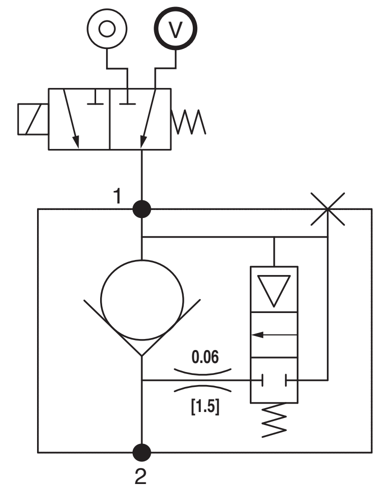
VACLOC W/ CROSS PORT OPTION & APPLE CORE PIN OR BALL SWIVEL MOUNT

The Cross-Ported option provides all of the features of a standard ***VacLoc*** but with both vacuum and blow air being supplied via a single inlet port instead of two. A typical system would consist of multiple VLCP38F supplied through a selector valve that switches between vacuum and blow air.

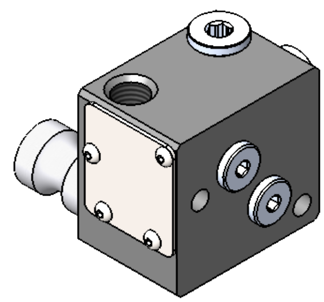
	OPTIONS		PORTS
VLCP38F	A	-	
	A = Apple Core		(Blank) = NPTF
	B = Ball Swivel		**G** = G Threads

CODE	FUNCTION	NPT	G
1	Air Supply	1/4 NPTF	G 1/4
2	Vacuum	3/8 NPSF	G 3/8

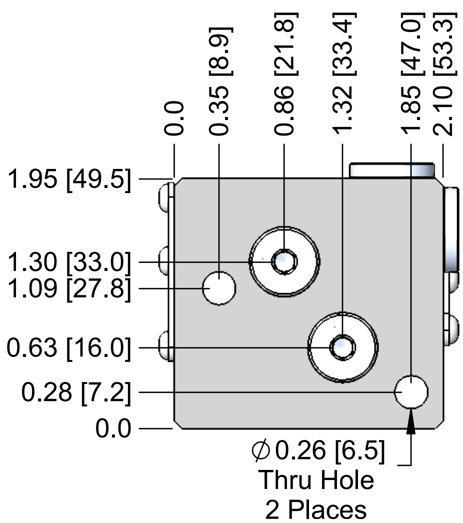


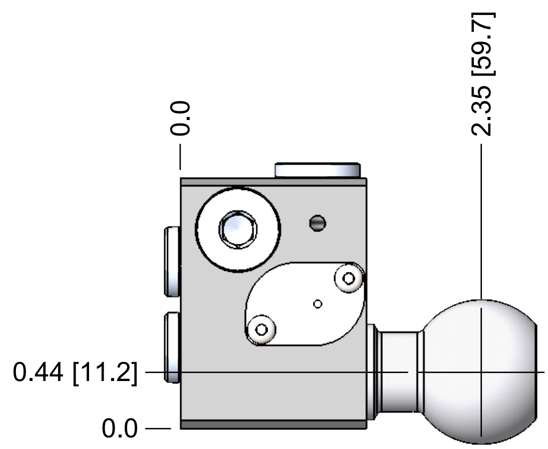


APPLE CORE PIN

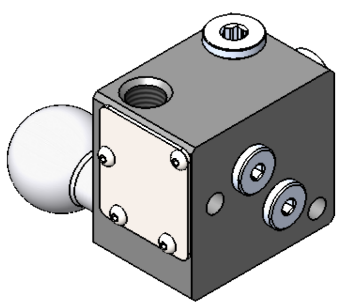


Weight: 0.54 lb [243.0 g]

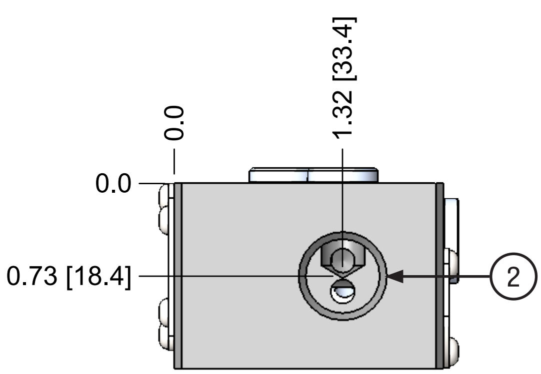




BALL SWIVEL



Weight: 0.59 lb [268.0 g]



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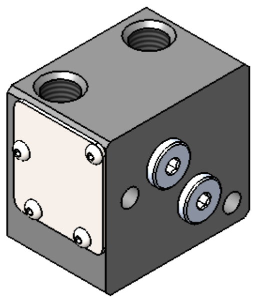
EMAT
VACLOC W/ INTEGRAL PUMP

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.

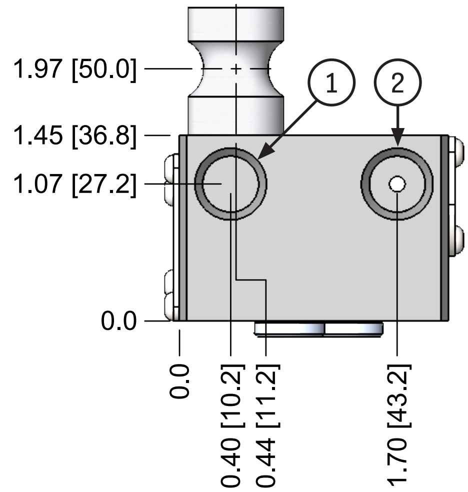
	VENTURI SIZE		OPTIONS		PORTS
VLP	10L	-38F		-	
	07		**A** = Apple Core		(Blank) = NPTF
	09		**B** = Ball Swivel		**G** = G Threads
	10		(Blank) = Stand Alone		
	08L				
	10L				

CODE	FUNCTION	NPT	G
1	Air Supply	1/4 NPTF	G 1/4
2	Pilot - Blow Off	1/4 NPTF	G 1/4
3	Vacuum	3/8 NPSF	G 3/8
3A	Vacuum - Alternate	G 1/8 NPSF	G 1/8 NPSF
4	Exhaust	G 1/4	G 1/4

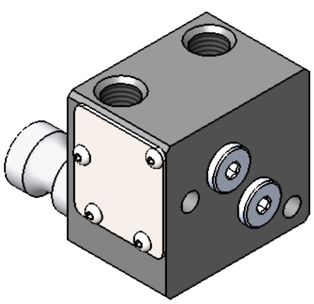
STAND ALONE



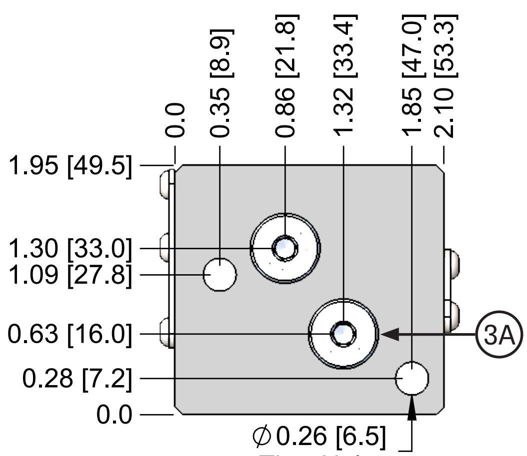
Weight: 0.47 lb [214.0 g]

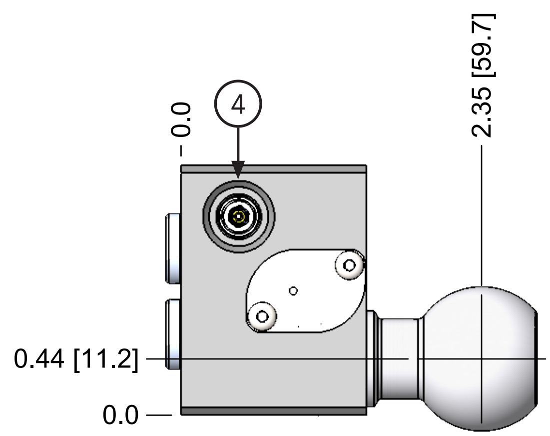


APPLE CORE PIN

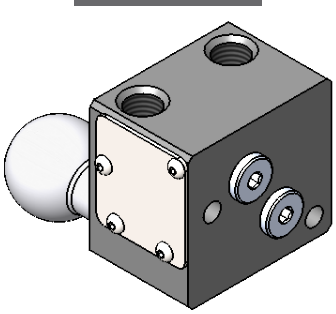


Weight: 0.54 lb [243.0 g]

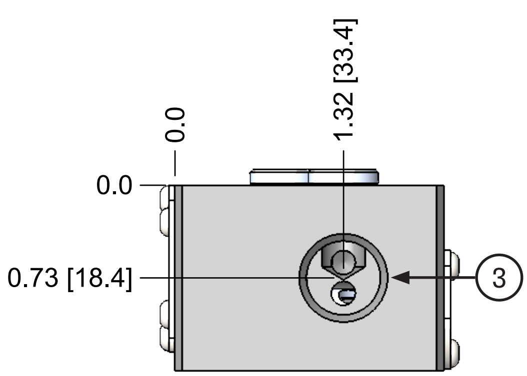


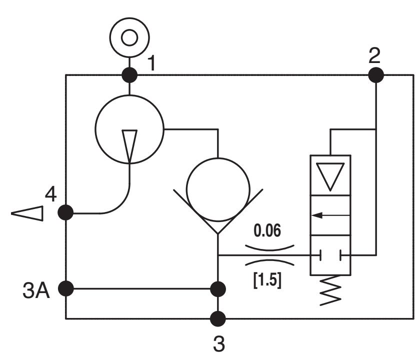


BALL SWIVEL



Weight: 0.59 lb [268.0 g]





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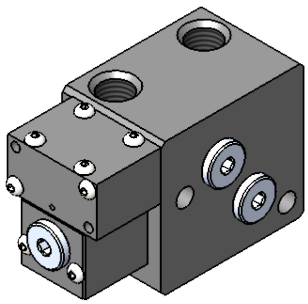
EMAT
VACLOC W/ INTEGRAL PUMP & ENERGY SAVER OPTION

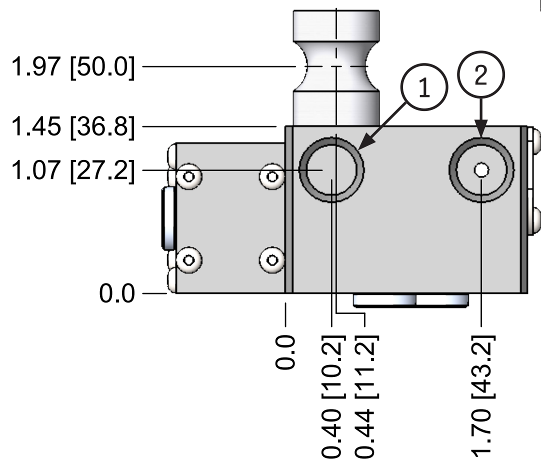
An adjustable vacustat control is added to a VLP assembly to automatically cycle the vacuum pump on only as required to maintain the desired vacuum level in a leak-free system. All ***VacLoc*** benefits are retained but air-energy consumption is reduced to only a small fraction of that required for a constant-on vacuum pump.

	VENTURI SIZE		OPTIONS		PORTS
VLP	10L	ES-38F	A	-	
	07		**A** = Apple Core		(Blank) = NPTF
	09		**B** = Ball Swivel		**G** = G Threads
	10		(Blank) = Stand Alone		
	08L				
	10L				

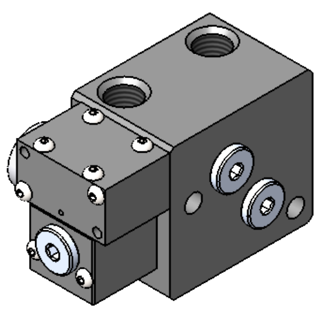
STAND ALONE



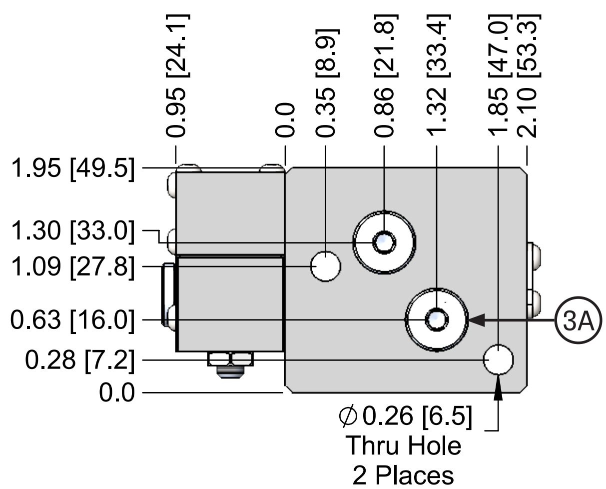
Weight: 0.62 lb [280.0 g]

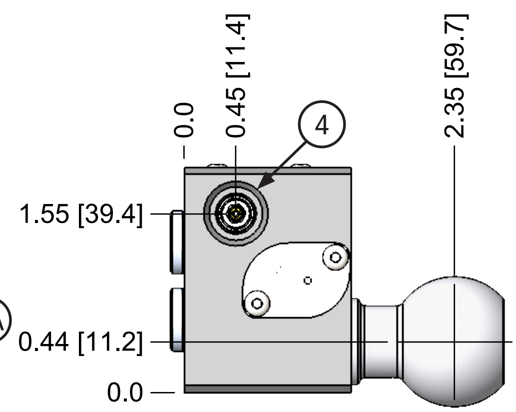


APPLE CORE PIN

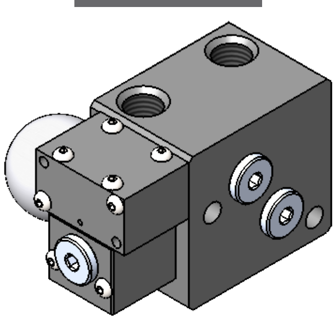


Weight: 0.68 lb [309.0 g]

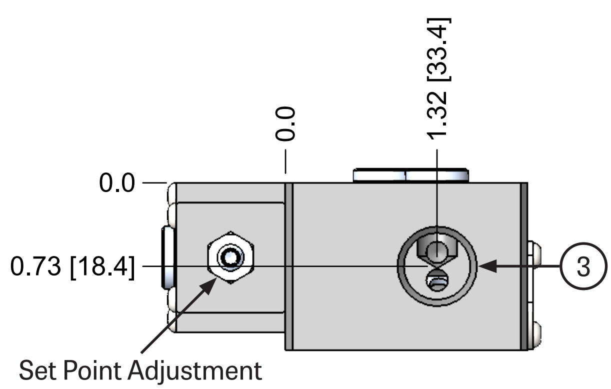




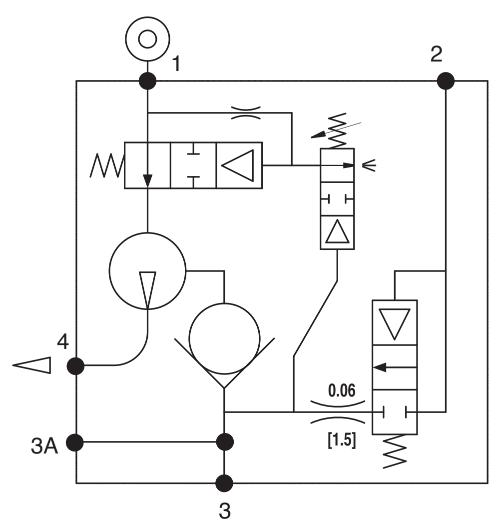
BALL SWIVEL



Weight: 0.73 lb [332.0 g]



CODE	FUNCTION	NPT	G
1	Air Supply	1/4 NPTF	G 1/4
2	Pilot - Blow Off	1/4 NPTF	G 1/4
3	Vacuum	3/8 NPSF	G 3/8
3A	Vacuum - Alternate	G 1/8 NPSF	G 1/8 NPSF
4	Exhaust	G 1/4	G 1/4



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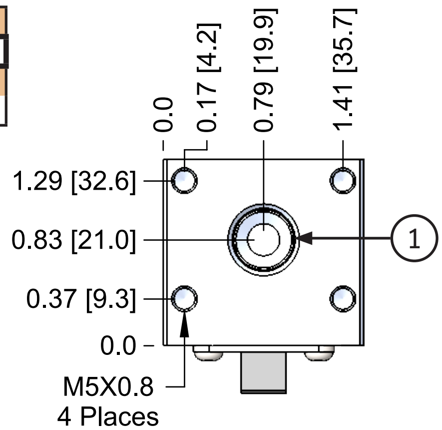
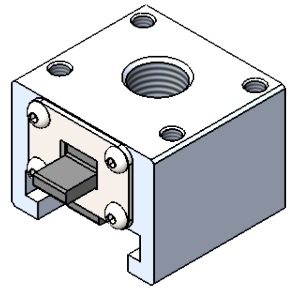
EMAT
T-SLOT RECEIVER W/ VACUUM CONNECTION

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.

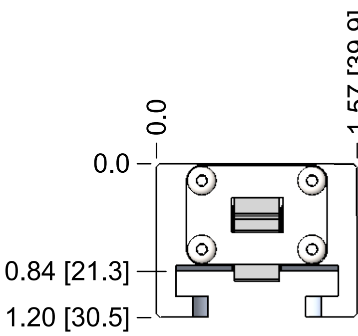
TR-14-

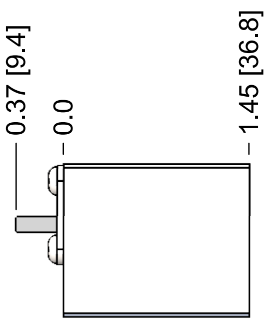
PORTS
(Blank) = NPTF
G = G Threads



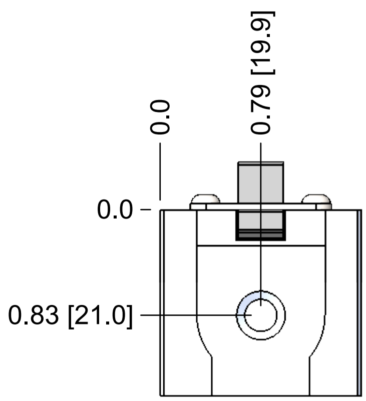


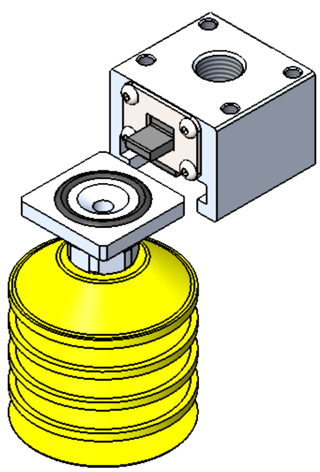
Weight: 0.20 lb [90.7 g]

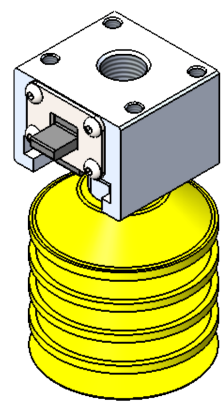




CODE	FUNCTION	NPT	G
1	Vacuum	1/4 NPTF	G 1/4

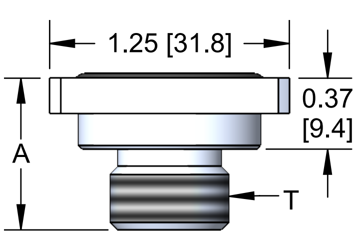


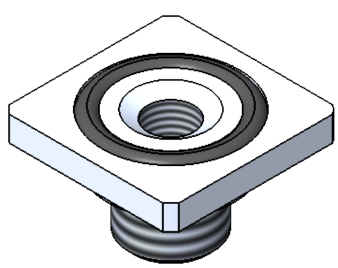




T-SLOT ADAPTERS

FITTINGS	WEIGHT oz [g]	A in [mm]	T THREAD
TSA-18M	0.75 [21.3]	0.61 [15.5]	G 1/8 NPT
TSA-38M	0.68 [19.3]	0.79 [20]	G 3/8 NPT
TSA-12M	0.59 [16.7]	0.79 [20]	G 1/2 NPT





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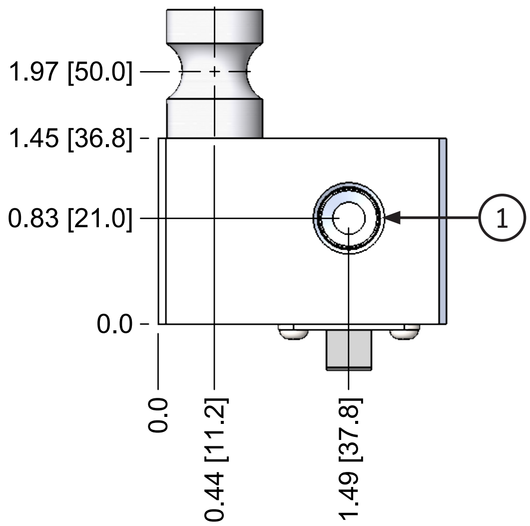
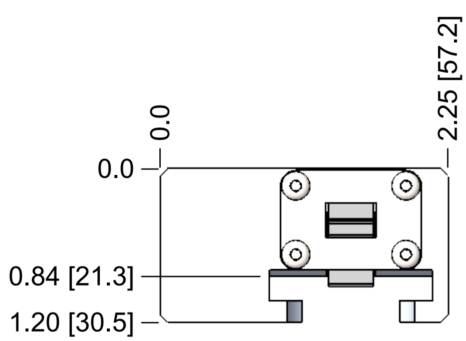
EMAT

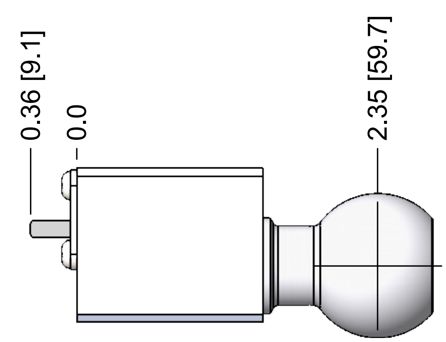
T-SLOT RECEIVER W/ VACUUM CONNECTION & APPLE CORE PIN OR BALL SWIVEL MOUNT

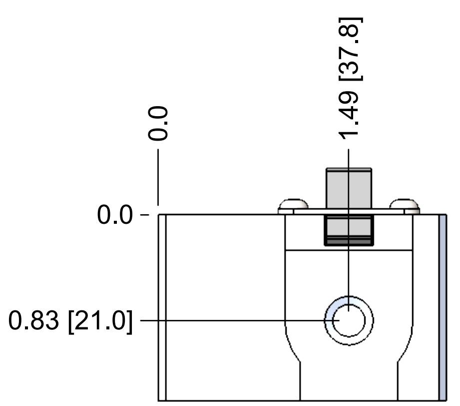
Provides a bayonet-style quick-change for suction cups equipped with o-ring sealed T-slot adapters. High quality Teflon impregnated nickel plating reduces friction during insertion and the simplified latch features a larger finger tab for comfortable operation.

	OPTIONS		PORTS
TR-14	A	-	
	A = Apple Core		(Blank) = NPTF
	B = Ball Swivel		**G** = G Threads



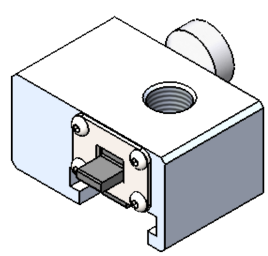






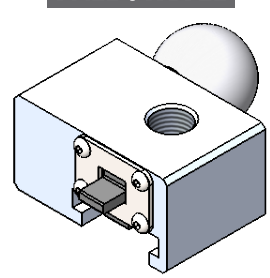
CODE	FUNCTION	NPT	G
1	Vacuum	1/4 NPTF	G 1/4

APPLE CORE PIN



Weight: 0.35 lb [159.0 g]

BALL SWIVEL



Weight: 0.40 lb [181.0 g]

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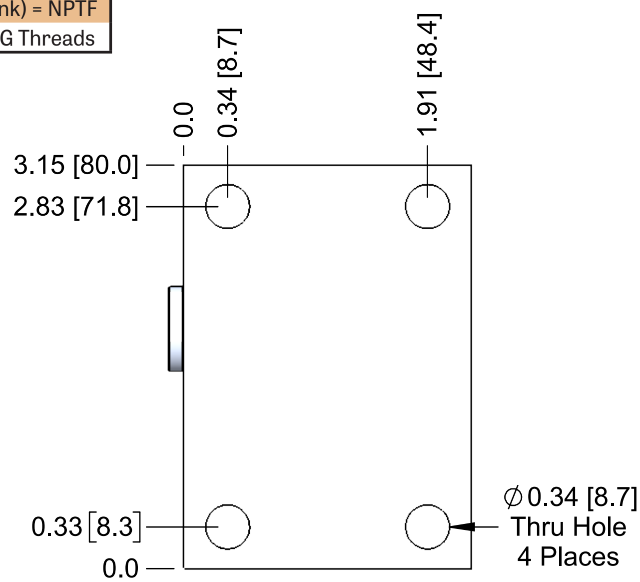
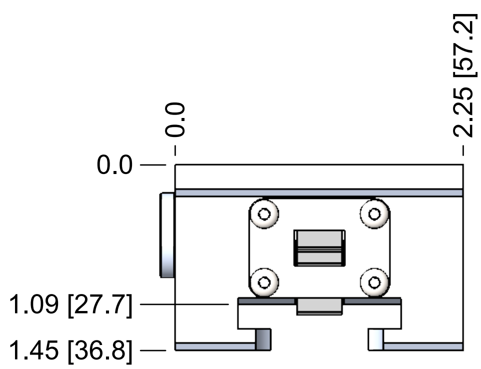
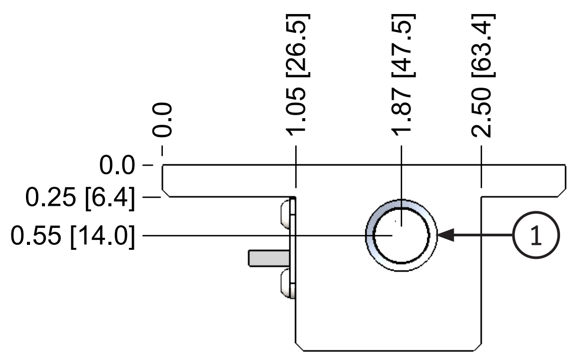
SURFACE MOUNT T-SLOT RECEIVER W/ VACUUM CONNECTION

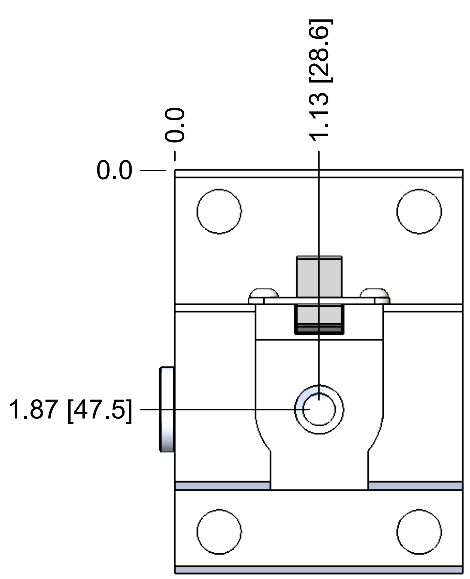
Provides a bayonet-style quick-change for suction cups equipped with o-ring sealed T-slot adapters. High quality Teflon impregnated nickel plating reduces friction during insertion and the simplified latch features a larger finger tab for comfortable operation.

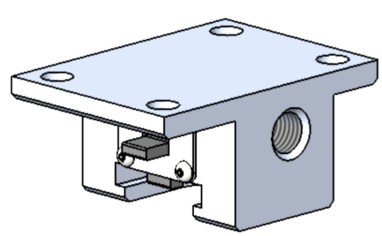
	PORTS
TR-14S-	
	(Blank) = NPTF
	G = G Threads











Weight: 0.46 lb [209.0 g]

CODE	FUNCTION	NPT	G
1	Vacuum	1/4 NPTF	G 1/4

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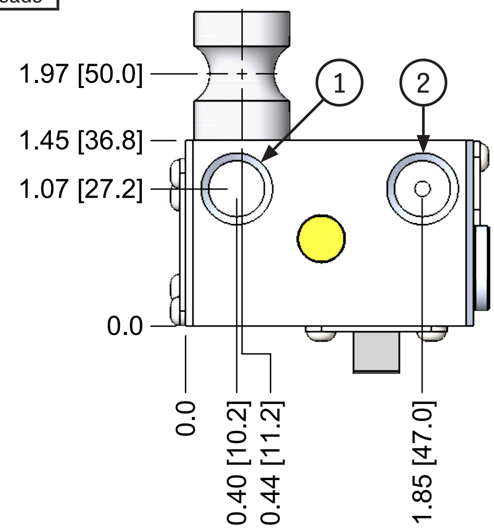
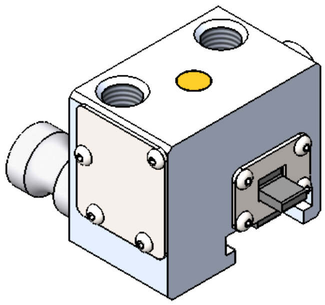
EMAT
T-SLOT RECEIVER W/ VACUUM CONNECTION & BLOW-OFF

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. Includes a blow-off sequence valve, and a vacuum source connection.

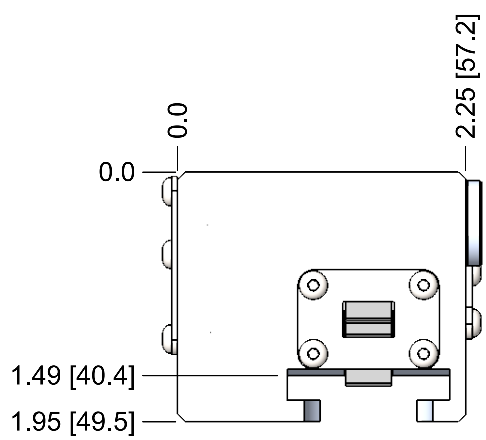
	OPTIONS		PORTS
VBT	A	-	
	A = Apple Core		(Blank) = NPTF
	B = Ball Swivel		**G** = G Threads

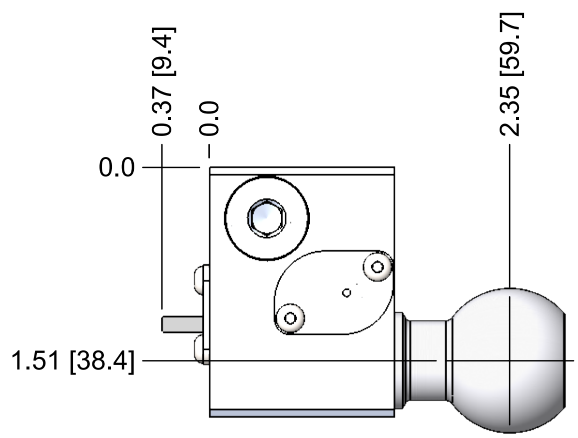


APPLE CORE PIN

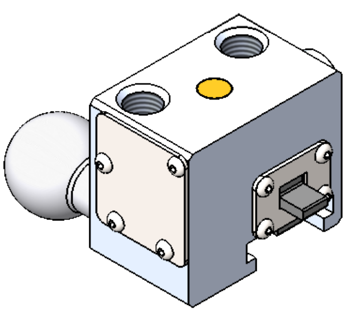


Weight: 0.56 lb [253.0 g]

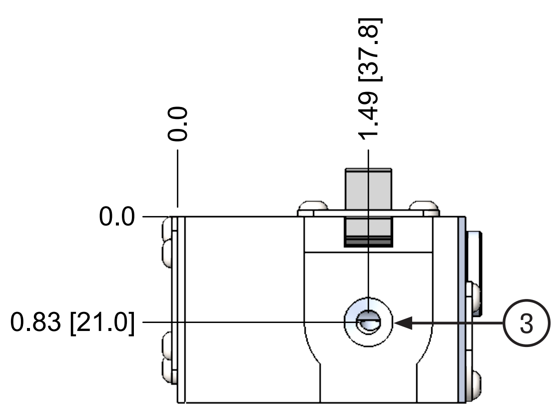


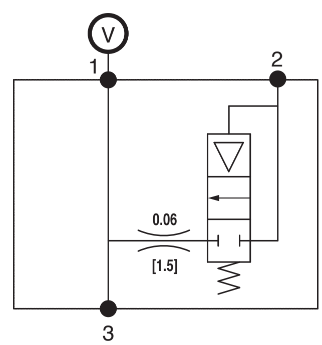


BALL SWIVEL



Weight: 0.61 lb [276.0 g]





CODE	FUNCTION	NPT	G
1	Air Supply	1/4 NPTF	G 1/4
2	Pilot - Blow Off	1/4 NPTF	G 1/4
3	Vacuum	T-Slot	T-Slot

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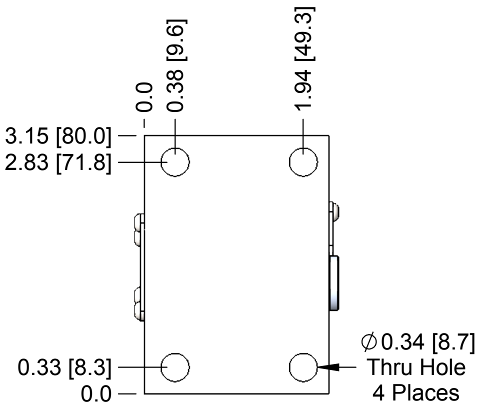
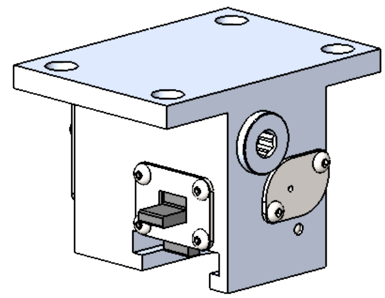
EMAT
SURFACE MOUNT T-SLOT RECEIVER W/ VACUUM CONNECTION & BLOW-OFF

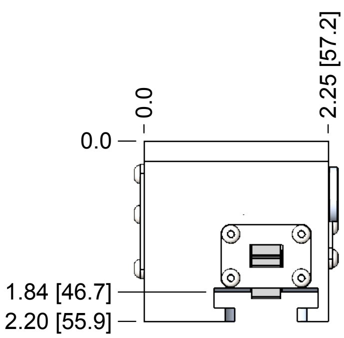
Provides a bayonet-style quick-change for suction cups equipped with o-ring sealed T-slot adapters. High quality Teflon impregnated nickel plating reduces friction during insertion and the simplified latch features a larger finger tab for comfortable operation. Includes a blow-off sequence valve, and a vacuum source connection.

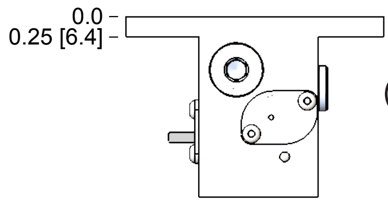
	PORTS
VBTS-	
	(Blank) = NPTF
	G = G Threads

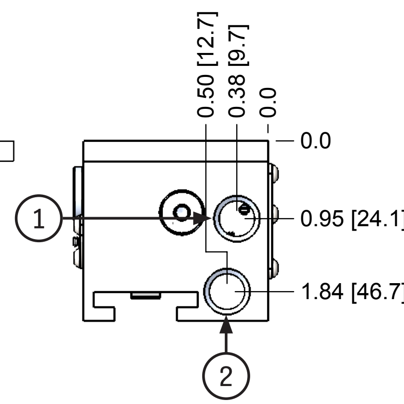


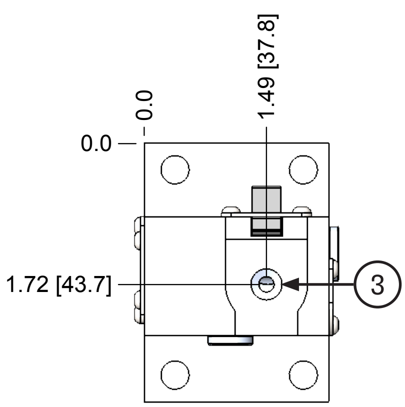


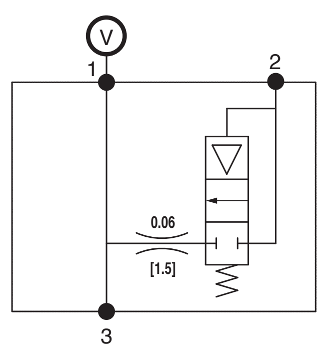
Weight: 0.7 lb [319.0 g]











CODE	FUNCTION	NPT	G
1	Air Supply	1/4 NPTF	G 1/4
2	Pilot - Blow Off	1/4 NPTF	G 1/4
3	Vacuum	T-Slot	T-Slot

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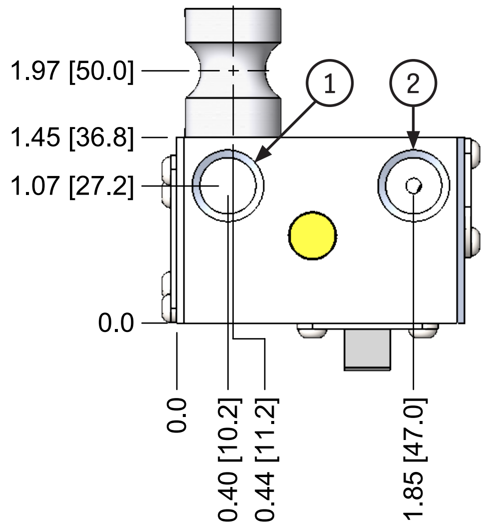
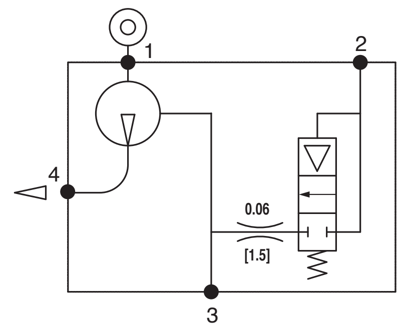
EMAT
T-SLOT RECEIVER W/ INTEGRAL PUMP & BLOW-OFF

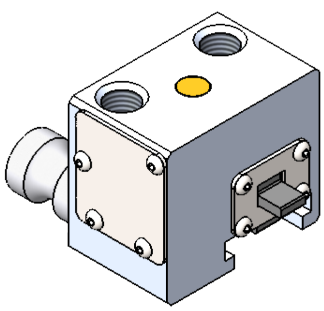
Provides a bayonet-style quick-change for suction cups equipped with o-ring sealed T-slot adapters. High quality Teflon impregnated nickel plating reduces friction during insertion and the simplified latch features a larger finger tab for comfortable operation. Includes a coaxial vacuum pump and a blow-off sequence valve.

	VENTURI SIZE		OPTIONS		PORTS
PB	10L	T		-	
	07		**A** = Apple Core		(Blank) = NPTF
	09		**B** = Ball Swivel		**G** = G Threads
	10				
	08L				
	10L				

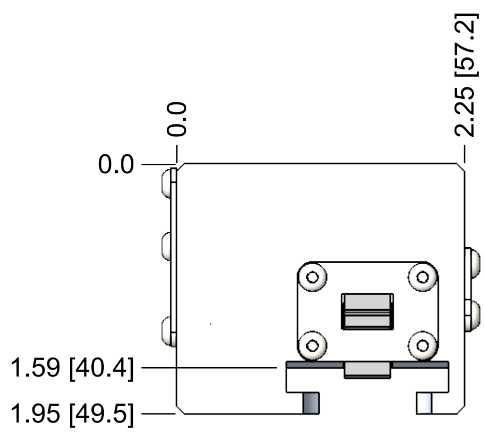


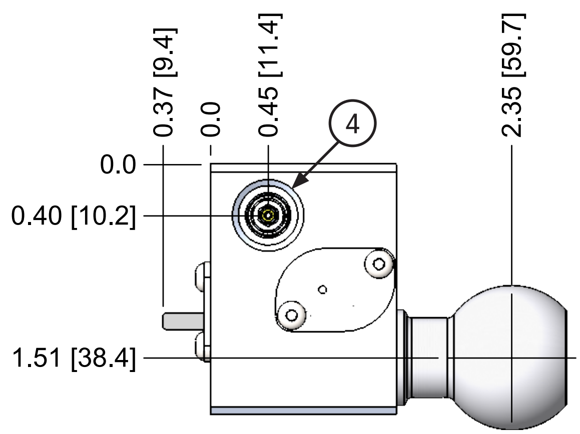


APPLE CORE PIN

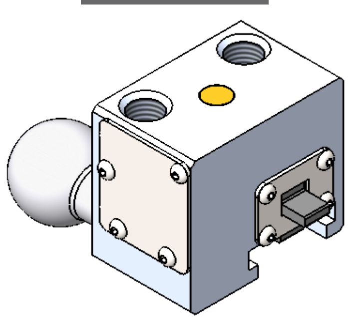


Weight: 0.56 lb [253.0 g]

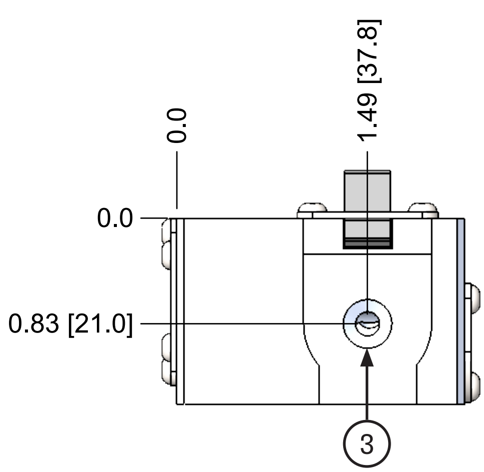




BALL SWIVEL



Weight: 0.61 lb [276.0 g]



CODE	FUNCTION	NPT	G
1	Air Supply	1/4 NPTF	G 1/4
2	Pilot - Blow Off	1/4 NPTF	G 1/4
3	Vacuum	T-Slot	T-Slot
4	Exhaust	G 1/4	G 1/4

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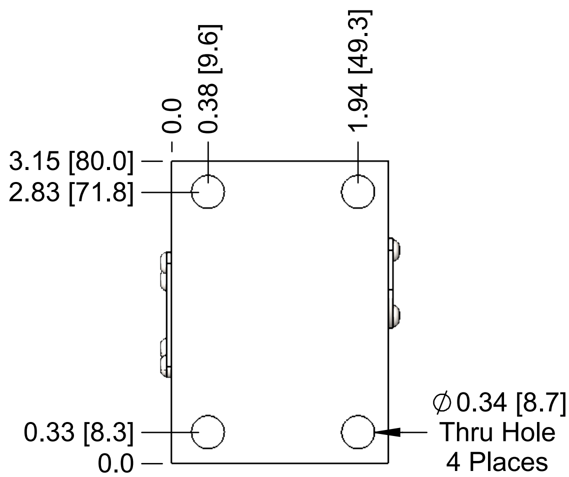
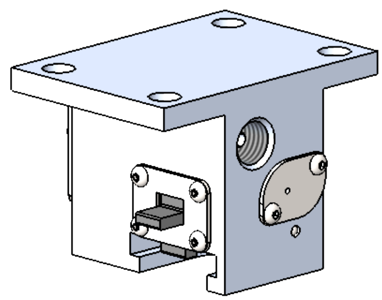
EMAT
SURFACE MOUNT T-SLOT RECEIVER W/ INTEGRAL PUMP & BLOW-OFF

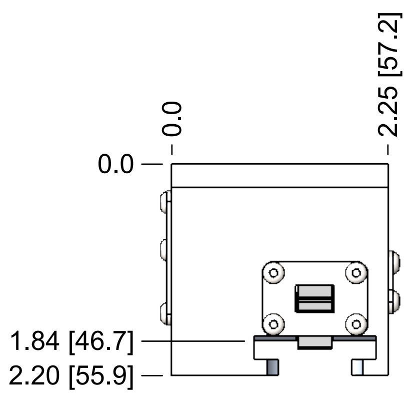
Provides a bayonet-style quick-change for suction cups equipped with o-ring sealed T-slot adapters. High quality Teflon impregnated nickel plating reduces friction during insertion and the simplified latch features a larger finger tab for comfortable operation. Includes a coaxial vacuum pump and a blow-off sequence valve.

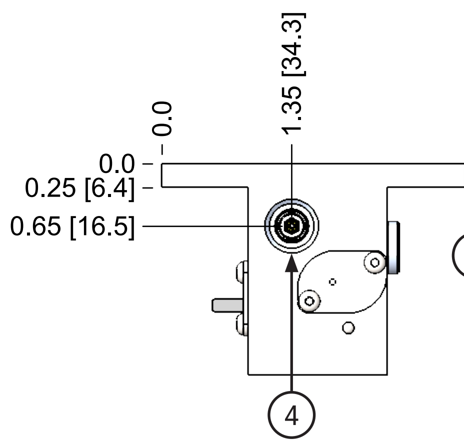
	VENTURI SIZE		PORTS
PB	10L	TS-	
	07		(Blank) = NPTF
	09		**G** = G Threads
	10		
	08L		
	10L		

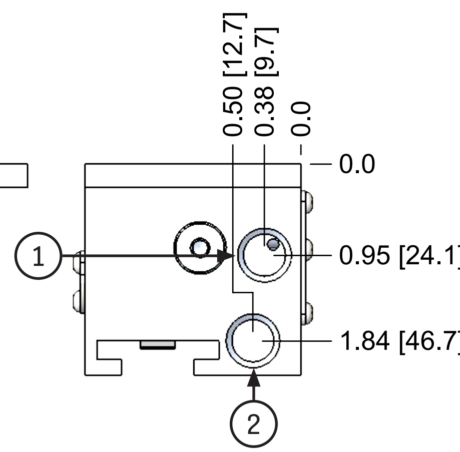


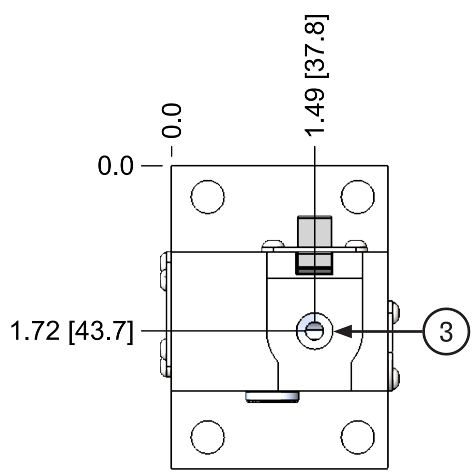


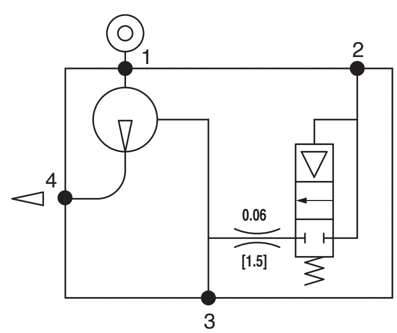
Weight: 0.70 lb [319.0 g]











CODE	FUNCTION	NPT	G
1	Air Supply	1/4 NPTF	G 1/4
2	Pilot - Blow Off	1/4 NPTF	G 1/4
3	Vacuum	T-Slot	T-Slot
4	Exhaust	G 1/4	G 1/4

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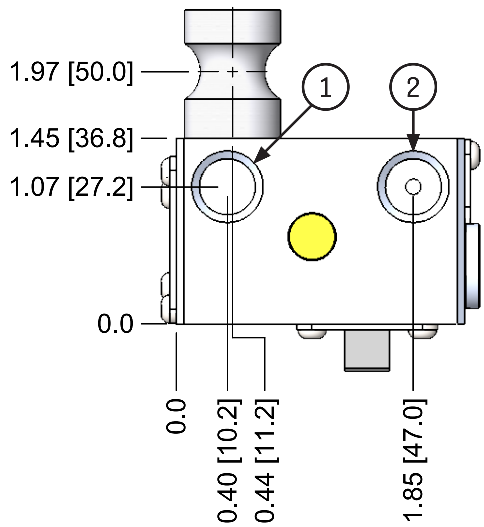
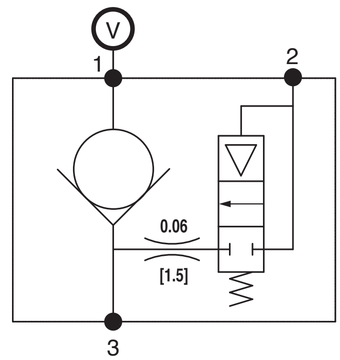
EMAT
T-SLOT RECEIVER W/ VACLOC & APPLE CORE PIN OR BALL SWIVEL MOUNT

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.

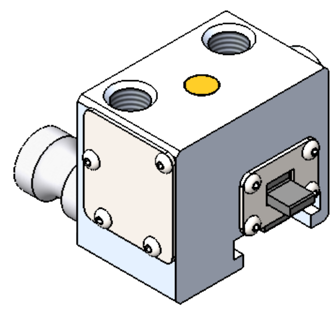
VacLoc is a combination modular vacuum check valve and a sequence blow valve incorporated in a perfectly aligned, one-piece cartridge body featuring electroless-nickel plated valve seats for long life. An internal orifice provides balanced blow-off air flow so that several units can be supplied and controlled by one solenoid valve.

	OPTIONS		PORTS
VLT	A	-	
	A = Apple Core		(Blank) = NPTF
	B = Ball Swivel		**G** = G Threads

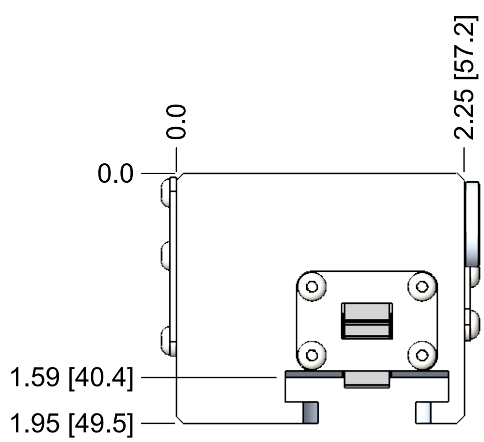


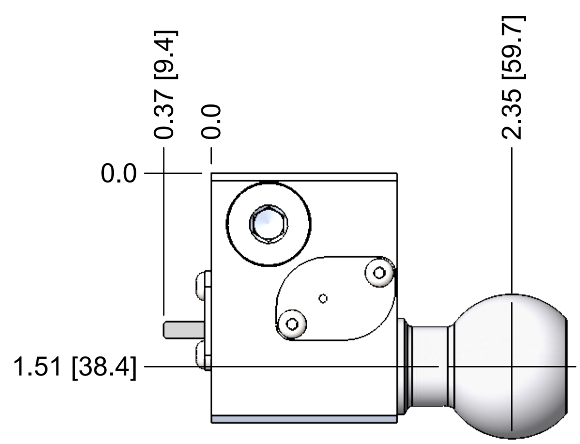


APPLE CORE PIN

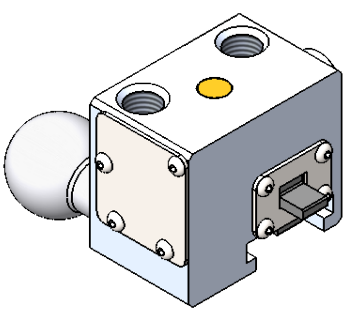


Weight: 0.56 lb [253.0 g]

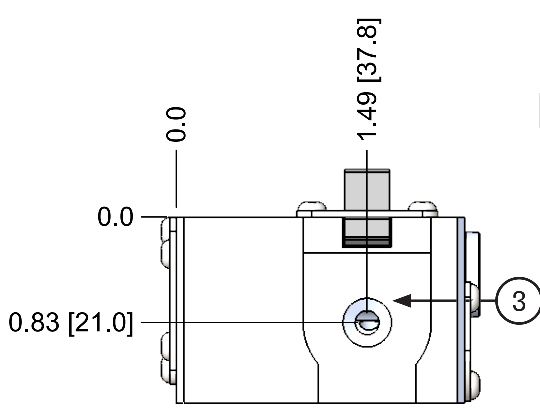




BALL SWIVEL



Weight: 0.61 lb [276.0 g]



CODE	FUNCTION	NPT	G
1	Air Supply	1/4 NPTF	G 1/4
2	Pilot - Blow Off	1/4 NPTF	G 1/4
3	Vacuum	T-Slot	T-Slot

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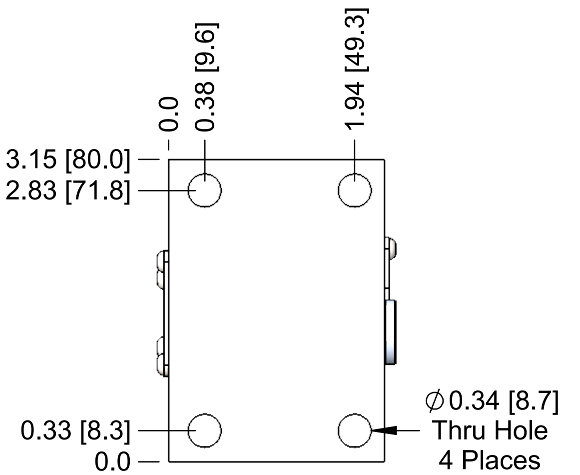
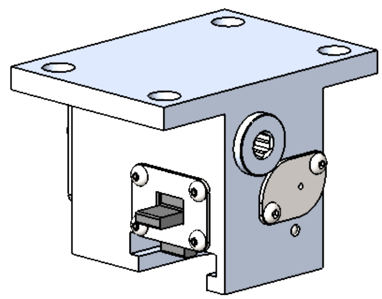
EMAT
SURFACE MOUNT T-SLOT RECEIVER W/ VACLOC

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.

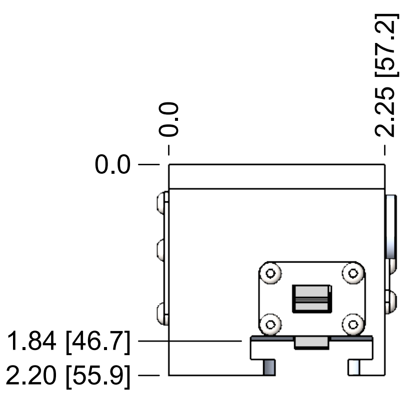
VacLoc is a combination modular vacuum check valve and a sequence blow valve incorporated in a perfectly aligned, one-piece cartridge body featuring electroless-nickel plated valve seats for long life. An internal orifice provides balanced blow-off air flow so that several units can be supplied and controlled by one solenoid valve.

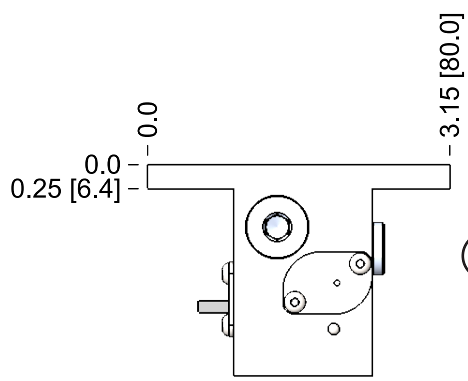
	PORTS
VLTS-	
	(Blank) = NPTF
	G = G Threads

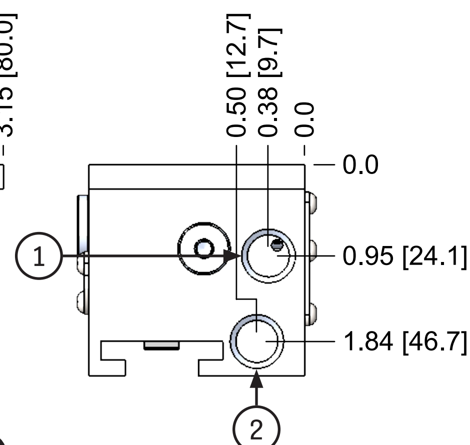


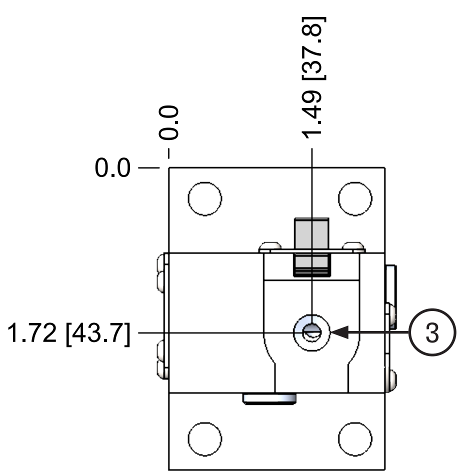


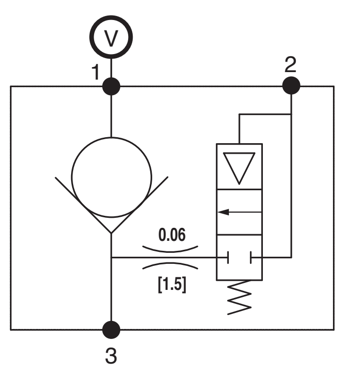
Weight: 0.70 lb [319.0 g]











CODE	FUNCTION	NPT	G
1	Air Supply	1/4 NPTF	G 1/4
2	Pilot - Blow Off	1/4 NPTF	G 1/4
3	Vacuum	T-Slot	T-Slot

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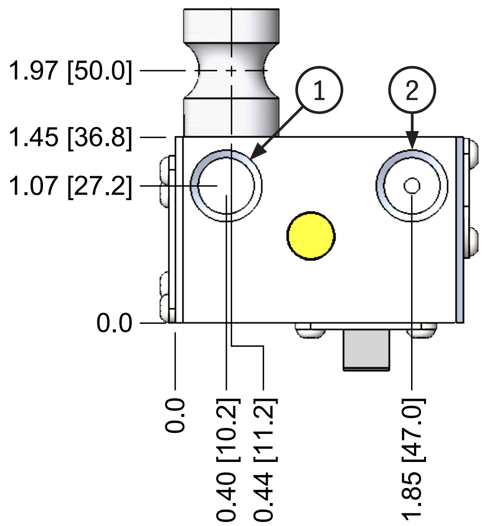
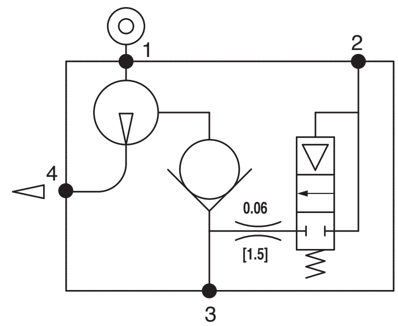
EMAT
T-SLOT RECEIVER W/ VACLOC & INTEGRAL PUMP

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.

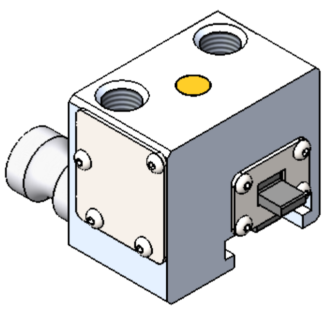
VLP includes all the ***VacLoc*** features plus a coaxial ejector vacuum pump cartridge that is integrated into a compact single-piece body. Response time is greatly improved by minimizing flow paths and system volume. Reliability is improved by eliminating external plumbing and potential leak points.

	VENTURI SIZE		OPTIONS		PORTS
VLP	10L	T	A	-	
	07		**A** = Apple Core		(Blank) = NPTF
	09		**B** = Ball Swivel		**G** = G Threads
	10				
	08L				
	10L				

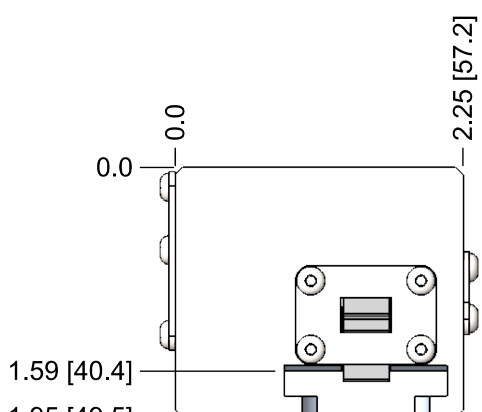


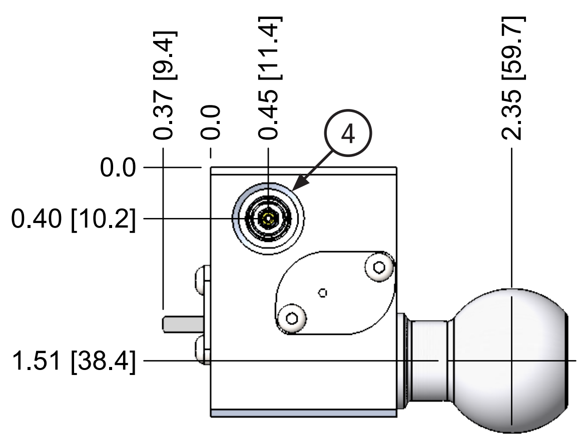


APPLE CORE PIN

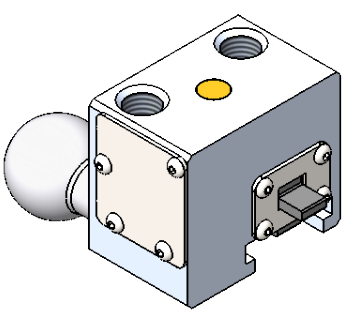


Weight: 0.58 lb [262.0 g]

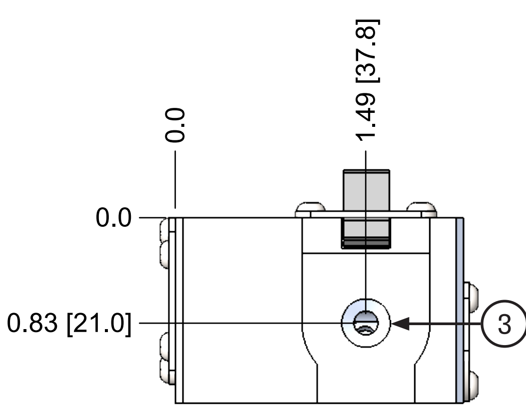




BALL SWIVEL



Weight: 0.63 lb [286.0 g]



CODE	FUNCTION	NPT	G
1	Air Supply	1/4 NPTF	G 1/4
2	Pilot - Blow Off	1/4 NPTF	G 1/4
3	Vacuum	T-Slot	T-Slot
4	Exhaust	G 1/4	G 1/4

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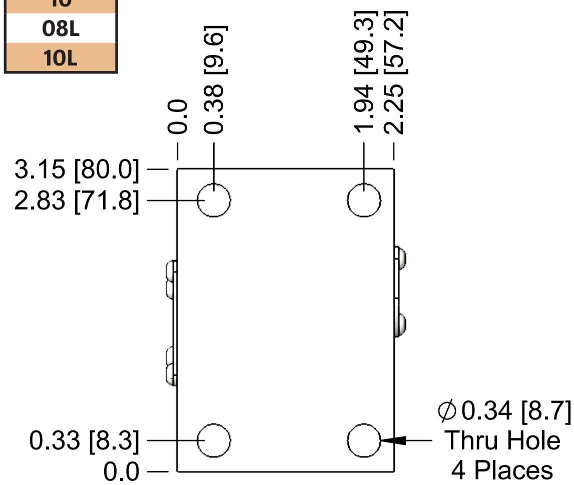
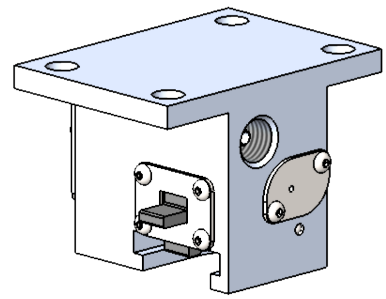
EMAT
SURFACE MOUNT T-SLOT RECEIVER W/ VACLOC & INTEGRAL PUMP

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.

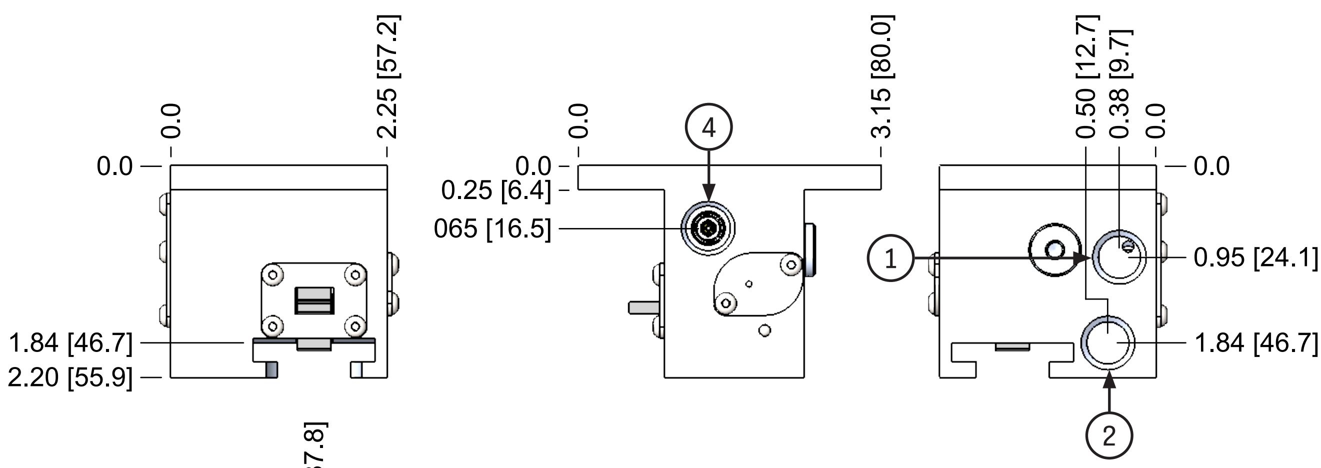
VLP includes all the ***VacLoc*** features plus a coaxial ejector vacuum pump cartridge that is integrated into a compact single-piece body. Response time is greatly improved by minimizing flow paths and system volume. Reliability is improved by eliminating external plumbing and potential leak points.

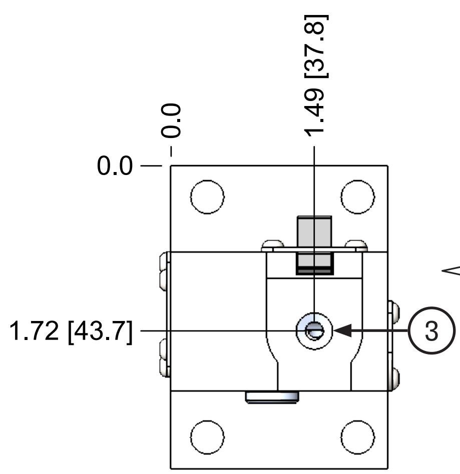
	VENTURI SIZE		PORTS
VLP	10L	TS	
	07		(Blank) = NPTF
	09		**G** = G Threads
	10		
	08L		
	10L		

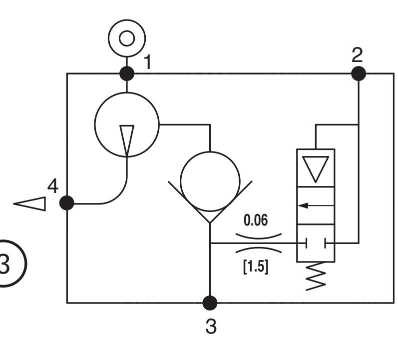




Weight: 0.70 lb [319.0 g]







CODE	FUNCTION	NPT	G
1	Air Supply	1/4 NPTF	G 1/4
2	Pilot - Blow Off	1/4 NPTF	G 1/4
3	Vacuum	T-Slot	T-Slot
4	Exhaust	G 1/4	G 1/4

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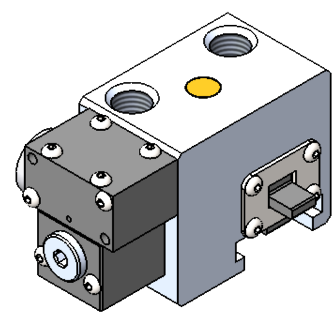
EMAT
T-SLOT RECEIVER W/ VACLOC, INTEGRAL PUMP, & ENERGY SAVER

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.

An adjustable vacustat control is added to a VLP assembly to automatically cycle the vacuum pump on only as required to maintain the desired vacuum level in a leak-free system. All ***VacLoc*** benefits are retained but air-energy consumption is reduced to on a small fraction of the required level required for a constant-on vacuum pump.

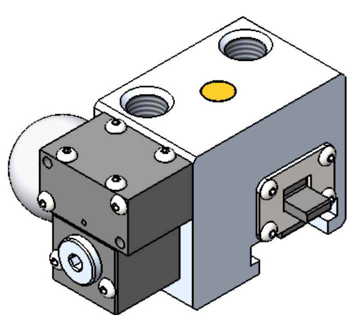
	VENTURI SIZE		OPTIONS		PORTS
VLP	**10L**	**TES-**	**A**	**-**	
	07		**A** = Apple Core		(Blank) = NPTF
	09		**B** = Ball Swivel		**G** = G Threads
	10				
	08L				
	10L				

APPLE CORE PIN

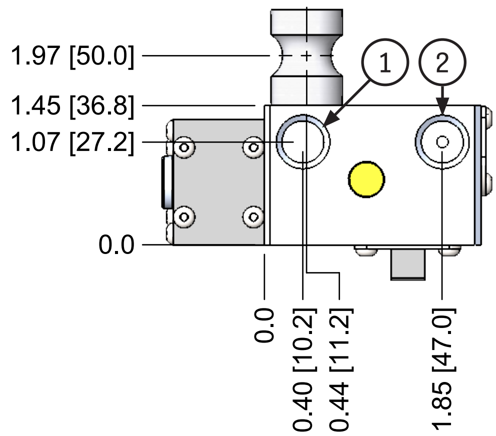


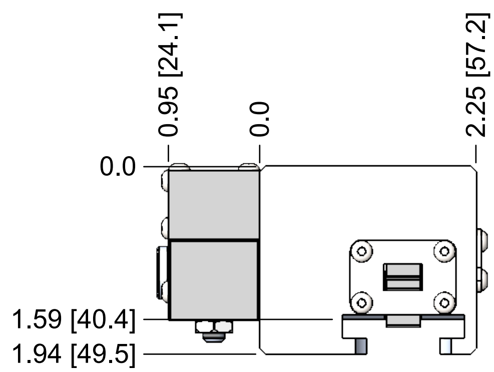
Weight: 0.70 lb [319.0 g]

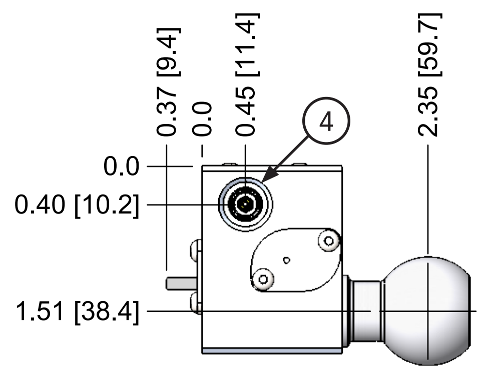
BALL SWIVEL

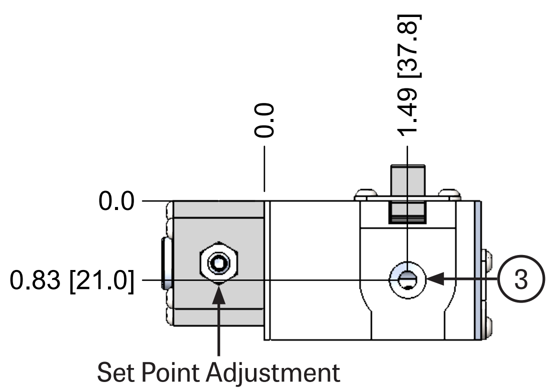


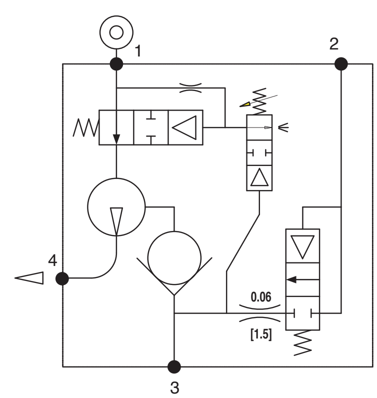
Weight: 0.75 lb [342.0 g]











CODE	FUNCTION	NPT	G
1	Air Supply	1/4 NPTF	G 1/4
2	Pilot - Blow Off	1/4 NPTF	G 1/4
3	Vacuum	T-Slot	T-Slot
4	Exhaust	G 1/4	G 1/4

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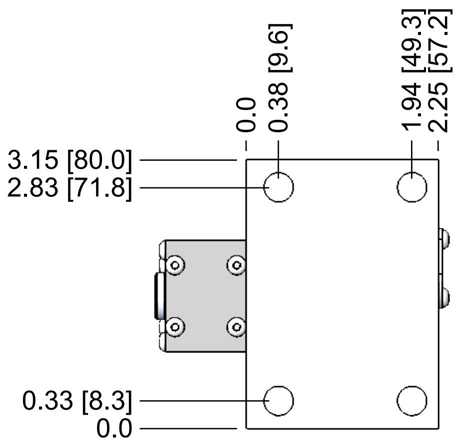
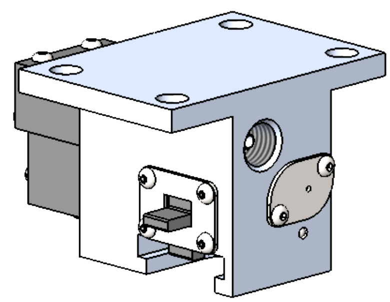
EMAT
SURFACE MOUNT T-SLOT RECEIVER W/ VACLOC, INTEGRAL PUMP, & ENERGY SAVER

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.

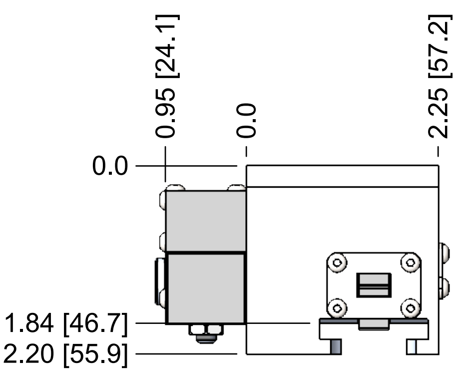
An adjustable vacustat control is added to a VLP assembly to automatically cycle the vacuum pump on only as required to maintain the desired vacuum level in a leak-free system. All ***VacLoc*** benefits are retained but air-energy consumption is reduced to on a small fraction of the required level required for a constant-on vacuum pump.

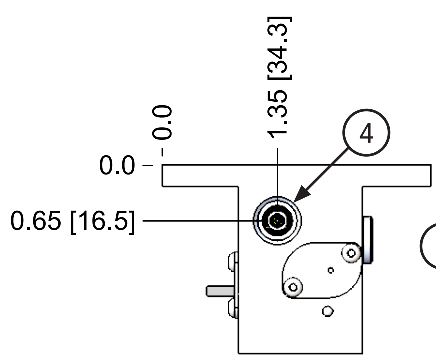
	VENTURI SIZE		PORTS
VLP	10L	TSES-	
	07		(Blank) = NPTF
	09		**G** = G Threads
	10		
	08L		
	10L		

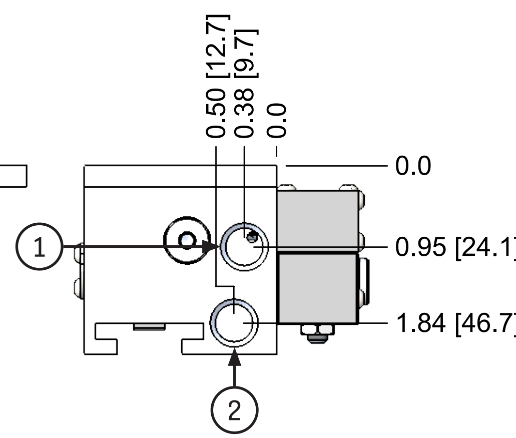


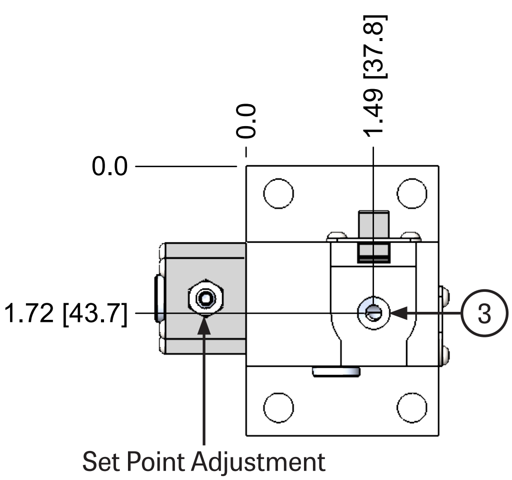


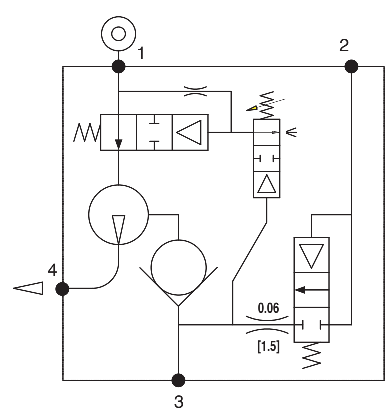
Weight: 0.79 lb [357.0 g]











CODE	FUNCTION	NPT	G
1	Air Supply	1/4 NPTF	G 1/4
2	Pilot - Blow Off	1/4 NPTF	G 1/4
3	Vacuum	T-Slot	T-Slot
4	Exhaust	G 1/4	G 1/4

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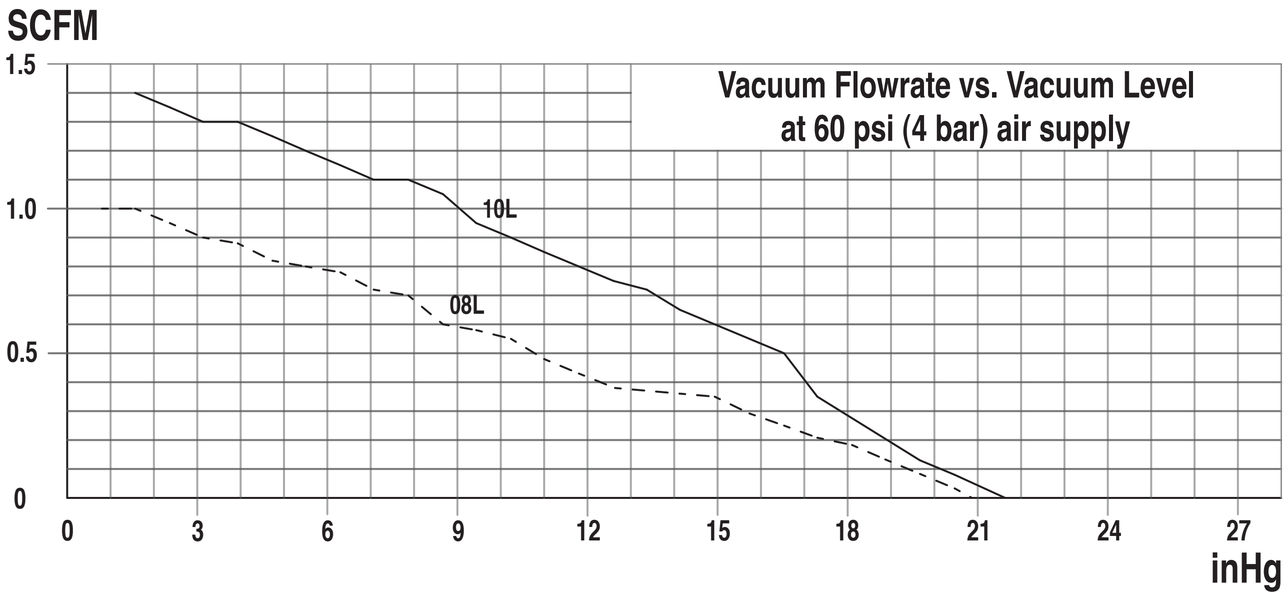

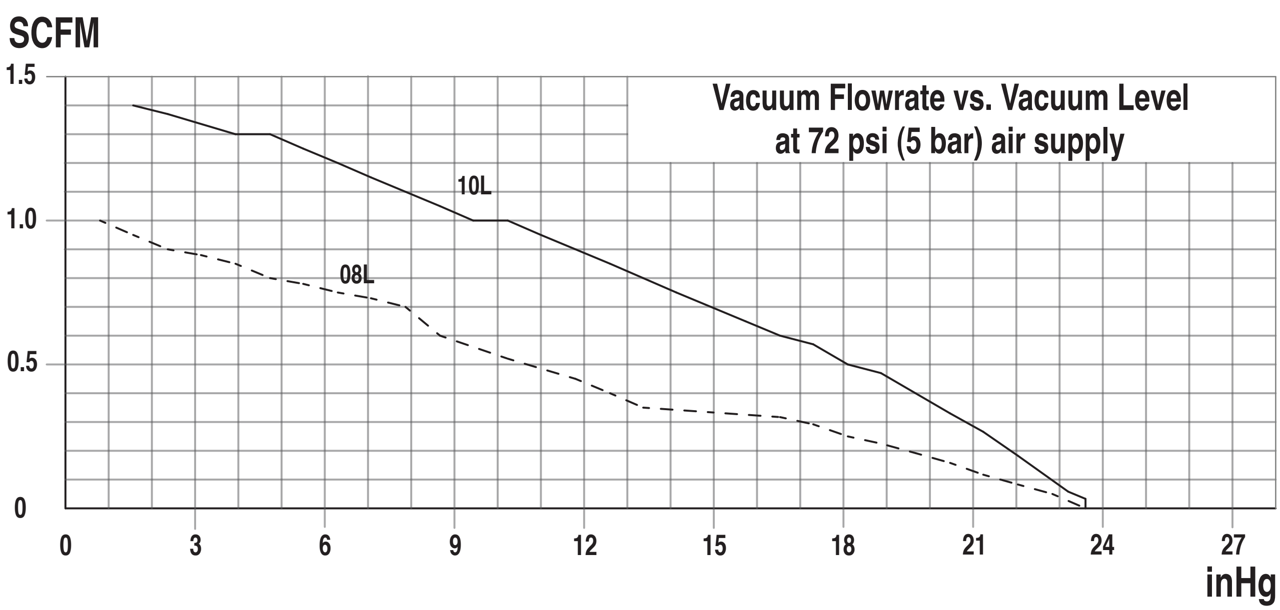

All performance data presented is a representatation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.

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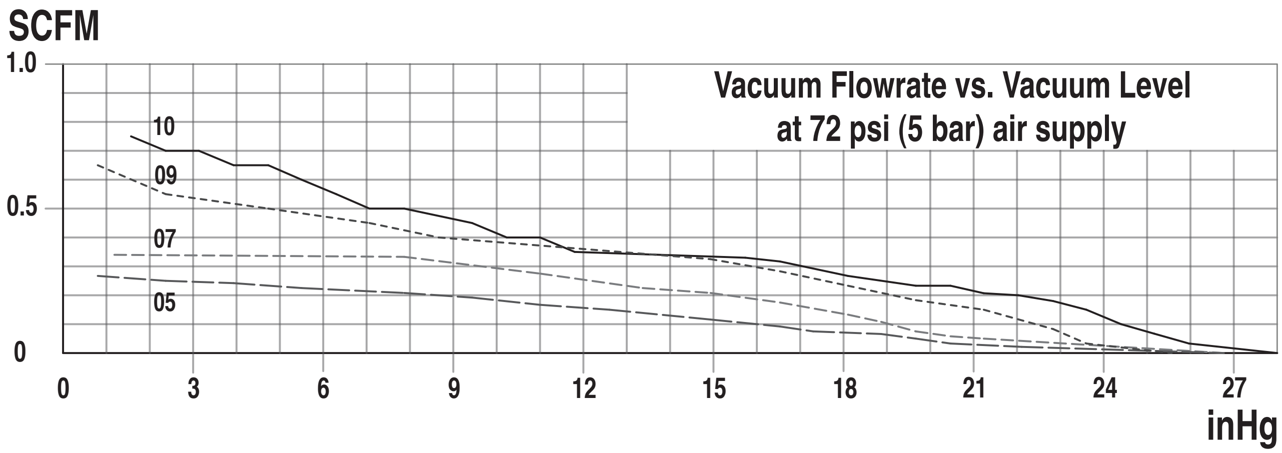

VACUUM FLOW - SCFM

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
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	0.70	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

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
ER05	72	0.4	26.7	1	2.5	4.5	7.5	12.5	20	35	-
ER07	72	0.8	26.7	0.8	1.80	3.1	5.1	8.1	13.1	22.8	-
ER09	72	1.4	25.5	0.45	1.1	2	3.4	5.4	8.7	14.8	-
ER10	72	1.8	28	0.36	2.88	1.66	2.8	4.6	7.5	12.7	-
ER08L	72	1.2	23.6	0.28	0.69	1.28	2.2	3.7	6.1	10.5	-
ER10L	72	1.9	23.6	0.2	0.46	0.83	1.38	2.2	3.6	6.1	-
ER08L	60	1.0	20.4	0.28	0.68	1.26	2.1	3.6	6.1	11	-
ER10L	60	1.65	21.6	0.2	0.46	0.82	1.4	2.3	3.8	6.8	-

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

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.

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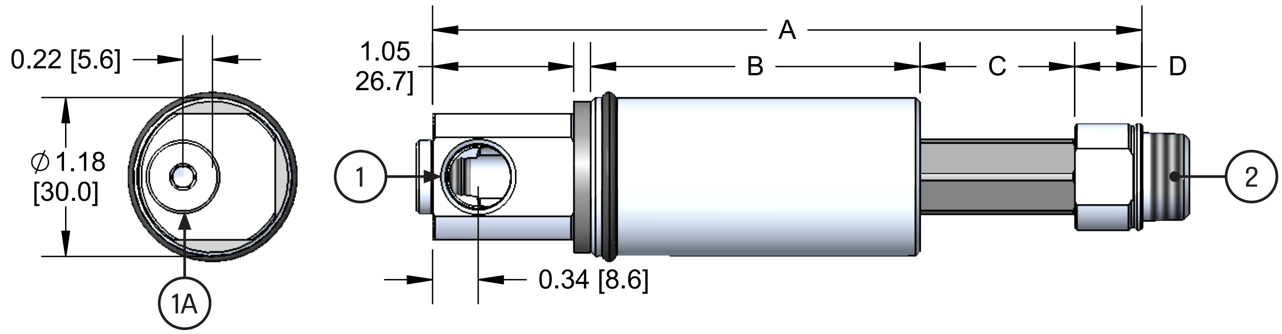
EMAT
LEVEL COMPENSATORS

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.

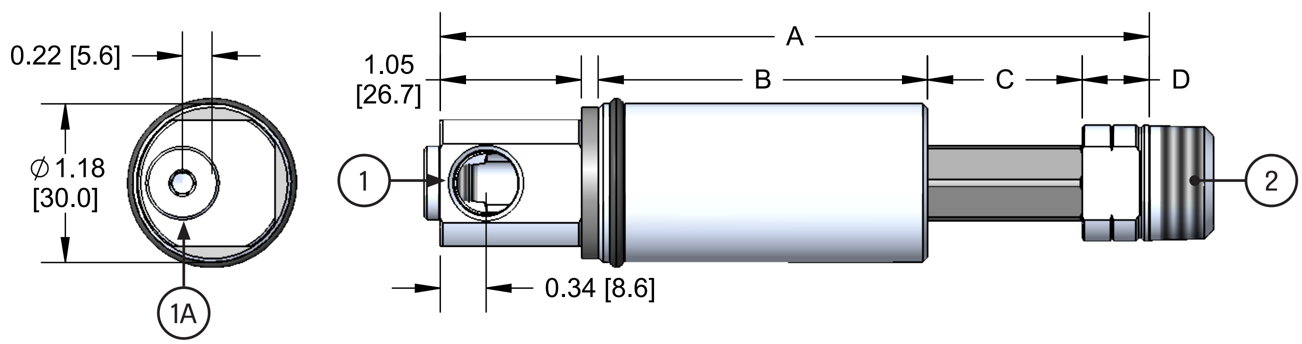
	STROKE	THREAD SIZE	-	THREAD
LC	25	38M	-	
	25 = 25 mm	**38M** = 3/8		(Blank) = NPTF
	50 = 50 mm	**12M** = 1/2		**G** = G Threads



O-ring retainer prevents level compensator from slipping through the mount.

CODE	FUNCTION	NPT	G
1	Air Supply	1/4 NPTF	G 1/4
1A	Air Supply - Alternate	G 1/8 NPSF	G 1/8 NPSF
2	Vacuum	3/8 NPTF	G 3/8

PART NUMBER	A LENGTH in [mm]	B SLEEVE HEIGHT 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]
LC5038M	7.88 [200.0]	4.20 [107.0]	2.00 [50.0]	0.50 [12.7]	0.60 [274.0]



O-ring retainer prevents level compensator from slipping through the mount.

CODE	FUNCTION	NPT	G
1	Air Supply	1/4 NPTF	G 1/4
1A	Air Supply - Alternate	G 1/8 NPSF	G 1/8 NPSF
2	Vacuum	1/2 NPTF	G 1/2

PART NUMBER	A LENGTH in [mm]	B SLEEVE HEIGHT in [mm]	C STROKE in [mm]	D COUPLER in (mm)	WEIGHT lb (g)
LC2512M	5.13 [130.0]	2.45 [62.2]	1.00 [25.0]	0.5 (12.7)	0.42 (189)
LC5012M	7.88 [200.0]	4.20 [107.0]	2.00 [50.0]	0.5 (12.7)	0.6 (274)

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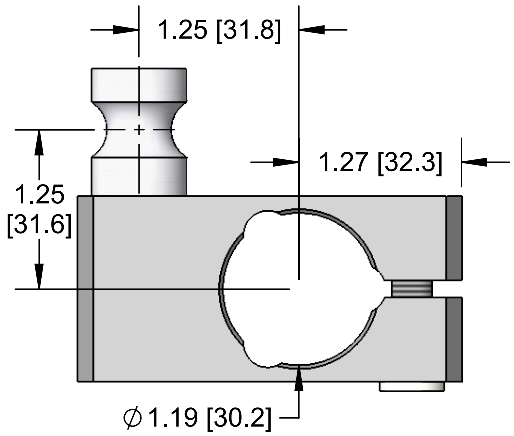
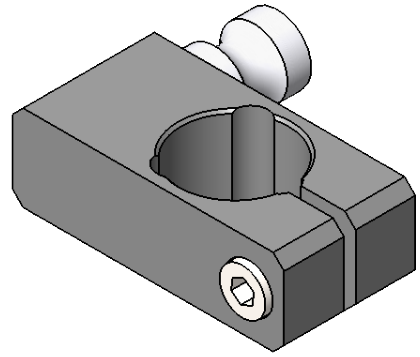
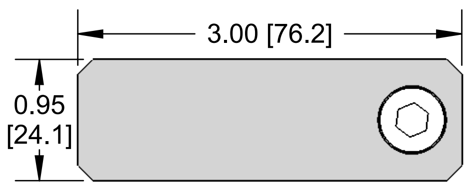
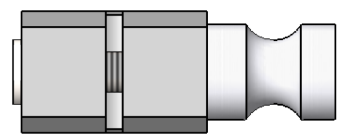
EMAT
LEVEL COMPENSATORS W/ APPLE CORE PIN MOUNT

	STROKE	THREAD SIZE		THREAD
LC	25	12M	A-	
	25 = 25 mm	**38M** = 3/8		(Blank) = NPT
	50 = 50 mm	**12M** = 1/2		**G** = G Threads

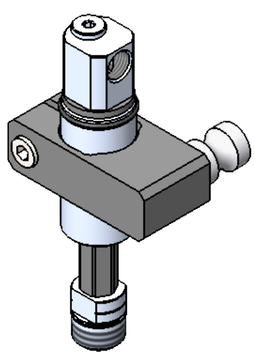






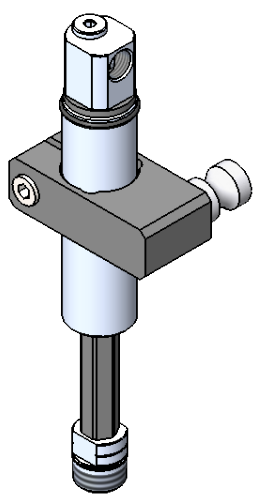


LC2512MA



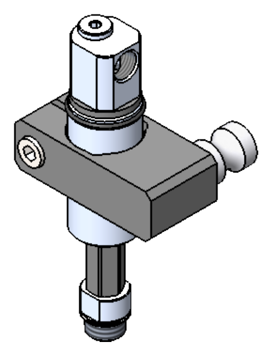
Weight: 0.76 lb [343.0 g]

LC5012MA



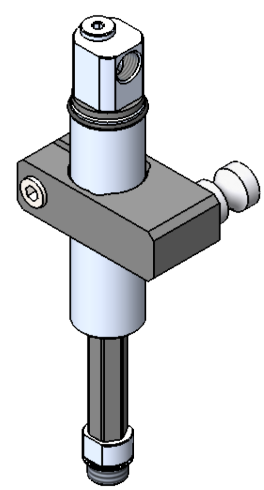
Weight: 0.94 lb [428.0 g]

LC2538MA



Weight: 0.76 lb [343.0 g]

LC5038MA



Weight: 0.94 lb [428.0 g]

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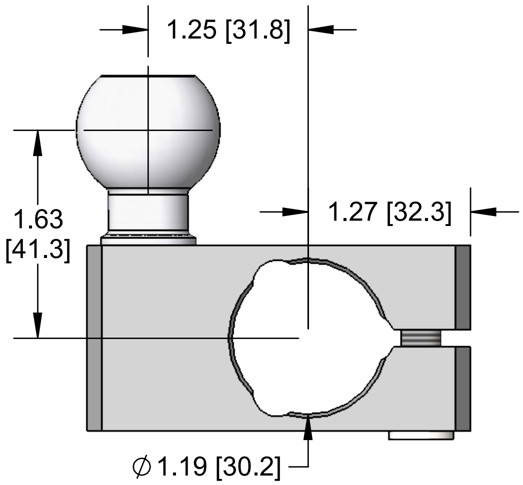
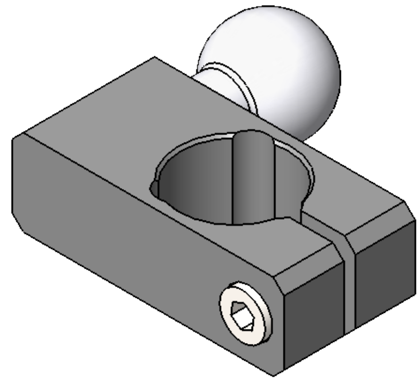
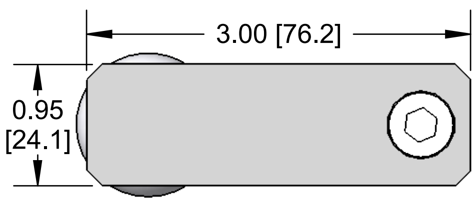
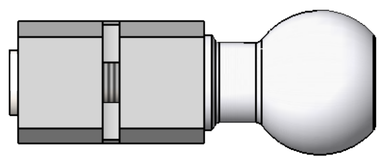
EMAT
LEVEL COMPENSATORS W/ BALL SWIVEL MOUNT

	STROKE	THREAD SIZE		THREAD
LC	25	12M	B-	
	25 = 25 mm	**38M** = 3/8		(Blank) = NPT
	50 = 50 mm	**12M** = 1/2		**G** = G Threads

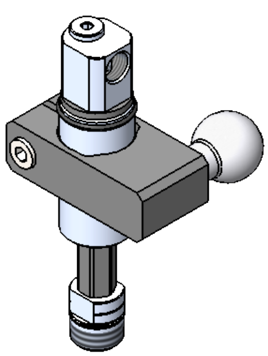






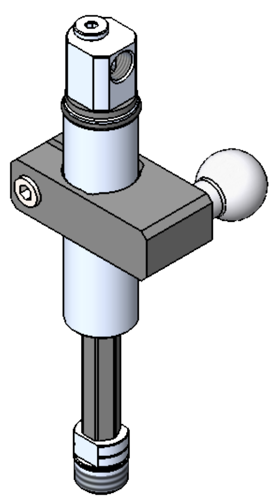


LC2512MB



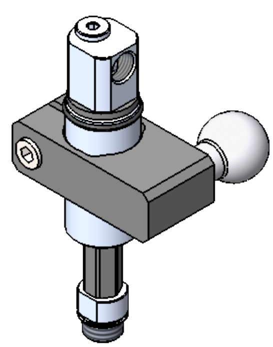
Weight: 0.81 lb [366.0 g]

LC5012MB



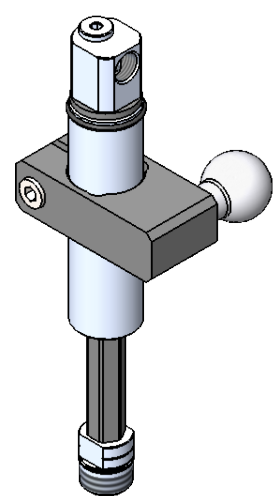
Weight: 0.99 lb [451.0 g]

LC2538MB



Weight: 0.81 lb [366.0 g]

LC5038MB



Weight: 0.99 lb [451.0 g]

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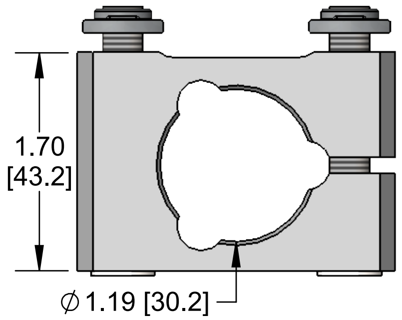
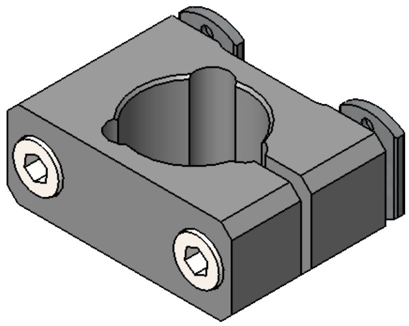
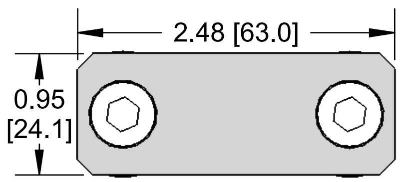
EMAT
LEVEL COMPENSATORS W/ EXTRUSION MOUNT

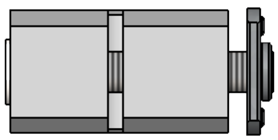
	STROKE	THREAD SIZE		THREAD
LC	25	12M	E-	
	25 = 25 mm	**38M** = 3/8		(Blank) = NPT
	50 = 50 mm	**12M** = 1/2		**G** = G Threads

Two M8x50 screws and two M8 t-nuts included.
Extrusion not included.

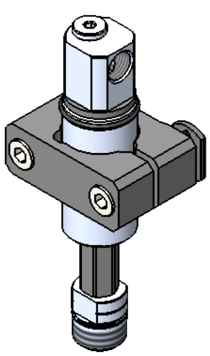






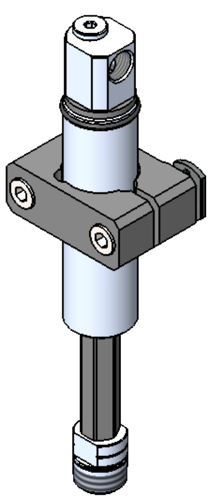


LC2512ME



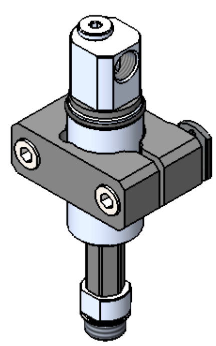
Weight: 0.77 lb [349.0 g]

LC5012ME



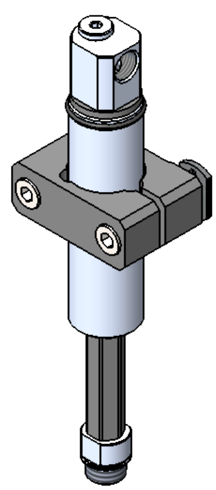
Weight: 0.96 lb [435.0 g]

LC2538ME



Weight: 0.77 lb [349.0 g]

LC5038ME



Weight: 0.96 lb [435.0 g]

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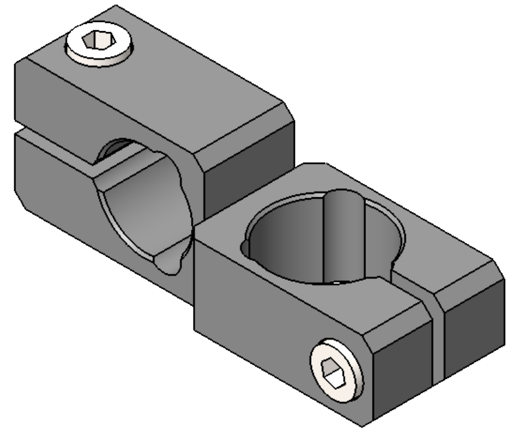
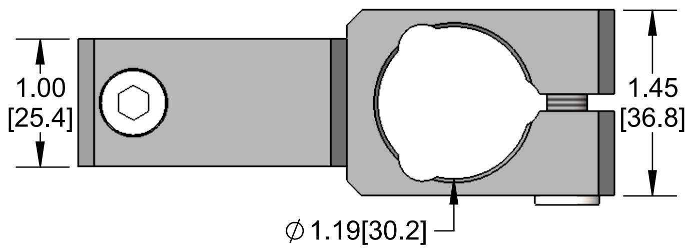
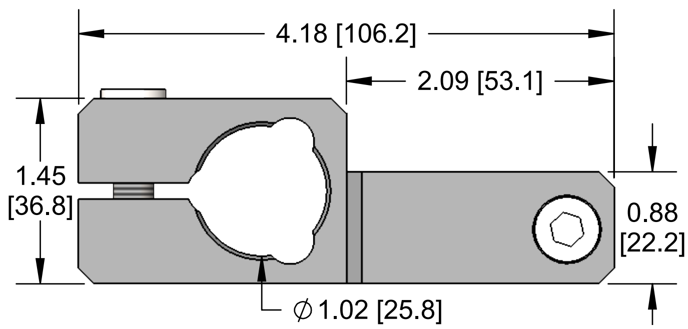
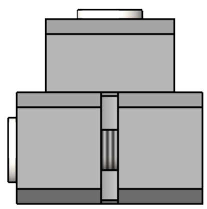
EMAT
LEVEL COMPENSATORS W/ 1.0” SLIDE-ON MOUNT

	STROKE	THREAD SIZE		THREAD
LC	25	12M	S10-	
	25 = 25 mm	**38M** = 3/8		(Blank) = NPT
	50 = 50 mm	**12M** = 1/2		**G** = G Threads

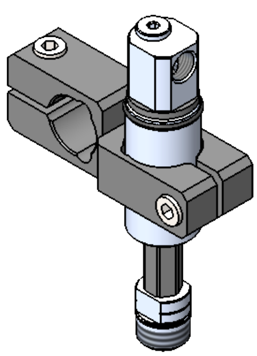






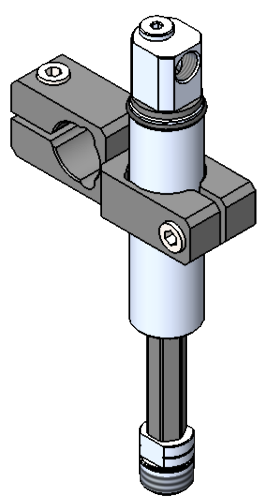


LC2512MS10



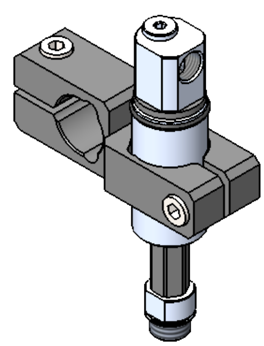
Weight: 0.82 lb [371.0 g]

LC5012MS10



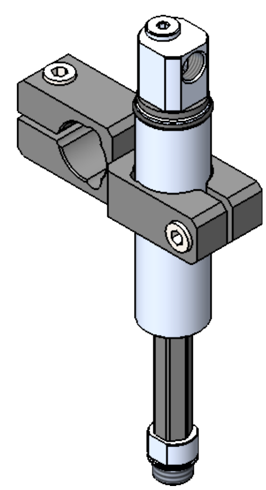
Weight: 1.00 lb [456.0 g]

LC2538MS10



Weight: 0.82 lb [371.0 g]

LC5038MS10



Weight: 1.00 lb [456.0 g]

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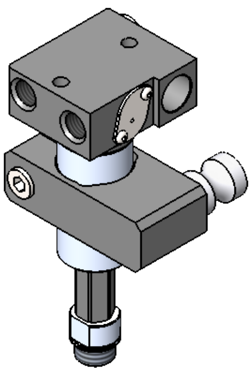
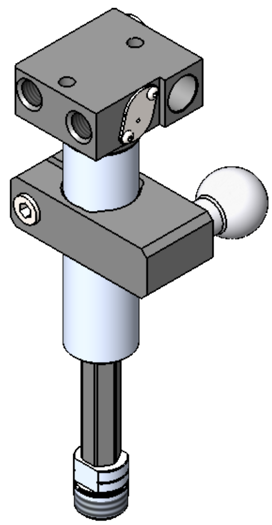
EMAT
LEVEL COMPENSATOR MOUNTED LOW-PROFILE VACUUM CONNECTION W/ BLOW-OFF

	STROKE	THREAD SIZE	MOUNT TYPE		THREAD
LVBC	25	12M	A	-	
	25 = 25 mm	**38M** = 3/8	**A** = Apple Core		(Blank) = NPT
	50 = 50 mm	**12M** = 1/2	**B** = Ball Swivel		**G** = G Threads
			E = Extrusion Mount		
			S10 = 1.0” Slide-On		

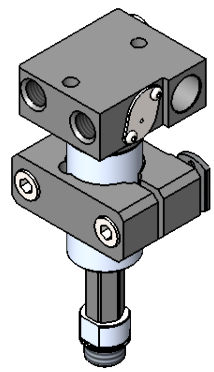
LVBC2538MA



LVBC5012MB



LVBC2538ME



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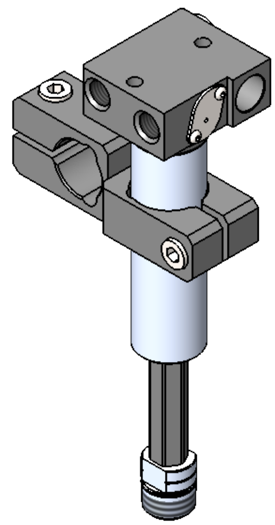

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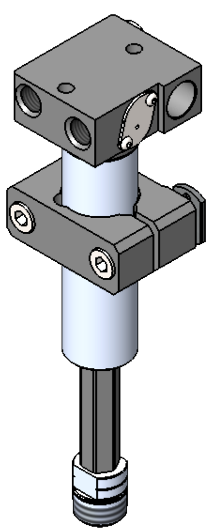
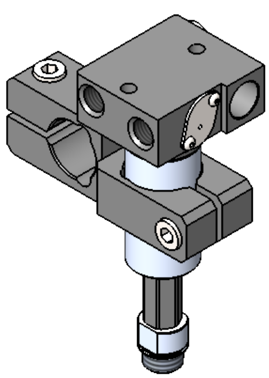
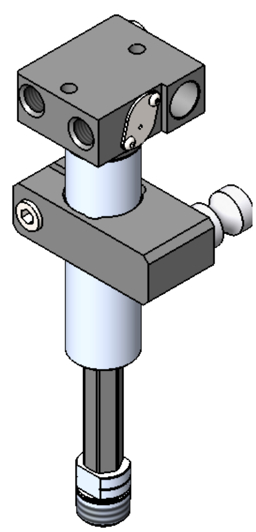


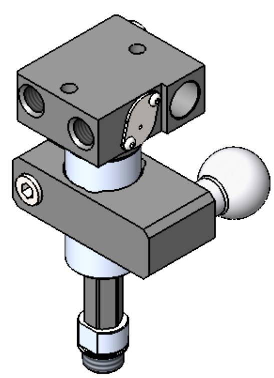
LVBC2538MS10



LVBC5012MA



LVBC2538MB



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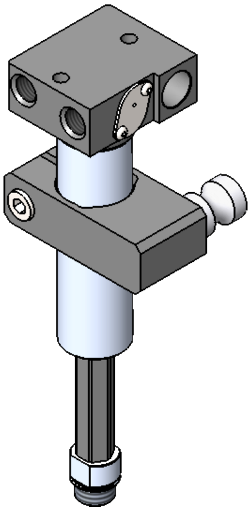
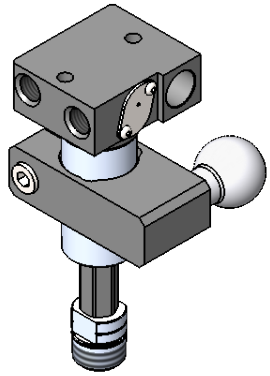
EMAT
LEVEL COMPENSATOR MOUNTED LOW-PROFILE VACUUM PUMP W/ BLOW-OFF

	VENTURI SIZE		STROKE	THREAD SIZE	MOUNT TYPE		THREAD
LPB	10L	C	25	12M	A	-	
	07		**25** = 25 mm	**38M** = 3/8	**A** = Apple Core		(Blank) = NPT
	09		**50** = 50 mm	**12M** = 1/2	**B** = Ball Swivel		**G** = G Threads
	10				**E** = Extrusion Mount		
	08L				**S10** = 1.0" Slide-On		
	10L						

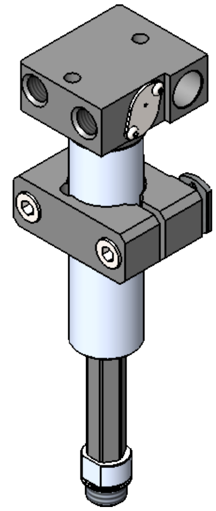
LPB10LC5038MA



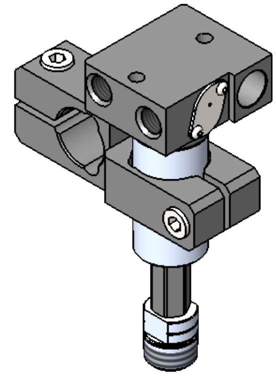
LPB10LC2512MB



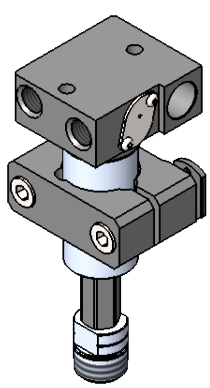
LPB10LC5038ME



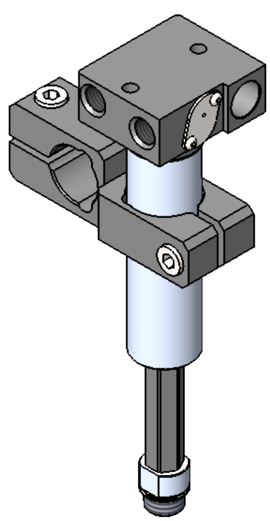
LPB10LC2512MS10



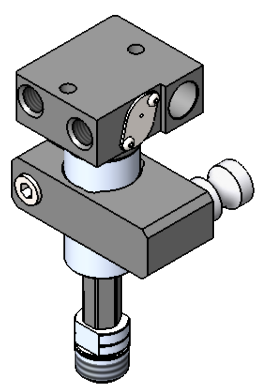
LPB10LC2512ME



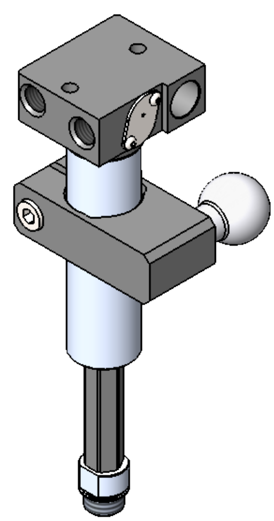
LPB10LC5038MS10



LPB10LC2512MA



LPB10LC5038MB



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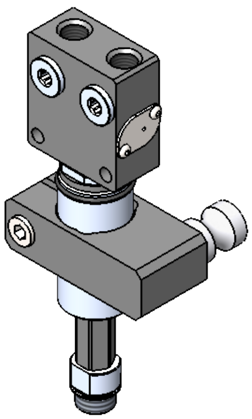
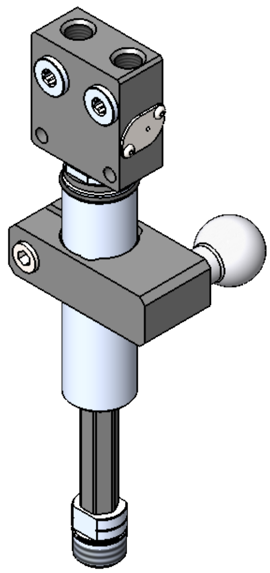
EMAT
LEVEL COMPENSATOR MOUNTED VACLOC

	STROKE	THREAD SIZE	MOUNT TYPE		THREAD
VLC	25	12M	A	-	
	25 = 25 mm	**38M** = 3/8	**A** = Apple Core		(Blank) = NPT
	50 = 50 mm	**12M** = 1/2	**B** = Ball Swivel		**G** = G Threads
			E = Extrusion Mount		
			S10 = 1.0” Slide-On		

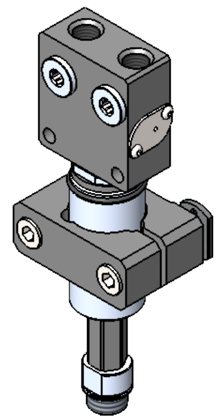
VLC2538MA



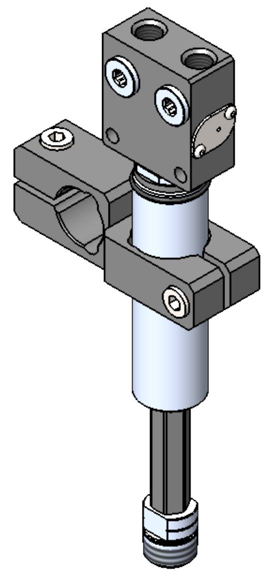
VLC5012MB



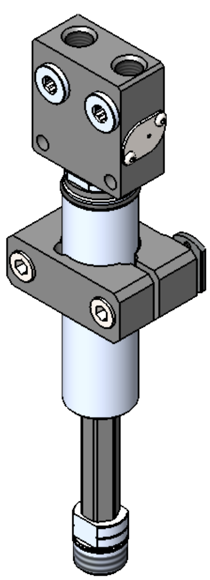
VLC2538ME



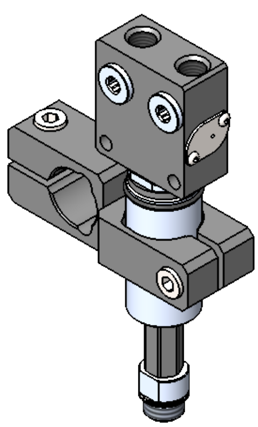
VLC5012MS10



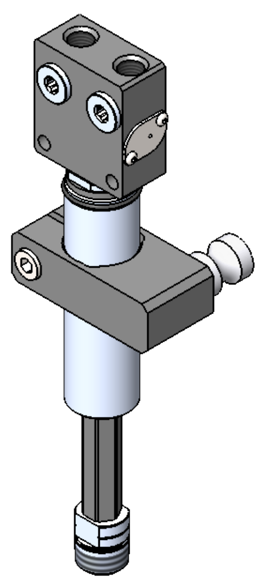
VLC5012ME



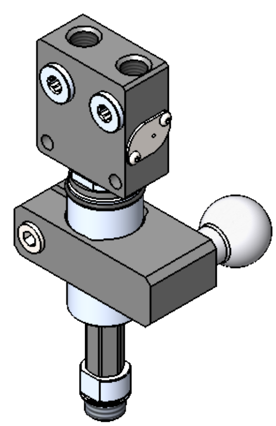
VLC2538MS10



VLC5012MA



VLC2538MB



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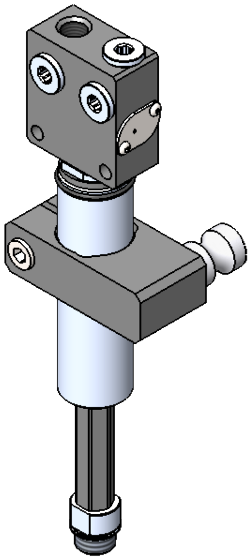
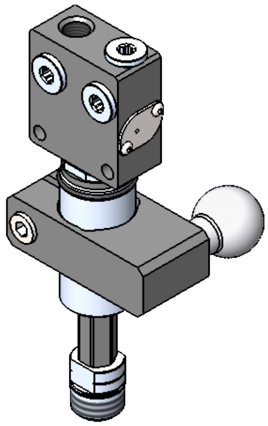
EMAT
LEVEL COMPENSATOR MOUNTED VACLOC W/ CROSS PORT

	STROKE	THREAD SIZE	MOUNT TYPE		THREAD
VLCPC	25	12M	A	-	
	25 = 25 mm	**38M** = 3/8	**A** = Apple Core		(Blank) = NPT
	50 = 50 mm	**12M** = 1/2	**B** = Ball Swivel		**G** = G Threads
			E = Extrusion Mount		
			S10 = 1.0" Slide-On		

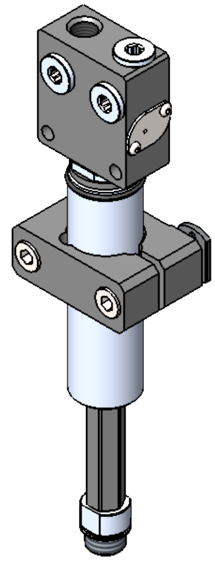
VLCPC5038MA



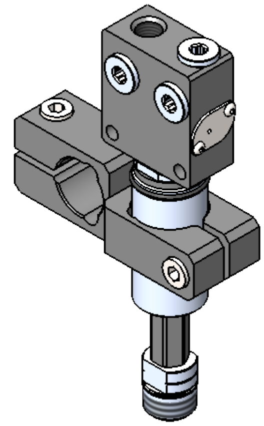
VLCPC2512MB



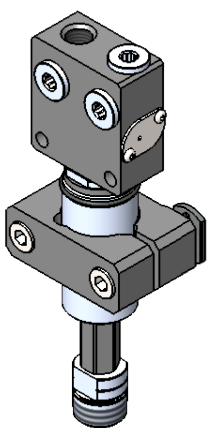
VLCPC5038ME



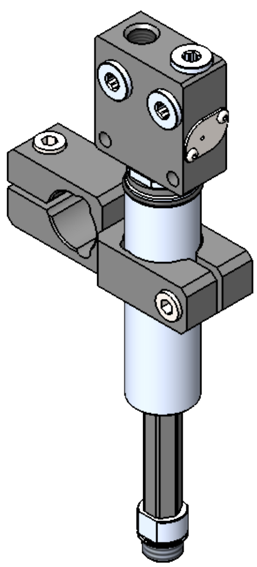
VLCPC2512MS10



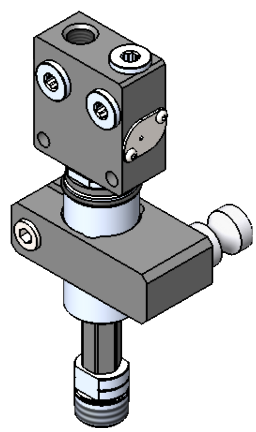
VLCPC2512ME



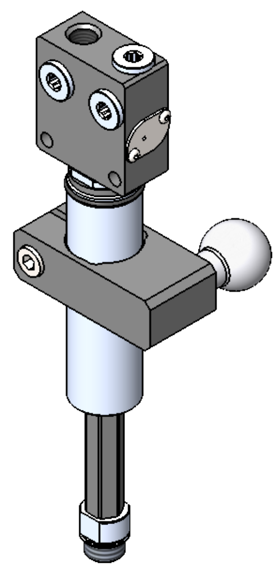
VLCPC5038MS10



VLCPC2512MA



VLCPC5038MB



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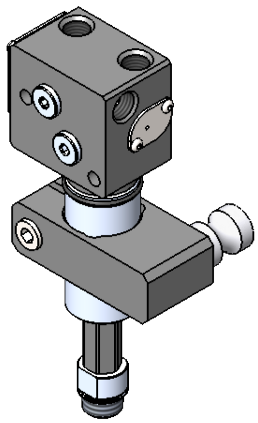
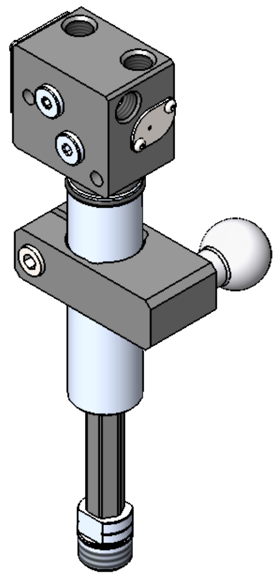
LEVEL COMPENSATOR MOUNTED VACLOC W/ INTEGRAL PUMP

	VENTURI SIZE		STROKE	THREAD SIZE	MOUNT TYPE		THREAD
VLP	10L	C	25	12M	A	-	
	07		**25** = 25 mm	**38M** = 3/8	**A** = Apple Core		(Blank) = NPT
	09		**50** = 50 mm	**12M** = 1/2	**B** = Ball Swivel		**G** = G Threads
	10				**E** = Extrusion Mount		
	08L				**S10** = 1.0" Slide-On		
	10L						

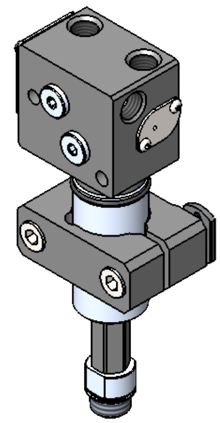
VLP10LC2538MA



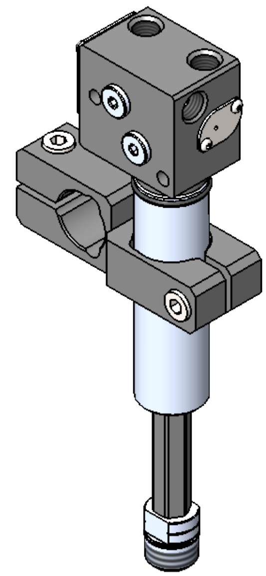
VLP10LC5012MB



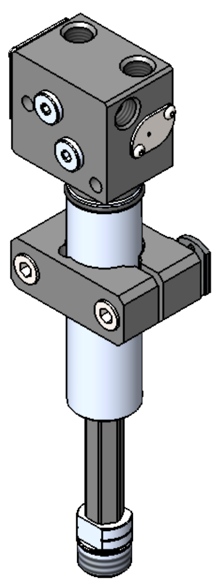
VLP10LC2538ME



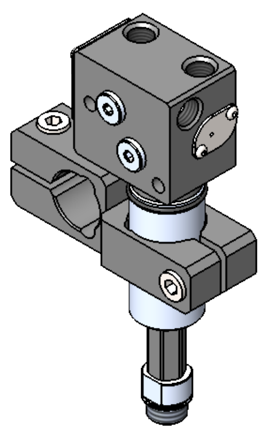
VLP10LC5012MS10



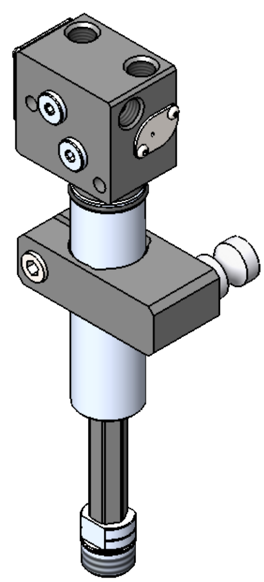
VLP10LC5012ME



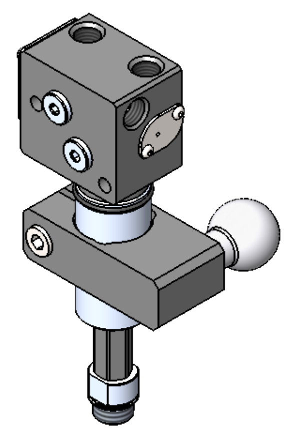
VLP10LC2538MS10



VLP10LC5012MA



VLP10LC2538MB



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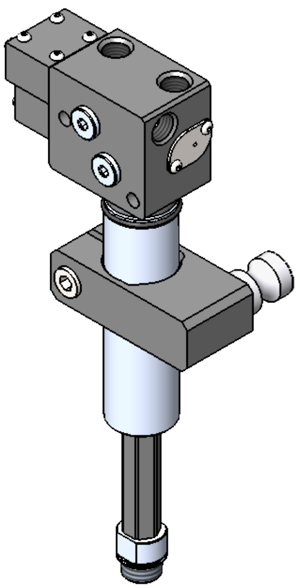
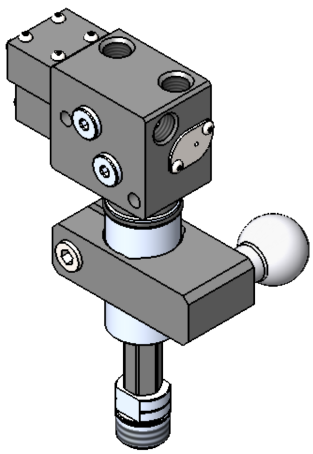
EMAT
LEVEL COMPENSATOR MOUNTED VACLOC W/ INTEGRAL PUMP & ENERGY SAVER OPTION

	VENTURI SIZE		STROKE	THREAD SIZE	MOUNT TYPE		THREAD
VLP	10L	ESC	25	12M	A	-	
	07		**25** = 25 mm	**38M** = 3/8	**A** = Apple Core		(Blank) = NPT
	09		**50** = 50 mm	**12M** = 1/2	**B** = Ball Swivel		**G** = G Threads
	10				**E** = Extrusion Mount		
	08L				**S10** = 1.0" Slide-On		
	10L						

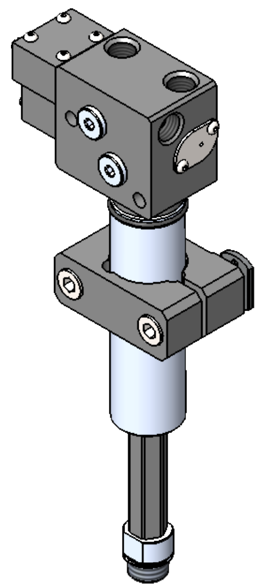
VLP10LESC5038MA



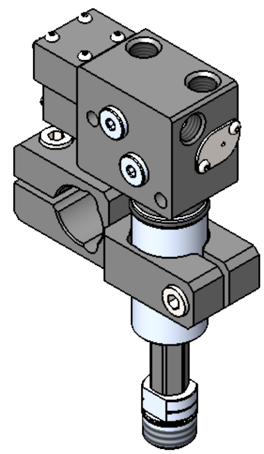
VLP10LESC2512MB



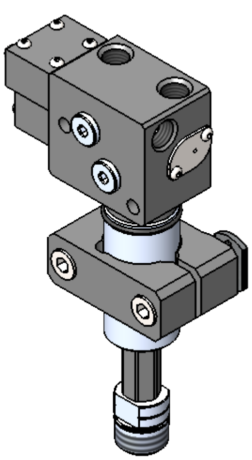
VLP10LESC5038ME



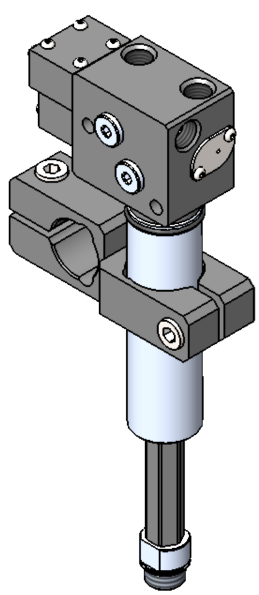
VLP10LESC2512MS10



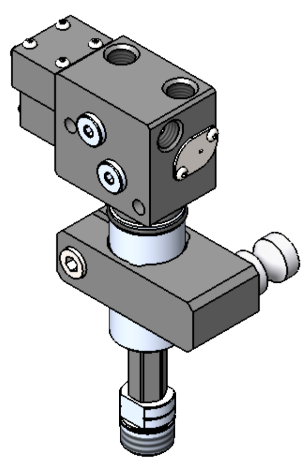
VLP10LESC2512ME



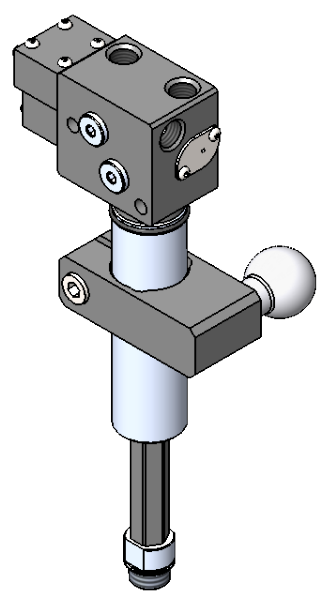
VLP10LESC5038MS10



VLP10LESC2512MA



VLP10LESC5038MB



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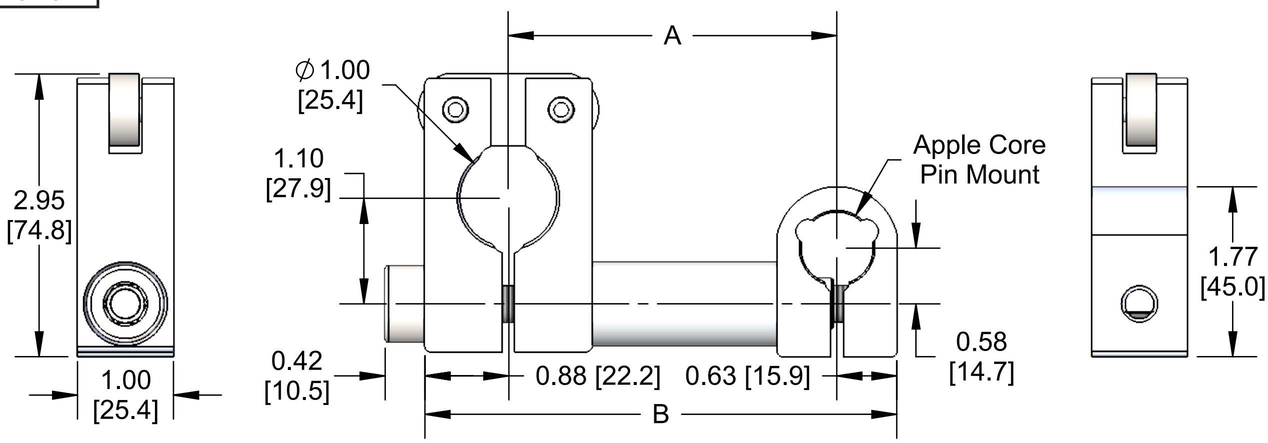
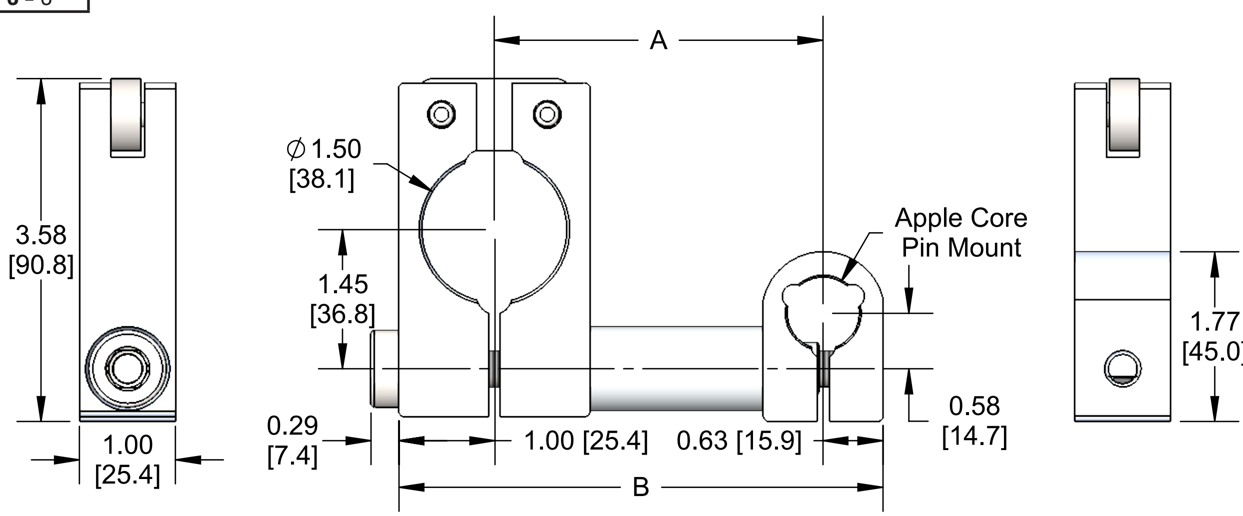
EMAT
CLAMP-ON ARM W/ APPLE CORE PIN RECEIVER

	LENGTH	
C10X	2	A
	1 = 1"	
	2 = 2"	
	4 = 4"	
	6 = 6"	



	C10X1A	C10X2A	C10X4A	C10X6A
A: in [mm]	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]
Weight: lb [g]	0.74 [336.0]	0.82 [370.0]	1.02 [463.0]	1.22 [555.0]

	LENGTH	
C15X	2	A
	1 = 1"	
	2 = 2"	
	4 = 4"	
	6 = 6"	



	C15X1A	C15X2A	C15X4A	C15X6A
A: in [mm]	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]
Weight: lb [g]	0.78 [354.0]	0.85 [387.0]	1.06 [480.0]	1.26 [572.0]

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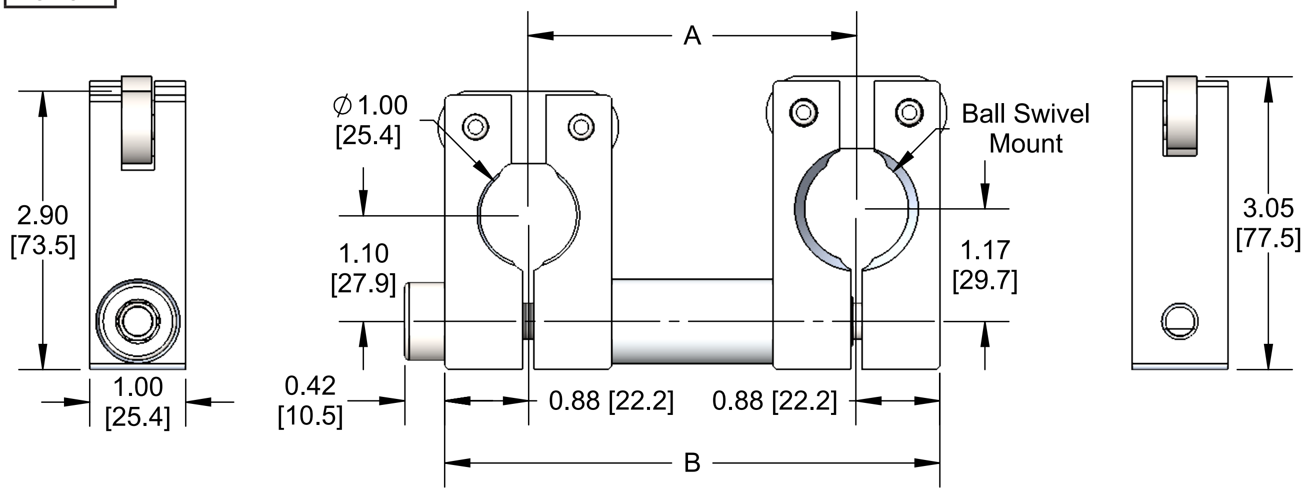
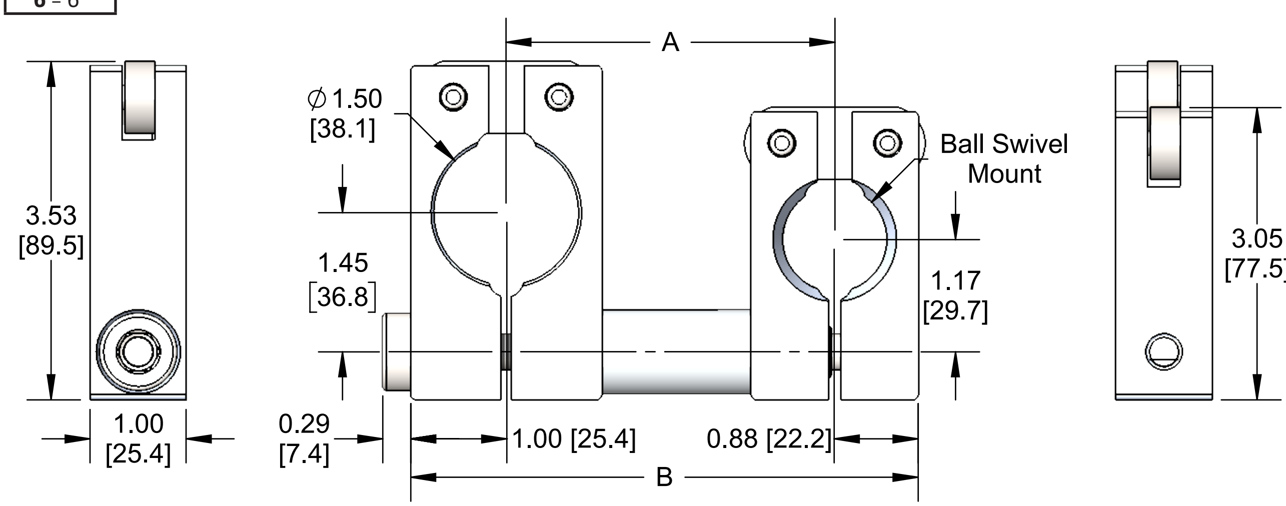
CLAMP-ON ARM W/ BALL SWIVEL RECEIVER

	LENGTH	
C10X	2	B
	1 = 1”	
	2 = 2”	
	4 = 4”	
	6 = 6”	



	C10X1B	C10X2B	C10X4B	C10X6B
A: in [mm]	2.35 [59.7]	3.35 [85.1]	5.35 [136.0]	7.35 [187.0]
B: in [mm]	4.09 [1040.]	5.09 [129.0]	7.09 [180.0]	9.09 [231.0]
Weight: lb [g]	1.03 [469.0]	1.11 [503.0]	1.31 [595.0]	1.52 [687.0]

	LENGTH	
C15X	2	B
	1 = 1”	
	2 = 2”	
	4 = 4”	
	6 = 6”	



	C15X1B	C15X2B	C15X4B	C15X6B
A: in [mm]	2.35 [59.7]	3.35 [85.1]	5.35 [136.0]	7.35 [187.0]
B: in [mm]	4.21 [107.0]	5.21 [132.0]	7.21 [183.0]	9.21 [234.0]
Weight: lb [g]	1.07 [487.0]	1.15 [522.0]	1.35 [613.0]	1.56 [705.0]

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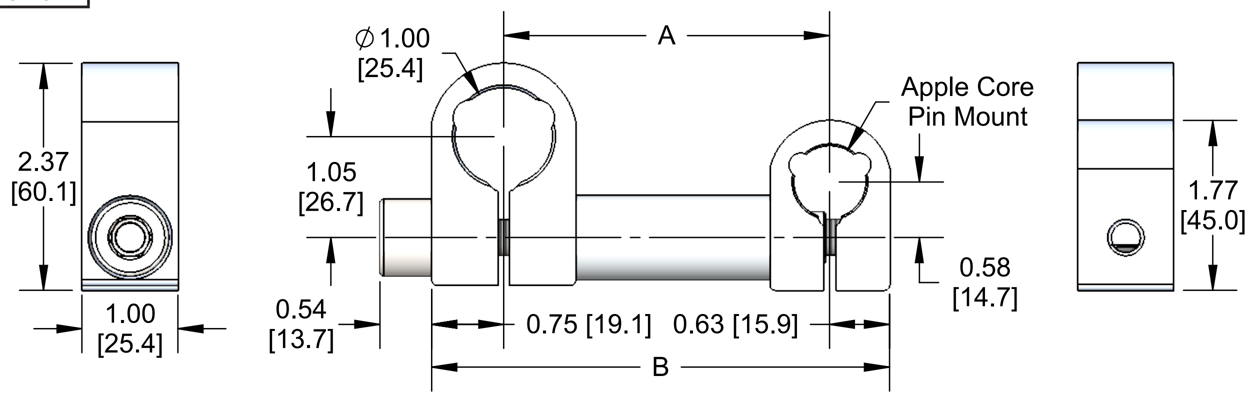
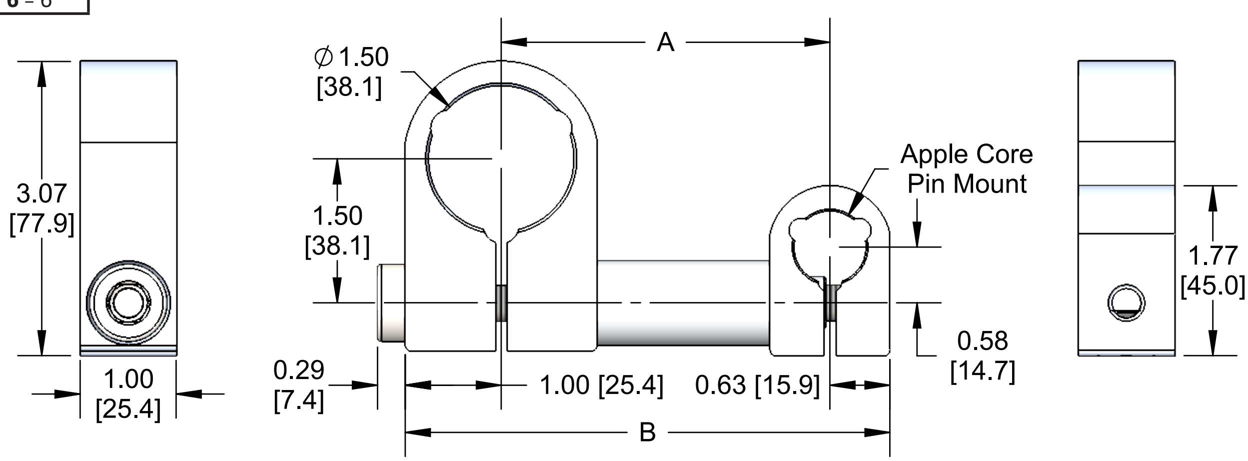
EMAT
SLIDE-ON ARM W/ APPLE CORE PIN RECEIVER

	LENGTH	
S10X	2	A
	1 = 1"	
	2 = 2"	
	4 = 4"	
	6 = 6"	



	S10X1A	S10X2A	S10X4A	S10X6A
A: in [mm]	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]
Weight: lb [g]	0.52 [235.0]	0.60 [270.0]	0.80 [362.0]	1.00 [454.0]

	LENGTH	
S15X	2	A
	1 = 1"	
	2 = 2"	
	4 = 4"	
	6 = 6"	



	S15X1A	S15X2A	S15X4A	S15X6A
A: in [mm]	2.35 [59.7]	3.35 [85.1]	5.35 [136.0]	7.35 [187.0]
B: in [mm]	3.98 [101.0]	4.98 [126.0]	6.98 [177.0]	8.98 [228.0]
Weight: lb [g]	0.62 [281.0]	0.70 (317.0	0.90 [408.0]	1.10 [499.0]

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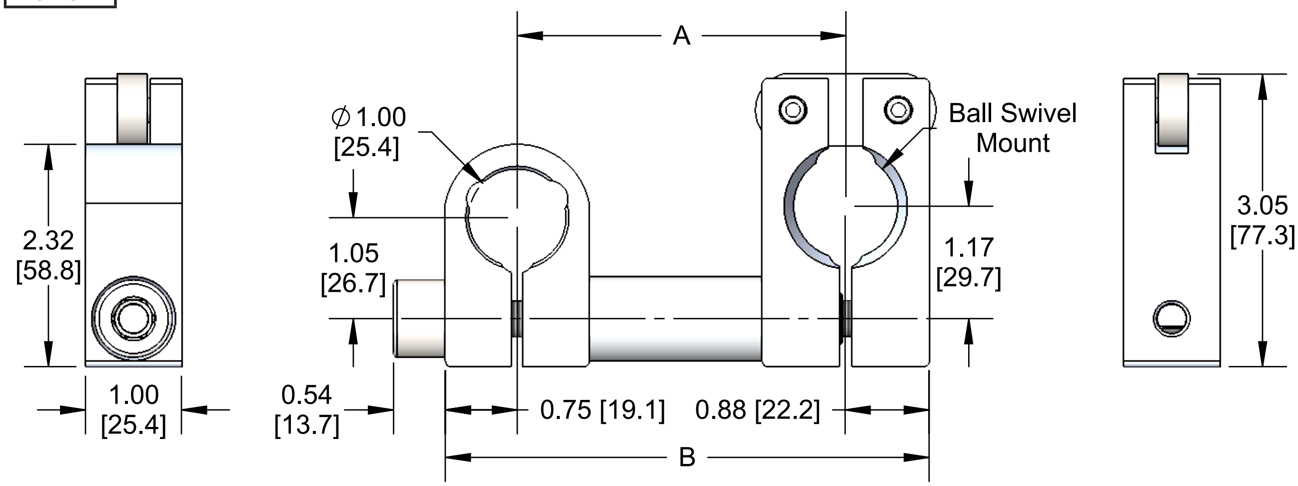
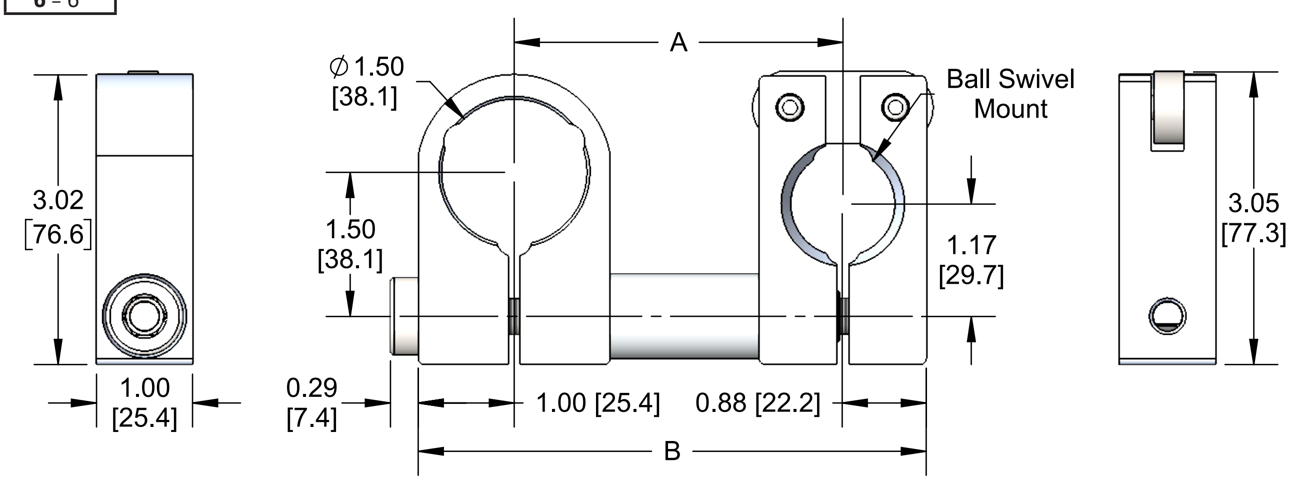
EMAT
SLIDE-ON ARM W/ BALL SWIVEL RECEIVER

	LENGTH	
S10X	2	B
	1 = 1"	
	2 = 2"	
	4 = 4"	
	6 = 6"	



	S10X1B	S10X2B	S10X4B	S10X6B
A: in [mm]	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]
Weight: lb [g]	0.81 [368.0]	0.89 [403.0]	1.09 [495.0]	1.29 [587.0]

	LENGTH	
S15X	2	B
	1 = 1"	
	2 = 2"	
	4 = 4"	
	6 = 6"	



	S15X1B	S15X2B	S15X4B	S15X6B
A: in [mm]	2.35 [59.7]	3.35 [85.1]	5.35 [136.0]	7.35 [187.0]
B: in [mm]	4.22 [107.0]	5.22 [133.0]	7.22 [183.0]	9.22 [234.0]
Weight: lb [g]	0.84 [379.0]	0.91 [414.0]	1.12 [506.0]	1.32 [599.0]

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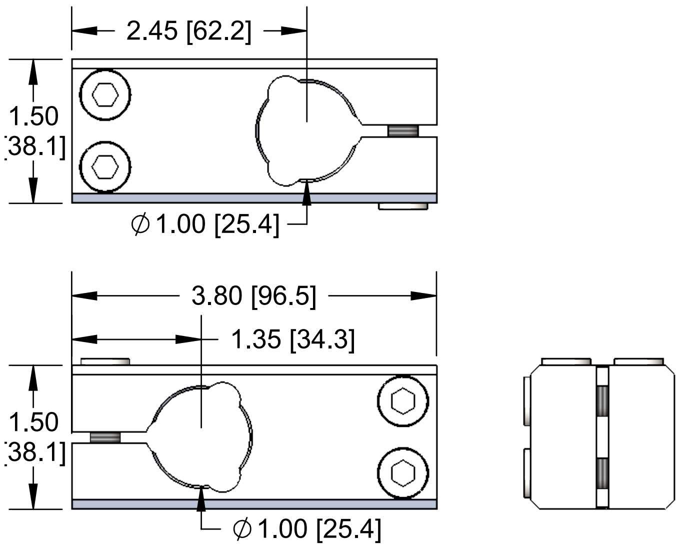
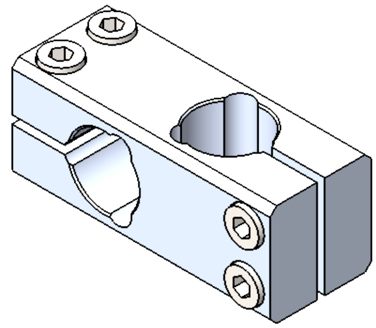
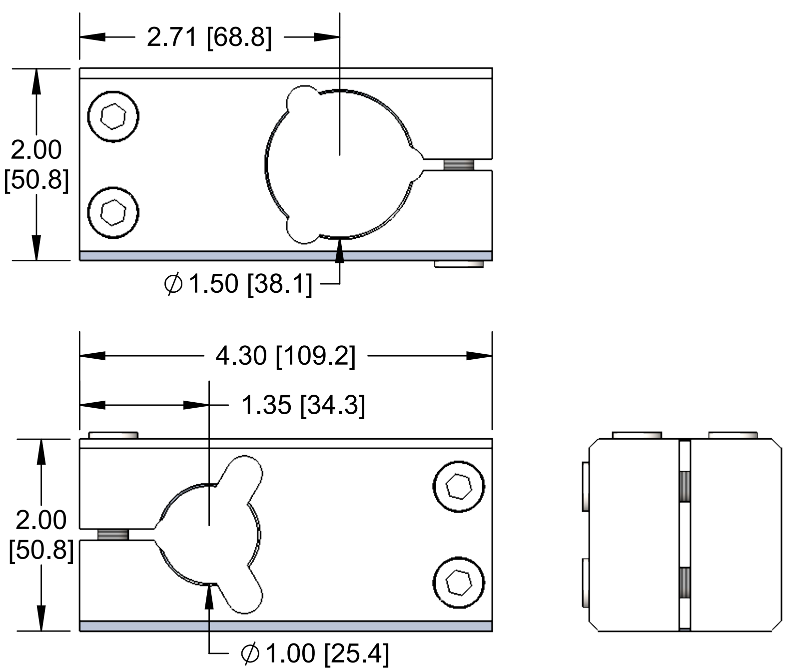
EMAT
CB1010 : CLAMP BLOCK

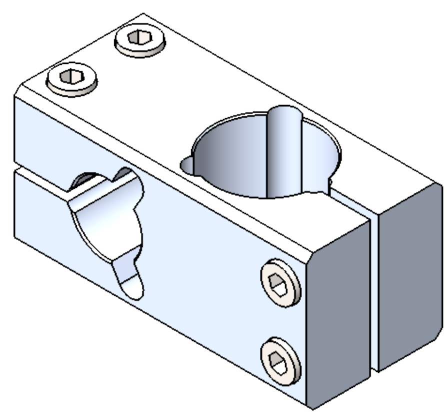




Weight: 0.64 lb [291.0 g]

CB1015 : CLAMP BLOCK





Weight: 1.12 lb [508.0 g]

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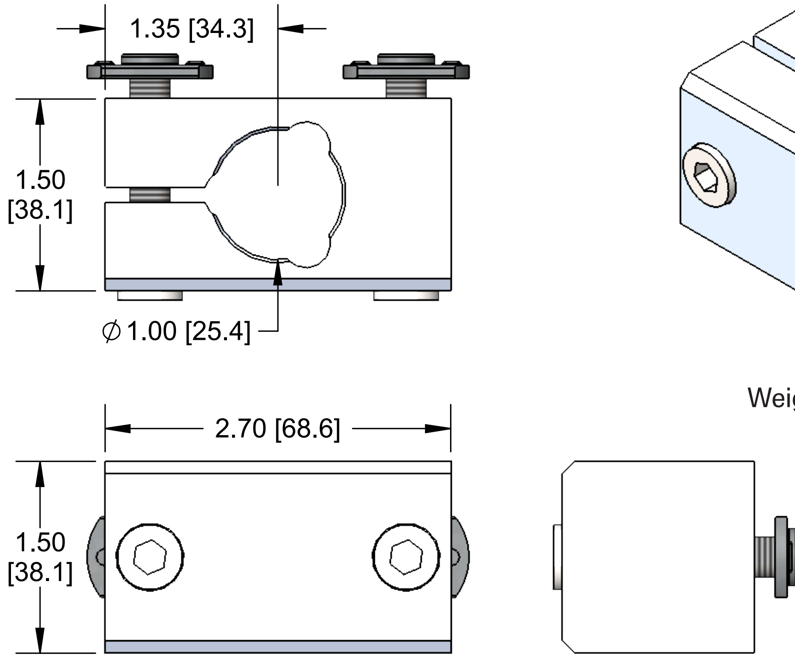
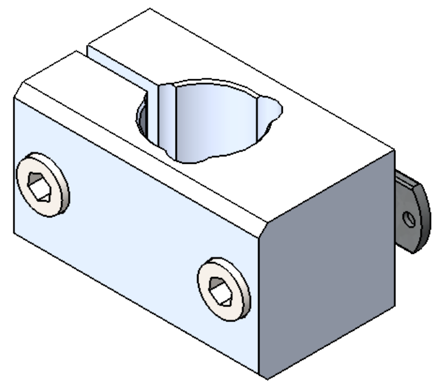
EMAT
E10 : EXTRUSION MOUNT CLAMP BLOCK

Two M8X45 screws and two M8 t-nuts included.

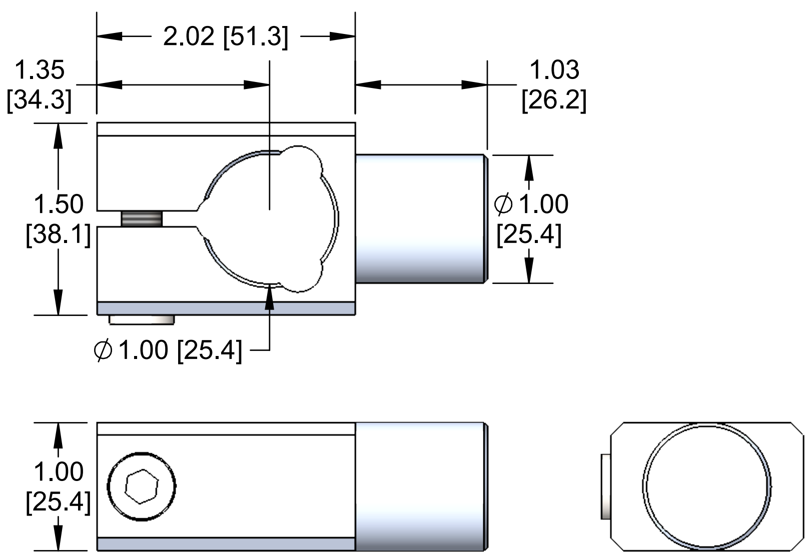
Fits 1-1/2 in or 40 mm extrusions.

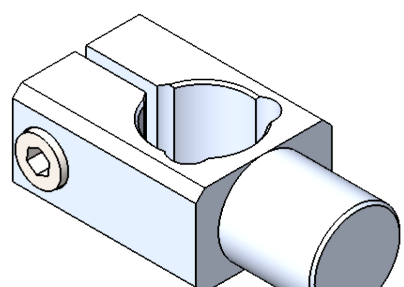




Weight: 0.54 lb [246.0 g]

M3A : 3RD AXIS LEVEL COMPENSATOR MOUNT





Weight: 0.30 lb (137.0 g)

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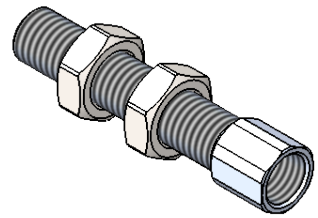
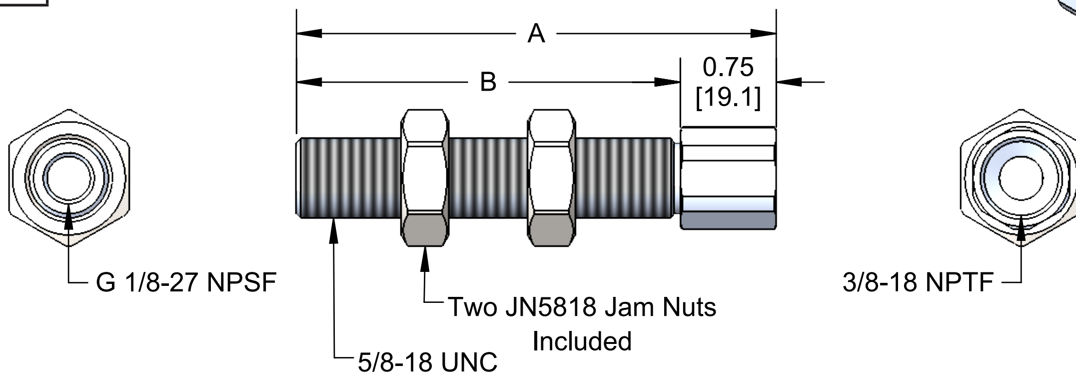
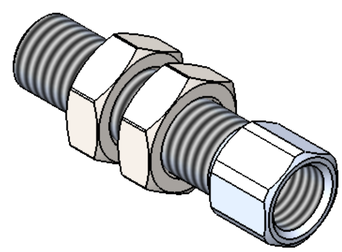
	LENGTH
AM38F-	3
	2 = 2.75”
	3 = 3.75”
	45 = 5.25”
	8 = 8.75”

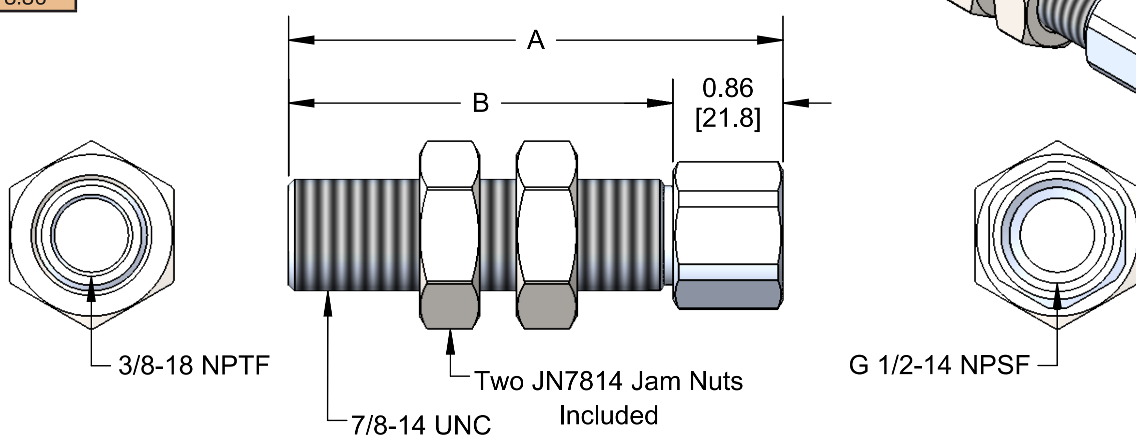




DIMENSION	-2	-3	-45	-8
A: in [mm]	2.75 [69.9]	3.75 [95.3]	5.25 [133.0]	8.75 [222.0]
B: in [mm]	2.0 [50.8]	3.00 [76.2]	4.50 [114.0]	8.00 [203.0]
Weight: lb [g]	0.14 [65.3]	0.16 [73.0]	0.19 [85.3]	0.25 [113.0]

	LENGTH
AM12F-	3
	3 = 3.86”
	6 = 6.86”
	8 = 8.86”





DIMENSION	-3	-6	-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]

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SECTION 17
TOOLING

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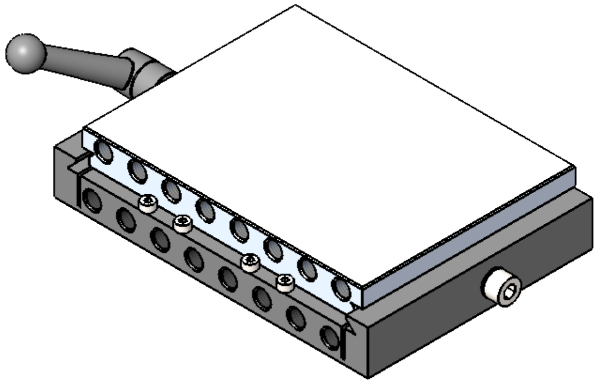
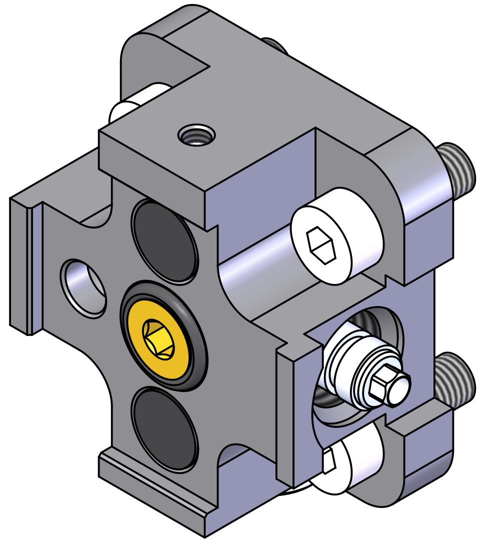
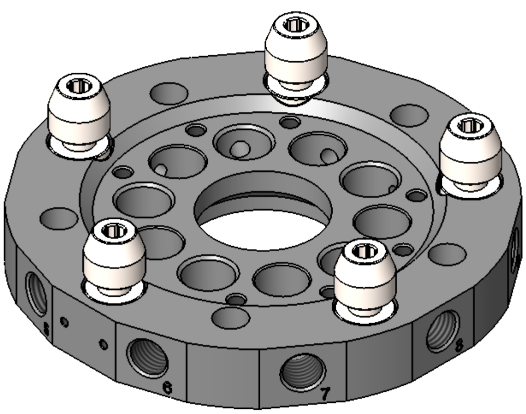


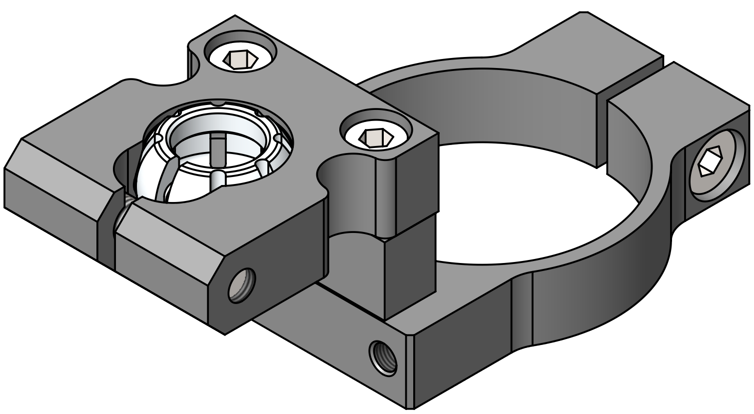
QUICK CHANGE SLIDES



ROBOT QUICK CHANGE PUMP



QUICK CHANGER



MICRO-TOOLING

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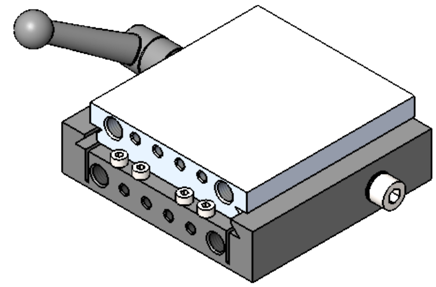
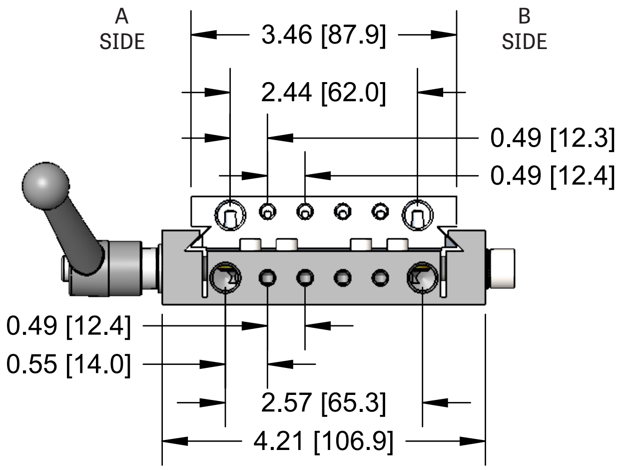
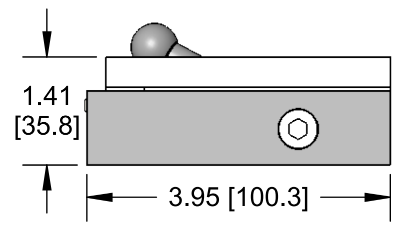
TOOLING
QCS -100: QUICK CHANGE SYSTEM

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.



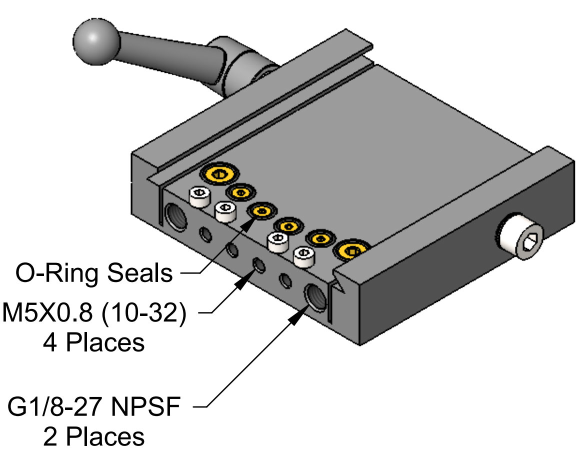




ROBOT CLAMP BASE

QCS-100B- | OPTIONS | - | LAYOUT

OPTIONS	LAYOUT
A	
A = Handle on "A" Side	(Blank) = As Shown
B = Handle on "B" Side	Submit worksheet on page 18:6

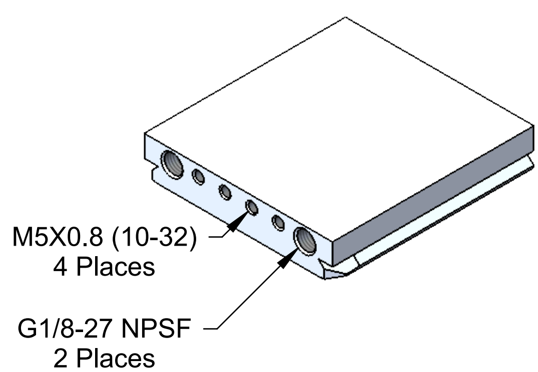


Weight: 1.41 lb [638.0 g]

TOOLING PLATE

QCS-100T-

LAYOUT
(Blank) = As Shown
Submit worksheet on page 18:6



Weight: 0.85 lb [383.0 g]

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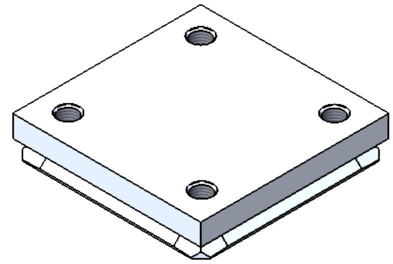
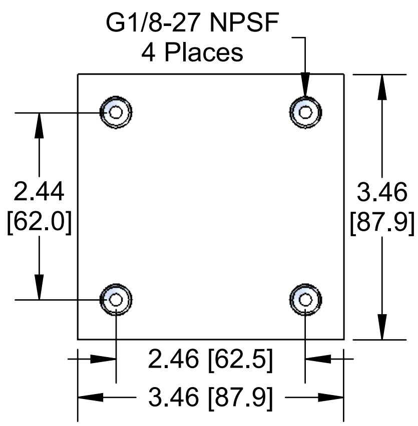
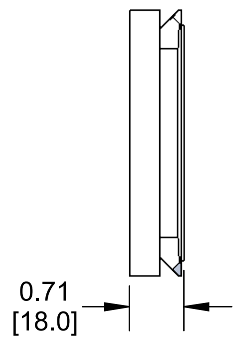
QCS-100: QUICK CHANGE SYSTEM
TOOL PLATE

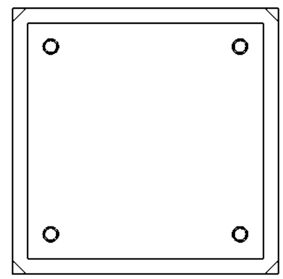
	LAYOUT
QCS-100TD-	
	(Blank) = As Shown
	Submit worksheet on page 18:6



Weight: 0.77 lb [347.0 g]

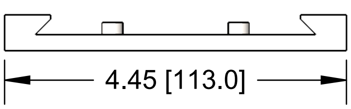


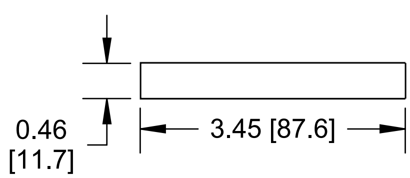


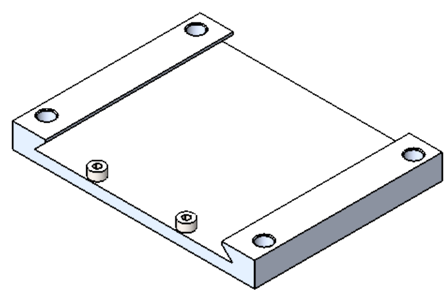


QCS-100P : TOOL PARK

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]

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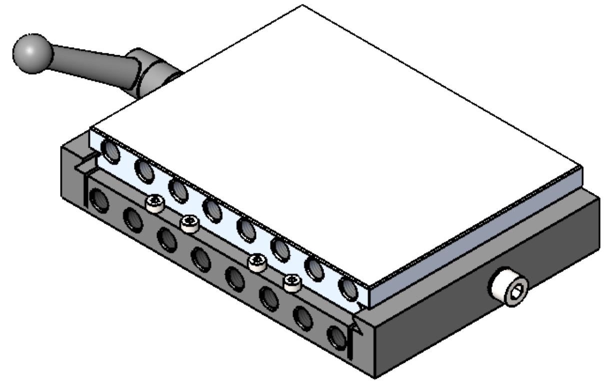
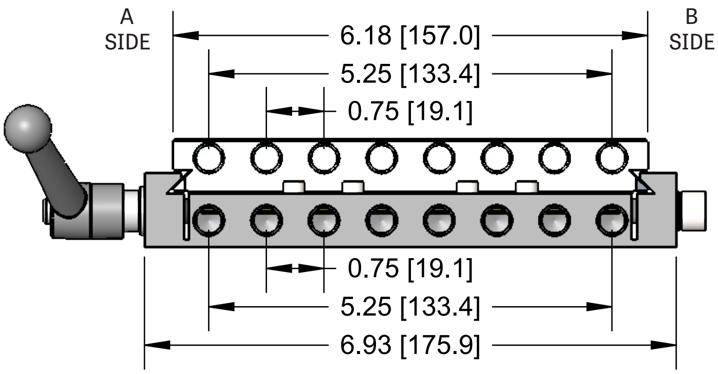
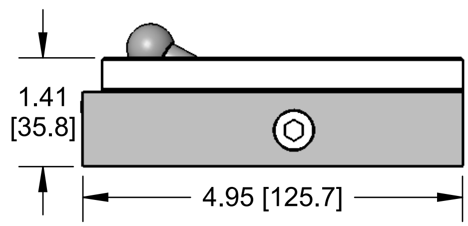
TOOLING
QCS : QUICK CHANGE SYSTEM

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.

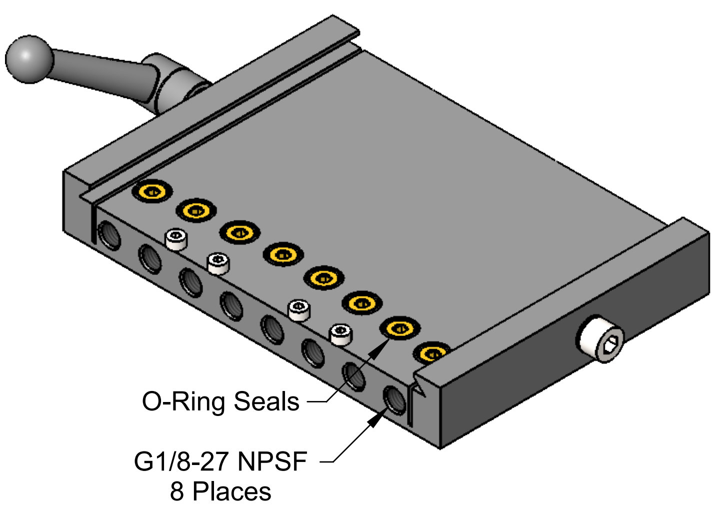






ROBOT CLAMP BASE

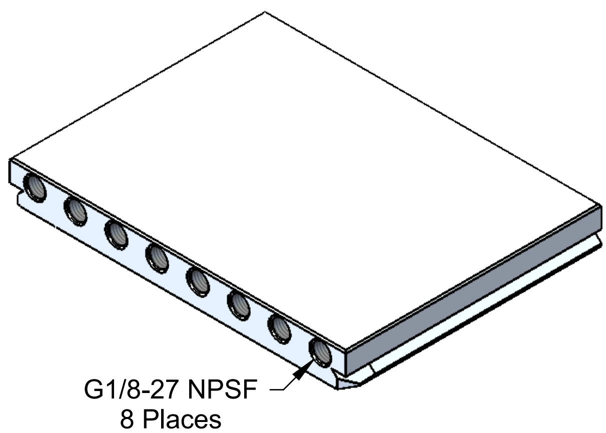
	OPTIONS		LAYOUT
QCS-140B-	A	-	
	A = Handle on "A" Side		(Blank) = As Shown
	B = Handle on "B" Side		Submit worksheet on page 18:6



Weight: 2.58 lb [1169.0 g]

TOOLING PLATE

	LAYOUT
QCS-140T-	
	(Blank) = As Shown
	Submit worksheet on page 18:6



Weight: 1.91 lb [866.0 g]

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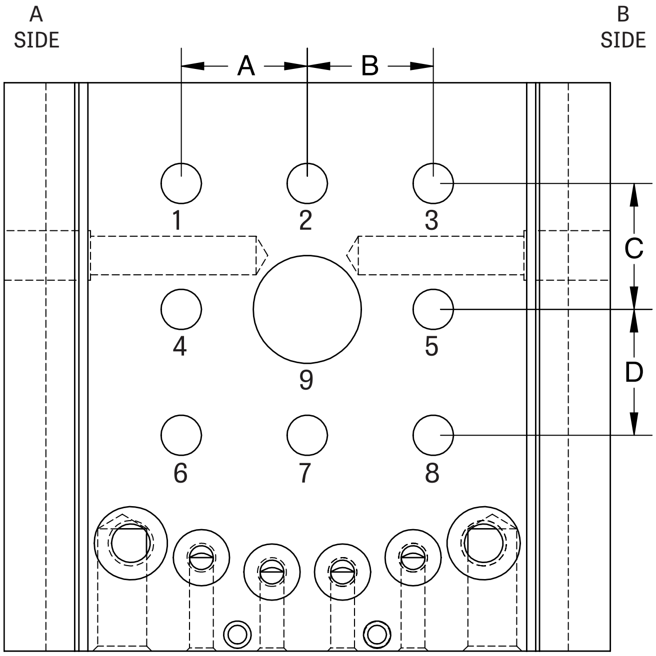


TAP ________________ THREAD @ POSITIONS:

1 [ ] 2 [ ] 3 [ ] 4 [ ]

5 [ ] 6 [ ] 7 [ ] 8 [ ]

9 [ ]

DRILL ________________ THRU @ POSITIONS:

1 [ ] 2 [ ] 3 [ ] 4 [ ]

5 [ ] 6 [ ] 7 [ ] 8 [ ]

9 [ ]

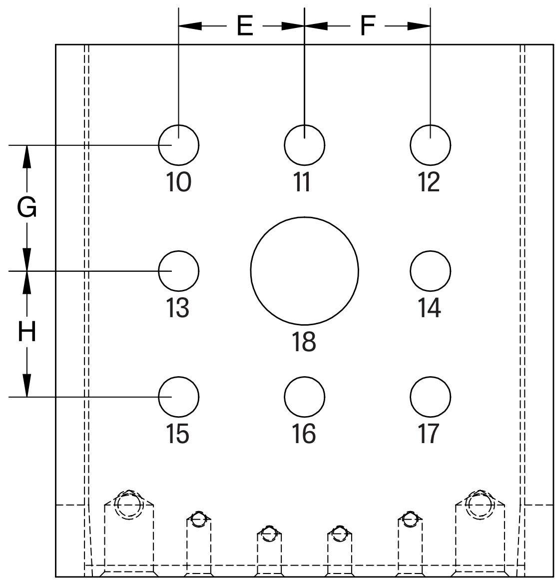
DIMENSIONS:

A [ ] B [ ]

C [ ] D [ ]

HANDLE SIDE:

A [ ] B [ ]



TAP ________________ THREAD @ POSITIONS:

10 [ ] 11 [ ] 12 [ ] 13 [ ]

14 [ ] 15 [ ] 16 [ ] 17 [ ]

18 [ ]

DRILL ________________ THRU @ POSITIONS:

10 [ ] 11 [ ] 12 [ ] 13 [ ]

14 [ ] 15 [ ] 16 [ ] 17 [ ]

18 [ ]

DIMENSIONS:

E [ ] F [ ]

G [ ] H [ ]

This form is available for download on our website.

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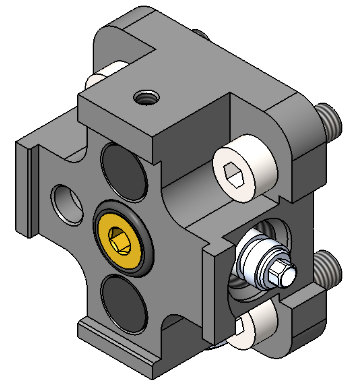
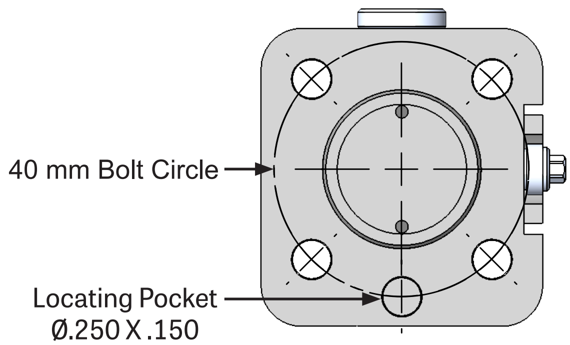
TOOLING
RQCP : ROBOT QUICK CHANGE PUMP

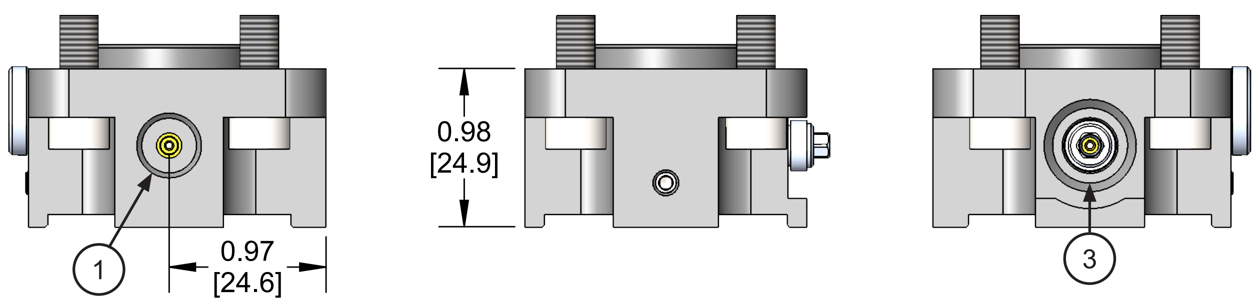
Vacuum pump fits Flexpicker and other robots with four 6mm tapped interface on 40 mm bolt circle. Tool is magnetically coupled to pump for fast replacement for either maintenance or for changeover to manipulate a different part. Handles up to 4.4 lbs (2kg) load. High vacuum flow venturi's allow fast evacuation and the purge options quickly dissipate vacuum to optimize cycle times.

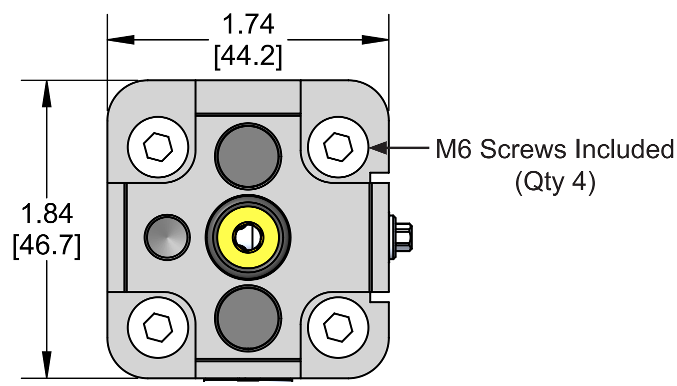
	VENTURI		PURGE
RQCP-	10L	-	
	08L		Blank = Standard
	10L		**LP** = Limted Purge
			PP = Positive Purge

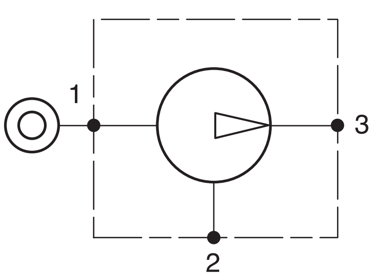


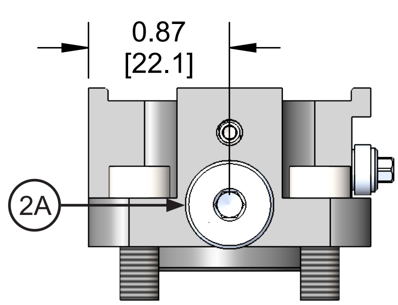
Weight: 3.70 oz [104.9 g]











CODE	FUNCTION	THREAD
1	Air Supply	1/8 NPSF
2A	Vacuum - Alternate	1/8 NPSF
3	Exhaust	G1/4-19
3A	Purge Pilot Signal	4mm (5/32) Tube

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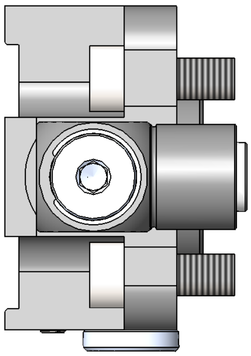
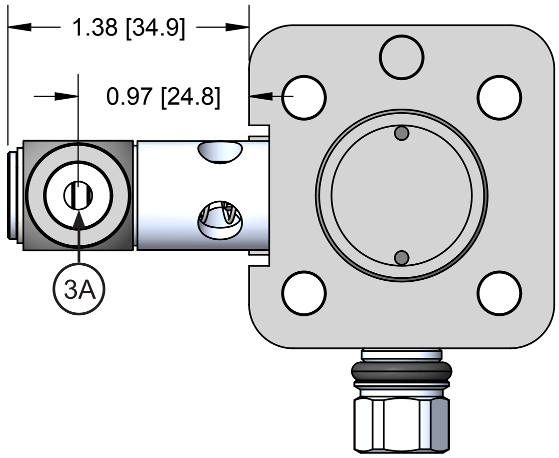
TOOLING
RQCP W/ PURGE

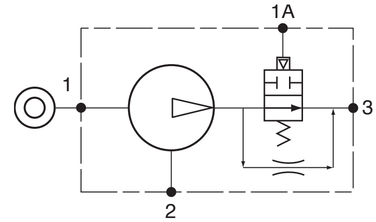
Purge option provides faster part placement by quickly dissipating residual vacuum which is especially useful when using bellows-style vacuum cups. When placing a part, the air supply to the vacuum pump is left on and a compressed air signal to the Purge unit blocks off the pump exhaust to redirect venture 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.



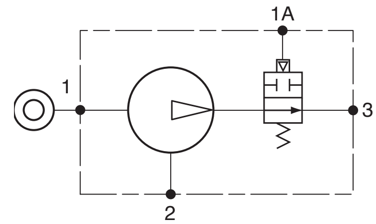
Weight: 4.53 oz [128.3 g]



LP : LIMITED PRESSURE

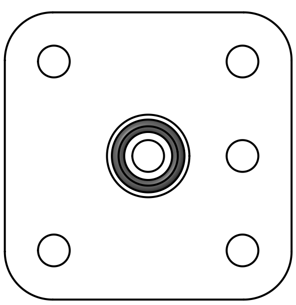


PP : POSITIVE PRESSURE

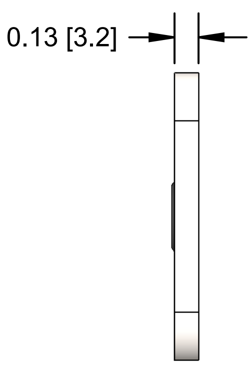


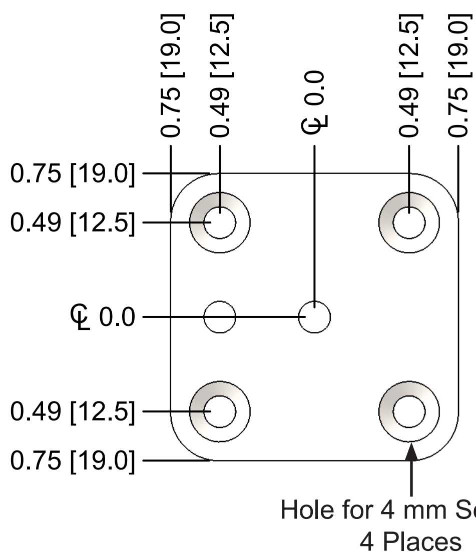
RQCP-P : TOOL PLATE

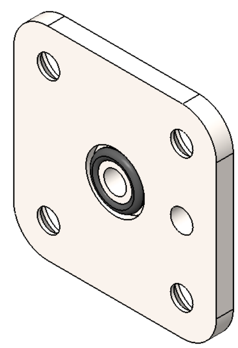
Precision steel tool plate is used to mount and register customer-supplied tooling to the RQCP pump. A port seal passes pump vacuum into the tool so that tool design is simplified.

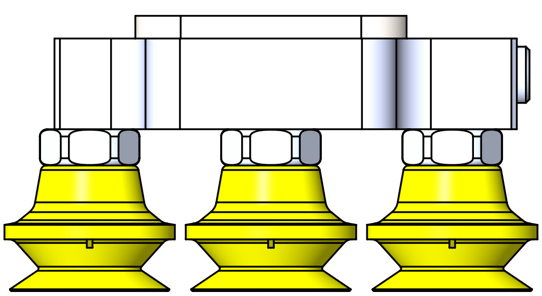


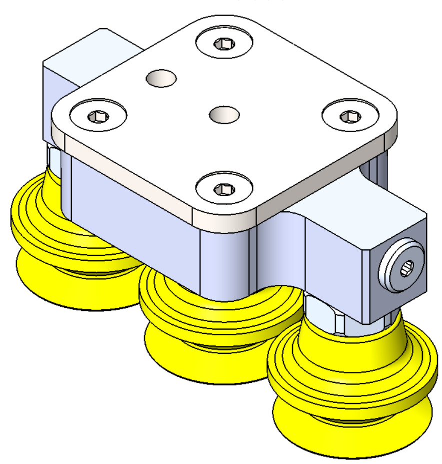
Weight: 1.08 oz [30.5 g]











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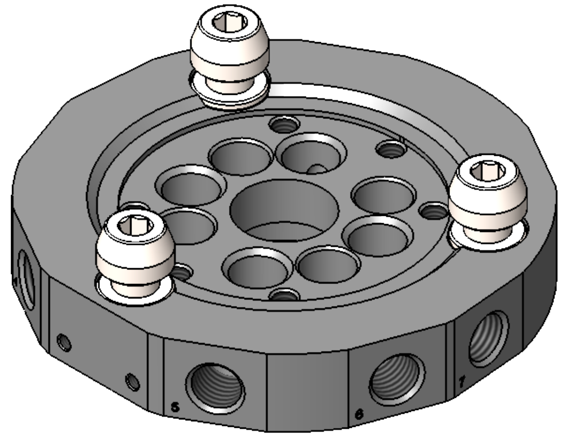
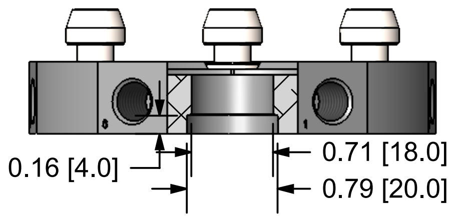
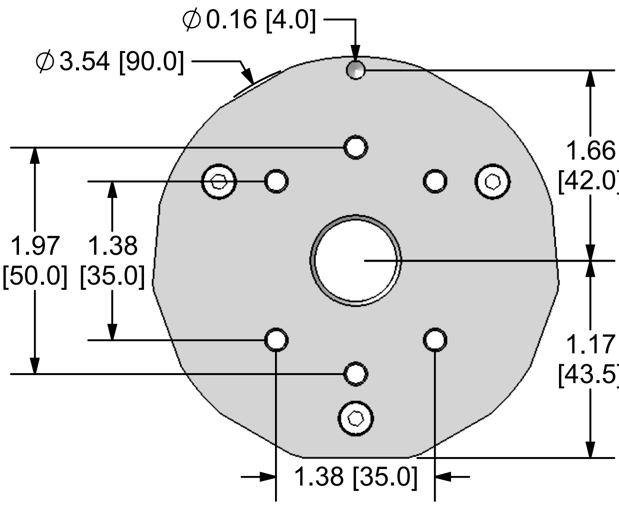
TOOLING
QC90-B : QUICK CHANGER

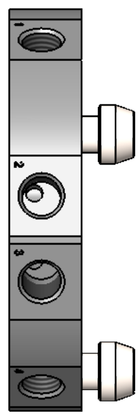
Tool-side EOAT Changer is typically used on injection molding machines to handle tools weighing up to 25 lbs. Mates with 90mm Robot-side Changer made by others.

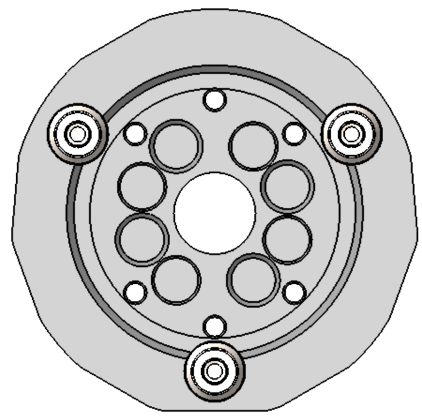


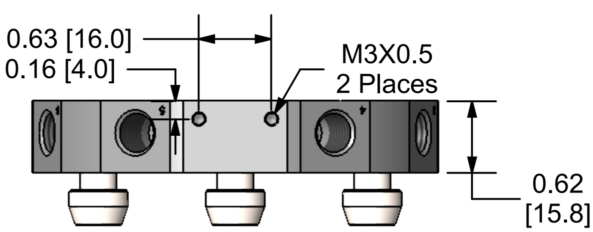
Weight: 7.90 oz [224.0 g]

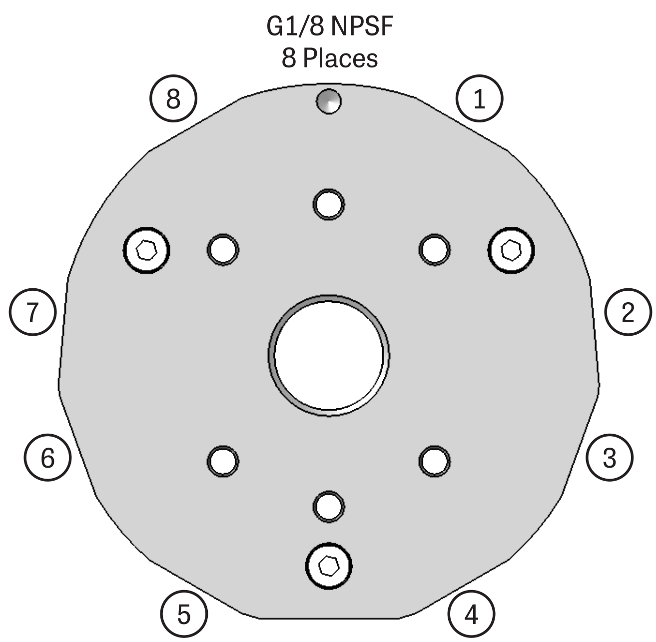












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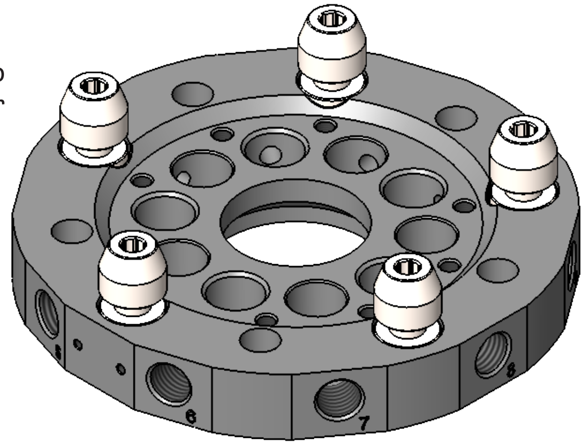
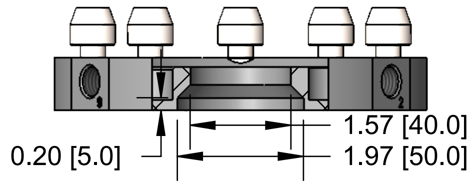
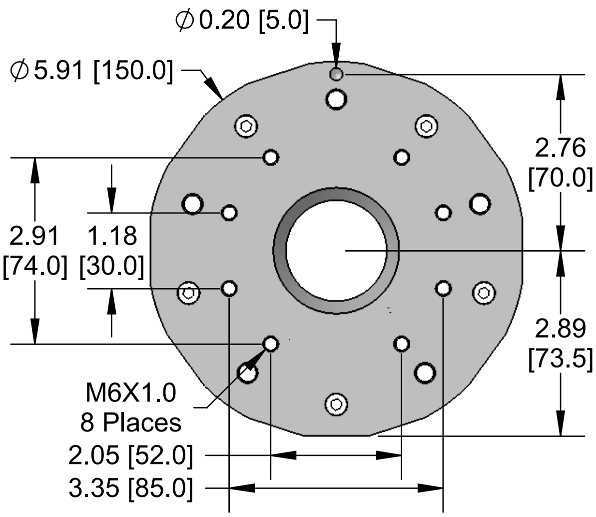
QC150-B : QUICK CHANGER

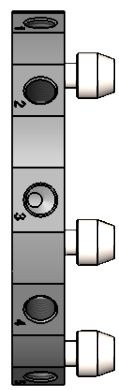
Tool-side EOAT Changer is typically used on injection molding machines to handle tools weighing up to 65 lbs. Mates with 150mm Robot-side Changer made by others.

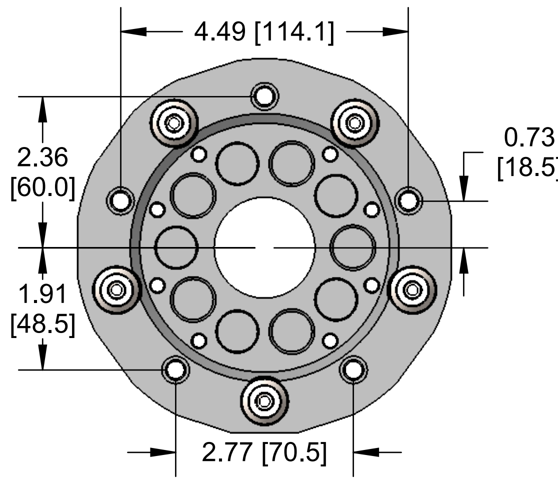


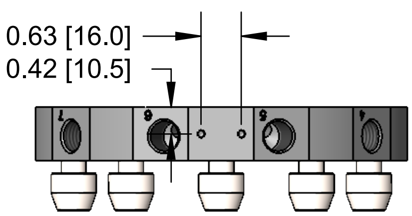
Weight: 29.69 oz [841.6 g]

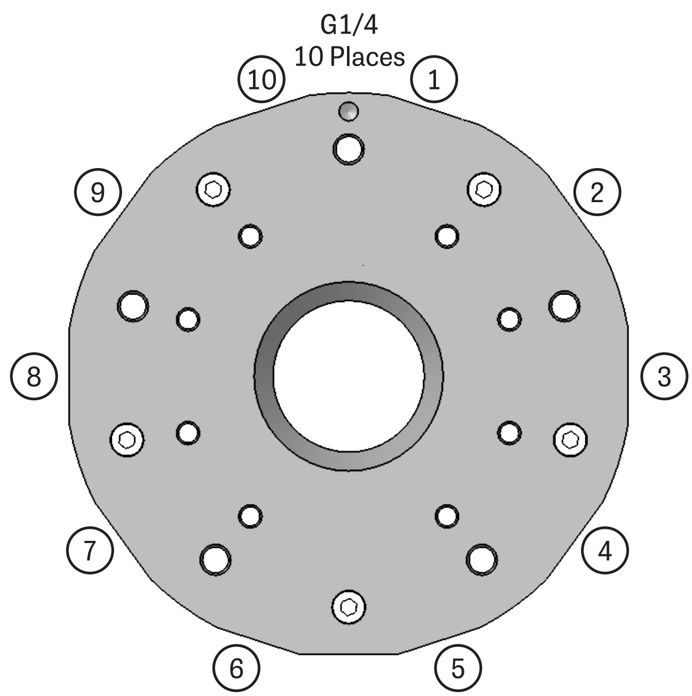












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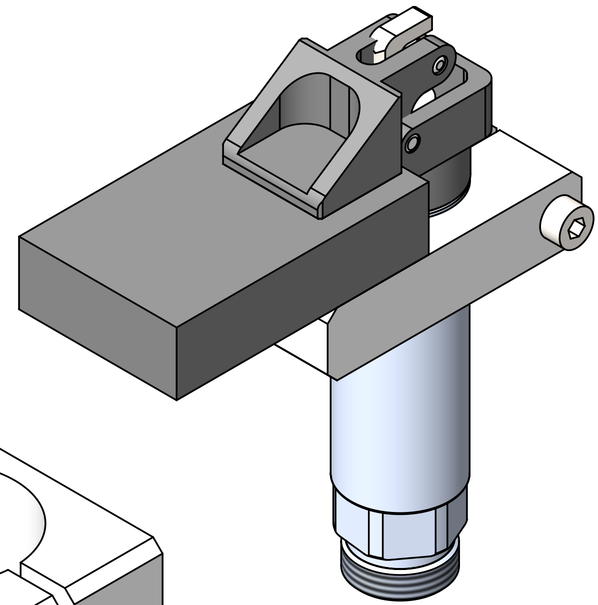
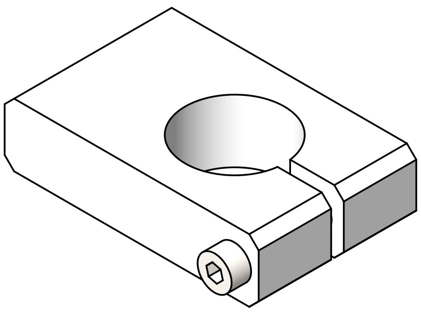
MICRO-TOOLING
EDGE MOUNTS

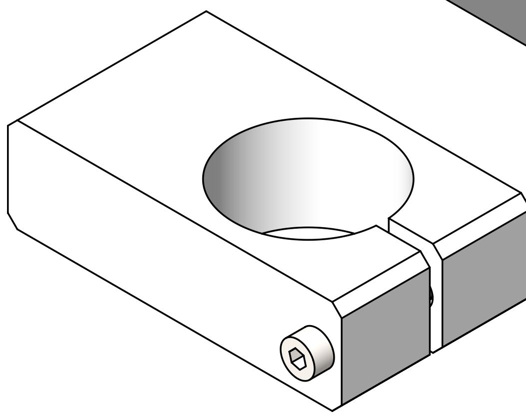
EDCO Edge Clamps are made out of Delrin and are designed for use with the EDCO Finger Grippers, acting as a stop for the part being gripped.

	TUBE SIZE	
ANF	20	D
	20 = 20 mm Tube	
	30 = 30 mm Tube	

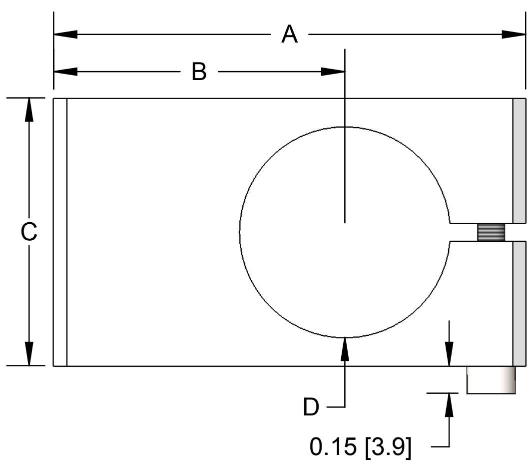


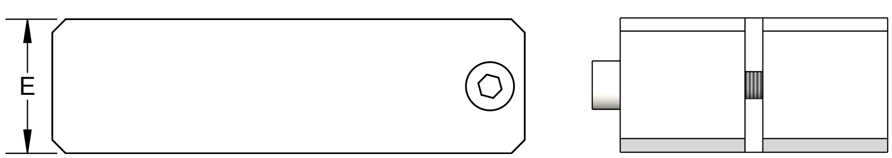


ANF20D



ANF30D





MODEL	DIMENSION					WEIGHT oz [g]
	A in [mm]	B in [mm]	C in [mm]	D in [mm]	E in [mm]	
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]

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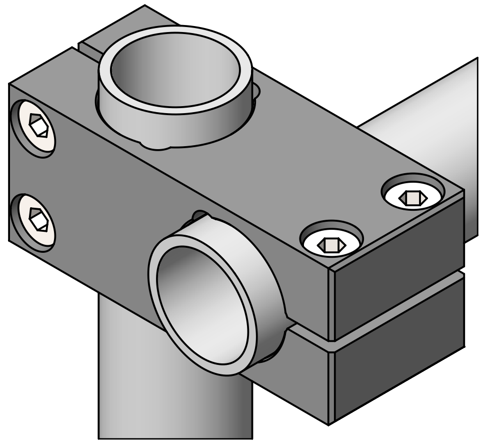
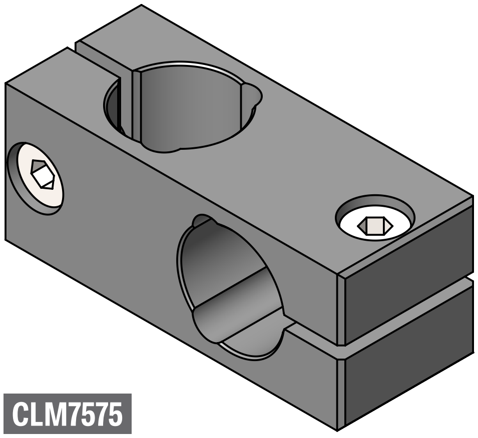
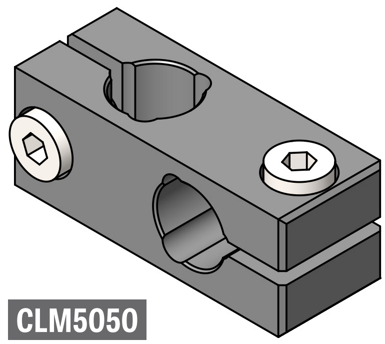
MICRO-TOOLING
CROSS CLAMP BLOCKS

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.

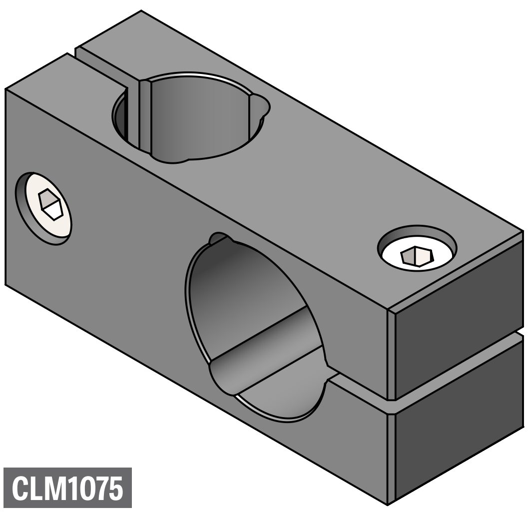




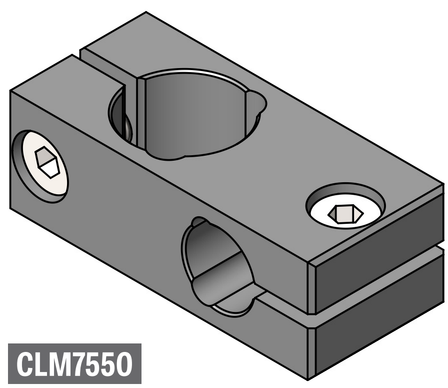
CLM7575



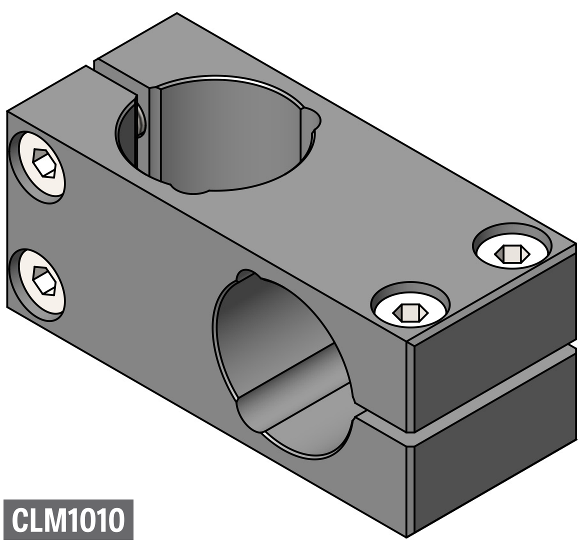
CLM5050



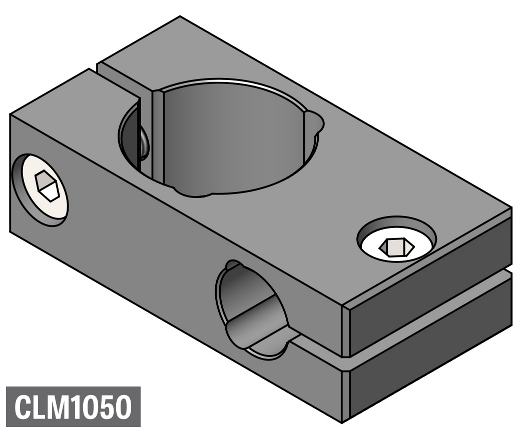
CLM1075



CLM7550



CLM1010



CLM1050

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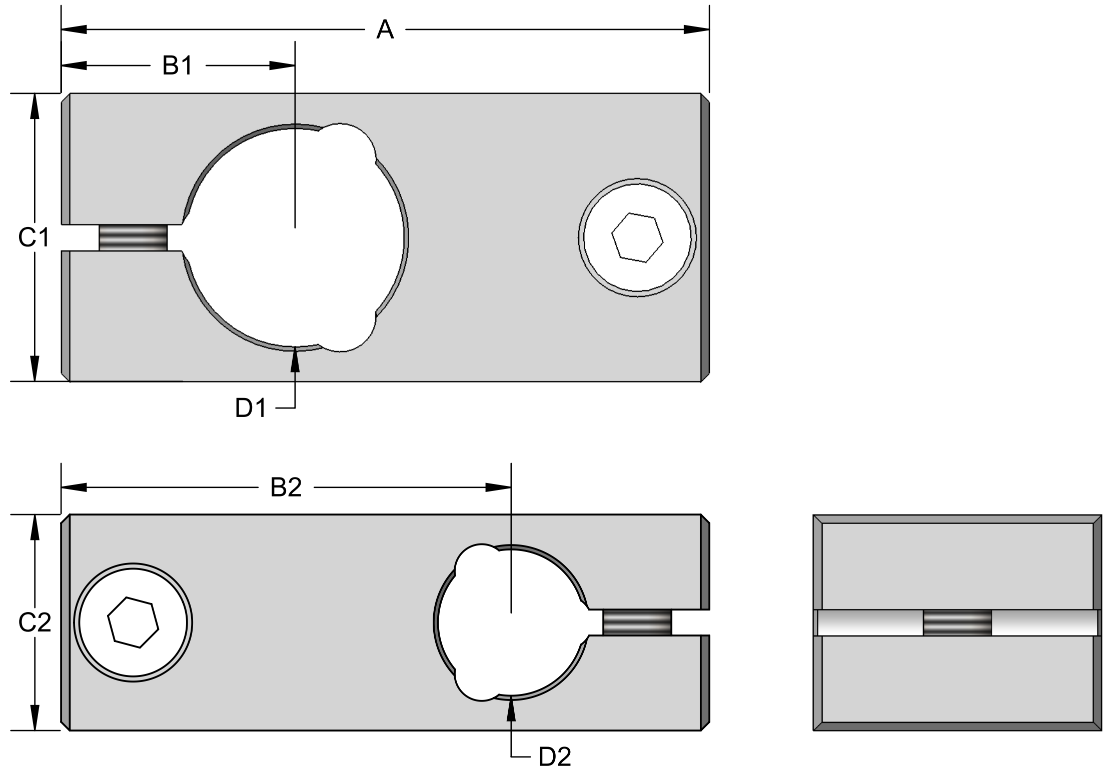

MODEL	DIMENSION							WEIGHT oz [g]
	A in [mm]	B1 in [mm]	C1 in [mm]	D1 in [mm]	B2 in [mm]	C2 in [mm]	D2 in [mm]	
CLM5050	2.00 [50.8]	0.69 [17.5]	0.75 [19.1]	0.51 [12.9]	1.31 [33.4]	0.75 [19.1]	0.51 [12.9]	1.39 [39.5]
CLM7550	2.25 [57.2]	0.69 [17.5]	0.75 [19.1]	0.51 [12.9]	1.44 [36.5]	1.00 [25.4]	0.76 [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]

On CLM5050, screw heads protrude by approximately 0.07 in [1.8 mm].

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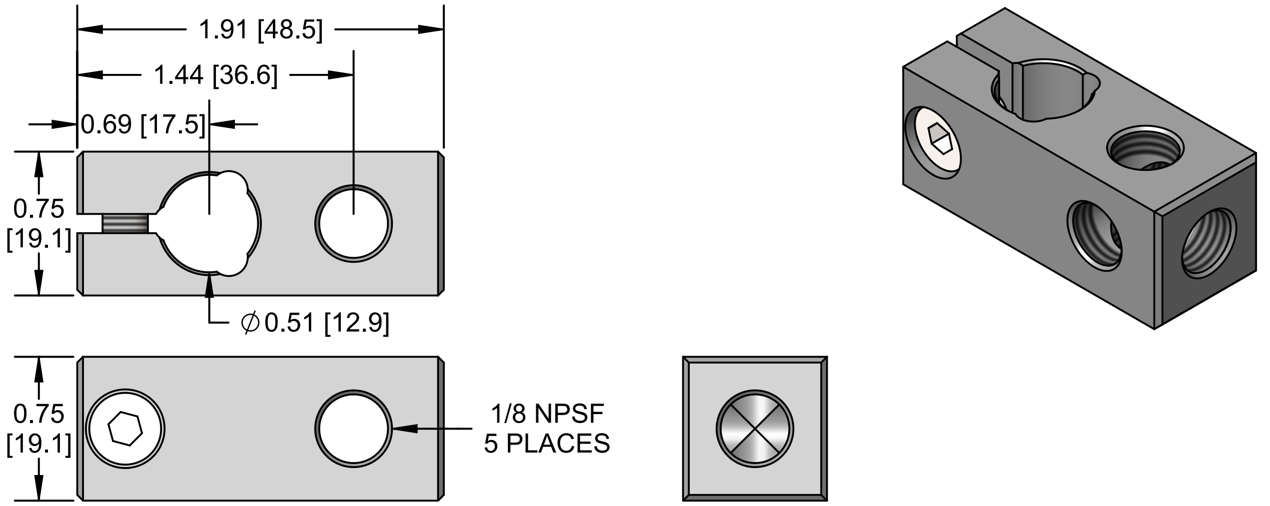
MICRO-TOOLING
CLAMP MOUNT BLOCKS

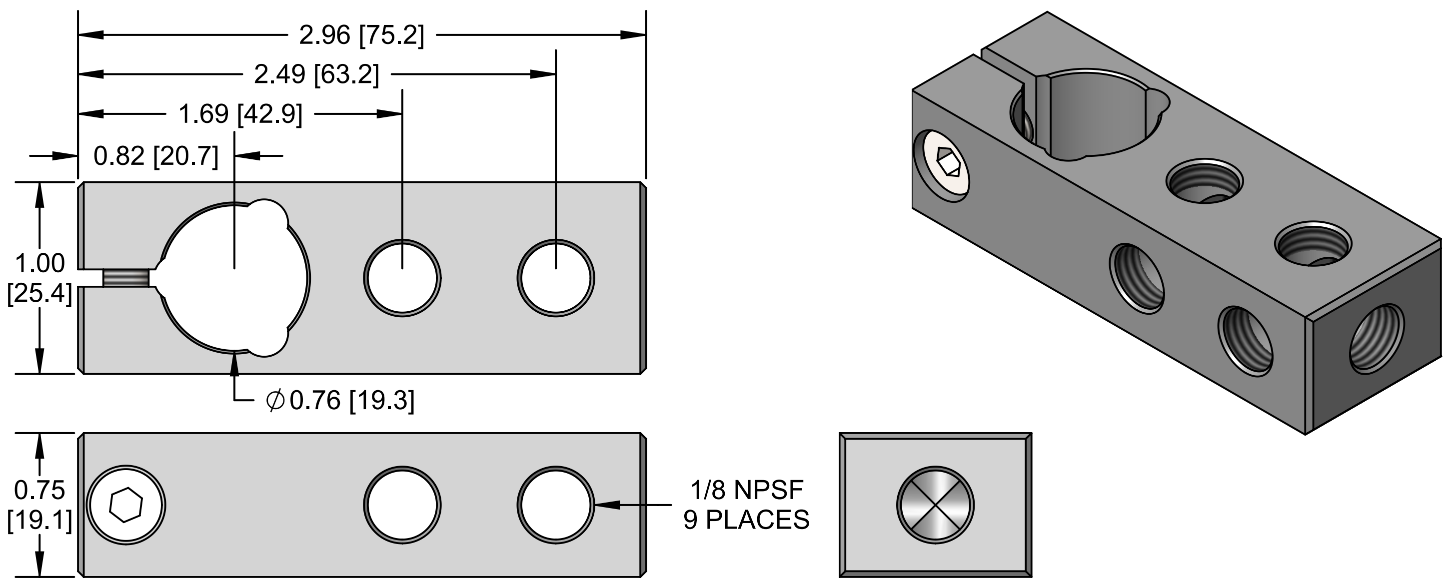
EDCO USA Clamp Mount Blocks come with a tubing clamp on one end and several 1/8” NPSF ports on the other.

CM505



Weight: 1.23 oz [35.0 g]

CM759



Weight: 2.48 oz [70.2 g]

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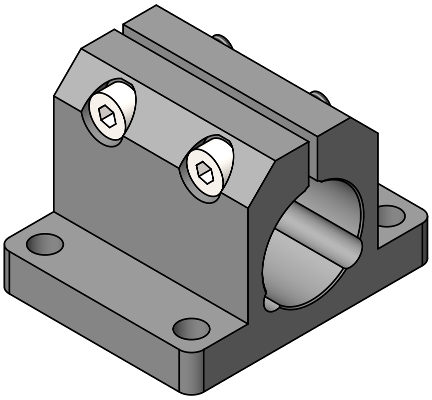
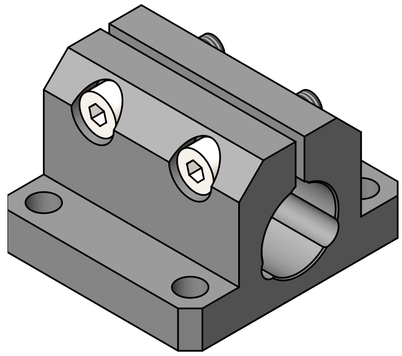
FLANGED CLAMPS - HORIZONTAL

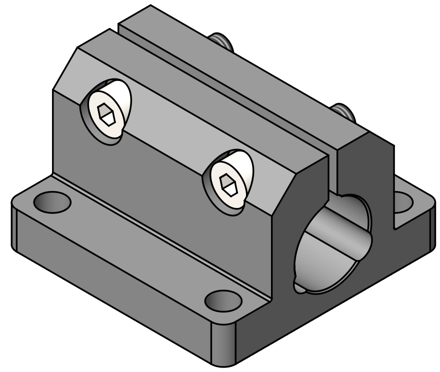
Horizontal Flanged Clamps give the base needed to build your end of arm tooling structure.



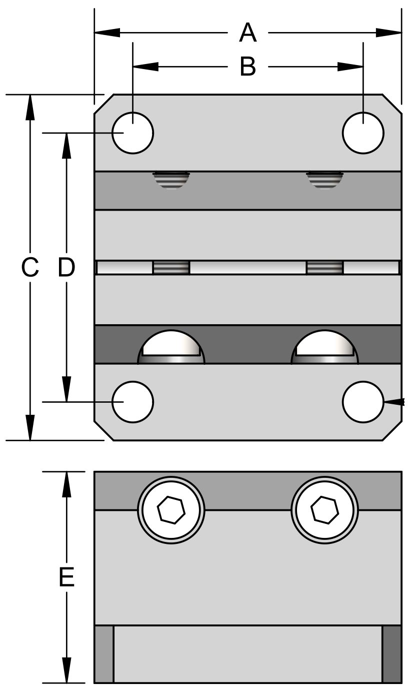
FCH100

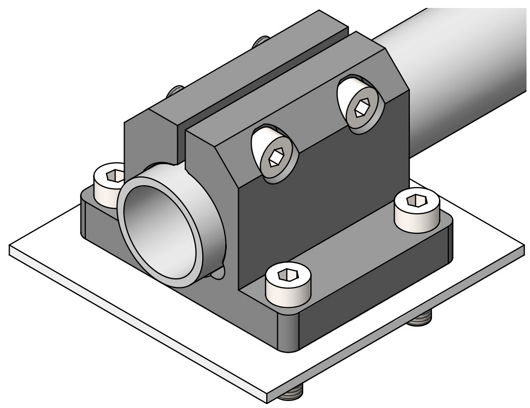


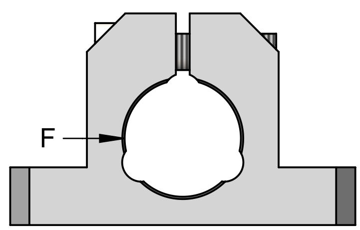
FCH75



FCH75L







MODEL	DIMENSION						WEIGHT oz [g]
	A in [mm]	B in [mm]	C in [mm]	D in [mm]	E in [mm]	F in [mm]	
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]

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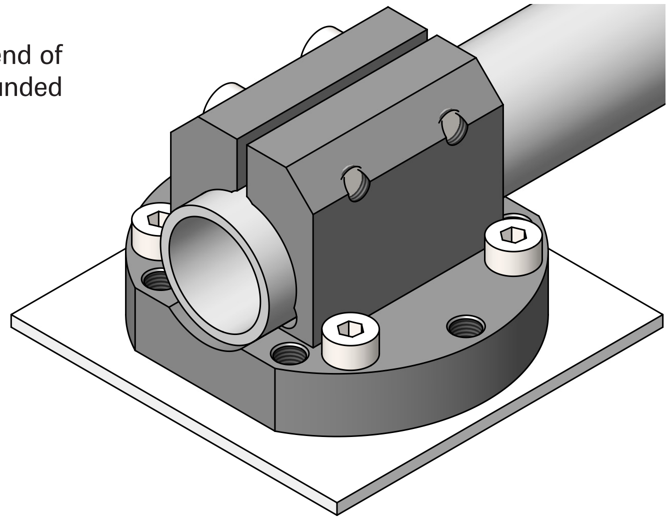
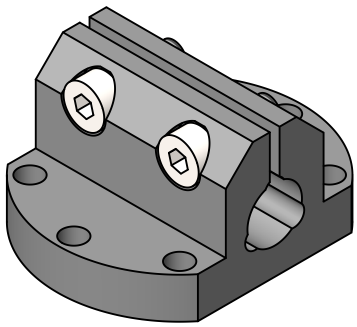
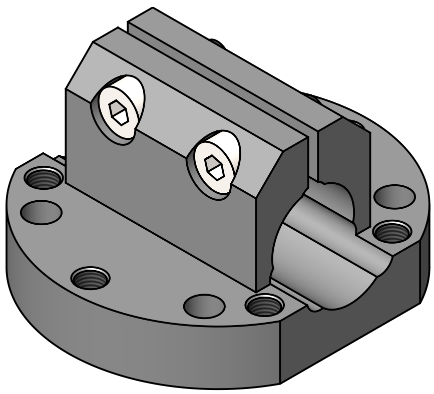
Horizontal Flanged Clamps give the base you need to build your end of arm tooling. The round clamps give the same function with a rounded base.

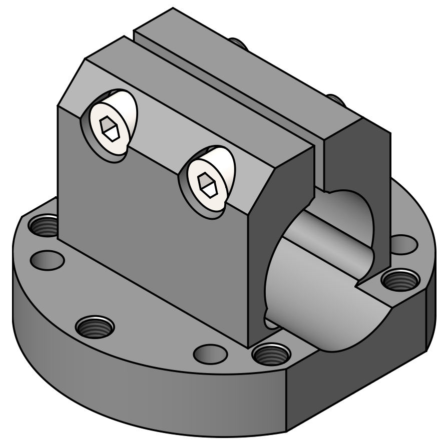




FCH50R

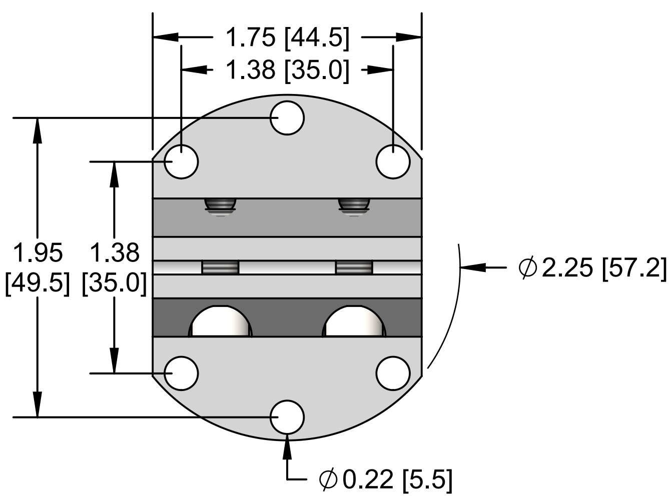


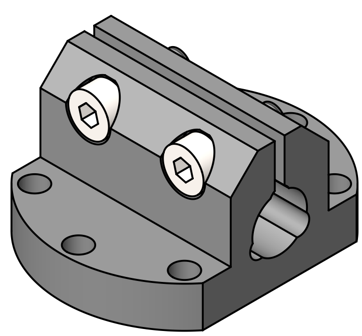
FCH75R

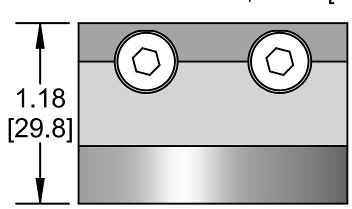


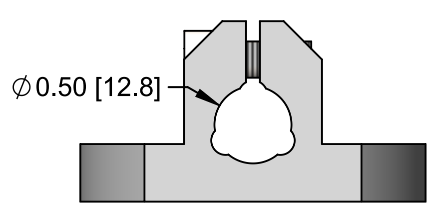
FCH100R

FCH50R









Weight: 3.31 oz [93.8 g]

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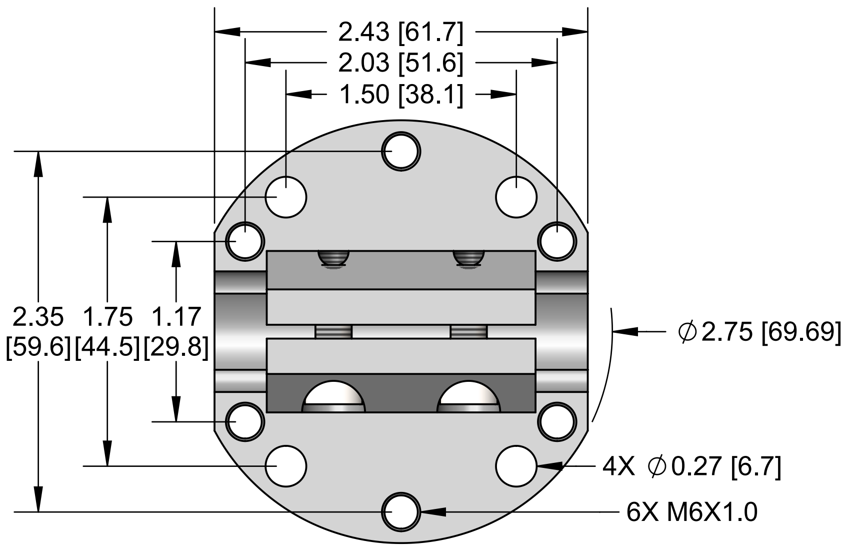
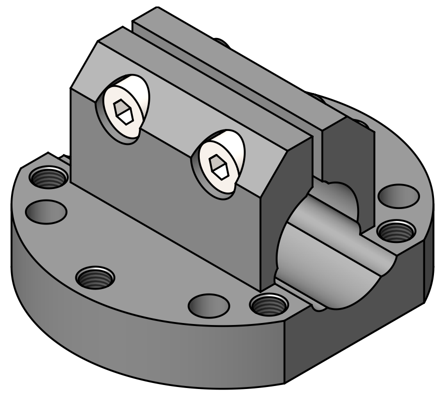
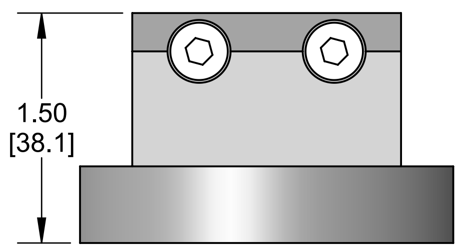
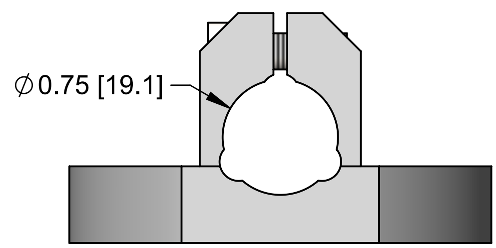
FCH75R



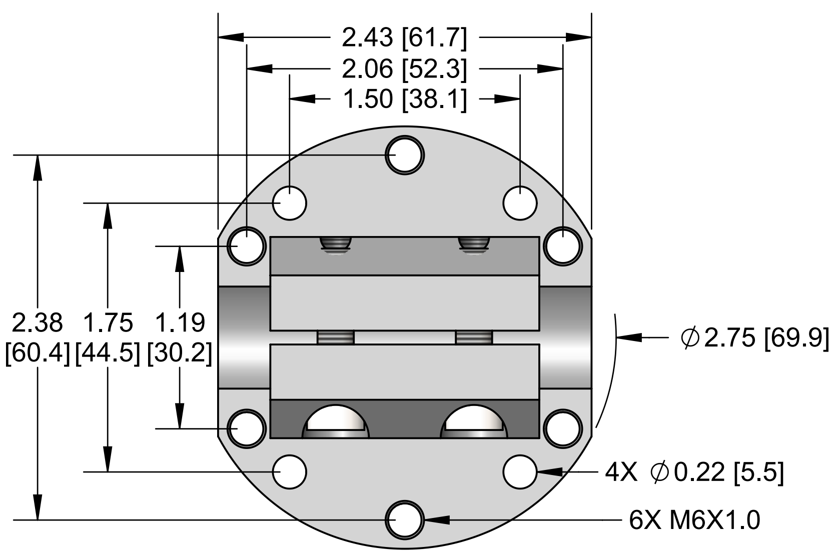


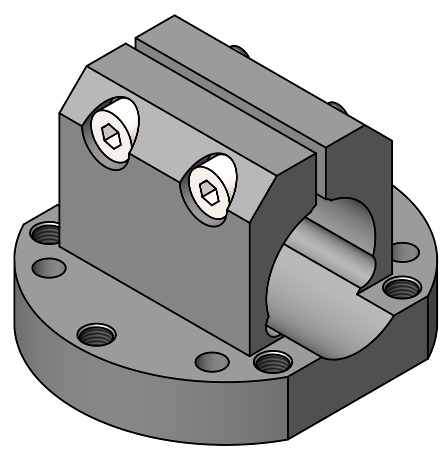


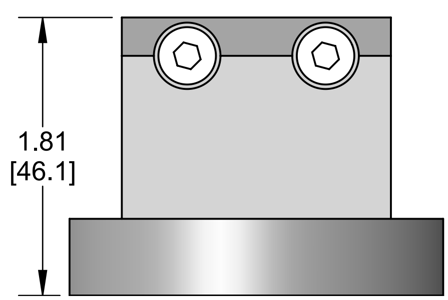


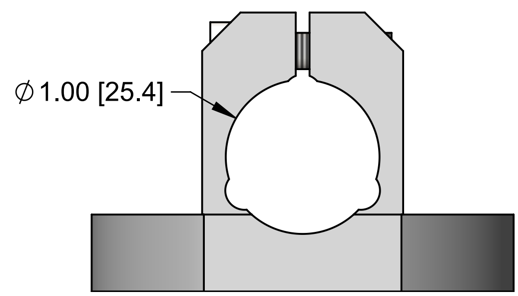
Weight: 5.56 oz [157.6 g]

FCH100R









Weight: 6.56 oz [187.7 g]

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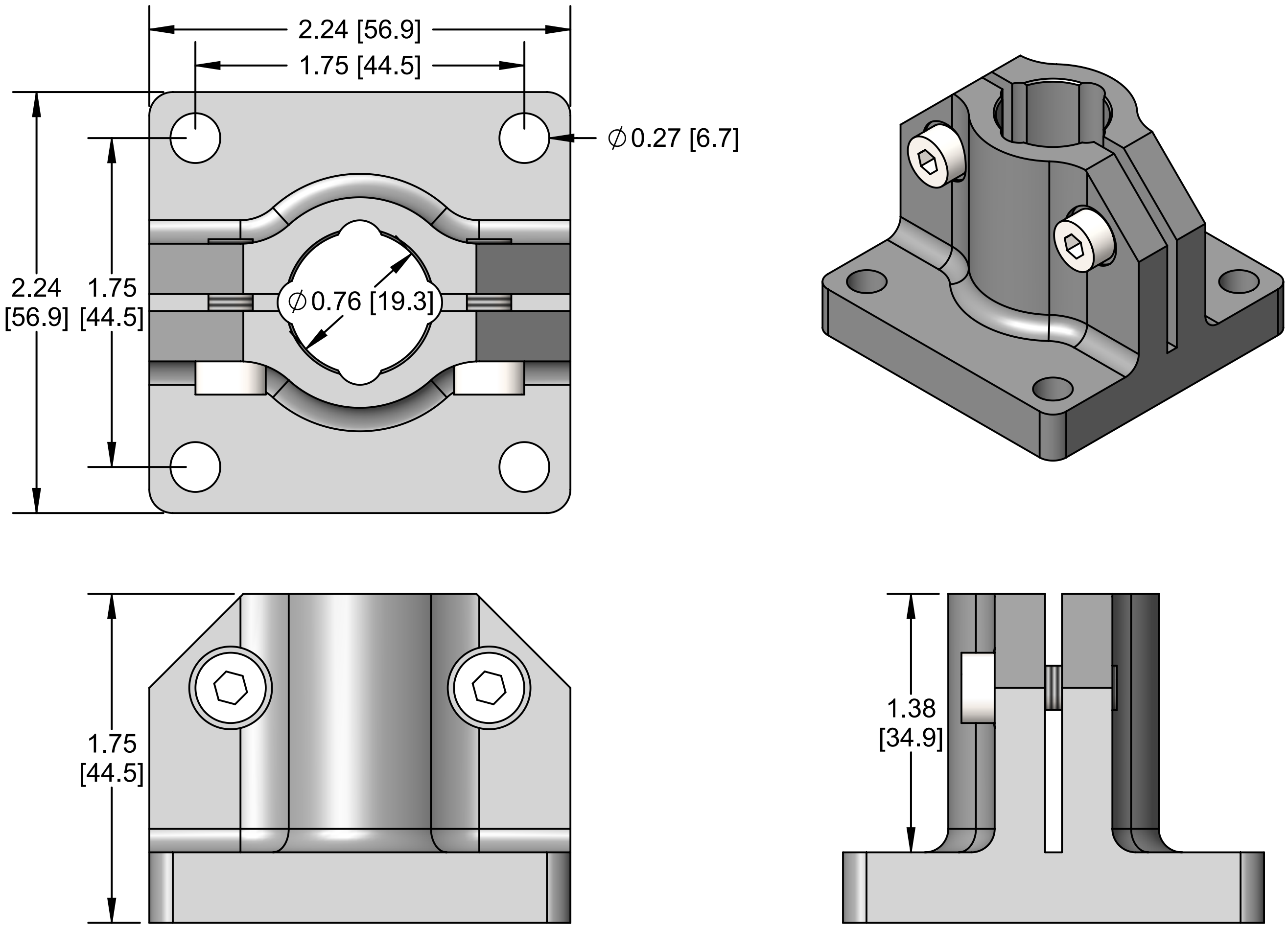
EDCO USA Flanged Clamps give the base needed to build your end of arm tooling structure. Vertical Flanged Clamps offer the same quality and function as the Horizontal Flaned Clamps

FCV75



Weight: 5.08 oz [144.0 g]

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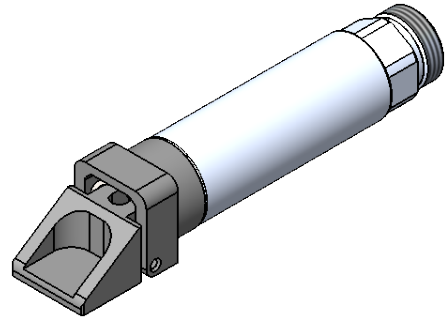
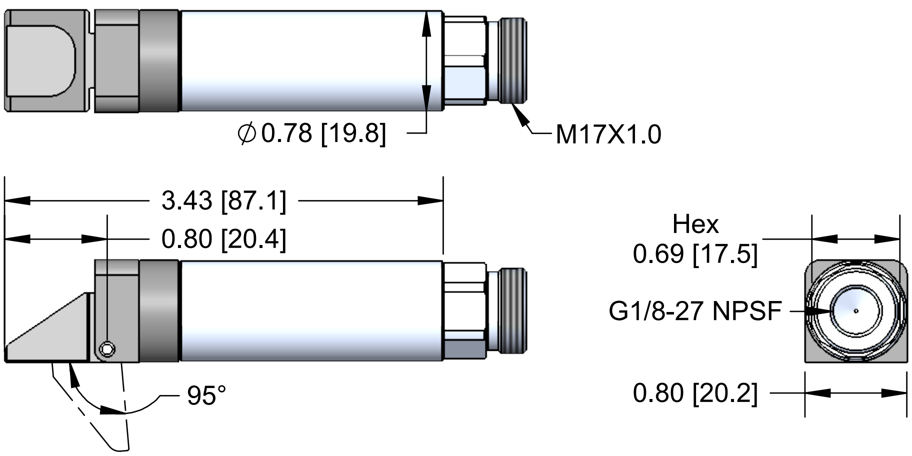
MICRO-TOOLING
GRIPPER FINGERS

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

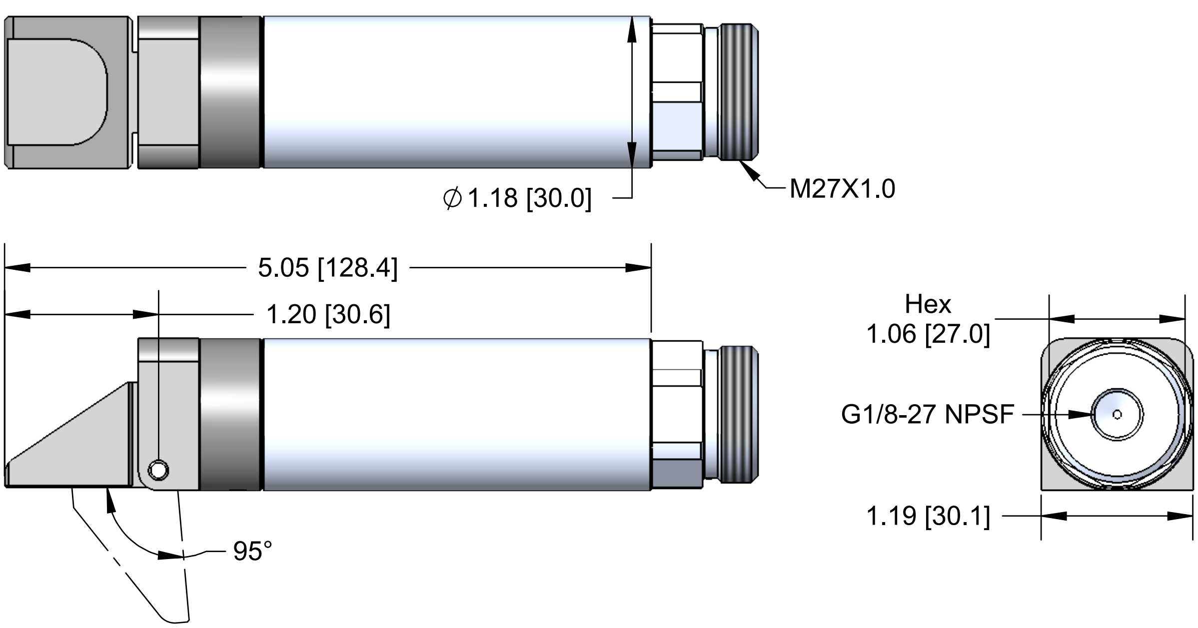


GRF20-95



Weight: 2.14 oz [60.8 g]

GRF30-95



Weight: 6.45 oz [182.9 g]

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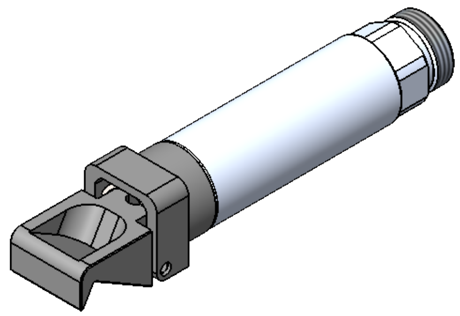
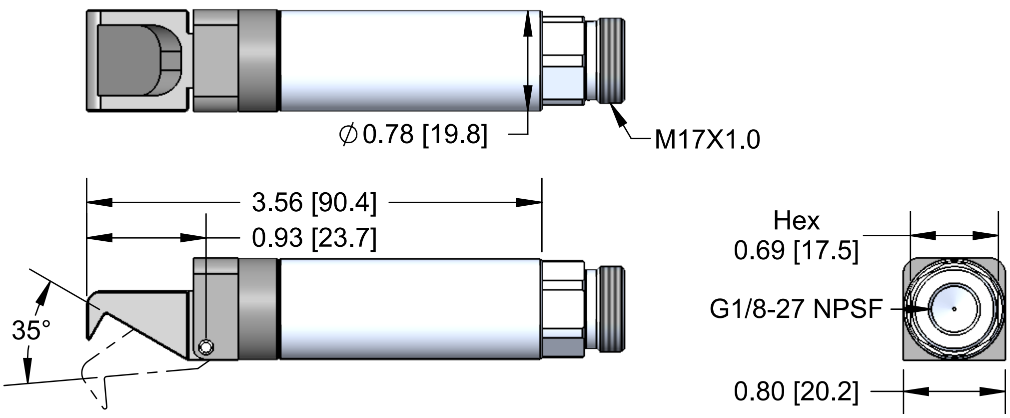
Pneumatic Finger Grippers with spring returns are used to secure parts at the edge.

The GRF20-35 and GRF30-35 provide a 35° reach and a finger claw.

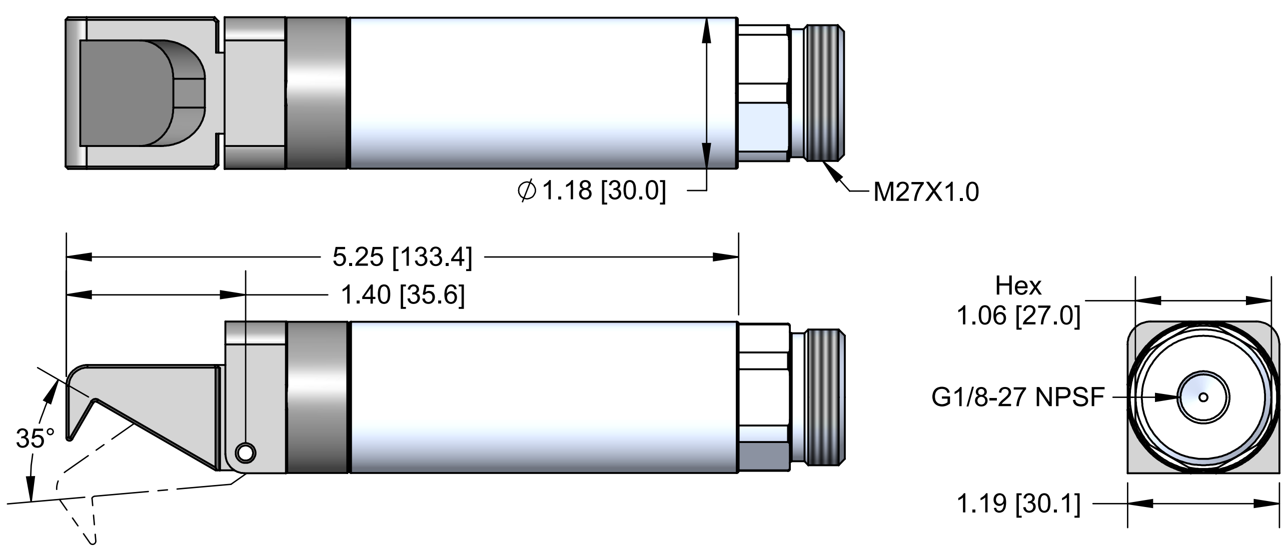


GRF20-35



Weight: 2.24 oz [63.5 g]

GRF30-35



Weight: 6.78 oz [192.3 g]

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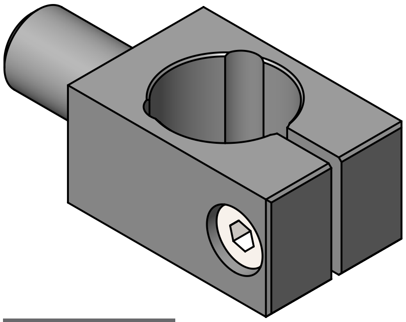
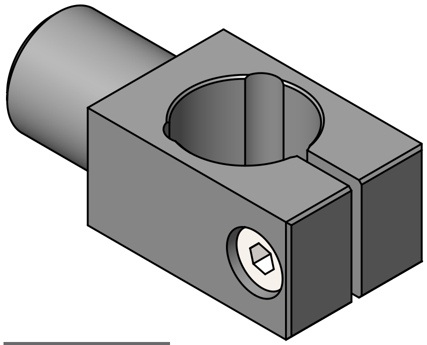
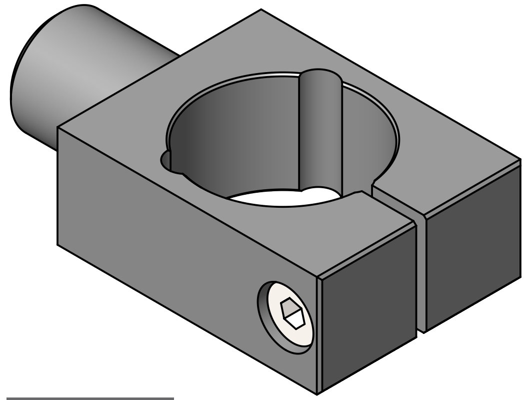
EDCO USA Finger Gripper Clamps come in various sizes to provide a quality clamp for use with a Finger Gripper.



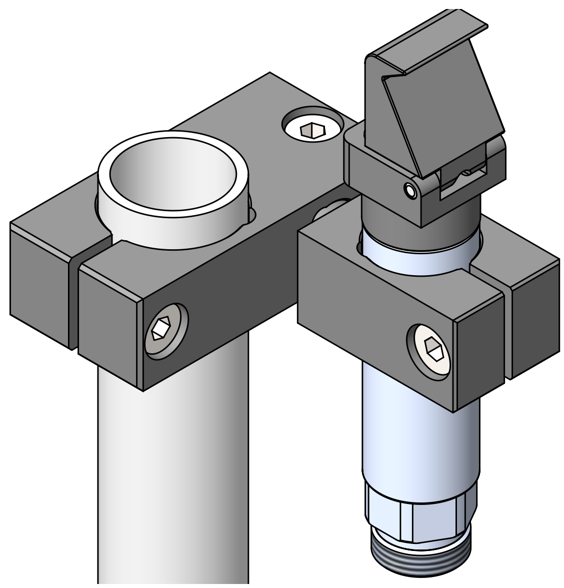
FGM-M2050

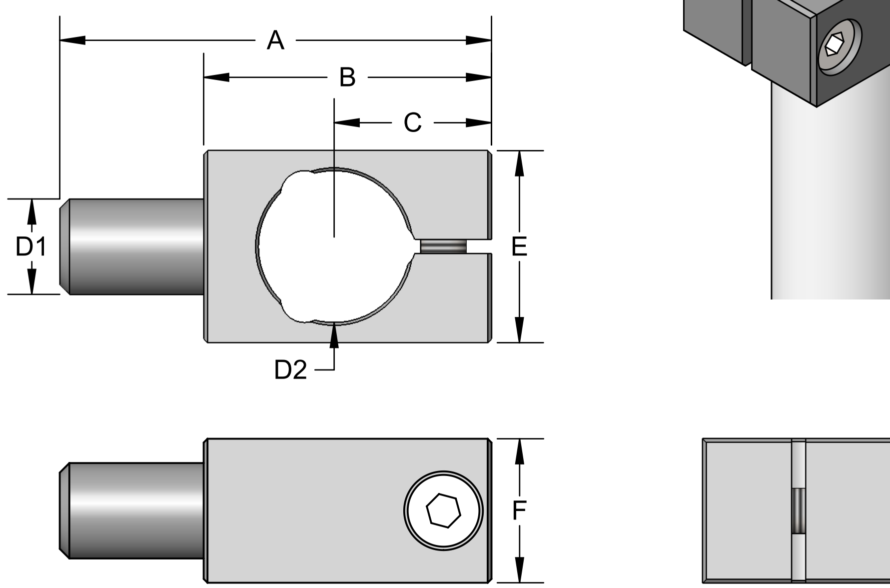


FGM-M2075



FGM-M3075





MODEL	DIMENSION							WEIGHT oz [g]
	A in [mm]	B in [mm]	C in [mm]	D1 in [mm]	D2 in [mm]	E in [mm]	F in [mm]	
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]

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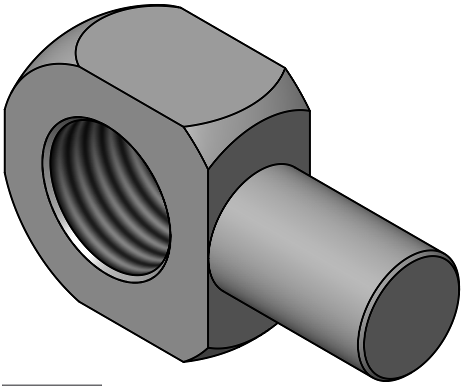
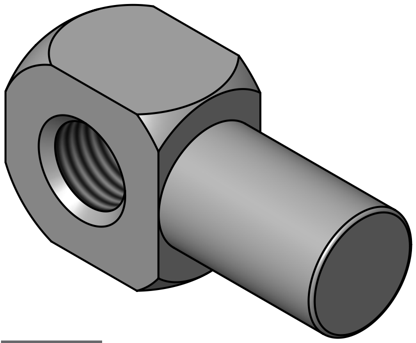
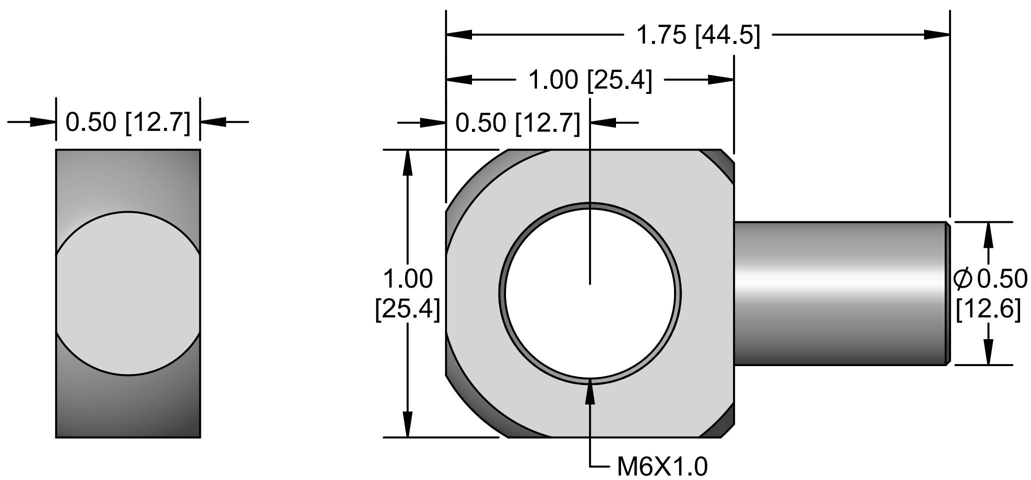


LCM18



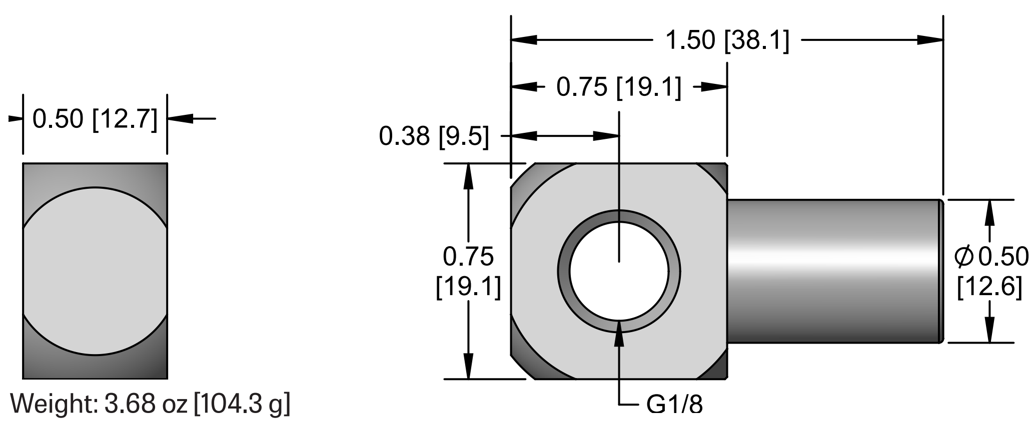
LCM10

LCM18



Weight: 3.68 oz [104.3 g]

LCM10



Weight: 3.68 oz [104.3 g]

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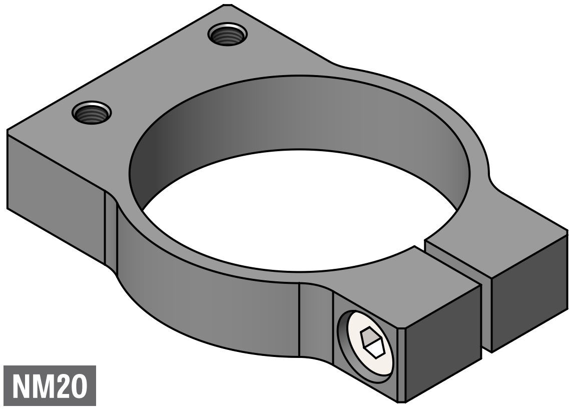
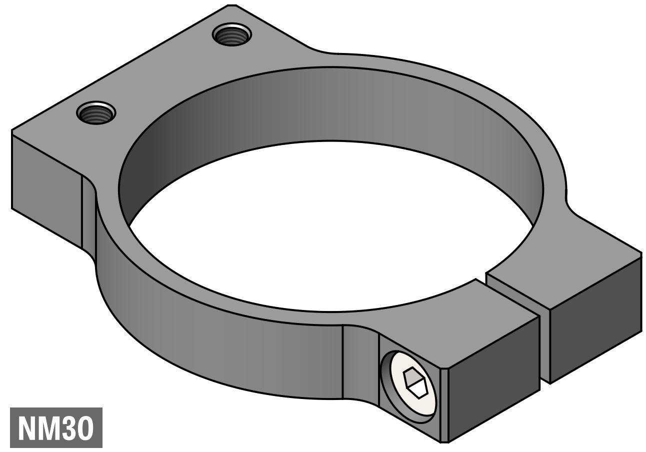
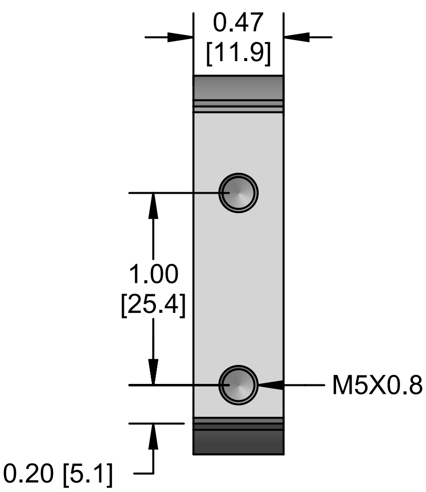


NM20

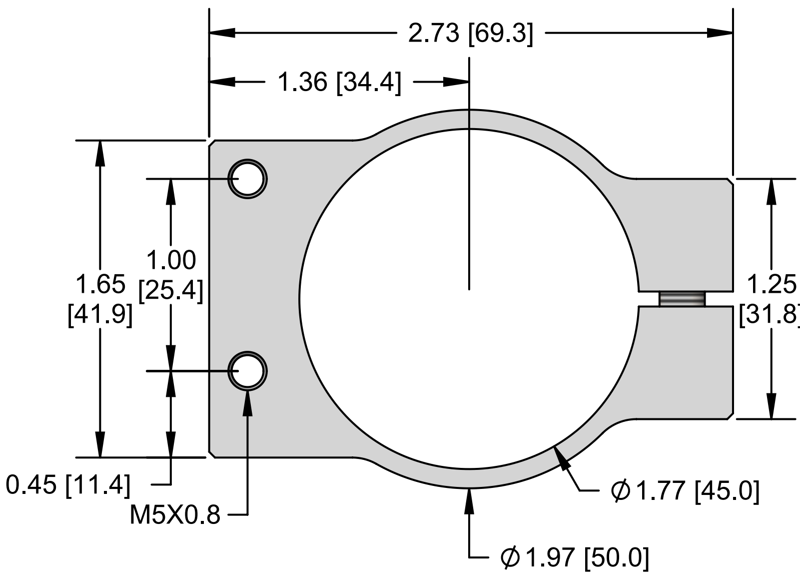


NM30

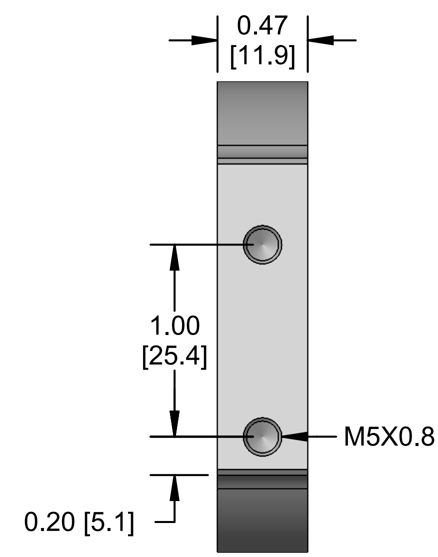
NM20



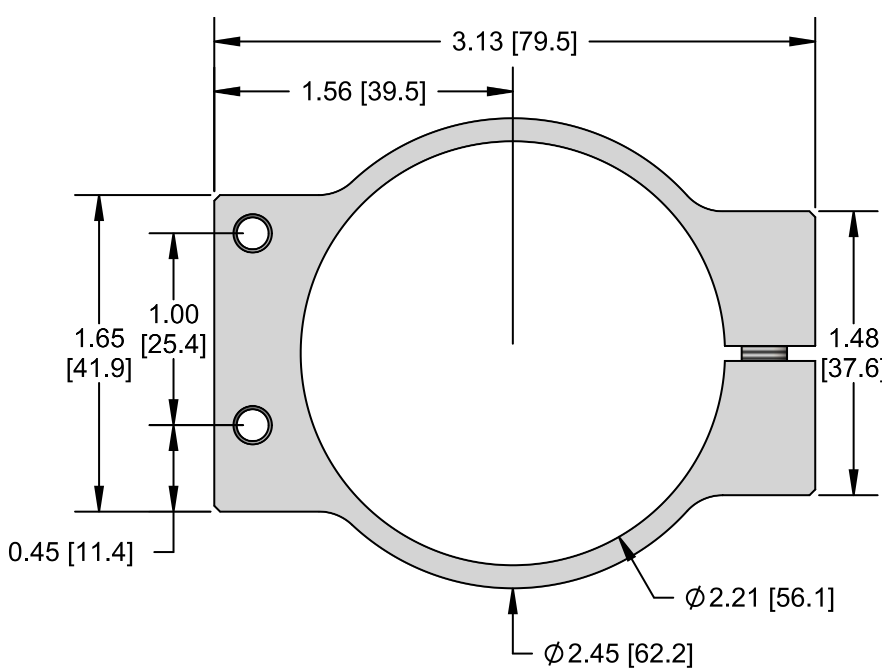
Weight: 1.52 oz [43.0 g]



NM30



Weight: 1.72 oz [48.6 g]



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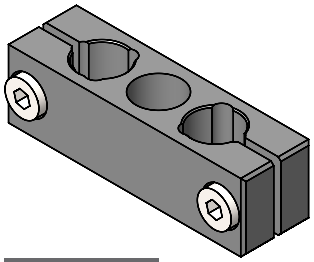
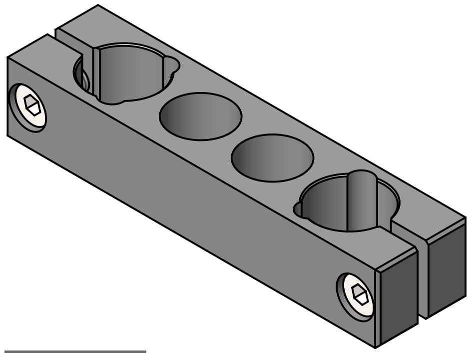
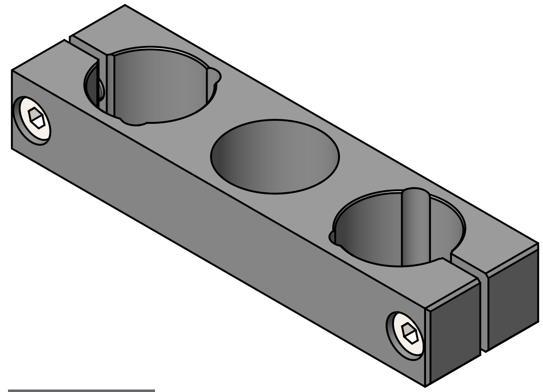
MICRO-TOOLING
PARALLEL CLAMP MOUNTS



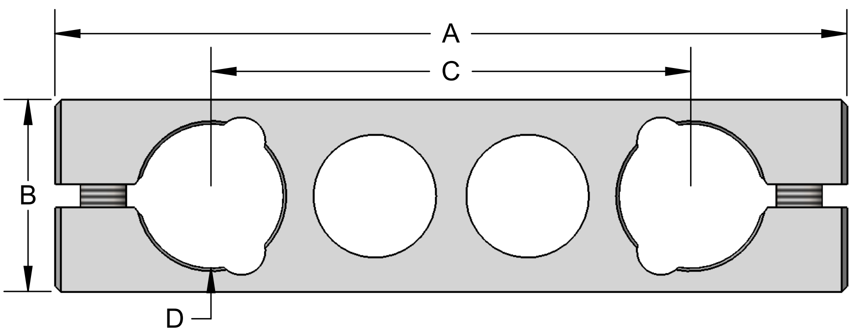
PCLM5050

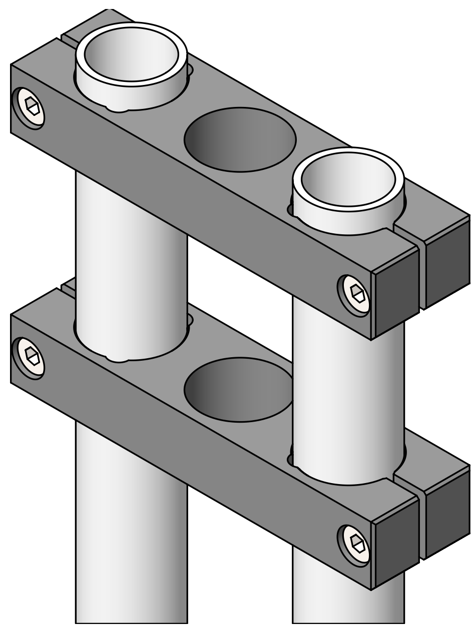


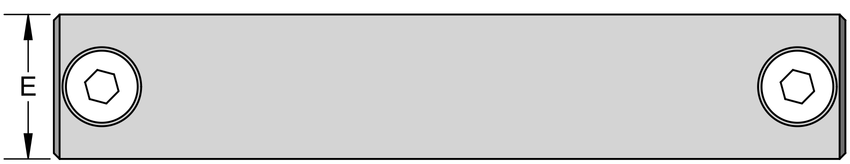
PCLM7575

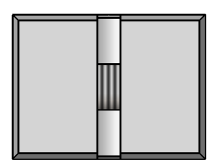


PCLM1010









MODEL	DIMENSION					WEIGHT oz [g]
	A in [mm]	B in [mm]	C in [mm]	D in [mm]	E in [mm]	
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].

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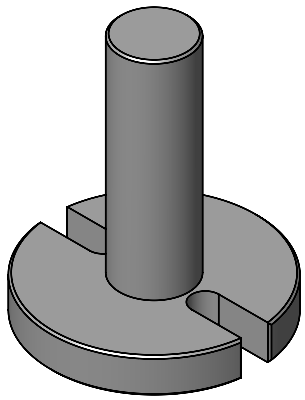
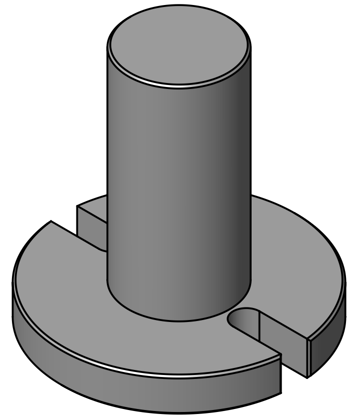
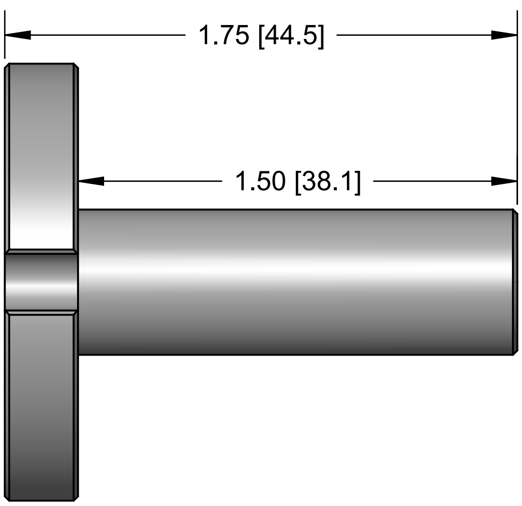


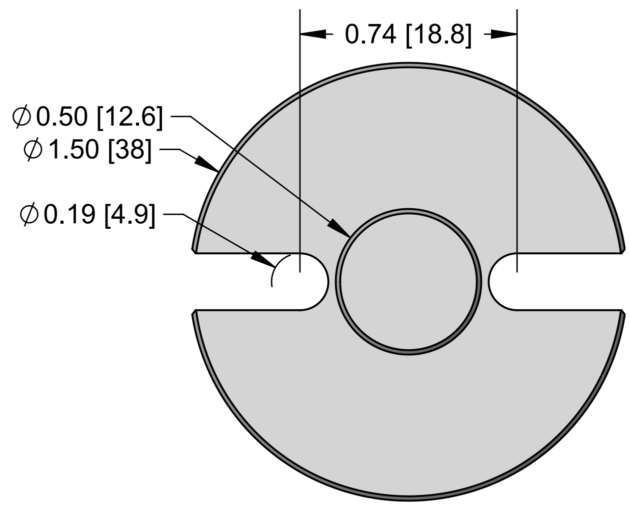
PGM50R



PGM75R

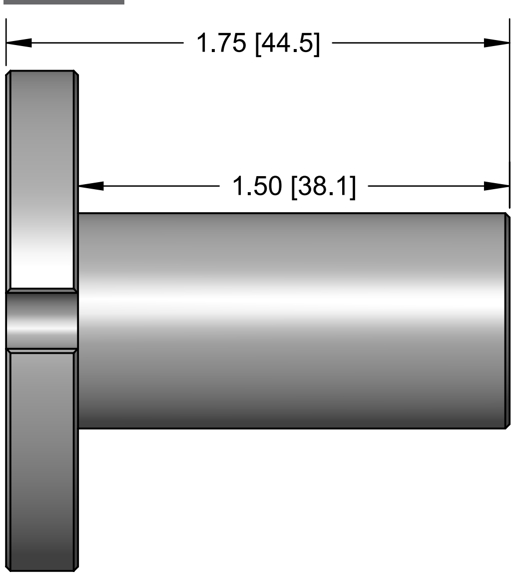
PGM50R

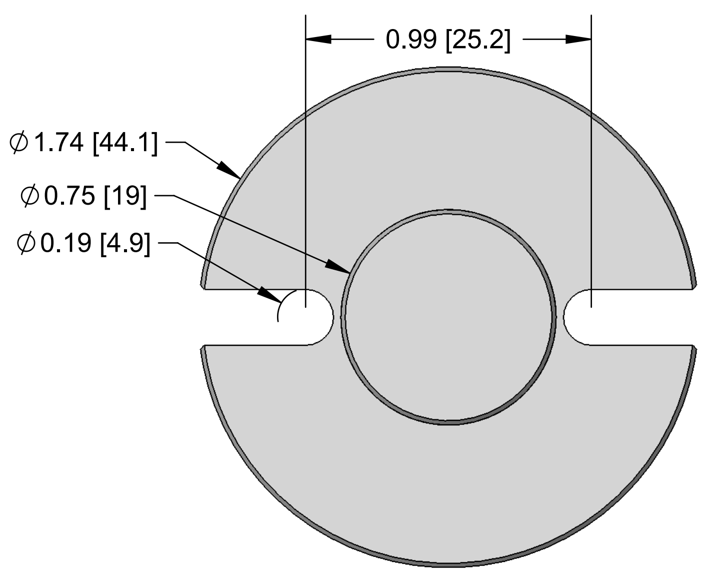




Weight: 1.07 oz [30.3 g]

PGM75R





Weight: 1.56 oz [44.2 g]

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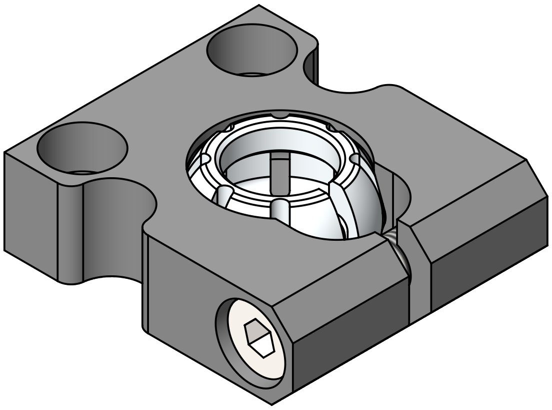
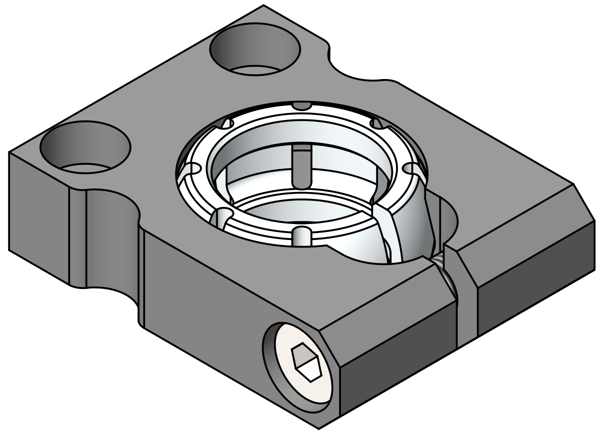
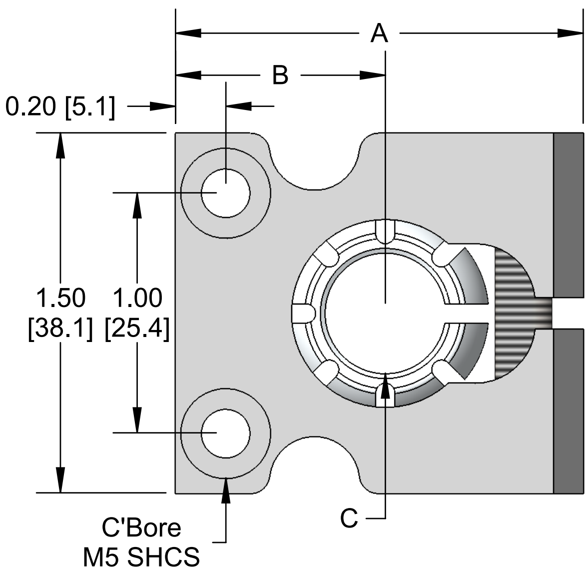
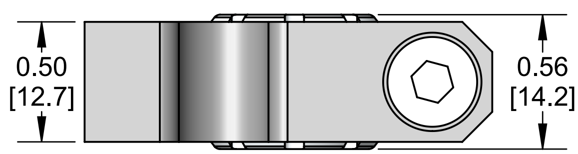


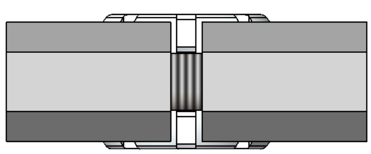
SMB50



SMB75







MODEL	DIMENSION			WEIGHT oz [g]
	A in [mm]	B in [mm]	C in [mm]	
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]

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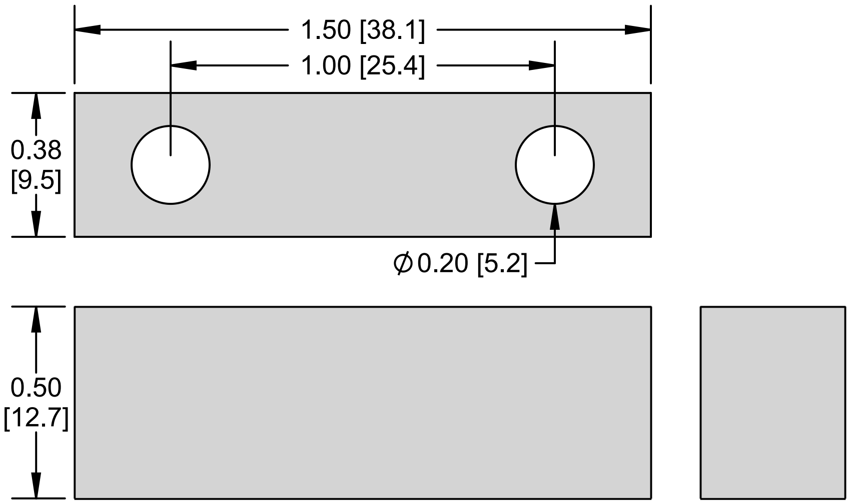
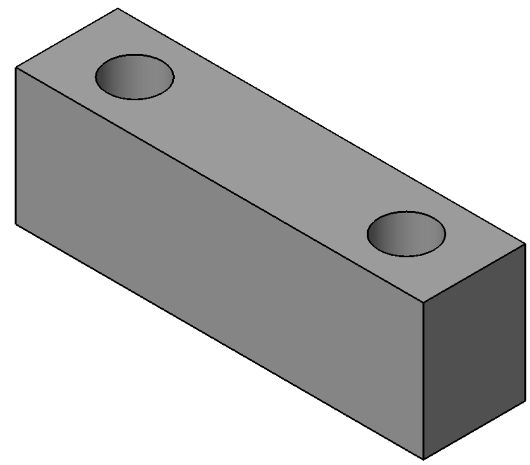
MICRO-TOOLING
STAND-OFF MOUNTS (SPACERS)

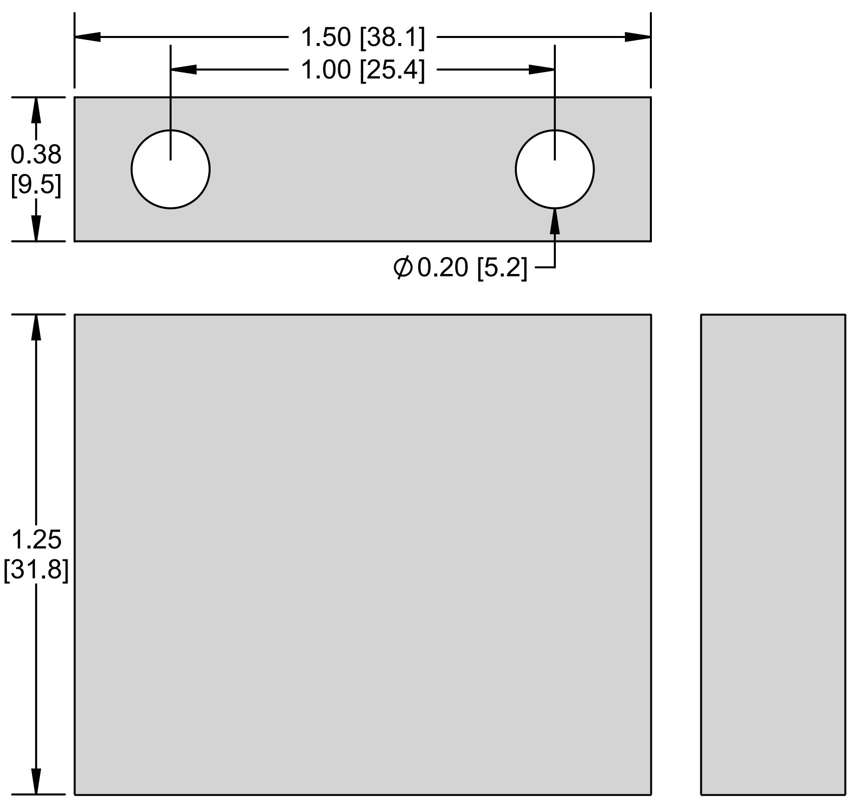
SP50

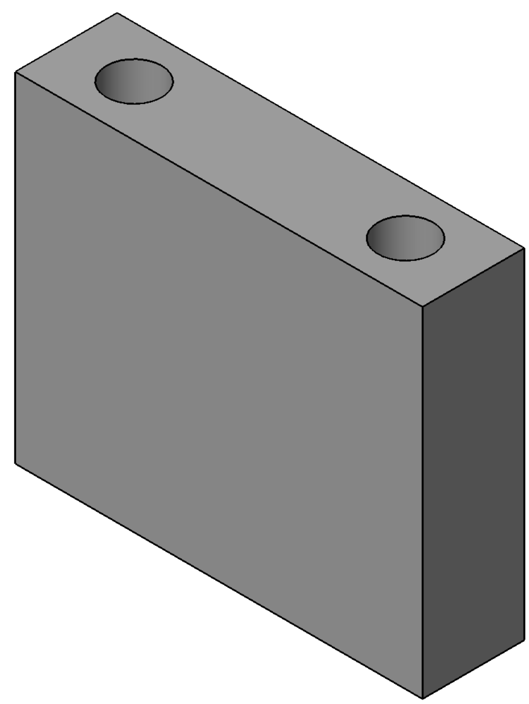




Weight: 0.39 oz [11.0 g]

SP125





Weight: 0.97 oz [27.5 g]

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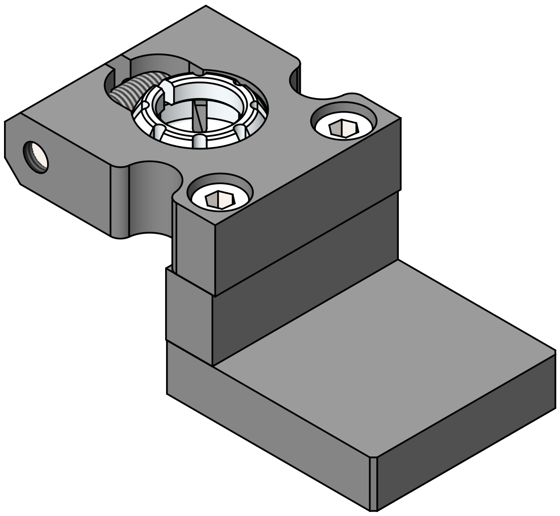
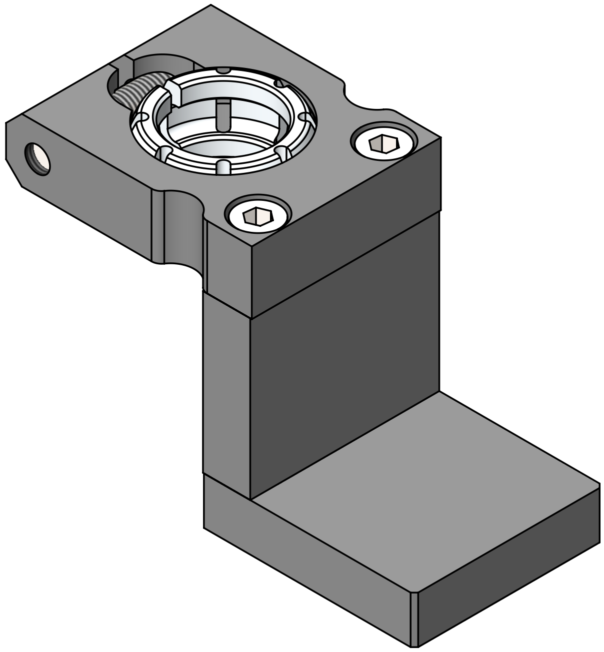
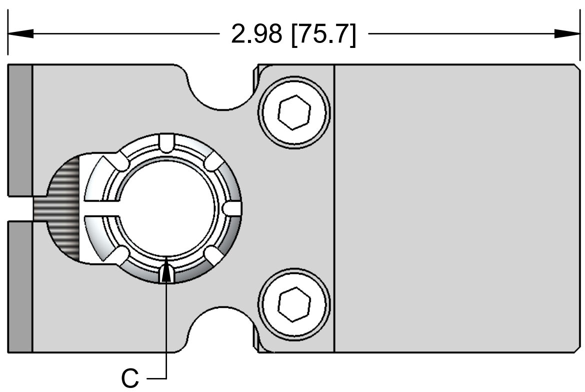
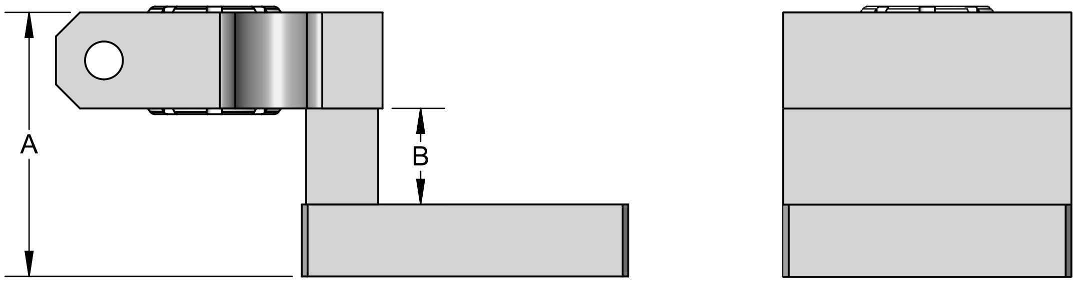
	TUBE SIZE		STAND OFF (SPACER)
SGM	50	-	
	50 = 1/2" Tube		(Blank) = None
	75 = 3/4" Tube		**50** = 1/2"
			125 = 1-1/4"









MODEL	DIMENSION			WEIGHT oz [g]
	A in [mm]	B in [mm]	C in [mm]	
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]

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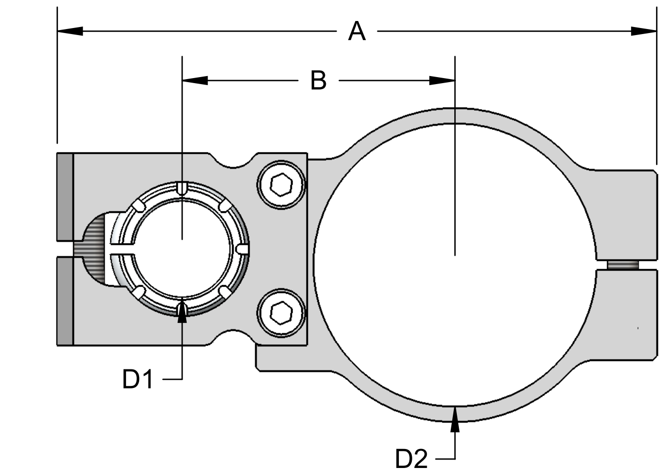
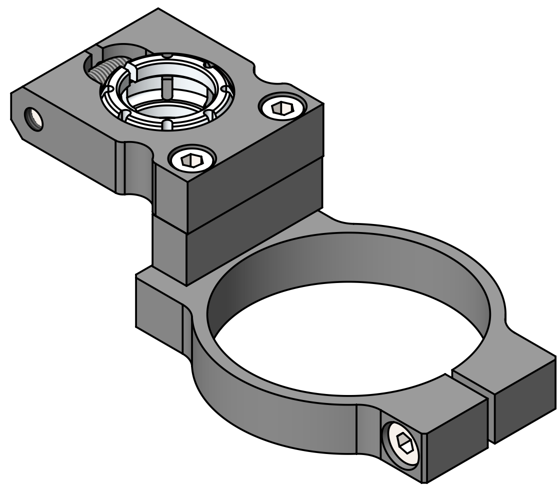
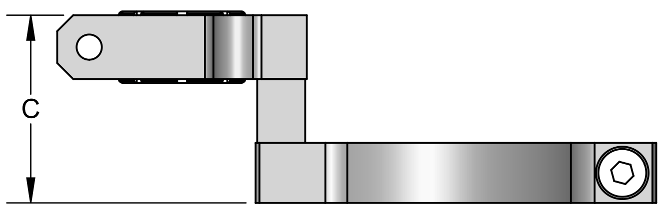
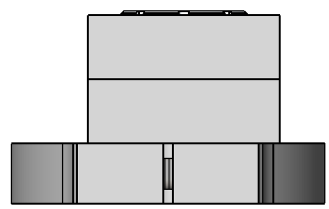
	TUBE SIZE	NIPPER SIZE		STAND OFF (SPACER)
SNM	**50**	**20**	-	
	50 = 1/2" Tube	**20** = 20 mm Nipper		(Blank) = None
	75 = 3/4" Tube	**30** = 30 mm Nipper		**50** = 1/2"
				125 = 1-1/4"









MODEL	DIMENSION					WEIGHT oz [g]
	A in [mm]	B in [mm]	C in [mm]	D1 in [mm]	D2 in [mm]	
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]

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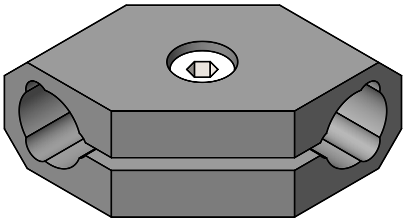
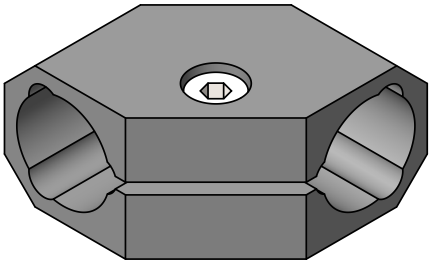
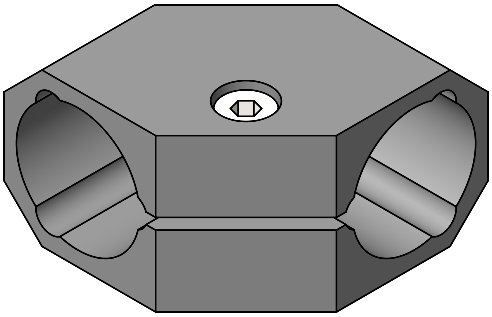


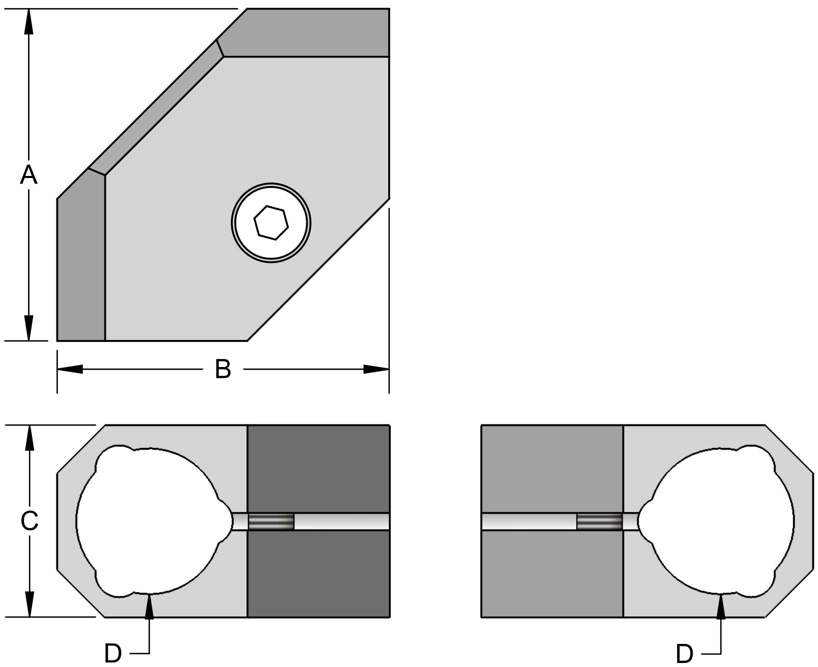
WC5050



WC7575



WC1010



MODEL	DIMENSION				WEIGHT oz [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]	1.50 [42.4]
WC7575	1.73 [43.9]	1.73 [43.9]	1.00 [25.4]	0.76 [19.3]	1.79 [50.7]
WC1010	1.98 [50.3]	1.98 [50.3]	1.25 [31.8]	1.01 [25.6]	2.52 [71.4]

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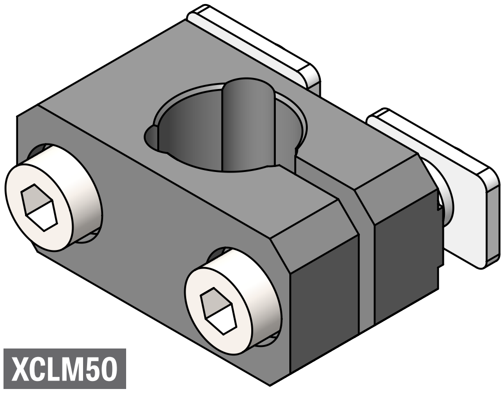
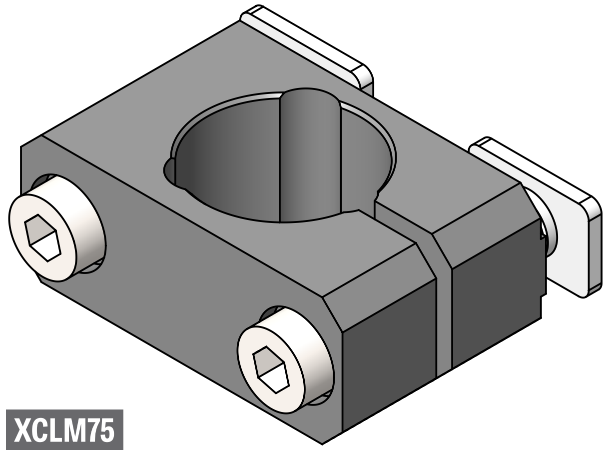
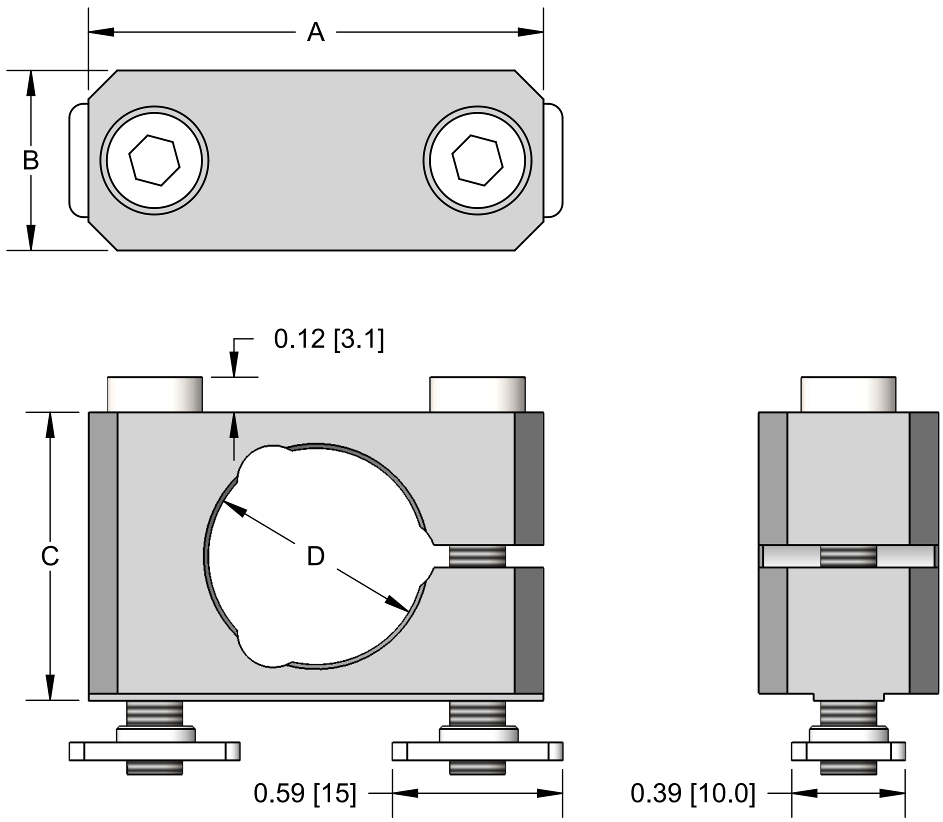


XCLM50



XCLM75



MODEL	DIMENSION				WEIGHT oz [g]
	A in [mm]	B in [mm]	C in [mm]	D in [mm]	
XCLM50	1.34 [34.0]	0.63 [15.9]	0.75 [19.1]	0.50 [12.8]	1.01 [28.7]
XCLM75	1.58 [40.1]	0.63 [15.9]	1.00 [25.4]	0.75 [19.1]	1.35 [38.3]

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SECTION 18
EDCO USA VACUUM UNIVERSITY

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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

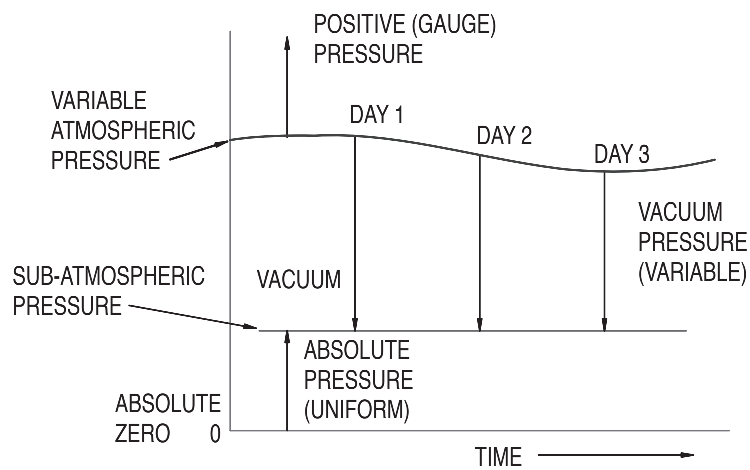
The International Standard Atmosphere (ISA) is defined as a mean atmospheric pressure of 29.92" Hg (760mm Hg) at 59°F (15°C) in dry air at sea level. Other equivalent units are 14.72 psi, 1 bar and 101.3 kPa. To complicate matters, the instrument used to measure atmospheric pressure is a barometer and 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.



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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

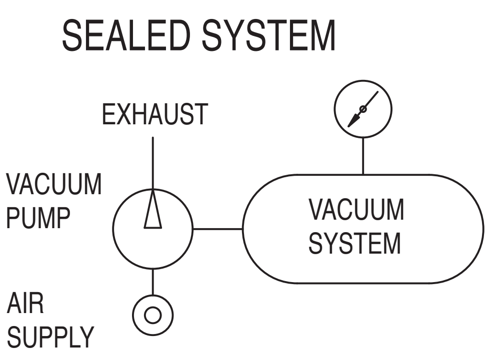
The performance of a vacuum pump is defined by its' performance curve which is simply a plot of the vacuum flow rate that it is capable of producing at a particular vacuum pressure. As vacuum pressure increases, it becomes more difficult to remove (pump out) additional air molecules, so vacuum flow rate 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.

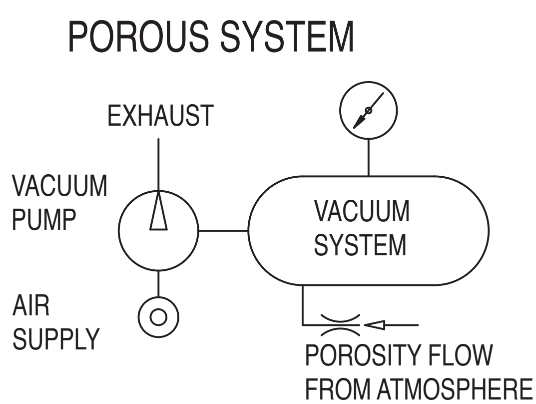
Vacuum pressure determines the amount of force that can be developed to hold a work piece or to carry a load. For a sealed system with no leakage, the two main concerns are; how much vacuum pressure is needed and how quickly can the system be evacuated to the required vacuum pressure? Since the system 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.





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EDCO VACUUM UNIVERSITY
VACUUM GENERATOR - AIR POWERED VACUUM PUMP

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.

EDCO offers many configurations of single-stage (mono-stage) vacuum pumps and pump selection is a matter of satisfying the required performance in a body style that best fits your application. EDCO USA multi-stage vacuum Classic pumps are available with five different series of ejector nozzles; M, ML, E, L, and X-series with different performance characteristics that give system designers a wide selection range instead of the one-size-fits-all approach. All five nozzle series cost the same, so let the system requirements lead you to the best solution for your application. Call us if you would like help.

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.

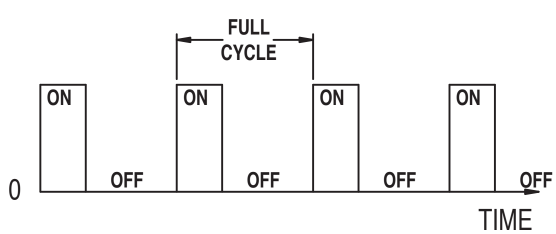
Electro-mechanical pumps efficiently convert electrical power into vacuum flow and pressure, but, because they must run continuously, they can't take advantage of the system duty-cycle to reduce overall energy consumption. However, for systems requiring constant large vacuum flows, they may be the best 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



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ON / OFF

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.

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.

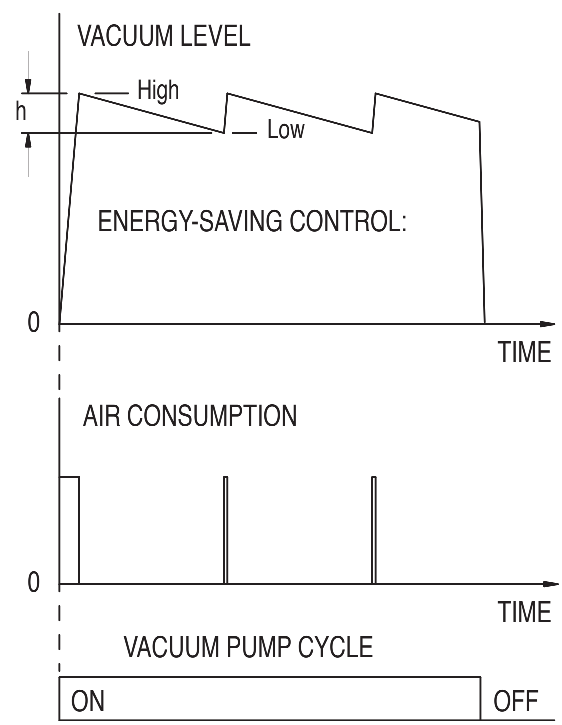
VACUUM CUPS

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



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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 $F = P \times A$ 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.

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.

VACUUM CUP MATERIAL 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.

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
X	X	X	X		X		X	X	X	**Flat**
X	X		X				X			**Concave - Slight**
X	X	X	X	X		X	X	X		**Convex**
X	X	X	X				X			**Compound**
X	X			X		X				**Spherical**
X	X	X		X			X	X	X	**Cylindrical**
X	X	X					X			**Flexible**
		X								**Plastic Flim**
X	X		X		X	X			X	**Shear Loads**

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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: G1/4-19)

Thread Compatibility:
Please note, some thread sizes in different systems do not always fit.

	M5 Male	M5 Female	G1/8 Male	G1/8 Female	G1/4 Male	G1/4 Female	G3/8 Male	G3/8 Female	G1/2 Male	G1/2 Female	G3/4 Male	G3/4 Female	G1 Male	G1 Female	G2 Male
10-32 UNF Male or Female	+	+++													
1/8 NPSF Female			+												
1/8 NPT Male or Female			-	+											
1/4 NPSF Female					+										
1/4 NPT Male or Female					-	-									
3/8 NPSF Female							-								
3/8 NPT Male or Female							-	-							
1/2 NPSF Female									+						
1/2 NPT Male or Female									-	+					
3/4 NPSF Female											+				
3/4 NPT Male or Female											-	+			
1 NPT Male or Female													-	-	
2 NPT Male or Female															-

+++ Fits, + Fits w/ Short Thread, - Does Not Fit

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