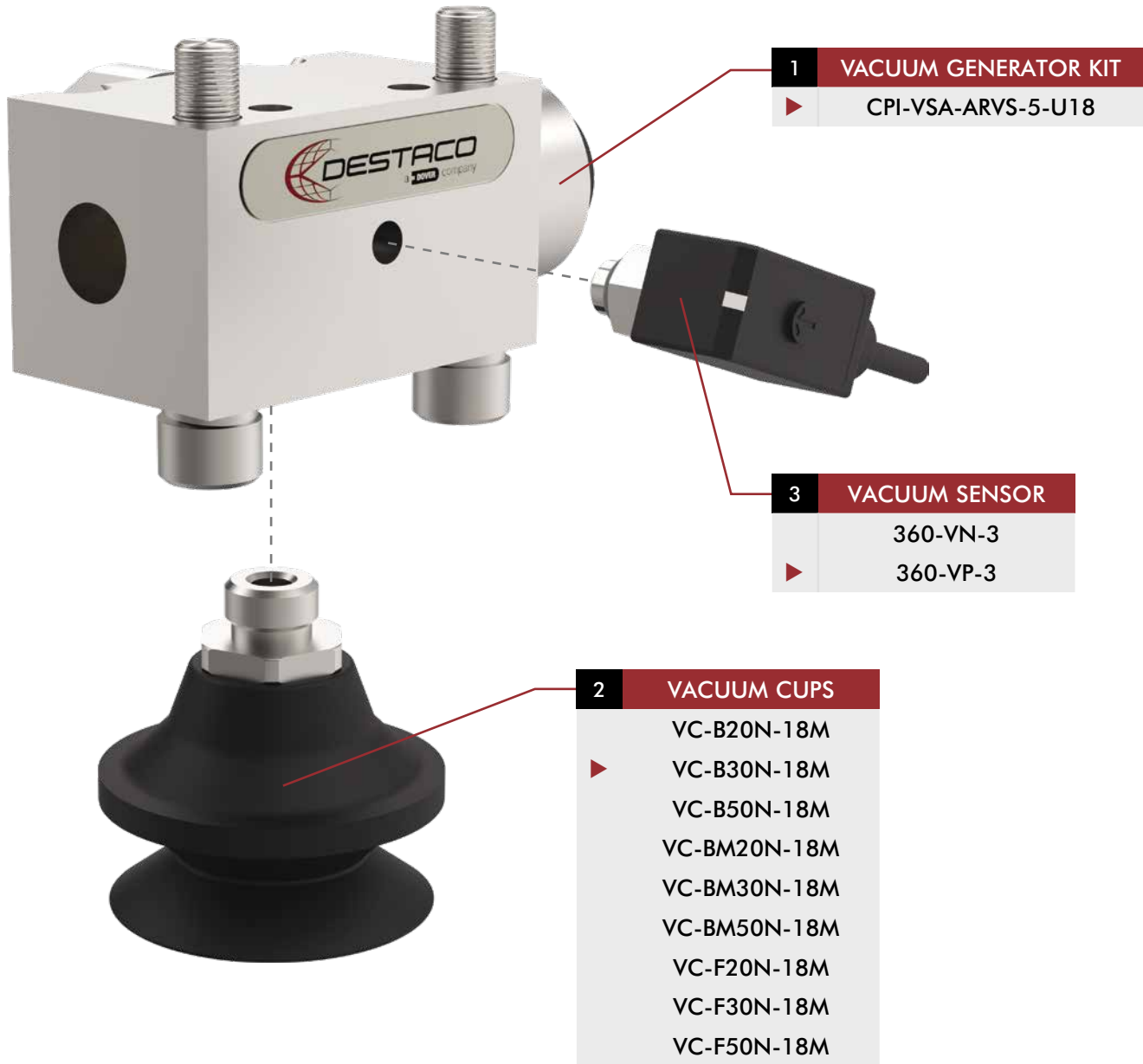


ROBOT VACUUM GRIPPING SOLUTIONS

ARV® Vacuum Gripper Kit | Ordering Information



1 VACUUM GENERATOR KIT
▶ CPI-VSA-ARVS-5-U18

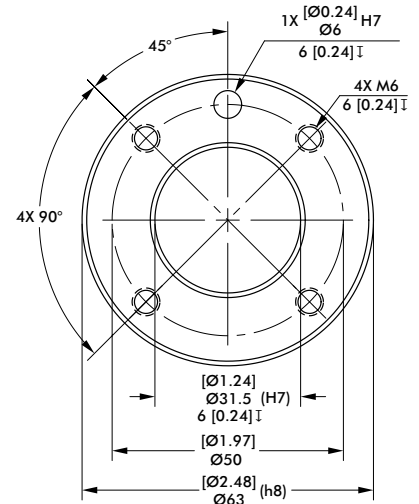
3 VACUUM SENSOR
360-VN-3
▶ 360-VP-3

2 VACUUM CUPS
VC-B20N-18M
▶ VC-B30N-18M
VC-B50N-18M
VC-BM20N-18M
VC-BM30N-18M
VC-BM50N-18M
VC-F20N-18M
VC-F30N-18M
VC-F50N-18M

How To Order: (Example for above configured product)

Order #	Description	Qty	Page
1	CPI-VSA-ARVS-5-U18 Vacuum Generator Kit	1	2
2	VC-B30N-18M Vacuum Cup	1	3
3	360-VP-3 Vacuum Sensor	1	4

Robot Manufacturer	Model
GENERIC	Any model with ISO-9409-1-50-4-M6 Pattern
ABB	CRB 15000
AUBO	I3, I5, I7, I10
DOBOT	CR - 5
DOOSAN ROBOTICS	M0609,M1509,M1013,M0617
ESI	C-7, C-15
F&P PERSONAL ROBOTICS	P-ROB 2R-24V, 48V
FRANKA EMIKA	PANDA
HAN'S ROBOTS	ELFIN 3, 5, 10
HANWHA PRECISION MACHINERY	HCR-3, 5, 12
JAKA/KUNLIN	ZU 7, 12
KAWADA INDUSTRIES	NEXTAGE
KUKA	LBR iiwa 7 R800, LBR iiwa 14 R820
MODBOT	Robot, SCARA
Omron TM	TM 5 - 700, TM 5 - 900, TM 12, TM 14
RAINBOW ROBOTICS	RB5
REIS	RV10-6, RV20-6
ROZUM	PULSE 75, 90
SIASUN	GCR5, GCR14, GCR20, SCR3, SCR5
STAUBLI	TX2 90, TX2 TOUCH 90, TX2 TOUCH 90L, TX2 TOUCH 90XL
TECHMAN	TM5M-700, TM5M-900, TM12M, TM14M
UNIVERSAL ROBOTS	UR3, UR5, UR10, UR16



ISO-9409-1-50-4-M6
Cobot Mounting Pattern

Vacuum grippers are used with smooth nonporous workpiece materials such as:

- Composites
- Glass
- High Density Cardboard
- Laminated paper
- Metals
- Hard Plastic
- Smooth surfaced Wood
- Smooth Ceramics
- Plastic Bag Packaging



ARV® Vacuum Gripper Operation:

- Vacuum grippers operate in any orientation with the workpiece.
- The entire area of the vacuum cup must be in contact with the smooth surface of the workpiece.
- Air Pressure is required to create and maintain gripforce on part
- The vacuum gripper will lose gripforce upon loss of air pressure.
- Workpiece should be gripped in the center of its geometry whenever possible.

ROBOT VACUUM GRIPPING SOLUTIONS

ARV® Vacuum Gripper Kit | Dimensions and Specifications



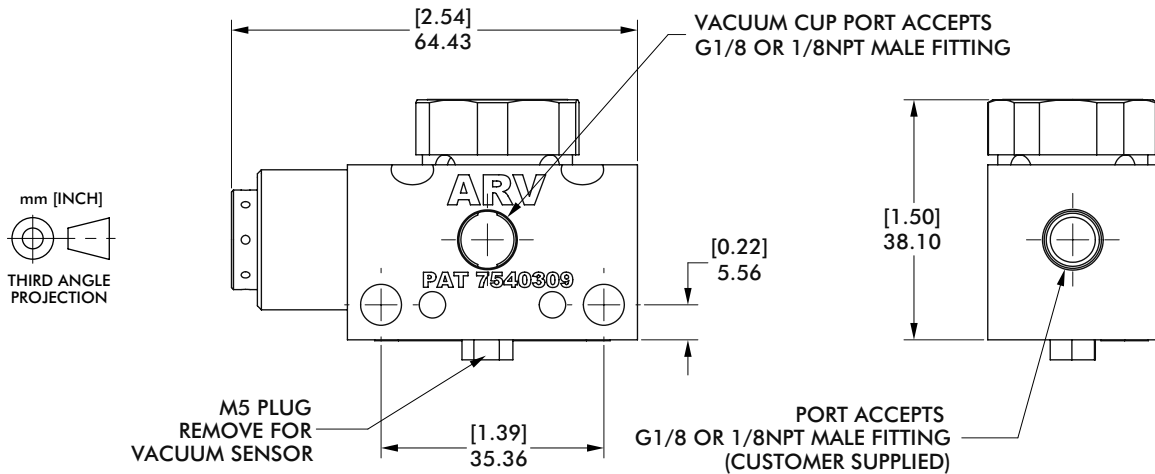
CPI-VSA-ARVS-5-U18 Vacuum Generator Kit



ARV Venturi Vacuum Generator with built-in exhaust silencer, provides automatic workpiece release for high-speed operation.



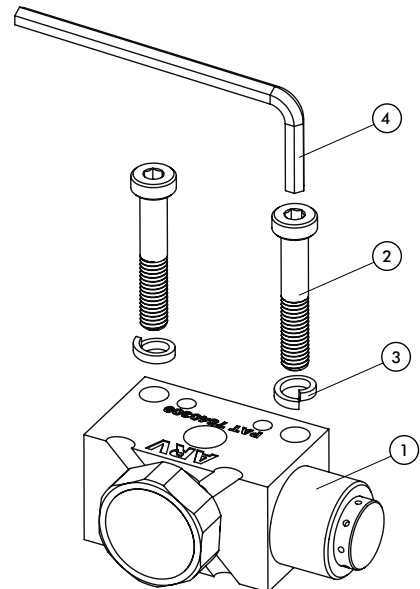
Specifications:	Units	MG-050-01
Weight	Kg [lb]	0,10 [0.22]
Material:		Aluminum
Specifications @ 4 bar [60psi]:		
Speed to Vacuum	sec.	0.2 - 0.3
Speed to Release	sec.	0.02
Air Consumption [Vacuum]	l/m [scfm]	40 l/m [1.4 scfm]
Air Consumption [Blow-Off]		0
Noise Level (at one meter)	dBa	68



CPI-VSA-ARVS-5-U18 Vacuum Generator Kit Components

Item	Description	Quantity
1	Auto Release Venturi Vacuum Generator	1
2	SHCS, M6 x 35mm, Stainless	2
3	Split Lock Washer	2
4	Wrench, Allen, 4mm Hex	1

All hardware and tools are provided in the kit



Vacuum Cup Usage

Vacuum grippers must be operated within a safe working payload. To properly size a vacuum cup for your application, use the formula on this page. There are four simple steps to help make sure your application has the appropriate vacuum cup.

- Step 1:** Verify Workpiece part weight and contour.
- Step 2:** Add up your application features that determines an effective safety factor(s). See application features below.
- Step 3:** Select the vacuum cup group (flat, bellows, multi-bellows) from the selection and load rating (f) charts that best matches your application.
- Step 4:** Starting with the largest cup within the selected vacuum cup group calculate the payload rating (w) and verify it is equal to or larger than the workpiece weight. See calculated example.

Use the largest cup possible that best fits the application.



Formula

$$W = \frac{F}{S}$$

W = Payload Rating
F = Load Rating
S = Safety factor

Payload and load rating must be in the same units, either English or Metric.

Use this formula to determine the maximum payload rating allowable for single vacuum gripper.

Application Features

Ideal plant conditions*: **3**
Fast moving robot: **+1**
Slick or Oily Panel: **+1**
Flexing Workpiece: **+2**
High Horizontal Loads: **+1**

Safety Factor

Starting with Ideal conditions (3), add each additional condition to determine a total safety factor.

Example:

Ideal conditions:	3
Fast moving robots:	+1
Oily Part:	+1
Total Safety Factor	5

Vacuum Cup Sizing Example:

Vacuum Cup:	VC-B50N-18M
F (Load Rating):	6.63kg
Safety Factor:	5
<small>(oily, fast moving, ideal plant conditions)</small>	
W (Payload Rating):	1.326kg (6.63/5)
This is the working payload rating of the cup for this application.	

*Ideal conditions are defined as having no surface, operational, or environmental conditions which could adversely effect the performance of the vacuum cup.

ROBOT VACUUM GRIPPING SOLUTIONS



Vacuum Cups | Selection and Load Ratings

Flat Cups

- Use with flat or mild contoured workpiece surfaces
- Consistent workpiece pick location, no misalignment

Vacuum Surface Contour:



		VC-F20N-18M	VC-F30N-18M	VC-F50N-18M
Supply Pressure	bar [psi]	4,0 [60]	4,0 [60]	4,0 [60]
Load Rating	Kg [lb]	1,47 [3.25]	2,55 [5.63]	7,54 [16.6]

Bellows Cups

- Flat & Slightly curved surface
- Used when workpiece pick location slightly varies or is less consistent
- Bellows allows for minor workpiece misalignment

Vacuum Surface Contour:



		VC-B20N-18M	VC-B30N-18M	VC-B50N-18M
Supply Pressure	bar [psi]	4,0 [60]	4,0 [60]	4,0 [60]
Load Rating	Kg [lb]	1,02 [2.25]	2,21 [4.88]	6,63 [14.6]

Multi-Bellows Cups

- Uneven, curved or arched workpieces
- Used when workpiece pick location slightly varies or is less consistent
- Bellows allows for high workpiece misalignment

Vacuum Surface Contour:

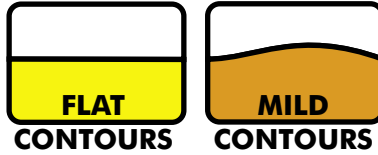


		VC-BM20N-18M	VC-BM30N-18M	VC-BM50N-18M
Supply Pressure	bar [psi]	4,0 [60]	4,0 [60]	4,0 [60]
Load Rating	Kg [lb]	0,68 [1.50]	1,64 [3.63]	4,37 [9.63]

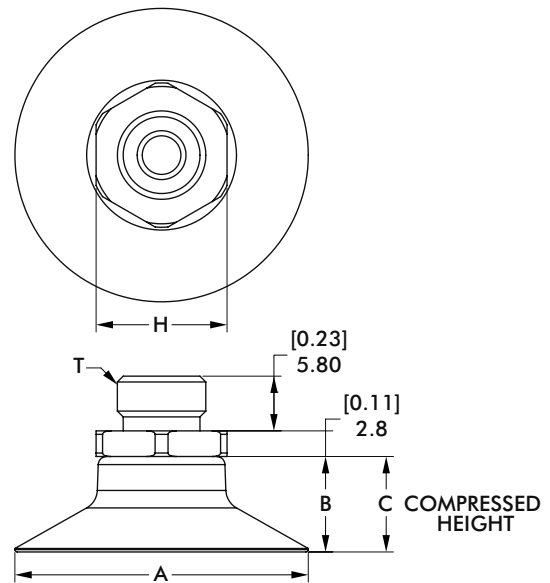
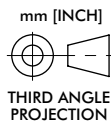
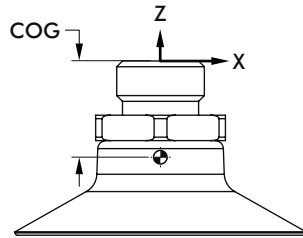
ROBOT VACUUM GRIPPING SOLUTIONS

Flat Foot Vacuum Cups | Selection and Dimensions

VC-FXXN-18M Flat Foot Vacuum Cups



Specifications:	Units	VC-F20N-18M	VC-F30N-18M	VC-F50N-18M
Weight:	g [oz]	7,8 [0.27]	6,2 [0.22]	19,6 [0.69]
COG (Centre of Gravity) [X] [Y] [Z]	mm	[0] [0] [-8.83]	[0] [0] [-10.55]	[0] [0] [-18]
Moment of Inertia @ COG -I _{XX}	[Kg-mm ²]	0,13	0,25	3,08
Moment of Inertia @ COG -I _{YY}	[Kg-mm ²]	0,13	0,25	3,08
Moment of Inertia @ COG -I _{ZZ}	[Kg-mm ²]	0,11	0,25	4,28
Temperature Range:		-40° to 57°C (-40° to 135°F)		
Material:		Shore A50 durometer Nitrile		



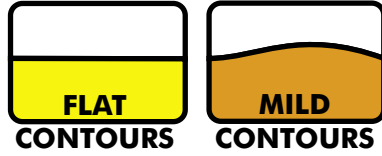
Model	Units	A	B	C	H	T
VC-F20N-18M	mm [in]	22,1 [0.87]	8,6 [0.34]	7,1 [0.28]	14,2 [0.56]	18M
VC-F30N-18M	mm [in]	32,0 [1.26]	10,4 [0.41]	8,1 [0.32]		
VC-F50N-18M	mm [in]	53,1 [2.08]	17,5 [0.69]	14,5 [0.57]	17,4 [0.68]	

ROBOT VACUUM GRIPPING SOLUTIONS

Bellows Vacuum Cups | Selection and Dimensions

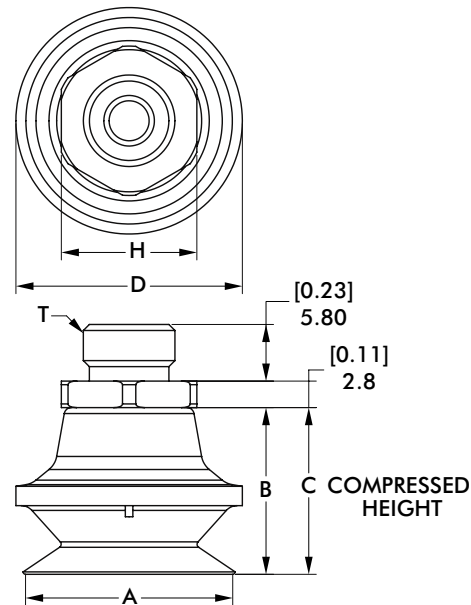
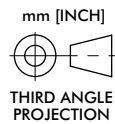
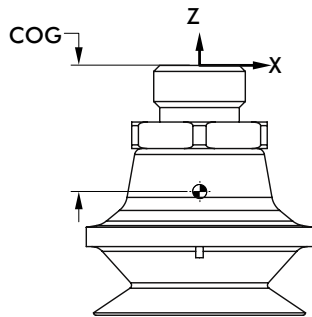


VC-**BXXN**-18M Bellows Vacuum Cups



Vacuum Cup: **VC** — Style: **BXXN** — Thread Size: **18M**

Specifications:	Units	VC-B20N-18M	VC-B30N-18M	VC-B50N-18M
Weight:	g [oz]	5,07 [0.18]	11,42 [0.40]	24,76 [0.87]
COG (Centre of Gravity) [X] [Y] [Z]	mm	[0] [0] [-11.87]	[0] [0] [-17.91]	[0] [0] [-23]
Moment of Inertia @ COG -IXX	[Kg-mm ²]	0,33	1,51	6,5
Moment of Inertia @ COG -IYY	[Kg-mm ²]	0,33	1,51	6,5
Moment of Inertia @ COG -IZZ	[Kg-mm ²]	0,22	1,39	7,2
Temperature Range:		-40° to 57°C (-40° to 135°F)		
Material:		Shore A50 durometer Nitrile		



Model	Units	A	B	C	D	H	T
VC-BM20N-18M	mm [in]	22,4 [0.88]	17,5 [0.69]	7,6 [0.30]	23,9 [0.94]	14.2 [0.56]	18M
VC-BM30N-18M	mm [in]	34,0 [1.34]	26,4 [1.04]	11,4 [0.45]	36,3 [1.43]		
VC-BM50N-18M	mm [in]	52,8 [2.08]	34,5 [1.36]	14,5 [0.57]	59,4 [2.34]	17.4 [0.68]	

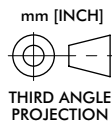
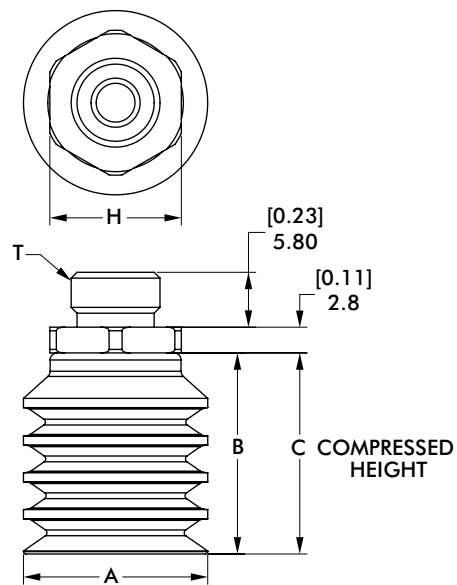
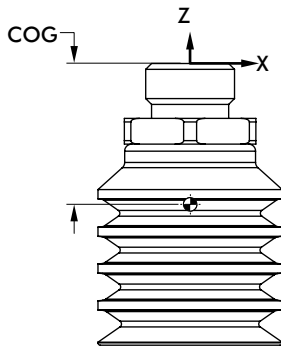
ROBOT VACUUM GRIPPING SOLUTIONS

Multi-Bellows Vacuum Cups | Selection and Dimensions

VC-**BMXXN**-18M Multi-Bellows Vacuum Cups



Specifications:	Units	VC-BM20N-18M	VC-BM30N-18M	VC-BM50N-18M
Weight:	g [oz]	5,3 [0.19]	10,3 [0.36]	32,7 [1.15]
COG (Centre of Gravity) [X] [Y] [Z]	mm	[0] [0] [-12.8]	[0] [0] [-16.60]	[0] [0] [-30.57]
Moment of Inertia @ COG -IXX	[Kg-mm ²]	0,37	1,38	17,59
Moment of Inertia @ COG -IYY	[Kg-mm ²]	0,37	1,38	17,59
Moment of Inertia @ COG -IZZ	[Kg-mm ²]	0,20	0,97	13,41
Temperature Range:		-40° to 57°C (-40° to 135°F)		
Material:		Shore A50 durometer Nitrile		



Model	Units	A	B	C	H	T
VC-BM20N-18M	mm [in]	20,1 [0.79]	21,9 [0.86]	8,9 [0.35]		
VC-BM30N-18M	mm [in]	30,0 [1.18]	30,7 [1.21]	10,7 [0.42]	14,2 [0.56]	18M
VC-BM50N-18M	mm [in]	50,0 [1.97]	51,1 [2.01]	23,1 [0.91]		

ROBOT VACUUM GRIPPING SOLUTIONS

Vacuum Sensors | Dimensions and Specifications

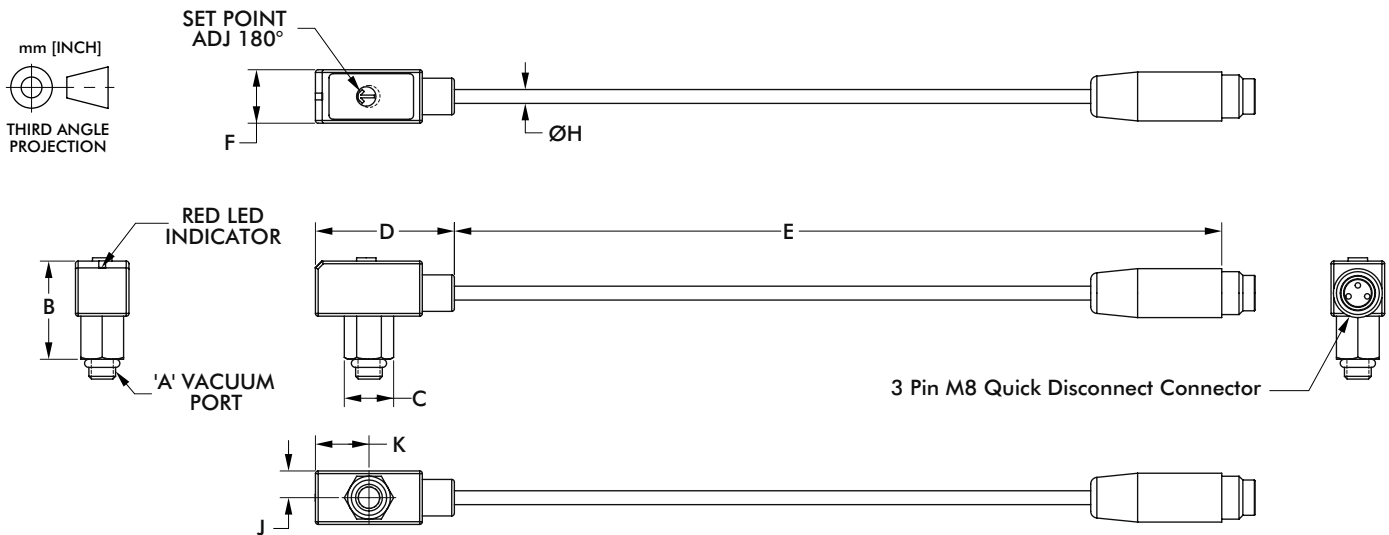


360-VX-3 Vacuum Sensor

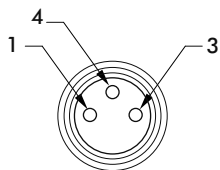


Series	Sensor Type	No. of Pins
360	VX	3

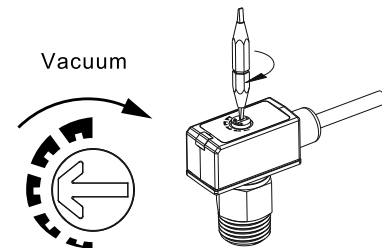
Part Number	Description
360-VN-3	NPN Vacuum Sensor
360-VP-3	PNP Vacuum Sensor



Part #	A	B	C	D	E	F	H	J	K
360-VX-3	[10-32] M5	[0.73] 18,57	[0.31] 7,95	[1.01] 25,73	[6.0] 152,4	[0.40] 10,11	[0.10] 2,54	[0.20] 5,05	[0.39] 9,96



QUICK DISCONNECT PIN OUT
 PIN 1, BROWN, +VDC
 PIN 4, BLACK, SWITCHED OUTPUT
 PIN 3, BLUE, -VDC



Specification	360-VN-3/360-VP-3
Maximum Pressure:	29 psi [200 kPa]
Rated Vacuum Pressure Range:	0 to -29,5 inHG [0 to 100 kPa]
Operating Pressure:	14°F to 122°F [-10°C to 60°C]
Electrical Connection:	-3 = 3-Pin Pico 8 mm Connector
Operating Voltage:	10.8 to 30 V DC (including ripple)
Current Consumption:	20 mA Max
Display:	Red LED
Circuit:	NPN, PNP
NPN Output Voltage	0.8 V DC Max
PNP Output Voltage:	1.8 V DC Max
Max Temperature	120 [250]

Easy Vacuum Setpoint Adjust

- Remove power and wire sensor per pin diagram.
- Set vacuum setpoint while vacuum cup maintains a gripped part.
- Increase vacuum by rotating setpoint clockwise.
- Decrease vacuum by rotating setpoint counter-clockwise.

