VACUFORCE®

THE SQUID®

UNIVERSAL VACUUM TOOL TECHNOLOGY

patent pending

THE SQUID®

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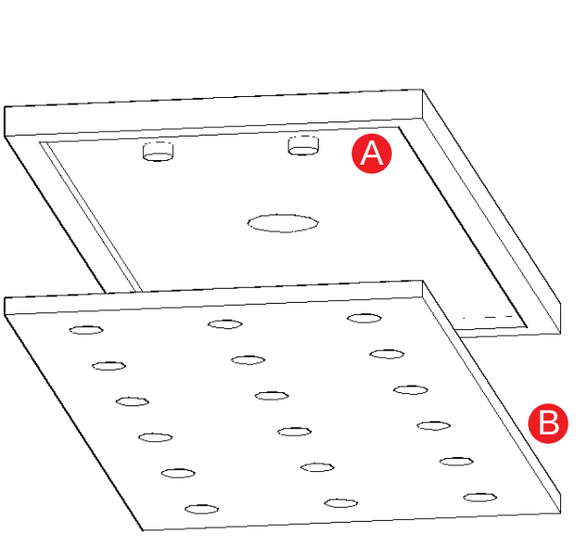
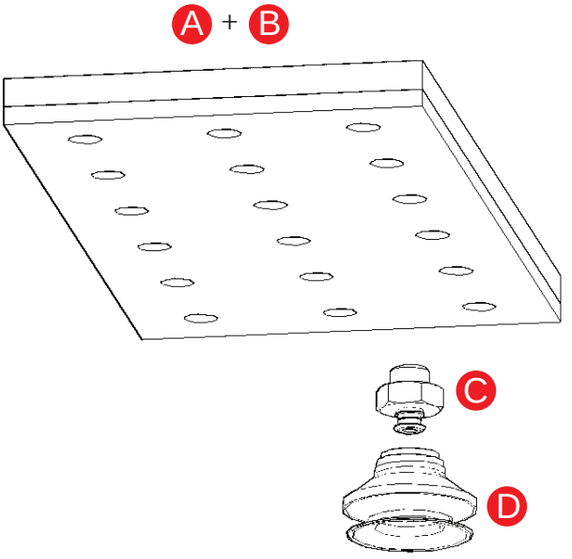
The Squid has been developed to offer the vacuum user a universal end of arm vacuum tool. The Squid utilizes different “end effectors” such as vacuum cups, foam, orifice fittings and self closing valves. The choice of Squid is dependent on the application and user preference. Please contact Vacuforce to discuss the application.





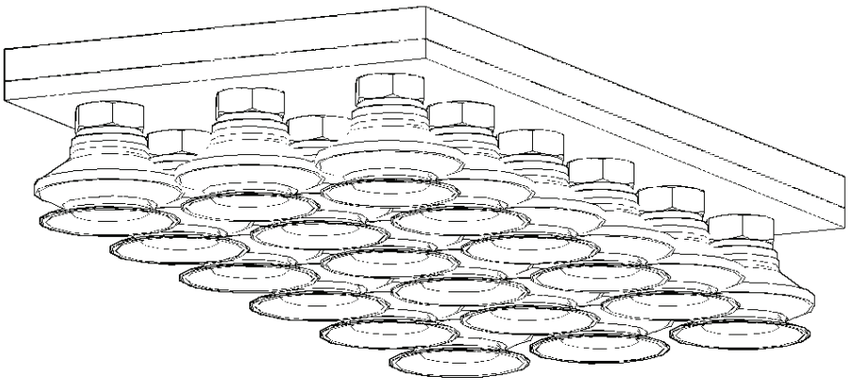
Assembly

Every Squid requires a Base Box Ⓐ. This is the top of the Squid system which mounts to the robot or lifting device. The cup plate Ⓑ connects to the underside of the Squid with an airtight seal.

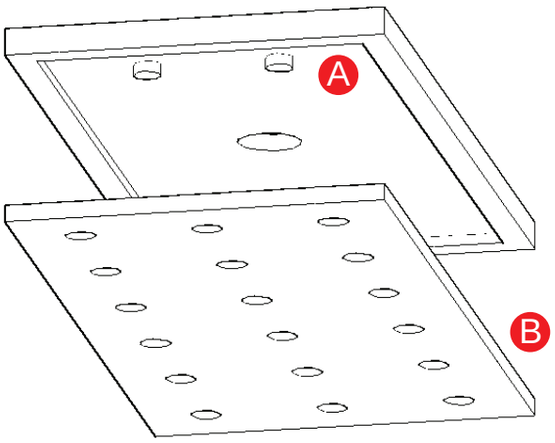
Orifice Version

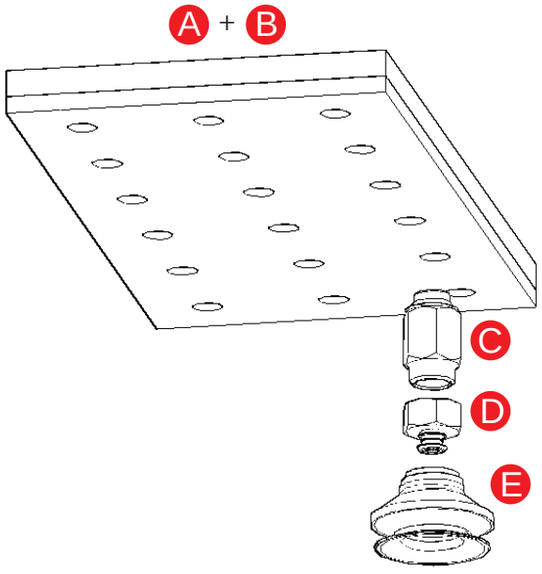
The Squid assembly above shows a vacuum cup fitting Ⓒ which has a small orifice in the vacuum channel. This orifice restricts leakage if the vacuum cup Ⓓ is not sealed correctly against the load being gripped by the Squid system. The orifice system is a very simple and effective way of handling parts of varying sizes where the vacuum source such a vacuum pump or compressed air powered venturi can compensate for the leakage in the system.

A + B + C + D



The Squid has been developed to offer the vacuum user a universal end of arm vacuum tool. The Squid utilizes different “end effectors” such as vacuum cups, foam, orifice fittings and self closing valves.
The choice of Squid is dependent on the application and user preference. Please contact Vacuforce to discuss the application.





Assembly

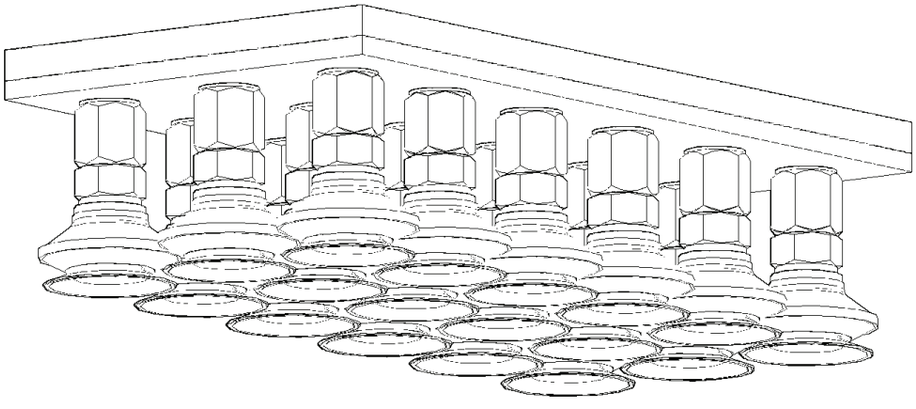
Every Squid requires a Base Box Ⓐ. This is the top of the Squid system which mounts to the robot or lifting device. The cup plate Ⓑ connects to the underside of the Squid with an airtight seal.

Self Closing Valve Version

The Squid assembly above shows a self closing valve Ⓒ which acts like an air velocity fuse. More details of this valve can be found on page 10.12. If the valve senses too much air flow when vacuum is turned on to the Squid, this valve will close isolating the attached vacuum cup from the rest of the system. Therefore, maximum system vacuum level is now available to the remaining vacuum cups that are sealed against the load being handled. The self closing valve system is the preferred choice when handling varying size loads with the same Squid particularly if the loads being handled vary greatly in surface area on the pick up face. The cup fitting Ⓓ and vacuum cup Ⓔ attach directly to the self closing valve.

It should be noted that the self closing valves are adjustable to allow for successful handling of low quality cardboard cartons or other porous type products.

A + B + C + D + E



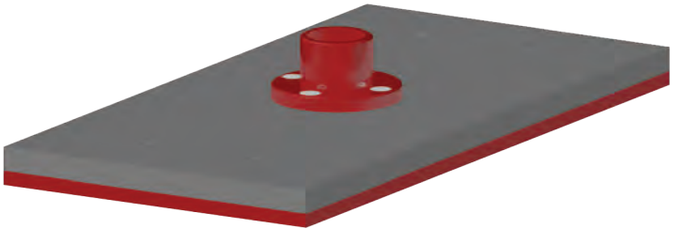
VFSQ1530
Squid Assembly

The following Squid assembly measures 144mm x 288mm (approximately 6” x 12”) and is a standard size model. There is one vacuum port on this model utilizing the VFSQFIT3/4 thread port adapter.

M8 mounting holes shown are on a 200mm x 50mm pitch, but mounting features can be provided to suit different machinery or mount directly to the end of a robot arm.

Weight 1.4kg / 3.1lbs
(Squid body and plate only, assembled)

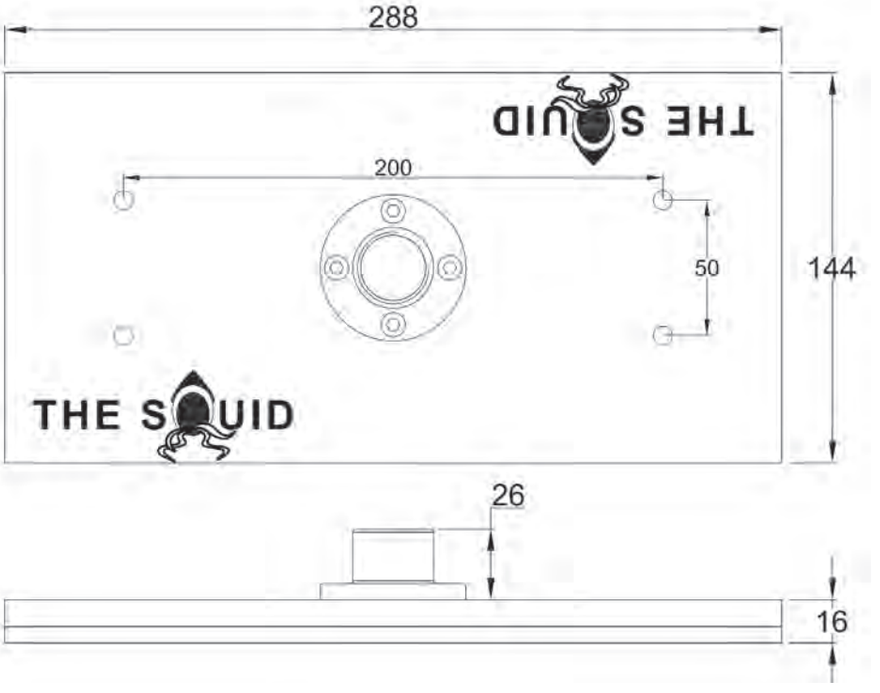
This illustration shows the assembled Squid model VFSQ1530. The vacuum cups, fittings or self closing valves are not shown in this illustration and should be ordered separately.



Assembly Components	Description	Qty Required	Lifting Force*
VFSQLT1530	Squid Body	1	170kg / 374lbs
VFSQP481530	Cup Plate	1	
VFSQFIT3/4	Vacuum Port	1	
VFCF40-U02*	Vacuum Cup Fitting	18	
VFB40ST*	Typical Single Bellows Ø40mm Vacuum Cup	18	
VFSC3/8	Optional Self Closing Valve	18	

**The lifting force is based upon the recommended vacuum cups and associated cup fittings as shown in the above table. The lifting force is also based upon a working vacuum of -80kPa / 24”Hg on a non porous rigid surface with a Ø40mm diameter vacuum cup. Other types of cups can be used based on the application. Please contact Vacuforce for assistance for correct selection.*

DIMENSIONS (mm)



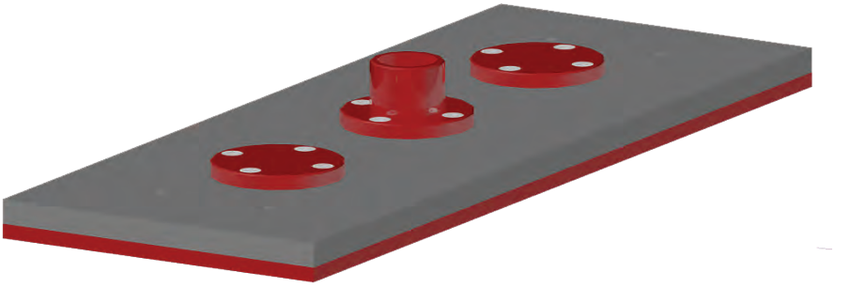
VFSQ1540
Squid Assembly

The following Squid assembly measures 144mm x 384mm (approximately 6” x 18”) and is a standard size model. There are three potential vacuum ports on this model. The illustration below shows two of these ports covered by the VFSQBP3/4 blanking plates with the central port utilizing the VFSQFIT3/4 thread port adapter.

M8 mounting holes shown are on a 300mm x 50mm pitch, but mounting features can be provided to suit different machinery or mount directly to the end of a robot arm.

Weight 2.1kg / 4.6lbs
(Squid body and plate only, assembled)

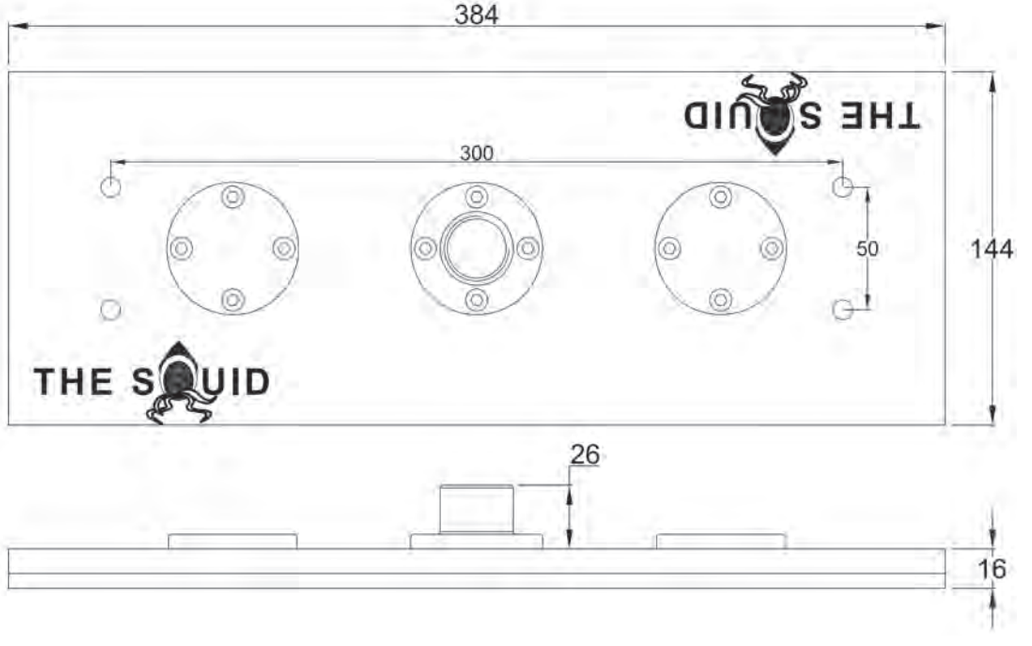
This illustration shows the assembled Squid model VFSQ1540. The vacuum connection adapter VFSQFIT3/4 and VFBP3/4 blanking plates are also shown. The vacuum cups and fittings are not shown in this illustration and should be ordered separately.



Assembly Components	Description	Qty Required	Lifting Force*
VFSQLT1540	Squid Body	1	225kg / 495lbs
VFSQP481540	Cup Plate	1	
VFSQFIT3/4	Vacuum Port	1	
VFSQBP3/4	Vacuum Blanking Port	2	
VFCF40-U02*	Vacuum Cup Fitting	24	
VFB40ST*	Typical Single Bellows Ø40mm Vacuum Cup	24	
VFSC3/8	Optional Self Closing Valve	24	

**The lifting force is based upon the recommended vacuum cups and associated cup fittings as shown in the above table. The lifting force is also based upon a working vacuum of -80kPa / 24”Hg on a non porous rigid surface with a Ø40mm diameter vacuum cup. Other types of cups can be used based on the application. Please contact Vacuforce for assistance for correct selection.*

DIMENSIONS (mm)



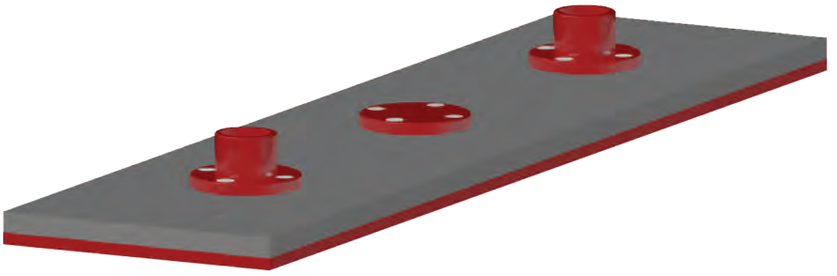
VFSQ1560
Squid Assembly

The following Squid assembly measures 144mm x 576mm (approximately 6” x 24”) and is a standard size model. There are three potential vacuum ports on this model. The illustration below shows one of these ports covered by the VFSQBP3/4 blanking plate with the two vacuum ports utilizing the VFSQFIT3/4 thread port adapter.

M8 mounting holes shown are on a 500mm x 50mm pitch, but mounting features can be provided to suit different machinery or mount directly to the end of a robot arm.

Weight 2.9kg / 6.4lbs
(Squid body and plate only, assembled)

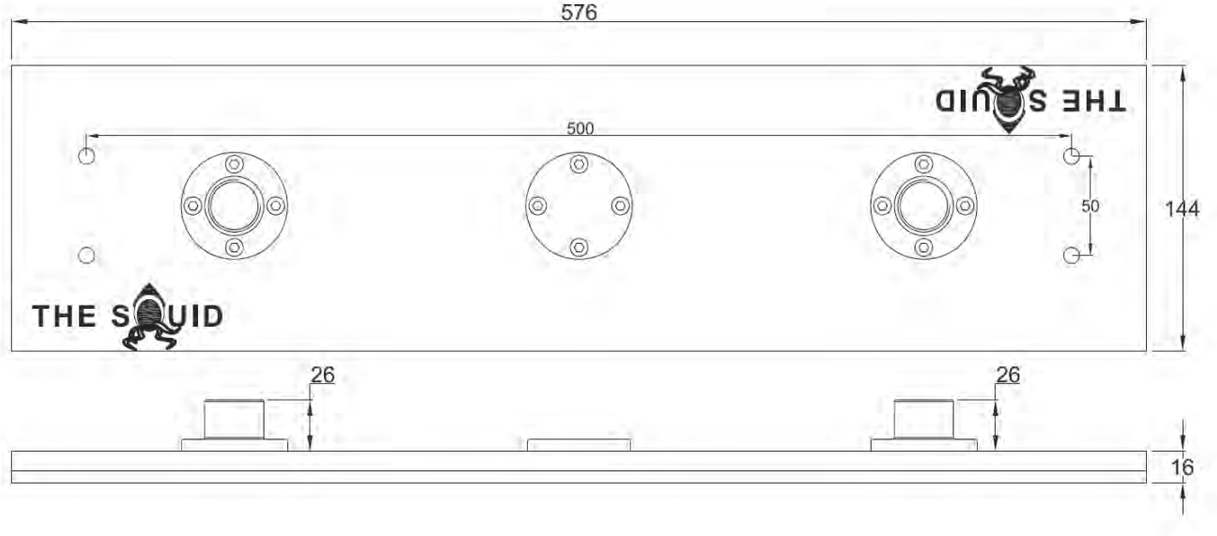
This illustration shows the assembled Squid model VFSQ1560. The vacuum connection adapters VFSQFIT3/4 and VFBP3/4 blanking plate are also shown. The vacuum cups and fittings are not shown in this illustration and should be ordered separately.



Assembly Components	Description	Qty Required	Lifting Force*
VFSQLT1560	Squid Body	1	340kg / 748lbs
VFSQP481560	Cup Plate	1	
VFSQFIT3/4	Vacuum Port	1	
VFSQBP3/4	Vacuum Blanking Port	2	
VFCF40-U02*	Vacuum Cup Fitting	36	
VFB40ST*	Typical Single Bellows Ø40mm Vacuum Cup	36	
VFSC3/8	Optional Self Closing Valve	36	

**The lifting force is based upon the recommended vacuum cups and associated cup fittings as shown in the above table. The lifting force is also based upon a working vacuum of -80kPa / 24”Hg on a non porous rigid surface with a Ø40mm diameter vacuum cup. Other types of cups can be used based on the application. Please contact Vacuforce for assistance for correct selection.*

DIMENSIONS (mm)



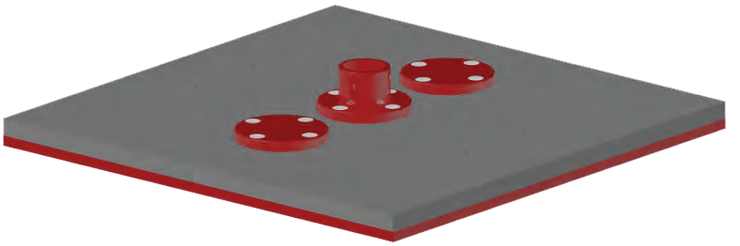
VFSQ3030
Squid Assembly

The following Squid assembly measures 288mm x 288mm (approximately 12” x 12”) and is a standard size model. There are three potential vacuum ports on this model. The illustration below shows two of these ports covered by the VFSQBP3/4 blanking plate with the central vacuum connection utilizing the VFSQFIT3/4 thread port adapter.

M8 mounting holes shown are on a 200mm x 50mm pitch, but mounting features can be provided to suit different machinery or mount directly to the end of a robot arm.

Weight 2.9kg / 6.4lbs
(Squid body and plate only, assembled)

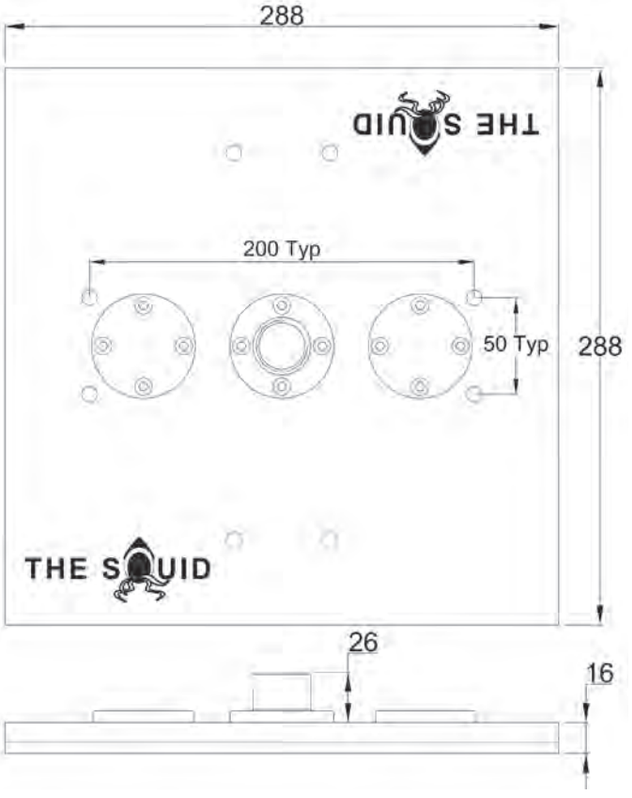
This illustration shows the assembled Squid model VFSQ3030. The vacuum connection adapter VFSQFIT3/4 and VFBP3/4 blanking plates are also shown. The vacuum cups and fittings are not shown in this illustration and should be ordered separately.



Assembly Components	Description	Qty Required	Lifting Force*
VFSQLT3030	Squid Body	1	340kg / 748lbs
VFSQP483030	Cup Plate	1	
VFSQFIT3/4	Vacuum Port	1	
VFSQBP3/4	Vacuum Blanking Port	2	
VFCF40-U02*	Vacuum Cup Fitting	36	
VFB40ST*	Typical Single Bellows Ø40mm Vacuum Cup	36	
VFSC3/8	Optional Self Closing Valve	36	

**The lifting force is based upon the recommended vacuum cups and associated cup fittings as shown in the above table. The lifting force is also based upon a working vacuum of -80kPa / 24”Hg on a non porous rigid surface with a Ø40mm diameter vacuum cup. Other types of cups can be used based on the application. Please contact Vacuforce for assistance for correct selection.*

DIMENSIONS (mm)

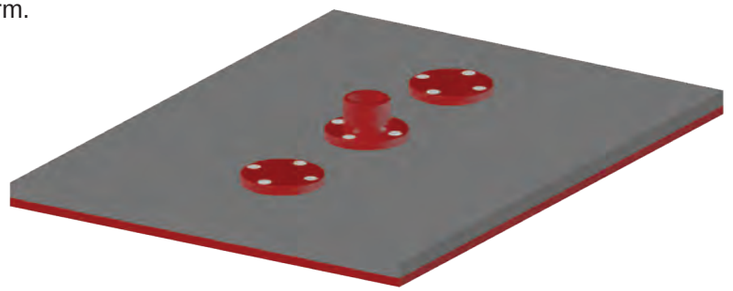


VFSQ3040
Squid Assembly

The following Squid assembly measures 288mm x 384mm (approximately 12” x 18”) and is a standard size model. There are three potential vacuum ports on this model. The illustration below shows two of these ports covered by the VFSQBP3/4 blanking plate with the central vacuum port utilizing the VFSQFIT3/4 thread port adapter.

M8 mounting holes shown are on a 300 x 50mm and 200mm x 50mm pitch, but mounting features can be provided to suit different machinery or mount directly to the end of a robot arm.

Weight 4.3kg / 9.4lbs
(Squid body and plate only, assembled)

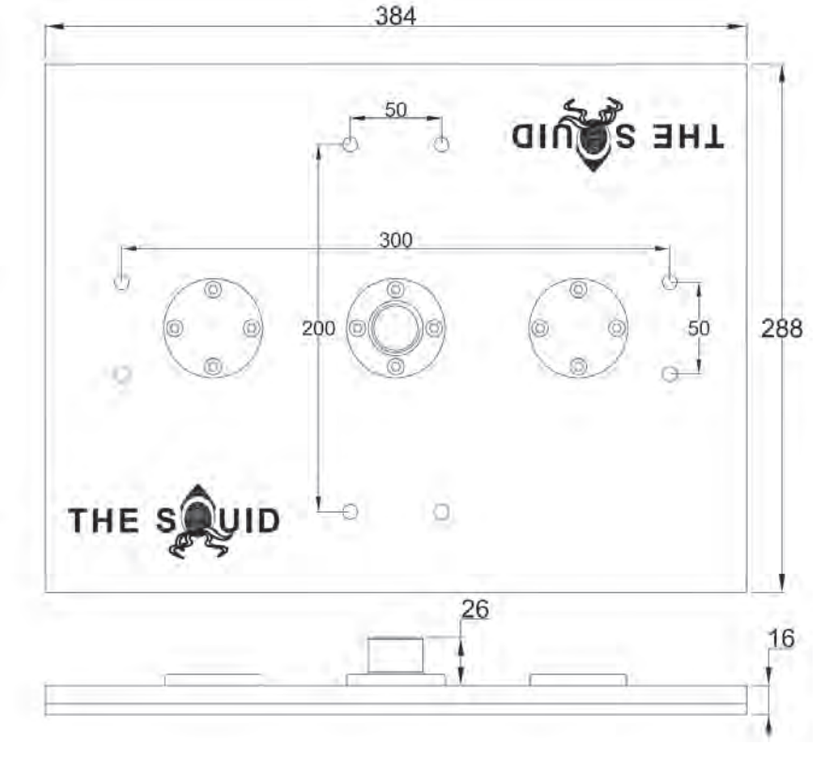


This illustration shows the assembled Squid model VFSQ3040. The vacuum connection adapter VFSQFIT3/4 and VFBP3/4 blanking plates are also shown. The vacuum cups and fittings are not shown in this illustration and should be ordered separately.

Assembly Components	Description	Qty Required	Lifting Force*
VFSQLT3040	Squid Body	1	450kg / 990lbs
VFSQP483040	Cup Plate	1	
VFSQFIT3/4	Vacuum Port	1	
VFSQBP3/4	Vacuum Blanking Port	2	
VFCF40-U02*	Vacuum Cup Fitting	48	
VFB40ST*	Typical Single Bellows Ø40mm Vacuum Cup	48	
VFSC3/8	Optional Self Closing Valve	48	

**The lifting force is based upon the recommended vacuum cups and associated cup fittings as shown in the above table. The lifting force is also based upon a working vacuum of -80kPa / 24”Hg on a non porous rigid surface with a Ø40mm diameter vacuum cup. Other types of cups can be used based on the application. Please contact Vacuforce for assistance for correct selection.*

DIMENSIONS (mm)



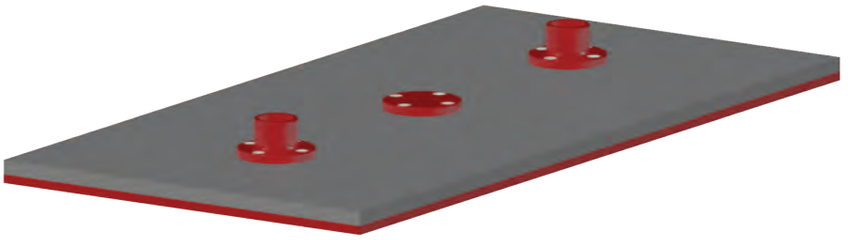
VFSQ3060
Squid Assembly

The following Squid assembly measures 288mm x 576mm (approximately 12” x 24”) and is a standard size model. There are three potential vacuum ports on this model. The illustration below shows two of these ports covered by the VFSQBP3/4 blanking plate with the central vacuum connection utilizing the VFSQFIT3/4 thread port adapter.

M8 mounting holes shown are on a 500mm x 50mm pitch, but mounting features can be provided to suit different machinery or mount directly to the end of a robot arm.

Weight 5.8kg / 12.8lbs
(Squid body and plate only, assembled)

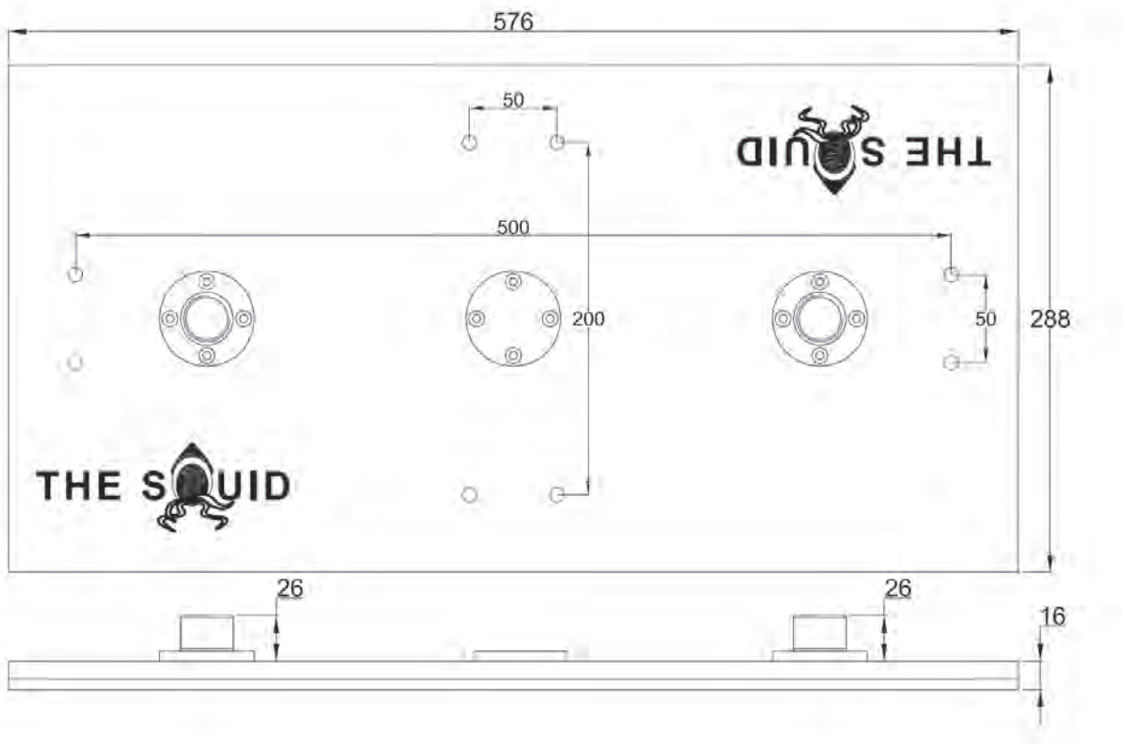
This illustration shows the assembled Squid model VFSQLT3030. The vacuum connection adapter VFSQFIT3/4 is also shown. The vacuum cups and fittings are not shown in this illustration and should be ordered separately.



Assembly Components	Description	Qty Required	Lifting Force*
VFSQLT3060	Squid Body	1	860kg / 1890lbs
VFSQP483060	Cup Plate	1	
VFSQFIT3/4	Vacuum Port	2	
VFSQBP3/4	Vacuum Blanking Port	1	
VFCF40-U02*	Vacuum Cup Fitting	72	
VFB40ST*	Typical Single Bellows Ø40mm Vacuum Cup	72	
VFSC3/8	Optional Self Closing Valve	72	

**The lifting force is based upon the recommended vacuum cups and associated cup fittings as shown in the above table. The lifting force is also based upon a working vacuum of -80kPa / 24”Hg on a non porous rigid surface with a Ø40mm diameter vacuum cup. Other types of cups can be used based on the application. Please contact Vacuforce for assistance for correct selection.*

DIMENSIONS (mm)

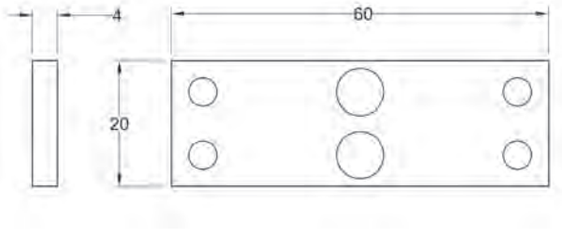


CP50
Modular Assembly

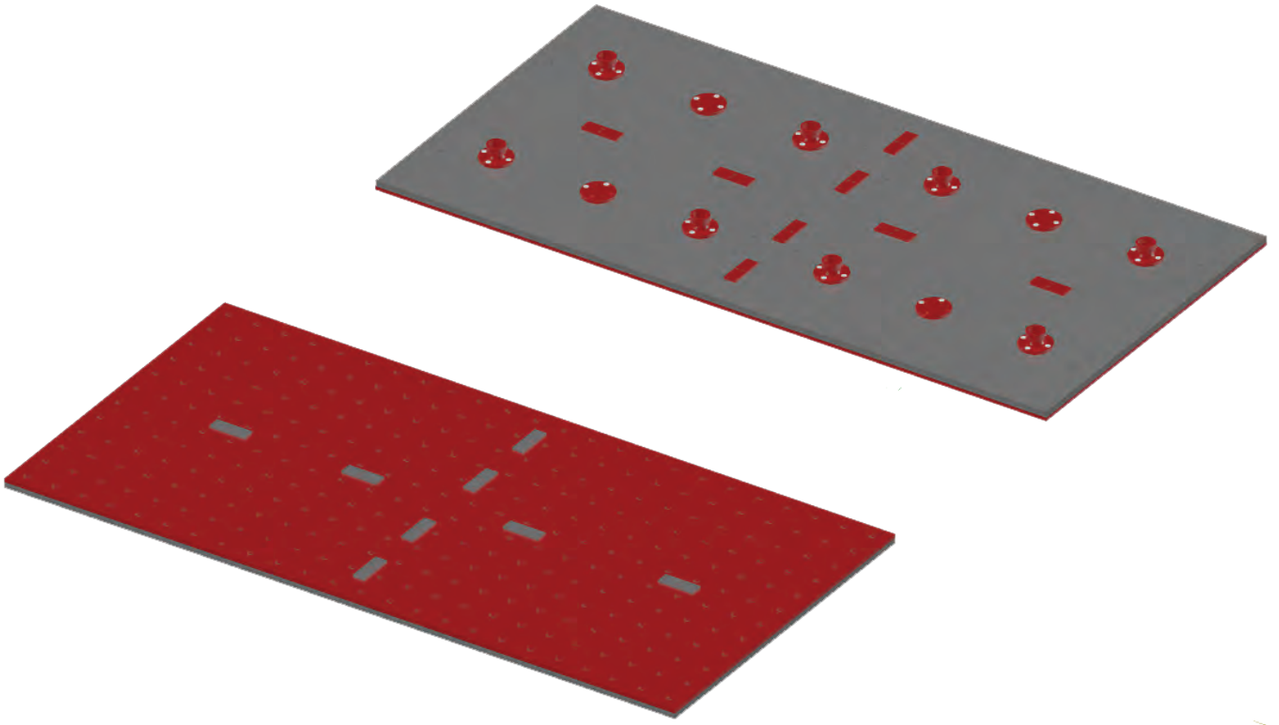
For larger Squid assemblies the standard Squid models shown on the previous pages can be coupled together to offer “full layer” vacuum systems. The illustration below shows four VFSQ3060 models close coupled together to offer a layer of 576mm x 1152 which is a 1/2 pallet Squid system. The Vacuforce CP50 connection plates are shown installed on the top and bottom surfaces of the assembled Squid. Although not intended for structural integrity, these connection plates add rigidity and a positive location of multiple Squids when mounted together on a common mounting frame.

Due to the unique, patent pending design of the Squid series of products, the cup pitch remains constatnt across the complete assembly.

DIMENSIONS (mm)



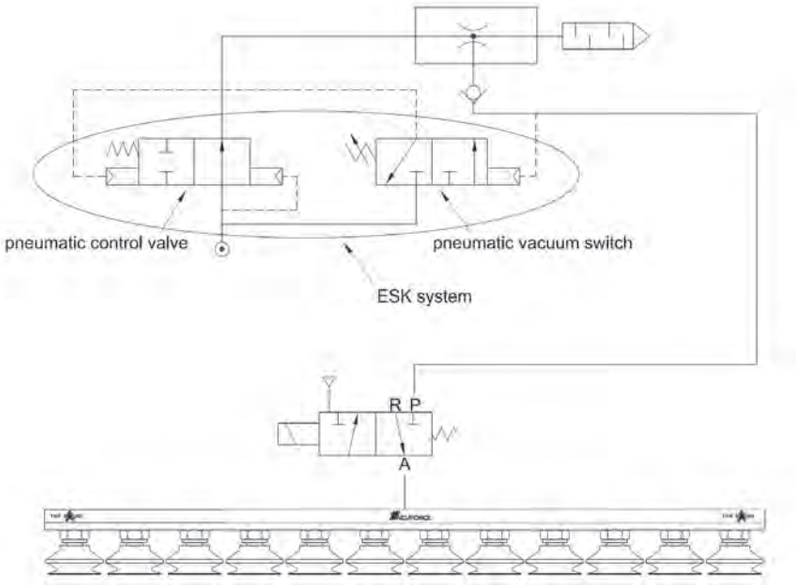
Part Number for Ordering **CP50**



Vacuum generation for The Squid can be a choice of either a vacuum pump or compressed air powered generator.

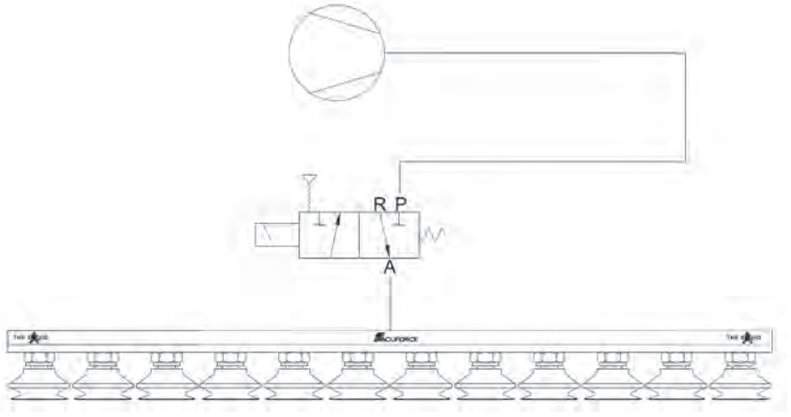
Vacuum Generators
The AM series of vacuum generators (refer to page 3.20) offer flow rates up to 278m³/hr (162CFM) with maximum vacuum levels in a sealed system of -90kPa (27”Hg).

Regenerative Blowers
The 4RB series of vacuum regeneration blowers (refer to page 4.6) offer vacuum levels up to -70kPa (21”Hg) with maximum flow rates of 200m³/hr (118CFM).



Vacuum Generator System
The venturi schematic on the left shows a vacuum venturi coupled with an ESK module (refer to page 3.20) which turns the venturi on and off as vacuum demand dictates. This method of controlling the venturi operation independent of machine cycles allows for significant compressed air savings. The JZF vacuum control valve (refer to page 6.3) is shown mounted directly to The Squid which will turn the vacuum on and off as per the machine control.

This schematic is typical of larger installations. However on smaller Squid systems vacuum control is normally achieved by turning off and on the compressed air supply to a directly coupled vacuum generator. Each application is assessed to ensure that the most efficient method is used.



Vacuum Pump System
The schematic on the left shows a vacuum pump such as a 4RB series regenerative blower (refer to page 4.6). The JZF vacuum control valve (refer to page 6.3) is shown mounted directly to The Squid which will turn the vacuum on and off as per the machine control.

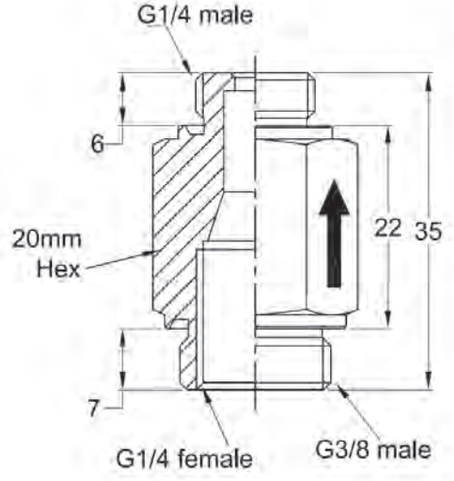
This schematic is typical of large installations.

VFSC3/8
Self Closing Valve

- All Anodized Aluminum Body
- Stainless Steel Spring
- 1/4” Female and 3/8” Male Thread Connection
- Fully Adjustable Based on Application

VFSC	3/8
Series	Male Thread
	3/8

DIMENSIONS (mm)



The Vacuforce self closing valve is used on vacuum cup handling systems where multiple cups are utilizing the same vacuum source. The valve is mounted directly onto the vacuum port of the vacuum cup. If that cup is damaged or does not seal against the load being lifted, the induced vacuum air flow closes the valve shut. This ensures that the vacuum level is retained in the rest of the vacuum cups installed on the same circuit. This valve is adjustable and therefore can be used on various size vacuum cups or even on porous surfaces such as cardboard or MDF paneling. The cup mounting can be facilitated using either the G1/4 female or G3/8 male thread. The brass adjustment screw, depending on the cup fitting design, can be adjusted with the vacuum cup installed.

The image below shows the simple construction of this valve consisting of:
- Valve Body
- Spring
- Nitrile Sealing Ball
- Brass Adjustment Screw

Adjustment Instructions

The self closing valve works on the principle of air flow volume. The adjustment of this valve is dependent on the volume of air between the valve and the sealing surface of the cup. Therefore this distance should be minimized to ensure accuracy and repeatability. The brass set screw should be turned inwards in a CW direction to decrease the amount of flow that closes the valve and turned outwards in a CCW direction to increase the amount of flow to close the valve. An approximate guide for use a on a 40mm diameter single bellows cup is 1mm of ball movement. If the cup is larger or sealing on a porous surface, this adjustment might need to be increased.

The illustration on the right shows 5 rows of cups but with Row 5 overhanging the load. The inrush of air will close this row or self closing valves.