

# DATASHEET

2FGP20

v1.1

# 1. Datasheet

## 1.1. 2FGP20

Finger Grip Properties		Minimum	Typical	Maximum	Unit
Payload		-	-	20	[kg]
		-	-	44.1	[lb]
Total stroke		-	260		[mm]
		-	10.24		[inch]
Grip width range <sup>(1)</sup>		170	-	430	[mm]
		6.69	-	16.93	[inch]
Gripping repeatability		-	+/- 0.5	-	[mm]
		-	+/- 0.0197	-	[inch]
Gripping force <sup>(2)</sup>		80	-	400	[N]
Gripping force tolerance		-	-	+/- 30	[N]
Gripping speed <sup>(3)</sup>		16	-	180	[mm/s]
Gripping time (including brake activation)		-	600	-	[ms]
Noise level <sup>(4)</sup>	Finger gripper	-	-	58 63	[dB(A)] <sub>Leq</sub> [dB(A)] <sub>Max</sub>
	Vacuum gripper	-	-	72 74	[dB(A)] <sub>Leq</sub> [dB(A)] <sub>Max</sub>
Hold workpiece in case of power loss?	Yes				
Motor	Integrated, electric BLDC				

<sup>(1)</sup> When pads are mounted, the minimum value is 158 mm and the maximum value is 418 mm.

<sup>(2)</sup> See [Force vs Current Graph](#)

<sup>(3)</sup> At 6 mm stroke and 150 N. The typical value is 900 ms at 20 mm and 200 N.

<sup>(4)</sup> For more information, see the [Noise level](#) section.

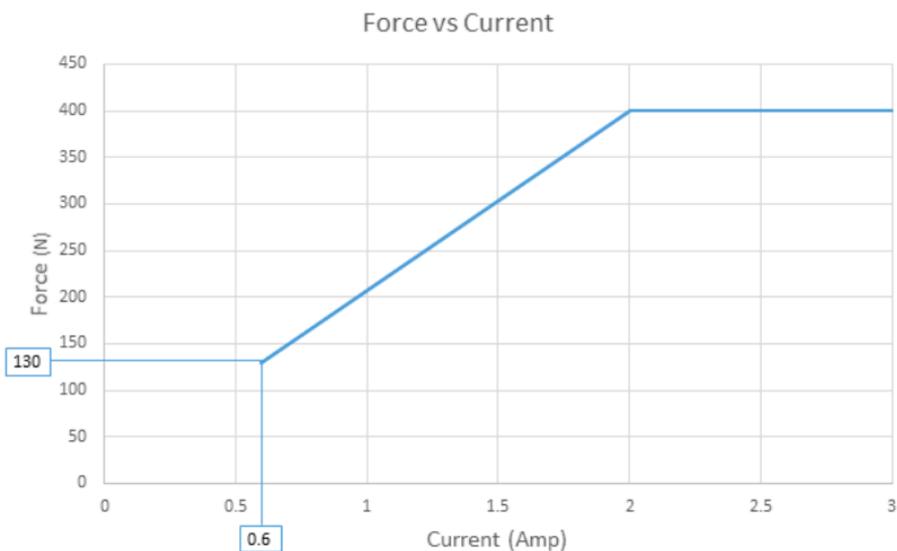
Vacuum grip properties	Minimum	Typical	Maximum	Unit
Vacuum	5	-	60	[%Vacuum]
	- 0.05	-	- 0.607	[Bar]
	1.5	-	17.95	[inHg]
Air flow	0		12	[L/min]
Payload (with delivered attachments)		-	2.5	[kg]
		-	5.51	[lb]
Vacuum cups	1		4	[pcs]
Gripping time (measured with vacuum target 40 %)		0.25		[s]

Vacuum grip properties	Minimum	Typical	Maximum	Unit
Release time		0.4		[s]
Vacuum pump	Integrated, electric BLDC			
Dust filters	Integrated 50 µm, field replaceable			

General properties	Minimum	Typical	Maximum	Unit
Storage temperature	0	-	60	[°C]
	32	-	140	[°F]
IP Classification	54			
Dimensions [L x W x D]	400 x 121.6 x 188			[mm]
	15.75 x 4.79 x 7.4			[inch]
Weight - Base unit without fingers or cups	3.7			[kg]
	8.16			[lb]
Weight - With fingers, pads on one finger, bracket for cups and cups	5.2			[kg]
	11.46			[lb]

Operating Conditions	Minimum	Typical	Maximum	Unit
Power supply	20	24	25	[V]
Current consumption	-	-	2000	[mA]
Operation temperature	5	-	50	[°C]
	41	-	122	[°F]
Relative humidity (non-condensing)	0	-	95	[%]

### Force vs Current Graph



## Noise Level

The noise level of the 2FGP20 depends on whether the finger or vacuum gripping part is used. Vacuum gripping noise depends on the set vacuum level and whether an object is picked up or not. Higher speed and stroke increase the noise. The noise level also depends on the surroundings and other equipment.

To measure the 2FGP20's noise level, a test has been carried out by an external company.

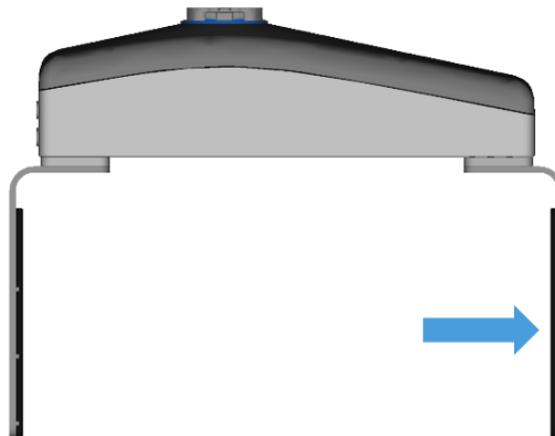
The test setup was the following:

- The test took place in a normal indoor production area.
- The finger gripping test ran 4 cycles full stroke, 100 % speed and with no pause in between the cycles.
- The vacuum gripping test was made with fully activated pump and with no pause.
- The noise measurement equipment was located in 1 m distance away from the 2FGP20.

The test concludes that the average measured noise level was below 58 dB(A)<sub>Leq</sub> for the finger gripper and 72 dB(A)<sub>Leq</sub> for the vacuum. The maximum noise level was measured below 63 dB(A)<sub>Max</sub> for the finger gripper and 74 dB(A)<sub>Max</sub> for the vacuum, which is below the maximum allowed noise level of (80 dB(A)). The 2FGP20 will not run continuously in an application which means that the average noise level will decrease significantly.

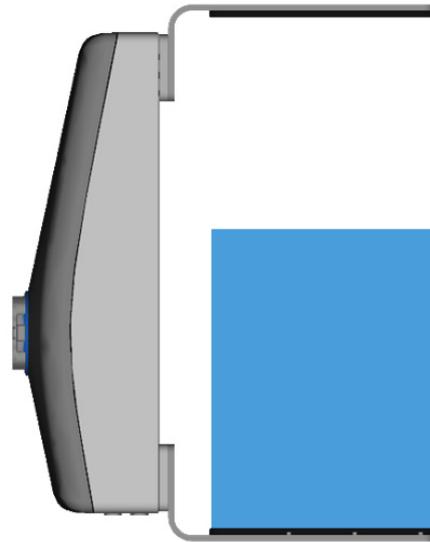
## Force Sensor

The gripper has a force sensor in the moving finger as shown in the figure below.



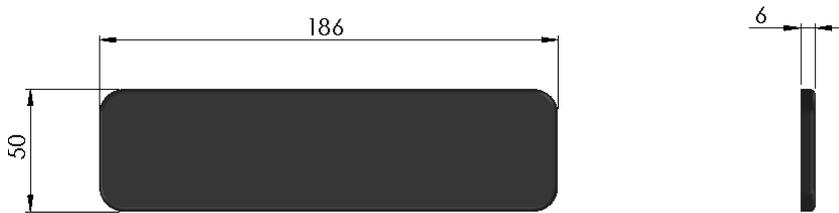
Consider the presence of the force sensor when the workpiece is aligned by using the fingers of the gripper or when the workpiece is picked sideways since the gravity can affect the force measurement.

If the workpiece is picked sideways, make sure to orient the gripper with the moving finger on top, as shown in the image below. Also ensure that the bottom finger makes contact with the workpiece before the top finger.



### Finger pads

Four finger pads are provided with the gripper and can be mounted in different configurations to achieve the best grip for your workpiece.



Some examples of how the pads can be mounted are shown below.



The pads are made of aluminum with a cover of silicone. The maximum force (equally distributed in the blue area of the images below) that can be applied to the finger pads is shown in the table below.

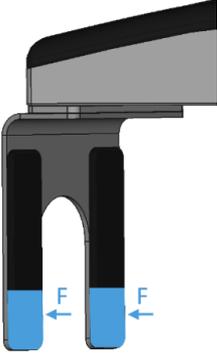
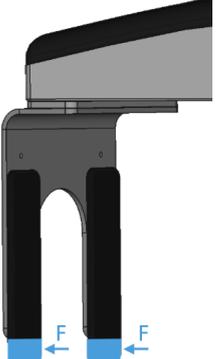
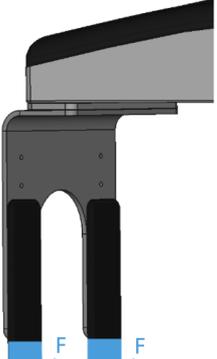
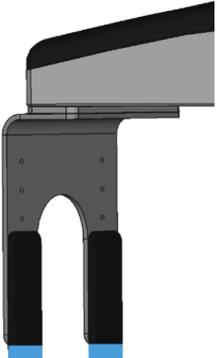
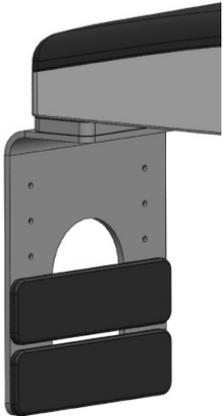
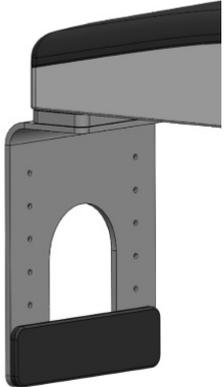
Illustration	Pad position	Maximum force (N)
	0	400
	1	300
	2	200
	3	100

Illustration	Pad position	Maximum force (N)
	4	400
	5	400

### Custom fingers

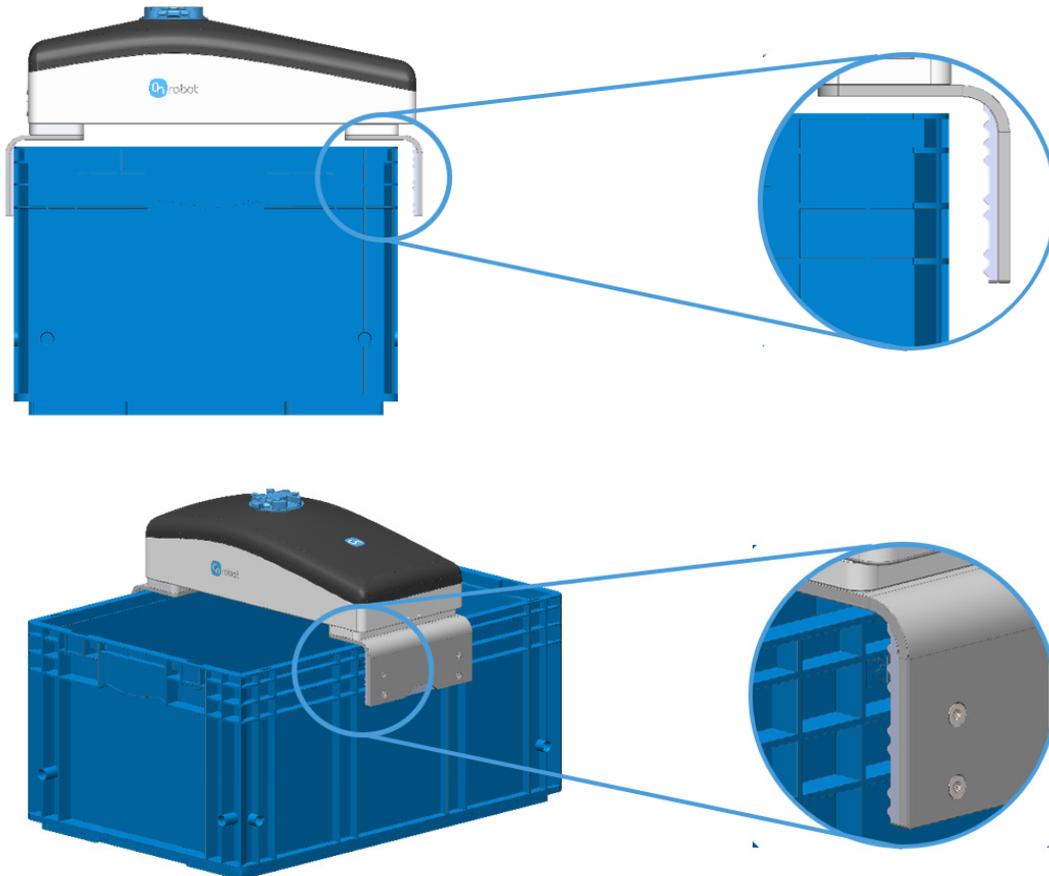
The standard fingers provided with the gripper have a height of 220 mm. For workpieces taller than 220 mm, it is recommended to customize the fingers.

An example is shown in the picture below where the pressure is recommended to be applied at the bottom of the workpiece. To achieve this, custom longer fingers are used, and the fingerpads are attached horizontally. This is the best way to get a firm grip.

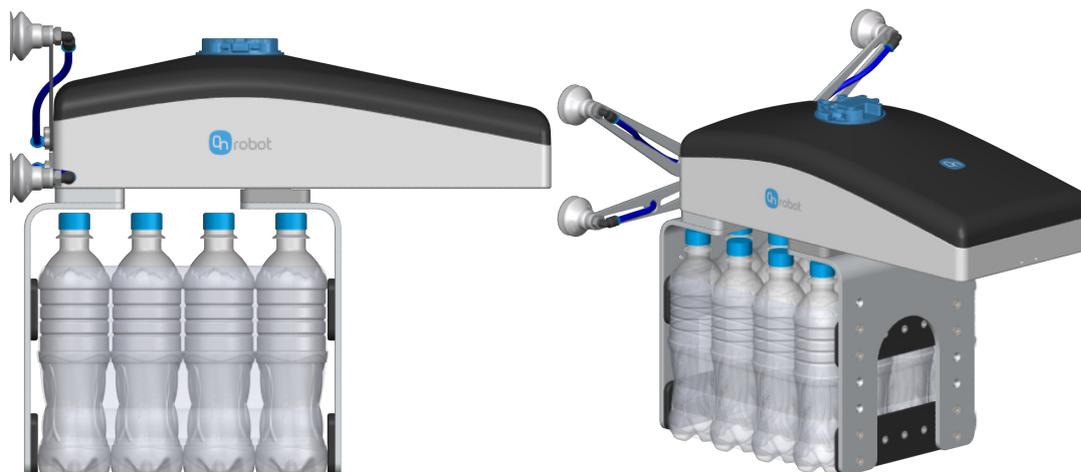


By increasing the finger height, the allowed torque might be reduced as shown in the [Moments in the finger base](#) section.

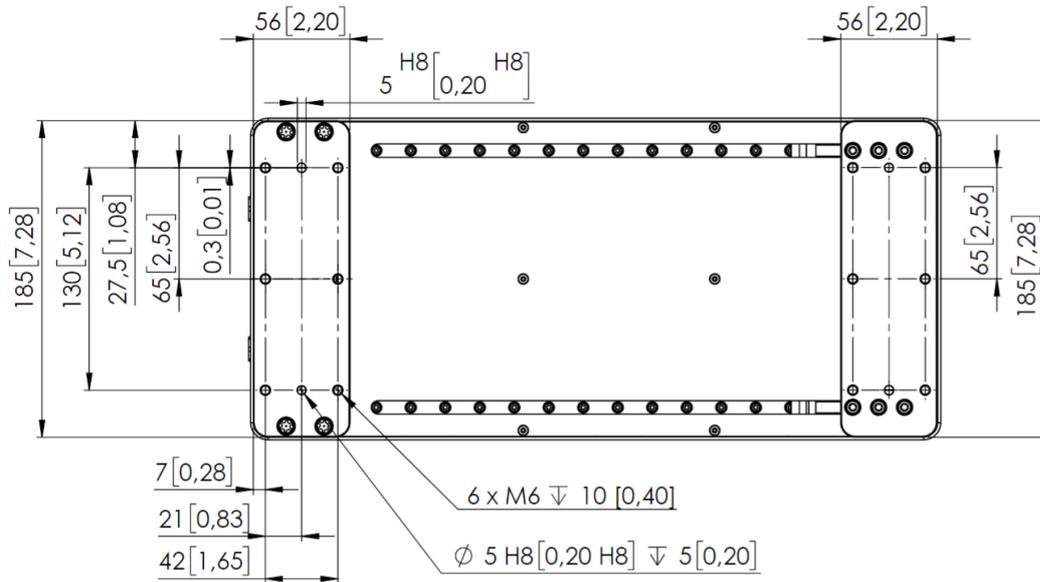
Another example is shown in the image below with custom fingers and fingerpads that are made to achieve a form fit. These kinds of fingers and fingerpads are helpful with KLT boxes.



Another example is shown in the image below for picking wrapped foil bottles. For this workpiece type, it is recommended to mount the pads horizontally to have as many contact points as possible. By doing so, the applied force can be increased and a firmer grip is achieved. Place the pads as close to the bottom of the workpiece as possible, so the workpiece structure is stronger and can resist more force.



If custom fingers are required, they can be made to fit the gripper according to the dimensions (mm) [inch] shown below. Use M6x10mm screws to attach the fingers.



### Moments in the finger base

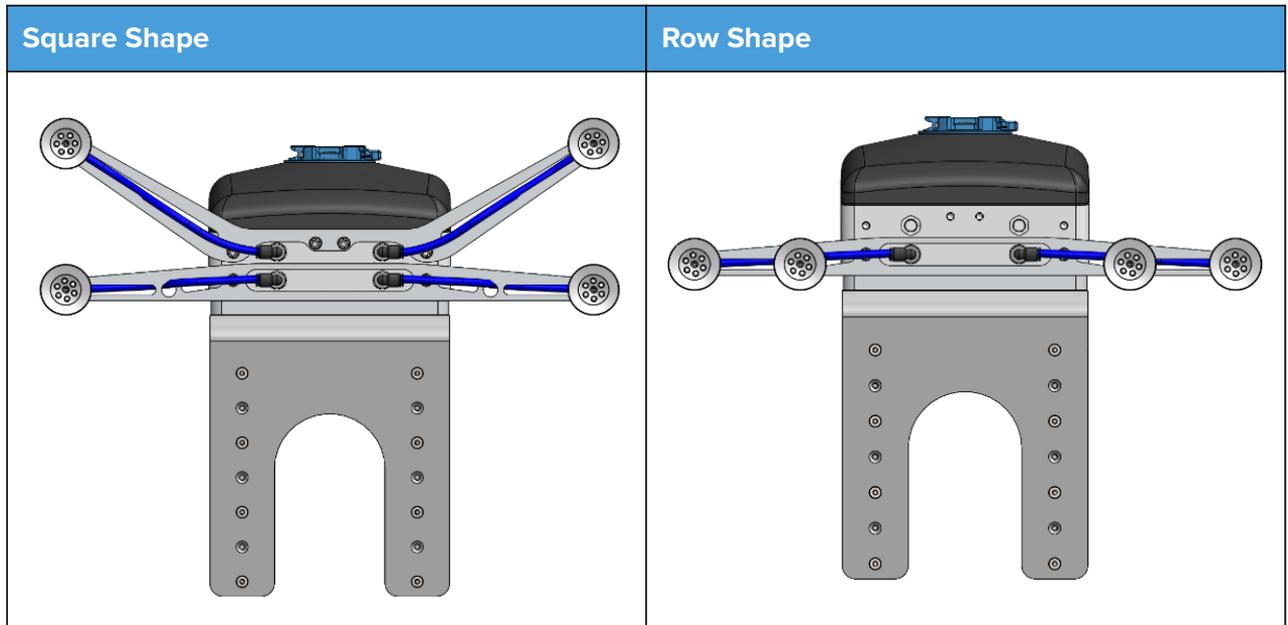
A maximum moment 80 Nm is allowed on each direction of the finger base.



### Vacuum cups

The vacuum solution has been designed to handle slip sheets and similar items. The two most common configurations with the delivered bracket and cups are shown below.

Square Shape	Row Shape
Better for cardboard slip sheets or multiple layer paper	Better for paper or similar slip sheets



The provided tube length is adequate for the Square Shape. For using the Row Shape, please cut two of the tubes to 83 mm length.

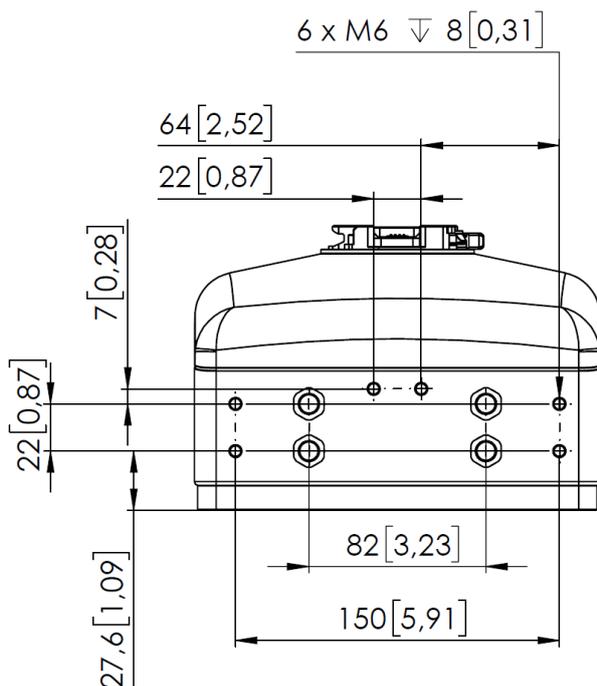


**NOTE:**

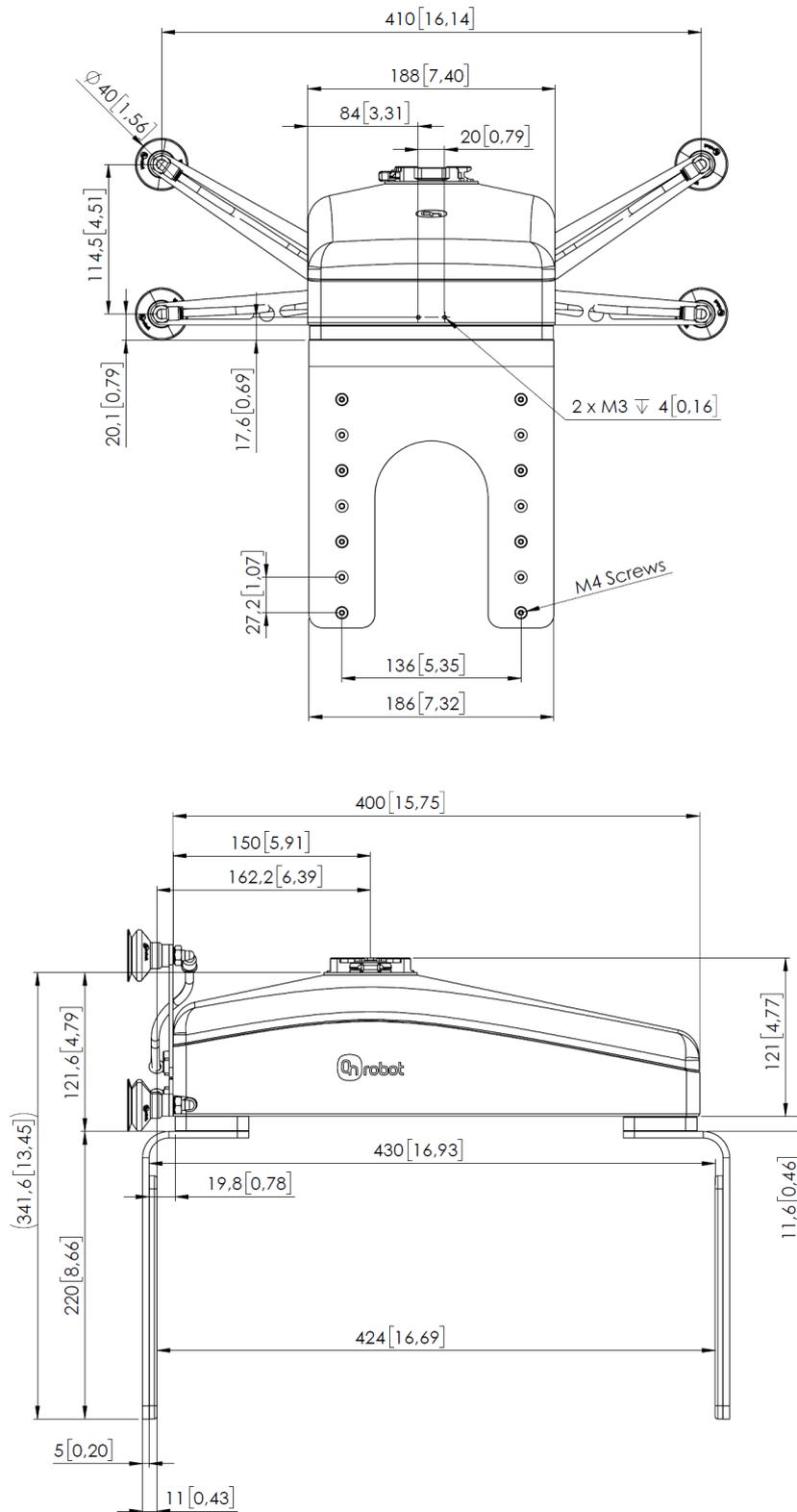
It is important to always use the four air sources together.

**Custom Vacuum Bracket**

If a custom bracket is required, it can be made to fit the gripper according to the dimensions (mm) [inch] shown below. Use M6x6mm screws to attach the fingers.



## 1.2. 2FGP20



All dimensions are in mm and [inches].