

## Preface

A finger gripper typically has 2 fingers for rectangular items and 3 fingers for round objects. The fingers clamp an object with a force. Due to the friction between the fingers and the item the item can be lifted/handled.

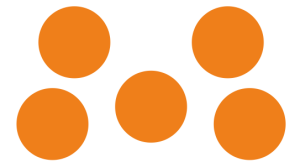
There are many advances using a pneumatic gripper:

- The item is centered between the fingers.
- The clamping force is maintained also after closing. Many electrical grippers do not maintain the clamping force so items can fall out.
- The pneumatic gripper has a very fast response time compared to electrical grippers.



## Feedback

The pneumatic gripper has sensors at its two end of travel positions. That is gripper open and gripper closed. When the closed position is reached during a gripping the ToolBase concludes there is no item in the gripper. The positive item in gripper status goes active after short delay to not false trigger Robot while gripper is traveling to the end position.



## Capacity

The standard finger gripper is mounted with SMC MHS2-25D (2 finger) and MHS3-25D (3 finger)

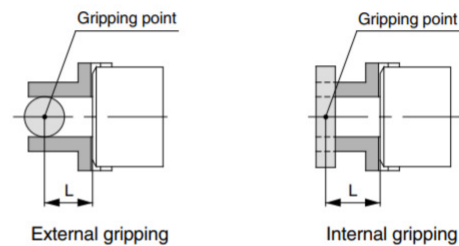
SMC MHS2-25D / MHS3-25D	
Cylinder bore	25mm
Operating pressure	6bar
Repeatability	0.01mm
External gripping force <sup>1</sup>	80N
Internal gripping force <sup>1</sup>	90N
Typical pull-out force steel item external gripping <sup>1</sup>	130N
Recommended max item weight <sup>2</sup>	5kg
Stroke (diameter)	6mm
Open/close time	<0.1s
Weight 2 finger	200g
Weight 3 finger	225g
<sup>1</sup> Standard fingers, gripping point 16mm	
<sup>2</sup> Friction / surface roughness / geometry impacts the maximum lifting capacity	

## Gripping point

Below extract from SMC MHS manual regarding gripping point.

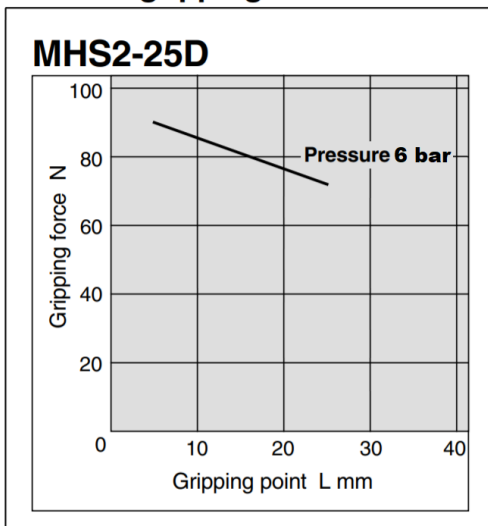
### Gripping Point

- The work piece gripping point distance should be within the gripping force ranges given for each pressure in the effective gripping force graphs below.
- If operated with the work piece gripping point beyond the indicated ranges, an excessive offset load will be applied to the sliding section of the fingers, which can have an adverse effect on the service life of the product.

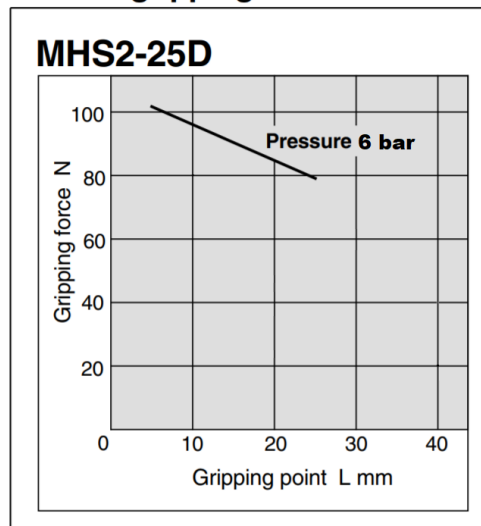


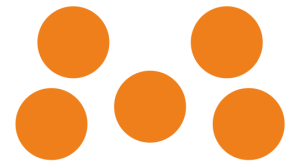
L: Gripping point distance

### External gripping force



### Internal gripping force





## Custom finger design.

If a gripping task cannot be solved with the standard fingers, 3D printing of custom fingers is an option.

SetupRobotics offers to design special fingers for the task if desired, but it is also possible with basic CAD knowledge and access to a 3D printer.

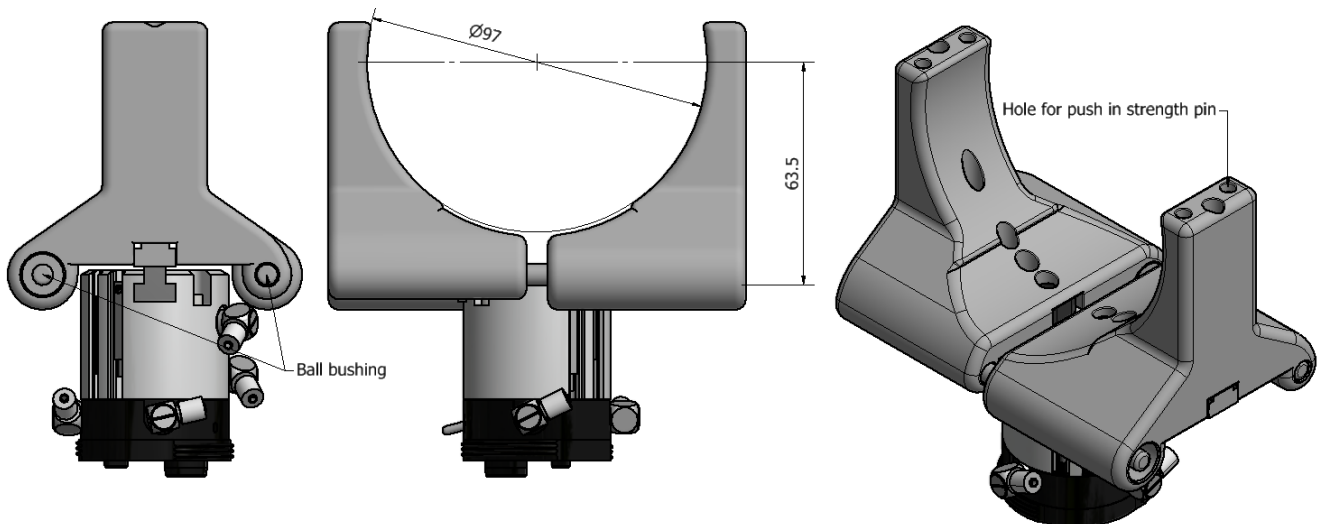
We recommend printing in PETG, which is dimensionally stable and strong. Optionally choose a carbon-filled PETG for extra strength.

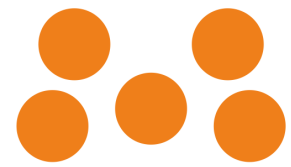
In order to give the fingers extra strength, we recommend that a  $\varnothing 2\text{-}3\text{mm}$  hole be drawn through the fingers, where pins will be pushed in afterwards. This provides a high degree of security against breakage.

The maximum finger length for the SMC25 series is 25mm. If long fingers are desired, we recommend pressing in ball bushings.



Below sample  $\varnothing 97\text{mm}$  gripper design with a 63.5mm gripping point and two LM6LUU ball bushings.





## External / Internal gripping

On the side of the adapter is a switch to select external/internal gripping.

External gripping - switch down (against ToolBase)

Internal gripping – switch up (against fingers)



## Adjustable standard fingers

The pneumatic gripper is delivered with adjustable fingers which can be used for many common setups.

On the fingers is a ruler for fast external diameter adjustments.

The finger can clamp items from 0 to 140mm



## Important message.



The finger gripper is part of a partly completed machinery. A risk assessment is required for each usage.

It is the responsibility of the robot integrator to make the risk assessment and that all safety requirements and local regulations are complied with.

Pneumatic gripping technology relies on stable electrical and compressed air supply. If supply is discontinued including control signals a picked item might drop.

Protect the finger gripper from damaging chemical and physical effects including but not limited to: Corrosive substances, solvents, extreme temperatures, radioactive radiation, extreme magnetic fields, small objects as powder/dirt, extreme mechanical vibrations, electrical currents and discharge.

Newer user a damaged gripper

Refer also to ToolBase manual.

## Contact

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