

GRIPHI TYPE A PIEZOELECTRIC MICROGRIPPER

ABSTRACT

The DS describes the main features of the GriPhi Type A piezoelectric microgripper. It includes technical data and drawings.

Author(s): Cherchi B.
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REVISION HISTORY

List of changes from original release to current revision.

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

CHANGES FROM REV. A

Page 5: grippers stroke corrected for Types B and C

CHANGES FROM REV. B

Page 5 and 6: example of custom microgripper and jaws

CHANGES FROM REV. C

Force-opening performance (Theoretical Analysis)

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1. Features

- Gripper stroke – Up to 0.80 mm
- Clamping force – Up to 2 N
- Dimensions – 57 x 22 x 11 mm
- Sample size - from 0.02 mm up to 0.2 mm
- Initial opening – Adjustable by grub screw
- Shape – Available on request
- High vacuum version – Available on request
- Position sensor – Available on request
- Closed-loop control – Available on request

2. Applications

- Micro optics manipulation
- Fiber optics connection
- Fiber bundle positioning
- Precision mounting and adjusting
- Biological sample manipulation
- High-dynamic applications

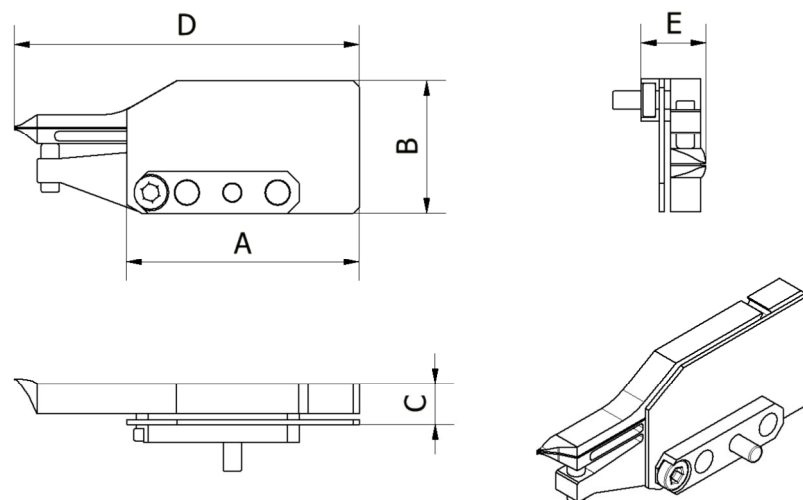
3. Description

The GriPhi Type A (code is **PH-GP30-0000**) piezoelectric microgripper can handle very small samples whose size arrives down to 20 μm . Thanks to its low inertia, it is suitable for high-dynamic applications. The mechanism which transforms the piezo stroke into the gripper stroke is designed by means of FEM (Finite Elements Method) analysis. This makes it possible to tune the opening and strength levels as desired by the customer.

The GriPhi Type A system is fully compatible with the GriPhi Driver devices provided by Phi Drive. Even if the GriPhi Type A system is highly customizable, this DS refers to the standard version of the microgripper.

4. Dimensions

Fig. 1: Main dimensions of the microgripper

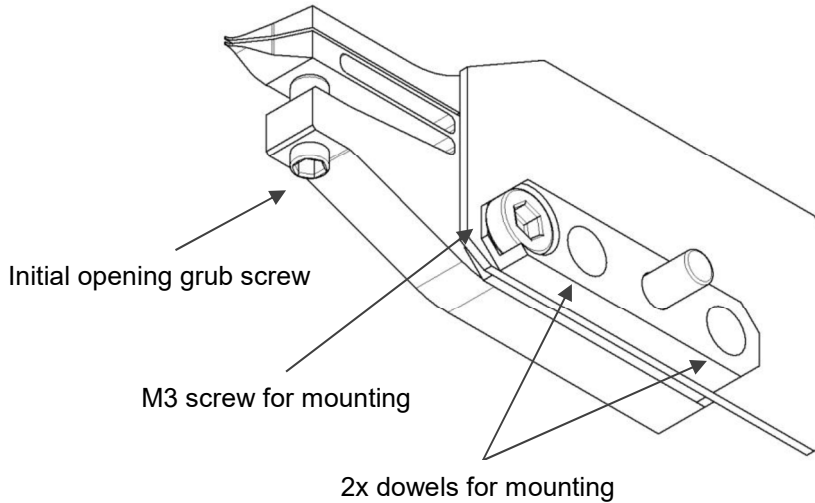


Tab. 1: Main dimensions of the microgripper

A		B		C		D		E	
38.4	mm	22.0	mm	6.80	mm	57.0	mm	10.6	mm

5. Mounting

Fig. 2: Mechanical interfaces



6. Jaws

The standard jaws for the GriPhi Type A piezoelectric microgripper are specifically designed to fully exploit the capabilities of the system. However, they can be customized as desired to meet specific needs.

Fig. 3: Top and side views of the standard jaws

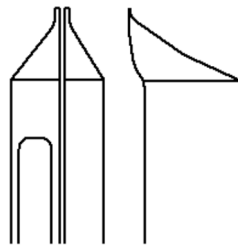
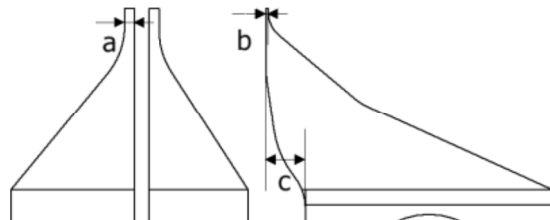


Fig. 4: Main dimensions of the standard jaws



Tab. 2: Main dimensions of the standard jaws

a	b	c
0.5	0.6	1.0
[mm]	[mm]	[mm]

Below is a special clamp that allows you to place objects next to each other at a distance of a few microns.

Fig. 5, Top and side view of custom GriPhi microgripper

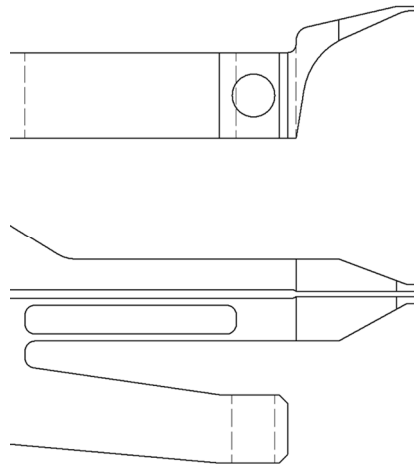
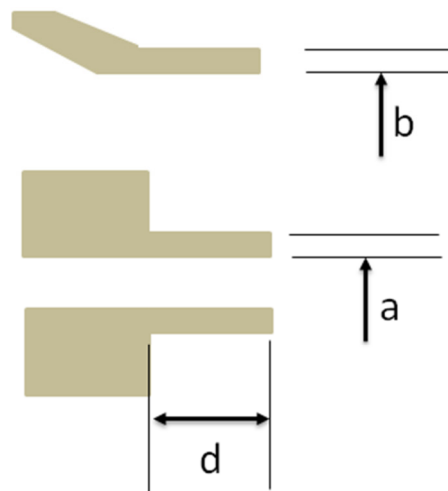


Fig. 6, Main dimensions of the custom jaws



Tab. 3, Main dimensions of the custom jaws

a		b		d	
0.03	[mm]	0.25	[mm]	0.3	[mm]

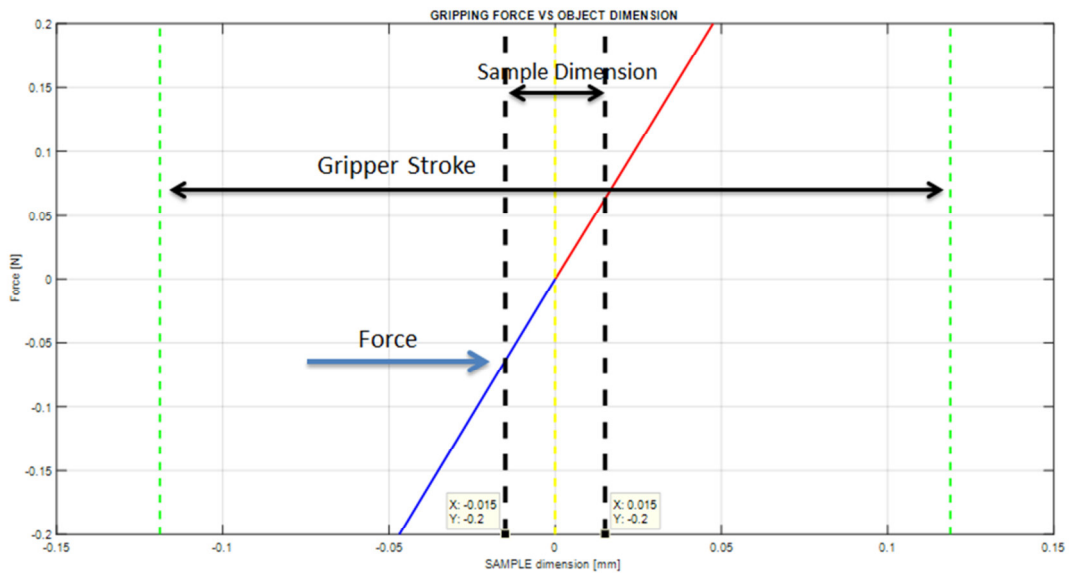
Fig. 7, Jaws specially designed to pick up objects up to $30\mu\text{m}$ and to pose them $60\mu\text{m}$ near each other.



7. Technical data

7.1. Force-opening performance (Theoretical Analysis)

Fig. 8, Standard monolithic Type A force-opening performance on a sample of 0.03 mm .



7.2. Mechanical specifications

Tab. 4: Mechanical specifications of the GriPhi microgrippers

	Type A	Type B	Type C	Unit
Axis of motion	X	X	X	
Gripping stroke	0.8	1.0	1.2	[mm]
	500	1000	1200	[µm]
Clamping force at ½ stroke	1	1	1	[N]
Opening/closing time	<50	<50	<50	[ms]
Resolution*	<100	<100	<80	[nm]
Speed	10	14	8	[mm/s]
Initial gap**	0.0-0.3	Up to 1.5	Up to 4.0	[mm]
Availability of the HV (High Vacuum) version	YES	YES	YES	
Rated opening-closing cycles	>40 million	>40 million	>40 million	

*Equipped with GriPhi Driver

**Customizable and adjustable via grub screw

7.3. Electrical specifications

The GriPhi Type C system is fully compatible with the GriPhi Driver devices cod. PH-DR10-0000 provided by Phi Drive.

NOTES:

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