

## > OBJECTIVES

MICA™ actuator fulfills requirements in which compact, highly dynamic, precise, reliable and robust actuators are needed. This technology has been designed to fill the gap between the well known voice coil and the solenoid technologies.

It is competitive towards hydraulic technologies for force generation, and competitive towards voice coil technologies for proof-mass dynamic applications (up to 500Hz and more) with high mass load.

## > PRESENTATION

MICA™ actuator, also called “Moving Iron Controllable Actuator”, is a special polarized electromagnet with the following characteristics:

- high acceleration, with high force density
- controllable thanks to its ability to produce a force proportional to the current all along the stroke (like voice-coils)
- combination with a position sensor, to work in closed-loop (like voice-coils) for position regulation or other mechatronic functions
- reliable since the coils are located at the fixed part of the actuator and mobile part is only made of iron
- robust (easy to cool, robust interface, long life guiding)
- compatible with severe environments (high temp, vacuum)

MICA™ is a patented technology, available as off the shelf products which can also be “customised”.

## > ADVANTAGES

- High reliability and life-time
- Lower losses per force unit towards voice-coil
- High acceleration
- High force density
- Easy integration

## > VERSATILITY

MICA™ actuator has been used in different ranges of:

- shape: rectangular or cylindrical
- stroke: 1mm to 10mm
- force: 1N to 1000N
- frequency: 50Hz up to 500Hz and more



Fig1: MICA™ 500L



Fig2: MICA200M

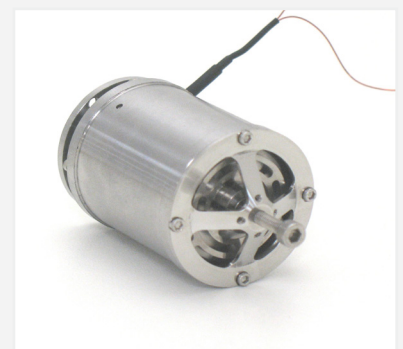


Fig3: MICA20S

## > ACTUATORS PERFORMANCES

	MICA 500L	MICA 1000L	MICA 200M	MICA20S
Stroke	+/- 5mm	+/- 5mm	+/- 2.5mm	+/-0.5mm
Force	500 N	1000 N	200 N	20 N
Moving mass	1562 g	1925 g	200 g	58 g
Size (with bearings facing the motion axis)	L 140mm x H 160mm Depth 160mm	L 195mm x H 160mm Depth 160mm	L 122mm x H 78mm Depth 112mm	Diameter 50mm Depth 40mm
Comment	Std product	Std product	Preliminary product	Application for pumps

Tab1: Standard MICAs

	CUSTOM 1	CUSTOM 2	CUSTOM 3	CUSTOM 4
Stroke	+/- 3mm	+/- 4mm	+/- 1.8mm	+/- 1mm
Force	65 N	80 N	40 N	3 N
Moving mass	70 g	232 g	100 g	
Size (with bearings facing the motion axis)	Diameter 49mm Depth 85mm	Diameter 104mm Depth 89mm	L 39mm x H 39mm Depth 80mm	L 28mm x H 15mm Depth 50mm
Comment	Valve application	Robotic application	Demonstrator	2 DOF – XY stage

Tab2: Customized MICAs

## > APPLICATIONS

- Valve control
- Pump and compressor actuation
- Test benches
- Vibration generation
- Active control of vibrations - [DYNXPERTS Video](#)
- Fast gripper
- Fast positioning
- XY stages

For more information, please contact:

CEDRAT TECHNOLOGIES  
59 Chemin du Vieux Chêne - Inovalée  
38246 Meylan Cedex - France  
[actuator@cedrat-tec.com](mailto:actuator@cedrat-tec.com)

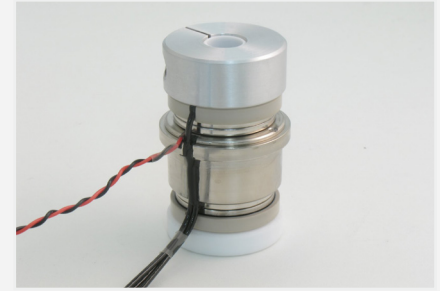


Fig4: Custom 1



Fig5: Custom 2

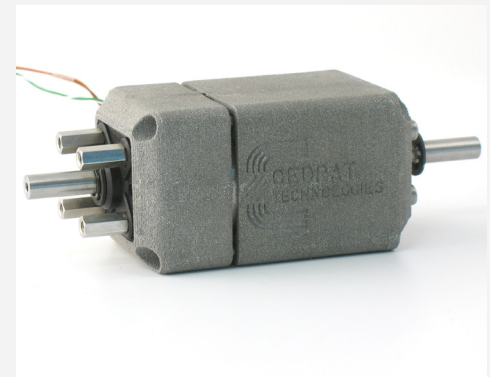


Fig6: Custom 3

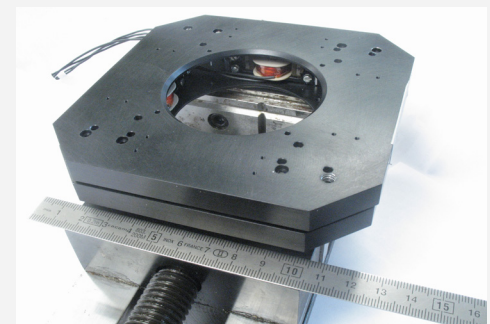


Fig7: Custom 4 inside 2DOF XY stage