**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
ACTUATORS PERFORMANCES

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

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 | 70 g |
Size (with bearings facing the motion axis) | Diameter 49mm | Diameter 104mm | Diameter 39mm x H 39mm | Diameter 28mm x H 15mm |
| Depth 85mm | Depth 89mm | Depth 80mm | 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