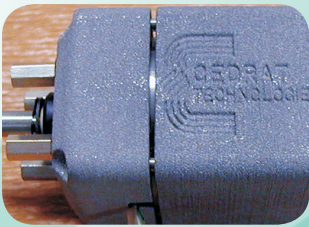


Moving Iron Controllable Actuator MICA



The Moving Iron Controllable Actuator MICA is part of the CEDRAT TECHNOLOGIES family of magnetic linear actuators.

Objective

The purpose of the MICA is to provide a controllable actuator over a stroke of several mm. Its optimized magnetic construction allows to get an almost constant force over the full stroke, providing a controllability similar to Voice Coil Actuator.



View of the MICA40.

Assembly

The architecture of the device is composed of a housing and a moving member throughout the whole actuator. It can be used as a position actuator and a closed loop can be set with a proximity sensor to get a position accuracy. It can be also used as a force generator, using the proof-mass approach for instance.

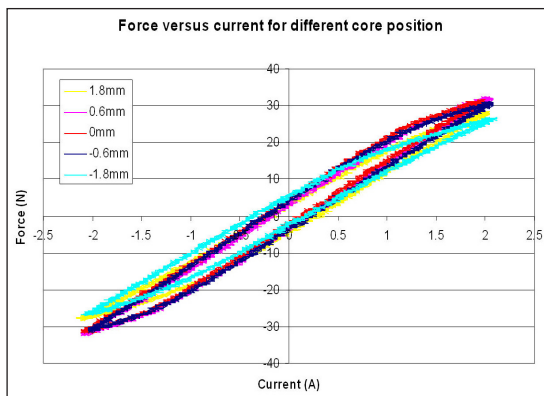
Moving Iron Controllable Actuators find applications as electro-valves, vibration generators, actuators for position control.

Performances of the MICA

Moving Iron Controllable Actuators MICA present:

- Controllability comparable to a Moving coil Actuator,
- 3 times less lower power & 2 times less mass than a moving coil,
- 10-50 times less heating than a moving coil !

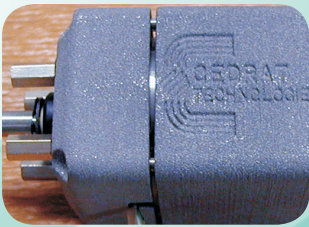
MICA can be used in severe environments such as vacuum or high temperature, where Voice Coil actuators can find limitations.



Force versus current for MICA 40-3

References	Unit	MICA3_1	MICA40-3 HF	MICA40-3 LF	MICA200-5 HF	MICA500-8 HF
Notes		Preliminary				Preliminary
Stroke	mm	1	3,6	3,6	5	8
Continuous force	N	+/- 3	+/- 40	+/- 40	+/- 200	+/- 550
Peak force	N	TBD	+/-100	+/-85	+/-300	+/- 1250
Continuous current	A	5,5	2,6	2,2	20,0	15,0
Peak current	A	TBD	7,5	10,0	40	79
Force sensitivity	N/A	0,54	15	19	10	37
Winding resistance	ohm	0,085	1,86	1,8	0,12	0,3
Winding inductance (12Hz)	mH	0,2	11,5	9	1,6	10,5
Electrical time constant	ms	2,4	6	5	13	35
Dissipated continuous power	W	2,6	13	9	48	68
Dissipated peak power	W	TBD	105	180	192	1872
Side	mm	15*9	39*39	39*39	D75	D105
Height	mm	18	80	80	135	101
Total Mass	g	TBD	420	420	2000	TBD
Moving mass	g	TBD	100	100	450	1310
Continuous force / mass	N/kg	TBD	95	95	100	TBD
Peak force / mass	N/kg	TBD	238	202	125	TBD
Continuous force / power ^{1/2}	N/W ^{1/2}	24,8	11,3	13,6	28,9	66,9
Electrical interface		2 wires AWG	2 wires AWG	2 wires AWG	2 wires AWG	2 wires AWG

Moving Iron Controllable Actuator MICA



Applications

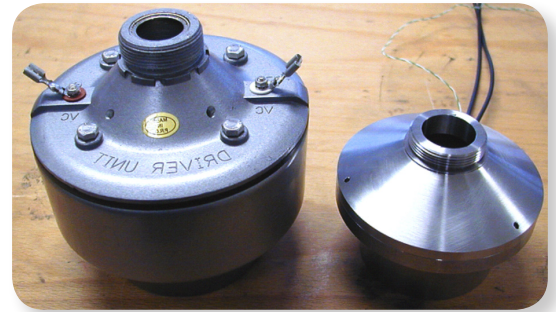
New controllable actuators are considered for high vibration generation, high power loud-speaker, active damping applications, smart circuit breakers...

Customization

Several MICA actuators can be designed and customized for a new application.

Supports

CEDRAT TECHNOLOGIES has been supported by OSEO.



High power loud-speaker based on MICA concept (right) compared to the initial moving-coil loud-speaker (left). In this application, MICA offer 3 times more forces, twice more displacement, while requesting twice less power and being much smaller. Courtesy of MADE.



*MICA 200-5 for
Mass proof damper*

