

# MMT ACTUATORS AT A GLANCE

Over the years, we have successfully developed a range of high-performance piezoelectric actuators. They include high-linearity near-hysteresis-free “Hi-Fi Stake” actuator, large displacement-cum-blocking force high-authority piezoelectric actuators (HAPA), and a wide range of flextensional actuator (FTA).

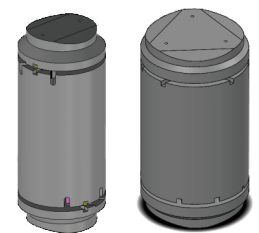
## “Hi-Fi Stake” Piezoelectric Actuators

“Hi-Fi Stake” piezoelectric actuators are driven by lead-based relaxor-PT single crystals. They display large linear displacement responses, minimum strain hysteresis and can be used up to 60°C. Currently, versions with up to 50 µm in axial displacement and 14 kg/f in working load are available. We are now developing “Hi-Fi-Stake” actuators of higher working temperatures and versions suitable for cryogenic use.



## HAPA Piezoelectric Actuators

“HAPA” actuators are made possible via a patented 2-level “High-Bending-Stiffness Connector (HBSC)”, which not only doubles the axial displacement of a piezoceramic stack but also doubles or triples its blocking force. Despite their compact sizes, displacement of up to 85 µm and blocking force of up to 2700N are available. They find applications when both large axial displacement and blocking forces are advantageous such as in active vibration control of precision instruments and machinery.



## Cost-effective Flextensional Actuators (FTA)

We have also successfully developed a series of cost-effective Flextensional Actuators (FTA), covering a wide range of displacement and working load. The plot below summarises the operating range of the various displacement actuators currently available at MMT.



**Stroke and blocking force (or max. working load) of MMT Piezoelectric Actuators of various designs**

Max. Load \ Stroke	15-40 N	40-100 N	120-240 N	250-500 N	500-2500 N
5-30 µm	HFS-CE(*) ●	HFS-HL(*) ●	“Hi-Fi Stake” actuators of various constructions - Linear, hysteresis-free		
30-100 µm	HFS-LS(*) ●				HAPA-(1+2)-85µm-1250N HAPA-(2+2)-85µm-1700N HAPA-(3+3)-85µm-2500N
100-250 µm		FTA-175-70 175µm-70N	FTA-200-140 200µm-140N	FTA-200-250 210µm-260N	HD-FTA-250-800 (*) 250µm-785N
250-400 µm	FTA-300-40 310µm-40N	FTA-350-50 350µm-50N	FTA-350-130 350µm-130N	HD-FTA-350-400 (*) 350µm-400N	
400-700 µm	FTA-500-15 500µm-15N		HD-FTA-450-200 (*) 450µm-220N		
	FTA-500-30 500µm-30N	HD-FTA-700-100 (*) 700µm-96N			

(\*) HFS-CE=Cost-Effective Hi-Fi Stake; HFS-LS=Large-Stroke Hi-Fi Stake; HFS-HL=High-Load Hi-Fi Stake; HD-FTA=HAPA driven FTA

