

4.13 Parallel Pre-Stressed Actuators PPA M Series

Designed by CEDRAT TECHNOLOGIES, these new models of Direct Piezo Actuators result from developments carried out under a CNES contract, the French Space Agency. PPA models are twice lighter than their analogue conventional DPAs, with the same electromechanical properties. Their compact size also makes their integration easier in mechanical assembly. The M series produce displacements up to 40 µm and can generate a pushing blocked force of 800 N.

References	Unit	PPA10M	PPA20M	PPA40M
Item Code		V-PPAM10	V-PPAM20	V-PPAM40
Notes		-	-	-
Displacement	(µm)	8	20	40
Blocked force	(N)	800	800	800
Stiffness	(N/µm)	100	40	20
Resonance frequency (free-free)	(Hz)	65000	38800	25000
Response time (free-free)	(ms)	0.01	0.01	0.02
Resonance frequency (blocked-free)	(Hz)	32500	19400	12500
Response time (blocked-free)	(ms)	0.02	0.03	0.04
Force limit (0-pk)	(N)	400	400	400
Max. displacement at resonance (pk-pk)	(µm)	7	18	36
Voltage range	(V)	-20 ... 150	-20 ... 150	-20 ... 150
Capacitance	(µF)	0.7	1.4	2.7
Resolution	(nm)	0.1	0.2	0.4
Thermo-mechanical behaviour	(µm/°K)	0.07	0.06	0.04
Height (in actuation direction)	(mm)	18.0	28.0	48.0
Base depth	(mm)	10.0	10.0	10.0
Base width (incl. wedge & wires)	(mm)	9.0	9.0	9.0
Mass	(g)	6.0	12.0	25.0
Standard mechanical interface - Top		1 centered M2.5 threaded hole 2.5 mm deep	1 centered M2.5 threaded hole 2.5 mm deep	1 centered M2.5 threaded hole 2.5 mm deep
Standard mechanical interface - Base		1 centered M2.5 threaded hole 2.5 mm deep	1 centered M2.5 threaded hole 2.5 mm deep	1 centered M2.5 threaded hole 2.5 mm deep
Standard electrical interface		2 PTFE insulated AWG30 wires 100 mm long with Ø 1 banana plug	2 PTFE insulated AWG30 wires 100 mm long with Ø 1 banana plug	2 PTFE insulated AWG30 wires 100 mm long with Ø 1 banana plug

Table 4.14: Characteristics of the PPA M Actuators

Available option(s): SG, NM, VAC, HT
Available interface option(s): TH, SI

The technical information on this leaflet is not contractual and can be changed without prior notice.



Figure 4.15: View of the PPA10M actuator

4.14 Parallel Pre-Stressed Actuators PPA L Series

Designed by CEDRAT TECHNOLOGIES, these new models of Direct Piezo Actuators result from developments carried out under a CNES contract, the French Space Agency. PPA models are twice lighter than their analogue conventional DPAs, with the same electromechanical properties. They are suited to dynamic applications and their compact size also makes their integration easier in mechanical assembly. The L series produce displacements up to 80 μm and can generate a pushing blocked force of 3500 N.

References	Unit	PPA40L	PPA60L	PPA80L
Item Code		V-PPAL40	V-PPAL60	V-PPAL80
Notes		-	-	-
Displacement	(μm)	40	60	90
Blocked force	(N)	3500	3500	3500
Stiffness	(N/ μm)	87,5	58,3	38,9
Resonance frequency (free-free)	(Hz)	15500	9500	8500
Response time (free-free)	(ms)	0,03	0,05	0,06
Resonance frequency (blocked-free)	(Hz)	7750	4750	4250
Response time (blocked-free)	(ms)	0,06	0,11	0,12
Force limit (0-pk)	(N)	1750	1750	1750
Max. displacement at resonance (pk-pk)	(μm)	36	54	81
Voltage range	(V)	-20 ... 150	-20 ... 150	-20 ... 150
Capacitance	(μF)	13,3	20,0	26,6
Resolution	(nm)	0,4	0,6	0,9
Thermo-mechanical behaviour	($\mu\text{m}/^\circ\text{K}$)	0,13	0,11	0,09
Height (in actuation direction)	(mm)	57,0	77,0	97,0
Base length	(mm)	23,5	23,5	23,5
Base width	(mm)	18,0	18,0	18,0
Mass	(g)	92,0	117,0	142,0
Standard mechanical interface - Top		1 centered M3 threaded hole 5 mm deep & 4 M2.5 threaded holes on \varnothing 15 mm 4 mm deep	1 centered M3 threaded hole 5 mm deep & 4 M2.5 threaded holes on \varnothing 15 mm 4 mm deep	1 centered M3 threaded hole 5 mm deep & 4 M2.5 threaded holes on \varnothing 15 mm 4 mm deep
Standard mechanical interface - Base		1 centered M3 threaded hole 5 mm deep & 4 M2.5 threaded holes on \varnothing 15 mm 4 mm deep	1 centered M3 threaded hole 5 mm deep & 4 M2.5 threaded holes on \varnothing 15 mm 4 mm deep	1 centered M3 threaded hole 5 mm deep & 4 M2.5 threaded holes on \varnothing 15 mm 4 mm deep
Standard electrical interface		2 PTFE insulated AWG26 wires 100 mm long with \varnothing 1 banana plug	2 PTFE insulated AWG26 wires 100 mm long with \varnothing 1 banana plug	2 PTFE insulated AWG26 wires 100 mm long with \varnothing 1 banana plug

Table 4.15: Characteristics of the PPA L Actuators



Figure 4.16: View of the PPA80L Actuator

Available option(s): SG, VAC, HT
Available interface option(s): TH, SI

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4.15 Parallel Pre-Stressed Actuators PPA XL Series

Designed by CEDRAT TECHNOLOGIES, these new models of Direct Piezo Actuators result from developments carried out under a CNES contract, the French Space Agency. PPA models are twice lighter than their analogue conventional DPAs, with the same electromechanical properties. They are suited to dynamic applications and their compact size also makes their integration easier in mechanical assembly. The XL series produce displacements up to 120 μm and can generate a pushing blocked force of 7000 N.

References	Unit	PPA40XL	PPA80XL	PPA120XL
Item Code		V-PPAXL40	V-PPAXL80	V-PPAXL120
Notes		-	-	-
Displacement	(μm)	38	90	130
Blocked force	(N)	7000	7000	7000
Stiffness	(N/ μm)	184.2	77.8	53.8
Resonance frequency (free-free)	(Hz)	15000	8500	5000
Response time (free-free)	(ms)	0.03	0.06	0.10
Resonance frequency (blocked-free)	(Hz)	7700	3500	2600
Response time (blocked-free)	(ms)	0.06	0.14	0.19
Force limit (0-pk)	(N)	3500	3500	3500
Max. displacement at resonance (pk-pk)	(μm)	34	81	117
Voltage range	(V)	-20 ... 150	-20 ... 150	-20 ... 150
Capacitance	(μF)	24.0	48.0	72.0
Resolution	(nm)	0.4	0.9	1.3
Thermo-mechanical behaviour	($\mu\text{m}/^\circ\text{K}$)	0.16	0.12	0.08
Height (in actuation direction)	(mm)	60.0	100.0	140.0
Base length	(mm)	30.0	30.0	30.0
Base width	(mm)	30.0	30.0	30.0
Mass	(g)	254.0	319.0	384.0
Standard mechanical interface - Top		1 centered M5 threaded hole 6 mm deep & 4 M3 threaded holes on \varnothing 20 mm 6 mm deep	1 centered M5 threaded hole 6 mm deep & 4 M3 threaded holes on \varnothing 20 mm 6 mm deep	1 centered M5 threaded hole 6 mm deep & 4 M3 threaded holes on \varnothing 20 mm 6 mm deep
Standard mechanical interface - Base		1 centered M5 threaded hole 6 mm deep & 4 M3 threaded holes on \varnothing 20 mm 6 mm deep	1 centered M5 threaded hole 6 mm deep & 4 M3 threaded holes on \varnothing 20 mm 6 mm deep	1 centered M5 threaded hole 6 mm deep & 4 M3 threaded holes on \varnothing 20 mm 6 mm deep
Standard electrical interface		2 PTFE insulated AWG26 wires 100 mm long with \varnothing 1 banana plug	2 PTFE insulated AWG26 wires 100 mm long with \varnothing 1 banana plug	2 PTFE insulated AWG26 wires 100 mm long with \varnothing 1 banana plug

Table 4.16: Characteristics of the PPA XL Actuators

Available option(s): SG, VAC
Available interface option(s): TH, SI

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Figure 4.17 : View of the PPA80XL Actuator

