

Piezo High Load Actuators

Series PAHL

Concept:

The PAHL series of actuators consists of high number of piezoelectrical plates. Based on their large size, they are ideally suited for high loads. They have high blocking forces and can move large masses. Due to the integrated mechanical pre-load, they can work under tensile forces and work well in dynamic applications. Their high resonant frequency guarantee fast setting times.

These actuators are useful for applications with precision mechanics, valve technologies and other fields, where high resolutions and high forces are critical.

Specials:

The resolution PAHL series is in sub-nanometer range and is limited only the signal noise.

As an option, these actuators are available with strain gage sensors for motion control.

The pre-loaded stack type actuator is designed for dynamical use.



image: high load actuators series PAHL

Product highlights:

- stack type actuator in multilayer technique
- integrated pre-load for dynamic use
- high tensile forces up to 350 N
- motion up to 200 μm
(larger motions available on request)
- high stiffness up to 165 N/ μm
- blocking force 3500 N

Applications:

- wafer alignment
- micro positioning
- scanning
- mirrors tilting
- vibration generation and cancellation
- injection valve control
- nanometrology

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Technical data

series PAHL		unit	PAHL 18/20	PAHL 40/20	PAHL 60/20	PAHL 80/20	PAHL 100/20	PAHL 120/20	PAHL 140/20	PAHL 160/20	PAHL 180/20	PAHL 200/20
part. no.			P-171-00	P-172-00	P-173-00	P-174-00	P-175-00	P-176-00	P-177-00	P-178-00	P-179-00	P-180-00
motion (-10/+20)%*		µm-	21	42	63	84	105	125	145	165	180	200
capacitance (±20%)**		µF	7	14	21	28	35	42	50.4	56	63	70
resolution***		nm	0.04	0.08	0.13	0.17	0.2	0.25	0.29	0.33	0.36	0.4
resonant frequency		kHz	22	12	8	6	5	4	3	3	3	2
stiffness		N/µm	165	83	55	41	33	28	24	21	19	17
blocking force		N	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500
pre-load		N	350	350	350	350	350	350	350	350	350	350
operating voltage		V	-20...+130									
connector voltage		-	LEMO 0S.302									
cable length		m	1									
dimensions	length L	mm	36	54	72	90	108	126	144	162	180	198
	diameter D	mm	20	20	20	20	20	20	20	20	20	20
series PAHL with spherical end R 2,5		unit	PAHL 18/20 R 2,5	PAHL 40/20 R 2,5	PAHL 60/20 R 2,5	PAHL 80/20 R 2,5	PAHL 100/20 R 2,5	PAHL 120/20 R 2,5	PAHL 140/20 R 2,5	PAHL 160/20 R 2,5	PAHL 180/20 R 2,5	PAHL 200/20 R 2,5
part. no.			P-171-50	P-172-50	P-173-50	P-174-50	P-175-50	P-176-50	P-177-50	P-178-50	P-179-50	P-180-50
dimensions length L		mm	38.5	56.5	74.5	92.5	110.5	128.5	146.5	164.5	182.5	200.5
series PA SG with integrated measurement system		unit	PAHL 18/20 SG	PAHL 40/20 SG	PAHL 60/20 SG	PAHL 80/20 SG	PAHL 100/20 SG	PAHL 120/20 SG	PAHL 140/20 SG	PAHL 160/20 SG	PAHL 180/20 SG	PAHL 200/20 SG
part. no.			P-171-01	P-172-01	P-173-01	P-174-01	P-175-01	P-176-01	P-177-01	P-178-01	P-179-01	P-180-01
motion (±0.2)%* closed loop		µm-	17	34	50	67	84	100	116	132	144	160
integrated measurement system			strain gage									
resolution closed loop		nm	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0
typ. repeatability		nm	6	8	12	15	20	21	21	21	24	32
dimensions length L		mm	40	58	76	94	112	130	148	166	184	202
series PA SG with integrated measurement system spherical end R 2,5		unit	PAHL 18/20 SG R 2,5	PAHL 40/20 SG R 2,5	PAHL 60/20 SG R 2,5	PAHL 80/20 SG R 2,5	PAHL 100/20 SG R 2,5	PAHL 120/20 SG R 2,5	PAHL 140/20 SG R 2,5	PAHL 160/20 SG R 2,5	PAHL 180/20 SG R 2,5	PAHL 200/20 SG R 2,5
part. no.			P-171-51	P-172-51	P-173-51	P-174-51	P-175-51	P-176-51	P-177-51	P-178-51	P-179-51	P-180-51
dimensions length L		mm	42.5	60.5	78.5	96.5	114.5	132.5	150.5	168.5	186.5	204.5

* typical value measured with NV 40/3(closed loop NV 40/3 CLE)

** typical value for small electrical field strength

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Options:

- vacuum version
- cryogenic temperature version
- full bridge strain gage sensors
- top plate: spherical tungsten carbide (part no./size: see table)
- other options available upon request

Accessories:

- tip adapter for M4 thread on top plate
size: diameter 7 mm, length 2.5 mm (part no. P-170-11)
- flexure hinge for PAHL XX/20
size: diameter 10 mm, length 13 mm (part no. Z-100-03)

Please pay attention to our “notes for mounting”, which are available as download on our homepage.

http://www.piezosystem.com/piezo_actuator_nanopositioning/downloads_publications/technical_information/notes_for_mounting

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