

PiezoMove Linear Actuator with High Stiffness

With Guide for Travel Ranges to 1 mm



P-602

- Flexure guides for linear motion with minimum tip and tilt
- Travel ranges to 1 mm
- Forces to 100 N
- Stiff and backlash-free construction
- Available with integrated position sensors
- Outstanding lifetime due to PICMA® piezo actuators
- Ideal OEM actuator for force generation in adaptive systems technology, for nanoimprint processes or machine tools
- Customized versions with longer travel range, shorter response time or nonmagnetic

Application fields

- Nanopositioning
- High-speed switching
- Patch clamp
- Microdispensing
- Adaptive systems technology / automation
- Photonics / integrated optics
- Biotechnology

Outstanding lifetime thanks to PICMA® piezo actuators

The patented PICMA® piezo actuators are all-ceramic insulated. This protects them against humidity and failure resulting from an increase in leakage current. PICMA® actuators offer an up to ten times longer lifetime than conventional polymer-insulated actuators. 100 billion cycles without a single failure are proven.

High guiding accuracy due to zero-play flexure guides

Flexure guides are free of maintenance, friction, and wear, and do not require lubrication. Their stiffness allows high load capacity and they are insensitive to shock and vibration. They work in a wide temperature range.

Motion	Unit	Tolerance	P-602.100	P-602.108	P-602.118	P-602.150	P-602.158	P-602.15L	P-602.300	P-602.308
Active axes			X	X	X	X	X	X	X	X
Travel range in X	µm				100	100	100	100		
Travel range in X, open loop, at -20 to 120 V	µm	+20 / -0 %	120	100	100	120	100	120	300	300
Linearity error, closed loop	%	Typ.			0.5	0.5	0.5	0.5		

Positioning	Unit	Tolerance	P-602.100	P-602.108	P-602.118	P-602.150	P-602.158	P-602.15L	P-602.300	P-602.308
Integrated sensor					SGS, indirect position measuring	SGS, indirect position measuring	SGS, indirect position measuring	SGS, indirect position measuring		
System resolution in X	nm				2	2	2	2		
Resolution in X, open loop	nm	Typ.	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3
Repeatability in X	nm	Typ.			10	10	10	10		

Drive Properties	Unit	Tolerance	P-602.100	P-602.108	P-602.118	P-602.1S0	P-602.1S8	P-602.1SL	P-602.300	P-602.308
Drive type			PICMA®	PICMA®	PICMA®	PICMA®	PICMA®	PICMA®	PICMA®	PICMA®
Electrical capacitance in X	µF	±20%	1.5	6	6	1.5	6	1.5	3.1	13

Mechanical Properties	Unit	Tolerance	P-602.100	P-602.108	P-602.118	P-602.1S0	P-602.1S8	P-602.1SL	P-602.300	P-602.308
Guide			Flexure guide with lever amplification	Flexure guide with lever amplification	Flexure guide with lever amplification	Flexure guide with lever amplification	Flexure guide with lever amplification	Flexure guide with lever amplification	Flexure guide with lever amplification	Flexure guide with lever amplification
Stiffness in X	N/µm	±20%	0.75	2.3	2.3	0.75	2.3	0.75	0.25	0.75
Resonant frequency in X, unloaded	Hz	±20%	1000	1100	1100	1000	1100	1000	450	480
Permissible push force in X	N	Max.	70	100	100	70	100	70	70	100
Permissible pull force in X	N	Max.	5	5	5	5	5	5	5	5
Overall mass	g	±5%	20	50	50	20	50	20	40	88
Material			Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel

Miscellaneous	Unit		P-602.100	P-602.108	P-602.118	P-602.1S0	P-602.1S8	P-602.1SL	P-602.300	P-602.308
Operating temperature range	°C		-20 to 80	-20 to 80	-20 to 80	-20 to 80	-20 to 80	-20 to 80	-20 to 80	-20 to 80
Connector			Stranded wires, PTFE isolated, AWG 32, Ø 0.49 mm	Stranded wires, PTFE isolated, AWG 32, Ø 0.49 mm	LEMO FFS. 00.250.CT-CE24	Stranded wires, PTFE isolated, AWG 32, Ø 0.49 mm	Stranded wires, PTFE isolated, AWG 32, Ø 0.49 mm	LEMO FFS. 00.250.CT-CE24	Stranded wires, PTFE isolated, AWG 32, Ø 0.49 mm	Stranded wires, PTFE isolated, AWG 32, Ø 0.49 mm
Sensor connector					LEMO FFA. 05.304. CLAC32	Stranded wires, PTFE isolated, AWG 30	Stranded wires, PTFE isolated, AWG 30	LEMO FFA. 05.304. CLAC32		
Cable length	m		0.5	0.5	2	0.5	0.5	2	0.5	0.5
Recommended controllers / drivers			E-610, E-625, E-831	E-610, E-625, E-831	E-610, E-625, E-831	E-610, E-625, E-831	E-610, E-625, E-831	E-610, E-625, E-831	E-610, E-625, E-831	E-610, E-625, E-831

Motion	Unit	Tolerance	P-602.3L8	P-602.3S0	P-602.3S8	P-602.3SL	P-602.500	P-602.508	P-602.5L8	P-602.5S0
Active axes			X	X	X	X	X	X	X	X
Travel range in X	µm		300	300	300	300			500	500
Travel range in X, open loop, at -20 to 120 V	µm	+20 / -0 %	300	300	300	300	600	500	500	600
Linearity error, closed loop	%	Typ.	0.5	0.5	0.5	0.5			0.5	0.5

Positioning	Unit	Tolerance	P-602.3L8	P-602.3S0	P-602.3S8	P-602.3SL	P-602.500	P-602.508	P-602.5L8	P-602.5S0
Integrated sensor			SGS, indirect position measuring	SGS, indirect position measuring	SGS, indirect position measuring	SGS, indirect position measuring			SGS, indirect position measuring	SGS, indirect position measuring
System resolution in X	nm		3	3	3	3			3	3
Resolution in X, open loop	nm	Typ.	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4
Repeatability in X	nm	Typ.	20	20	20	20			35	35

Drive Properties	Unit	Tolerance	P-602.3L8	P-602.3S0	P-602.3S8	P-602.3SL	P-602.500	P-602.508	P-602.5L8	P-602.5S0
Drive type			PICMA®	PICMA®	PICMA®	PICMA®	PICMA®	PICMA®	PICMA®	PICMA®
Electrical capacitance in X	µF	±20%	13	3.1	13	3.1	6.2	26	26	6.2

Mechanical Properties	Unit	Tolerance	P-602.3L8	P-602.3S0	P-602.3S8	P-602.3SL	P-602.500	P-602.508	P-602.5L8	P-602.5S0
Guide			Flexure guide with lever amplification	Flexure guide with lever amplification	Flexure guide with lever amplification	Flexure guide with lever amplification	Flexure guide with lever amplification	Flexure guide with lever amplification	Flexure guide with lever amplification	Flexure guide with lever amplification
Stiffness in X	N/μm	±20%	0.75	0.25	0.75	0.25	0.2	0.65	0.65	0.2
Resonant frequency in X, unloaded	Hz	±20%	480	450	480	450	230	240	240	230
Permissible push force in X	N	Max.	100	70	100	70	70	100	100	70
Permissible pull force in X	N	Max.	5	5	5	5	5	5	5	5
Overall mass	g	±5%	88	40	88	40	105	215	215	105
Material			Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel

Miscellaneous	Unit		P-602.3L8	P-602.3S0	P-602.3S8	P-602.3SL	P-602.500	P-602.508	P-602.5L8	P-602.5S0
Operating temperature range	°C		-20 to 80	-20 to 80	-20 to 80	-20 to 80	-20 to 80	-20 to 80	-20 to 80	-20 to 80
Connector			LEMO FFS. 00.250.CT-CE24	Stranded wires, PTFE isolated, AWG 32, Ø 0.49 mm	Stranded wires, PTFE isolated, AWG 32, Ø 0.49 mm	LEMO FFS. 00.250.CT-CE24	Stranded wires, PTFE isolated, AWG 32, Ø 0.49 mm	Stranded wires, PTFE isolated, AWG 32, Ø 0.49 mm	LEMO FFS. 00.250.CT-CE24	Stranded wires, PTFE isolated, AWG 32, Ø 0.49 mm
Sensor connector			LEMO FFA. 0S.304. CLAC32	Stranded wires, PTFE isolated, AWG 30	Stranded wires, PTFE isolated, AWG 30	LEMO FFA. 0S.304. CLAC32			LEMO FFA. 0S.304. CLAC32	Stranded wires, PTFE isolated, AWG 30
Cable length	m		2	0.5	0.5	2	0.5	0.5	2	0.5
Recommended controllers / drivers			E-610, E-625, E-831	E-610, E-625, E-831	E-610, E-625, E-831	E-610, E-625, E-831	E-610, E-625, E-831	E-610, E-625, E-831	E-610, E-625, E-831	E-610, E-625, E-831

Motion	Unit	Tolerance	P-602.5S8	P-602.5SL	P-602.800	P-602.8S0	P-602.8SL
Active axes			X	X	X	X	X
Travel range in X	μm		500	500		1000	1000
Travel range in X, open loop, at -20 to 120 V	μm	+20 / -0 %	500	600	1000	1000	1000
Linearity error, closed loop	%	Typ.	0.5	0.5		1.5	1.5

Positioning	Unit	Tolerance	P-602.5S8	P-602.5SL	P-602.800	P-602.8S0	P-602.8SL
Integrated sensor			SGS, indirect position measuring	SGS, indirect position measuring		SGS, indirect position measuring	SGS, indirect position measuring
System resolution in X	nm		3	3		7	7
Resolution in X, open loop	nm	Typ.	0.4	0.4	0.5	0.5	0.5
Repeatability in X	nm	Typ.	35	35		60	60

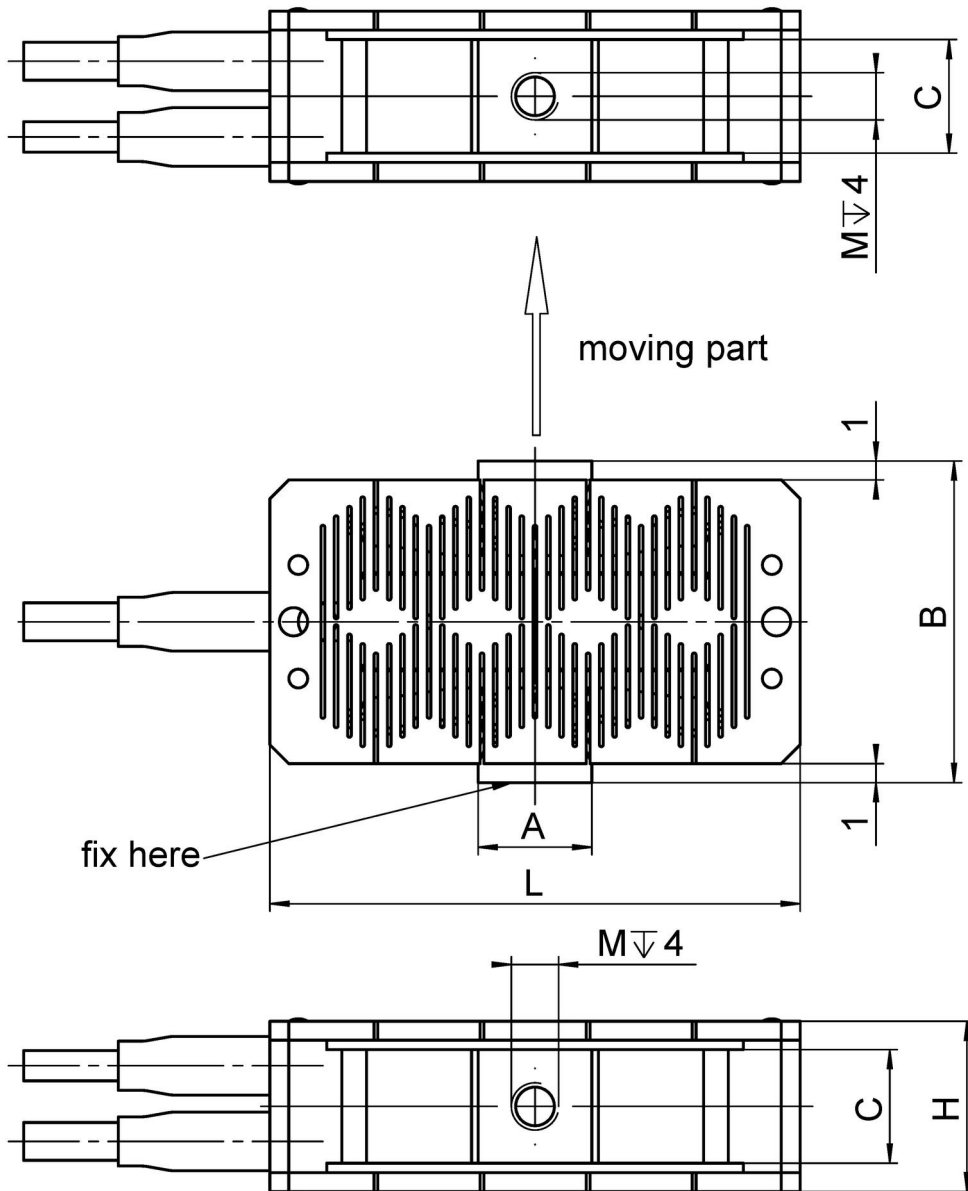
Drive Properties	Unit	Tolerance	P-602.5S8	P-602.5SL	P-602.800	P-602.8S0	P-602.8SL
Drive type			PICMA®	PICMA®	PICMA®	PICMA®	PICMA®
Electrical capacitance in X	μF	±20%	26	6.2	39	39	39

Mechanical Properties	Unit	Tolerance	P-602.5S8	P-602.5SL	P-602.800	P-602.8S0	P-602.8SL
Guide			Flexure guide with lever amplification	Flexure guide with lever amplification	Flexure guide with lever amplification	Flexure guide with lever amplification	Flexure guide with lever amplification
Stiffness in X	N/ μ m	$\pm 20\%$	0.65	0.2	0.4	0.4	0.4
Resonant frequency in X, unloaded	Hz	$\pm 20\%$	240	230	150	150	150
Permissible push force in X	N	Max.	100	70	100	100	100
Permissible pull force in X	N	Max.	5	5	5	5	5
Overall mass	g	$\pm 5\%$	215	105	355	355	355
Material			Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel

Miscellaneous	Unit		P-602.5S8	P-602.5SL	P-602.800	P-602.8S0	P-602.8SL
Operating temperature range	$^{\circ}\text{C}$		-20 to 80	-20 to 80	-20 to 80	-20 to 80	-20 to 80
Connector			Stranded wires, PT-FE isolated, AWG 32, $\varnothing$ 0.49 mm	LEMO FFS.00.250. CTCE24	Stranded wires, PT-FE isolated, AWG 32, $\varnothing$ 0.49 mm	Stranded wires, PT-FE isolated, AWG 32, $\varnothing$ 0.49 mm	LEMO FFS.00.250. CTCE24
Sensor connector			Stranded wires, PT-FE isolated, AWG 30	LEMO FFA.05.304. CLAC32		Stranded wires, PT-FE isolated, AWG 30	LEMO FFA.05.304. CLAC32
Cable length	m		0.5	2	0.5	0.5	2
Recommended controllers / drivers			E-610, E-625, E-831	E-610, E-625, E-831	E-610, E-625, E-831	E-610, E-625, E-831	E-610, E-625, E-831

The resolution of the system is only limited by the noise of the amplifier and measuring technology because PI piezo actuators are free of friction.
Ask about customized versions.

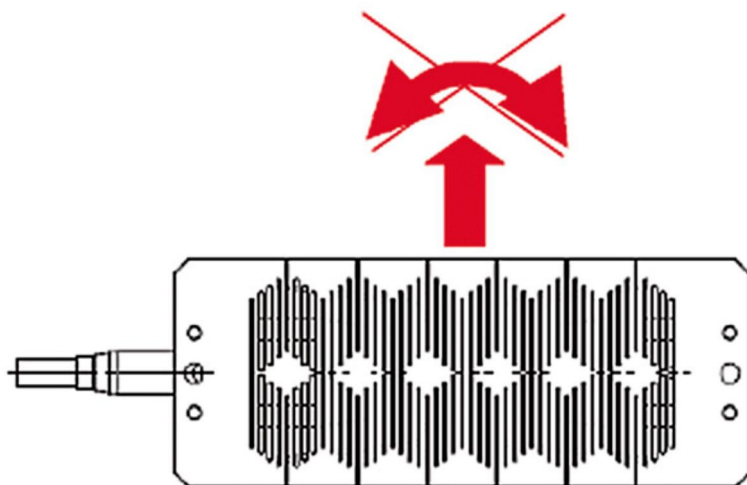
Drawings / Images



	L	B	H	M	A	C
P-602.1xx	28	17	9	M2.5	6	6
P-602.3xx	46	19	9	M2.5	6	6
P-602.5xx	85	26	9	M2.5	6	6
P-602.8xx	126	34	14	M4	10	11
P-602.1x8	28	22	14	M2.5	6	11
P-602.3x8	46	24	14	M2.5	6	11
P-602.5x8	85	31	14	M2.5	6	11

P-602, dimensions in mm

Drawings / Images



Low tilt and no displacement at the output

Order Information

P-602.100

PiezoMove linear actuator with high stiffness; PICMA® piezo actuator drive; 120 µm travel range (open loop); connecting wires; 0.5 m cable length

P-602.108

PiezoMove linear actuator with high force; PICMA® piezo actuator drive; 100 µm travel range (open loop); connecting wires; 0.5 m cable length

P-602.1L8

PiezoMove linear actuator with high force; PICMA® piezo actuator drive; 100 µm travel range; SGS, indirect position measuring; LEMO connectors; 2 m cable length

P-602.1S0

PiezoMove linear actuator with high stiffness; PICMA® piezo actuator drive; 100 µm travel range; SGS, indirect position measuring; connecting wires; 0.5 m cable length

P-602.1S8

PiezoMove linear actuator with high force; PICMA® piezo actuator drive; 100 µm travel range; SGS, indirect position measuring; connecting wires; 0.5 m cable length

P-602.1SL

PiezoMove linear actuator with high stiffness; PICMA® piezo actuator drive; 100 µm travel range; SGS, indirect position measuring; LEMO connectors; 2 m cable length

P-602.300

PiezoMove linear actuator with high stiffness; PICMA® piezo actuator drive; 300 µm travel range (open loop); connecting wires; 0.5 m cable length

Order Information

P-602.308

PiezoMove linear actuator with high force; PICMA® piezo actuator drive; 300 µm travel range (open loop); connecting wires; 0.5 m cable length

P-602.3L8

PiezoMove linear actuator with high force; PICMA® piezo actuator drive; 300 µm travel range; SGS, indirect position measuring; LEMO connectors; 2 m cable length

P-602.3S0

PiezoMove linear actuator with high stiffness; PICMA® piezo actuator drive; 300 µm travel range; SGS, indirect position measuring; connecting wires; 0.5 m cable length

P-602.3S8

PiezoMove linear actuator with high force; PICMA® piezo actuator drive; 300 µm travel range; SGS, indirect position measuring; connecting wires; 0.5 m cable length

P-602.3SL

PiezoMove linear actuator with high stiffness; PICMA® piezo actuator drive; 300 µm travel range; SGS, indirect position measuring; LEMO connectors; 2 m cable length

P-602.500

PiezoMove linear actuator with high stiffness; PICMA® piezo actuator drive; 600 µm travel range (open loop); connecting wires; 0.5 m cable length

P-602.508

PiezoMove linear actuator with high force; PICMA® piezo actuator drive; 500 µm travel range (open loop); connecting wires; 0.5 m cable length

P-602.5L8

PiezoMove linear actuator with high force; PICMA® piezo actuator drive; 500 µm travel range; SGS, indirect position measuring; LEMO connectors; 2 m cable length

P-602.5S0

PiezoMove linear actuator with high stiffness; PICMA® piezo actuator drive; 500 µm travel range; SGS, indirect position measuring; connecting wires; 0.5 m cable length

P-602.5S8

PiezoMove linear actuator with high force; PICMA® piezo actuator drive; 500 µm travel range; SGS, indirect position measuring; connecting wires; 0.5 m cable length

P-602.5SL

PiezoMove linear actuator with high stiffness; PICMA® piezo actuator drive; 500 µm travel range; SGS, indirect position measuring; LEMO connectors; 2 m cable length

P-602.800

PiezoMove linear actuator with high stiffness; PICMA® piezo actuator drive; 1000 µm travel range (open loop); connecting wires; 0.5 m cable length

Order Information

P-602.8S0

PiezoMove linear actuator with high stiffness; PICMA® piezo actuator drive; 1000 µm travel range; SGS, indirect position measuring; connecting wires; 0.5 m cable length

P-602.8SL

PiezoMove linear actuator with high stiffness; PICMA® piezo actuator drive; 1000 µm travel range; SGS, indirect position measuring; LEMO connectors; 2 m cable length