

Preloaded Piezo Actuators

Compact Actuators for High Loads and Forces, with Position Sensor



P-841

- Outstanding lifetime due to PICMA® piezo actuators
- Travel range to 90 µm
- Compact housing
- Push force capacity to 1000 N
- Pull force capacity to 50 N
- µs response time
- Subnanometer resolution
- Versions with spherical tip

Application fields

- Static and dynamic precision positioning
- Fiber positioning
- Laser tuning
- Nanotechnology

Outstanding lifetime thanks to PICMA® piezo actuators

The 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.

Motion	Unit		P-841.10	P-841.1B	P-841.20	P-841.2B	P-841.30	P-841.3B	P-841.40	P-841.4B
Active axes			Z	Z	Z	Z	Z	Z	Z	Z
Travel range in Z	µm		15	15	30	30	45	45	60	60

Positioning	Unit	Tolerance	P-841.10	P-841.1B	P-841.20	P-841.2B	P-841.30	P-841.3B	P-841.40	P-841.4B
Resolution in Z, open loop	nm	Typ.	0.15	0.15	0.3	0.3	0.45	0.45	0.6	0.6
Integrated sensor			SGS, direct position measuring	SGS, direct position measuring	SGS, direct position measuring	SGS, direct position measuring	SGS, direct position measuring	SGS, direct position measuring	SGS, direct position measuring	SGS, direct position measuring
System resolution in Z	nm		0.3	0.3	0.6	0.6	0.9	0.9	1.2	1.2

Drive properties	Unit	Tolerance	P-841.10	P-841.1B	P-841.20	P-841.2B	P-841.30	P-841.3B	P-841.40	P-841.4B
Drive type			PICMA®	PICMA®	PICMA®	PICMA®	PICMA®	PICMA®	PICMA®	PICMA®
Electrical capacitance in Z	µF	±20 %	1.5	1.5	3	3	4.5	4.5	6	6

Mechanical properties	Unit	Tolerance	P-841.10	P-841.1B	P-841.20	P-841.2B	P-841.30	P-841.3B	P-841.40	P-841.4B
Stiffness in Z	N/μm	±20 %	57	57	27	27	19	19	15	15
Resonant frequency in Z, unloaded	kHz	±20 %	18	18	14	14	10	10	8.5	8.5
Permissible push force in Z	N	Max.	1000	1000	1000	1000	1000	1000	1000	1000
Permissible pull force in Z	N	Max.	50	50	50	50	50	50	50	50
Permissible torque in θZ	N·m	Max.	0.35	—	0.35	—	0.35	—	0.35	—
Mass without cable	g	±5 %	20	20	28	28	46	46	54	54
Material			Housing / tip: Stainless steel	Housing / tip: Stainless steel	Housing / tip: Stainless steel	Housing / tip: Stainless steel	Housing / tip: Stainless steel	Housing / tip: Stainless steel	Housing / tip: Stainless steel	Housing / tip: Stainless steel
Length	mm	±0.3 mm	32	32	50	50	68	68	86	86
Mechanical interface			—	Spherical tip	—	Spherical tip	—	Spherical tip	—	Spherical tip

Miscellaneous	Unit		P-841.10	P-841.1B	P-841.20	P-841.2B	P-841.30	P-841.3B	P-841.40	P-841.4B
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 FFA. 00.250	LEMO FFA. 00.250	LEMO FFA. 00.250	LEMO FFA. 00.250	LEMO FFA. 00.250	LEMO FFA. 00.250	LEMO FFA. 00.250	LEMO FFA. 00.250
Sensor connector			LEMO FFA. 0S.304. CLAC32	LEMO FFA. 0S.304. CLAC32	LEMO FFA. 0S.304. CLAC32	LEMO FFA. 0S.304. CLAC32	LEMO FFA. 0S.304. CLAC32	LEMO FFA. 0S.304. CLAC32	LEMO FFA. 0S.304. CLAC32	LEMO FFA. 0S.304. CLAC32
Cable length	m		1	1	1	1	1	1	1	1
Recommended controllers/drivers			E-503, E-505, E-610, E-621, E-625, E-663, E-665, E-709, E-831	E-503, E-505, E-610, E-621, E-625, E-663, E-665, E-709, E-831	E-503, E-505, E-610, E-621, E-625, E-663, E-665, E-709, E-831	E-503, E-505, E-610, E-621, E-625, E-663, E-665, E-709, E-831	E-503, E-505, E-610, E-621, E-625, E-663, E-665, E-709, E-831	E-503, E-505, E-610, E-621, E-625, E-663, E-665, E-709, E-831	E-503, E-505, E-610, E-621, E-625, E-663, E-665, E-709, E-831	E-503, E-505, E-610, E-621, E-625, E-663, E-665, E-709, E-831

Motion	Unit		P-841.60	P-841.6B
Active axes			Z	Z
Travel range in Z	μm		90	90

Positioning	Unit	Tolerance	P-841.60	P-841.6B
Resolution in Z, open loop	nm	Typ.	0.9	0.9
Integrated sensor			SGS, direct position measuring	SGS, direct position measuring
System resolution in Z	nm		1.8	1.8

Drive properties	Unit	Tolerance	P-841.60	P-841.6B
Drive type			PICMA®	PICMA®
Electrical capacitance in Z	μF	±20 %	9	9

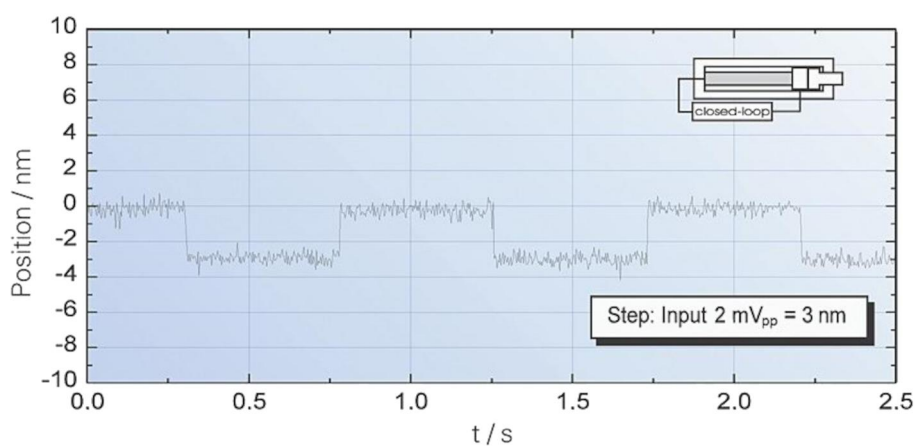
Mechanical properties	Unit	Tolerance	P-841.60	P-841.6B
Stiffness in Z	N/μm	±20 %	10	10
Resonant frequency in Z, unloaded	kHz	±20 %	6	6
Permissible push force in Z	N	Max.	1000	1000
Permissible pull force in Z	N	Max.	50	50
Permissible torque in θZ	N·m	Max.	0.35	—
Mass without cable	g	±5 %	62	62
Material			Housing / tip: Stainless steel	Housing / tip: Stainless steel
Length	mm	±0.3 mm	122	122
Mechanical interface			—	Spherical tip

Miscellaneous	Unit	P-841.60	P-841.6B
Operating temperature range	°C	-20 to 80	-20 to 80
Connector		LEMO FFA.00.250	LEMO FFA.00.250
Sensor connector		LEMO FFA.0S.304.CLAC32	LEMO FFA.0S.304.CLAC32
Cable length	m	1	1
Recommended controllers/drivers		E-503, E-505, E-610, E-621, E-625, E-663, E-665, E-709, E-831	E-503, E-505, E-610, E-621, E-625, E-663, E-665, E-709, E-831

Integrated sensor: Versions with SGS allow closed-loop linearity up to 0.15 % and are shipped with calibration log.
 Stiffness in Z: Static large-signal stiffness; dynamic small-signal stiffness is approx. 30 % higher.
 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.

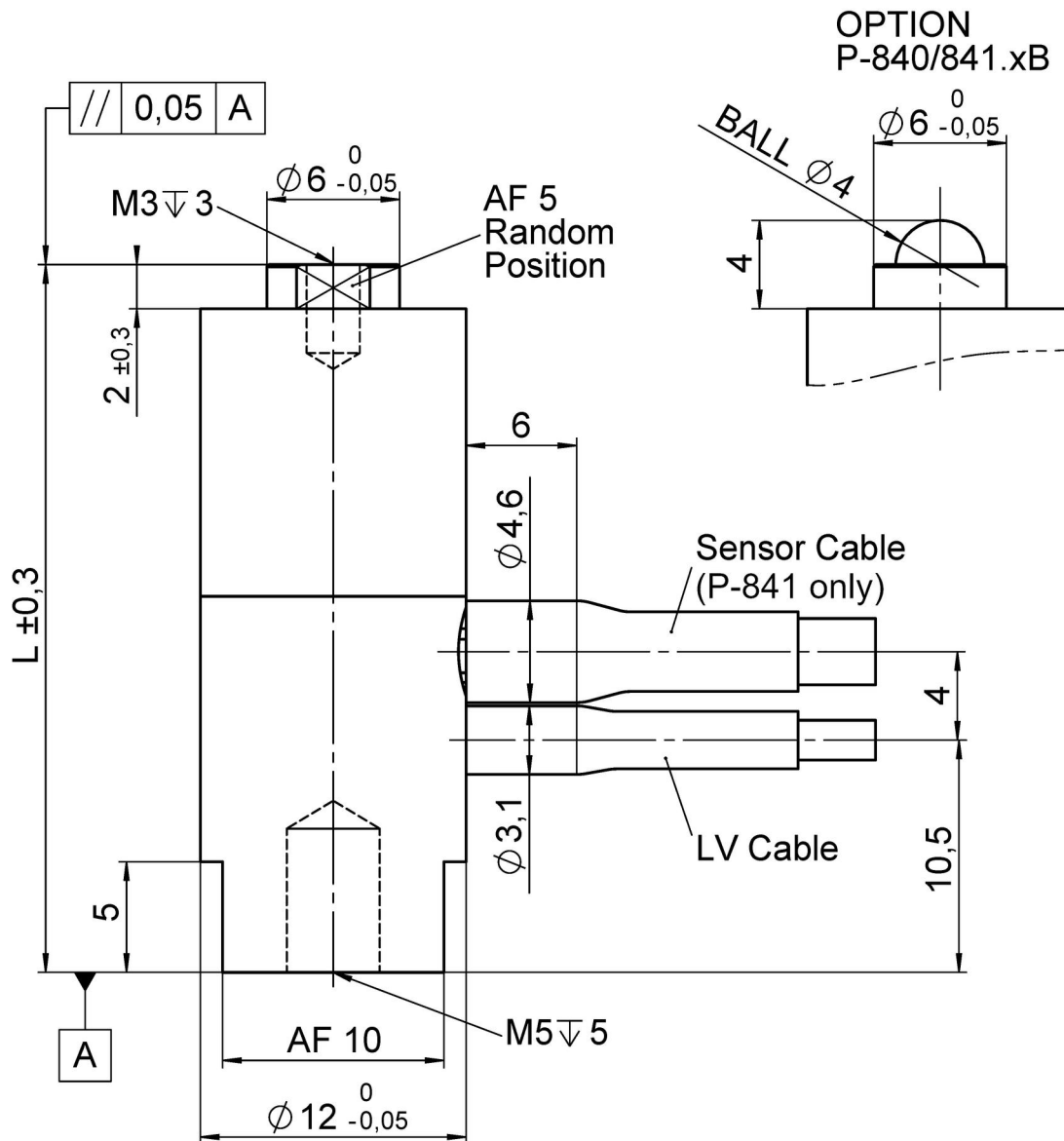
At PI, technical data is specified at 22 ±3 °C. Unless otherwise stated, the values are for unloaded conditions. Some properties are interdependent. The designation "typ." indicates a statistical average for a property; it does not indicate a guaranteed value for every product supplied. During the final inspection of a product, only selected properties are analyzed, not all. Please note that some product characteristics may deteriorate with increasing operating time.

Drawings / Images



Response behavior of a P-841.10 to square wave control with an amplitude of 3 nm. Servo setting: 240 Hz bandwidth, 2 ms settling time.

Drawings / Images



Model	Travel Range	L	Cable Length
P-840.10 / P-841.10	15 μ m	32 mm	1 m
P-840.20 / P-841.20	30 μ m	50 mm	1 m
P-840.30 / P-841.30	45 μ m	68 mm	1 m
P-840.40 / P-841.40	60 μ m	86 mm	1 m
P-840.60 / P-841.60	90 μ m	122 mm	1 m

P-840 / P-841, dimensions in mm. Sensor included only with P-841.

Order Information

P-841.10

Preloaded piezo actuator; PICMA® piezo actuator drive; 15 µm travel range; 32 mm length; push force capacity 1000 N; pull force capacity 50 N; SGS, direct position measuring; LEMO connectors; 1 m cable length

P-841.1B

Preloaded piezo actuator; PICMA® piezo actuator drive; 15 µm travel range; 32 mm length; push force capacity 1000 N; pull force capacity 50 N; SGS, direct position measuring; spherical tip; LEMO connectors; 1 m cable length

P-841.20

Preloaded piezo actuator; PICMA® piezo actuator drive; 30 µm travel range; 50 mm length; push force capacity 1000 N; pull force capacity 50 N; SGS, direct position measuring; LEMO connectors; 1 m cable length

P-841.2B

Preloaded piezo actuator; PICMA® piezo actuator drive; 30 µm travel range; 50 mm length; push force capacity 1000 N; pull force capacity 50 N; SGS, direct position measuring; spherical tip; LEMO connectors; 1 m cable length

P-841.30

Preloaded piezo actuator; PICMA® piezo actuator drive; 45 µm travel range; 68 mm length; push force capacity 1000 N; pull force capacity 50 N; SGS, direct position measuring; LEMO connectors; 1 m cable length

P-841.3B

Preloaded piezo actuator; PICMA® piezo actuator drive; 45 µm travel range; 68 mm length; push force capacity 1000 N; pull force capacity 50 N; SGS, direct position measuring; spherical tip; LEMO connectors; 1 m cable length

P-841.40

Preloaded piezo actuator; PICMA® piezo actuator drive; 60 µm travel range; 86 mm length; push force capacity 1000 N; pull force capacity 50 N; SGS, direct position measuring; LEMO connectors; 1 m cable length

P-841.4B

Preloaded piezo actuator; PICMA® piezo actuator drive; 60 µm travel range; 86 mm length; push force capacity 1000 N; pull force capacity 50 N; SGS, direct position measuring; spherical tip; LEMO connectors; 1 m cable length

P-841.60

Preloaded piezo actuator; PICMA® piezo actuator drive; 90 µm travel range; 122 mm length; push force capacity 1000 N; pull force capacity 50 N; SGS, direct position measuring; LEMO connectors; 1 m cable length

P-841.6B

Preloaded piezo actuator; PICMA® piezo actuator drive; 90 µm travel range; 122 mm length; push force capacity 1000 N; pull force capacity 50 N; SGS, direct position measuring; spherical tip; LEMO connectors; 1 m cable length