

Preloaded PICA Power Piezo Actuators

Preloaded High-Load Piezo Actuators (HVPZT) with Sensor Option



P-235

- Extremely high stiffness
- Push force capacity to 30000 N
- Pull force capacity to 3500 N
- Travel range up to 180 μm
- Options: Vacuum, high-temperature versions, water-proof housing

Application fields

- Active vibration absorber
- Adaptive mechanics
- Precision mechanics / micromechanics
- Optics
- Measuring technology / interferometry
- Adaptive systems technology
- Switch
- Laser tuning
- Force generation / materials testing
- Nanotechnology

PICA Power piezo actuators for high loads

PICA Power high-load stack actuators are reliable and provide long travel ranges for heavy loads. The actuators are suitable for demanding loads with high temperatures.

Suitable for sophisticated vacuum applications

Piezo actuators do not require lubricants or cause abrasion. Versions are available for vacuum to 10^{-6} hPa and for particularly high or low operating temperatures.

Motion	Unit	Tolerance	P-235.10	P-235.10V	P-235.1S	P-235.1SV	P-235.20	P-235.20V	P-235.2S	P-235.2SV
Active axes			Z	Z	Z	Z	Z	Z	Z	Z
Travel range in Z	μm		—	—	15	15	—	—	30	30
Travel range in Z, open loop	μm	$\pm 20\%$	15	15	15	15	30	30	30	30
Linearity error in Z	%	Typ.	—	—	0.2	0.2	—	—	0.2	0.2

Positioning	Unit	Tolerance	P-235.10	P-235.10V	P-235.1S	P-235.1SV	P-235.20	P-235.20V	P-235.2S	P-235.2SV
Resolution in Z, open loop	nm	Typ.	0.15	0.15	0.15	0.15	0.3	0.3	0.3	0.3
Integrated sensor			—	—	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

Drive properties	Unit	Tolerance	P-235.10	P-235.10V	P-235.1S	P-235.1SV	P-235.20	P-235.20V	P-235.2S	P-235.2SV
Actuator type			Linear actuator	Linear actuator	Linear actuator	Linear actuator	Linear actuator	Linear actuator	Linear actuator	Linear actuator
Drive type			PICA	PICA	PICA	PICA	PICA	PICA	PICA	PICA
Operating voltage	V		0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000
Electrical capacitance in Z	nF	±20 %	550	550	550	550	1100	1100	1100	1100

Mechanical properties	Unit	Tolerance	P-235.10	P-235.10V	P-235.1S	P-235.1SV	P-235.20	P-235.20V	P-235.2S	P-235.2SV
Stiffness in Z	N/μm	±20 %	860	860	860	860	600	600	600	600
Resonant frequency in Z, unloaded	kHz	±20 %	14	14	14	14	10	10	10	10
Permissible push force in Y	N	Max.	707	707	707	707	420	420	420	420
Permissible push force in Z	N	Max.	30000	30000	30000	30000	30000	30000	30000	30000
Permissible pull force in Z	N	Max.	3500	3500	3500	3500	3500	3500	3500	3500
Permissible torque in θZ	N·m	Max.	2	2	2	2	2	2	2	2
Overall mass	g	±5 %	580	580	580	580	690	690	690	690
Material			Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel

Miscellaneous	Unit		P-235.10	P-235.10V	P-235.1S	P-235.1SV	P-235.20	P-235.20V	P-235.2S	P-235.2SV
Operating temperature range	°C		-40 to 80	-40 to 150	-40 to 80	-40 to 150	-40 to 80	-40 to 150	-40 to 80	-40 to 150
Vacuum class	hPa		—	10 ⁻⁶	—	10 ⁻⁶	—	10 ⁻⁶	—	10 ⁻⁶
Connector			LEMO HVPZT	LEMO HVPZT	LEMO HVPZT	LEMO HVPZT	LEMO HVPZT	LEMO HVPZT	LEMO HVPZT	LEMO HVPZT
Sensor connector			—	—	LEMO for strain gauge sensors	LEMO for strain gauge sensors	—	—	LEMO for strain gauge sensors	LEMO for strain gauge sensors
Cable length	m		1	1.5	1	1.5	1	1.5	1	1.5
Recommended controllers/drivers			E-462, E-464, E-470 • E-472 • E-421, E-481, E-482, E-508	E-462, E-470 • E-472 • E-421, E-481, E-482, E-508	E-462, E-470 • E-472 • E-421, E-481, E-482, E-508	E-462, E-470 • E-472 • E-421, E-481, E-482, E-508	E-462, E-470 • E-472 • E-421, E-481, E-482, E-508	E-462, E-470 • E-472 • E-421, E-481, E-482, E-508	E-462, E-470 • E-472 • E-421, E-481, E-482, E-508	E-462, E-470 • E-472 • E-421, E-481, E-482, E-508

Motion	Unit	Tolerance	P-235.40	P-235.40V	P-235.4S	P-235.4SV	P-235.80	P-235.80V	P-235.8S	P-235.8SV
Active axes			Z	Z	Z	Z	Z	Z	Z	Z
Travel range in Z	μm		—	—	60	60	—	—	120	120
Travel range in Z, open loop	μm	±20 %	60	60	60	60	120	120	120	120
Linearity error in Z	%	Typ.	—	—	0.2	0.2	—	—	0.2	0.2

Positioning	Unit	Tolerance	P-235.40	P-235.40V	P-235.4S	P-235.4SV	P-235.80	P-235.80V	P-235.8S	P-235.8SV
Resolution in Z, open loop	nm	Typ.	0.6	0.6	0.6	0.6	1.2	1.2	1.2	1.2
Integrated sensor			—	—	SGS, direct position measuring	SGS, direct position measuring	—	—	SGS, direct position measuring	SGS, direct position measuring
System resolution in Z	nm		—	—	1.2	1.2	—	—	2.4	2.4

Drive properties	Unit	Tolerance	P-235.40	P-235.40V	P-235.4S	P-235.4SV	P-235.80	P-235.80V	P-235.8S	P-235.8SV
Actuator type			Linear actuator	Linear actuator	Linear actuator	Linear actuator	Linear actuator	Linear actuator	Linear actuator	Linear actuator
Drive type			PICA	PICA	PICA	PICA	PICA	PICA	PICA	PICA
Operating voltage	V		0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000
Electrical capacitance in Z	nF	±20 %	2400	2400	2400	2400	5100	5100	5100	5100

Mechanical properties	Unit	Tolerance	P-235.40	P-235.40V	P-235.4S	P-235.4SV	P-235.80	P-235.80V	P-235.8S	P-235.8SV
Stiffness in Z	N/μm	±20 %	380	380	380	380	210	210	210	210
Resonant frequency in Z, unloaded	kHz	±20 %	7	7	7	7	4	4	4	4
Permissible push force in Y	N	Max.	232	232	232	232	147	147	147	147
Permissible push force in Z	N	Max.	30000	30000	30000	30000	30000	30000	30000	30000
Permissible pull force in Z	N	Max.	3500	3500	3500	3500	3500	3500	3500	3500
Permissible torque in θZ	N·m	Max.	2	2	2	2	2	2	2	2
Overall mass	g	±5 %	940	940	940	940	1400	1400	1400	1400
Material			Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel

Miscellaneous	Unit		P-235.40	P-235.40V	P-235.4S	P-235.4SV	P-235.80	P-235.80V	P-235.8S	P-235.8SV
Operating temperature range	°C		-40 to 80	-40 to 150	-40 to 80	-40 to 150	-40 to 80	-40 to 150	-40 to 80	-40 to 150
Vacuum class	hPa		—	10 ⁻⁶	—	10 ⁻⁶	—	10 ⁻⁶	—	—
Connector			LEMO HVPZT	LEMO HVPZT	LEMO HVPZT	LEMO HVPZT	LEMO HVPZT	LEMO HVPZT	LEMO HVPZT	LEMO HVPZT
Sensor connector			—	—	LEMO for strain gauge sensors	LEMO for strain gauge sensors	—	—	LEMO for strain gauge sensors	LEMO for strain gauge sensors
Cable length	m		1	1.5	1	1.5	1	1.5	1	1.5
Recommended controllers/drivers			E-462, E-464, E-470 • E-472 • E-421, E-481, E-482, E-508	E-462, E-464, E-470 • E-472 • E-421, E-481, E-482, E-508	E-462, E-464, E-470 • E-472 • E-421, E-481, E-482, E-508	E-462, E-464, E-470 • E-472 • E-421, E-481, E-482, E-508	E-462, E-464, E-470 • E-472 • E-421, E-481, E-482, E-508	E-462, E-464, E-470 • E-472 • E-421, E-481, E-482, E-508	E-462, E-464, E-470 • E-472 • E-421, E-481, E-482, E-508	E-462, E-464, E-470 • E-472 • E-421, E-481, E-482, E-508

Motion	Unit	Tolerance	P-235.90	P-235.90V	P-235.9S	P-235.9SV
Active axes			Z	Z	Z	Z
Travel range in Z	μm		—	—	180	180
Travel range in Z, open loop	μm	±20 %	180	180	180	180
Linearity error in Z	%	Typ.	—	—	0.2	0.2

Positioning	Unit	Tolerance	P-235.90	P-235.90V	P-235.9S	P-235.9SV
Resolution in Z, open loop	nm	Typ.	1.8	1.8	1.8	1.8
Integrated sensor			—	—	SGS, direct position measuring	SGS, direct position measuring
System resolution in Z	nm		—	—	3.6	3.6

Drive properties	Unit	Tolerance	P-235.90	P-235.90V	P-235.9S	P-235.9SV
Actuator type			Linear actuator	Linear actuator	Linear actuator	Linear actuator
Drive type			PICA	PICA	PICA	PICA
Operating voltage	V		0 to 1000	0 to 1000	0 to 1000	0 to 1000
Electrical capacitance in Z	nF	±20 %	7800	7800	7800	7800

Mechanical properties	Unit	Tolerance	P-235.90	P-235.90V	P-235.9S	P-235.9SV
Stiffness in Z	N/μm	±20 %	150	150	150	150
Resonant frequency in Z, unloaded	kHz	±20 %	2.8	2.8	2.8	2.8
Permissible push force in Y	N	Max.	147	147	147	147
Permissible push force in Z	N	Max.	30000	30000	30000	30000
Permissible pull force in Z	N	Max.	3500	3500	3500	3500
Permissible torque in θZ	N·m	Max.	2	2	2	2
Overall mass	g	±5 %	1900	1900	1900	1900
Material			Stainless steel	Stainless steel	Stainless steel	Stainless steel

Miscellaneous	Unit		P-235.90	P-235.90V	P-235.9S	P-235.9SV
Operating temperature range	°C		-40 to 80	-40 to 150	-40 to 80	-40 to 150
Vacuum class	hPa		—	10 ⁻⁶	—	10 ⁻⁶
Connector			LEMO HVPZT	LEMO HVPZT	LEMO HVPZT	LEMO HVPZT
Sensor connector			—	—	LEMO for strain gauge sensors	LEMO for strain gauge sensors
Cable length	m		1	1.5	1	1.5
Recommended controllers/drivers			E-462, E-464, E-470 • E-472 • E-421, E-481, E-482, E-508	E-462, E-464, E-470 • E-472 • E-421, E-481, E-482, E-508	E-462, E-464, E-470 • E-472 • E-421, E-481, E-482, E-508	E-462, E-464, E-470 • E-472 • E-421, E-481, E-482, E-508

Stiffness in Z: Static large-signal stiffness; dynamic small-signal stiffness 50 % higher.

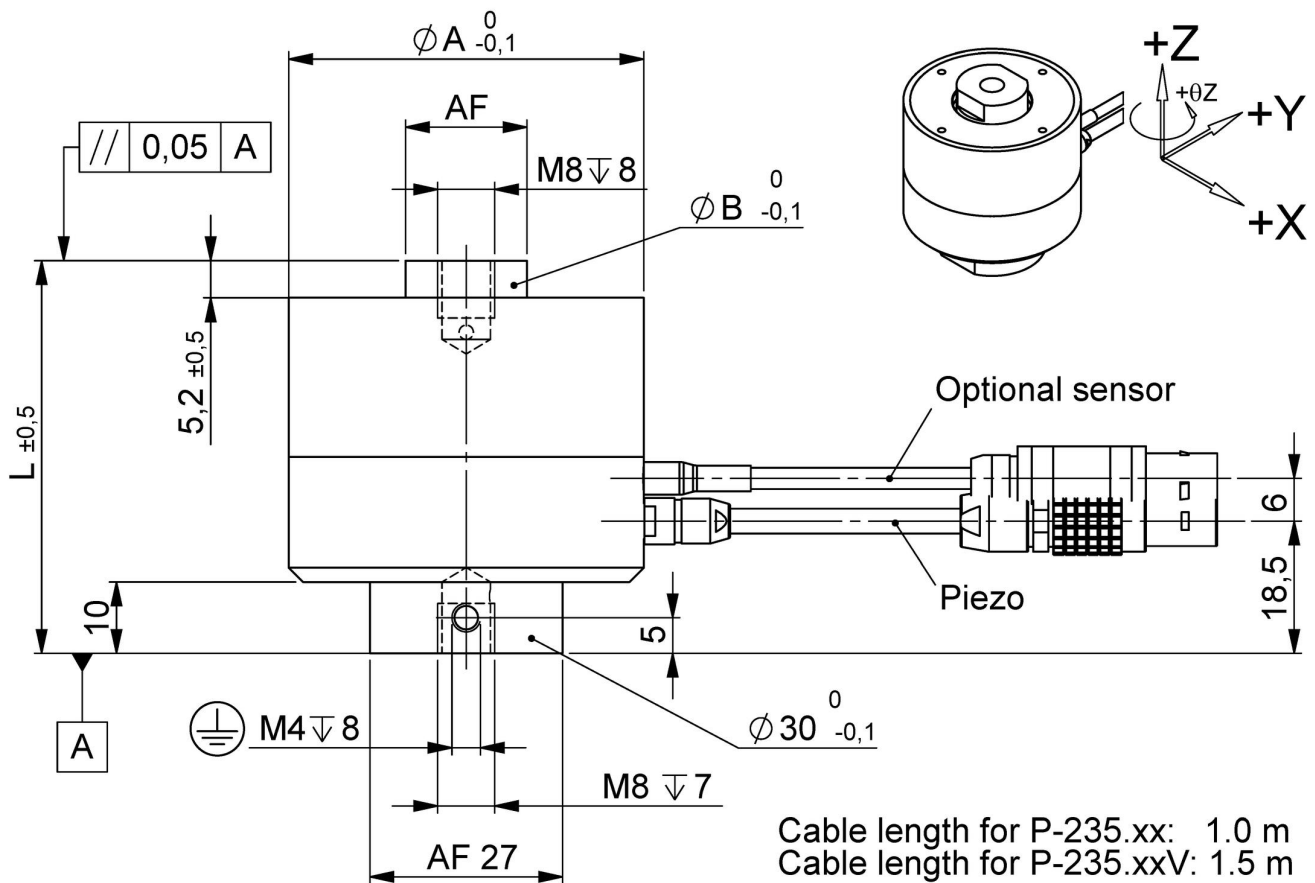
Operating temperature range: The maximum bakeout temperature of the vacuum feedthrough is 100 °C.

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.

The operating voltage should not exceed 750 V in continuous operation.

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



	L [mm]	ϕA [mm]	ϕB [mm]	AF [mm]
P-235.1x	55	49,8	20	17
P-235.2x	68	49,8	20	17
P-235.4x	94	49,8	20	17
P-235.8x	147	49,8	20	17
P-235.9x	199	49,8	20	17

P-235, dimensions in mm. Note that a comma is used in the drawings instead of a decimal point.

Order Information

P-235.10

PICA Power piezo actuator; 15 µm travel range (open loop); LEMO HVPZT; 1 m cable length

P-235.10V

PICA Power piezo actuator; 15 µm travel range (open loop); vacuum compatible to 10⁻⁶ hPa; LEMO HVPZT; 1.5 m cable length

P-235.1S

PICA Power piezo actuator; 15 µm travel range; SGS, direct position measuring; LEMO HVPZT; 1 m cable length

P-235.1SV

PICA Power piezo actuator; 15 µm travel range; SGS, direct position measuring; vacuum compatible to 10⁻⁶ hPa; LEMO HVPZT; 1.5 m cable length

P-235.20

PICA Power piezo actuator; 30 µm travel range (open loop); LEMO HVPZT; 1 m cable length

P-235.20V

PICA Power piezo actuator; 30 µm travel range (open loop); vacuum-compatible to 10⁻⁶ hPa; LEMO HVPZT; 1.5 m cable length

P-235.2S

PICA Power piezo actuator; 30 µm travel range; SGS, direct position measuring; LEMO HVPZT; 1 m cable length

P-235.2SV

PICA Power piezo actuator; 30 µm travel range; SGS, direct position measuring; vacuum compatible to 10⁻⁶ hPa; LEMO HVPZT; 1.5 m cable length

P-235.40

PICA Power piezo actuator; 60 µm travel range (open loop); LEMO HVPZT; 1 m cable length

P-235.40V

PICA Power piezo actuator; 60 µm travel range (open loop); vacuum-compatible to 10⁻⁶ hPa; LEMO HVPZT; 1.5 m cable length

P-235.4S

PICA Power piezo actuator; 60 µm travel range; SGS, direct position measuring; LEMO HVPZT; 1 m cable length

P-235.4SV

PICA Power piezo actuator; 60 µm travel range; SGS, direct position measuring; vacuum compatible to 10⁻⁶ hPa; LEMO HVPZT; 1.5 m cable length

P-235.80

PICA Power piezo actuator; 120 µm travel range (open loop); LEMO HVPZT; 1 m cable length

P-235.80V

PICA Power piezo actuator; 120 µm travel range (open loop); vacuum-compatible to 10⁻⁶ hPa; LEMO HVPZT; 1.5 m cable length

Order Information

P-235.8S

PICA Power piezo actuator; 120 µm travel range; SGS, direct position measuring; LEMO HVPZT; 1 m cable length

P-235.8SV

PICA Power piezo actuator; 120 µm travel range; SGS, direct position measuring; vacuum compatible to 10⁻⁶ hPa; LEMO HVPZT; 1.5 m cable length

P-235.90

PICA Power piezo actuator; 180 µm travel range (open loop); LEMO HVPZT; 1 m cable length

P-235.90V

PICA Power piezo actuator; 180 µm travel range (open loop); vacuum-compatible to 10⁻⁶ hPa; LEMO HVPZT; 1.5 m cable length

P-235.9S

PICA Power piezo actuator; 180 µm travel range; SGS, direct position measuring; LEMO HVPZT; 1 m cable length

P-235.9SV

PICA Power piezo actuator; 180 µm travel range; SGS, direct position measuring; vacuum compatible to 10⁻⁶ hPa; LEMO HVPZT; 1.5 m cable length