P-840 · P-841

Preloaded Open- & Closed-Loop Piezo Translators (LVPZT)

P-840, P-841 piezo translators (DIP switch for size comparison)

- **Displacement to 90 µm**
- **Pushing Forces to 1000 N**
- **Preloaded for Pulling Forces to 50 N**
- **Sub-msec Response**
- **Sub-nm Resolution**
- **Options: Ball Tip, Vacuum Versions**

P-840 and P-841 preloaded piezo translators are high-resolution linear actuators for static and dynamic applications. They provide sub-millisecond response and sub-nanometer resolution. The internal spring preload makes them ideal for dynamic applications.

High Accuracy in Closed-Loop Operation

The P-840 is specifically designed for open-loop operation. For highest accuracy, the P-841 closed-loop version includes integrated ultra-high-resolution strain gauge position sensors and operate with PI servo-control electronics see page 4-19 *ff.* and page 4-31 *ff.* for details).

Design

These translators are equipped with highly reliable multilayer PZT ceramic stacks protected by a non-magnetic stainless steel case with internal spring preload. The standard translator tip and base have tapped holes. Select the P-840.95 ball tip option to help decouple off-axis or torque loads from the translator.

Mounting

For push/pull forces up to 5 N, the translator can be mounted by clamping around the case. For larger forces, the translator must be mounted by the base. For positioning of magnetic parts the P-176.20 magnetic adapter can be screwed into the translator tip.
For more mounting guidelines see page 1-48.

Ordering Information

P-841.10
Closed-Loop LVPZT Translator, 15 µm

P-841.20
Closed-Loop LVPZT Translator, 30 µm

P-841.30
Closed-Loop LVPZT Translator, 45 µm

P-841.40
Closed-Loop LVPZT Translator, 60 µm

P-841.60
Closed-Loop LVPZT Translator, 90 µm

P-840.10
Open-Loop LVPZT Translator, 15 µm

P-840.20
Open-Loop LVPZT Translator, 30 µm

P-840.30
Open-Loop LVPZT Translator, 45 µm

P-840.40
Open-Loop LVPZT Translator, 60 µm

P-840.60
Open-Loop LVPZT Translator, 90 µm

Ask about custom designs!

Application Examples

- Static and dynamic positioning
- Disk drive testing
- Smart structures
- Adaptive mechanics
- Vibration cancellation
- Switching
- Laser tuning
- Patch clamping

For more examples see page 1-5

Technical Data **Closed-Loop**

Models	P-841.10	P-841.20	P-841.30	P-841.40	P-841.60
Open-loop travel @ 0 to 100 V	15	30	45	60	90
Closed-loop travel	15	30	45	60	90
* Integrated feedback sensor	SGS	SGS	SGS	SGS	SGS
** Closed-loop / open-loop resolution	0.3 / 0.15	0.6 / 0.3	0.9 / 0.45	1.2 / 0.6	1.8 / 0.9
*** Static large-signal stiffness	57	27	19	15	10
Push/pull force capacity	1000 / 50	1000 / 50	1000 / 50	1000 / 50	1000 / 50
Torque limit (at tip)	0.35	0.35	0.35	0.35	0.35
Electrical capacitance	1.5	3.0	4.5	6.0	9.0
Dynamic operating current coefficient (DOCC)	12.5	12.5	12.5	12.5	12.5
Unloaded resonant frequency (f_0)	18	14	10	8.5	6
Standard operating temperature range	-20 to +80	-20 to +80	-20 to +80	-20 to +80	-20 to +80
Voltage connection	VL	VL	VL	VL	VL
Sensor connection	L	L	L	L	L
Weight without cables	20	28	46	54	62
Material case / end pieces	N-S	N-S	N-S	N-S	N-S
Length L	32	50	68	86	122
Recommended amplifier/controller (codes explained p. 1-3)	C, D ,G , H	C, D ,G , H	C, D ,G , H	C, D ,G , H	C, D ,G , H

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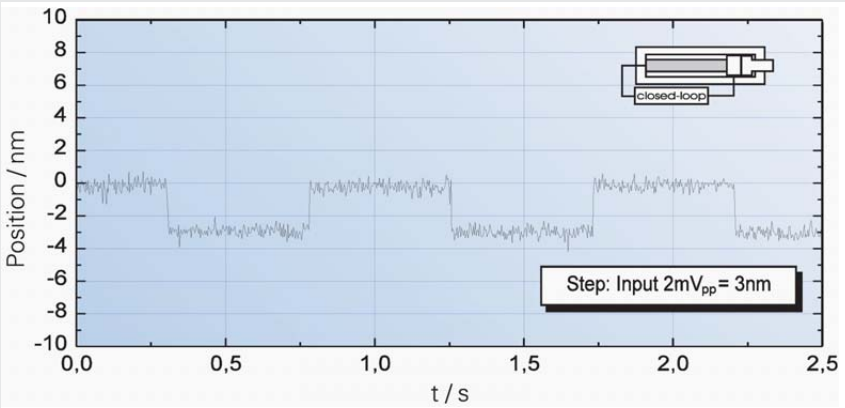


Response of a P-841.10 to a 3 nm peak-to-peak square wave control input signal, measured with servo-control bandwidth set to 240 Hz and 2 msec settling time. Note the crisp response to the square wave control signal.

Factory Installed Options

P-703.20

High-Vacuum Option (see p. 1-44)

P-840.95

Ball Tip (see page 1-44)

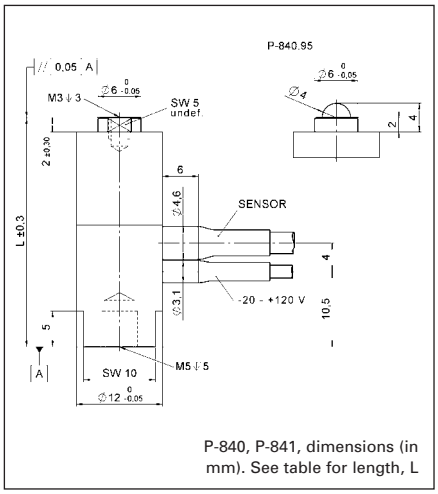
Accessories

P-176.20

Magnetic adapter with M3 threaded stud, see page 1-45. Extension cables & connectors: see page 6-55 in the "Piezo Drivers & Nanopositioning Controllers" section.

Notes

See the "Piezo Drivers & Nanopositioning Controllers" section for our comprehensive line of low-noise modular and OEM control electronics for computer and manual control.



P-840, P-841, dimensions (in mm). See table for length, L

Open-Loop

P-840.10	P-840.20	P-840.30	P-840.40	P-840.60	Units	Notes see page 1-46
15	30	45	60	90	µm ±20%	A2
-	-	-	-	-	µm	A5
-	-	-	-	-		B
- / 0.15	- / 0.3	- / 0.45	- / 0.6	- / 0.9	nm	C1
57	27	19	15	10	N/µm ±20%	D1
1000 / 50	1000 / 50	1000 / 50	1000 / 50	1000 / 50	N	D3
0.35	0.35	0.35	0.35	0.35	Nm	D6
1.5	3.0	4.5	6.0	9.0	µF ±20%	F1
12.5	12.5	12.5	12.5	12.5	µA/ (Hz x µm)	F2
18	14	10	8.5	6	kHz ±20%	G2
-20 to +80	-20 to +80	-20 to +80	-20 to +80	-20 to +80	°C	H2
VL	VL	VL	VL	VL		J1
-	-	-	-	-		J2
20	28	46	54	62	g ±5%	K
N-S	N-S	N-S	N-S	N-S		L
32	50	68	86	122	mm ±0.3	
C,G	C,G	C,G	C,G	C,G		

* Closed-loop models can attain linearity up to 0.15% and are shipped with performance reports.
** Resolution of piezo actuators is not limited by friction or stiction. Noise equivalent motion with E-503 amplifier;
*** Dynamic small-signal stiffness ~30% higher.