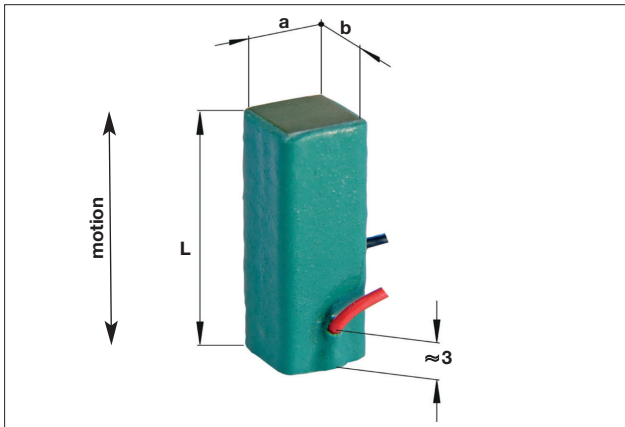




1. Cofired monolithic solid stacks PSt 150/axb/... (osi-type)



Actuator PSt with thick epoxy-coating

max. Voltage range -30V/+150V

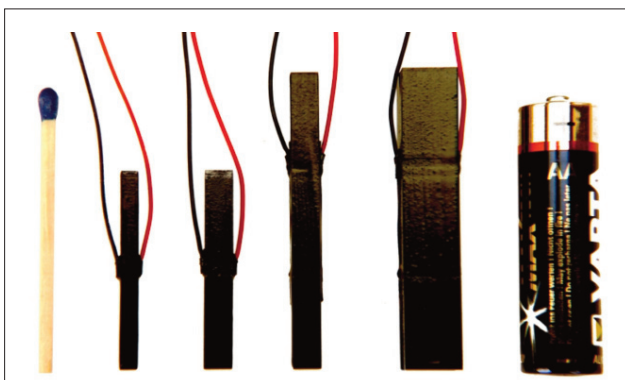
Dimensions a, b, L refer to ceramic body only,
coating not included

Length L: tolerance +/-0.1 mm

type osi-stack (+) $U_{\max}$ 150 V	ceramic- crosssection a x b /mm	length L ¹⁾ mm	max. stroke ²⁾ μm	capacitance nF	resonance frequency kHz	stiffness N/ μm	blockingforce ³⁾ N	max. load force N
PSt 150/2x3/5	2 x 3	5	6.5/5	100	150	45	300	300
PSt 150/2x3/7	2 x 3	9	13/9	170	100	25	300	300
PSt 150/2x3/20	2 x 3	18	28/20	420	50	12	300	300
PSt 150/3.5x3.5/7	3.5 x 3.5	9	13/9	350	100	50	800	800
PSt 150/3.5x3.5/20	3.5 x 3.5	18	28/20	800	50	25	800	800
PSt 150/5x5/7	5 x 5	9	13/9	800	100	120	1600	2000
PSt 150/5x5/20	5 x 5	18	28/20	1800	50	60	1600	2000
PSt 150/7x7/7	7 x 7	9	13/9	1400	100	240	3500	4000
PSt 150/7x7/20	7 x 7	18	28/20	3400	50	120	3500	4000
PSt 150/10x10/7	10 x 10	9	13/9	3000	100	500	7000	8000
PSt 150/10x10/20	10 x 10	18	28/20	6500	50	250	7000	8000
PSt 150/14x14/20	14 x 14	18	28/20	14500	47	500	15000	16000
PSt 150/25x25/20	25 x 25	18	28/20	32000	on request			

¹⁾ axis of motion ²⁾ -30V-150V // 0V-150V ³⁾ max. force for (-)30V-150V activation (blocking)

Combined longer stacks for increased stroke



27 mm, 36 mm, 54 mm ... on request

Monolithic stacks with modified PZT ceramic
formula for

high temperature operation,
reduced capacitance values

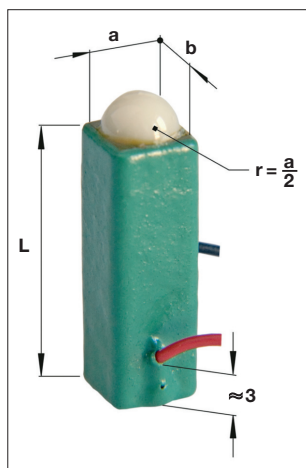
on request



Further specs and options

Spherical end pieces

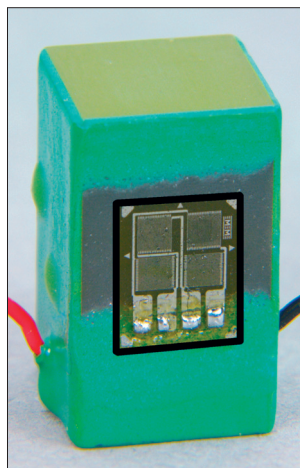
Half balls,
corundum Al_2O_3



Actor with spherical end-piece

Strain gages

for position detection
and feedback

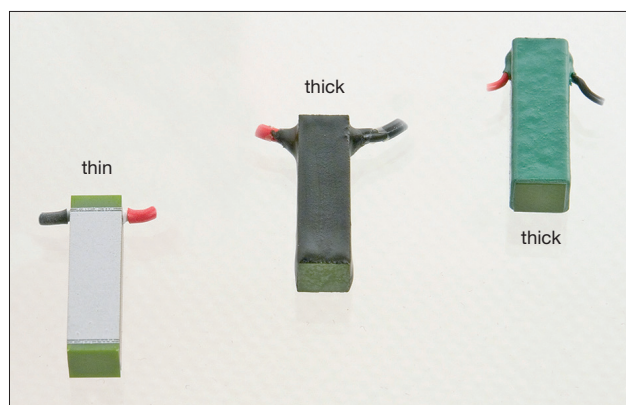


*4-element strain gage-bridge
configuration on a piezo stack
Typical gage resistance:
1.2 kiloOhms*

Coatings

Thin type (thickness approx 100 μm),
color grey/white order code g or w
for max. temperature range $\ll -50^\circ\text{C}$ thru 100°C
(120°C non-operating)

Thick type (thickness approx 0,5mm),
color green or black order code gr or bl
For mechanical ruggedizing
temperature range $> -50^\circ\text{C}$ thru 100°C
(120°C non-operating)



Different kinds of stack coatings

Cryogenic operation:

On request:

Special coating

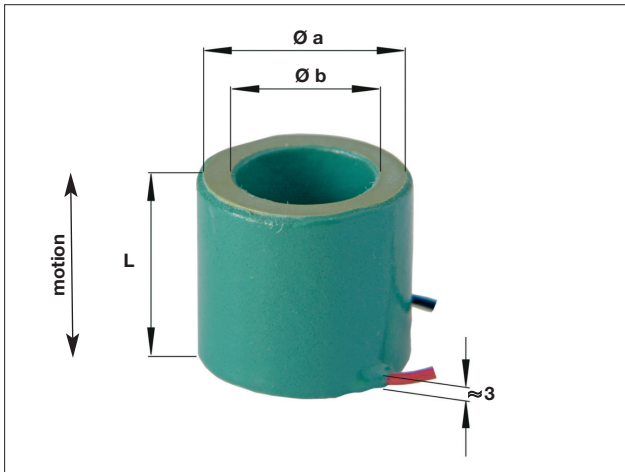
Electrical wiring: Kapton insulated manganin-wires
to minimize thermal heat conduction/thermal load to
cryostat

Vacuum compatibility: standard for all kinds of
coating, UHV on request

Special modifications: feel free to ask our
engineers for special solutions.



Cofired monolithic ring stacks HPSt 150/a-b/... (osi-type, tubular design)



Ringactuator HPSt 150/a-b/...

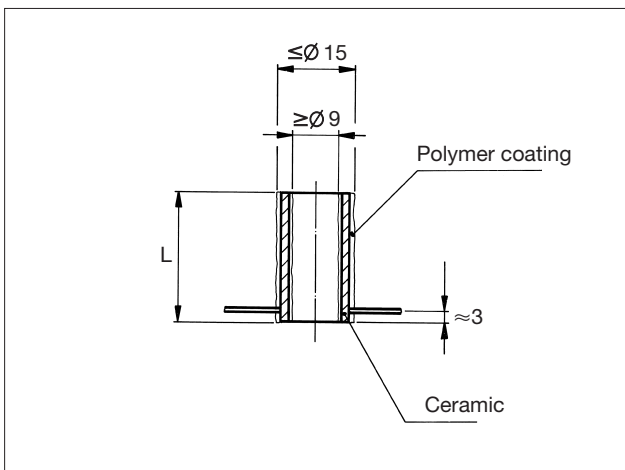
Voltage range -30V / +150V

Dimensions a,b, L: ceramic stack only
(no coating included)
L tolerance +/- 0.1 mm

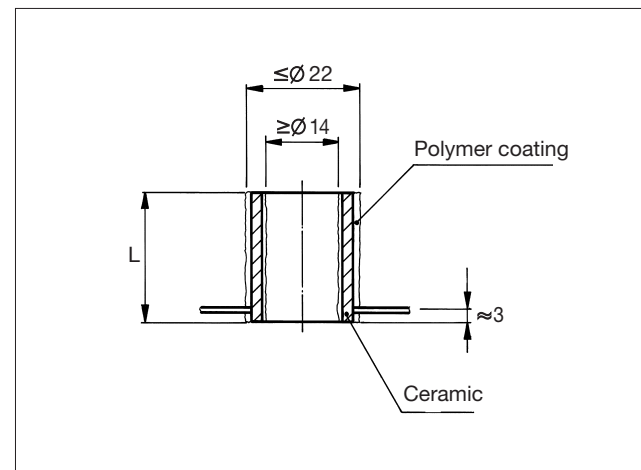
coatings: check page 4

type osi-stack (+) U_{max} 150 V	ceramic- crosssection a x b /mm	length L ¹⁾ mm	max. stroke ²⁾ µm	capacitance nF	resonance frequency kHz	stiffness N/µm	blockingforce ³⁾ kN	max. load force kN
HPSt 150/14-10/12	14 - 10	13.5	16/12	2600	75	250	4,5	7
HPSt 150/20-15/12	20 - 15	13.5	16/12	5300	75	450	8	12

¹⁾ axis of motion ²⁾ -30V-150V // 0V-150V ³⁾ max. force for (-)30V-150V activation (blocking)



Ringactuator HPSt 150/14 - 10/xx
free aperture 9 mm



Ringactuator HPSt 150/20 - 15/xx
free aperture 19 mm



Combined longer ring stacks HPSt150 for increased stroke



Ringactuators HPSt 150, various types

¹⁾Stroke A/B:

A: for -30V thru +150V

B: for 0V thru +150V

type	diameters mm	length L mm	¹⁾ max. stroke µm	capacitance µF	resonance Hz	stiffness N/µm
HPSt 150/14-10/25	14 – 10	27	30/25	5.2	20	120
HPSt 150/14-10/40	14 – 10	40.5	50/40	8	on request	

Max. load approx. 7 kNewtons

Blocking force: 4500 Newtons, (-)30V/+150V)

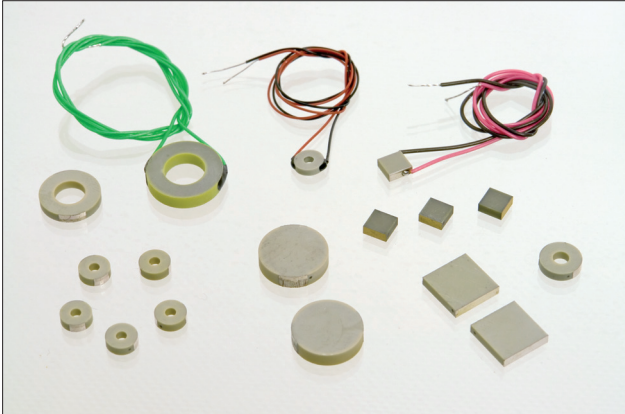
type	diameters mm	length L mm	¹⁾ max. stroke µm	capacitance µF	resonance Hz	stiffness N/µm
HPSt 150/20-15/25	20 – 15	27	32/25	10	22	230
HPSt 150/20-15/40	20 – 15	40.5	50/40	15	on request	

Max. load approx. 12 kNewtons

Blocking force: 8 kNewtons, (-)30V/+150V)



Flat piezo-chips and rings PCh150 / HPCh150 (isi technology)



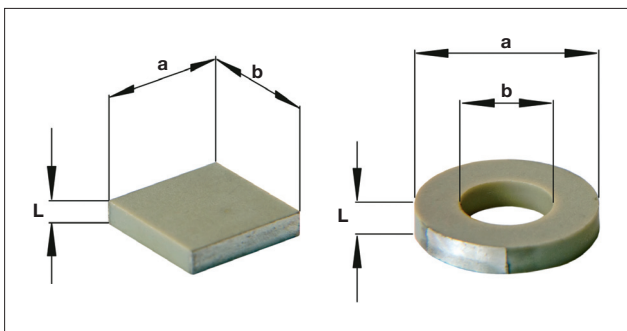
Piezo-chips

actor type solid-stacks	ceramic crosssection a x b / mm ²	thickness L ¹⁾ mm	max. stroke ²⁾ µm	capacitance nF	resonance- frequency kHz	stiffness N/µm	blockingforce ³⁾ N	max. load force N
(+) U _{max} 150 V PCh 150/3x3/2	3x3	2	>3/>2	30	>500 kHz	190	500	500
PCh 150/5x5/2	5x5	2	>3/>2	110	>500 kHz	500	1500	2000
PCh 150/7x7/2	7x7	2	>3/>2	240	>500 kHz	1000	3000	5000
PCh 150/10x10/2	10x10	2	>3/>2	480	>500 kHz	1900	6000	10000
ring-chips (+) U _{max} 150 V	diameters a - b							
HPCh 150/6-2/2	6-2	2	>3/>2	110	>500 kHz	400	1500	2000
HPCh 150/8-3/2	8-3	2	>3/>2	200	>500 kHz	900	2500	4000
HPCh 150/10-5/3	10-5	3	>4/>3	375	>300 kHz	900	3000	4500
HPCh 150/12-6/2	12-6	2	>3/>2	500	>500 kHz	1400	5000	5000
HPCh 150/15-8/3	15-8	3	>4/>3	790	>300 kHz	1800	7000	10000

¹⁾ direction of expansion

²⁾ semi-bipolar/unipolar activation

³⁾ blocking force = max. force generation defined for max. semi-bipolar operation



Piezo-chips PCh, HPCh

Dimensions: a, b, L

tolerances: a, b +/- 0.3 mm, L +/- 0.1 mm

Maximum voltage ranges

PCh 150: -30 V/+150 V

Temperature range

-273 °C thru approx. +130 °C

Surface insulation

buried electrode, no coating

wiring on request: insulation: teflon, kapton



Further specs and options

Strain gages

for position detection and feedback: ask for details

Coatings

Thin type: (approx 100 μm), color grey/white
for max. temperature range $< -50^\circ\text{C}$ thru 100°C
(120°C non operating)

Thick type: (approx 0,5mm), color green or black
mechanically ruggedized version
temperature range $> -50^\circ\text{C}$ thru 100°C
(120°C non-operating)

Cryogenic operation

Special coating

Electrical wiring

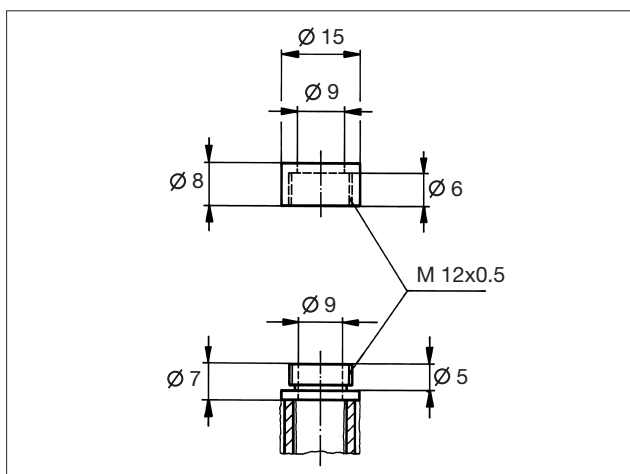
Kapton insulated manganin-wires to minimize
thermal heat conduction / thermal load to cryostat

Special modifications

feel free to ask our engineers for special solutions

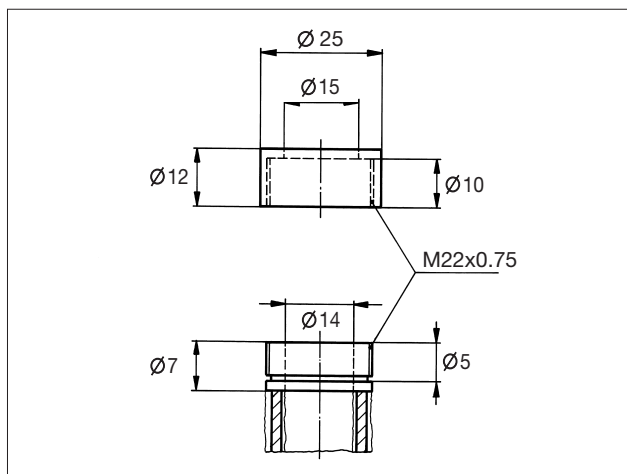
Threaded endpiece HAg 9 for HPSt 150/14 – 12/xx

free aperture 9 mm



Threaded endpiece HAg 14 for HPSt 150/20 – 15/xx

free aperture 14 mm



Optic adaptors 0A1/2" and 0A1";
see Chapter Accessories