

## ring actuators

### series R and RA

- motion up to 50  $\mu\text{m}$
- free inside diameter (9 mm to 14 mm)
- sub nm-resolution
- blocking force up to 4000 N
- $\mu\text{sec}$  response time
- flexible epoxy insulation

#### applications:

- micro positioning
- laser beam steering
- scanning systems for atomic force microscopes
- piezoelectrical pumps
- fiber positioning
- laser tuning



fig.: RA 14/24 SG  
with including mirror fastener

#### Concept

Piezoelectric ring actuators consist of a large number of contacted ceramic rings. Based on their design they provide a 9 mm or 14 mm free inside diameter. Those make them especially suitable for integration into the laser beam line.

Ring actuators are available with housing, series RA, and without housing, series R.

The R series of actuators are not pre-loaded. They are not suitable for dynamic applications. The RA series of actuators are internally pre-loaded by a mechanical spring making them ideal for dynamic applications.

As an option actuators of the series RA, are available with strain gage sensor for motion control.

#### Specials

A free inside diameter makes these actuators especially suitable for all optical applications such as laser beam steering or other mechanical components.

Compared with a small tube actuator the ring actuator achieves a higher stiffness and double extension.

The ability to generate a large force and be subjected to high mass loading make them particularly useful for machine tools and dynamic scanning systems.

Actuators with housing are always delivered with mirror fastener.

#### Mounting/Installation

Actuators without housing (Series-R) will be glued. They can be connected on the ceramic top and ground plate only.

During installation and use, it is important not to subject the actuator tip to non axial forces.

Actuators with housing (Series-RA) are normally fastened with screws or clamps to the bottom plate. They can also be assembled on housing directly.

Please avoid tensile forces greater than the given pre-load!

**technical data:**  
**ring actuators without casing and without preload**

series R	unit	R 12/14	R 25/14	R 50/14	R 12/20	R 25/20	R 50/20
part no.	-	P-401-00	P-402-00	P-405-00	P-403-00	P-404-00	P-406-00
motion open loop ( $\pm 10\%$ )*	$\mu\text{m}$	12	25	50	12	25	50
capacitance ( $\pm 20\%$ )**	$\mu\text{F}$	2.9	5.8	11.6	6.0	12.0	24.0
resolution open loop***	nm	0.03	0.05	0.1	0.03	0.05	0.1
stiffness	N/ $\mu\text{m}$	160	80	40	330	160	80
blocking force	N	2000	2000	2000	4000	4000	4000
voltage range	V	- 20 ... + 130					
height (H)	mm	13.5	27	54	13.5	27	54
outer diameter D2	mm	14	14	14	20	20	20
inner diameter D1	mm	9	9	9	14	14	14
weight	g	8	16	32	14	28	56

**technical data:**  
**ring actuators with casing and with preload**

series RA	unit	RA 12/24	RA 25/24	RA 50/24	RA 12/35	RA 25/35	RA 50/35
part-no.		P-401-10	P-402-10	P-405-10	P-403-10	P-404-10	P-406-10
motion open loop ( $\pm 10\%$ )*	$\mu\text{m}$	12	25	50	12	25	50
capacitance ( $\pm 20\%$ )**	$\mu\text{F}$	2.9	5.8	11.6	6.0	12.0	24.0
resolution open loop ***	nm	0.03	0.05	0.1	0.03	0.05	0.1
resonant frequency	kHz	18	11	6	18	11	7
stiffness	N/ $\mu\text{m}$	160	80	40	330	160	80
blocking force	N	2000	2000	2000	4000	4000	4000
pre-load	N	300	300	300	500	500	500
voltage range	V	- 20 ... + 130					
connector	voltage	LEMO 0S.302					
cable length	m	1.0					
thread (t)		M12x0,5	M12x0,5	M12x0,5	M18x0,5	M18x0,5	M18x0,5
length (l)	mm	36.5	49	70.5	36.5	49	70.5
outer diameter D2	mm	24	24	24	35	35	35
inner diameter D1	mm	9	9	9	14	14	14
spanner flats	mm	20	20	20	24	24	24
weight	g	75	95	140	145	185	265
series RA with integrated measurement system	unit	RA 12/24SG	RA 25/24 SG	RA 50/24 SG	RA 12/35 SG	RA 25/35 SG	RA 50/35 SG
part-no.		P-401-11	P-402-11	P-405-11	P-403-11	P-404-11	P-406-11
motion closed loop ( $\pm 0.2\%$ )	$\mu\text{m}$	10	20	40	10	20	40
resolution closed loop	nm	0.5	1.0	2.0	0.5	1.0	2.0
typ. repeatability	nm	6	8	10	6	8	10
connector	voltage	LEMO 0S.302					
	sensor	LEMO 0S.304					
cable length	m	1.2					

\* typical value measured with NV 40/1 CLE amplifier.

\*\* typical value for small electrical field strength.

\*\*\* the resolution is only limited by the noise of the power amplifier and metrology.

**recommended controller:**

without SG feed back sensors	12V40	E-440-011
	30V300	E-460-011
with SG feed back sensors	NV40/1CLE	E-101-7X

**Please pay attention to our “notes for mounting”, which are available as download on our homepage.**