PI

DuraAct Piezoelectric Patch Transducer

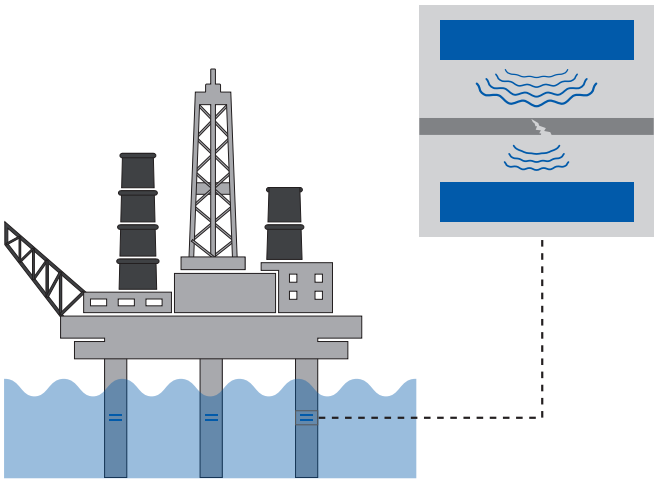
FLEXIBLE, EFFICIENT, DURABLE

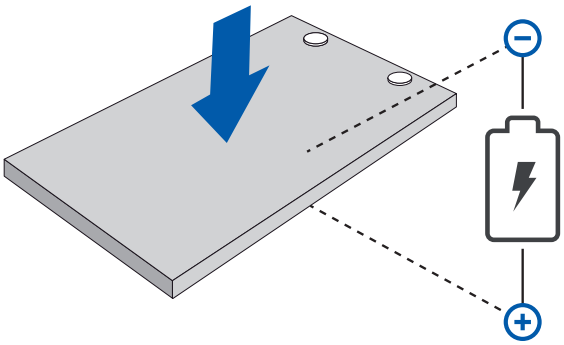
Versatile in Application

Efficient in Use

Structural Health Monitoring

When monitoring components, piezo transducers are used to measure deformations, e.g. the monitoring of weld seams on components that are difficult to access. Entire areas can be actively monitored by some of the transducers acting as wave-generating actuators, while other modules acting as sensors pick up these waves. Disturbances within a component, e.g. microcracks, are detected by comparison with reference signals from the undamaged system.



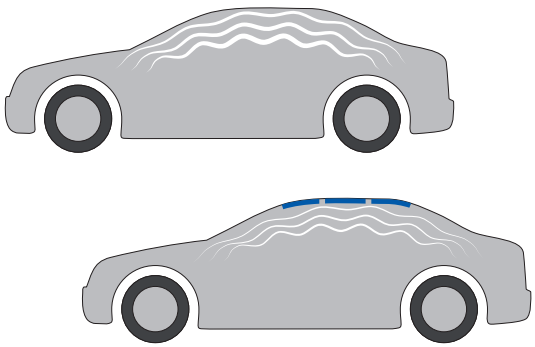


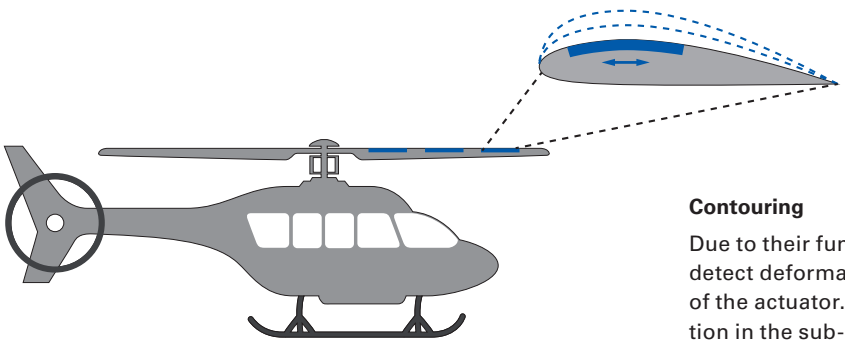
Energy-Autarkic Systems

DuraAct Patch Transducers use the direct piezoelectric effect to generate electricity – they convert the energy from vibrations and air currents, force changes or mechanical deformations into electricity and thus enable a self-sufficient supply of small electrical consumers such as sensors or radio transmitters.

Active Vibration and Sound Insulation

DuraAct Patch Transducers work both as a sensor and as an actuator and can thus dampen undesired vibrations. The phase-shifted sensor signal can also be used as voltage supply for the same piezo element.

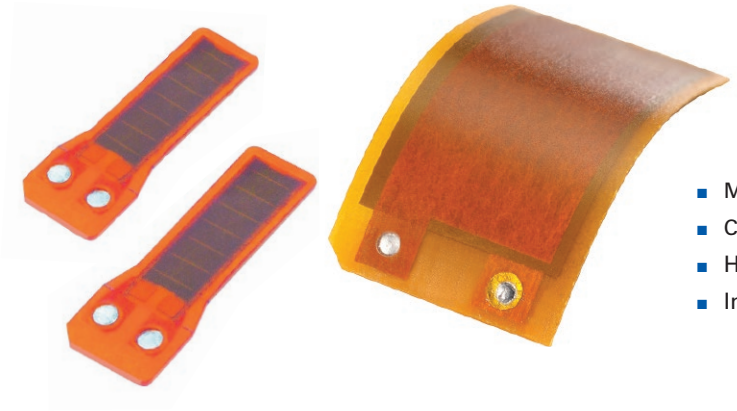




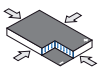
Contouring

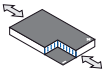
Due to their function as sensors, DuraAct Patch Transducers detect deformations that are counteracted by the control of the actuator. This enables high-precision contour deformation in the sub-micrometer range.

DuraAct Patch Transducer



- Minimum bending radii up to 12 mm
- Compact design
- High bandwidth
- Individual solutions





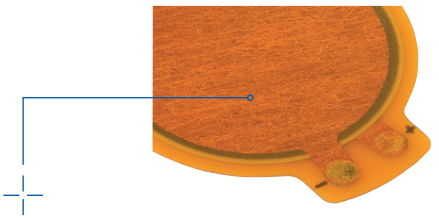
		DuraAct Patch Transducer				DuraAct Power Patch Transducer	DuraAct Shear Patch Transducer
		P-876.A11	P-876.A12	P-876.A15	P-876.SP1		
	Operating voltage range [V]	-50 to 200	-100 to 400	-250 to 1.000	-100 to 400		
Motion & positioning	**Min. lateral/axial deformation [µm/m]**	400	650	800	650		
	Rel. lateral/axial deformation [µm/V]	1,6	1,3	0,64	1,3		
Mechanical properties	**Blocking force [N]**	90	265	775	280		
	Min. bending radius [mm]	12	20	70	-		
Drive properties	**Electrical capacitance [nF]**	150 ± 20 %	90 ± 20 %	45 ± 20 %	8 ± 20 %	Customized development on request	
	Piezoceramic material	PIC255	PIC255	PIC255	PIC255		
	Active piezoceramic thickness [µm]	100	200	500	200		
Miscellaneous	**Contacting**	Solder points	Solder points	Solder points	Solder points		
	Dimensions L x W x D (mm)	61 × 35 × 0,4	61 × 35 × 0,5	61 × 35 × 0,8	16 × 13 × 0,5		
	Recommended electronics	E-413, E-821, E-835	E-413, E-821, E-835	E-413, E-821, E-835	E-413, E-821, E-835		

Combined with suitable electronics, DuraAct Patch Transducers are the ideal solution for highly dynamic precise actuators with nanometer accuracy – discover our controllers at **www.piceramic.com**

Your Requirements

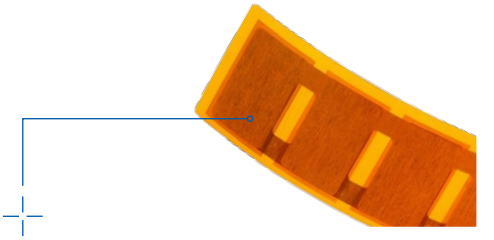
Your Customized Modification

DuraAct Patch Transducers are manufactured in a wide variety of shapes. Whether special geometries or electronics – we are happy to adapt our product to your application.



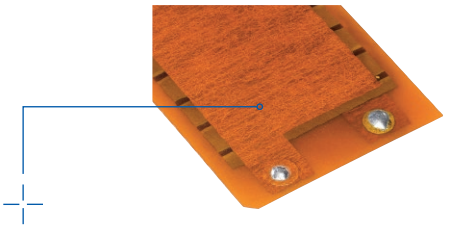
Dimensions and Geometries

- Broad selection
- Flexibility depending on the height of the piezoceramics
- Alternative piezoceramic materials on request



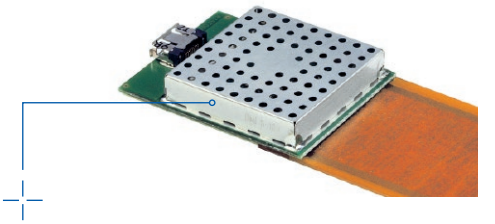
Arrays

- Incorporation of several DuraAct Patch Transducers in one laminate possible
- Contacting together or individually
- Piezoceramic construction in several layers for use of the DuraAct Patch Transducer as actuator and sensor



Electrical Connections

- Standard products with pre-tinned solder pads
- Customer-specific contacting variants with wires or strands possible

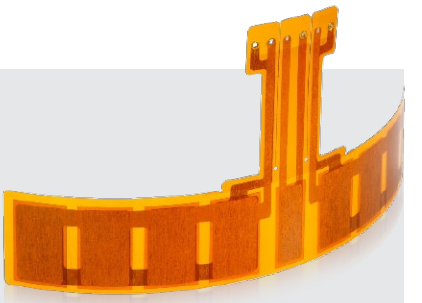


Special Electronics for Sensor Applications

- Electronic modules can be mounted close to the converter, e.g. for processing sensor data or controlling the DuraAct Patch Transducer
- Contacting via solder pins or mini plugs

Production with Know-how from the Space Industry

The piezoelectric plates of the DuraAct Patch Transducers are embedded in fiber-reinforced plastic (GRP) using a patented process and bonded to form a composite. Our partner INVENT takes over the joining process: A vacuum injection process produces completely bubble-free laminates of the highest quality. The curing temperature profile of the autoclave used for this purpose is selected in such a way that a defined internal preload of the piezoceramic plates is created. The polymer coating of the GRP serves simultaneously as electrical insulation and mechanical pretension.



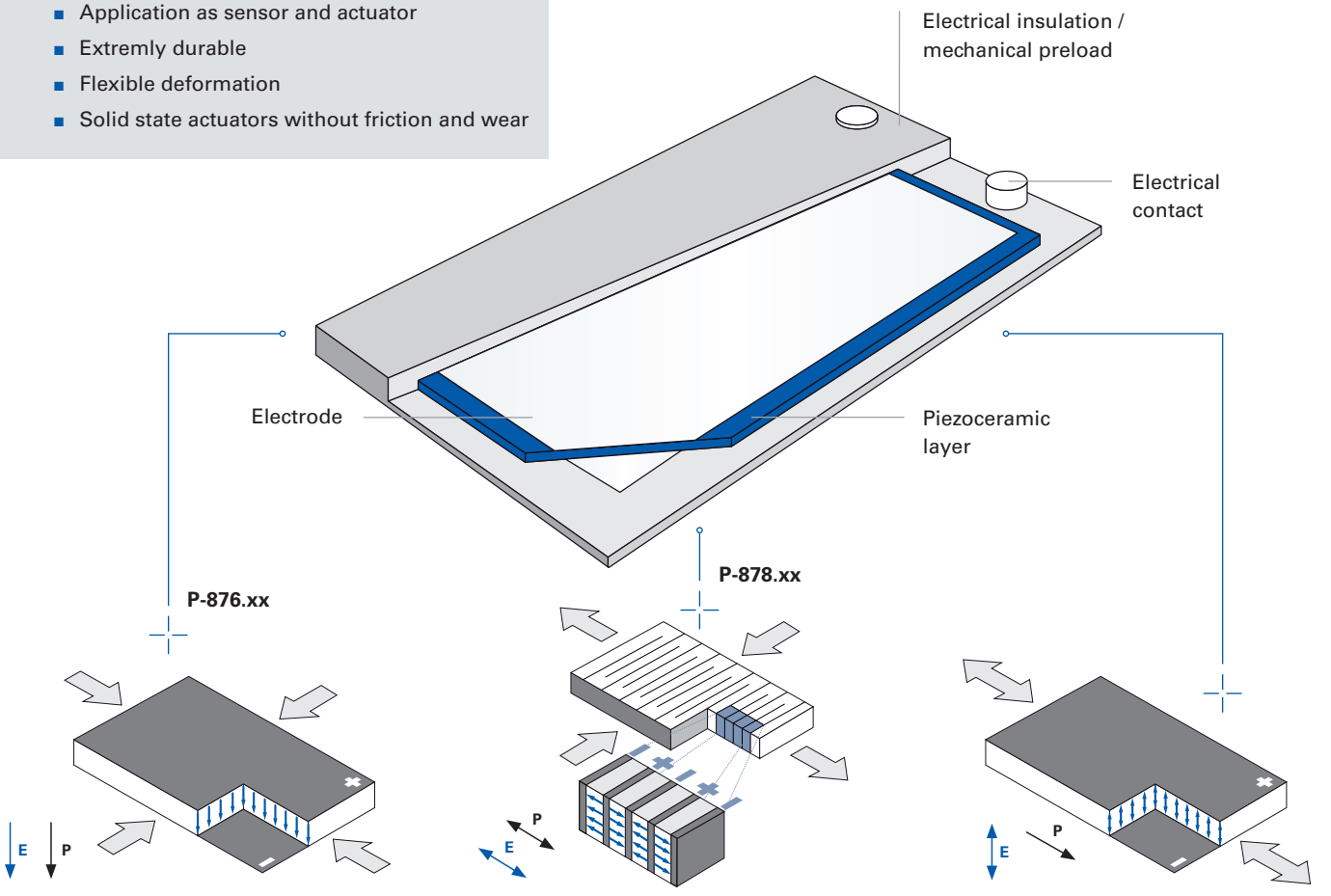
INVENT GmbH Braunschweig is a recognized lightweight construction specialist for innovative fiber composite technologies in the aerospace industry and develops and produces high-precision structural components for PI Ceramic, among others.

DuraAct Patch Transducers

Piezo Ceramics as Flexible Composites

DuraAct Patch Transducers are composites of one or more thin piezoceramic plates in a patented laminate structure: Piezo components equipped with electrodes are electrically insulated and mechanically pre-stressed by a polymer outer surface. Depending on the application, strands can be soldered, glued or clamped at two contact points. If the patch transducer is to have a separate sensor or actuator functionality, several layers are contacted separately.

- Application as sensor and actuator
- Extremly durable
- Flexible deformation
- Solid state actuators without friction and wear



DuraAct Patch Transducers

- Longitudinal and transversal contraction or expansion of the patch transducer
- Moderate deflection up to max. 800 µm/m
- Minimum bending radii up to 12 mm
- Voltage range up to max. 1,000 V

DuraAct Power Patch Transducers

- Longitudinal deflection in transverse contraction
- High axial deflection up to max. 1,200 µm/m
- Greater efficiency through multilayer design
- Voltage range up to max. 120 V

DuraAct Shear Patch Transducers

- Shear movement of the patch transducer
- Generation of surface acoustic waves
- Voltage range up to max. 500 V

Learn more about DuraAct technology at **www.piceramic.com**

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