

M E D I C A L

Ultrasonic Technology for  
Medical Applications

# Langevin Transducers and Drive Circuits

# Langevin Transducer and Drive Circuit

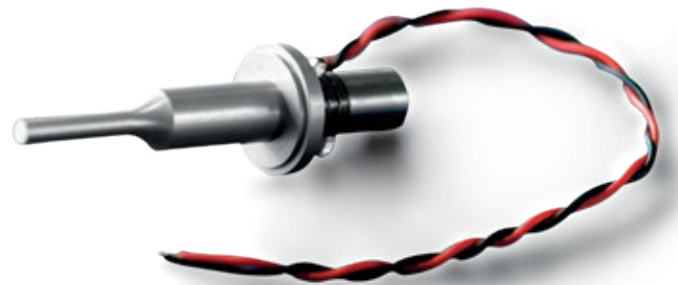
CeramTec specialises in the design and manufacture of transducers for a variety of medical and industrial applications. Utilising CeramTec's speciality Piezo ceramic rings combined with high quality materials and manufacturing processes, our design engineers have created a standard 40kHz transducer that is capable of delivering high quality performance and reliability in your application.

## Applications include

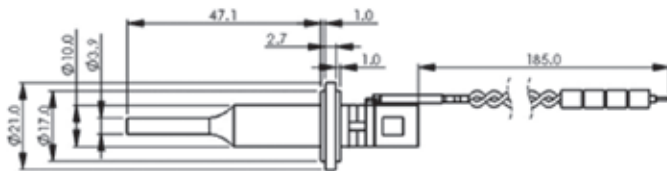
- Molecular diagnostics
- Ultrasonic mixing and stirring
- De-gassing

## Customisable for surgical devices

- Ultrasonic scalpels
- Dental descalers
- Phaco-emulsification



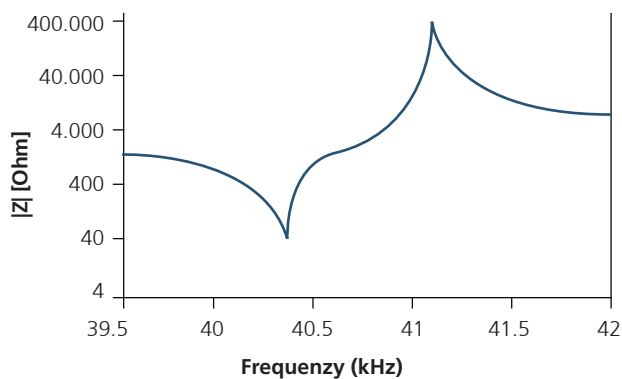
## Transducer Characteristics



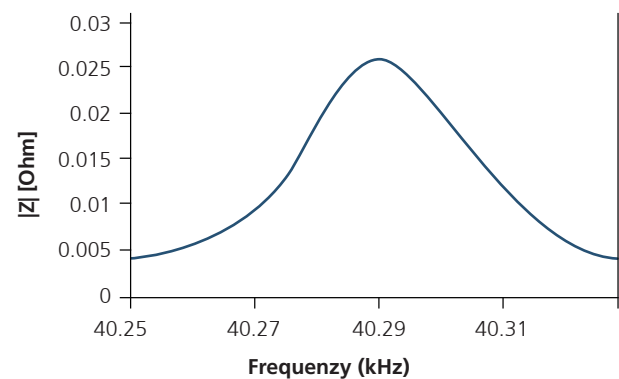
## Transducer Specifications

Resonant Frequency	40 kHz $\pm$ 0.3 kHz
Resonant impedance	50 $\Omega$ MAX
Maximum peak – peak displacement	38 $\mu$ m
Capacitance	1100 – 1300 pF MIN
Horn magnification	6.6
Max power consumption	3 W
Phase margin	750 Hz @ 40 kHz
Qm	3500

## Frequency vs. Impedance



## Conductance vs. Frequency





### Customisation

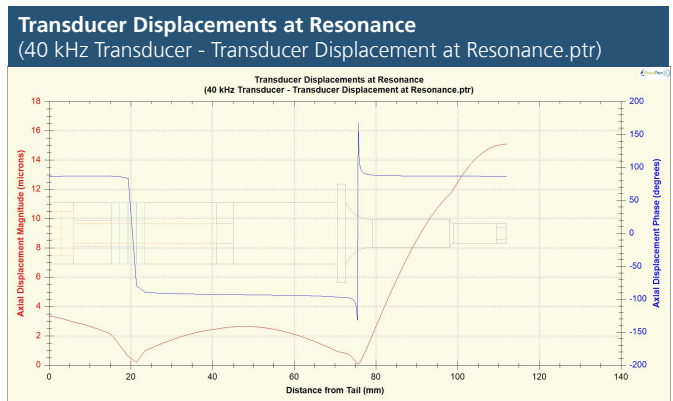
Our transducer research and development team is dedicated to working with customers to find solutions to their problems. Using top of the range tools such as 3D Finite Element analysis they can virtual prototype transducers cutting down development time considerably before creating and finetuning solutions. Our design engineers can adjust the architecture, materials and manufacturing processes used to create solutions that match with your exact requirements.

### Drive Circuit Part Number 90710

A stand-alone circuit board can be purchased to efficiently drive these transducers. The circuit board comes unpackaged and hence allows for easy integration into your machine’s control system and can then be cabled directly to the transducer.

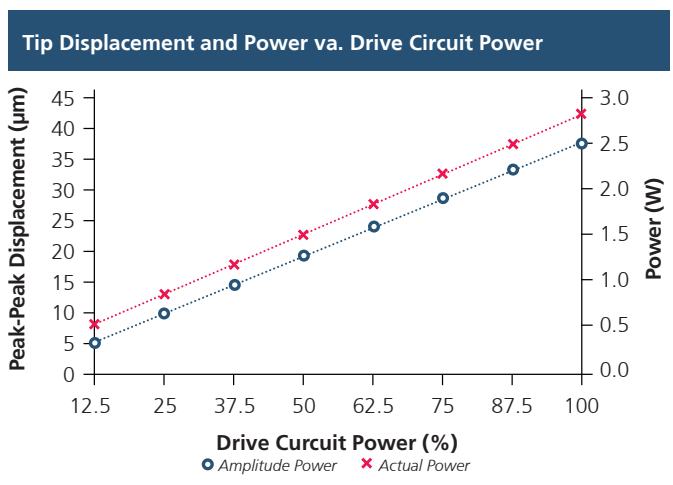
### Features and Benefits:

- The drive circuit tracks key transducer parameters to ensure optimal performance and to maintain a pre-determined constant vibrational amplitude, under a variety of drive and load conditions.
- Three output ports located on the drive circuit allow for the drive frequency, voltage and current to be monitored during operation.
- The drive circuit conducts self-testing measures to identify specific fault conditions. If a fault is detected an alarm is raised.
- The board is designed to meet the requirements of a variety of common ISO standards associated with industrial equipment.
- The power applied to the transducer can be easily controlled using an analogue variable control which varies the power on a 0-100% scale.
- The drive circuit produces a liner relationship between power and amplitude, allowing for precision control of the output tip displacement



Drive Circuit Specifications	
Operating frequency	40 kHz (nominal)
Operational mode	Continuous drive
Maximum drive current	200 mA RMS @ 40 kHz
Supply voltage	24 Vdc
Power control	Analogue variable between 0% and 100%
Monitoring outputs	Frequency (kHz)   Voltage (Vdc*)   Current (Vdc*)
System error self-diagnostics	Yes

\* dc propotional (0-100% Scale)



A demo kit (120 -240Vac supply) can be provided to demonstrate the drive circuit performance.

**CeramTec**  
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*The measured values mentioned before were determined for test samples and are applicable as standard values. The values were determined on the basis of DIN-/DIN-VDE standards and if these were not available, on the basis of CeramTec standards. The values indicated must not be transferred to arbitrary formats, components or parts featuring different surface qualities. They do not constitute a guarantee for certain properties. We expressly reserve the right to make technical changes.*