ACOUSTIC CONTROL SYSTEMS

Electromagnetic acoustic transducer S7392

DATA SHEET

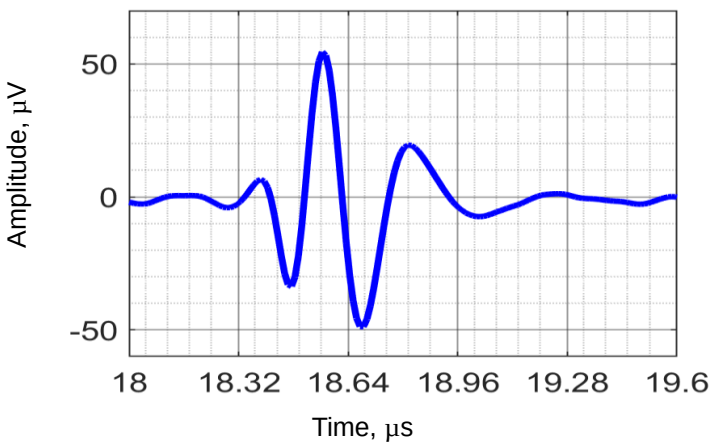
Transducer type:	**normal beam, EMAT transducer with permanent magnet for generating ultrasonic shear waves with radial polarization.**
Nominal frequency:	**4 MHz**
Effective aperture diameter	**10 mm**
Inspection range:	**1 up to 100 mm (when using A1270 EMAT)**
Lift-off / through-coating thickness:	**up to 1 mm (for inspection range up to 50 mm)**
Maximal excitation pulse voltage:	**500 V**
Direct current resistance if signal inductor:	**1.5 ± 0.3 Ohm**
Operating temperature range:	**from -20 to +60 °C**
Extended operating temperature range:	**from -20 to +800 °C (when using high-temp ACS probe holder)**
Overall dimensions:	**35x58 mm**
Type of socket:	**LEMO ERN.00.250**
Weight:	**255 g**

MEASUREMENT CONDITIONS AND EQUIPMENT

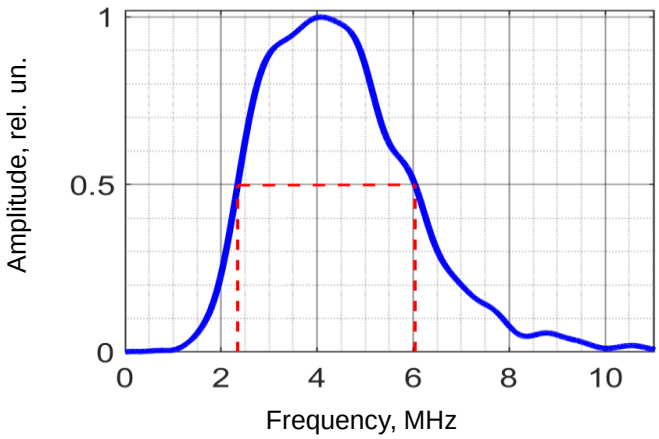
Reference excitation signal: unipolar square pulse with amplitude 400 V ± 40 V, pulse duration 200 ± 13 ns by 50% of the maximum voltage amplitude.
Calibration specimen: CO-2 made of steel 20, serial number 006, longitudinal wave velocity 5930 m/s, shear waves velocity 3247 m/s.
Measured pulse: echo pulse from the backwall of CO-2, depth 30 mm.
Induced noise: white thermal noise with 2 mV effective amplitude, generated in inductor coil placed adjacent to the protector of the transducer.

MEASURED CHARACTERISTICS

Shape of the measured echo pulse



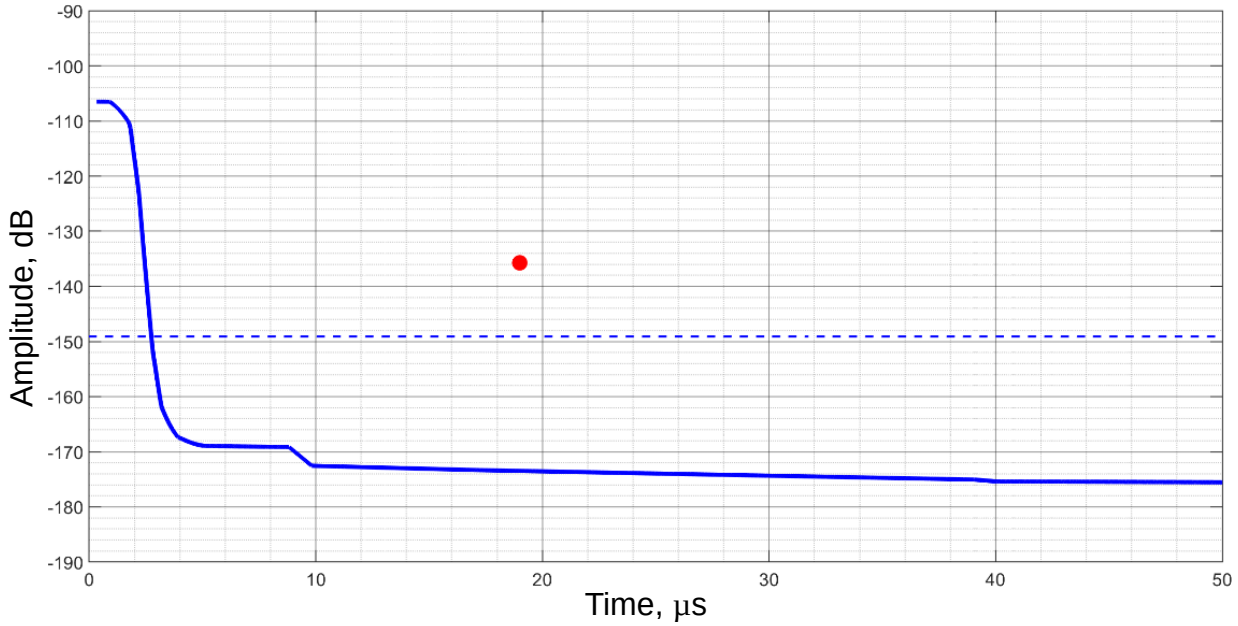
Amplitude frequency response



Echo pulse duration:	**0.73 µs**
Echo pulse amplitude: A_e:	**58.2 µV**
Bandwidth Π:	**3.2 MHz**
Relative bandwidth B_w:	**81%**

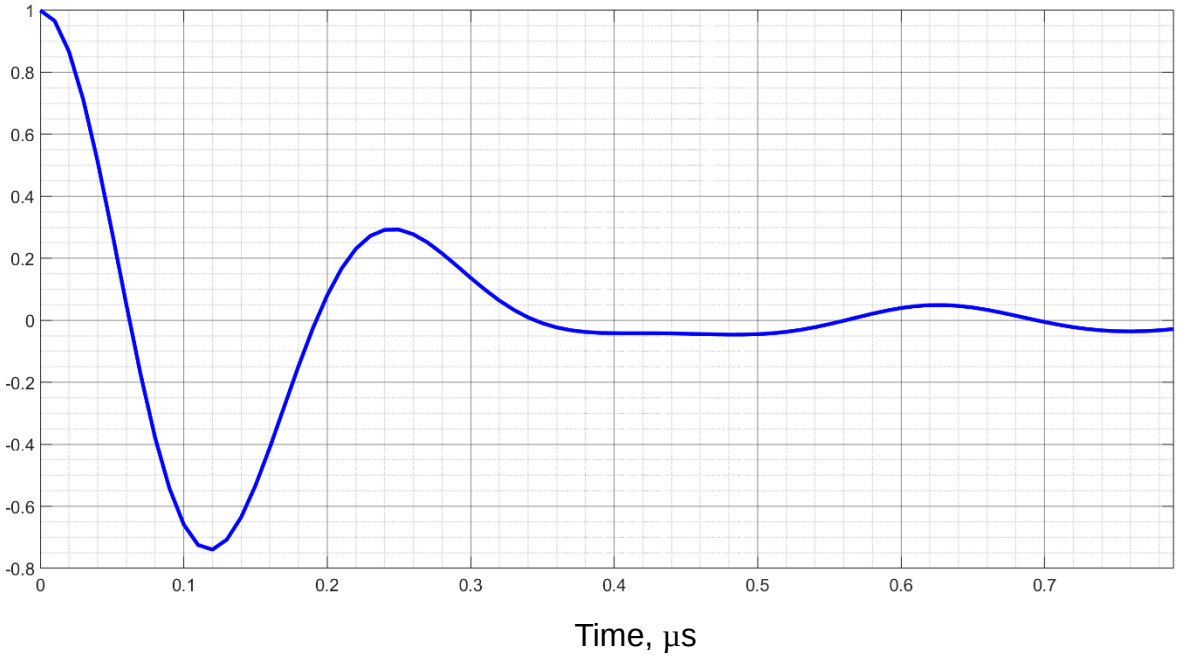
Peak frequency f_p:	**3.4 MHz**
Lower cut-off frequency f_l:	**2.4 MHz**
Upper cut-off frequency f_u:	**5.6 MHz**
Centre frequency f_c:	**4 MHz**

Reverberation noise curve (RNC)



Signal-to-noise ratio between the backwall signal in the reference block and transducer self-noise: 38 dB
Signal-to-noise ratio between the backwall signal in the reference block transducer self-noise in presence of electromagnetic noise: 13 dB
RNC level at 5 μs: -169 dB

Autocorrelation function (ACF)



Amplitude of the first maximum of ACF: **0.29**
Time position of the first maximum of ACF: **0.25 μs**

Note:

The RNC is normalized by test excitation signal amplitude and is given in logarithmic scale. Transducer RNC is indicated by the solid line. The dash line shows the amplitude of induced noise in sum with the RNC. The dot indicates the echo pulse amplitude received on the CO-2 specimen.