ACOUSTIC CONTROL SYSTEMS

Ultrasonic piezoelectric transducer S3750 1.0A0D30CL
DATA SHEET

Main technical specifications

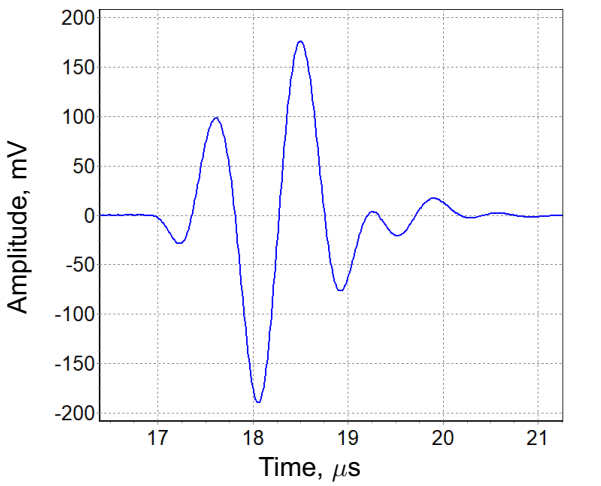
Transducer type:	Contact straight beam single
Nominal frequency:	1 MHz
Nominal echo pulse duration:	3 μs
Nominal relative band width:	70 %
Nominal sensitivity:	-50 dB
Piezoelement diameter:	30 mm
Nominal echo pulse delay in protector:	0.1 μs
Nominal piezoelement capacity:	5200 $\pm$ 200 pF
Connector type:	LEMO 00.250
Operation temperature range:	from -20 to +50 °C
Dimensions:	36$\times$40 mm
Weight:	220 g

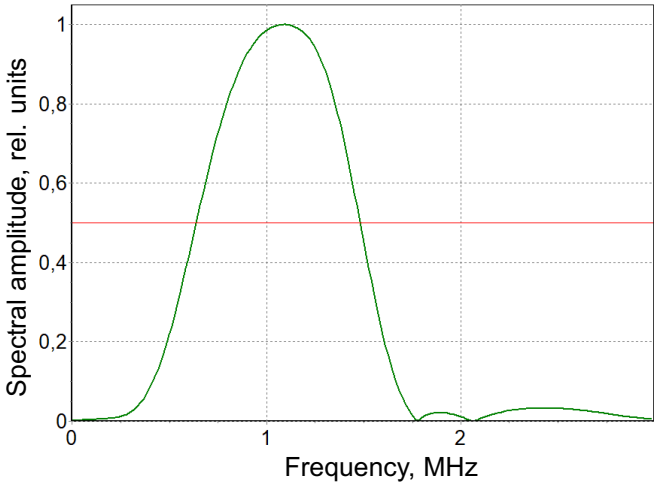
Measurement conditions and used equipment

Excitation:	Rectangular pulse with amplitude 20 V and duration **500 ns**, equal to half-period of nominal frequency oscillations.
Reciever:	Amplifier with 0.01-15 MHz bandwidth and 400 Ω input impedance. Effective noise level, normalized to the amplifier input level, is less than 20 μV.
Damping resistor:	100 Ω (connected in parallel to the transducer).
Cable:	Single LEMO-LEMO with wave resistance 50 Ω and 1.2 m length.
Calibration block:	Calibration block CB002-2 from a set of ultrasonic samples of thickness and ultrasonic wave velocity, ser. No. 004. Calibration certificate 0930220 of 17.02.2020. Longitudinal wave velocity 5918 m/s, thickness 50 mm (dimensions 230$\times$120$\times$50 mm).

Measurement results

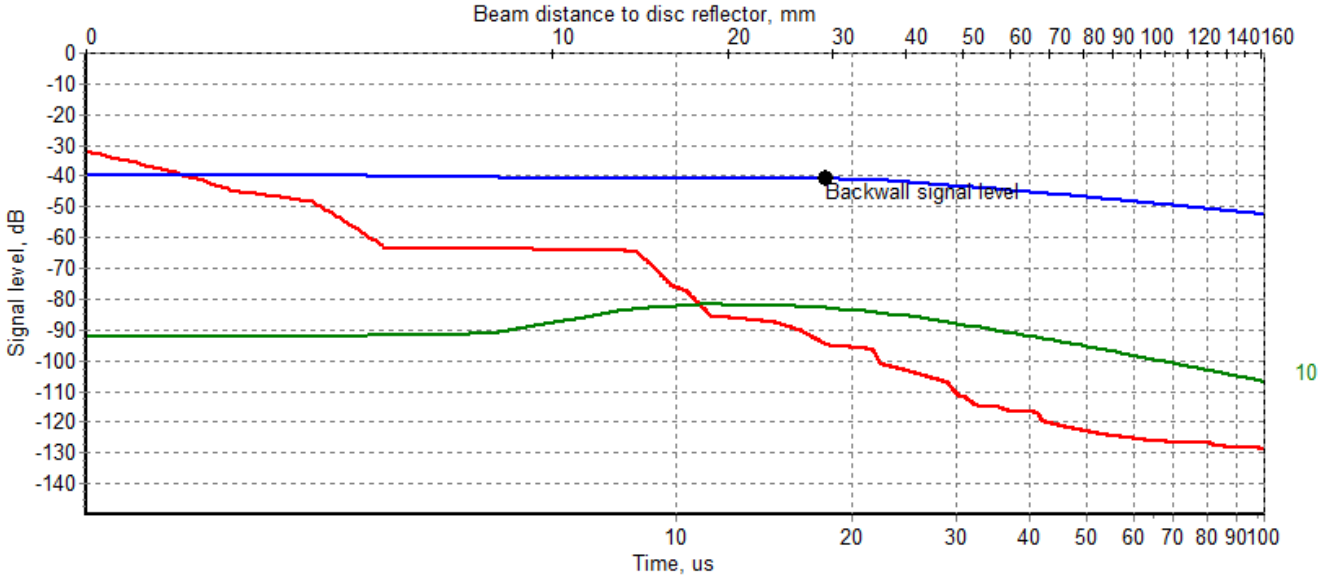
Backwall echo pulse for 50 mm thickness and its spectrum





Reverberation-noise characteristics (RNC) of the tranducer without acoustic load and DGS diagram for flat bottomed reflectors with area 1, 3 and 10 mm^2

The level of 0 dB corresponds to the amplitude of the transducer excitation pulse.



Calculated parameters and acceptance results

Parameter	Value	Tolerance	Result
Work frequency (Mean of border spectrum frequencies) **, MHz**	**1.1**	0.8 – 1.2	**+**
Echo pulse duration (at -20 dB level from maximum) **, μs**	**2.42**	<= 3	**+**
Relative spectrum bandwidth (at -6 dB level) **, %**	**76**	50 – 90	**+**
Sensitivity (bottom echo pulse and excitation pulse amplitudes' ratio), **dB**	**-41**	>= -50	**+**
Sensitivity margin above the RNC in the time interval 2 - 50 μs according to ADD for reflector area of 1 mm^2, dB	**46**	>= 40	**+**
Echo pulse amplitude, mV	**176**	—	
Delay, μs	**1.1**	—	
Spectrum maximum frequency, MHz	**1.1**	—	
Lower spectrum frequency (at -6 dB level) **, MHz**	**0.6**	—	
Upper spectrum frequency (at -6 dB level) **, MHz**	**1.5**	—	
Spectrum bandwidth (at -6 dB level) **, MHz**	**0.8**	—	
Amplitude of the first maximum of the 1st lobe of aouto-correlation function(ACF)	**0.47**	—	
Time position of the maximum of the 1st lobe of ACF, μs	**0,41**	—	