



7952 Nieman Road, Lenexa, KS 66214-1560 USA  
Phone: 913-685-0675, Fax: 913-685-1125  
[www.ndtsupply.com](http://www.ndtsupply.com), [sales@ndtsupply.com](mailto:sales@ndtsupply.com)

## UT Probes

Doppler designed a series of standard probes, customized probes and relevant accessories, in total more than 4000 models. Probes are widely used in aerospace, nuclear power, oil and gas, mechanical manufacturing, shipping industry, railway transportation, medicals and so on, and used on a variety of projects around the world. With more than 10 years transducer design experiences and keep improving manufacturing process to ensure high performance and reliability of products. Doppler keep bringing in talents, investing in R&D, testing and production facilities. From ultrasonic field distribution to transducer stack up design, Doppler keep innovating and progressing to bring better products and services to clients.

This manual collects most standardized transducer products, you can find almost all models you need; For customized products or unsolving difficult subjects, our application and transducer specialists are very pleased to help to find the viable solutions.

## Instruction of Conventional UT Probes

- Ultrasonic Probe is the most essential part of ultrasonic detection systems, to choose the right probe can ensure a smooth detection work and accuracy of test results
- Doppler provides three different kinds of performance probes, with unique application and performance characteristics
- Below shows transmitter, configuration, cable, crystal frequency, crystal size etc., characteristics and applications of three types of probes

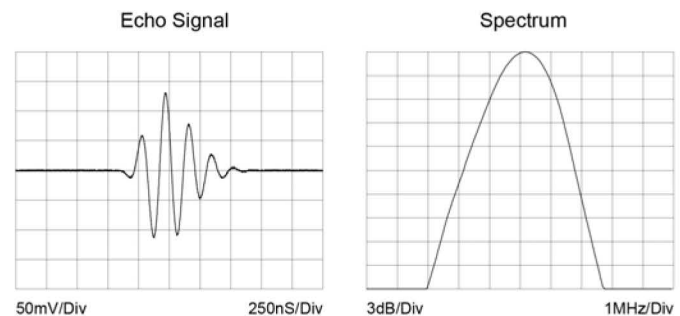
### PL - Universal Series

#### Applications

- General inspection environments

#### Features

- With appropriate sensitivity and resolution
- Longer duration of wave, typically at 3~5 cycles
- Lower bandwidth, typically at 35~50%



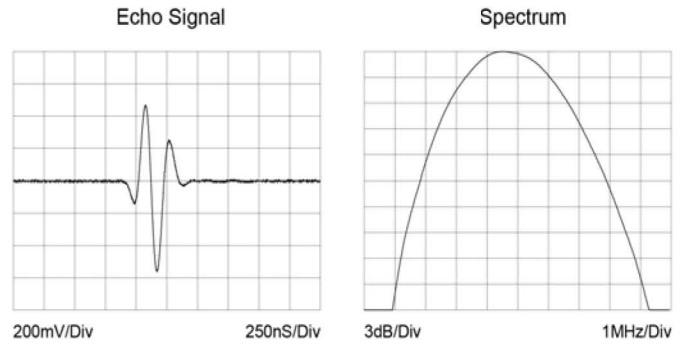
## PH - Short Pulsing Series

### Applications

- Ideal for precise thickness measurement, near surface detection environments

### Features

- Excellent vertical and horizontal resolutions
- Tiny blind spot width of initial pulse
- Less Sensitivity than PL and C Series
- Shorter duration of wave, typically at 1.5~2 cycles
- Higher Bandwidth, typically at 80~110%



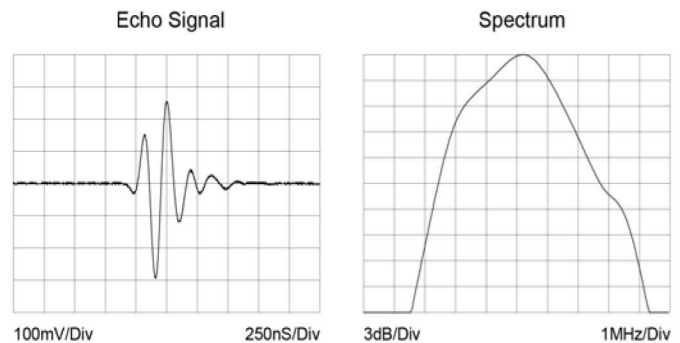
## C - Composite Series

### Applications

- High penetration power and high SNR for coarse-grained, fiber-reinforced composite materials

### Features

- 1-3 Piezo-Composite Crystal
- Higher Sensitivity to PL and PH Series
- Shorter duration of wave, typically at 2~2.5 cycles
- Higher Bandwidth, typically at 70~110%
- Low acoustic impedance composites enable probes better
- matching with low acoustic impedance medium such as water, plastics, etc





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## Probe Test Report

The probe produced by Doppler are passed through a rigorous testing and certification, with reliable detection equipment and stable testing environment. Complies with domestic and international relevant detection standards, with a true reflection of performance of probes, and ensure consistency of all same probe models; All data characteristics are reappearable, and saved as archive to make sure data can obtain again in future.

Data Type	Description
CN	Complied to Chinese GB/T 27664.2 Testing Standards
EN	Complied to European EN 12668-2 Testing Standards
AT	Complied to North America ASTM E-1065 Testing Standards
LFA	For Twin Crystal Longitudinal Wave Angle Probes, analysis relationship between Angles, Focal Depth and Focal Points, Center Frequency, Bandwidth, Sensitivity and relevant important data

### DOPPLER<sup>®</sup> TRL Angle Beam Probe Data Sheet

Information			
Probe SN.	: HDD026	Piezoelectric ceramics dimension (mm)	: 2 (8×14)
Frequency (MHz)	: 2	Housing dimension (mm)	: 25×25×30
Beam angle (°)	: 45	Connector type	: C5×2
Focal distance (mm)	: FD10	Macroshape	: Flat
Index point&Wedge delay measure		Beam angle measure	
Block SN.	: 708203	Block SN.	: 081538
Reflector radius	: R25	Reflector hole (mm)	: Φ2
Block velocity L/S (m/s)	: 5750/3150	Block velocity L/S (m/s)	: 5750/3150
Cable length/Type	: 1.5m/RG174/U	Cable length/Type	: 1.5m/RG174/U
Index point (mm)	: 10.0	Beam angle β (°)	: 45.6
Wedge delay (us)	: 8.47		

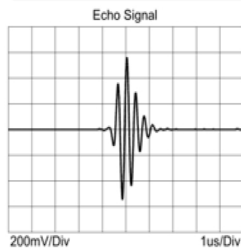
  

Beam angle-Focal amplitude data			
Focal depth(mm)	Focal sound path (mm)	Beam angle β(°)	Amplitude %
5	7.2	52.2	30
10	13.7	47.2	82
15	20.4	45.6	90
20	27.3	45	71
25	33.8	44	52
30	38	43.8	50
35	42	43	36
40	47	42.6	30
45	52	42	25
50	56	41.5	20

Measured by : \_\_\_\_\_ Confirm : \_\_\_\_\_  
 Date : \_\_\_\_\_ Date : \_\_\_\_\_

LFA

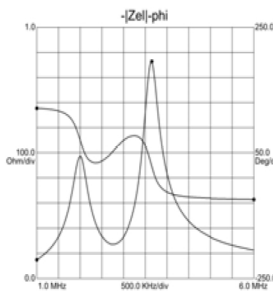
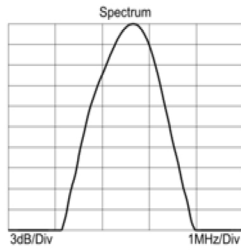


Probe Type:  
 A2.5P13X13A45 (1GA3373)

Serial No:  
 JEA806

Test Date:  
 2020/07/28

Checked by:



ProbeData			
Symbol	Description	Information	Units
Do	Transducer dimensions	13*13	mm
Mt	Transducer material	Common material	-
S	Probe size	36*21*28	mm
m	Probe weight	54±10%	g
Co	Connector	Q9	-
Mz	Wear allowance	4.5	mm
Dp	Delay path	8.9	us
Ta	Working temperature range	-20-60	°C
$\Delta\beta/\Delta T$	Temperature dependence	0.5±0.1	degree/10°C

Technical Data					
Symbol	Description	Reference	Min	Max	Units
T10	-20dB Echo Pulse Duration	1568.00	800.00	2400.00	ns
Fc	Test Frequency	2.60	2.25	2.75	MHz
B-6	-6dB Relative BandWidth	40.15	30.00	60.00	%
B	Beam Angle	45.30	43.00	47.00	Grad / deg
ZA	Probe Index	12.50	12.00	14.00	mm
F/N	Focus	41.00	33.00	49.00	mm
Srel	Relative pulse-echo sensitivity	-51.38	-54.00	-48.00	dB
$\gamma$ -6	Angle of divergence horizontal	5.6	-10%	10%	Grad / deg
$\phi$ -6	Angle of divergence vertical	-6/4	-10%	10%	Grad / deg
$\delta$	Squint angle	0.5	0	2	Grad / deg
Z	Offset	0.2	0	1	mm
FB-6	-6dB Focus length	7.5	-20%	20%	mm
FL-6	-6dB Focus width	6	-10%	10%	mm
Ca	Cross talk distance	-	-	-	dB

Instruments Used		
Instruments	Manufacturer/Model	Serial No.
Pulser-Receivers	Doppler/Anyscan	AA302BGA010
Oscilloscope	Tektronix/TDS 2012C	C031347
Standard echo probe	Doppler/PE-50	S0001
Impedance Analyzer	Agilent/4294A	MY43201723

Test Setting(Anyscan)		Test Block	
Intensity	High	Sound Velocity	3250m/s
Damping	100 Ohm	Reflector/Radius	cylinder/100
PRF Mode	1 KHz	Connecting Cable	RG 174/U
Filter	0.5 MHz/22 MHz	Test Temperature	22±5 °C

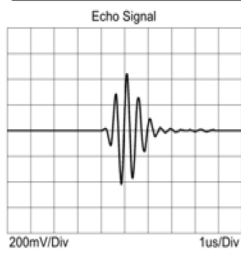
Doppler Electronic Technologies Co.,Ltd

Doppler BLD.,No.1501 Kaichuang Avenue,  
 Huangpu District,Guangzhou,510530,P.R.China  
**China**  
 Tel: +86(020)-82086632  
 Fax: +86(020)-82086200

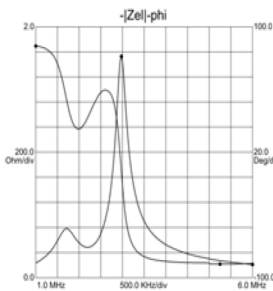
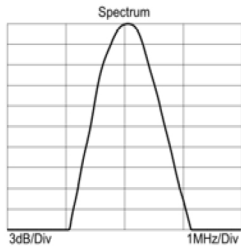
[www.cndoppler.com](http://www.cndoppler.com)  
[cndoppler@cndoppler.com](mailto:cndoppler@cndoppler.com)



CN



Probe Type:  
 A2P14X14A60 (1GA1204)  
 Serial No:  
 JGA413  
 Test Date:  
 2020/09/17  
 Checked by:



ProbeData			
Symbol	Description	Information	Units
Do	Transducer dimensions	14*14	mm
Mt	Transducer material	Common material	-
S	Probe size	36*21*31.6	mm
m	Probe weight	58±10%	g
Co	Connector	C5	-
Mz	Wear allowance	4.5	mm
Dp	Delay path	8.5	us
Ta	Working temperature range	-20~60	°C
$\Delta\beta/\Delta T$	Temperature dependence	0.7±0.1	degree/10°C

Technical Data					
Symbol	Description	Reference	Min	Max	Units
T10	-20dB Echo Pulse Duration	2024.00	1000.00	3000.00	ns
Fc	Test Frequency	2.02	1.80	2.20	MHz
B-6	-6dB Relative BandWidth	38.71	30.00	60.00	%
B	Beam Angle	60.00	58.00	62.00	Grad / deg
ZA	Probe Index	16.80	16.00	18.00	mm
F/N	Focus	38.00	30.00	46.00	mm
Srel	Relative pulse-echo sensitivity	-53.52	-56.00	-50.00	dB
$\gamma$ -6	Angle of divergence horizontal	4.1	-10%	10%	Grad / deg
$\varphi$ -6	Angle of divergence vertical	-6.2/3.7	-10%	10%	Grad / deg
$\delta$	Squint angle	0.4	0	2	Grad / deg
Z	Offset	0.2	0	1	mm
FB-6	-6dB Focus length	10	-10%	10%	mm
FL-6	-6dB Focus width	4	-10%	10%	mm
Ca	Cross talk distance	-	-	-	dB

Instruments Used		
Instruments	Manufacturer/Model	Serial No.
Pulser-Receivers	Doppler/Anyscan	AA302BGA010
Oscilloscope	Tektronix/TDS 2012C	0054865
Standard echo probe	Doppler/PE-50	S0001
Impedance Analyzer	Agilent/4294A	MY43201723

Test Setting(Anyscan)		Test Block	
Intensity	High	Sound Velocity	3250m/s
Damping	100 Ohm	Reflector/Radius	cylinder/100
PRF Mode	1 KHz	Connecting Cable	RG 174/U
Filter	0.5 MHz/22 MHz	Test Temperature	22±5 °C

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EN

### Transducer Description

Probe Type: N4-5P13(1GN1072)  
 Serial No: JGA104  
 Frequency: 5 MHz  
 Element Size:  $\Phi$ 13  
 Designation: Straight Beam Transducers

### Test Instrumentation

Pulser/Receivers: 5800PR P/E  
 Oscilloscope: Tektronix/TDS2012C #C031347  
 Test Block: WIDE IIW Cable: RG 174/U  
 Software: ProbeToolV05.00

### Test Conditions

Intensity: 12.5  $\mu$ J Damping: 36 Ohm  
 PRF Mode: 1 KHz Filter: 1 MHz/10 MHz

### Test Data

Relative Sensitivity: -28.51 dB  
 Pulse Duration:  
     @-6dB 222.00 nS  
     @-12dB 446.00 nS  
     @-20dB 608.00 nS  
     @-30dB 864.00 nS  
 Center Frequency: 5.08 MHz  
 Peak Frequency: 4.97 MHz  
 Relation Bandwidth@-6dB: 46.73 %

Date: 2020/07/27 Inspector:

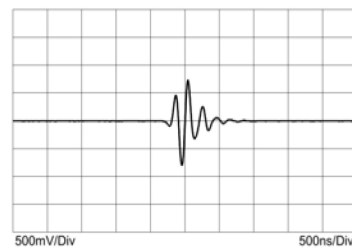
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Doppler Electronic Technologies Co.,Ltd

Adds:Doppler BLD.,No.1501 Kaichuang Avenue,Huangpu District,Guangzhou,510530,P.R.China  
 Tel:+86(020)-82086632 Fax:+86(020)-82086200



Echo Signal



Spectrum

