Ultrasonic Visualization System UVS30

Technical Information

We think that it is important for the technological improvement to observe real ultrasonic behavior by using an ultrasonic imaging system. The realistic imagination of ultrasound propagation in materials helps us to easily and correctly understand the interrelation between the complex behavior of ultrasounds in materials and the waveforms appeared on a monitor.

We offer systems made to order for your applications.

Ultrasonic imaging systems are mostly used for experiments and laboratories and not multipurpose instruments which meet various applications under diverse conditions. For examples, a measurement of fine parts using a high frequency transducer requires a small optical system and a precision positioning mechanism, while an imaging of ultrasonic propagation in large structures using a low frequency requires a large optical system and a supersensitive emitter/receiver system. The volume ratio of the two optical systems, for the monitoring using a 100MHz and Ø3mm spherical focusing high frequency transducer and for the monitoring using a 1MHz and Ø56mm low frequency transducer, will be over 100. The general transducers in usually used frequency range can be excited with a general flaw detector, but in case of high and low frequency transducers, a sharp image can only be obtained when a special transmitter is used to apply higher transmitter output voltage to the transducers than the instruments on the market so that higher sound pressure will be generated.

As mentioned above, the ultrasonic imaging systems are always required to be modified according to the application, therefore, we make all instruments on customer's requirements.

On the other hand, once the user has been familiar with the operation of the system and enlarged his stock of its knowledge, the user can rather easily make modifications like size change of optical lens by himself. We recommend users to construct a system for the objective simulation first, and then to modify it as the need arises. In this case, we are available for consultans, designing and manufacturing if the user requires. You can observe various ultrasound images at minimum cost.

For quotation of our recommendable system, please fill out each column of the table below.

Points to notice:

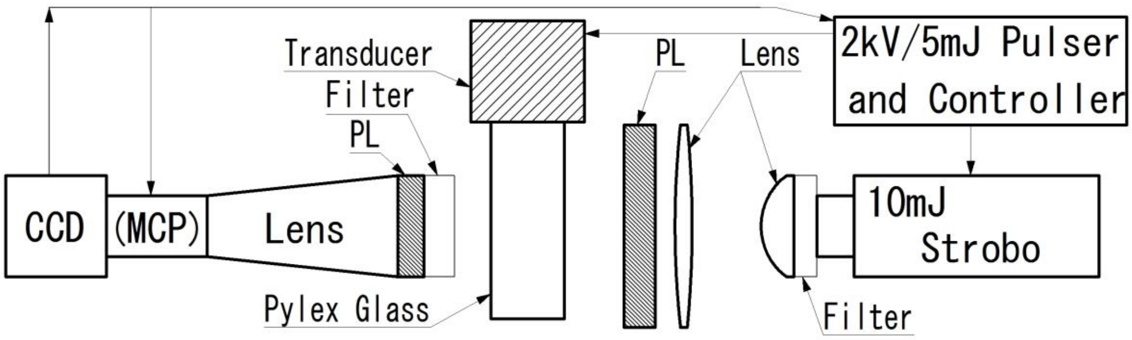
- In the immersion method, the sensitivity may remarkably drop because of transfer loss of ultrasounds propagating from water into the glass specimen, and so it requires a technically skill for the observation. It is recommendable that the beginner starts with the contact method.
- The electrically driven machine may not be as good as it seems to be. As it is difficult to modify the system with it, we recommend to use it only when a fixed system is required.
- The optimum dimensions of glass specimen will be around 100×100×20mm because of easiness of anneal. Larger it is, harder the elimenation of internal distortion in glass is, therefore, a clear image can not be obtained.
- Your ultrasonic instrument can be used as a pulser, provided that an output of over 500V and an external trigger with TTL input are required. If you intend to observe prisice profile of wave, pulser affect mach. In this case please inform us.
- There are two types of pulser available, the spike pulser (a normal type) and the Step-function pulser, which are selectable. It will be efficient that the step pulser is used for fundamental examinations, and after that the normal pulser (the spike pulser) is used for high sensitivity tests. The step pulser generates a small number of waves which allows the image resolution to be improved, and the analysis to be easy.

The leftmost column (Reference: UVP31x) of the table shows our recommendable system specifications for the observation of ultrasounds generated from a typical frequency transducer. On the following conditions; 1) The transducers of 0.5MHz and Ø40mm to 2MHz and Ø 20mm are mainly used. 2) Visual field is about 30×20mm. 3) The observation is made with a CCD camera and the images are acquired by a computer. 4) The image processing software on the market which is supplied by the user, should make the processing of the images acquired. We have 4 types of UVS kit: UVS31SS, UVS31S, UVS31M, UVS31L:View width 40mm…150mm..

Number	Descriptions	Specifications required	Reference: UVP31x
1	Transducers used:Frequency	☐0.5MHz…5MHz ☐High Frequency up to 100MHz ☐Low Frequency down to 0.1MHz	BLP48 BLP49 BLP48H
2	Transducers used:Crystal Material	☐Polymer ☐1-3 composite ☐PZT ☐Lead Metaniobate	
3	What will be observed	☐Wave porpagaion ☐Precise Profile of wave ☐Other: ______________	
4	Special performance Transducers	☐0.5MHz…5MHz ☐High Frequency up to 100MHz ☐Low Frequency down to 0.1MHz	
5	Test mode	☐Immersion ☐Direct contact	Direct contact
6	Visual field	× mm	40×30mm
7	Vertical movement range of test block	± mm by hand ± mm by moter	±25mm by hand
8	Horizontal movement range of test block	± mm by hand ± mm by moter	±25mm by hand
9	Rotaton and Slope of test block	☐ Required ☐ Not required	Fixed
10	Motor driven rotation of Polalizer(PL)	☐ Required ☐ Not required	by hand

11	Motor driven rotation of deflector(62mm)	□ Required □ Not required	by hand
12	Observation method	□ Visual □ CCD camera □ MCP and CCD camera	CCD camera
13	Image data format	□ BMP □ PCX	BMP
14	Profile processing software	□ Required □ Not required	Inclueded
15	Glass reference block	□ Required □ Not required	20x50x100 Pylex 20x100x100 Pylex
16	Dimension of glass reference block	____×____ ×____ mm	100×100×20mm
17	Pulser	□ Required □ Not required	Included
18	Pulser type required	□ Spike pulser □ Step pulser	Spike and step Pulsers included
19	Strobe	□ Required □ Not required	Included
20	Strobe delay circuit	□ Required □ Not required	Included
21	Immersion tank	□ Required □ Not required	Required
30	PC connection	□ USB2	Included

Principle of Visualization System (The UVS30 is not same combination of Lens bellow)



The above figure shows a block diagram of the entire system of which the movement of glass block is not motor driven. With a trigger signal at the PRF of about 10 to 100(200)Hz transferred from the system synchronizer to the flaw detector (or the pulser), the pulser excites the transducer to generate ultrasounds. When the ultrasounds propagating in the glass reference block reach a point to be observed, the strobe light is emitted when a certain time has passed after the transducer excitation. The timing of light emission is adjusted by using the remote-control box for stroboscope delay time. When system use MCP, gate is opened at peek light emission of strobo.The gate width is minimum 5nS.

The light beam emitted is collimated by the lens and passes through the deflector(PL) into the glass block. The analyzer(PL on CCD Lens) turned at 90 degrees to the deflector is opaque to the light beam which passed through the parts where an ultrasonic distortion and/or a distortion inside the glass block do not occur, while the light passed through the parts where the ultrasonic and material distortions take place, the plate of oscillation of light is bent due to the interaction with a stress, and then the light will pass through the analyzer with a strength corresponding to the stress. The light passed is visibly or by a CCD camera observed. The light deflection by stress is affected by a direction of light oscillation and a direction of stress.

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