Information on ABR-10A model change

UNIOPT Co.,Ltd.
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Summary

Thank you very much for your patronage of our ABR-10A birefringence measurement system for more than 20 years.

We are pleased to announce that the ABR-10A has undergone a model change and is now available in a new model with higher reliability and faster measurement speeds. The ABR-10A is now available in a new model with higher reliability and speed.

In recent years, the beat frequency of the laser source (Zeeman laser) used in the ABR-10A has shifted to the high frequency side.

* Orders for lasers with the current beat frequency setting (fb ≤ 200 kHz) will cease to be accepted as of 23 December 2022.

ABR model change (new product model name: ABR-100) was made in response to this change.

The beat frequency of the new ABR will be approximately 1.0 to 1.6 MHz. This will require changes to the related electronics and other equipment in the measurement section.

The optical measurement principle remains basically unchanged. Basic performance, such as measurement accuracy, will be maintained at the current level.

Main Modified Parts

(1) Laser : Beat frequency will change. Other specifications, such as appearance, remain the same.
(2) Amplifier : As with the detector, changed to support high frequency.
(3) Phase meter : Changed to a digital phase meter using a phase measurement algorithm developed by the National Institute of Advanced Industrial Science and Technology (AIST) to handle high frequencies.
(4) Optics motor : Changed to brushless motor.
(5) Software : Modification of control unit due to changes in peripheral devices (phase meter, etc.).

Items that do not need to be changed.

Sample stage system

Beat frequency of Zeeman laser

Until now, the beat frequency of Zeeman lasers has been 200 kHz or lower, depending on the bandwidth of the analog phase meter. In recent years, the condition of the internal mirror used in the laser has changed, and the number of laser tubes that exhibit a beat frequency in the same bandwidth has been decreasing. In recent years, we have received only a few (yield rate of about 20%). There is also a large variation in the number of laser tubes received from different lots, and some lots do not contain laser tubes that can be used for ABR-10A.

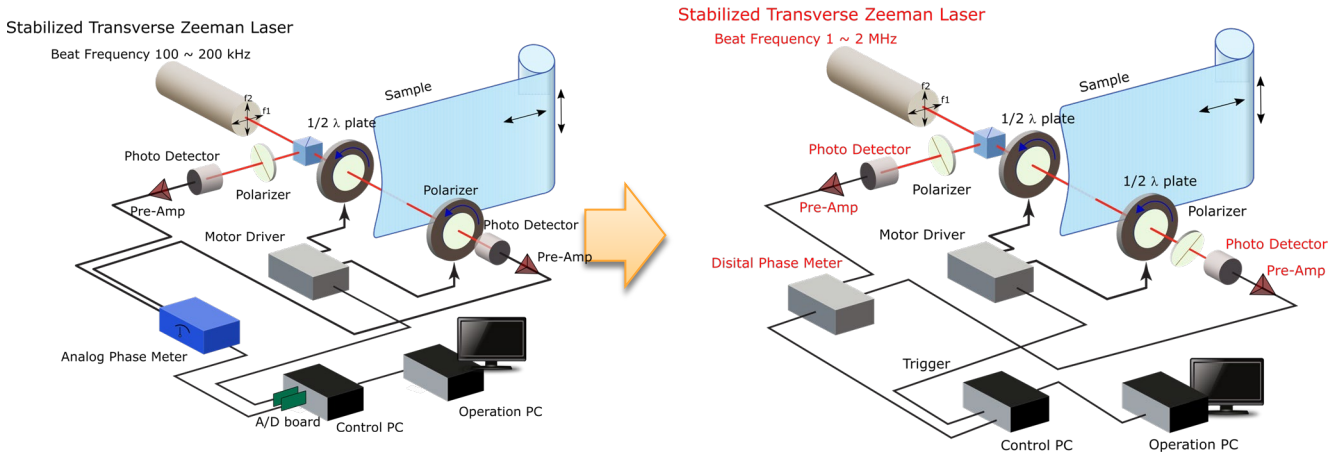
In recent years, the beat frequency of laser tubes has been distributed around 1 MHz, and a model change to a measurement device that uses this band is essential for a stable supply (including laser replacement and maintenance) in the future.

Digital phase meter

The AIST-developed arithmetic algorithm capable of high-speed processing will be used (license agreement in place). The phase meter will be equipped with the AIST algorithm in FPGA. Since analog processing is eliminated, instrumental error is reduced and stable measurement processing is possible.

The basic specifications of the new ABR-100 model are shown in the table below, with the main difference being the measurement speed. There is no significant difference in measurement performance between the two models. Compared to the current model, the phase meter is digitally processed, which has advantages such as reduced instrumental error and more stable measurement repeatability.

Changes in the new ABR



(1). High frequency Zeeman laser 1 MHz
(2). High-speed signal amplifier
(3). FPGA digital phase meter
(4). Brushless motor

Comparison of new ABR model numbers and specifications

model number	beat frequency	Measurement Time	phase meter
ABR-10A (conventional product)	Below 200 kHz	1 sec.	Analog phase meter
ABR-100, ABR-100B	900 kHz to 1.6 MHz	0.1 sec.	FPGA
ABR-1000	30 MHz or higher	0.01 sec.	FPGA

The ABR100 is available in two models: the ABR-100B (intermittent measurement type), in which measurement is performed while the sample stage is stopped (same measurement method as the ABR-10A), and the ABR-100 (continuous measurement type), in which measurement is performed while the sample stage is moved.

Advantages of the ABR-100

[1] Reduction of measurement time … Improvement of work efficiency

[2] The number of samples in the measurement can be made denser

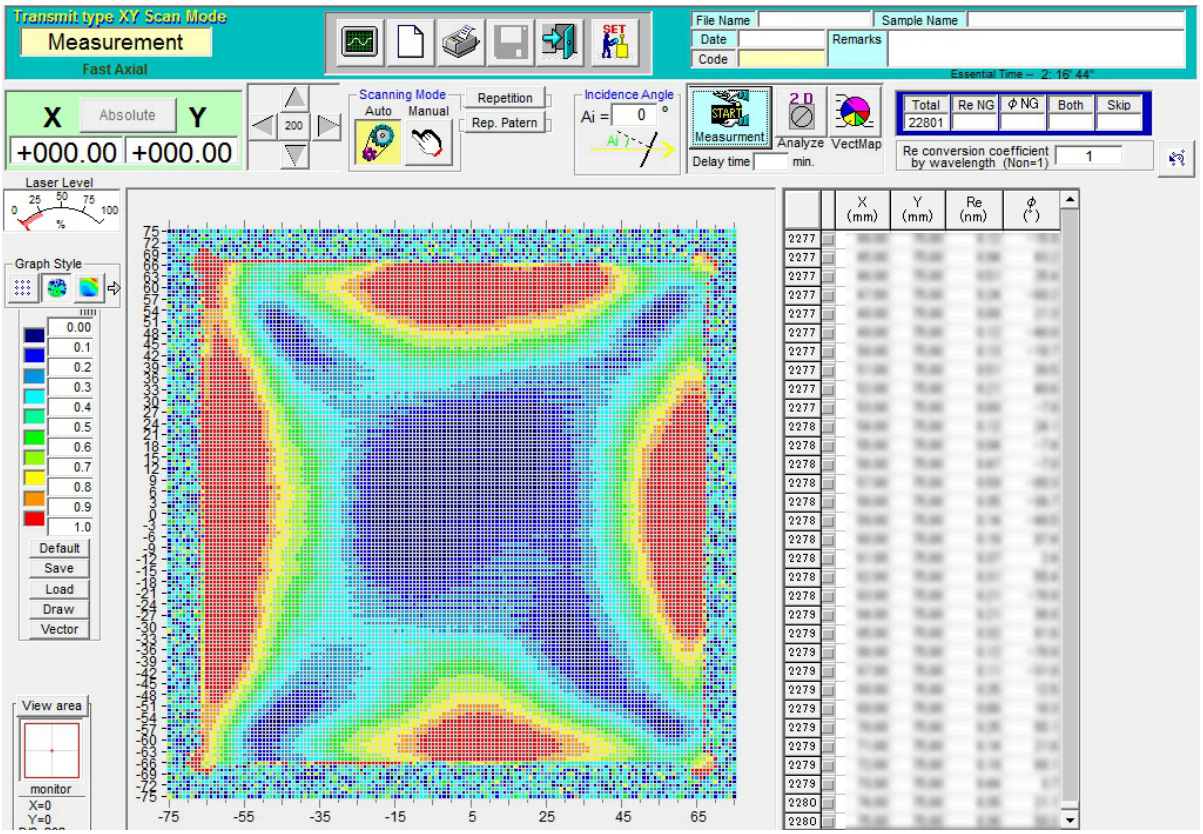
[3] Step by step → Continuous measurement

[4] Dynamic response measurement of samples is expected

The effect of continuous measurement makes fine distribution measurement possible. It is expected that birefringence measurement will make it possible to detect defects such as bubbles and foreign matter that are (or may be) present in the specimen under test. (We could not find any literature showing a correlation between defects and the amount of strain, so a demonstration experiment is needed.)

Since the sample stage can be operated without stopping, deterioration of the stage can be prevented and a longer service life can be expected.

We would like to take this opportunity to ask our customers to consider switching to the ABR-100 model.



Display functions for high-density measurements

Example of retardation display. Similarly, azimuth display is also possible.

More detailed strain distribution can be easily obtained.

… and upwards