THE MICROPROCESSOR DEVICE FOR MEASUREMENT OF HUMIDITY OF LOOSE MATERIALS

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Abstract
The optimal method for creating a universal system for most materials is the ultrahigh-frequency moisture measurement method. The article discusses the generalized structure of a humidity meter. The system is designed to solve all problems related to obtaining measurement information about the moisture content of bulk materials and products of its processing.

Keywords: Optimal method, ultra-high frequency, humidity, sensor, output signals, external device interface.

Introduction

Optimum method of creation of universal system for the majority of materials is superhigh-frequency (microwave) a method of measurement of humidity. The structure of the offered generalized system is shown in a fig. 1.

The system is called to decide (solve) all tasks connected to reception of the measuring information on humidity of loose materials and products of his (its) processing.

Mainframes of system are:

- complex of primary measuring converters of humidity;

- the base measuring device with additional blocks and built - in microprocessor;

- complex of target means of display of registration and accumulation of the measuring information.

The gauges based on updatings of a microwave - method enter into a complex of primary measuring converters: free spaces, резонаторные, волноводные. The choice of the gauge for various materials in view of concrete properties of object and conditions of measurement is shown on an example хлопковых семян at acceptance and primary processing. The gauges of all types have the unified target signal.

The base measuring device, serves by a microwave of the device with rotating by the primary converter. The primary converter rotates around of a vertical axis the step-by-step engine, which copes by the switch located on a cover влагомера. The block diagram of the device is given in a fig. 2. Base devices is constructed by a блочно-modular principle. The microwave a path of the device consists of the following parts: A1, A2 - transmitting and reception of the aerial, M1, M2 - microwave modules (accordingly, microwave - generator and detector).

The signals with M1, M2 and gauge of temperature act on BIU. Here signals of easing - NL, phase shift - j a microwave of a wave and temperature of a sample - t are formed as standard signals for interface to the microcontroller. In the device the corrections of errors caused by the basic influencing sizes (temperature, density) are stipulated. In constant memory of the microprocessor enter градировочные of the characteristic (dependence of a target signal on humidity) измеряемого of parameter with the help of the keyboard (block of input and output - БВВ), and also calibration of the characteristic of the influencing factors of microprocessor.
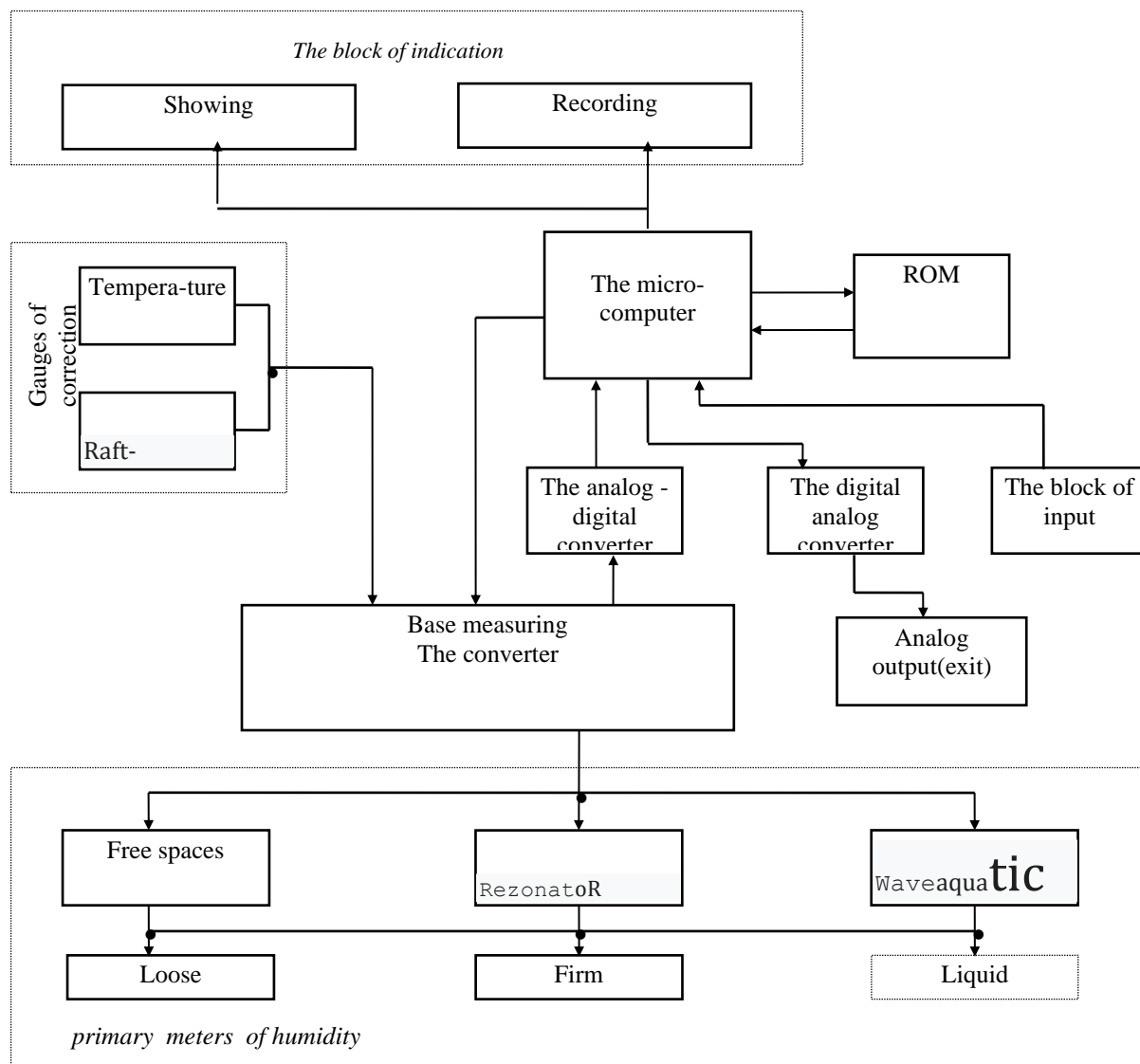

Fig. 1. The block diagram of universal system measurement

Connected with humidity of a material. In this case target signals of the measuring device (N_L, j, t) act on the microcontroller. Through the analog interface the signals N_L, j and t will be transformed to digital signals with the help of the analog-digital converter and act on the interface of external devices of the microprocessor. The microprocessor carries out all

computing operations. After calculation of dependence the humidity of a material in a digital kind through the indicator is deduced.
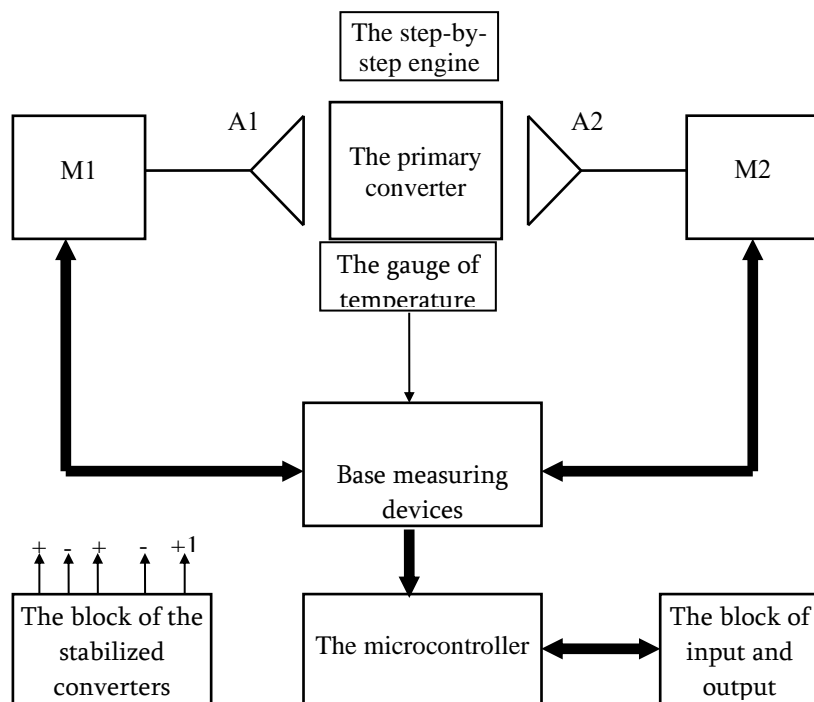

Fig. 2. The block diagram of a microwave of the device with the built - in microprocessor device

Means of indication (БВВ) in the given system can serve (depending on the requirements of manufacture devices, light board(panel), digital printers etc., and signals of management the microprocessor through the digital-to-analog converter and block of management of technological process realizing required law of automatic control or regulation by technological process is direct in technological process or in the automated control systems of technological processes). If necessary uses (or at search of the information about humidity) in the automated control systems of technological processes the message acts on book keeping. In case of drawing up of balance of raw material and the microprocessor block transfers ready production these data to a higher hierarchical step.

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