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CONTROL AND MEASURING DEVICES FOR CONTROLLING THE TEMPERATURE REGIME OF THE COOKING CABINET

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Many enterprises in Russia are currently engaged in the development of temperature and humidity regulators. It happens due to the fact that in every small town and even village there are manufacturers using technological processes associated with the regulation of these parameters. The article analyzes the control and measuring devices for controlling the temperature regime of the cooking cabinet. The devices of the "Thermodat" series produced by LLC "UralTeploPribor" and "MPR 51" of the company "Aries" are considered. The advantages and disadvantages of the devices are revealed. The analysis of the application of the control device for the temperature and humidity regime of the cooking cabinet is carried out.

Many enterprises in Russia are currently engaged in the development of temperature and humidity regulators. It happens due to the fact that in every small town and even village there are manufacturers using technological processes associated with the regulation of these parameters. Thus, the demand for such devices is large [1-6].

As a result of the research, it was revealed that in Russia Orel T419 devices are often used to automate such technological processes. But devices of this type can be considered obsolete, since they were developed about ten years ago. T419 has some disadvantages, one of which is the constant presence of the operator, since after each stage of the technological process it is necessary to change the set parameters.

Among the modern developments, it is possible to note the devices of the "Thermodat" series produced by LLC "UralTeploPribor" and "MPR 51" of the company "Aries".

The device "Thermodat-38N1" is designed to measure and regulate temperature and humidity. The device has two universal inputs. Each input can work with any thermocouple XA, XK, LCD, MK, NN or thermal resistance Pt, Cu. The temperature measurement range is from minus 50°C to 200°C for any sensor. Humidity is determined psychrometrically by the temperature difference measured on the first and the second channels. In this case, the first channel of the device is designed to measure the temperature of the "dry thermometer", and the second — to measure the temperature of the "wet thermometer".

In the psychrometric method, the device measures the temperature of the "dry" and "wet" temperature sensors. The device calculates the relative humidity value based on the psychrometric table based on the "dry" temperature and the temperature difference between the "dry" and "wet" temperature sensors. In the memory of the device, two tables are "sewn" - for the aspiration speed (blowing) of 0.8 m/s, corresponding to the speed of air movement in closed rooms, and 3m/s - for blowing a "wet" temperature sensor with a fan in a standard aspiration psychrometer.

As thermal sensors, two thermocouples or two thermal resistances can be connected to the device. But since the temperature difference indicated above is usually small, the use of independent sensors can give a large error in determining humidity, since the measurement errors of the sensors add up. To obtain the relative humidity value with higher accuracy, the Thermodat-38PN1 devices provide for the measurement of the psychrometric temperature difference by differential thermocouples.

Upon request, the device can be supplied complete with a combined psychrometric humidity sensor and a temperature sensor. The sensor has a glass water feeder. As a "dry" thermometer, it is equipped with a resistance thermometer Pt100. To measure the temperature difference between the "dry" and "wet" thermometers, a battery of five differential thermocouples is used. The battery of thermocouples allows you to register small temperature differences with high accuracy, which leads to an increase in the accuracy of determining humidity.

Psychrometric humidity sensors can operate in a polluted and dusty atmosphere. The time to establish the readings is about 20 minutes.

The device has two four-digit LED digital indicators for indicating temperature and humidity.

The device can be equipped with an interface for communication with a computer. The computer program allows you to accumulate measurement results, observe and print out graphs of humidity and temperature.

In devices with an archive, the measured temperature is recorded in non-volatile memory with reference to real time and the calendar. The recording period is from 1 min to 1 hour. The archive cannot be deleted by the operator, the transfer of the archive to the computer via the interface.

Technical specifications:

Power supply ~ 220V AC 50 Hz.

ICT, Electronics, Programming, Geodesy

Power consumption-no more than 10W.

The safety requirements comply with GOST 12.2.007.0-75 and GOST 12997.

Overall dimensions of the electronic counting device-96x96x110 mm, mounting cutout in the shield-92x92 mm.

Weight - no more than 0.8 kg.

Performance in terms of construction, strength and resistance to external influences.

The device is designed for panel placement according to GOST 5944-91. The electronic device for resistance and strength to temperature and moisture correspond to the performance group B1 according to GOST 12997-84 for operation in closed heated or cooled and ventilated industrial premises, the operating temperature range is +5oC... +45oC, humidity up to 75% at 30oC. The device does not contain precious metals [1].

The device "MPR 51". The device is designed to measure and regulate temperature and humidity. It performs regulation simultaneously on two channels, according to a given program. Programs are compiled by the user and can have from two to 20 steps. The device can be used in the food industry. For example, in bakeries to maintain the regime in proofing cabinets, in ovens for baking bread; in meat and fish processing plants to ensure the technological process in cooking and smoking chambers, in maturation chambers, in universal climate chambers. The device can also be used in the production of reinforced concrete products for the heat-curing process. MPR51 can help in maintaining the desired modes in the wood drying chambers.

You can use the device for controlling the temperature and humidity mode of the cooking cabinet:

- in bakeries to maintain the mode in the proofing cabinets;
- in bread baking ovens;
- at meat and fish processing plants, to ensure the technological process in the cooking and smoking chambers;
- in the maturation chambers;
- in universal climate chambers;
- in the production of reinforced concrete products for the heat-curing process;
- when maintaining the desired modes in the wood drying chambers;
- in the cooking cabinets;
- in incubator plants.

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