to binary one, the 153.07 module is intended to generate a signal proportional to difference between given and current angels.

DATA ACQUISITION SYSTEM consists of DV, control electronic equipment, personal computer and software. DV surveis the Hall voltages, current and temperature by using the 753-2 relay multiplexer. Relay multiplexer has (2 × 32) channels. One channel is allowed to switch three lines and it is possible to use a scheme recommended by the DV designers to suppress an inteference voltage. Also it was used reverse of the Hall plate current. Summing the measurements in the direct and reverse current direction through Hall plates it makes possible to avoid the termoelectric voltage on the relay contacts.

The designed mapper makes enable to measure all field map on 18 thousend points at duration 7.5 hours with ten measurements at each point.

THE CONSTRUCTION FEATURES OF AN ACCELERATION SYSTEM FOR THE ISOCHRONOUS CYCLOTRON AT GATCHINA

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The acceleration system (AS) is intended for the accelaration of H^- ions up to 80 MeV and operates at the second harmonik of ion revolution 41,2 MHz. AS consists of two identical 1/4 wave resonators with 60^0 dees. At 60 kV on the dee AS provides energy gain 200 KeV per turn. The conception design of the AS is described at works [1,2] where were analysed the requirements, block-diagram, methods and results of calculations as well as results of measurements on the model.

Presented work is intended for the technical design of AS. The drawing of AS is presented on the Fig. On the Fig. only one part of AS is presented due to symmetry of the dee system. The dees (*8*) are console-settled at base-plates (*11*) and conductivy coupled in the center. The upper and lower AS ground liners are formed by lids of vacuum chamber (VC) (*15*). The resonant volume (*12*) around the rectangular stem (*4*) is separated by side-plates (*16*) and by the shorting plate (*18*). The dee stem is fastened at the shorting plate. The dee fastening has a positioning device (*13*). After the dee positioning they are bridged with a removable rigid shorting jumper (9), which have a different configuration depending on the internal or external ion source being used. A dummy-dee (*5*) is fastened to VC lids and formed accelerating gap 20 mm.

A frequency tuning device such as a tuning capacitor (*7*), a fine trimmer (*6*) are attached to the shorting plate as well as RF probe (*2*) and RF power input (*3*). The plates (*17*) are used for primery tuning of frequency by the regulation the effective stem width. The access to AS can be obtained only after the upper part of a magnet together with VC lid are lifted up. Therefore the upper and lower ground liner are separated by a gap and connected only on the shorting plate by clamping contacts (10) after assembling of VC.

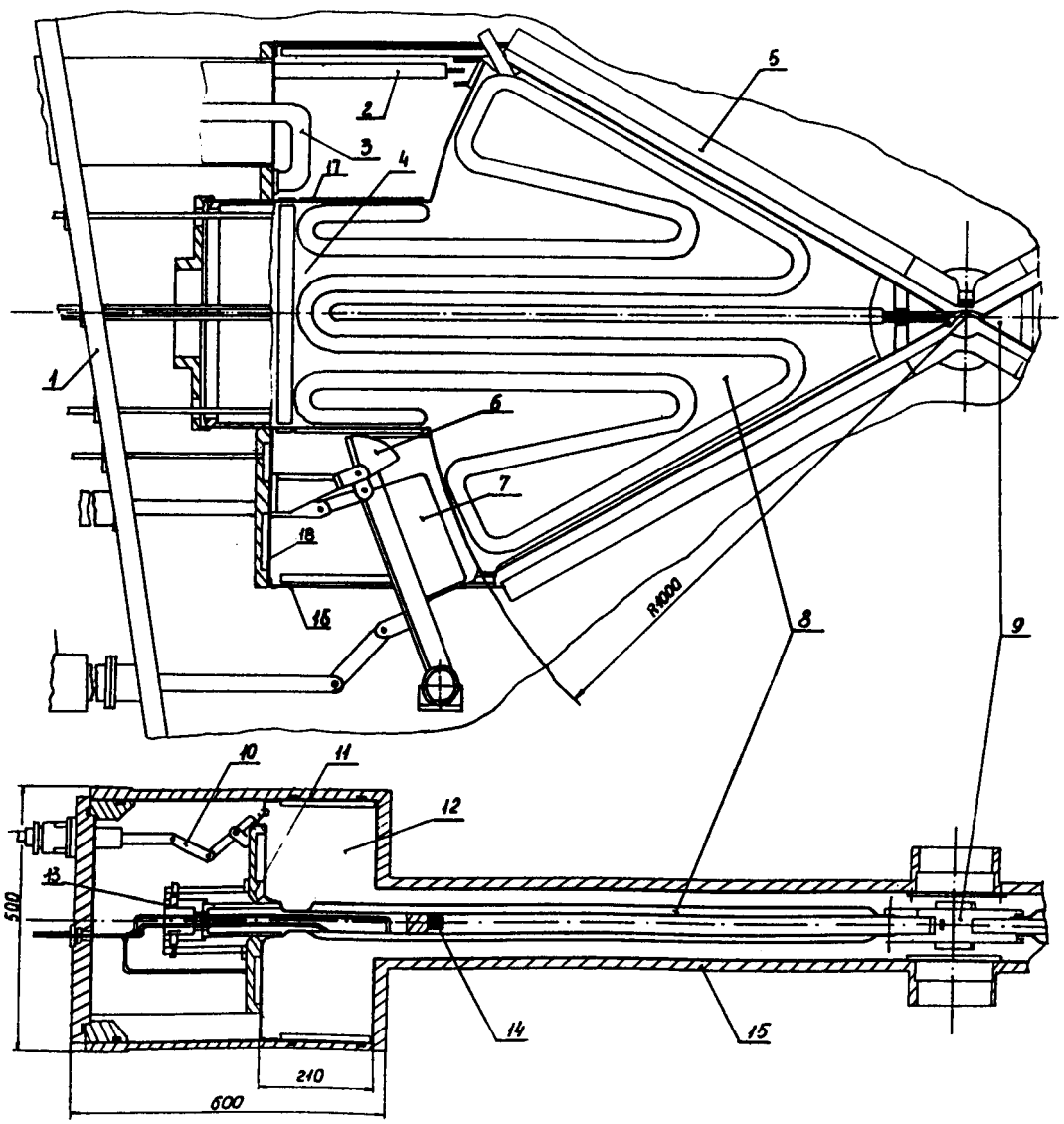

Fig.1. General view of the accelerating system.
1 – side wall of vacuum chamber, *2* – RF probe, *3* – RF power input, *4* – stem, *5* – dummy-dee, *6* – fine trimmer, *7* – tuning capacitor, *8* – dee, *9* – removable shorting jumper, *10* – clamping contact, *11* – base plate, *12* – resonator box, *13* – positioning device, *14* – buffle, *15* – vacuum chamber lid, *16* – side plates, *17* – plates for the primery frequency tuning, *18* – shorting plate.

All surfaces are water-cooled therefore the VC lids and the dees have cooling cannels. At the same time dee cooling cannels form the stiffening ribs. The graphit neutral beam buffles are placed in the vacuum chamber to shield the VC components installed on the median plane. If it is necessery to work in the chamber these buffles may be quickly removed and for the next run they are changed on the clean and new buffles.

The VC lids and the dees are welded of the bimetal plates: the stainless steel- copper (lids – 16/2 mm, dees – 1,5/1,5 mm).

The mechanical strength and warming of resonance system were investigated. The special attention was payed on the deformation of elements which cause the resonance frequency detuning. At calculation dee system was regarded as variable cross-section two- console beam joined by hinge or regidly at centre and loaded with as well own weight and as with cool-water weight. The value of the sag don't exceed 1mm and 0,5 mm accordingly. At the mechanical calculation VC lid was regarded as round diaphragm loaded by the atmospheric pressure. The diaphragm is supported around the periphery, at the central region and also at the 8 points inside of diaphragm. The value of the deflection don't exceed 0,5–0,7 mm. It was also investigated the temperature distribution on the AS surface which is coused by non-uniform RF power losses.If the enter water temperature is 20^0C and the water pressure is equal 4 atmosphere the water temperature at exit about 60^0C.

At present the design and the drawings of an RF of cyclotron have been acomplished. The progress in the manufacturing is resticted by the deficient financing. To reduce the expenditure it was examined traditional technology of production vacuum chamber and resonance system without using bimetal plates which can be used at the institute work shop.

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REFERENCES

1. *Dmitriev S.P. et al.*, Proc. XIV Conf. on Charg. Part. Accel., Protvino, 1994. V.3. P.112.
2. *Abrossimov N.K. et al.*, Proc. XIII Intern. Conf. on Cycl. and their Appl., Vancouer, Canada, 6-10 July, 1992. P.58.