



High power X and C band magnetrons for linac system Handling Procedure

1. TRANSPORTATING

For your transportation of these magnetrons, use the original packaging, which is shipped from New JRC factory. The magnetron is gotten into the double boxes for absorbing mechanical shock and vibration. This original package has been designed following our criterion of magnetron transportation. This magnetron should be handled as Magnetized Material in IATA regulation for air transport, but can be transport by air following Package instruction 902.



2. HEALTH AND SAFETY HAZARDS

Magnetrons are safe to handle and operate. The relevant precautions stated herein must be treated appropriately. Equipment manufacturers and users must ensure that adequate precautions are taken. Appropriate warning labels and notices must be provided on equipment and in operating manuals.



High Voltage

Equipment must be designed so that personnel cannot come into contact with high voltage circuits. All high voltage circuits and terminals must be enclosed. Fail-safe interlock switches must be fitted to disconnect the primary power supply and discharge all high voltage capacitors and other stored charges before allowing access. Interlock switches must not be bypassed to allow operation with across doors open.



X-Ray Radiation

Never apply high voltage without having X-ray shielding in place. High voltage magnetrons emit a significant intensity of X-rays not only from the input insulator but also from cathodes sidearm and the others. These rays can constitute a health hazard unless adequate shielding for X-ray radiation is provided.



RF Radiation

Personnel must not be exposed to excessive RF radiation. High voltage magnetrons not only emit RF energy from the RF output but also leak one from the input insulator. All RF connectors must be correctly fitted before operation so that no leakage of RF energy can occur and the RF output must be coupled efficiently to the load. Personnel must maintain sufficient clearance away from the magnetron while the device is energized. It is particularly dangerous to look into open waveguide while the magnetron is energized.



Magnetized materials

Take off your watch and keep distance the accurate instruments from the magnetron.

Magnetic materials must not be permitted at any time closer than 200 millimeters from the tube. Any energized magnets must not be permitted at any time closer than 300mm from the tube.

3. INSTALLATION

Fastening and connect earth lead wire

The magnetron must be fastened the system with bolts and nuts using 4 holes at the top of the flange as Fig. 1.

Then, connect an earth lead wire from modulator output to connect to this flange using at least 1 spot.

Insulation space

Keep the insulation space around the input section of ceramic and terminals includes the lead wires.

Waveguide connecting

Connect the output waveguide to the RF transmission line of linac systems. Then, the alignment of the waveguide flange of the system should system's flange should be fit ted to magnetron waveguide flange without any mechanical thrust force. Then connect an earth lead wire from modulator output to connect to this flange using at least 1 spot is recommended.

Test the leakage at the applied maximum pressure of 0.3 MPa. The maximum leakage will be such that the pressure will not drop by more than 70 kPa in 7 days with an enclosed volume of 1 liter.

Tuner motor connecting

The tuner mechanism is driven by the tuner shaft (see outline drawing). The torque required is minimum 0.05 Nm; the torque applied must not exceed 0.3 Nm.

Avoid the mechanical shock and thrust force to tuner shaft.

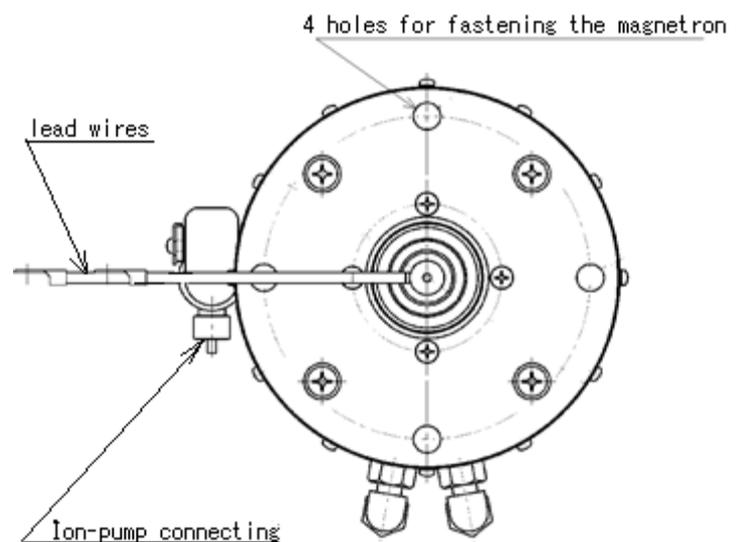


Fig. 1 Top view of magnetron



Ion-pump controller connecting

Connect the Ion-pump controller is recommended for detecting vacuum level and making high vacuum level inside of the tube. See technical information of “MicroVac Controller”.

Cooling water tube connecting

Connect the cooling water tube with “Swage Lock tube 8 mm male”. The recommended water quality is pure grade and water flow is 5 l/min. or more; a pressure of approximately 0.12 MPa will be necessary to give this rate of flow. The outlet water temperature must not exceed 50 degrees centigrade.

Provide the interlock for minimum water flow level and maximum water temperature at outlet.

4. WORKOUT

After finished the confirmation above INSTALLATION, flow the cooling water, and pressurize 0.2 MPa the inside of waveguide with sulfur Hexafluoride (SF₆) insulating gas, turn on the heater voltage and hold the preheat of the cathode.

Confirm the vacuum level less than 1.3 exp. -4 Pa with Ion-pump controller and the conversion table in the technical information of “MicroVac Controller”.

Start to apply the high voltage and slowly increase the voltage. It is better to start the pulse conditions, the short pulse and low duty cycle.

After high voltage turned off, cooling water should be flown for at least 30 minutes for cooling down the cavity temperature.