6 - 10 Test of Linear Part in Tuner System of ADS 25 MeV Linac

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The tuner system of ADS 25 MeV Linac(Fig. 1) built in CM1, CM2 and CM3 consists of 17 tuners and every tuner consists of two parts - linear drive unit and tuning implement unit. Linear drive unit is mainly composed of step motor, reduction box, screw-nut and coupler (Fig. 2). To learn about the working conditions and structure characteristics, 17 tuners were tested and the CM1-2, CM2-3 and CM3-1 were chosen as representatives to give a brief introduction of test procedure and results.

The linear part of tuners was tested at 300 K as shown in Fig. 3. The moving plate was adjusted to a suitable position to ensure enough space to move up and down. Then the dial indicator was fixed on the bracket and was properly set at an indication that later we took as the center. With 200 steps at a time, the step motor was made to move 25 times in the direction where the moving plate rose and fell respectively. Positions of every movement were recorded by the dial indicator.
The result of CM1-2 tuner linear driving part (Fig. 4) test shows that the plate tends to move linearly and is barely influenced by hysteresis, which shows the linear drive unit works well and meets the requirement of tuners.

From the curve of CM2-3 (Fig. 5), five times (1000 steps) of delay of moving plate can be seen. This could be caused by worn screw-nut and fatigue damage of coupler.

The curve in Fig. 6 shows much of hysteresis in linear driving part of CM3-1. 3800 steps of returns occurred throughout all 5000 steps of processes. The rate is up to 76%. This may also result from worn screw-nut and fatigue damage of coupler. Moreover, the position of the return processes in positive direction slightly lifts before it descends. As for this phenomenon, further experimental analysis is needed.