Technical Memo

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GTM : .....
Date : .....

GMRT Brakes
Visit to M/s. Stromag Inc., Ohio [1]

G. Swarup

Key words : GMRT Antennas; Brakes, Servo System

Visit to M/s. Stromag Inc. at Dayton, Ohio by G. Swarup to discuss problems regarding GMRT brakes

During my visit to USA I visited the office and factory of M/s. Stromag Inc. at Dayton, Ohio state on 20 September 1996. The following is the summary of the discussions.

1. M/s. Stromag were informed that the torque of the GMRT brakes has been decreasing with time. M/s. Stromag stated that they have not come across such a complaint from any of their other customers. They have supplied large number of brakes to various users of the servo motors. Two reasons were identified by them for the problems faced by the GMRT engineers regarding the brakes.

   (a) M/s. Stromag informed that it is necessary that the motor speed be decreased to less than about 50 rpm before the brakes are applied. They informed that this is a standard practice for all the DC servo motors. For servo motors, the brakes are designed to be of low inertia and are not supposed to take wear and tear which takes place if brakes are applied for stopping the load when motors are running at higher speeds of more than about 50 rpm.

   (b) M/s. Stromag also advised that we should put a seal on the input shaft, in addition to the aluminium cap. They informed that they had supplied only the brake module to M/s. Industrial Drives and the body was made by M/s. Industrial Drives.

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2. **The screw on the key of the collar becoming loose :** M/s. Stromag informed that this may also be due to either our applying the brakes at full speed of the motor or foreign particles getting into the brake module from side the back whenever the cap is opened. Thus the aluminium parts of the brake unit would get oxidized and wear out. It was advised that we could lock the spline by using "lock-tight" or similar adhesive. They did not have any comments to Rajmohan's suggestion of putting an additional collar, but felt that the same may not be necessary.

3. **Fitting of new brake discs :** I discussed with them that we had fitted new brake discs on 10 motors but we were able to obtain only about 26±2 Nm torque instead of 32 Nm as specified for these brakes. M/s. Stromag informed that the required torque for tightening the bolts of the brake module are given in the enclosed drawings (Enclosure 2). It is necessary to assemble the brakes on a clean table. Inner assembly of the brakes should be cleaned with a solvent which leaves no residue and also assembled with clean hands. Further, a seal may be provided at the input shaft. I also discussed with them about the travel of the brake disc when the brake is disengaged. I was informed that this can be calculated by substracting from the thickness of the spacer (=0.627") the given thickeness of the armature and brake discs (equal to 0.608"). Thus the expected travel is only 0.019" which is about 0.48 mm. The drawings are enclosed as Enclosure 3, 4 and 5.

4. **Brake Current Circuit :** M/s. Stromag informed that the full wave rectifier is generally used and is satisfactory. The circuit given by M/s. Industrial Drives seems adequate (Enclosure 6) but TIFR can experiment to find an optimum circuit. They also gave a copy of the measurements made by them on a few GMRT brakes, from which it is seen that the pulling current was only 0.20 to 0.23 ampere for three of the GMRT brakes.

5. M/s. Stromag informed that the estimated price of 32 Nm brakes without the body is about $ 250. For a 40 Nm price the drive is likely to be considerably higher. They are willing to quote for it if an enquiry is made. It may be possible to fit such a brake in the existing body but they need to work it out. They also said that one could put stiffer springs or 2 more springs in the existing units for this purpose in the existing units and it is possible that the existing brake coil may be able to pull the stiffer unit.

6. M/s. Stromag were quite clear that the hand lever for manual release is not likely to give any problems. I pointed out that atleast in one case we found signs of water going through the hand lever. They agreed that a waterproof cover would help but warned

that it is desirable that the brake body temperature should not rise by more than 10° or 20°C over the ambient temperature.

General Remarks

M/s. Stromag were very cooperative. They showed me great courtesy. The President of the Company received me at the airport and also left me at the airport. They assured they will be willing to answer any other queries. They were quite interested to know about the GMRT project.

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PS : Drawings are enclosed only in the copy given to the Khodad technical office (Mrs. Deshmukh).