

VIRGOVACPISA 039 P
D.G. motorWritten: February, 1996 p 1
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Object: Outgassing measurements of D.G. stepper motor

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In this note we briefly report the results obtained with a stepper motor by Oriental motor customized and cleaned for vacuum by D. G.. The test apparatus is described in detail in the note VACPISA 025. The outgassing is measured using the dynamic method: measuring both pressures in the sample chamber P_1 and in the pumping chamber P_2 the total outgassing flow can be deduced from the relation:

$$Q = (P_1 - P_2) \times C \quad (1)$$

where C is the conductance (20 l/s N_2 equivalent at 20°C). The measurement is performed twice, with and without the sample into the sample chamber: the difference between the two flow values will represent the net sample outgassing; the difference in the RGA spectra will give the mass distribution of the sample outgassing.

1 - System performances

After baking the base pressure of the chamber is of the order of 10^{-9} mbar and the outgassing rate of the order of 10^{-11} mbar $l\ s^{-1}\ cm^{-2}$. The main components of outgassing are H_2 , H_2O , N_2/CO , CO_2 .

2 - Measurement of the outgassing flow of D.G. motor

The sample was a stepper motor by Oriental Motor customized by D.G., Italy, and cleaned for use in vacuum. The motor was put under vacuum and we started pumping.

t(h)	p ₁ (mbar)	p ₂ (mbar)	Q(mbar l/s)
3.5	2.4x10 ⁻⁴	4.5x10 ⁻⁵	3.9x10 ⁻³
19	1.0x10 ⁻⁴	1.0x10 ⁻⁵	1.8x10 ⁻³
21	8.9x10 ⁻⁵	8.7x10 ⁻⁶	1.6x10 ⁻³
27	7.7x10 ⁻⁵	6.7x10 ⁻⁶	1.4x10 ⁻³
43	3.1x10 ⁻⁶	3.8x10 ⁻⁵	7.0x10 ⁻⁴
46	2.8x10 ⁻⁶	3.4x10 ⁻⁵	6.2x10 ⁻⁴
49	2.5x10 ⁻⁶	3.2x10 ⁻⁵	5.9x10 ⁻⁴
117	1.2x10 ⁻⁶	1.4x10 ⁻⁵	2.6x10 ⁻⁴

The outgassing flow is reported in Fig. 1. The outgassing spectra taken after 21h (Fig. 2) showed that there is a strong hydrocarbon contamination.

3 - Discussion

The motor cannot be recommended for VIRGO due to the large outgassing flow and to the strong contamination from hydrocarbons. A visual inspection of an open motor showed that there was a large amount of not vacuum compatible materials. Moreover later the factory discovered that cleaning was not able to remove oil inside.

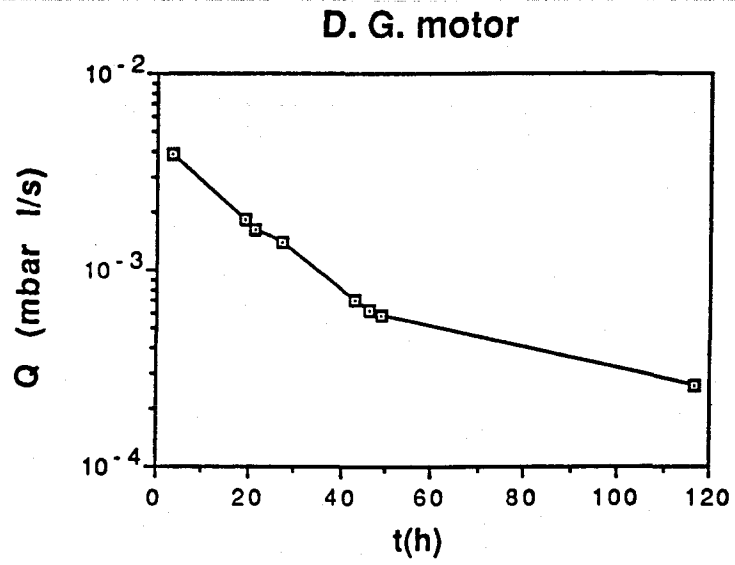
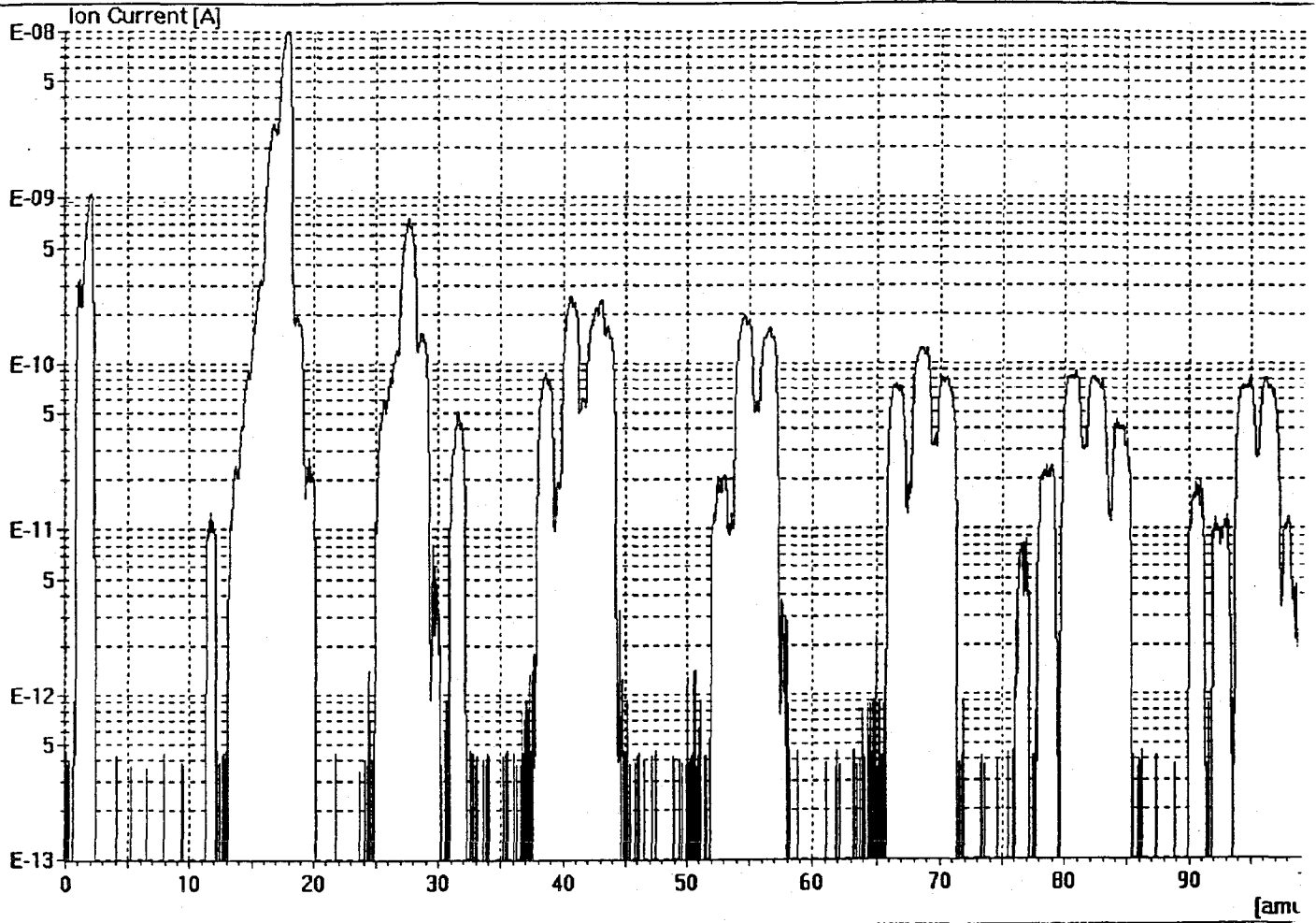


Fig. 1



X: 20.88 Y: 1.723195E-09

Fig. 2