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# Office Memorandum • UNITED STATES GOVERNMENT

TO : The Files (R&D Branch)

DATE: 19 November 1957

FROM :

[Redacted]

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ILLEGIB

SUBJECT: TP-3 Motors

[Redacted]

REF : Trip Report to [Redacted] dated 30 September 1957; Memo to The Files dated 16 October 1957

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1. Five TP-3 motors were received at the Laboratory on 18 October 1957. [Redacted] was found defective and returned to the manufacturer.

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2. The motors at room temperature and under printer load drew current in the range of 80 to 105 ma. The motors at room temperature exhibited best speed control with voltage without the use of a governor resistor. The armature had been slowed down, however, such that weighting of the armature with solder was not resorted to as it was on the previous samples.

3. In order to suppress motor hash standard procedures were used but any capacitance or resistance across the governor increased the speed variation from  $\pm 10$  rpm to  $\pm 25$  rpm at room temperature. Effective hash reduction was obtained by using a 1N56 diode in a spark suppression circuit together with bypassing at the motor and 12 volt supply.

4. We took the position that confining the speed variation at room temperature would permit the motors to meet the specified speed regulation over the temperature range  $-10$  to  $+40^{\circ}$  C. This reasoning is based on measurements of motor [Redacted], an original prototype. As a back-up, circuitry had also been breadboarded and temperature tested which would correct the speed regulation even though it was 2.5 times out of specifications.

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5. The four motors, Serial Nos. [Redacted] inclusive, with printer loads were temperature cycled over the range  $-10^{\circ}$  to  $+40^{\circ}$  C. The least speed variation noted was 30 rpm and the greatest 215 rpm. This 5:1 variation in speed over the temperature-voltage range makes it practically impossible to employ the speed control previously breadboarded. One motor needs no control; the worst of the others was five times out of specifications and is impossible to work with. Governors were interchanged; the worst governor was put on the motor that had governed the best and this motor now exhibited a change in speed of over 200 rpm.

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6. Our report to the files dated 19 July, and [redacted] follow-up and trip report dated 30 July 1957 shows that [redacted] was made aware of the temperature dependence of the governor. Following this further, during my trip to [redacted] and on September 18th recorded in notebook 264, page 3, is the following statement: "Discussion with engineers here established that temperature control depends on the governor and since this unit is not under their control they can do nothing about it".

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7. After making temperature runs on the four motors and interchanging the governors, a telephone call was made to [redacted] This company can:

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- (a) Temperature compensate the governors using NYPSTAN C spring material.
- (b) Stabilize the governors by baking at 275° F for 18 hours and retightening component parts.
- (c) Substitute a high temperature phenolic of low moisture absorption for the melamine now used. This substitution reduces moisture absorption by the insulating material and prevents distortion of the governor plate.

8. [redacted] has never made temperature measurements required by the specifications. Without this data they could not direct [redacted] in the manufacture of a temperature compensated governor. There is reasonable doubt as to whether [redacted] is aware of what [redacted] can do in temperature correction and stabilization of the governor.

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9. On November 18th a call was made to [redacted] The results of our tests and call to [redacted] were discussed. [redacted] was requested to contact [redacted] and make recommendations by November 19th.

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