to earth; the neutral line, N' is earthed to the case of the suppressor in the power-supply cabinet, which defines 'earth' for the whole equipment. The supply is 415V between phases, i.e. 240V phase-to-neutral. The suppressed lines are connected direct to the heater transformers in the computing cabinet, to alarm relays RL2, RL4, and RL6, which are associated with the HT alarm fuses. The three phases in the power-supply cabinet are tapped to the voltmeter switch, SW1, and again to give signal inputs to the control amplifier. Power for the field control amplifier and field regulators is obtained between phase C' of the regulated supply and neutral as soon as contactor CR4 closes, i.e. when the motorised potentiometer has reached its top limit. The heater transformers in bay 3 load the phases A', B', and C', in the ratio, 3:4:3, those in bay 2 in the ratio 4:3:3 and those in bay 1 in the ratio 2:2:1. The monitor power supply and the drum-servo power supply are fed from phase C'.

15. The HT and bias rectifiers and the HT stabilising units are housed in the left-hand bay of the power-supply cabinet. The bias rectifiers are fed from transformer TR4 at the bottom of the left-hand bay if the rotary bias switch in the right-hand bay is closed. The HT rectifiers are fed from transformer TR5 at the bottom of the right-hand bay as soon as contactor CR2 (Fig.2.10) closes, provided that the rotary bias switch is closed too. Regulated power is also fed to the HT control amplifiers and to the heaters of the shunt-stabiliser valves. Relays RL10, RL12 and RL11 (fig.2-4) act as interlocks with the HT switching circuit, to ensure that the HT supplies are switched off (by de-energising CR4) if one of the stabiliser supplies should fail. The stabilisers and control amplifiers are fed as follows:

| | |
|---|---|
| phase A' | -150V control amp. and associated stabiliser unit. |
| phase B' | 200V control amp. and three associated stabiliser units. |
| phase C' | 300V control amp. and two associated stabiliser units. |

16. The under-voltage and over-voltage relays are Sangamo-Weston AC-voltmeter-type units. Two under-voltage trips and two over-voltage trips are used, which operate between phases A' and B' and between phases B' and C'. The relay contacts are shown in the under-voltage positions in fig.2.4. Relay RL9 is energised when the main isolator is closed; it drops out if the regulated voltage rises above the nominal value by more than 10%, and in doing so, breaks the supply to CR1 which in turn isolates the unregulated three phase supply from the alternator exciter power unit. This reduces the alternator output to zero thereby switching-off heaters and HT supplies (fig.2.2). Relay RL8 is energised as soon as the regulated voltage rises to within 10% of the nominal value; if the voltage subsequently falls below this level, the relay drops out and the HT supplies are switched off as shown in fig.2.7. The heaters are not switched off in the case of under-voltage.

**Regulation**

17. The AC-regulating system is shown in fig.2.5. The field winding of the alternator is fed from the DC exciter, whose field winding is in turn fed from the main