

## POWER SWITCHBOARD EQUIPMENTS: EP13/1 SERIES

### Introduction

Switchboards in this series are used to control and distribute 240-volt single-phase supplies at certain transmitting stations. Although slight variations exist at different sites, the switchboards conform in most respects to a common pattern to be described. The D.C.C. code (e.g. EP13/1 or EP13/1A) allocated to a switchboard may not appear on it or on related drawings.

The equipment is designed to take its mains input from a single-phase-and-neutral 480/240-volt three-wire system. (In a system of this type, the power is derived from a 240-0-240-volt winding on a supply authority's transformer.) The mains feed passes through a double-pole-and-neutral main isolator on the switchboard, and from that point on is treated as two independent 240-volt single-phase supplies.

The switchboard includes equipment to control and distribute 240-volt single-phase supplies from a standby Diesel-alternator set. Precautions are taken to ensure that the mains and alternator feeders cannot be connected together inadvertently.

In most installations the Diesel-alternator set is controlled by an Automatic Control and Protection System Mark II, Mark III or Mark IIIA. These systems are described in Part 1 of Instruction T.14 and use some of the apparatus fitted to the switchboard.

### Switchboards EP13/1 and EP13/1A

#### *General Description*

These switchboards, although similar, have certain differences between them as mentioned subsequently. Differences of detail also occur at individual stations and are mentioned in Instructions dealing with particular sites.

Each switchboard is floor-mounted and is about 7 ft high, 9 ft wide and 2 ft 6 in. from front to back. Control switches and indicating equipment are carried on the front face and the rear is enclosed by bolted panels and hinged doors. The positions of the individual items of equipment on a typical EP13/1A are indicated in Fig. 1.

Each switchboard comprises three sections with distinctive functions. One end-section controls the incoming mains supply, the other end-section is concerned with the standby alternator and the centre-section is used for distribution purposes. Fig. 2 shows the circuit of a typical EP13/1A.

#### *Incoming Mains Section*

This section is divided into an upper and a lower compartment.

The lower compartment houses the incoming-supply cable-termination and the supply authority's metering equipment. The incoming mains feeder enters the switchboard from below the floor beneath the compartment. A lockable hinged door is fitted and has a glazed panel through which the meters can be read with the door shut.

The three-wire mains supply passes from the lower compartment to a main isolator in the upper compartment; this isolator takes the form of a 300-ampere double-pole-and-neutral fuse-switch, FS1, the neutral of which makes before and breaks after the live poles. A 5-ampere auxiliary switch is fitted within FS1 and operates with the main contacts; this switch is part of the standby-supply control system.

The remainder of the upper compartment has a hinged door which carries BBC metering equipment. In some installations, where the Mark-III or IIIA standby-supply control equipment is used, the space behind the door is used to mount a mains-failure relay.

The mains supply from the output of FS1 is connected to busbars which extend into an upper compartment of the distribution section. One of the live busbars, together with the neutral busbar, is further extended to pass into an upper compartment of the standby supply section.

#### *Standby Supply Section*

The front panel of the upper compartment of this section carries meters associated with the standby alternator and maintained distribution system. Below this panel are a double-pole switch S1 and a fuse-switch FS3, which are used to connect the mains and alternator outputs respectively to interlocked contactors in a separate compartment in the rear of this section.

The contactor compartment has a hinged door which is secured by two locks. The keys for these locks are held trapped in switches S1 and FS3 when the switches are closed. When either switch is open its key can be removed and the switch cannot then be operated. Both keys are required to open the contactor compartment door.

The contactors are part of the standby-supply control system; their operation is described in

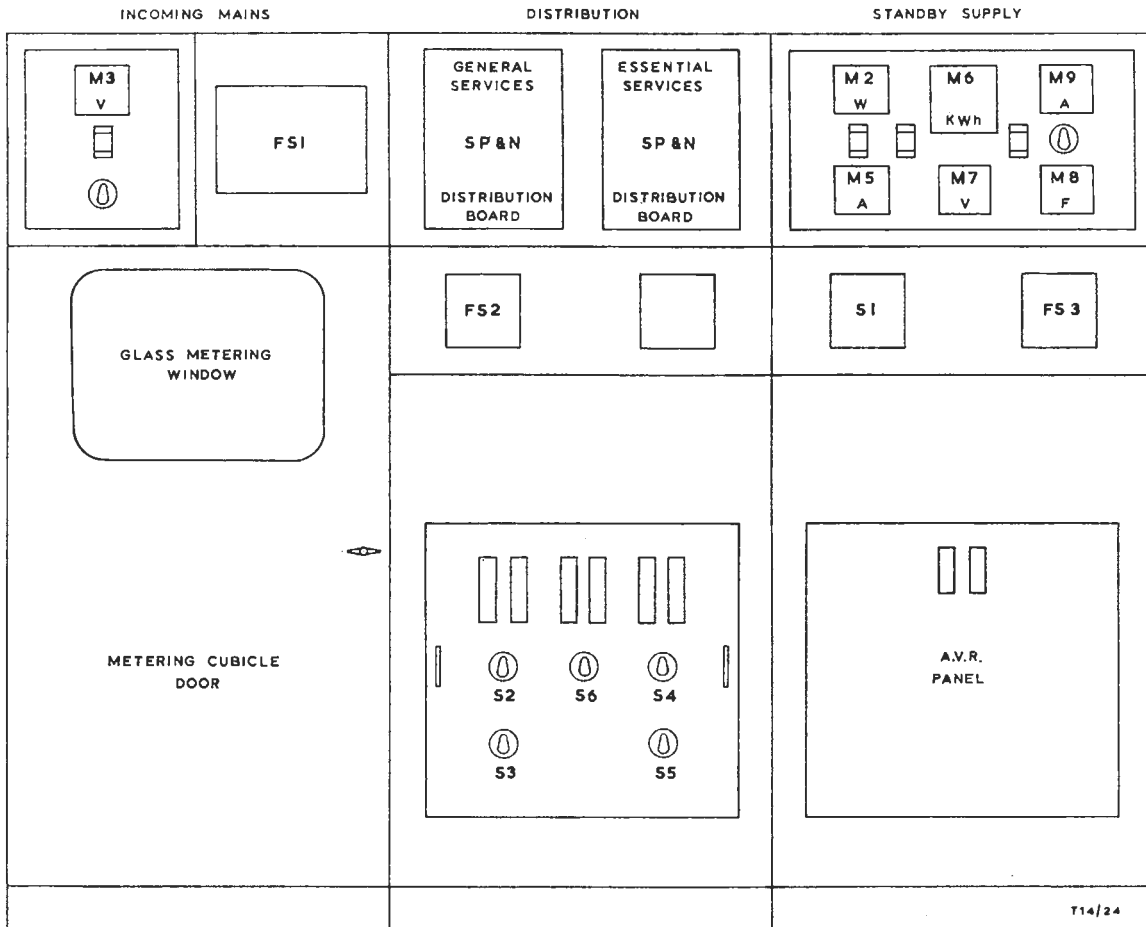


Fig. 1 Power Switchboard Equipment EP13/1A: Front View

The D.C.C. code and corresponding title may not appear on this equipment or on drawings

Part 1 of Instruction T.14. The output from the contactors is taken to maintained busbars in the upper compartment.

The front of the lower compartment houses an automatic voltage regulator for the standby alternator. This regulator is in two parts, one of which forms the bulk of the equipment and stands on the floor. The other part provides means of control and manual adjustment of the regulator and is fitted to a hinge-down panel on the front of the section.

Some installations have additional standby-supply auxiliary equipment such as a speed indicator on this section.

*Distribution Section*

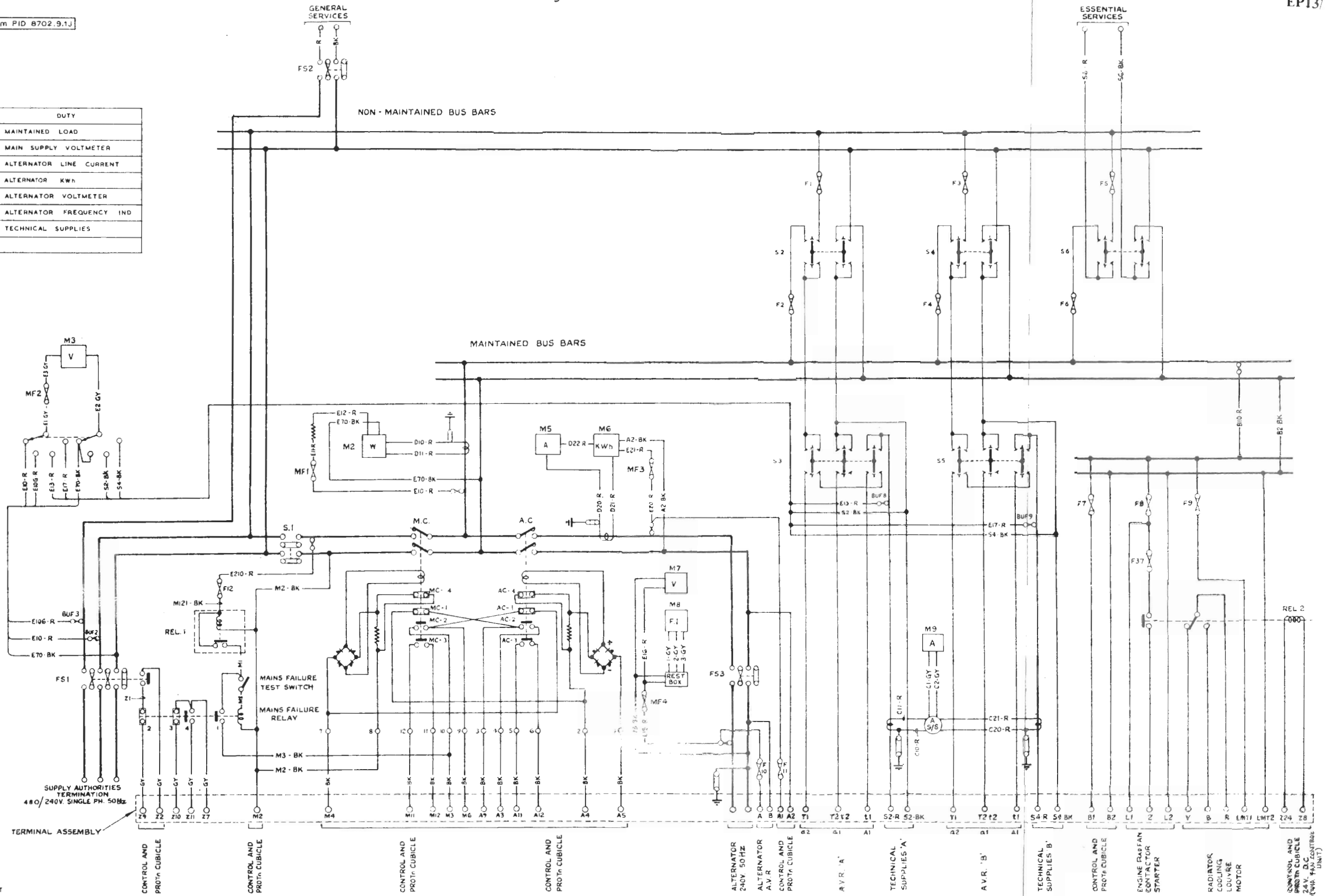
The upper compartment of this section carries two

distribution boards which are 12-way in an EP13/1 and 8-way in an EP13/1A. One board is used to distribute general services and is fed with a non-maintained supply from one side of the incoming mains via *General Services* fuse-switch FS2. No other equipment is fed from this side of the mains input. The other distribution board is to feed essential services and is supplied via a rotary switch S6. This switch is used to select the feed to the distribution board from either the maintained or the non-maintained busbars. A central *Off* position is provided to isolate the board.

The lower compartment of the section carries the switches FS2 and S6 already mentioned, as well as rotary switches to control A and B technical supplies. The A supply is selected from either the maintained or the non-maintained busbars by

from PID 8702.9.1J

REF	DUTY
M 2	MAINTAINED LOAD
M 3	MAIN SUPPLY VOLTMETER
M 5	ALTERNATOR LINE CURRENT
M 6	ALTERNATOR KWh
M 7	ALTERNATOR VOLTMETER
M 8	ALTERNATOR FREQUENCY IND
M 9	TECHNICAL SUPPLIES



T14/79T

Fig. 2 Power Switchboard Equipment EP13/1A: Typical Circuit

switch S2. The output from S2 passes to *A.V.R.A.* selector switch S3, by means of which an external automatic voltage regulator can be connected in circuit or bypassed-and-isolated. Switch S3 has a central *Off* position, at which it can be locked and the key removed as a safety tally. The B supply is similarly routed via switches S4 and S5.

The rotary switches S2 to S6 are wired with sets of contacts in parallel to increase the current-

carrying capacity. In the EP13/1, these switches are permanently fixed to the front panel. The EP13/1A has a separate withdrawable chassis on which the switches are mounted; with this arrangement, the connections to the switches are made via butt contacts at the chassis rear. The chassis must not be withdrawn or inserted unless all its switches are at *Off*.

AJ 9/67