

Part I—Description and Management of Systems

Chapter 21—ECM Installation

List of Contents

	<i>Para.</i>		<i>Para.</i>
General	1	Operation of the turbo-alternator	4
ECM power supplies	2	ECM cooling	5
ECM controls and indicators	3	Rear warning pressurisation system	6

1 General

(a) Nine canisters in the rear fuselage consist of six transmitter units grouped forward and three power units grouped at the rear. Socket plates and ballasted socket plates are provided for fitting in lieu of the canister units should the aircraft be flown with the canisters removed.

(b) Access to the equipment is via three outward-opening doors on the underside. The doors of the rear-fuselage which are fitted with press-to-release fasteners, must be opened in sequence commencing from the rear end and closed in the reverse order.

(c) This Chapter covers the power supplies and the cooling system for the ECM, and also the rear warning pressurisation system.

2 ECM power supplies

(a) (i) the 28-volt DC supplies to the ECM equipment are from the existing bus-bars of the aircraft system, via suitable fuses on the distribution panels. (The bulk of the control fuses are contained in a fuse box adjacent to panel 3P in the cabin. These fuses are fed via circuit-breaker No. 3 which is on panel 3P.

The fuses do not become "alive" until the alternator output is at the correct level and switched ON. The remainder of the DC supplies at 28-volts are obtained from individual fuses on panels 3P, 4P, and 26P.)

(ii) AC power at 200-volt, 400 CPS, 3 phase is supplied by a turbine-driven 30KVA alternator installed, with its frequency and voltage controllers, in a compartment aft of the starboard main wheel bay. The turbine is driven by air bled from the pressurisation and anti-icing supplies from No. 3 and No. 4 engines.

(iii) A 200-volt 3 phase AC ground supply socket is on the starboard side of the rear fuselage. The turbo-alternator electrical supply is isolated when a ground supply is plugged in and switched on.

(b) Cooling of the alternator gear box and voltage control unit is by ram air taken from a flush intake on the access door, the air being exhausted via a similar outlet aft.

(c) The fuse distribution and main sub contactor panels for the installation are in the rear fuselage section—adjacent to the various ARI units.

(d) Operation of the crash switches will shut down the alternator and isolate all ECM circuits.

3 ECM controls and indicators

(a) Two switch panels (71P and 81P), a voltmeter and frequency meter panel and a dimmer switch panel at the AEO's station comprise the control panels for the ECM equipment.

(b) (i) The turbine air and alternator control panel (71P) has the following switches and indicators from left to right:

- ◀ *Pre-Mod. 1884*
- Turbine bleed air valve OPEN—SHUT indicator
- Turbine RUN—STOP control switch
- Inching push switch
- Alternator ON—OFF control switch
- Alternator power supply ON—OFF indicator
- Ground supply (200 volt) ON—OFF indicator
- Post-Mod. 1884*
- Emergency EMERG—NORM control switch
- Speed INC—DEC control switch spring-loaded central (neutral)
- Turbine RUN—TRIP & RESET control switch spring loaded central (neutral)
- Turbine bleed air valve OPEN—SHUT indicator
- Alternator ON—OFF control switch
- Ground supply (200 volt) ON—OFF indicator ▶

(ii) The indicators show black/white stripes when in the neutral position.

NOTE 1: No. 4 engine air switch must be selected OPEN before the turbine control switch is set to RUN.

NOTE 2: The turbine control switch must be at RUN before the alternator ON—OFF control switch is effective.

(c) The ECM power supplies panel (81P), which is immediately below panel 71P, contains ON—OFF push-switches for each ARI forming the complete installation. Also on the panel are COOLING ON—OFF push-switches and an indicator for the ECM cooling system. (See para. 5).

(d) The voltmeter and the frequency meter are on a panel marked BLEED AIR TURBINE. The instruments show the voltage and frequency output of the turbo-alternator unit and are protected by suitable fuses on the port fuse panel (68P) in the ECM compartment.

(e) Two dimmer switches at the AEO's station marked DIMMER TAIL WARNING and DIMMER AIRBORNE W'NG, control the illumination of their respective indicators.

4 Operation of the turbo-alternator

◀ (a) *Running the turbo-alternator (pre-Mod. 1884)*

To run the turbo-alternator pre-Mod. 1884, set the turbine RUN—STOP switch to RUN and inch the air valve open by use of the inching push switch (turbine bleed air valve indicator OPEN). When voltage and frequency are correct (200 volt, 400 cps)—set the alternator control switch to ON.

(b) *Running the turbo-alternator (post-Mod. 1884)*

To run the turbo alternator post-Mod. 1884, ensure that the emergency switch is selected to NORM, hold the turbine control switch to RUN until 200 volts is indicated on the voltmeter then release the turbine control switch. The turbine bleed valve will continue to open and when fully open the valve indicator will show OPEN. Check the voltage and frequency are correct (200 volts, 400 cps), then set the alternator control switch to ON.

(c) *Protection circuits*

If the voltage and frequency meters read zero, indicating that one of the turbo alternator protection circuits has operated, the appropriate circuit is reset by selecting the alternator control switch to OFF and the turbine control switch to STOP (TRIP & RESET post-Mod. 1884). When the turbine bleed air valve indicator shows SHUT the system has reset and can be selected on as in paras. 4(a) or (b) as appropriate. If the protection circuit operates again, the equipment should be shut down as in para. 4(d). However, post-Mod. 1884, it may be possible to run the equipment ▶

by selecting EMERG on the emergency switch and opening the bleed valve by use of the INC position of the speed switch. If the correct output is obtained (200 volts, 400 CPS), subsequent control should be by use of the INC and DEC positions of the speed switch. Under these circumstances Nos. 3 and 4 engine throttle settings should, if possible, be left alone as a slight variation in throttle setting will affect the output of the alternator.

(d) *Manual shut-down*

To shut down the turbo-alternator, switch off all ECM loads and set the alternator control switch to OFF, then set the turbine control switch to STOP (TRIP & RESET post-Mod. 1884). The turbine bleed valve will show SHUT after 90 secs.

NOTE: When the turbine control switch is set to STOP, the turbine runs down but (in order to protect the turbine bearings) a hot air bleed maintains the turbine speed at continuous-idling RPM.

5 Cooling

(a) The ECM equipment is cooled by a water-glycol mixture which is drawn from a reservoir and circulated by two pumps (operating in parallel) to a cooling pack and thence to the canisters. A constant circulation then obtains. Should one pump fail the remaining one will continue to circulate coolant, but at a reduced rate. The water-glycol system is pressurised to 10 PSI from the engine air supply to the bomb door seals. (See Chap. 9, para. 10.)

(b) A sight glass, mounted in the rear face of the water-glycol reservoir, can be viewed through a small perspex window in the rear fuselage—starboard side.

(c) The system is controlled by two ON—OFF push-button switches on panel 81P. The switch controls the electrical supplies to the water-glycol pumps and the compressor of the cooling pack.

(d) The adjacent magnetic indicator shows LOW when the water-glycol temperature is below 0°C, and ON when the water-glycol temperature reaches +3°C. Operation of an automatic high temperature switch, which safeguards the system, will cause the indicator to show OFF. A period of two minutes must then elapse before the system is switched ON again.

(e) A condenser, which forms part of the cooling pack, is located in a ram air intake on the starboard side of the rear fuselage. The nose portion of the intake is removable and embodies an electrically-heated anti-icer which is operated in conjunction with the aircraft anti-icing system—(TAIL FIN). See Chapter 12, para. 4(a). A test switch is provided to check the serviceability of the anti-icer.

6 Rear warning pressurisation system

(a) The tail warning radar unit and scanner are at the extreme rear end of the fuselage. The radar head is normally pressurised to 20 PSI absolute, by a self-contained system in the rear fuselage.

(b) Two air storage cylinders in the roof structure are charged to 3,000 PSI through an air charging valve. The charging valve and a pressure gauge are behind a removable louvred panel on the port underside of the rear fuselage. The louvred panel permits ventilation of the rear fuselage. A relief valve in the charging line operates at pressures in excess of 3,300 PSI.

(c) A lamp on the indicator unit at the AEO's station comes on when the radar head pressurisation is normal. The rear warning installation switches itself off when the pressure falls below a pre-determined figure.

(d) Cooling air (ram) for the radar unit is taken (via an automatic valve) from a flush intake on the port side of the rear fuselage.

This file was downloaded
from the RTFM Library.

Link: www.scottbouch.com/rtfm

Please see site for usage terms,
and more aircraft documents.

