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Ministry of Defence

de&s

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DE&S Secretariat Land Equipment

DESSEC-PolSec LE-JSC-WPNS@mod.uk

Defence Equipment & Support
Maple 0a #2043
MOD Abbey Wood
Bristol BS34 8JH

[redacted]

Via: [redacted]

26-Sep-17 Our Reference:2017/08151

[redacted],

Thank you for your e-mail dated 21st August 2017, requesting the following information:

> *Can I have AESP's for Generator Set, Engine Driven (Gasoline), Battery Charging 14/28V 300/500 W (Hopkins)*
>
> *I would be grateful if you could supply copies of any of the following documents but especially the 201 – Operating Information.*
>
> *6115-G-153-101 Purpose and Planning Information*
> *6115-G-153-201 Operating Information*
> *6115-G-153-302 Technical Description (contains wiring diagram)*
> *6115-G-153-512 Failure Diagnosis*
> *6115-G-153-601 Maintenance Schedule*
> *6115-G-153-711 Illustrated Parts Catalogue*
> *6115-G-153-811 Modification Instruction and Index*

I am treating your correspondence as a request for information under the Freedom of Information Act 2000 (FOIA).

A search for the information has now been completed within the Ministry of Defence, and I can confirm that information in scope of your request is held. The information you have requested can be found attached below, but some of the information falls entirely within the scope of the absolute exemption provided for at Section 40 (2) (Personal Data) of the FOIA and has been redacted.

Section 40(2) has been applied to some of the information in order to protect personal information as governed by the Data Protection Act 1998. Section 40 is an absolute exemption and there is therefore no requirement to consider the public interest in making a decision to withhold the information.

If you have any queries regarding the content of this letter, please contact this office in the first instance.

If you wish to complain about the handling of your request, or the content of this response, you can request an independent internal review by contacting the Information Rights Compliance team, Ground Floor, MOD Main Building, Whitehall, SW1A 2HB (e-mail CIO-FOI-IR@mod.uk). Please note that any request for an internal review should be made within 40 working days of the date of this response.

If you remain dissatisfied following an internal review, you may raise your complaint directly to the Information Commissioner under the provisions of Section 50 of the Freedom of Information Act. Please note that the Information Commissioner will not normally investigate your case until the MOD internal review process has been completed. The Information Commissioner can be contacted at: Information Commissioner's Office, Wycliffe House, Water Lane, Wilmslow, Cheshire, SK9 5AF. Further details of the role and powers of the Information Commissioner can be found on the Commissioner's website at https://ico.org.uk/.

Yours Sincerely

DE&S Secretariat Land Equipment

[redacted]

ARMY EQUIPMENT
SUPPORT PUBLICATION

[redacted]

6115-G-153-101
2nd Edition September 1996
(Superseding edition dated Jan 93)

CONDITIONS OF RELEASE

1 [redacted]

2 [redacted]

[redacted]

4 This information may be subject to privately owned rights.

[redacted]

GENERATOR SET, ENGINE DRIVEN (GASOLINE), BATTERY CHARGING, 14/28 V, 300/500 W (HOPKINS)

PURPOSE AND PLANNING INFORMATION

REPRINTED INCORPORATING AMDTS 1-2

This publication contains information covering the requirements of Category 1.0 at information levels 1, 2, 3 and 4

BY COMMAND OF THE DEFENCE COUNCIL

Ministry of Defence
Issued by
ARMY TECHNICAL SUPPORT AGENCY
DIRECTORATE OF TECHNICAL SERVICES

AMENDMENT RECORD

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PRELIMINARY MATERIAL Page

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Table

PREFACE

Sponsor:
DGES(A)
File ref:

Publications Agency:
ATSA Chertsey
Project No: 72111(210)
File ref:

INTRODUCTION

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			1 User/ Operator	2 Unit Maintenance	3 Field Maintenance	4 Base Maintenance
1	0	Purpose and Planning Information	101	101	101	101
	1	Equipment Support Policy Directives	*	*	*	*
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	1	Aide Memoire	*	*	*	*
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3		Technical Description	201	302	302	*
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Associated publications

4

Reference	Title
AESP 2805-B-900-octad	Engine, Gasoline, S/Cyl, OHV Kubota
SEI 14411	Safety Precautions for Electrical Equipment
AESP 6150-A-100-201	Earthing and Electrical Protection
AESP 6140-A-100-013	Lead Acid Batteries

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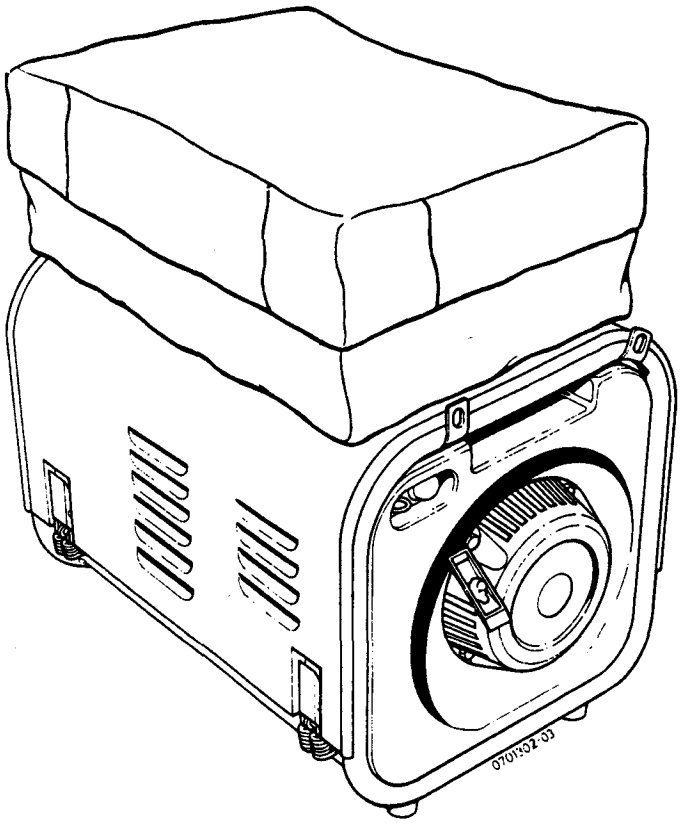
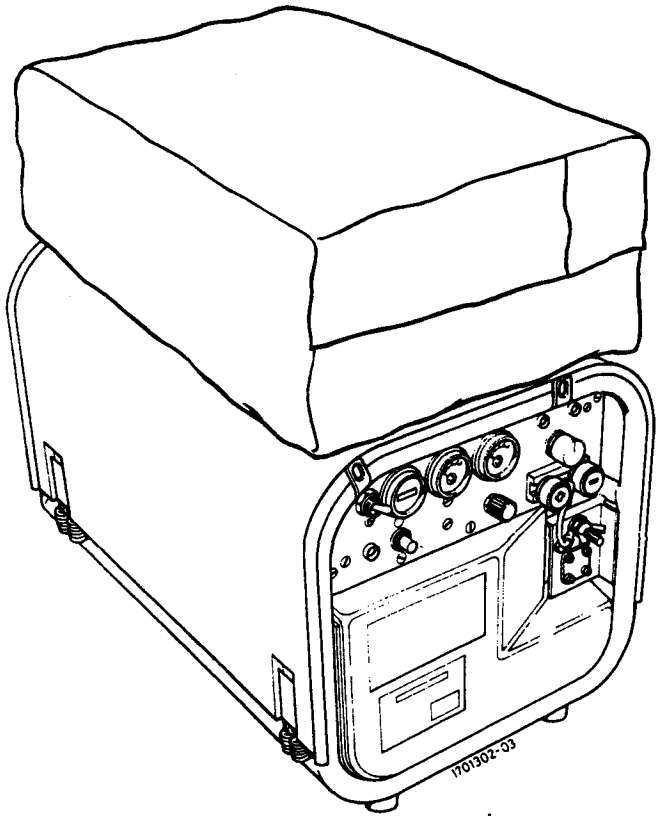


Generator - Three-quarter rear view



Generator - Three-quarter front view

PURPOSE AND PLANNING INFORMATION

EQUIPMENT IDENTITY

1 The equipment identity data is as follows:

1.1 Equipment designations : Generator set, gasoline engine, 300/500 W, general purpose, (battery charger), (Hopkins).

Generator set, gasoline engine, 300/500 W, ADAD only version, (battery charger), (Hopkins).

1.2 NATO Stock No (NSN) : General purpose version – X2/6115-99-983-9538.

ADAD only version – X2/6115-99-396-0315.

1.3 Manufacturer : E. C. Hopkins Ltd.

ROLE

2 The 14/28 V, 300-500 W generator is intended to provide a portable d.c. source for charging lead-acid batteries in the field. It may also be used as a general purpose d.c. source. Once the generator is running, no action is required by the operator other than monitoring performance and refuelling as necessary.

BRIEF DESCRIPTION

3 The generator set comprises a rigid tubular steel frame which supports a gasoline powered engine, an alternator and a control box assembly. The top and sides of the complete assembly are shrouded by an acoustic cover held in place by spring loaded catches. Moulded fibreglass end panels are attached at the front and rear ends of the assembly. Accessory equipment is stowed in a waterproof, removable bag attached to the top of the acoustic cover. A recoil (rope) type starting system is incorporated for starting the generator set engine. Output voltage is automatically regulated and the alternator is protected by a resettable overload protection device.

PHYSICAL DATA

4 The main physical parameters of the assembled equipment are as follows:

4.1 Overall dimensions:

Length	-	470 mm.
Width	-	370 mm.
Height:		
Full stowage bag	-	500 mm.
Empty stowage bag	-	380 mm.

4.2 Weight:

Full stowage bag	-	43 kg.
Empty stowage bag	-	36 kg.

4.3 Engine:

Fuel consumption at full load	-	0.69 kg/hour (approx).
Oil sump capacity	-	0.55 litres

PERFORMANCE

5 The generator set performance data is given in Table 1.

TABLE 1 PERFORMANCE DATA

Serial (1)	Item (2)	Performance data (3)
1	Maximum gross continuous output of engine.	2.7 kW (3.7 hp) at 3200 rpm.
2	Noise level.	63 dBA at 6 m.

FUEL REQUIREMENT

6 The fuel requirement for the equipment is as follows:

6.1 Either NATOGAS - NATO F-57 or 4* Gasoline to BS4040 or ULGAS - NATO F-67 or Unleaded Gasoline to BS7070/EN228.

NOTE

ULGAS is the preferred fuel.

ENVIRONMENTAL DATA

7 The environmental data for the equipment is as follows:

7.1 The generator set is designed for continuous operation in weather conditions ranging from arctic to tropical.

7.2 The engine is capable of starting and running in ambient temperatures between -32 and +44 degrees centigrade.

7.3 The operational altitude range is from sea level to 1500 m.

7.4 The storage temperature range for the equipment is between -13 and +55 degrees centigrade.

TRANSPORTATION DATA

8 The generator set is suitable for transportation by land, sea or air.

MANNING REQUIREMENTS

9 The manning requirements for the equipment are as follows:

9.1 One person can start and operate the equipment.

9.2 Two persons are required to lift the equipment safely.

ELECTRICAL DATA

10 Generator set electrical data is given in Table 2.

TABLE 2 ELECTRICAL DATA

Serial (1)	Item (2)	Data (3)
1	Output.	14 V d.c. nominal, 300 W. 28 V d.c. nominal, 500 W.
2	Voltage regulation.	± 1%.
3	RFI suppression.	DEF STAN 59-41 Class A.
4	Circuit breaker rating.	50 A.

6115-9-153-101
~~XXXX-X-XXX-XXX~~

ARMY EQUIPMENT
SUPPORT PUBLICATION

COMMENT(S) ON AESP

To: ATSA DTS 3.2
Ha-Ha Road
Woolwich
LONDON SE18 4QF

From: .....
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Senders Reference	BIN Number	Date
AESP Title:		
Chapter(s)/Instruction	**Page(s)/Paragraph(s)**	

If you require more space please use the reverse of this form or a separate piece of paper.
Comment(s):

Signed: ..... Telephone No.: .....

Name (Capitals): ..... Rank/Grade: ..... Date: .....

✂ .....

ATSA DTS 3.2 USE ONLY

To: .....
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From: ATSA DTS 3.2
Ha-Ha Road
Woolwich
LONDON SE18 4QF

Thank you for commenting on AESP

Your reference ..... Dated .....

Action is being taken to:	Tick		Tick
Issue a revised/amended AESP		Under investigation	
Incorporate comment(s) in future amendments		No action required	
Remarks			

Signed: ..... Telephone No.: .....

Name (Capitals): ..... Rank/Grade: ..... Date: .....

AESP Form 10 (Issue 3 dated Oct 97)

CONDITIONS OF RELEASE

1 [redacted]

2 [redacted]

4 This information may be subject to privately owned rights.

[redacted]

GENERATOR SET, ENGINE DRIVEN (GASOLINE), BATTERY CHARGING, 14/28 V, 300/500 W (HOPKINS)

REPRINTED INCORPORATING AMDTS 1–3

OPERATING INFORMATION

This publication contains information covering the requirements of Categories 2, 3, 4, 5-1 and 5-2 at information level 1.

BY COMMAND OF THE DEFENCE COUNCIL

Ministry of Defence
Issued by
ARMY TECHNICAL SUPPORT AGENCY
DIRECTORATE OF TECHNICAL SERVICES

72111(209)
ATSA Chertsey
9609\WCP-0402
Sep 96 (Amdt 1)

[redacted]

AMENDMENT RECORD

Amdt No.	Incorporated By (Signature)	Date
1	[redacted]	11-2-97
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PRELIMINARY MATERIAL

OPERATING INFORMATION

Chapter

PREFACE

Sponsor:
DGES(A)
File ref: DGES(A)/173/12/10/ES42b(3)

Publication Agency:
ATSA Chertsey
Project No: ES42b(3) 8793(119)
File ref: 11 MAG/08/8793

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CAUTION

EQUIPMENT DAMAGE. Ensure the air louvres in the acoustic cover are not obstructed.

This proforma should be retained in this publication. When required for use, reproduce locally.

COMMENT ON AESP

To: ARMY TECHNICAL SUPPORT AGENCY
Directorate of Technical Services
Repository Road
Woolwich
London SE18 4QA

From: .....
.....
.....
.....
.....

Sender's Reference:

Tel No: .....

Date:

Title of AESP: Generator Set, Engine Driven (Gasoline), Battery Charging, 14/28 V, 300/500 W (Hopkins)

COMMENT

Signed .....

To: .....
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.....
.....

From: ARMY TECHNICAL SUPPORT AGENCY
Directorate of Technical Services
Repository Road
Woolwich
London SE18 4QA

Thank you for commenting on AESP 6115-G-153-201

* Action is being taken to:

  * (i) Revise the AESP
  * (ii) Amend the AESP

* No action is considered necessary for the following reasons:

* Delete as necessary

Signed:

AESP Form 10

Date .....

CHAPTER 1

GENERAL DESCRIPTION

CONTENTS

INTRODUCTION

Role

1 The 14/28 V, 300/500 W generator set is intended to provide a portable d.c. source for charging lead-acid batteries in the field. It may also be used as a general purpose d.c. source. General views of the generator set are shown in Figs 1 and 2. These diagrams also indicate the generator set orientation and should be referred to when explanations of component locations are given.

FACILITIES AND GENERAL DATA

2 The generator set provides two selectable nominal outputs of 14 V d.c. (300 W) and 28 V d.c. (500 W). A rotary control on the front panel is used to set the voltage level of the selected output. The output is variable over the ranges 12.3 V - 16 V and 24 V - 32 V.

3 An oil level sensor acts to shut the engine down when the engine oil level becomes too low. The alternator is protected by a resettable circuit breaker.

4 The top and sides of the complete assembly are shrouded by a metal cover which provides acoustic attenuation and weather protection.

5 A removable, waterproof accessory equipment bag containing all necessary generator accessory equipment is attached to the top of the acoustic cover.

6 A recoil (rope) type starting system is incorporated for starting the generator set engine.

7 Fuel is supplied to the engine externally from a jerrycan.

TABLE 1 GENERATOR SET GENERAL DATA

Serial (1)	Description (2)	Value (3)
1	Overall dimensions:	
	Length	470 mm
	Width	370 mm
	Height - with full stowage bag	500 mm
	with stowage bag removed	380 mm
2	Weight - with full stowage bag	43 kg
	with stowage bag removed/empty	36 kg
3	Operating ambient temperature range	-32° C to 44° C
4	Output	14 V d.c. nominal, 300 W (12.3 V to 16 V manual adjustment)
		28 V d.c. nominal, 500 W (24 V to 32 V manual adjustment)

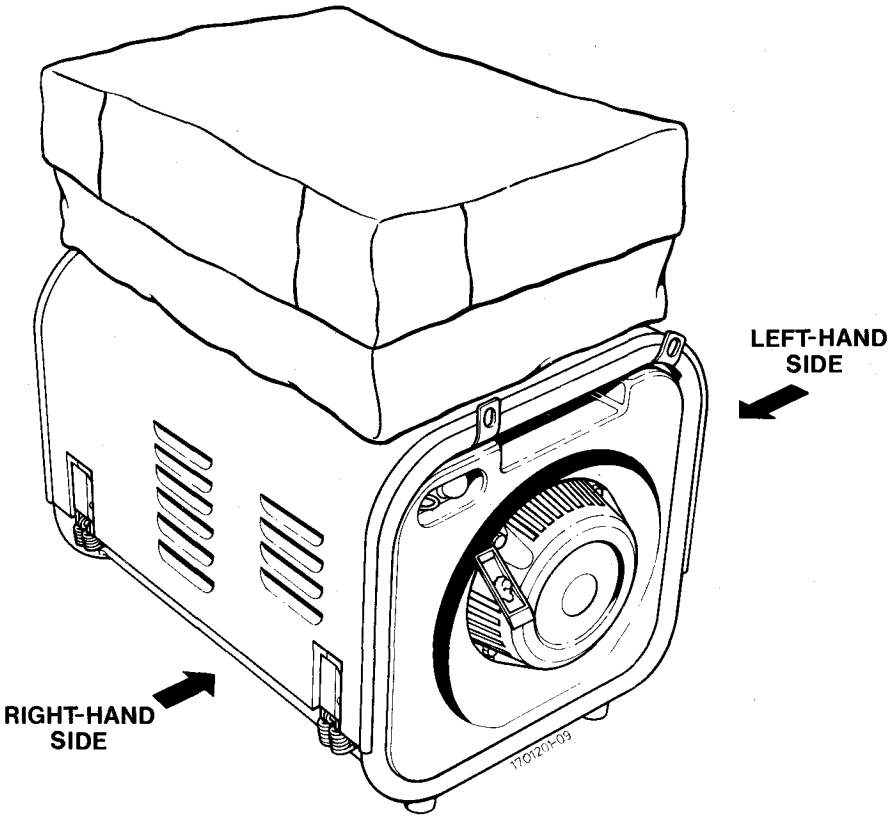


Fig 1 Generator set - Three-quarter rear view

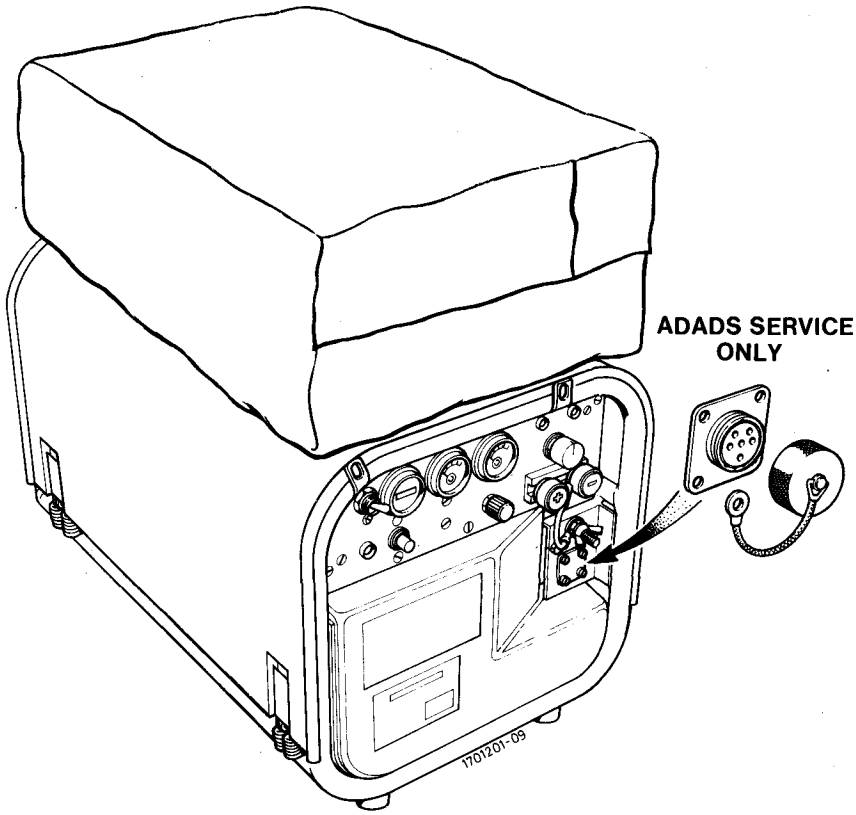


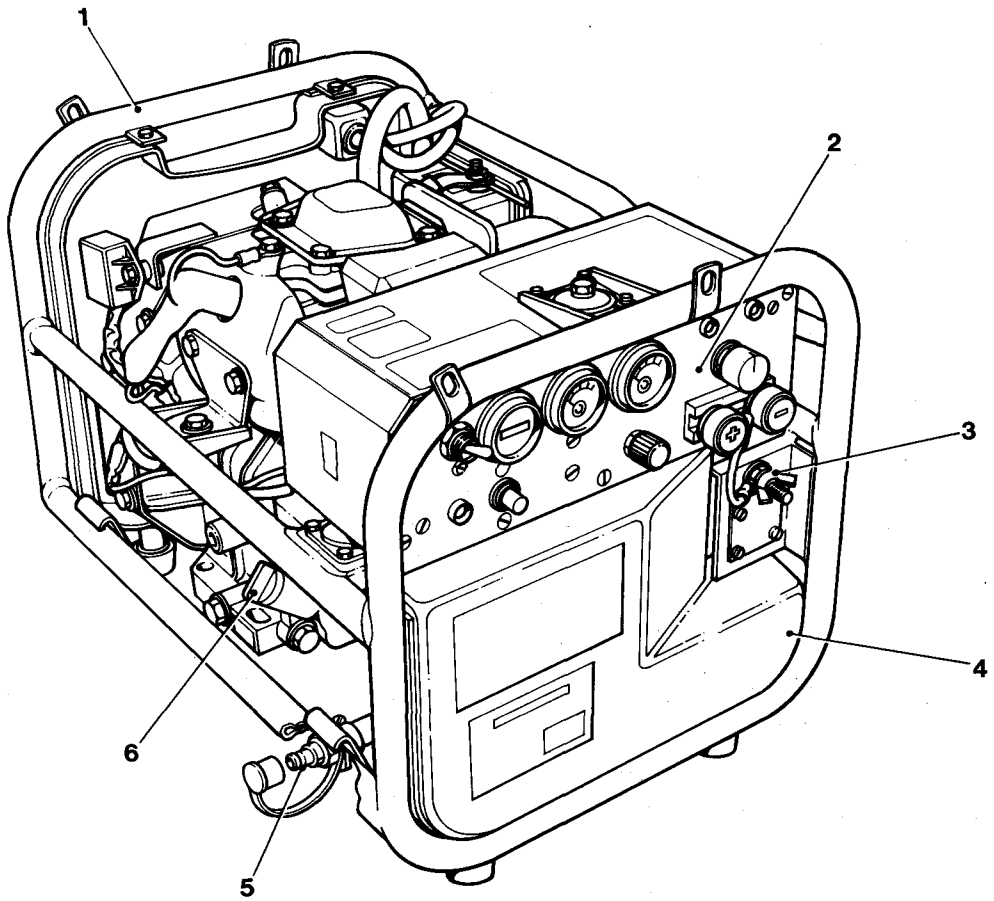
Fig 2 Generator set - Three-quarter front view

Construction

8 The components of the 14/28 V generator set are mounted on a rigid tubular steel frame. The top and sides of the complete assembly are shrouded by a metal acoustic cover. Moulded fibreglass panels are attached at the front and rear ends of the assembly. A removable, waterproof accessory equipment bag is situated on top of the acoustic cover.

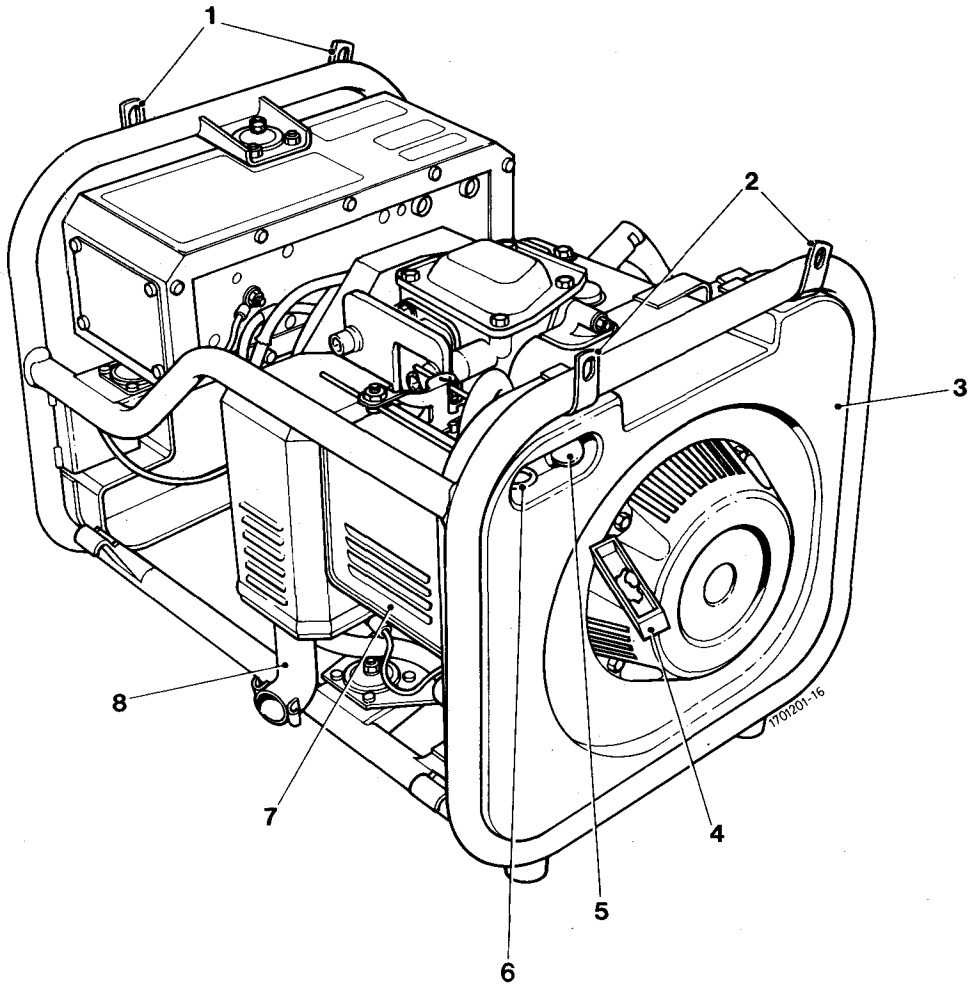
9 The main items of the generator set are a single cylinder gasoline engine, an alternator and a control box assembly. The engine and alternator are combined to form an assembled unit which is mounted onto the tubular frame via resilient mountings.

10 Figs 3 and 4 show views of the generator set with the acoustic cover removed and indicate the locations of the component items associated with the operation and maintenance activities covered in this document.



1 Frame
2 Front panel
3 Earth stud terminal
4 Front end cover
5 Fuel connection point
6 Dipstick/oil filler plug

Fig 3 Component locations - Front left-hand side



1 Carrying handle/shoulder strap lugs
2 Carrying handle/shoulder strap lugs
3 Rear end panel
4 Starter pull-cord
5 Fuel primer control
6 Choke control
7 Air filter system
8 Exhaust silencer unit tail pipe

Fig 4 Component locations - Rear right-hand side

Brief functional description

11 The main functional areas of the 14/28 V, 300/500 W generator set are shown in Fig 5.

12 Once the operator has set the output voltage level, engine speed and output voltage are regulated to suit the load requirements.

13 Instrumentation on the front panel displays the output voltage and current continuously when the generator set is in operation. Lamp indicators on the front panel indicate the selected output voltage range and the presence of an output overload condition.

14 In the event of an output over load condition, a resettable overload protection device disconnects output power from the output terminals.

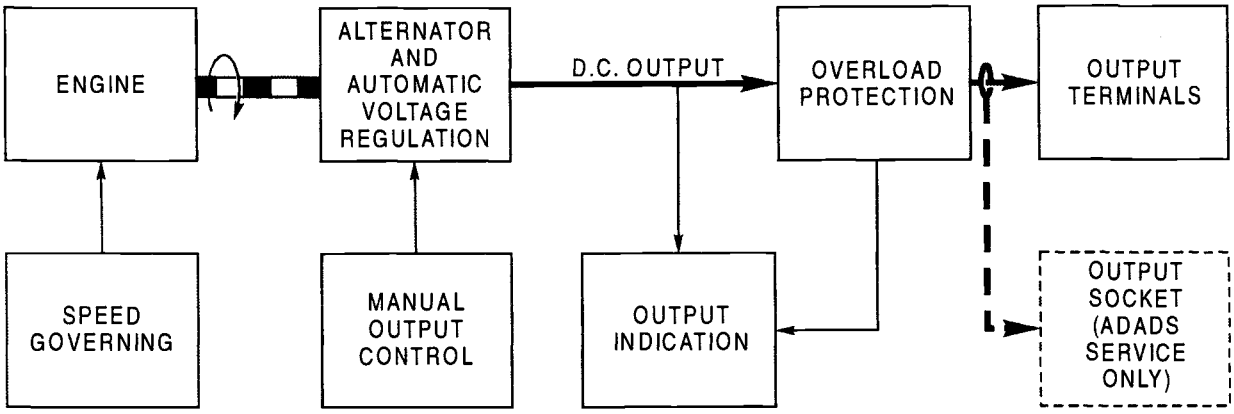


Fig 5 Generator set simplified block diagram

ENGINE

15 The generator set alternator is driven by a Kubota GH120, single cylinder, overhead valve, four cycle, gasoline fuelled, 121 cm^3 engine, which is air cooled. There are a number of engine mounted accessories and support systems used for controlling engine operation.

Air intake system

16 Air intake to the engine carburettor is via an air filter assembly incorporating disposable and re-usable air filter elements.

Ignition system

17 The ignition system is a transistor/magnet type comprising a transistor/magnet ignition unit and a spark plug.

Exhaust system

WARNINGS

(1) TOXIC FUMES. IF THE GENERATOR IS OPERATED IN A CONFINED SPACE, ENSURE THAT THE EXHAUST GASES ARE VENTED TO THE OUTSIDE ATMOSPHERE.

(2) FIRE HAZARD. CARE MUST BE TAKEN WHEN DEPLOYING THE EXHAUST EXTENSION MUFFLER TO ENSURE THAT IT IS NOT CLOSE TO OR CAN COME INTO CONTACT WITH ANY COMBUSTIBLE MATERIAL.

18 Exhaust gas expelled from the engine is routed through a silencer unit and out to the atmosphere via a flexible exhaust extension pipe.

Lubrication system

19 An oil splash system is incorporated for lubricating the moving parts of the engine. A low engine oil level sensing system acts to shut the engine down and disable engine starting until the correct oil level is restored. An oil drain plug is situated at the bottom left-hand side of the crank case.

Fuel system

(1) GASOLINE. GASOLINE FUEL VAPOUR IS EXPLOSIVE WHEN CONTAINED IN A CONFINED SPACE.

(2) GASOLINE. GASOLINE FUEL IS FLAMMABLE AND CONSTITUTES A FIRE HAZARD.

20 Gasoline fuel for powering the engine is supplied externally from a jerrycan, via a 3.7 m long jerrycan adaptor assembly stowed in the accessory equipment bag. An electrical fuel pump, mounted on the generator set frame, forces fuel to the carburettor via an in-line, disposable fuel filter. The fuel system is primed using a rubber bubble type priming control mounted on the generator set rear end cover.

Cooling

21 The engine fan draws cooling air in through grills in the engine fan cover and forces it around the engine.

Starting system

22 A conventional recoil (rope) type starting system is incorporated at the rear end of the engine.

ALTERNATOR

23 The alternator assembly is a separately excited type and is of brush gear construction. It is assembled onto the engine drive shaft to form a combined engine/alternator unit. An automatic voltage regulator (AVR) is an integral part of the alternator assembly and forms part of the excitation system. The AVR provides output sensing and excitation current control functions for maintaining the alternator output voltage.

CONTROL BOX

24 The control box assembly (Fig 6) is resiliently mounted at the front end of the generator set and houses the operation control and indication circuitry.

Front panel

25 The front panel is the control console, which carries the majority of operator controls, the main output terminals and the necessary instrumentation and indicators for monitoring generator set performance. Other controls, used for engine starting, are situated on the generator set rear end panel.

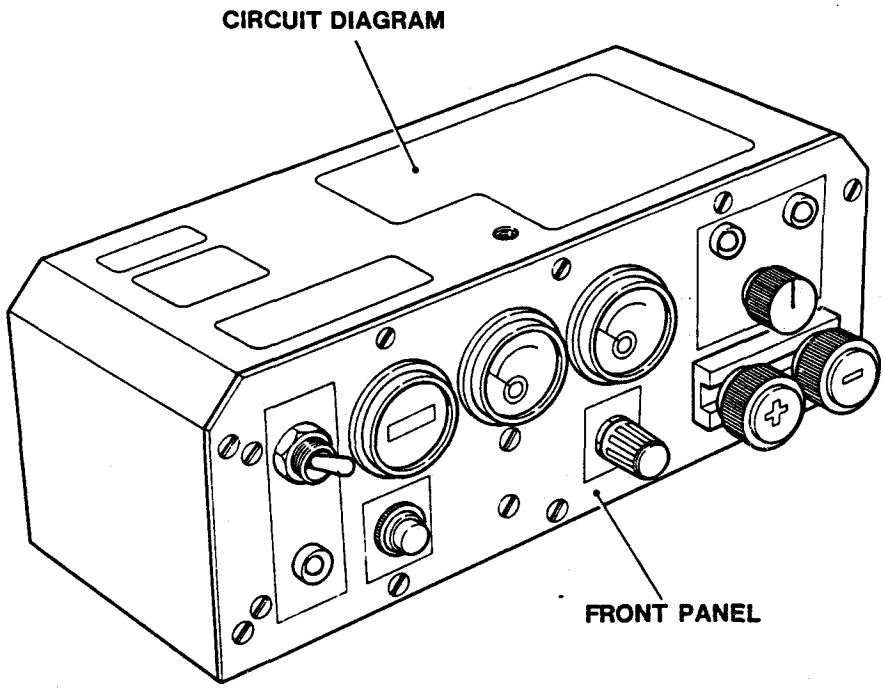


Fig 6 Control box assembly

CONNECTORS

26 External connectors are provided on the control box front panel and below the front panel on a bracket attached to the right-hand side of the generator set frame. The connector locations and identifications are shown in Fig 7 and their functions are described in Table 2.

TABLE 2 CONNECTORS

Serial (1)	Connector (2)	Fig Item Ref. (3)	Function (4)
1	+ Output terminal	1	Positive main output load connection terminal
2	- Output terminal	2	Negative main output load connection terminal
3	Earth terminal	3	Earthing point for the metal earth spike and the negative output terminal.
4	ADADS service output socket (no ident)	4	Six pin output socket connected to the main output terminals (fitted only to generator sets supplied for ADADS service use)

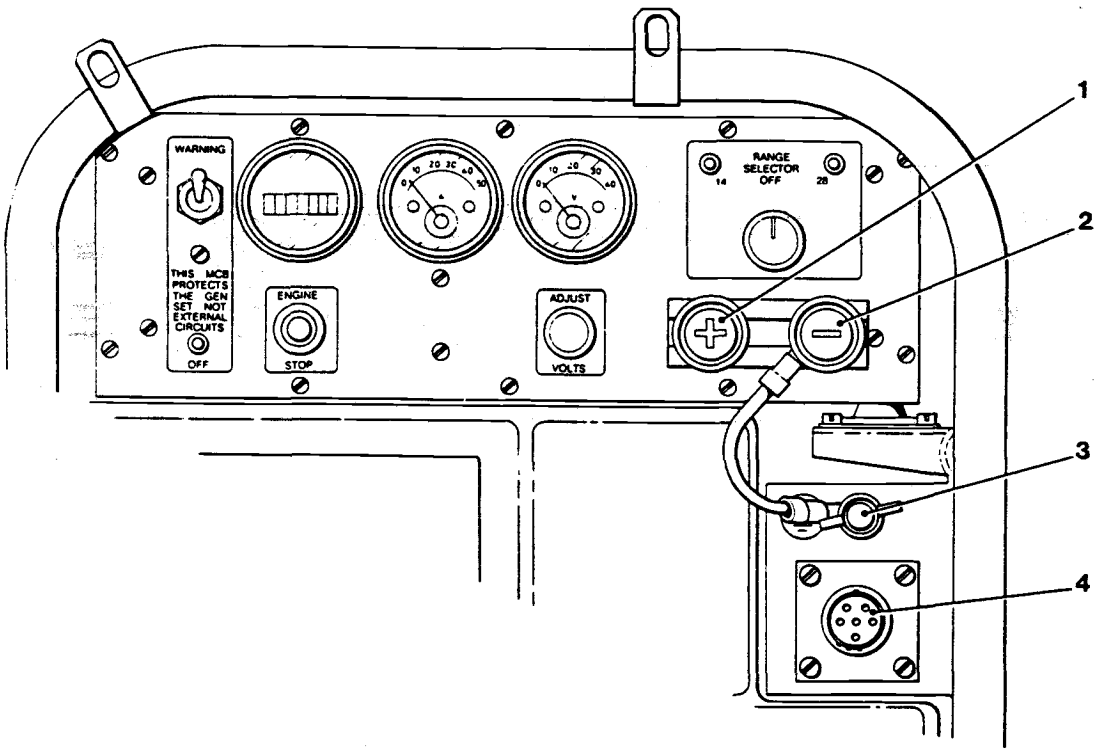


Fig 7 Connector locations

OPERATOR CONTROLS

27 Operator controls are provided on the control box front panel and on the rear end panel of the generator set.

Front panel controls

28 Front panel mounted controls are shown in Fig 8 and their functions are given in Table 3.

TABLE 3 FRONT PANEL CONTROLS

Serial (1)	Control (2)	Fig Item Ref. (3)	Function (4)
1	Circuit breaker (no ident)	1	A resettable 50 A magnetic circuit breaker providing alternator overload protection
2	ENGINE STOP pushbutton switch	2	Pushbutton switch, which shuts the engine down
3	ADJUST VOLTS potentiometer control	3	A rotary control used for adjusting the generator set output voltage
4	RANGE SELECTOR switch	4	Three position rotary switch for selecting the generator set output mode: OFF = Alternator output disabled 14 = 14 V output mode selected 28 = 28 V output mode selected

Rear end panel controls

29 Rear end panel controls are shown in Fig 9 and their functions are given in Table 4.

TABLE 4 REAR END PANEL CONTROLS

Serial (1)	Control (2)	Fig Item Ref. (3)	Function (4)
1	Carburettor choke control (no ident)	1	Carburettor choke starting aid control, which is pulled outwards before recoil starter is operated
2	Fuel priming control	2	Rubber bubble type pump used for priming the fuel system before starting the engine
3	Recoil starter pull-cord grip	3	Pulled to turn engine when starting up

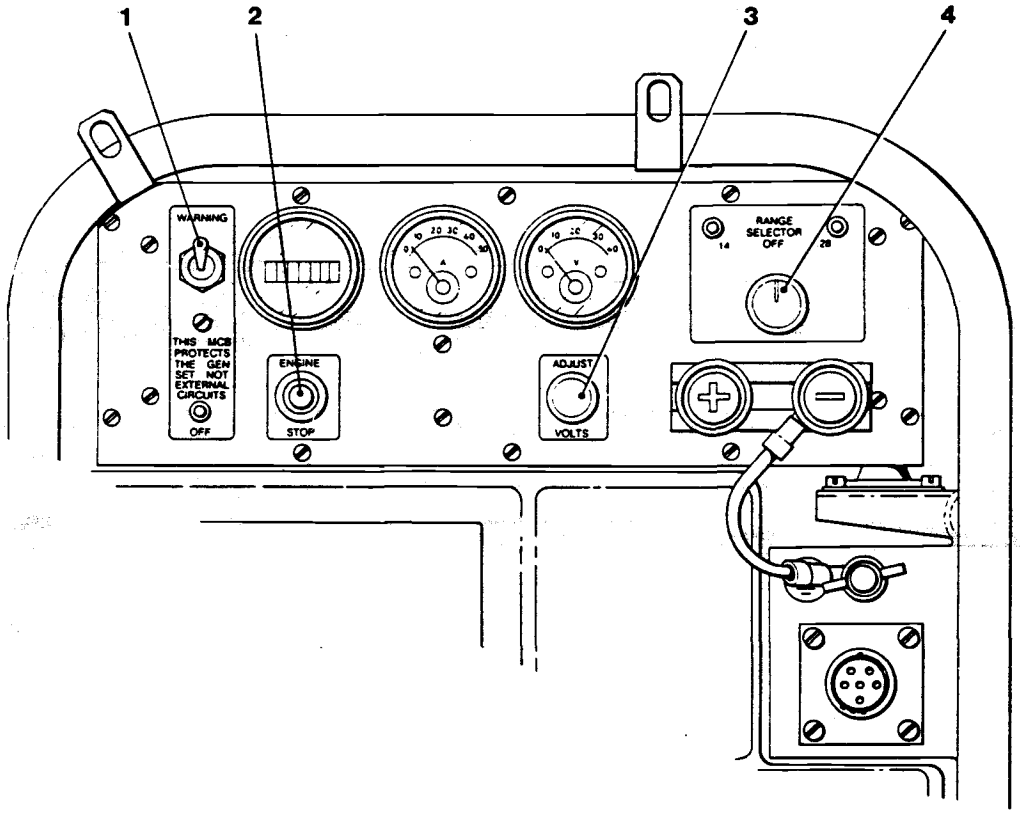


Fig 8 Front panel control locations

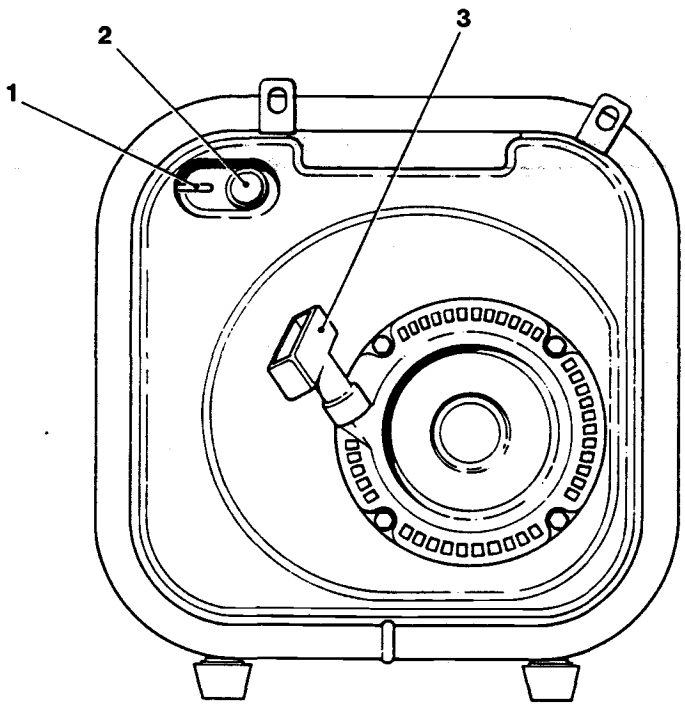


Fig 9 Rear end panel control locations

INDICATORS

30 All indicators (i.e. instrumentation and indicator lamps) are mounted on the control box front panel. The indicator locations are shown in Fig 10 and their functions are given in Table 5.

TABLE 5 FRONT PANEL INDICATORS

Serial (1)	Control (2)	Fig Item Ref. (3)	Function (4)
1	OFF indicator lamp	1	Red LED lamp which lights when the magnetic circuit breaker is open
2	Hours run meter (no ident)	2	A meter which records the total elapsed operating time of the generator set engine
3	Ammeter (no ident)	3	A meter displaying the current drawn by the output load
4	Voltmeter (no ident)	4	A meter displaying the output voltage
5	14 indicator lamp	5	Yellow LED lamp which lights when the RANGE SELECTOR switch is in the 14 V mode position
6	28 indicator lamp	6	Green LED lamp which lights when the RANGE SELECTOR switch is in the 28 V mode position

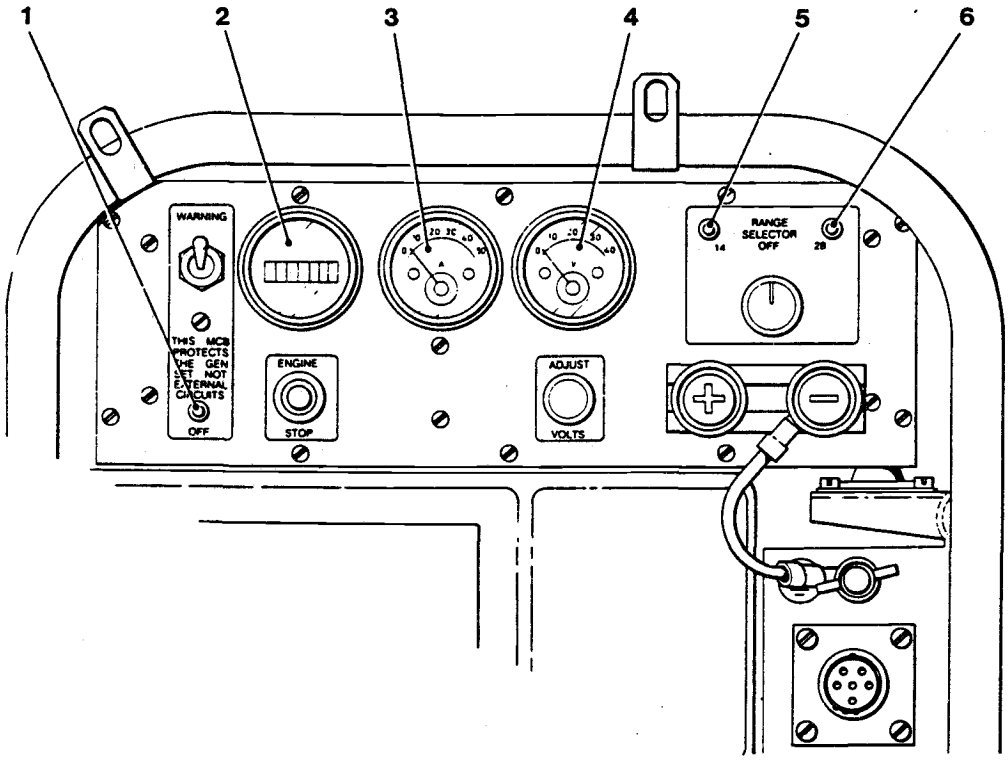


Fig 10 Front panel indicator locations

CHAPTER 2

OPERATING PROCEDURES

CONTENTS

INTRODUCTION

1 This chapter provides the information necessary to enable personnel to prepare the generator set for use and to operate it efficiently. It is essential that the operator is fully conversant with the equipment and the contents of Chapter 1 before attempting to operate the generator set.

PREPARATION FOR USE

Siting

WARNING

PERSONAL INJURY. TWO PERSONS ARE REQUIRED TO CARRY THE TOTAL EQUIPMENT SAFELY.

2 For generator sets supplied for ADADS service use, two shoulder straps and two carrying handles are provided in the accessory equipment bag for lifting and carrying the generator set. The straps and handles incorporate snap-action fasteners, which attach to the two carrying lugs at the front and rear ends of the generator set frame.

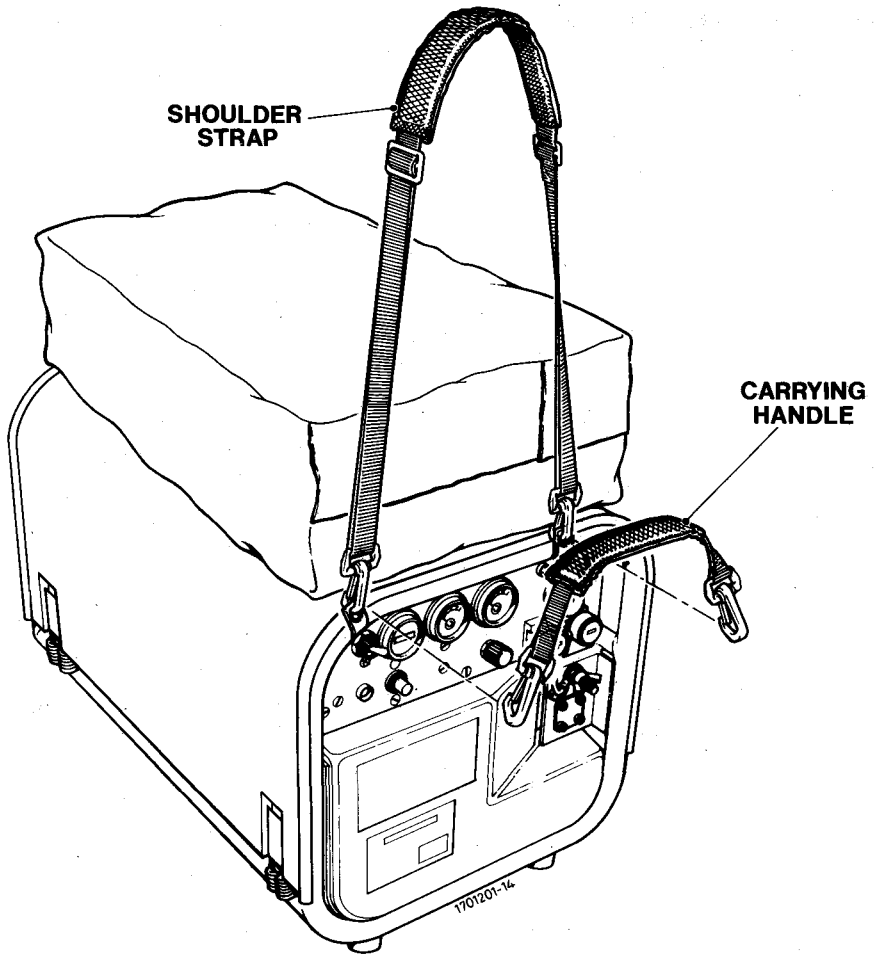


Fig 1 Generator set lifting shoulder straps/handles (ADADS service only)

3 The ground site for operating the generator set should be firm and as level as possible. If no level ground is available, the generator set may be operated at any angle not exceeding 15 degrees from the horizontal in any plane.

4 Placing of the generator set must be such that exhaust gas does not pollute personnel working or living environments.

Earthing

WARNING

EARTHING. BEFORE THE GENERATOR IS STARTED UP, A GOOD EARTH CONNECTION MUST BE ESTABLISHED USING THE GENERATOR SET EARTH TERMINAL.

5 When the equipment is used in the field, the earthing spike and cable stowed in the accessory equipment bag must be used, as follows:

5.1 Select an area of ground which is most easily penetrable by the earthing spike and drive the spike into the ground.

NOTE

Wetting dry ground will improve penetration by the spike and will also improve electrical contact.

5.2 Connect the earthing cable between the earthing spike and the generator set earth terminal (Fig 2).

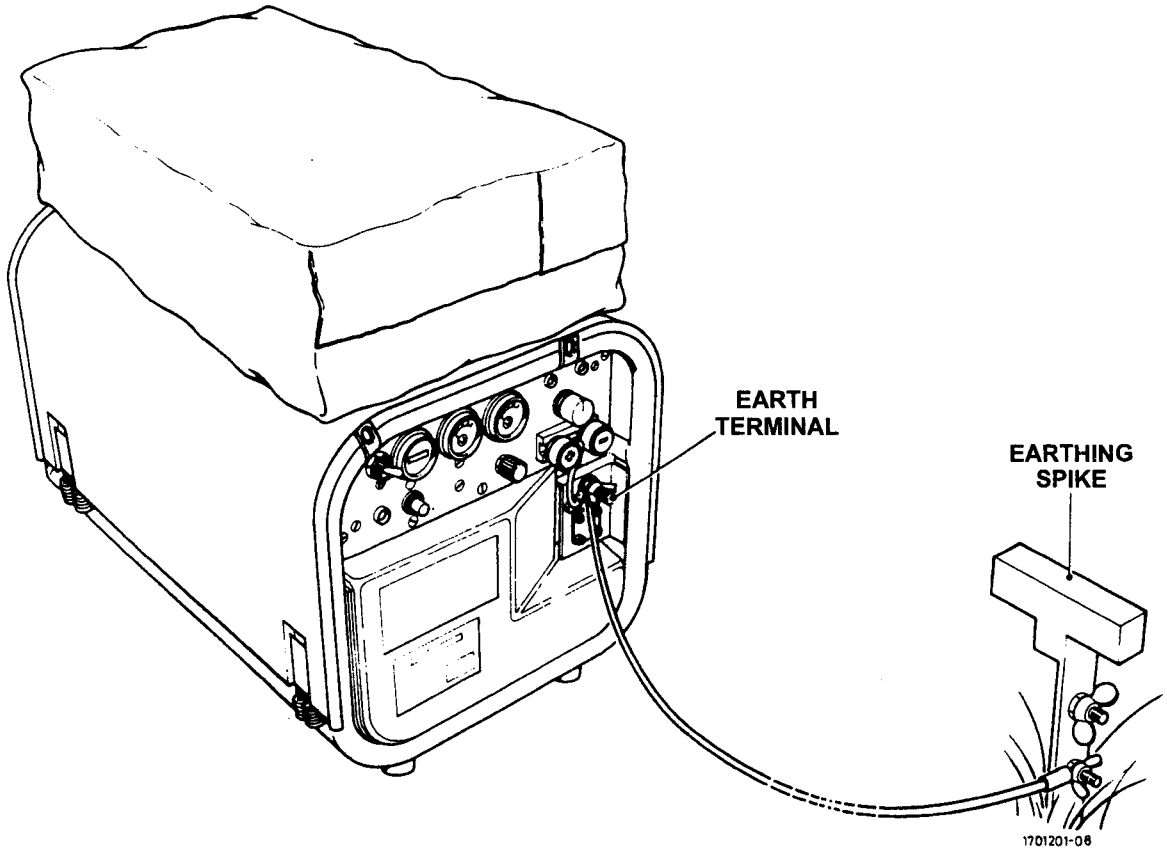


Fig 2 Earthing spike connections

Fitting the exhaust extension pipe

WARNINGS

(1) TOXIC FUMES. EXHAUST GASES ARE TOXIC AND CAN QUICKLY REACH TOXIC PROPORTIONS IF BASIC PRECAUTIONS ARE NOT FOLLOWED. IF THE GENERATOR IS TO BE USED IN A CONFINED SPACE, A STANDARD ISSUE EXHAUST EXTENSION MUST BE FITTED. THE EXHAUST EXTENSION MUST NOT BE FURTHER MUFFLED OR RESTRICTED IN ANY WAY FROM ITS ORIGINAL DESIGN AS THE RESULTING BACK PRESSURE COULD CAUSE ADDITIONAL LEAKS TO OCCUR OR DAMAGE THE ENGINE. EXTREME CARE MUST BE TAKEN TO ENSURE THAT EXHAUST GASES ARE VENTED SAFELY AWAY FROM ANY PERSONNEL IN THE VICINITY WITH DUE CONSIDERATION BEING GIVEN TO TOPOGRAPHY AND PREVAILING WIND CONDITIONS. HARMFUL CONCENTRATIONS CAN BE ODOURLESS AND NOT VISUALLY PERCEPTIBLE.

(2) FIRE HAZARD. CARE MUST BE TAKEN WHEN DEPLOYING THE EXHAUST EXTENSION MUFFLER TO ENSURE THAT IT IS NOT CLOSE TO OR CAN COME INTO CONTACT WITH ANY COMBUSTIBLE MATERIAL.

6 Obtain the exhaust extension pipe from the accessory equipment stowage bag. Apply grease (ROCAL J166) to the mating surfaces of the exhaust silencer tail pipe and the exhaust extension pipe. Fit the pipe to the exhaust silencer tail pipe, which is visible below the acoustic cover at the right-hand side of the generator set (Fig 3).

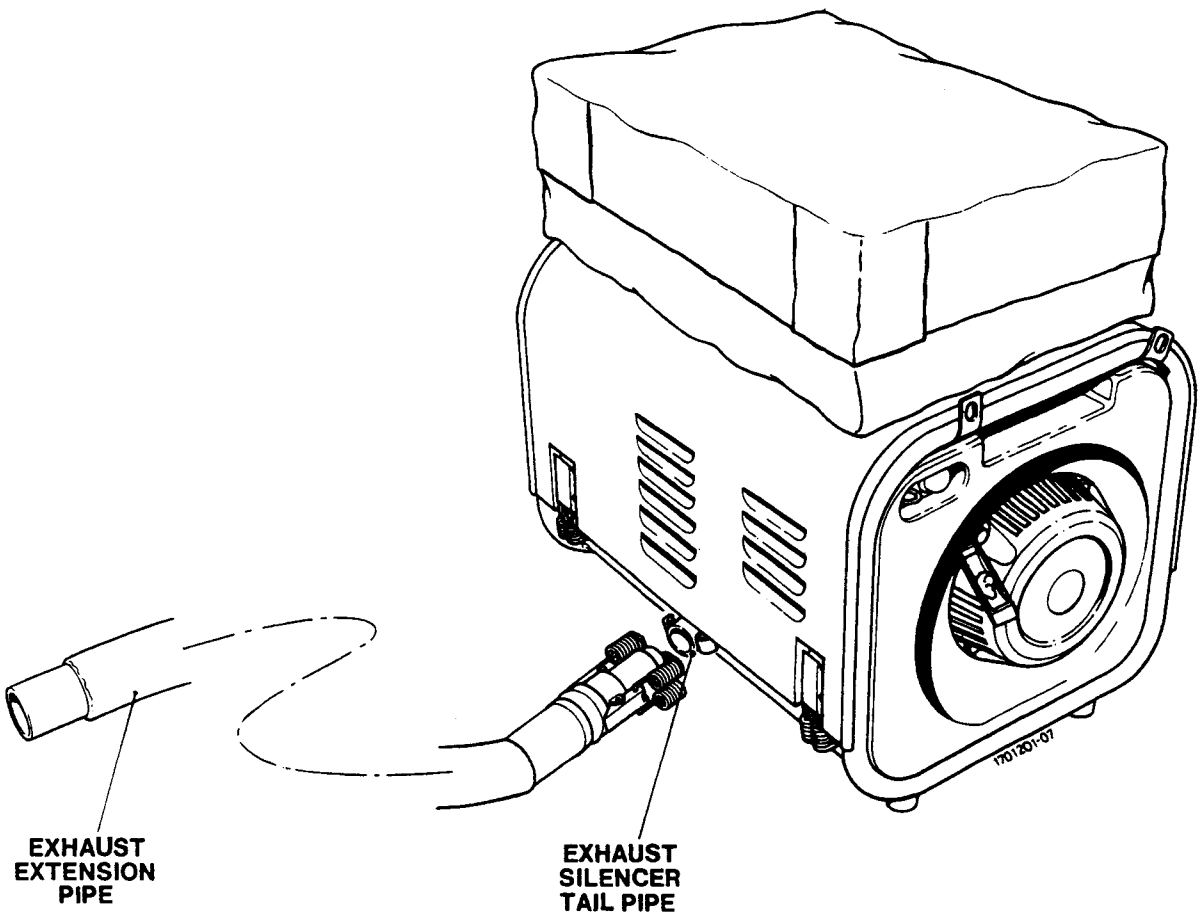


Fig 3 Fitting the exhaust extension pipe

Connecting the fuel supply

WARNING

GASOLINE. GASOLINE FUEL IS FLAMMABLE AND CONSTITUTES A FIRE HAZARD. DO NOT SMOKE CIGARETTES OR EXPOSE NAKED FLAMES IN THE VICINITY OF THE GENERATOR SET. SPECIAL CARE MUST BE TAKEN WHEN REFUELLING, SHUTTING DOWN OR PERFORMING MAINTENANCE ACTIVITIES.

7 Obtain the jerrycan adaptor assembly from the accessory equipment bag, insert the dip tube into the jerrycan and secure the filler neck adaptor to the jerrycan. Connect the fuel pipe to the quick-release type fuel connection point below the acoustic cover at the front end of the left-hand side of the generator set. Ensure that a positive snap lock is experienced and the coupling socket sleeve slides forward. Set the fuel tap on fully (tap handle in line with pipe) by turning it in a counter-clockwise direction.

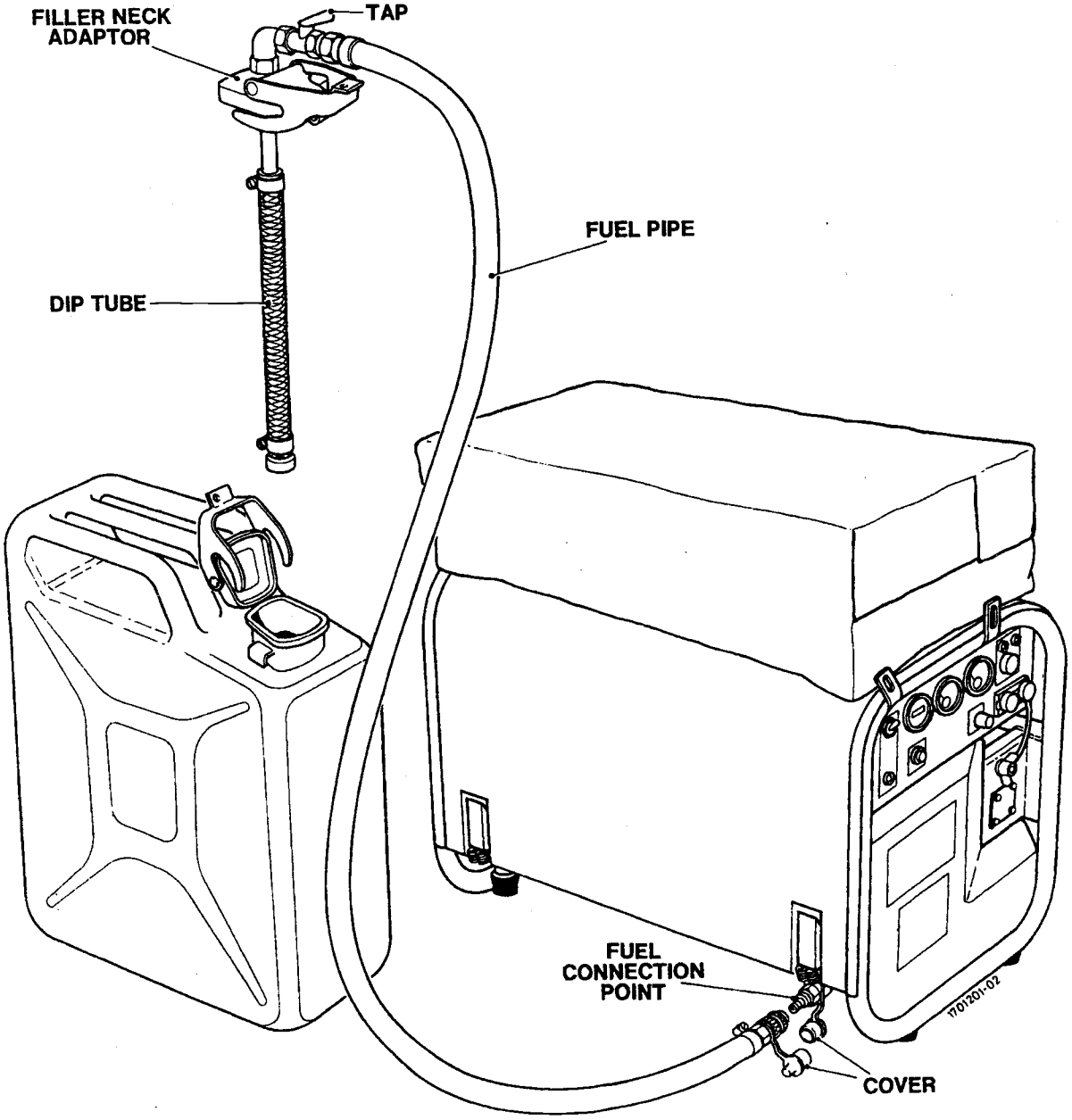


Fig 4 Connecting the fuel supply

PRE-STARTING CHECKS

WARNINGS

(1) FIRE HAZARD. THE ACOUSTIC CANOPY MUST BE FITTED TO THE GENERATOR SET WHEN IN OPERATION TO PREVENT COMBUSTIBLE MATERIALS (IE CAMOUFLAGE NETTING) COMING INTO CONTACT WITH THE GENERATORS HOT SURFACES.

(2) GASOLINE. GASOLINE FUEL IS FLAMMABLE AND CONSTITUTES A FIRE HAZARD. DO NOT SMOKE CIGARETTES OR EXPOSE NAKED FLAMES IN THE VICINITY OF THE GENERATOR SET. SPECIAL CARE MUST BE TAKEN WHEN REFUELLING, SHUTTING DOWN OR PERFORMING MAINTENANCE ACTIVITIES.

CAUTION

EQUIPMENT DAMAGE. Ensure that the air louvres in the acoustic cover are not obstructed.

8 Before starting the engine, the checks described in the following paragraphs must be carried out.

Lubricating oil level

9 The dipstick/oil filler plug is located on the left-hand side of the engine crank case. Check the oil level, as follows:

9.1 Remove the acoustic cover.

9.2 Unscrew and withdraw the dipstick/oil filler plug and clean the dipstick part of it with a lint free cloth.

9.3 Insert and screw in the dipstick/filler plug fully then unscrew and withdraw it.

9.4 Check where the oil level is in relation to the maximum and minimum requirements shown in Fig 5 and, if necessary, top up using the approved oil type (Chap 3, Table 3).

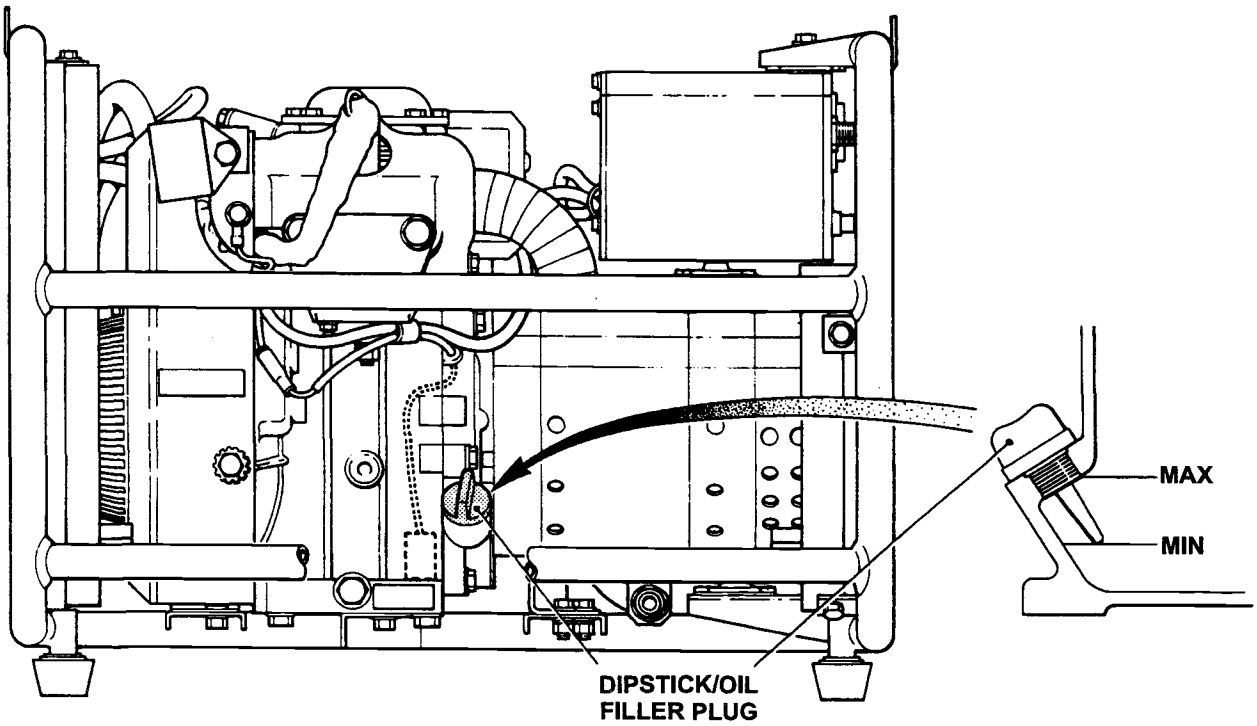


Fig 5 Engine oil levels

Leakages

10 Check for evidence of leakage of fuel and oil, as follows:

10.1 Check fuel piping, connections and associated components for signs of leakage.

10.2 Check engine surfaces for signs of oil leakage.

10.3 If a leak is found, identify the source and report the find.

10.4 Replace the acoustic cover.

CONNECTING A LOAD

11 A load can be connected to the generator set at this stage or when it is running.

NOTES

(1) Before connecting/disconnecting a load to/from the generator set when it is running, ensure that the RANGE SELECTOR switch is set to the OFF position.

(2) Observe correct polarity when connecting the load.

(3) The circuit breaker may be used as an output isolation switch.

STARTING PROCEDURE

12 The generator set incorporates a conventional recoil (rope) type starting system.

NOTE

The pre-starting checks (Para 8) must be carried out before attempting to start the generator set engine.

13 To start the generator set engine, proceed as follows:

13.1 Ensure that the RANGE SELECTOR switch (Fig 6) is in the OFF position.

13.2 Depress and release the fuel primer bubble (Fig 7) repeatedly until resistance is felt.

13.3 At initial start only (engine cold), pull out the choke control (Fig 7).

13.4 Operate the recoil starter by pulling the starter pull cord (Fig 7). Repeat until engine starts.

13.5 Gradually return the choke control when the engine is running.

13.6 Set the circuit breaker to the "on" (down) position and check that the OFF indicator is extinguished.

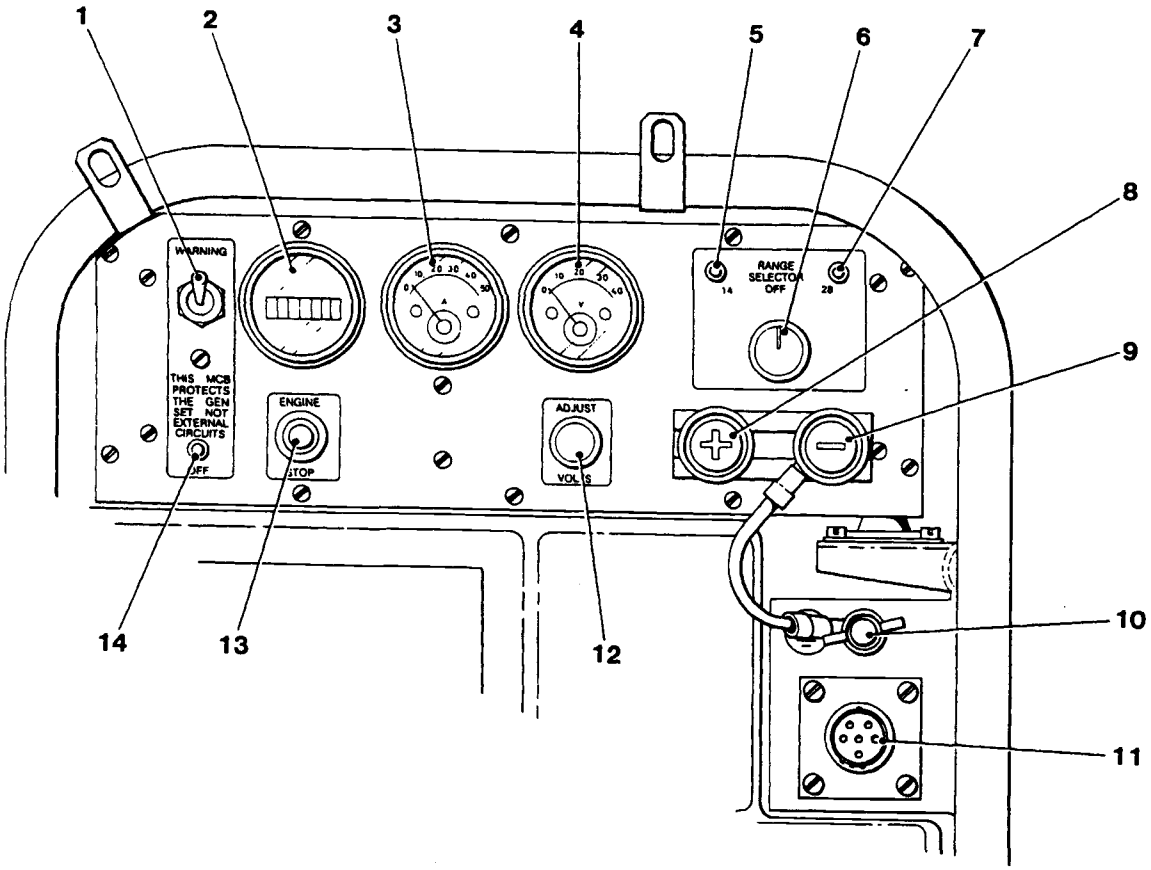
NOTE

At this stage, if not already connected, the battery/load must be connected to the output terminals.

13.7 Set the RANGE SELECTOR switch (Fig 6) to either 14 or 28, as required, and check that the associated output indicator is lit.

13.8 Adjust the ADJUST VOLTS control (Fig 6) to set the required output voltage.

13.9 Check that the ammeter is working.



1	Magnetic circuit breaker	8	Positive output terminal
2	Hours run meter	9	Negative output terminal
3	Output ammeter	10	Earth terminal
4	Output voltmeter	11	ADADS service output socket
5	14 V mode indicator	12	Output voltage adjust control
6	Range selector switch	13	Engine stop switch
7	28 V mode indicator	14	Circuit breaker OFF indicator

Fig 6 Front end controls/indicators/connectors locations

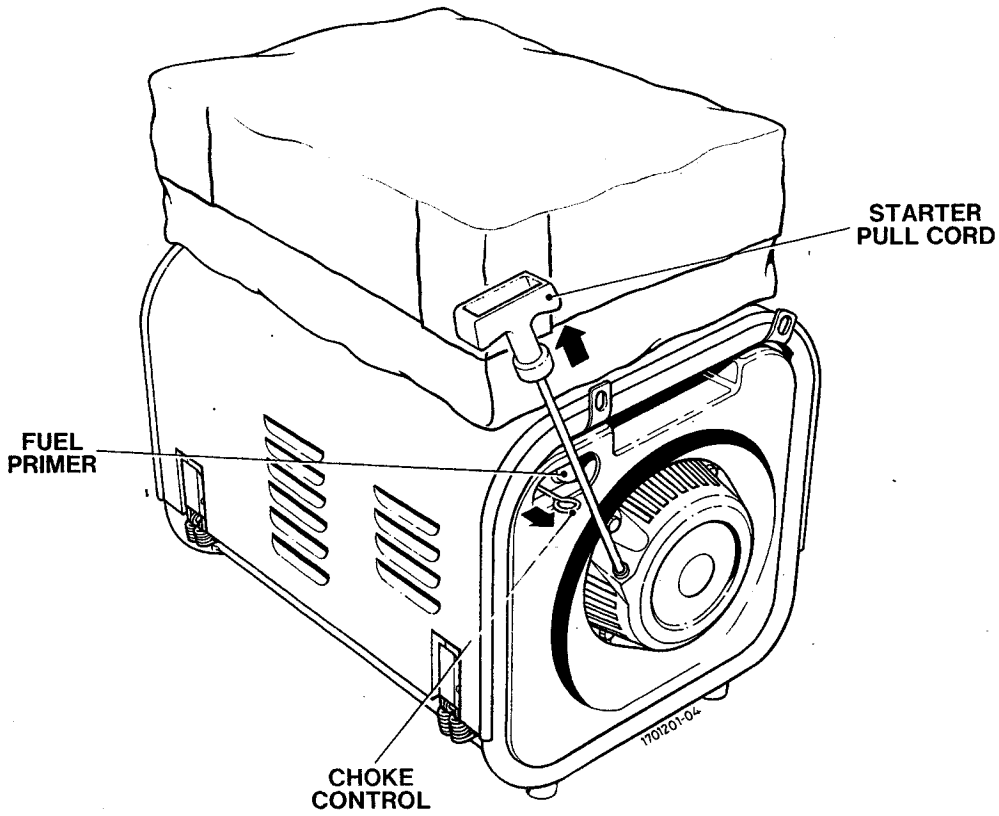


Fig 7 Rear end control locations

GENERATOR SET SHUT DOWN PROCEDURE

14 To shut down the generator set, proceed as follows:

14.1 Set the RANGE SELECTOR switch to the OFF position.

14.2 Press and hold in the ENGINE STOP pushbutton and release when the engine is at rest.

14.3 Remove and stow the exhaust extension pipe assembly.

Draining the jerrycan adaptor assembly before stowage

WARNING

FIRE HAZARD. WHEN THE JERRYCAN ADAPTOR ASSEMBLY IS STOWED IN THE VALISE, SEEPAGE OF FUEL INTO THE VALISE CAN CONSTITUTE A FIRE HAZARD. ENSURE THE JERRYCAN ADAPTOR ASSEMBLY IS DRAINED BEFORE STOWAGE.

15 To drain the jerrycan adaptor assembly, proceed as follows:

15.1 Refer to Fig 4 and disconnect the jerrycan adaptor assembly from the generator set quick release self sealing connector.

15.2 Fit the protection cap on the generator set fuel connection point.

15.3 With the dip tube in the jerrycan suspended above the fuel level, hold the fuel pipe above the jerrycan and insert the nipple of the protection cap (Fig 8) into the quick release connector. This will allow air into the fuel pipe enabling the retained fuel in the fuel pipe to drain into the jerrycan.

15.4 When the fuel pipe is fully drained, turn the protection cap around and fit the cap to the self sealing connector on the fuel pipe.

15.5 Turn the fuel tap of the jerrycan adaptor assembly to the "off" position (i.e. fully clockwise).

15.6 Remove the jerrycan adaptor assembly from the jerrycan and store in the valise.

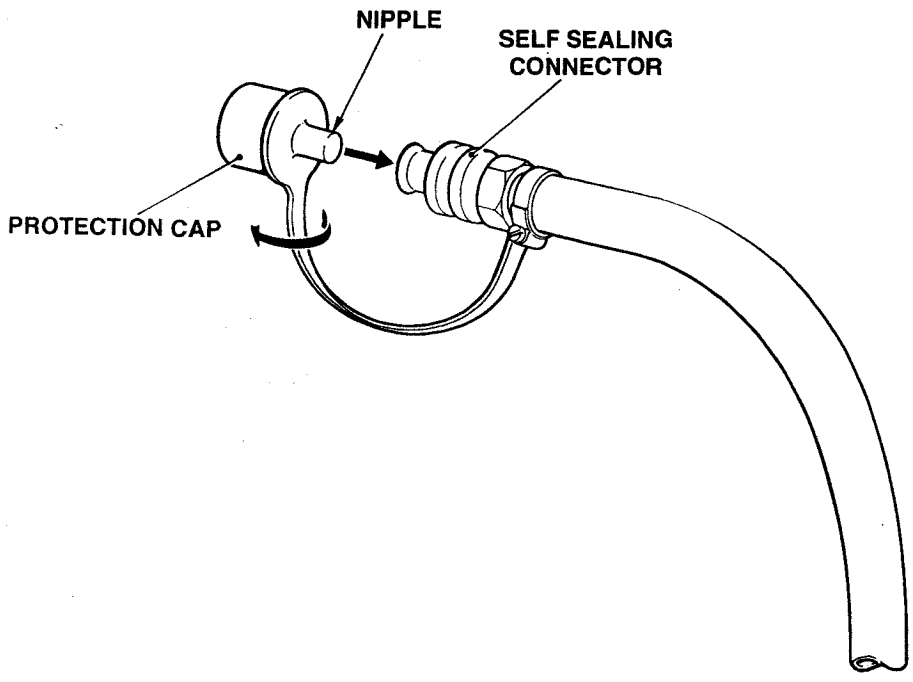


Fig 8 Draining the jerrycan adaptor assembly

CHAPTER 3

OPERATOR MAINTENANCE

CONTENTS

INTRODUCTION

1 This chapter provides the operator level technical information and step-by-step instructions relating to the procedures, tools and materials required to maintain the 14/28 V, 300/500 W generator set in an operational condition.

2 All other maintenance tasks and fault remedies which are outside the scope of these procedures must be carried out by suitably qualified personnel in accordance with the relevant maintenance schedule/repair procedures.

Operator level routine maintenance schedule

3 Routine operator maintenance tasks are restricted to those listed in Table 1 and must be carried out at the intervals specified or at any time a fault is suspected.

NOTE

If, for any reason, it is necessary to alter any part of the maintenance schedule, revision and authorisation must be carried out by the appropriate personnel.

TABLE 1 ROUTINE MAINTENANCE SCHEDULE

Serial (1)	Maintenance task (2)	Period (3)
	PHYSICAL INSPECTION	
1	Acoustic enclosure condition	)
2	Frame condition	)
3	Controls - mechanical operation	) Weekly
4	Serviceability of pipes, cables	)
5	Leakages	)
	ENGINE LUBRICATING OIL SYSTEM	
6	Oil level - check and top-up	Prior to use and every 8 hours
7	Drain and replace	Initial 20 hours (new engine) and every 50 hours
	AIR FILTER SYSTEM	
8	Foam filter element - clean	50 hours
9	Paper filter element - replace	yearly
	FUEL SYSTEM	
10	Jerrycan adaptor assembly gauze filter - clean	200 hours

EQUIPMENT AND MATERIALS

Special equipment and spares

4 The items listed in Table 2 are the special-to-type equipment and service spares required to carry out the procedures detailed in this chapter.

TABLE 2 SPECIAL-TO-TYPE EQUIPMENT AND SERVICE SPARES

Serial (1)	Special-to-type equipment/spares (2)	NATO stock No. (3)
1	Exhaust extension pipe	X2/2990-99-623-9060
2	Jerrycan adaptor assembly	X2/2910-99-701-5563
3	Earthing spike	X2/6115-99-842-1503
4	Earthing cable	X2/6115-99-016-8510
5	Carrying handles (ADADS service only)	X2/6115-99-425-1839
6	Shoulder straps (ADADS service only)	X2/6115-99-883-5813
7	Paper filter element	X3/2940-99-335-4668
8	Spanner, box, 14mm/15mm Spanner operating rod	F1/5120-99-910-6277
9	Screwdriver, cross-point	F1/5120-99-910-5866
10	Screwdriver, flat-point	F1/5120-99-136-5590
11	Spanner, adjustable, 8 inch	F1/5120-99-910-5964
12	Pliers, side-cutting	F1/5120-99-910-5525

Materials

5 The items listed in Table 3 are the materials required to carry out the procedures detailed in this chapter.

TABLE 3 MATERIALS

Serial (1)	Materials (2)	Use (3)
1	Fuel, general purpose, unleaded gasoline	For all operating environmental temperatures
2	Oil, OMD 80, capacity 0.55 litres	Engine lubricating oil for temperatures above -15°C
3	Oil, OMD 55, capacity 0.55 litres	Engine lubricating oil for temperatures below -15°C
4	Cleaning solvent (i.e. ARKLONE)	Engine degreasing and cleaning
5	Primer, to DEF STAN 80-41, Eau-de-nil to BS 381C, Tint 216	Paint, acoustic cover, frame surface repair
6	Undercoat, to DEF STAN 80-41, Dark Admiralty Grey, to BS 381C, Tint 632	Paint, acoustic cover, frame surface repair
7	Finish, IRR Matt, to DEF STAN 80-41, NATO Green to BS 381C, Tint 285	Paint, acoustic cover, frame surface repair
8	Paper, emery, size 00	Acoustic cover, frame repair
9	Lint free cloth	General cleaning

ROUTINE MAINTENANCE

WARNINGS

(1) TOXIC FUMES. EXHAUST GASES ARE TOXIC AND CAN QUICKLY REACH TOXIC PROPORTIONS IF BASIC PRECAUTIONS ARE NOT FOLLOWED. IF THE GENERATOR IS TO BE USED IN A CONFINED SPACE, A STANDARD ISSUE EXHAUST EXTENSION MUST BE FITTED. THE EXHAUST EXTENSION MUST NOT BE FURTHER MUFFLED OR RESTRICTED IN ANY WAY FROM ITS ORIGINAL DESIGN AS THE RESULTING BACK PRESSURE COULD CAUSE ADDITION LEAKS TO OCCUR OR DAMAGE THE ENGINE. EXTREME CARE MUST BE TAKEN TO ENSURE THAT EXHAUST GASES ARE VENTED SAFELY AWAY FROM ANY PERSONNEL IN THE VICINITY WITH DUE CONSIDERATION BEING GIVEN TO TOPOGRAPHY AND PREVAILING WIND CONDITIONS. HARMFUL CONCENTRATIONS CAN BE ODOURLESS AND NOT VISUALLY PERCEPTIBLE.

(2) NOISE HAZARD. EAR DEFENDERS MUST BE WORN BY MAINTENANCE PERSONNEL DURING SCHEDULED MAINTENANCE OR REPAIR TASKS WHEN THE GENERATOR SET IS RUNNING WITH THE ACOUSTIC CANOPY REMOVED.

(3) FALLING HAZARD. THE ACOUSTIC CANOPY MUST NOT BE USED AS A SEAT OR STEP DURING MAINTENANCE OPERATIONS. THE ACOUSTIC CANOPY WILL NOT BARE WEIGHT WHEN REMOVED FROM THE GENERATOR SET.

(4) FIRE HAZARD. CARE MUST BE TAKEN WHEN DEPLOYING THE EXHAUST EXTENSION MUFFLER TO ENSURE THAT IT IS NOT CLOSE TO OR CAN COME INTO CONTACT WITH ANY COMBUSTIBLE MATERIAL.

(5) TOXIC FUMES. MATERIAL USED IN THE CONSTRUCTION OF THE GENERATOR SET GIVE OFF TOXIC AND IRRITANT FUMES WHEN BURNT. DO NOT INHALE SMOKE OR FUMES IF THE GENERATOR SET IS INVOLVED IN A FIRE.

(6) FIRE HAZARD. BEFORE USING THE GENERATOR SET, OPERATORS MUST BE FAMILIAR WITH THE LOCATION OF SUITABLE FIRE EXTINGUISHING EQUIPMENT.

(7) TOXIC FUMES. MAINTAINERS OF THE EQUIPMENT MUST ENSURE THAT NO PART OF THE WIRING LOOM IS ROUTED NEAR ANY POTENTIAL HOT SURFACE. I.E. EXHAUST SYSTEM, ALTERNATOR OR ENGINE. ENSURE THAT ONLY WIRES WITH SILICON INSULATION ARE USED IN ANY REPAIRS OR FUTURE MODIFICATIONS.

(8) SKIN BURNS. THE ACOUSTIC CANOPY MUST BE FITTED TO THE GENERATOR SET WHEN IN OPERATION. DURING SCHEDULED MAINTENANCE OR REPAIR ACTIVITIES, EXERCISE EXTREME CARE WHEN CARRYING OUT TASKS ADJACENT TO THE EXHAUST SYSTEM, ENGINE OR ALTERNATOR, AS BOTH ITEMS CAN RETAIN HEAT FOR SEVERAL MINUTES AFTER SHUT DOWN.

(9) GASOLINE. GASOLINE FUEL IS FLAMMABLE AND CONSTITUTES A FIRE HAZARD. DO NOT SMOKE CIGARETTES OR EXPOSE NAKED FLAMES IN THE VICINITY OF THE GENERATOR SET. SPECIAL CARE MUST BE TAKEN WHEN REFUELLING, SHUTTING DOWN OR PERFORMING MAINTENANCE ACTIVITIES.

6 Routine maintenance tasks to be carried out by the operator are those specified in Table 1.

Physical inspection

7 The following inspection procedures should be carried out on initial receipt of the equipment and then at weekly intervals. The inspection involves a physical scrutiny of the equipment to make sure that there is no evidence of physical defects, contamination, leakages or the presence of foreign matter which may render the generator set unfit for use. Where applicable, manual operation of a control component is required to make sure of its correct mechanical action. Any defects found shall be reported and repaired in strict accordance with the appropriate maintenance procedures.

Acoustic cover

8 Inspect the external and internal surfaces of the acoustic enclosure, as follows:

8.1 Examine the surfaces of the acoustic enclosure for evidence of physical damage such as dents, scratches and corrosion.

8.2 Examine rivets for corrosion and security of fixing.

8.3 Check the operation of the four spring loaded catches and security of fixings.

End panels

9 Inspect the front and rear end panels, as follows:

9.1 Examine the fibreglass end panels for cracks, deformation and security of fixing.

9.2 Check that all label information is clearly legible.

Frame

10 Inspect the frame structure, as follows:

10.1 Examine the frame for evidence of physical damage such as dents, scratches and corrosion.

10.2 Examine welded lugs and bracketry for security and damage.

Front panel

11 Inspect the control box front panel, as follows:

11.1 Examine the panel facia for evidence of physical damage.

11.2 Check that the panel mounted components are securely fixed.

11.3 Manually operate each panel mounted control and check for correct mechanical action.

11.4 Check that all labelling and surface etched information is clearly legible.

Cables and pipes

12 Inspect all cables and pipes, as follows:

12.1 Ensure all cables are clear of potential hot surfaces.

12.2 Examine all fuel piping, cable loom, cable outer coverings and cable connector sleeves for evidence of overheating, deformation, cuts and chafing.

12.3 Examine each cable connector for physical damage, the presence of foreign matter and corrosion.

12.4 Check that identification labels are firmly attached and clearly legible.

Leakages

13 Examine fuel piping, pipe connections and associated component items for evidence of fuel leakage.

14 Examine engine surfaces for evidence of oil leakage.

Lubricating oil level - check and top-up

15 The engine lubricating oil level should be checked prior to starting the generator set and after every 8-hour period of operation and, if required, topped up. The dipstick/oil filler plug is located on the left-hand side of the engine crank case.

16 To check and top up the engine lubricating oil, proceed as follows:

16.1 Place the generator set on a level surface.

16.2 Remove the acoustic cover.

16.3 Unscrew and withdraw the dipstick/oil filler plug and clean the dipstick part with a lint free cloth.

16.4 Replace the dipstick/oil filler plug then unscrew and withdraw it.

16.5 Check where the oil level is in relation to the maximum and minimum requirements shown in Fig 1 and, if necessary, top up using the approved oil type (Table 3).

16.6 On completing the oil level check and top up operations, replace the dipstick/oil filler plug and refit the acoustic cover.

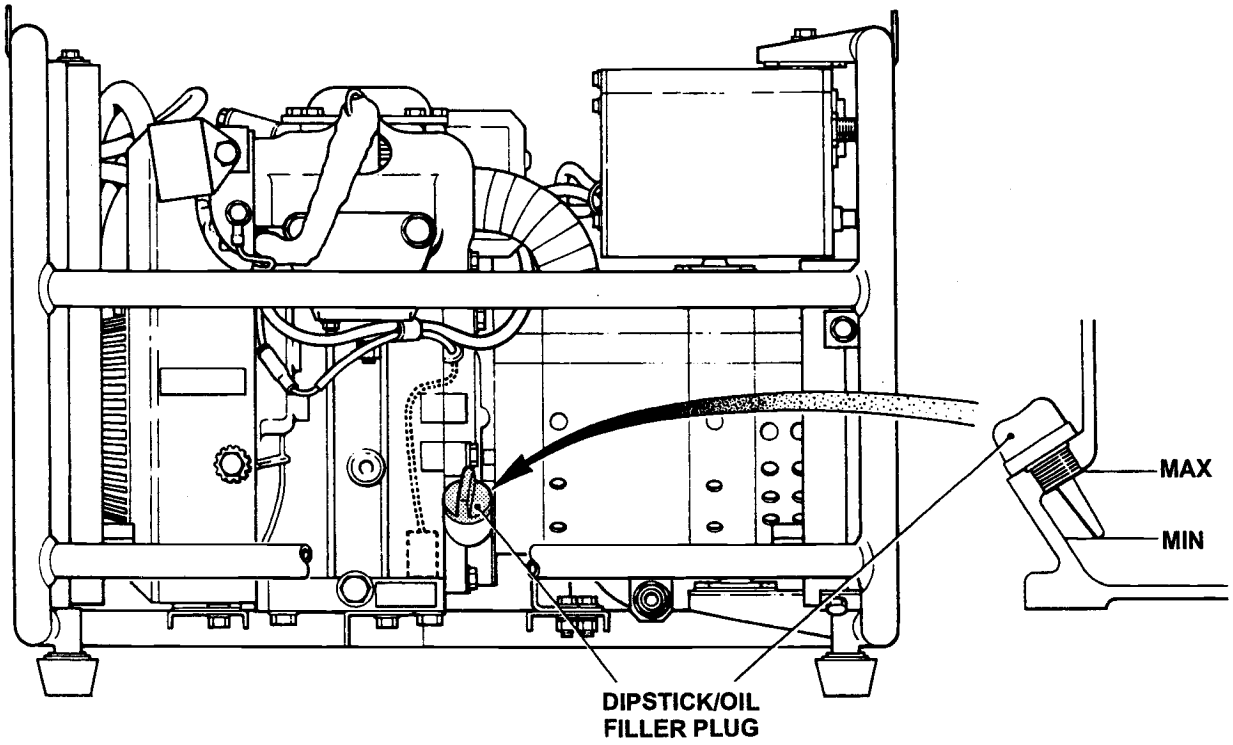


Fig 1 Engine oil levels

Lubricating oil - drain and replace

17 The engine lubricating oil must be drained and replaced after every 50-hour period of operation. The engine oil drain plug is located at the bottom left-hand side of the crank case.

18 To drain and replace the engine lubricating oil, proceed as follows:

18.1 Remove the acoustic cover.

18.2 Remove the dipstick/oil filler plug (Fig 1) and oil drain plug (Fig 2).

18.3 Tilt the generator set and drain the oil into a suitable container.

18.4 Level the generator set and replace the oil drain plug.

18.5 Refill the engine with new oil of the correct type (Table 3) to the correct level (Fig 1) and replace the dipstick/oil filler plug.

18.6 Refit the acoustic cover.

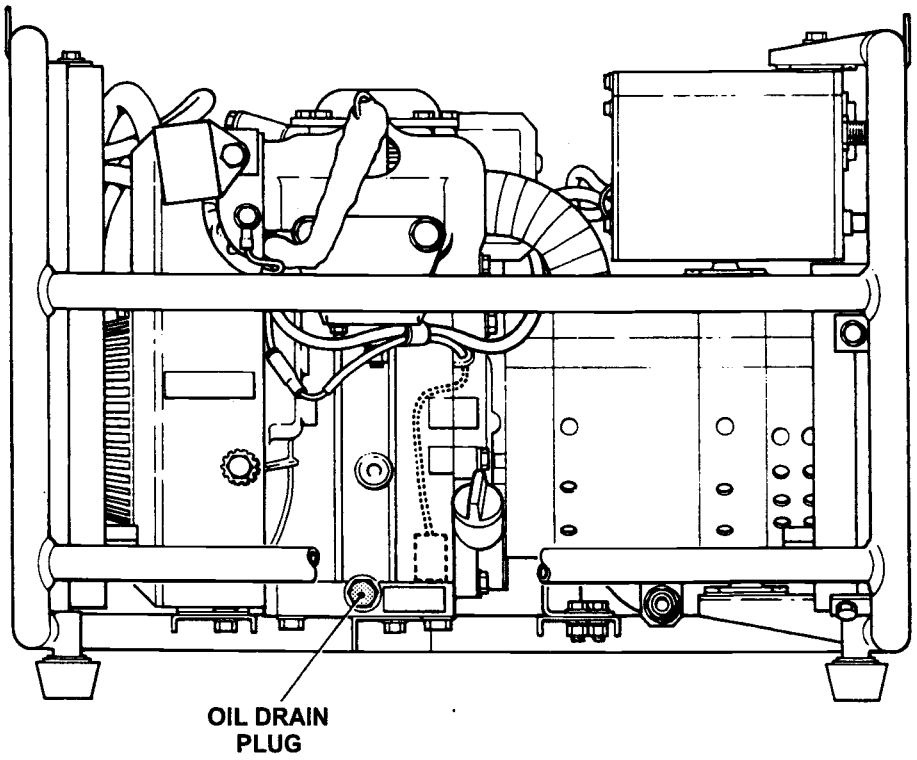


Fig 2 Draining the engine lubricating oil

Foam air filter element - clean

19 The foam filter element of the air filter system must be removed and cleaned after every 50-hour period of operation.

20 To remove and clean the foam air cleaning element (Fig 3), proceed as follows:

20.1 Remove the acoustic cover.

20.2 Unhook (from the bottom) and remove the air filter cover from the air filter casing.

20.3 Remove the foam filter element from the air filter casing and wash it thoroughly in a mixture of water and detergent.

20.4 When dry, replace the foam filter element in the air filter casing and refit the air filter cover.

20.5 Refit the acoustic cover.

Paper air filter element - replace

21 The paper filter element of the air filter system must be replaced by a new one on a yearly basis.

22 To replace the paper air cleaning element (Fig 3), proceed as follows:

22.1 Remove the acoustic cover.

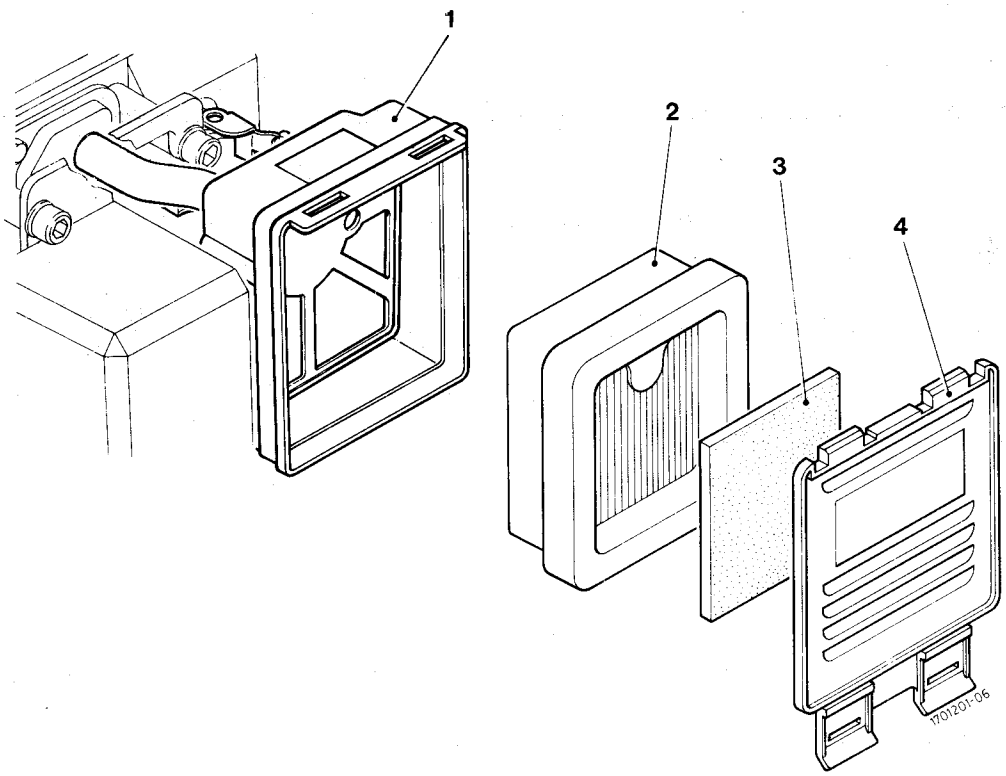
22.2 Unhook (from the bottom) and remove the air filter cover from the air filter casing.

22.3 Remove the foam filter element and paper filter element from the air filter casing.

22.4 Fit a new paper filter element in the air filter casing and refit the foam filter element.

22.5 Refit the air filter cover.

22.6 Refit the acoustic cover.



1 Air filter casing
2 Paper filter element
3 Foam filter element
4 Air filter cover

Fig 3 Air filtering system

Jerrycan adaptor gauze filter

23 The jerrycan adaptor gauze filter on the end of the dip tube (Fig 4) must be cleaned after every 200-hour period of operation.

24 To clean the filter, immerse it in clean gasoline and agitate it until the filter appears clean.

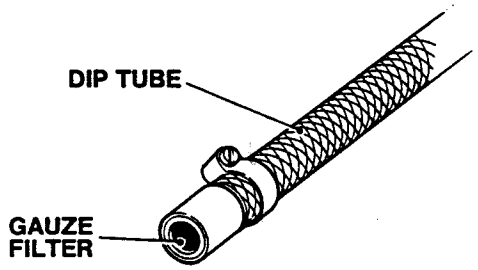


Fig 4 Jerrycan adaptor gauze filter

FUNCTIONAL TESTING

WARNINGS

(1) ELECTRIC SHOCK. AN EARTH PIN WILL NOT NECESSARILY PROVIDE IMMUNITY FROM ELECTRIC SHOCK. ENSURE THAT ADEQUATE UNIT SAFETY INSTRUCTIONS ARE HELD AND SAFE WORKING PRACTICES PROCEDURES IMPLEMENTED.

(2) EARTHING. THE EQUIPMENT MUST BE PROPERLY EARTHED BEFORE ATTEMPTING TO OPERATE THE GENERATOR SET.

25 A generator set functional test must be carried out on a yearly basis to ensure that correct operation is maintained. Functional testing consists primarily of monitoring generator set performance by observing the instrumentation and indicators. If any faults are found during the following functional tests, refer to the failure diagnosis/repair information provided in Table 4.

26 Start up the generator set and make the following assessments:

26.1 Recoil starter system performance.

26.2 Check that engine is running evenly.

26.3 Check that the VOLTS ADJUST control enables the correct voltage swing for each output mode:

26.3.1 14 V mode - 12.3 V to 16 V.

26.3.2 28 V mode - 24 V to 32 V.

26.4 Check that the hours run meter is operating by observing movement of the minutes digits.

26.5 Check the OFF indicator is lit with the circuit breaker in the "off" (up) position and extinguished in the "on" (down) position.

CORRECTIVE MAINTENANCE

27 The corrective maintenance procedures cover generator set faults and remedies which may be carried out by the operator.

Faults and remedies

28 The generator set faults listed in Table 4 are at operator level only. If a fault is not rectified by using the remedy suggested, the fault must be reported to and corrected by suitably qualified personnel.

TABLE 4 FAULTS AND REMEDIES

Serial (1)	Fault (2)	Possible cause (3)	Suggested remedy (4)	Doc. ref. (5)
	STARTING			
1	Engine does not start or is difficult to start.	Choke control not pulled out far enough.	Reset choke control and try starting again.	Chap 2
		Jerrycan adaptor assembly fuel tap turned off.	Check tap position.	Chap 2
		Empty jerrycan.	Check jerrycan fuel level and, if necessary, refill.	
		Low engine oil.	Check oil level and, if necessary, top up with new oil.	Para 15
		Restricted air filter.	Check air filter assembly filter elements and, if necessary, clean/replace elements as appropriate.	Para 20 and 22
2	Engine will not run.	Blocked gauze fuel filter in jerrycan adaptor assembly dip tube.	Check gauze fuel filter and, if necessary, clean it.	Para 24
	OUTPUT OVERLOAD			
3	OFF indicator lit.	Circuit breaker tripped due to excessive load current.	Disconnect load cable and report the fault.	
		Circuit breaker tripped due to incorrectly connected battery (i.e. wrong polarity).	Reconnect battery observing correct polarity.	

Painted surface repair

29 Repair of abrasions to the painted metal surfaces of the acoustic cover and frame must be carried out as follows:

29.1 Use emery paper (grade 00) to make the abraded area smooth.

29.2 Clean the area to be repaired, using a lint free cloth and a suitable solvent ensuring that no grease or deposits remain in the cleaned area.

29.3 Apply one coat of primer (Table 3), in accordance with the maker's instructions.

29.4 Apply one coat of undercoat (Table 3), in accordance with the maker's instructions.

29.5 Apply one coat of paint (Table 3), in accordance with the maker's instructions.

29.6 Remove paint from brush(es), using a suitable solvent.

CHAPTER 4

DESTRUCTION OF EQUIPMENT

CONTENTS

MANDATORY DIRECTIVE

1 Destruction of the equipment when subject to capture by the enemy will be undertaken by the user arm, ONLY WHEN, in the judgement of the unit commander concerned, such action is necessary in accordance with orders of, or policy established by the Army or Divisional Commanders.

2 The reporting of the destruction of equipment is to be done through command channels.

Degree of damage

3 The degree of damage inflicted, to prevent the equipment being used by an enemy, shall be as follows:

3.1 Methods of destruction should achieve such damage to equipment and essential spare parts, that it will not be possible to restore the equipment to a usable condition in the combat zone either by repair or by cannibalisation.

3.2 Classified equipment must be destroyed in such degree as to prevent, whenever possible, duplication, or determination of operation or function by the enemy.

3.3 Any classified documents, notes, instructions or other written material pertaining to function, operation, maintenance or employment, including drawings or parts lists, must be destroyed in a manner to render them useless to the enemy.

4 In general, destruction of essential parts, followed by burning will usually be sufficient to render the equipment useless. However, selection of the particular method of destruction requires imagination and resourcefulness in utilisation of the facilities at hand under the existing conditions. Time is usually critical.

PRIORITIES OF DESTRUCTION

5 The priorities of destruction should be considered, as follows:

5.1 Priority must be given to the destruction of classified equipment and associated documents.

5.2 When lack of time and/or means prevents complete destruction of equipment, priority must be given to the destruction of essential parts. The same parts are to be destroyed on all like equipment and in spare parts storage areas.

5.3 A guide to priorities of destruction of the equipment is shown in Table 1.

TABLE 1 PRIORITIES OF DESTRUCTION

Serial (1)	Item (2)	Priority (3)
1	Fuel pump and carburettor	1st
2	Engine block	2nd
3	Alternator, control boxes and control panel	3rd

METHODS OF DESTRUCTION

6 If destruction is ordered, due consideration should be given to:

6.1 Selection of a point of destruction that will cause greatest obstruction to enemy movement and also prevent hazard to friendly troops.

6.2 Observance of appropriate safety precautions.

7 The following information is for guidance only. Of the possible methods of destruction, those most generally applicable are mechanical, burning and gunfire.

Mechanical

8 This method requires the use of an axe, pick, crowbar or similar implement. The equipment should be destroyed in accordance with the priorities given on Table 1.

Burning

WARNING

DUE CONSIDERATION SHOULD BE GIVEN TO THE HIGHLY FLAMMABLE NATURE OF GASOLINE. CARELESSNESS IN ITS USE MAY RESULT IN SERIOUS BURNS.

9 This method requires the use of gasoline, oil or other flammables. To destroy the equipment by burning, proceed as follows:

9.1 Remove and empty the portable fire extinguishers.

9.2 If quantities of combustibles are limited, smash all vital elements such as switches, instruments and control levers.

9.3 Place ammunition and charges in and about the equipment so that the greatest damage will result from the explosion.

9.4 Pour gasoline and oil liberally over the equipment.

9.5 Ignite the equipment, using one of the following methods and exercise all necessary personal safety precautions:

9.5.1 An incendiary grenade.

9.5.2 A burst from a flame thrower.

9.5.3 A combustible train of suitable length.

9.5.4 Or any other appropriate means.

Gunfire

WARNING

FIRING ARTILLERY AT RANGES OF 500 YARDS OR LESS, AND FIRING RIFLE GRENADES OR ANTI-TANK ROCKETS SHOULD BE FROM COVER.

10 When destroying the equipment by gunfire, proceed as follows:

10.1 Remove and empty the portable fire extinguishers.

10.2 Smash all vital elements, such as switches, instruments and control levers.

10.3 Destroy the equipment by gunfire, using any of the following methods:

10.3.1 Tank guns.

10.3.2 Self-propelled guns.

10.3.3 Artillery.

10.3.4 Rifle grenades.

10.3.5 Anti-tank rockets from launchers.

CONDITIONS OF RELEASE

1 [redacted]

2 [redacted]

4 This information may be subject to privately owned rights.

[redacted]

GENERATOR SET, ENGINE DRIVEN (GASOLINE), BATTERY CHARGING, 14/28 V, 300/500 W (HOPKINS)

TECHNICAL DESCRIPTION

REPRINTED INCORPORATING AMDTS 1–3

This publication contains information covering the requirements of Category 3 at information levels 2 and 3

BY COMMAND OF THE DEFENCE COUNCIL

Ministry of Defence
Issued by
ARMY TECHNICAL SUPPORT AGENCY
DIRECTORATE OF TECHNICAL SERVICES

72111(208)
ATSA Chertsey
9609\WCP-0502
Sep 96 (Amdt 1)

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AMENDMENT RECORD

Amdt No.	Incorporated By (Signature)	Date
1	[redacted]	
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PRELIMINARY MATERIAL

TECHNICAL DESCRIPTION

Chapter

PREFACE

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INTRODUCTION

1 Service users should forward any comments on this publication through the channels prescribed in AESP 0100-P-011-013. An AESP Form 10 is provided at the end of this publication; it should be photocopied and used for forwarding comments on this AESP.

2 The subject matter of this publication may be affected by Defence Council Instructions (DCIs), Standing Operating Procedures (SOPs) or by local regulations. When any such instruction, order or regulation contradicts any portion of this publication it is to be taken as the overriding authority.

RELATED AND ASSOCIATED PUBLICATIONS

Related publications

3 The Octad for the subject equipment consists of the publications shown opposite. All references are prefixed with the first eight digits of this publication. The availability of the publications can be checked by reference to the relevant Group Index (see AESP 0100-A-001-013).

Category/Sub-category			Information Level			
			1 User/ Operator	2 Unit Maintenance	3 Field Maintenance	4 Base Maintenance
1	0	Purpose and Planning Information	101	101	101	101
	1	Equipment Support Policy Directives	*	*	*	*
	2	Purpose and Planning Information Medical and Dental	*	*	*	*
2	0	Operating Information	201	*	*	*
	1	Aide Memoire	*	*	*	*
	2	Training Aids	*	*	*	*
3		Technical Description	201	302	302	*
4	1	Installation Instructions	201	*	*	*
	2	Preparation for Special Environments	*	*	*	*
5	1	Failure Diagnosis	201	512	512	*
	2	Repair Instructions	201	522	522	*
	3	Inspection Standards	*	532	532	*
	4	Calibration Procedures	*	*	*	*
6		Maintenance Schedules	601	601	601	601
7	1	Illustrated Parts Catalogues	711	711	711	711
	2	Commercial Parts Lists	*	*	*	*
	3	Complete Equipment Schedules Production Edition	*	*	*	*
	4	Complete Equipment Schedules Service Edition (Simple Equipment)	*	*	*	*
	5	Complete Equipment Schedules Service Edition (Complex Equipment)	*	*	*	*
8	1	Modification Instructions	*	*	*	*
	2	General Instructions, Special Technical Instructions and Servicing Instructions	*	*	*	*
	3	Service Engineered Modification Instructions (RAF only)	*	*	*	*

* Category/Sub-category not published

Associated publications

4

Reference	Title
AESP 2805-B-900	Engine, Gasoline, S/Cyl, OHV Kubota
SEI 14411	Safety Precautions for Electrical Equipment
AESP 6150-A-100-201	Earthing and Electrical Protection
AESP 6140-A-100-013	Lead Acid Batteries

Hazardous substances

5 Before using any hazardous substance or material, the user must be conversant with the safety precautions and first aid instructions:

5.1 On the label of the container it was supplied in.

5.2 On the material Safety Data Sheet.

5.3 In local Safety Orders and Regulations.

WARNINGS

(1) GASOLINE. GASOLINE FUEL VAPOUR IS EXPLOSIVE WHEN CONTAINED IN A CONFINED SPACE.

(2) GASOLINE. GASOLINE FUEL IS FLAMMABLE AND CONSTITUTES A FIRE HAZARD. DO NOT SMOKE CIGARETTES OR EXPOSE NAKED FLAMES IN THE VICINITY OF THE GENERATOR SET. SPECIAL CARE MUST BE TAKEN WHEN REFUELLING, SHUTDOWN OR PERFORMING MAINTENANCE ACTIVITIES

(3) EARTHING. THE EQUIPMENT MUST BE PROPERLY EARTHED BEFORE ATTEMPTING TO OPERATE THE GENERATOR SET. WHEN USED WITH ANCILLARY EQUIPMENT, IT IS ESSENTIAL THAT THE EARTHING INSTRUCTIONS FOR THAT EQUIPMENT BE FOLLOWED.

(4) ELECTRIC SHOCK. AN EARTH PIN WILL NOT NECESSARILY PROVIDE IMMUNITY FROM ELECTRIC SHOCK. ADEQUATE UNIT SAFETY INSTRUCTIONS ARE TO BE HELD AND SAFE WORKING PRACTICES AND PROCEDURES IMPLEMENTED.

(5) PERSONAL INJURY. MANUAL LIFTING OF THE TOTAL EQUIPMENT MUST BE CARRIED OUT BY TWO PERSONS.

(6) TOXIC FUMES. EXHAUST GASES ARE TOXIC AND CAN QUICKLY REACH TOXIC PROPORTIONS IF BASIC PRECAUTIONS ARE NOT FOLLOWED. IF THE GENERATOR IS TO BE USED IN A CONFINED SPACE, A STANDARD ISSUE EXHAUST EXTENSION MUST BE FITTED. THE EXHAUST EXTENSION MUST NOT BE FURTHER MUFFLED OR RESTRICTED IN ANY WAY FROM ITS ORIGINAL DESIGN AS THE RESULTING BACK PRESSURE COULD CAUSE ADDITION LEAKS TO OCCUR OR DAMAGE THE ENGINE. EXTREME CARE MUST BE TAKEN TO ENSURE THAT EXHAUST GASES ARE VENTED SAFELY AWAY FROM ANY PERSONNEL IN THE VICINITY WITH DUE CONSIDERATION BEING GIVEN TO TOPOGRAPHY AND PREVAILING WIND CONDITIONS. HARMFUL CONCENTRATIONS CAN BE ODOURLESS AND NOT VISUALLY PERCEPTIBLE.

(7) SKIN BURNS. THE ACOUSTIC CANOPY MUST BE FITTED TO THE GENERATOR SET WHEN IN OPERATION. DURING SCHEDULED MAINTENANCE OR REPAIR ACTIVITIES, EXERCISE EXTREME CARE WHEN CARRYING OUT TASKS ADJACENT TO THE EXHAUST SYSTEM, ENGINE OR ALTERNATOR, AS BOTH ITEMS CAN RETAIN HEAT FOR SEVERAL MINUTES AFTER SHUT DOWN.

(8) INFLAMMABLE GASES. HIGHLY INFLAMMABLE GASES ARE LIBERATED FROM LEAD-ACID BATTERIES DURING CHARGING AND UP TO ONE HOUR AFTER COMPLETION OF CHARGE. NAKED LIGHTS MUST NOT BE USED WHEN CHECKING ELECTROLYTE LEVELS NOR MUST LIVE ELECTRICAL CONNECTIONS/DISCONNECTIONS BE MADE DURING THESE PERIODS.

(9) LEAD ACID BATTERIES. CARE SHOULD BE TAKEN WHEN WORKING ON OR AROUND HIGH CAPACITY LEAD-ACID BATTERIES AS THE EXTREMELY HIGH CURRENTS GENERATED BY AN ACCIDENTAL SHORT CIRCUIT MAY CAUSE SEVERE BURNS OR THE BATTERY TO EXPLODE. THEREFORE WATCHES, RINGS, ETC. SHOULD BE REMOVED BEFORE COMMENCING BATTERY ASSOCIATED TASKS.

(10) FIRE HAZARD. WHEN THE JERRYCAN ADAPTOR ASSEMBLY IS STOWED IN THE VALISE, SEEPAGE OF FUEL INTO THE VALISE CAN CONSTITUTE A FIRE HAZARD. ENSURE THE JERRYCAN ADAPTOR ASSEMBLY IS DRAINED BEFORE STOWAGE.

(11) FIRE HAZARD. THE ACOUSTIC CANOPY MUST BE FITTED TO THE GENERATOR SET WHEN IN OPERATION TO PREVENT COMBUSTIBLE MATERIALS (IE CAMOUFLAGE NETTING) COMING INTO CONTACT WITH THE GENERATORS HOT SURFACES.

(12) PERSONAL INJURY. THE ACOUSTIC CANOPY MUST BE FITTED TO THE GENERATOR SET TO PREVENT THE RISK OF PERSONNEL BEING CUT ON SHARP UNPROTECTED EDGES.

(13) NOISE HAZARD. EAR DEFENDERS MUST BE WORN BY MAINTENANCE PERSONNEL DURING SCHEDULED MAINTENANCE OR REPAIR TASKS WHEN THE GENERATOR SET IS RUNNING WITH THE ACOUSTIC CANOPY REMOVED.

(14) FALLING HAZARD. THE ACOUSTIC CANOPY MUST NOT BE USED AS A SEAT OR STEP DURING MAINTENANCE OPERATIONS. THE ACOUSTIC CANOPY WILL NOT BARE WEIGHT WHEN REMOVED FROM THE GENERATOR SET.

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(16) TOXIC FUMES. MATERIAL USED IN THE CONSTRUCTION OF THE GENERATOR SET GIVE OFF TOXIC AND IRRITANT FUMES WHEN BURNT. DO NOT INHALE SMOKE OR FUMES IF THE GENERATOR SET IS INVOLVED IN A FIRE.

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CAUTION

EQUIPMENT DAMAGE. Ensure the air louvres in the acoustic cover are not obstructed.

ARMY EQUIPMENT
SUPPORT PUBLICATION

XXXX-X-XXX-XXX
6115-G-153-302

COMMENT(S) ON AESP

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AESP Form 10 (Issue 3 dated Oct 97)

CHAPTER 1

GENERAL INFORMATION

CONTENTS

INTRODUCTION

Purpose and facilities

1 The 14/28 V, 300/500 W generator set is intended to provide a portable d.c. source for charging lead-acid batteries in the field. It may also be used as a general purpose d.c. source. General views of the generator set are shown in Figs 1 and 2. These diagrams also indicate the generator set orientation and should be referred to when explanations of component locations are given.

2 The generator set provides two selectable nominal outputs of 14 V d.c. (300 W) and 28 V d.c. (500 W). A rotary control on the front panel is used to set the voltage level of the selected output. The output is variable over the ranges 12.3 V - 16 V and 24 V - 32 V.

3 An oil level sensor acts to shut the engine down when the engine oil level becomes too low. The alternator is protected by a resettable circuit breaker.

4 The top and sides of the complete assembly are shrouded by a metal cover which provides acoustic attenuation and weather protection.

5 A removable, waterproof accessory equipment bag containing all necessary generator accessory equipment is attached to the top of the acoustic cover.

6 A recoil (rope) type starting system is incorporated for starting the generator set engine.

7 Fuel is supplied to the engine externally from a jerrycan.

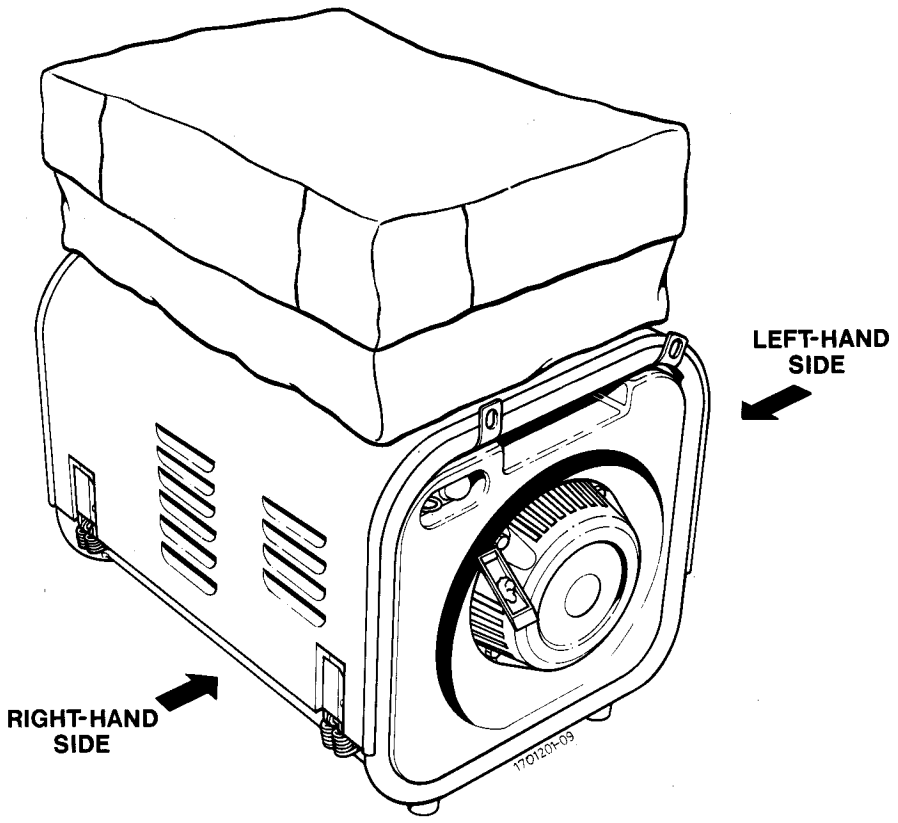


Fig 1 Generator set - Three-quarter rear view

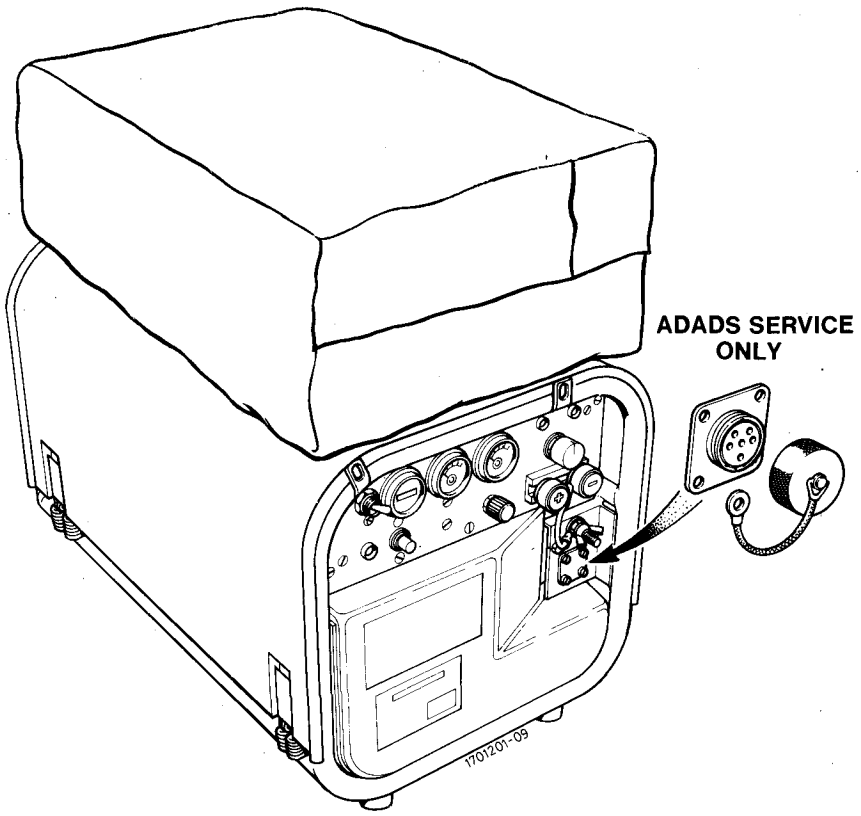


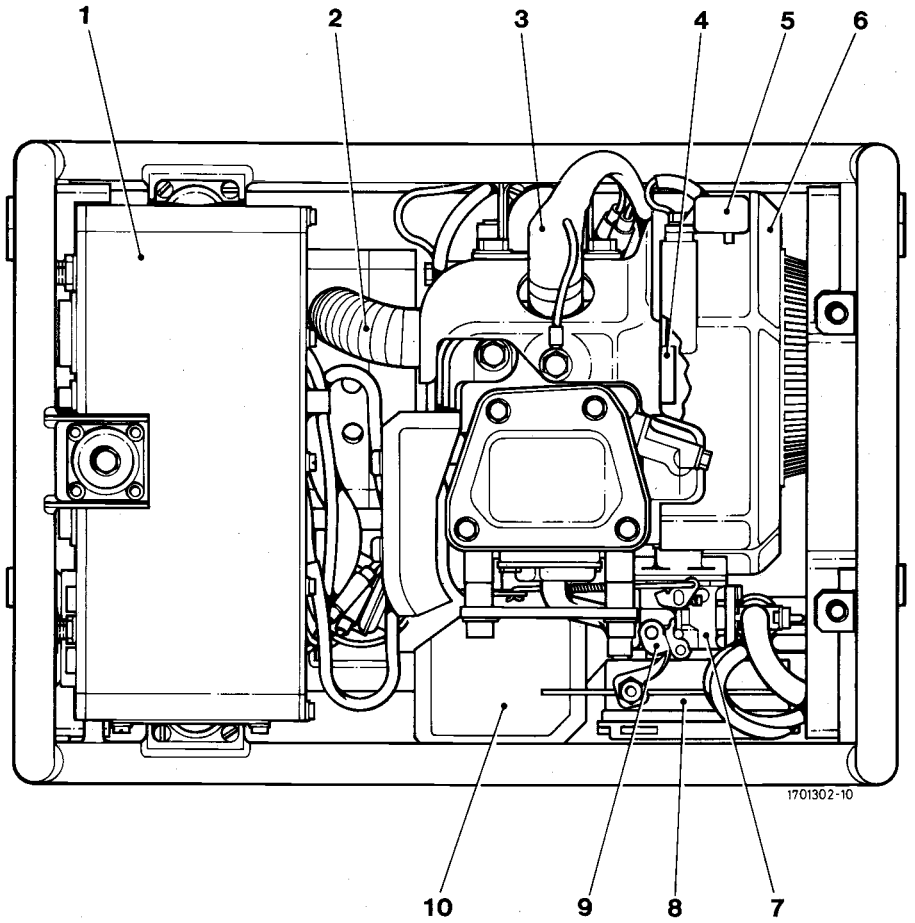
Fig 2 Generator set - Three-quarter front

Construction

8 The components of the 14/28 V generator set are mounted on a rigid tubular steel frame. The top and sides of the complete assembly are shrouded by a metal acoustic cover. Moulded fibreglass panels are attached at the front and rear ends of the assembly. A removable, waterproof accessory equipment bag is situated on top of the acoustic cover.

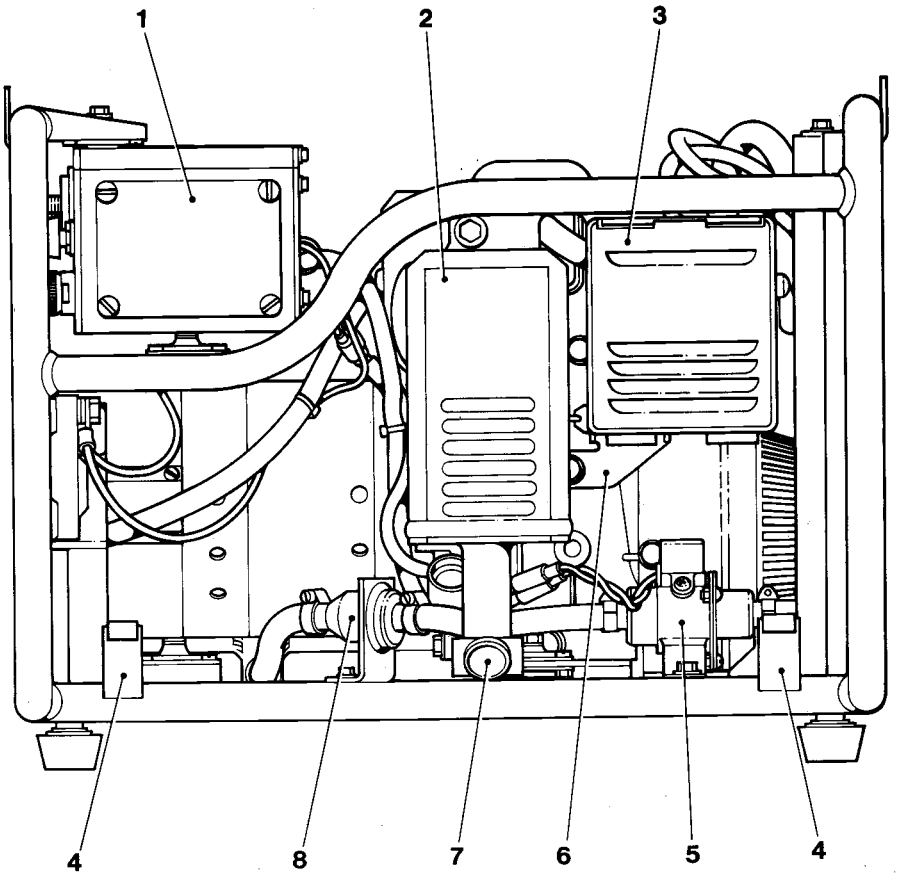
9 The main items of the generator set are a single cylinder gasoline engine, an alternator and a control box assembly. The engine and alternator are combined to form an assembled unit which is mounted onto the tubular frame via resilient mountings.

10 Figs 3 to 6 show the locations of the main items and auxiliary items that make up the generator set.



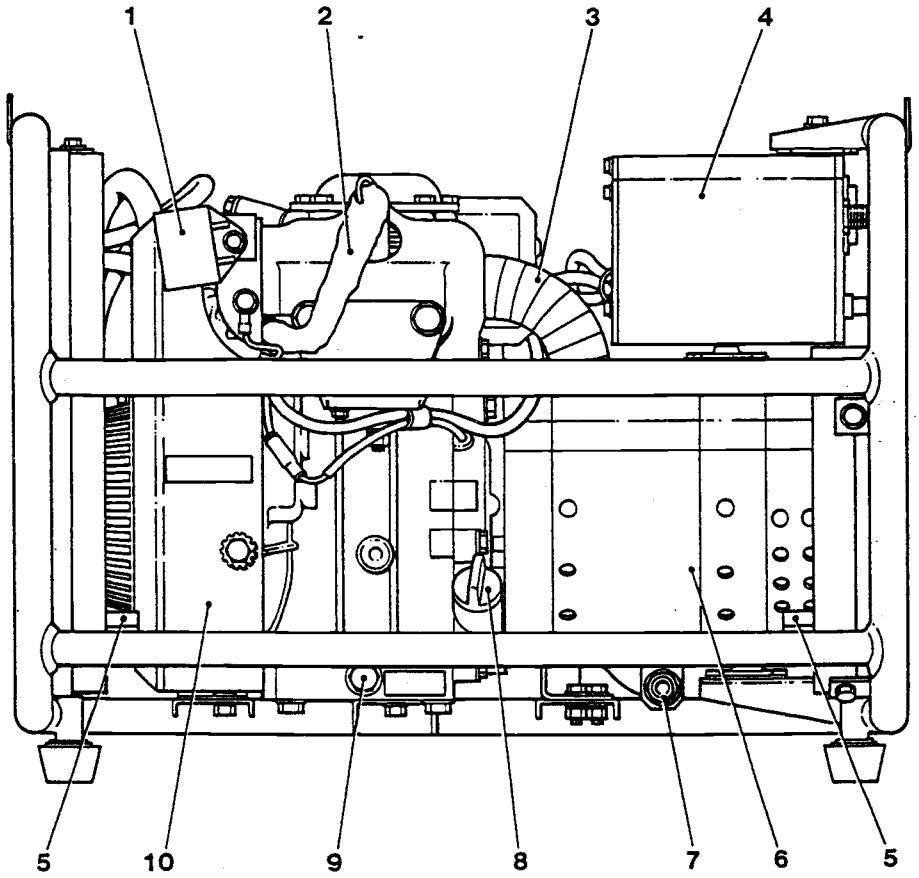
1 Control box assembly
2 Cooling air hose
3 Ignition lead
4 Magnet/transistor ignition unit
5 Electronic switch module
6 Engine fan cover
7 Carburettor
8 Air filter assembly
9 Choke control
10 Exhaust silencer

Fig 3 Component locations - Plan view



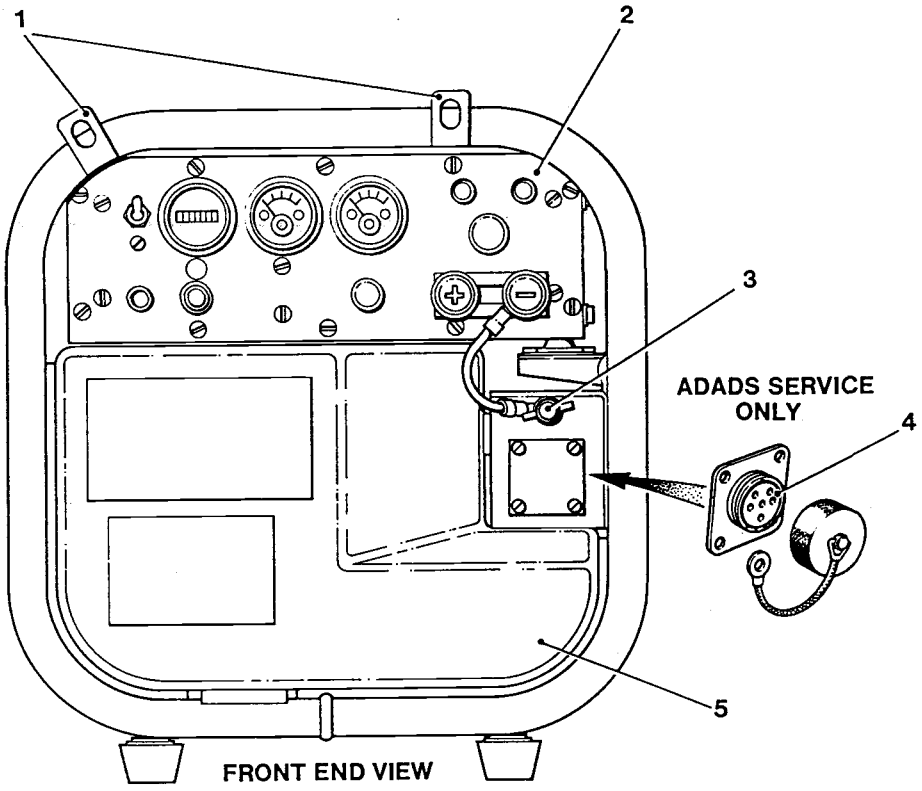
1 Control box assembly
2 Exhaust silencer
3 Air filter assembly
4 Canopy retaining lug
5 Fuel pump
6 Governing system
7 Exhaust outlet
8 Fuel filter

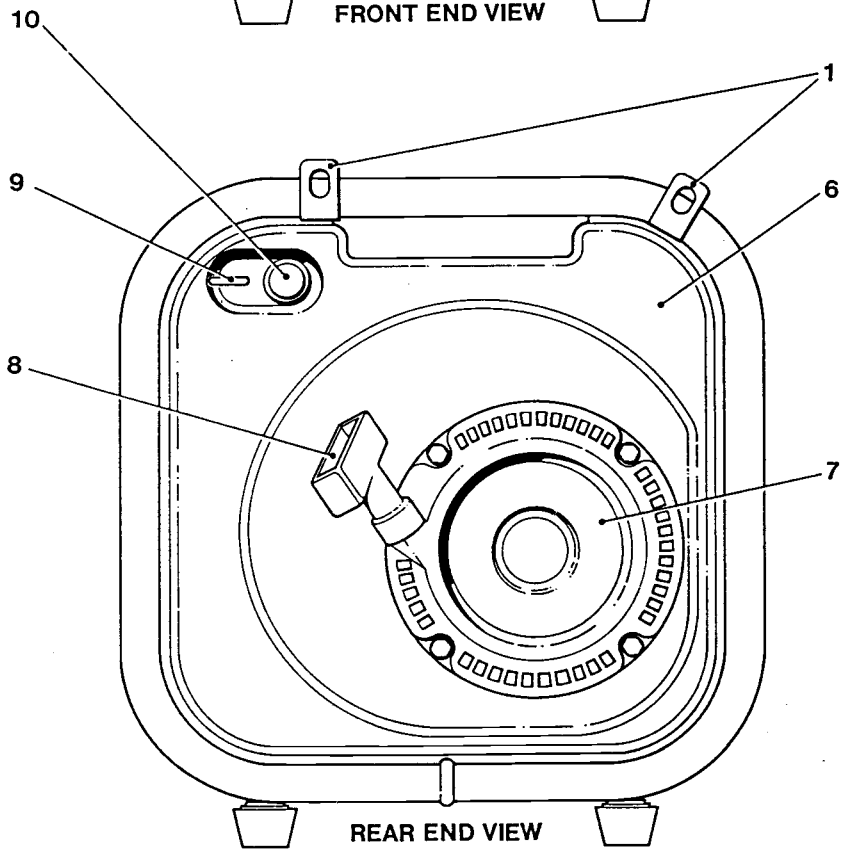
Fig 4 Component locations - Right-hand side



1 Electronic switch module
2 Ignition lead
3 Cooling air hose
4 Control box assembly
5 Cover retaining lug
6 Alternator
7 Fuel connection point
8 Oil level dipstick/filler plug
9 Oil drain plug
10 Engine fan cover

Fig 5 Component locations - Left-hand side





1 Carrying handle/shoulder strap lugs
2 Control panel
3 Earth stud
4 Output socket (ADADS only)
5 End cover
6 End cover
7 Recoil starter case
8 Starter pull-grip
9 Choke control
10 Fuel primer control

Fig 6 Component locations - End views

ENGINE

11 The generator set alternator is driven by a Kubota GH120, single cylinder, overhead valve, four cycle, air cooled, gasoline fuelled, 121 cm^3 engine, which incorporates some minor external modifications to suit the application.

12 A recoil starting system is situated at the non-drive end of the engine. Starting is aided by an automatic decompression system.

13 An electronic, magnet type ignition system is used to fire the engine. This type of system does not use switching contacts for ignition control.

14 The engine is lubricated using an oil splash system.

15 Engine speed is regulated by a mechanical governing system, which adjusts the engine throttle control to maintain constant engine speed under varying load conditions.

16 The engine is combined with the alternator to form a unit assembly, which is mounted to the generator frame via resilient mounts.

17 Cooling air is forced around the engine by a fan attached to the engine shaft at the non-drive end of the engine.

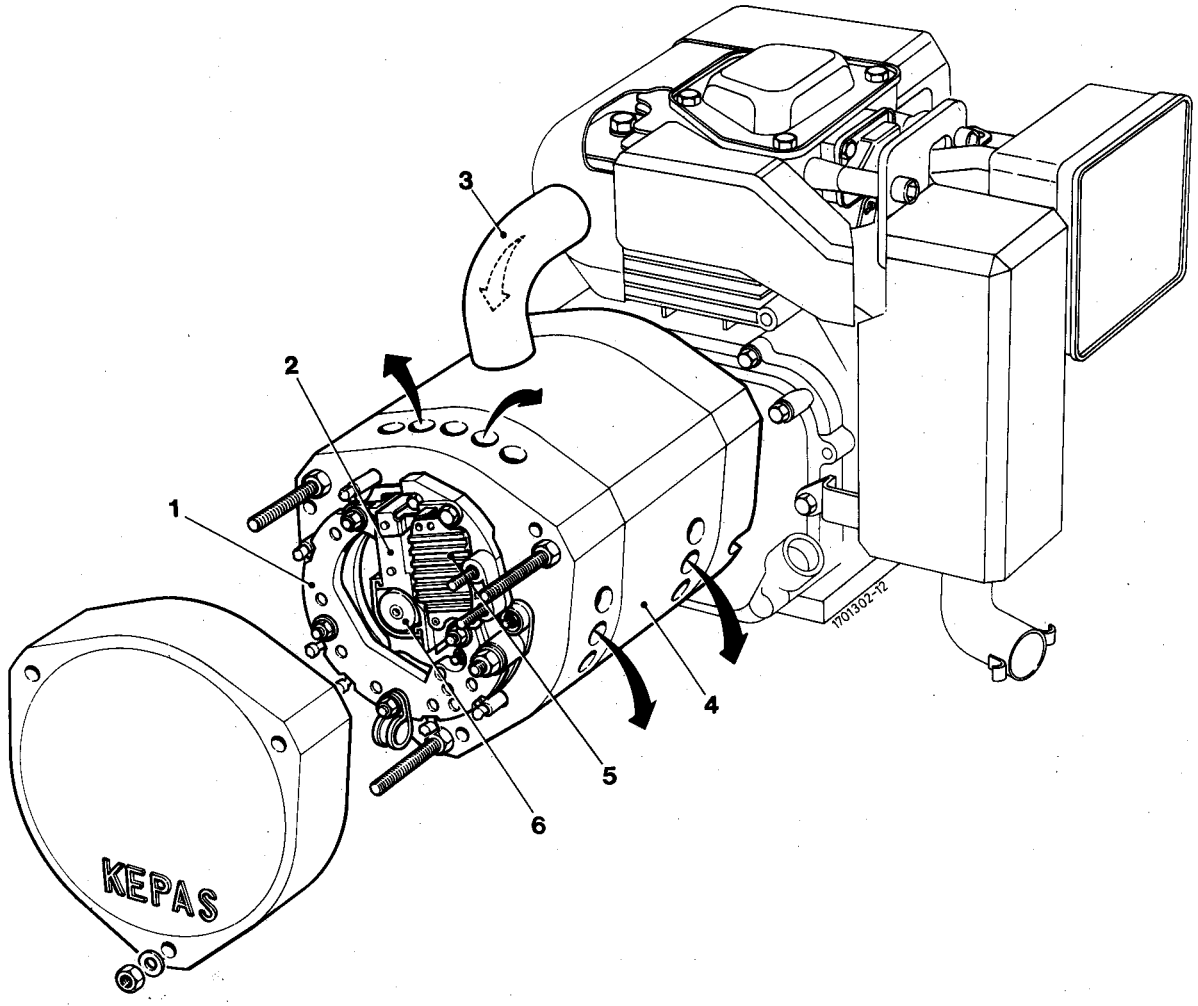
ALTERNATOR

18 The alternator assembly (Fig 7) is a separately excited type of brush gear construction. It is rated to provide nominal outputs of 14/28 V d.c. at 300/500 W and is capable of sustaining a 150% overload condition.

19 A 3-phase rectifier unit, an automatic voltage regulator (AVR) module and a brush guide housing are mounted on the rear (non-drive end) section casting of the alternator. The 3-phase rectifier unit converts the alternator 3-phase output to a d.c. output. The AVR module forms part of the excitation system and provides output sensing and excitation voltage control functions for maintaining the alternator output voltage. The brush guide housing, which forms part of the AVR module, situates the two brushes above and in contact with the two slip rings mounted on the end of the alternator rotor shaft.

20 The alternator is fitted to the engine by assembling the alternator component parts, in stages, to the engine drive shaft. The engine/alternator assembly is mounted to the generator frame via resilient mounts.

21 Cooling air is forced into the alternator through a hose on top of the middle casing section and is expelled through holes in the middle and rear casing sections.



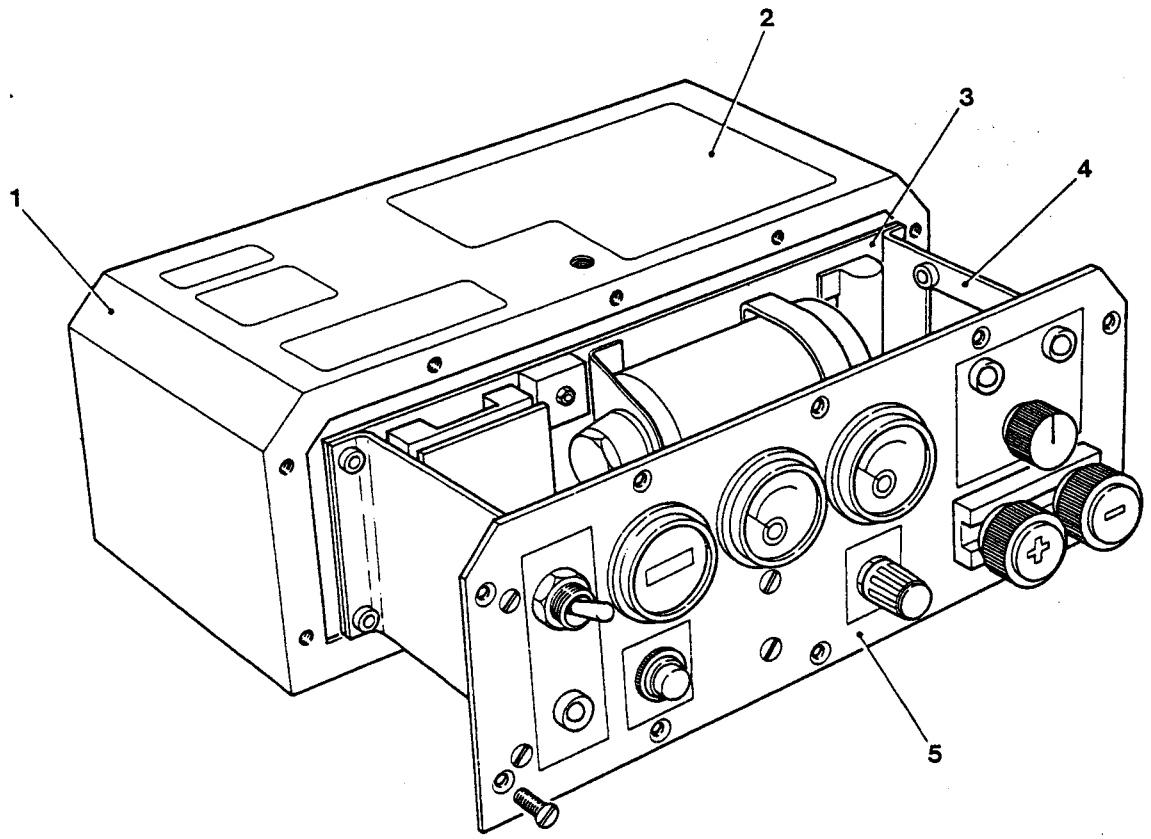
1 3-phase rectifier unit
2 Brush guides
3 Cooling air hose
4 Alternator casing
5 Automatic voltage regulator module
6 Slip rings

Fig 7 Alternator assembly

CONTROL BOX

22 The control box assembly (Fig 8) is resiliently mounted at the front end of the generator set and houses the operation control and indication circuitry. The assembly consists of a mild steel fabricated box, an alluminium alloy front panel and an alluminium alloy rear panel. The front and rear panels and two mild steel brackets are bolted together to form a component chassis on which all control and indication circuitry components are mounted.

23 The front panel is the control consoje, which carries the operator controls, the main output terminals and the necessary instrumentation and indicators for monitoring generator set performance.

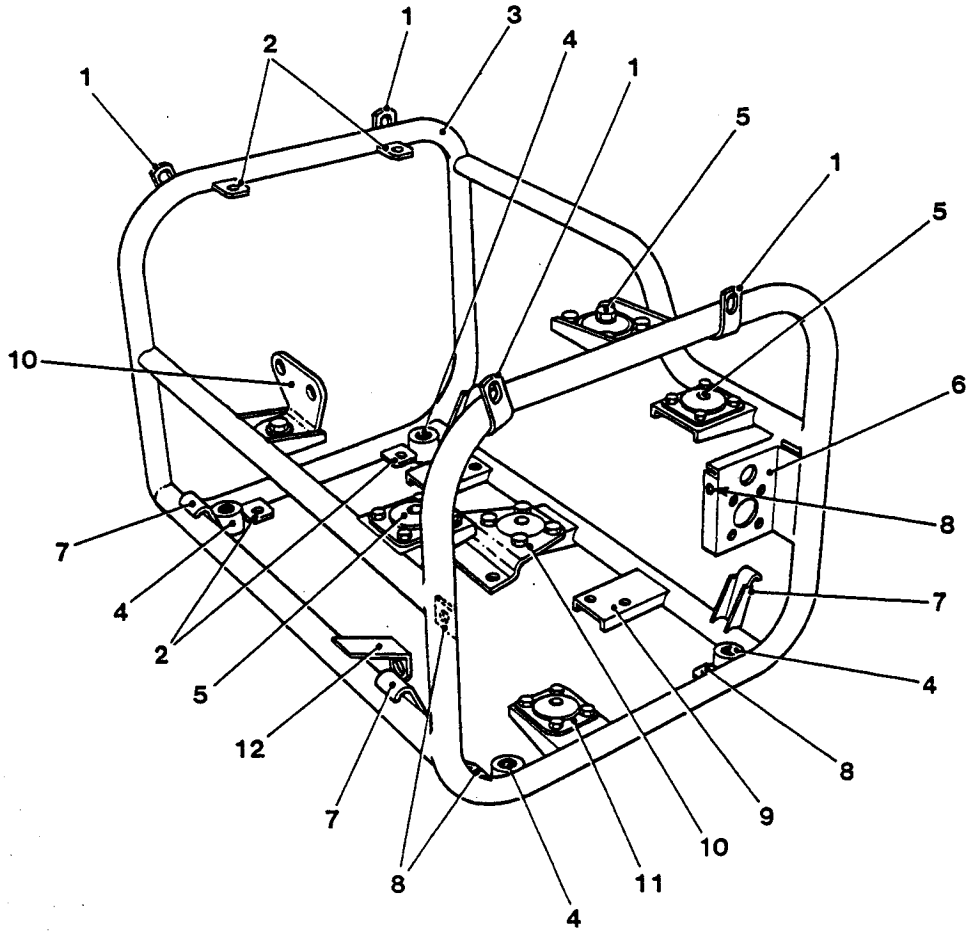


1 Control box
2 Generator circuit diagram
3 Rear panel
4 Bracket (2)
5 Front panel

Fig 8 Control box assembly

FRAME

24 The generator set frame (Fig 9) is constructed of 19 mm (outside diameter) steel tube and has various welded lugs and bracketing for supporting the generator set components.



1 Carrying handle/shoulder strap lug
2 Rear end panel fixing point
3 Frame assembly
4 Support feet mounting point
5 Control box resilient mount bracket
6 Output socket mounting bracket
7 Acoustic cover retaining lug
8 Front end panel fixing point
9 Fuel filter mounting bracket
10 Engine resilient mount bracket
11 Alternator resilient mount bracket
12 Fuel input connector bracket

Fig 9 Generator set frame assembly

ACOUSTIC COVER

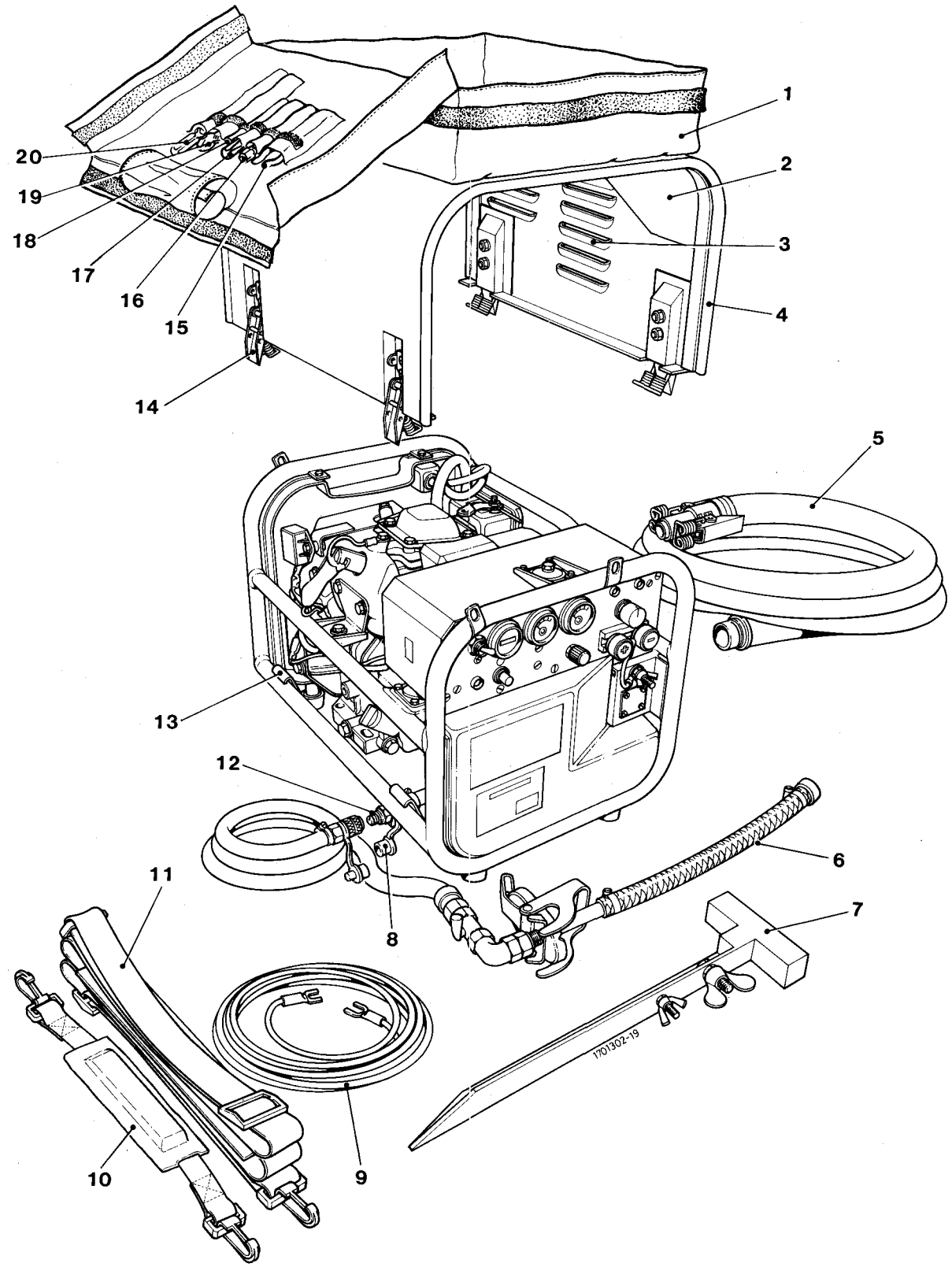
CAUTION

EQUIPMENT DAMAGE. Ensure that the air louvres in the side of the acoustic cover are not obstructed.

25 The top and sides of the generator set are shrouded by an acoustic cover (Fig 10) which provides environmental protection and noise attenuation. The cover is constructed from aluminium and the inner, upper surface is lined with acoustic insulation material. Rubber edging strip is installed around the front and rear edges of the cover to prevent noise caused by vibration transmission through the cover. Four spring loaded over-centre toggle catches (two each side) are used to secure the cover to the generator set frame. Louvres in the right-hand side of the cover enable respiratory air to be drawn directly into the engine air intake system and to allow cool air to circulate around the engine exhaust silencer area.

26 A removable, waterproof accessory equipment bag is situated on top of the cover. The bag contains the equipment necessary for generator set operation, carrying the generator set and for performing general maintenance operations. The accessory equipment items are shown and listed in Fig 10.

1 Accessory equipment stowage bag
2 Acoustic lining
3 Air louvres
4 Rubber edging strip
5 Exhaust extension pipe
6 Jerrycan adaptor assembly
7 Earthing spike
8 Fuel connector cap
9 Earth cable
10 Carrying handles (ADADS service only)
11 Shoulder straps (ADADS service only)
12 Fuel connection point
13 Acoustic cover retaining lugs (4)
14 Cover retaining catch (4)
15 Side cutting pliers
16 Box spanner
17 Screwdriver, cross-point
18 Box spanner rod
19 Adjustable spanner
20 Screwdriver, flat blade



Acoustic cover and accessory equipment

BRIEF FUNCTIONAL DESCRIPTION

27 The main functional areas of the 14/28 V, 300/500 W generator set are shown in Fig 11, which indicates the functional locations of these areas within the generating system in a simplified block schematic form.

28 Once the operator has set the output voltage level, engine speed and output voltage are regulated to suit the load requirements.

29 Instrumentation on the front panel displays the output voltage and current when the generator set is in operation. Lamp indicators on the front panel indicate the selected output voltage range and the presence of an output overload condition.

30 In the event of an output over load condition, a resettable overload protection device disconnects output power from the output terminals.

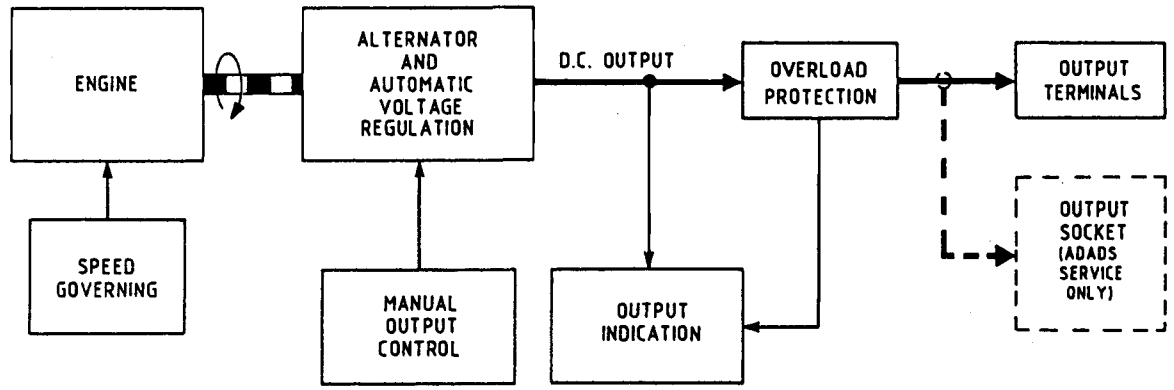


Fig 11 Generator set simplified block diagram

CHAPTER 2

POWER UNIT

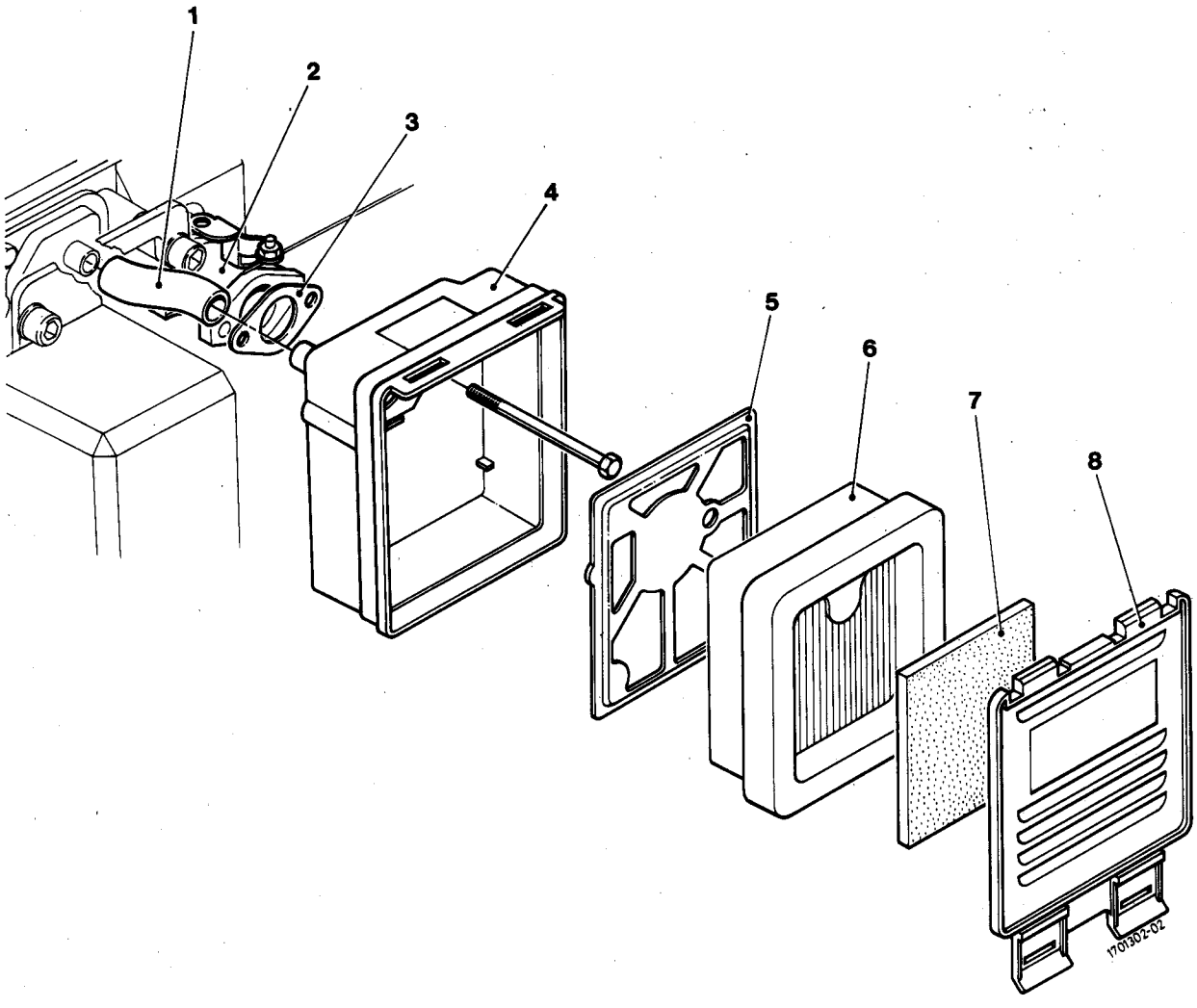
CONTENTS

INTRODUCTION

1 The power unit consists of an engine, engine mounted accessories and engine support systems. Equipment location is shown in Chapter 1, Figs 3 to 6. The engine is a Kubota GH120, single cylinder, 121 cm^3, gasoline fuelled engine and is supplied with some special options and minor modifications to suit the application.

AIR FILTERING

2 Air drawn in from the atmosphere passes through a dry type air cleaning system (Fig 1), which incorporates a re-usable foam filter element and a disposable paper filter element. The foam filter element collects larger airborne particles before they reach the paper element.



1 Breather pipe
2 Carburettor
3 Gasket
4 Air filter casing
5 Plate
6 Paper filter element
7 Foam filter element
8 Air filter cover

Fig 1 Air filtering system

EXHAUST SYSTEM

WARNINGS

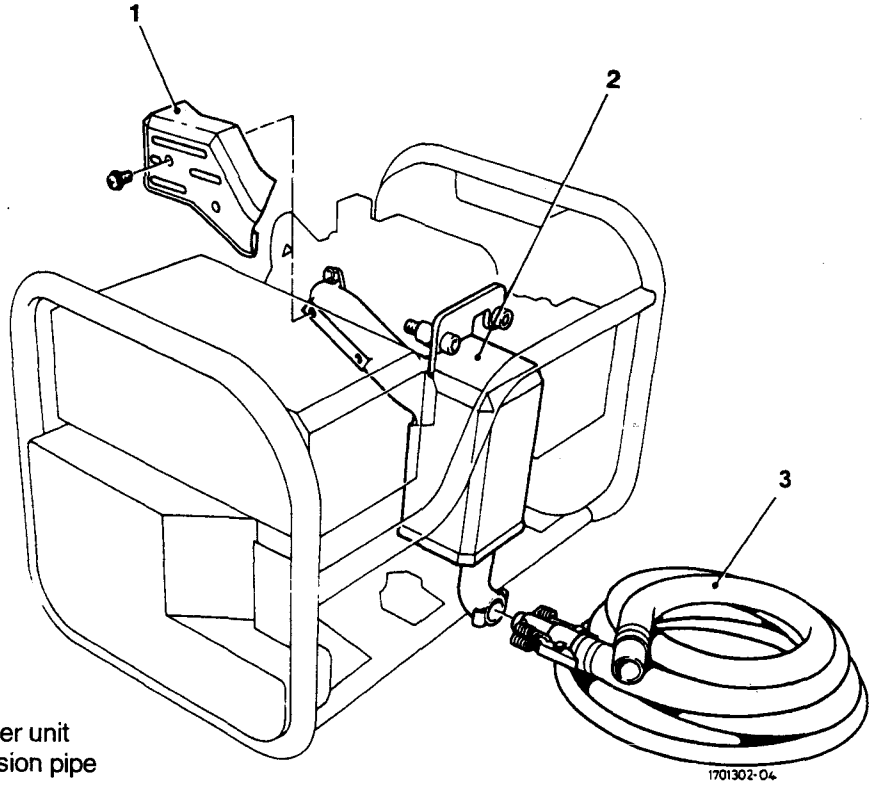
(1) TOXIC FUMES. EXHAUST GASES ARE TOXIC AND CAN QUICKLY REACH TOXIC PROPORTIONS IF BASIC PRECAUTIONS ARE NOT FOLLOWED. IF THE GENERATOR IS TO BE USED IN A CONFINED SPACE, A STANDARD ISSUE EXHAUST EXTENSION MUST BE FITTED. THE EXHAUST EXTENSION MUST NOT BE FURTHER MUFFLED OR RESTRICTED IN ANY WAY FROM ITS ORIGINAL DESIGN AS THE RESULTING BACK PRESSURE COULD CAUSE ADDITIONAL LEAKS TO OCCUR OR DAMAGE THE ENGINE. EXTREME CARE MUST BE TAKEN TO ENSURE THAT EXHAUST GASES ARE VENTED SAFELY AWAY FROM ANY PERSONNEL IN THE VICINITY WITH DUE CONSIDERATION BEING GIVEN TO TOPOGRAPHY AND PREVAILING WIND CONDITIONS. HARMFUL CONCENTRATIONS CAN BE ODOURLESS AND NOT VISUALLY PERCEPTIBLE.

(2) SKIN BURNS. THE EXHAUST FITTINGS BECOME EXTREMELY HOT AND APPROPRIATE SAFETY PRECAUTIONS ARE TO BE OBSERVED.

(3) FIRE HAZARD. THE ACOUSTIC CANOPY MUST BE FITTED TO THE GENERATOR SET WHEN IN OPERATION TO PREVENT COMBUSTIBLE MATERIALS (IE CAMOUFLAGE NETTING) COMING INTO CONTACT WITH THE GENERATORS HOT SURFACES.

(4) FIRE HAZARD. CARE MUST BE TAKEN WHEN DEPLOYING THE EXHAUST EXTENSION MUFFLER TO ENSURE THAT IT IS NOT CLOSE TO OR CAN COME INTO CONTACT WITH ANY COMBUSTIBLE MATERIAL.

3 Exhaust gas expelled from the engine (Fig 2) passes directly into an exhaust silencing unit located at the right-hand side of the generator set. The exhaust silencer unit connection pipe and inside the rear of the exhaust silencer unit is covered with a special compound to improve exhaust silencing. A tail pipe at the bottom of the silencer unit directs exhaust gas under the bottom edge of the acoustic cover and out to the atmosphere. Exhaust gas can be routed away from the generator set by attaching the exhaust extension pipe assembly to the silencer unit tail pipe.



1 Cover
2 Exhaust silencer unit
3 Exhaust extension pipe

Fig 2 Exhaust system

LUBRICATION SYSTEM

4 The Kubota GH120 engine incorporates an oil splash system for lubricating the moving parts of the engine.

CAUTION

EQUIPMENT DAMAGE. Engine oil OMD 80 may be used in ambient temperatures down to -15°C, but MUST NOT be used in temperatures below -15°C.

5 The lubrication oils specified for use in the 14/28 V generator set are as follows:

5.1 Engine oil OMD 80 for ambient temperatures above -15°C.

5.2 Engine oil OMD 55 for ambient temperatures below -15°C.

6 The oil level dipstick (Fig 3) is combined with the oil filler plug situated in a threaded orifice at the rear, left-hand side of the engine. An oil drain plug is situated at the bottom, left-hand side of the engine crank case.

7 For a low oil level condition, a low oil level sensing system acts to shut the engine down and disable engine starting until the correct oil level is restored. The low oil level sensing system consists of a float operated oil level sensor module, situated in the crank case at the drive shaft end of the engine, and an electronic switch module mounted on the engine fan cover. When the oil falls below a predetermined level, the float in the oil level sensor module activates an integral reed switch, which in turn operates the electronic switch module to shut the engine down. The electronic switch module performs in the same way as the engine stop switch by connecting the ignition coil (Para 16) primary current to chassis (earth) potential.

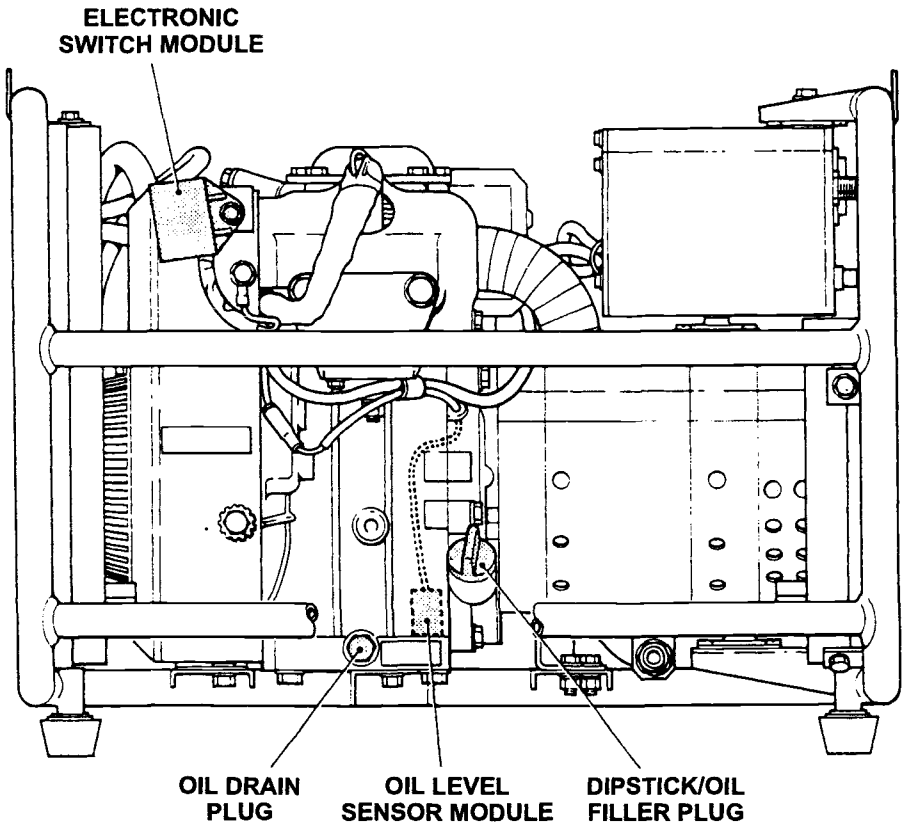


Fig 3 Lubrication system

FUEL SYSTEM

WARNINGS

(1) GASOLINE. GASOLINE FUEL VAPOUR IS EXPLOSIVE WHEN CONTAINED IN A CONFINED SPACE.

(2) GASOLINE. GASOLINE FUEL IS FLAMMABLE AND CONSTITUTES A FIRE HAZARD. DO NOT SMOKE CIGARETTES OR EXPOSE NAKED FLAMES IN THE VICINITY OF THE GENERATOR SET. SPECIAL CARE MUST BE TAKEN WHEN REFUELLING, SHUTTING DOWN OR PERFORMING MAINTENANCE ACTIVITIES.

8 The generator set fuel system arrangement is illustrated in Fig 4.

Fuel supply equipment

9 Fuel is supplied from a jerrycan via the jerrycan adaptor assembly stowed in the accessory equipment bag on the acoustic cover. The jerrycan adaptor assembly comprises a 3.7 m long fuel pipe, a tap, a jerrycan filler neck adaptor, and a dip tube assembly. A fine gauze fuel filter is fitted to the lower end of the dip tube assembly. A quick-release connector at the free end of the fuel pipe connects to the mating connector on the generator set. The tap prevents fuel spillage from the fuel pipe when the jerrycan adaptor is removed from the jerrycan.

Fuel filter

10 Fuel initially passes through a filter situated at the right-hand side, towards the front of the generator set frame. This filter is a disposable type and is replaced in accordance with the maintenance schedule.

Fuel pump

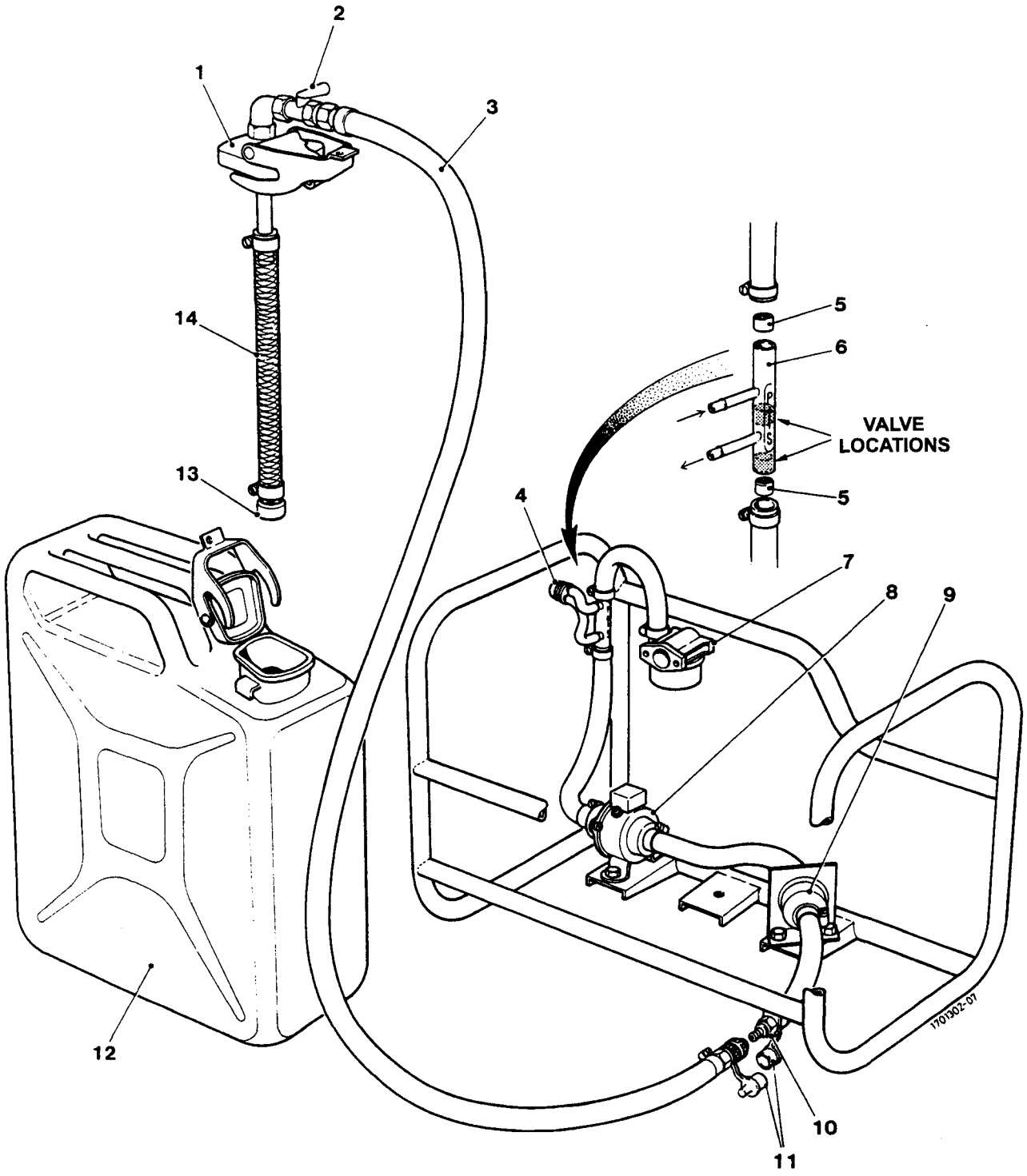
11 An electrically driven fuel pump is situated at the front, right-hand side of the generator set frame. The pump provides an unrestricted outlet flow of 500 cc/min. Fuel is pumped by means of an electrically operated solenoid, which operates a spring loaded piston. An integral, transistorised oscillator circuit provides pulsed d.c. power to the solenoid, which operates the piston to provide the pumping action at a frequency of 18 ±3 Hz. Pumping action is obtained by the piston being drawn (magnetically) by the solenoid during the "on time" of the driving signal and then pulled back by the return spring during the "off time" of the driving signal. A unidirectional valve enables the piston to return without forcing fuel in the opposite direction.

Carburettor

12 The air/fuel mixture for combustion is produced by a carburettor attached to the engine inlet manifold. The carburettor is a conventional side-draft type comprising mainly a float chamber, a pilot air jet, a main air jet, a throttle flap valve, a choke flap valve and various adjustment facilities. The choke flap valve is operated by the choke control situated on the generator set rear end panel, next to the fuel primer control. To prevent the carburettor from flooding when the jerrycan is sited at the same height as or above the carburettor, a spring has been added inside the carburettor to suppress excess movement of the needle valve due to increased fuel pump pressure.

Fuel priming system

13 A fuel priming control is mounted on the generator set rear end cover for priming the carburettor before starting the engine. The priming control comprises a flexible, transparent, rubber bubble which, when repeatedly pressed and released, pumps fuel from the jerrycan to the carburettor. The pumping action is enabled by two unidirectional valves strategically placed in a priming module connected in the fuel input pipe line.

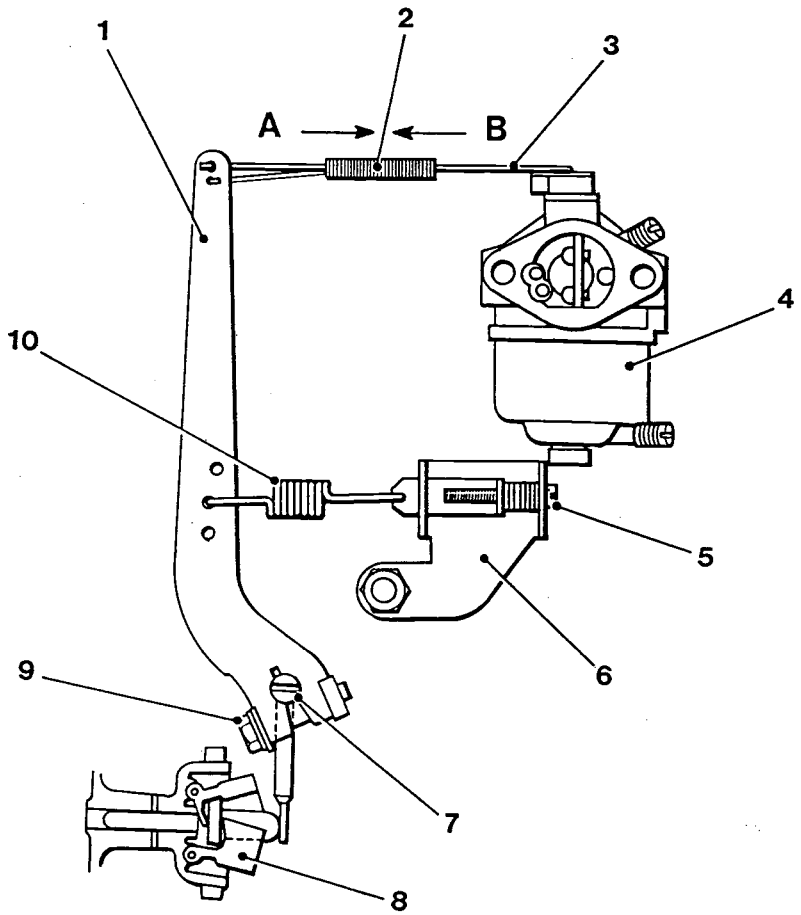


1 Jerrycan filler neck adaptor
2 Fuel tap
3 Fuel pipe
4 Fuel primer control
5 Unidirectional valve
6 Priming module
7 Carburettor
8 Fuel pump
9 Fuel filter
10 Fuel connection point
11 Fuel connector cap
12 Jerrycan
13 Gauze filter
14 Dip tube assembly

Fig 4 Fuel system

SPEED GOVERNING

14 Engine speed is initially set by the speed adjustment screw (Fig 5) and when engine speed changes occur due to load variations, the speed governing system restores the set engine speed by adjusting the carburettor throttle flap valve. The governing system (Fig 5) is a mechanical type and is situated on the right-hand side of the engine. It is designed to set a balance between the centrifugal force produced by the governor weights inside the engine and the external governor tension spring. When the engine load increases, the engine speed and hence the governor weights spinning rate decreases. The reduced centrifugal force produced by the governor weights causes the governor tension spring to pull the governor lever in direction (A) (Fig 5), which adjusts the throttle flap valve to increase the engine speed. When the engine load decreases, the centrifugal force produced by the governor weights increases and the governor lever is moved in direction (B) (Fig 5) to adjust the throttle flap valve and decrease the engine speed.

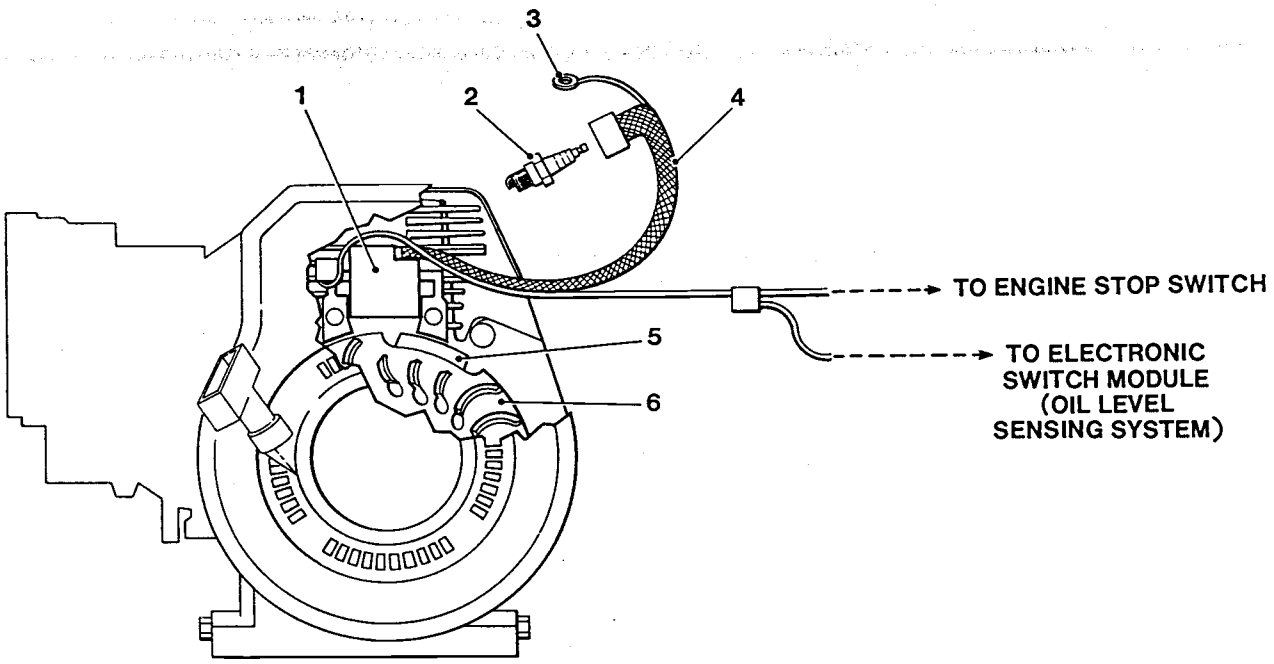


1 Governor lever
2 Throttle control rod spring
3 Throttle control rod
4 Carburettor
5 Speed adustment screw
6 Speed adjustment plate
7 Governor lever shaft
8 Governor weights
9 Clamping screw
10 Governor tension spring

Fig 5 Governing system

IGNITION SYSTEM

15 The ignition system (Fig 6) is a transistor/magnet type comprising a transistor/magnet ignition unit and a spark plug. A magnet attached to the engine flywheel induces the energy necessary for powering the system and controlling the ignition timing. The transistor/magnet ignition unit is mounted on the rear end of the engine, above the engine flywheel. The ignition lead is attached to the transistor/magnet ignition unit and is electrically screened along its entire length. An earth lead is attached to the screening braid at the spark plug cap end of the ignition lead. A cable is provided for connection to the ENGINE STOP switch on the control box front panel and to the electronic switch module of the oil level sensing system (Para 7).



1 Transistor/magnet ignition unit
2 Spark plug
3 Earth lead
4 Ignition lead
5 Magnet
6 Engine flywheel

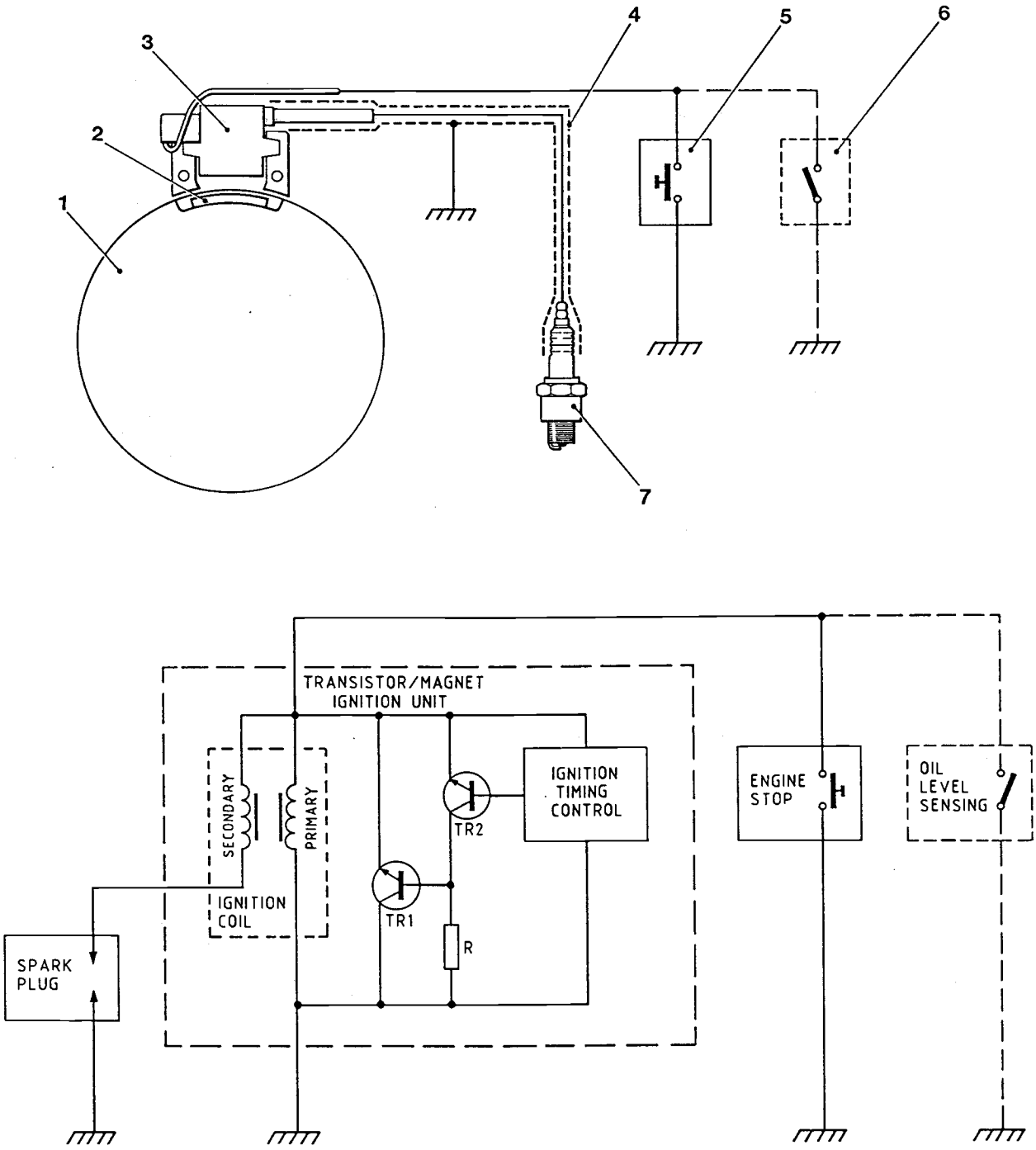
Fig 6 Ignition system component locations

Ignition system operation

16 The transistor/magnet ignition unit (Fig 7) comprises an ignition coil to generate a high secondary winding voltage from current generated in the primary winding and an ignition timing circuit for generating the ignition coil primary current.

17 During the period where the engine flywheel magnet passes the transistor/magnet ignition unit, a voltage is induced in the primary winding of the ignition coil. The induced voltage provides power to the electronic circuitry causing current to flow in the base of transistor TR1 and the ignition timing control circuit to be activated. Transistor TR1 turns on and initiates a current flow between the primary winding of the ignition coil and TR1. At the appropriate time, a signal from the ignition timing control circuit turns transistor TR2 on and TR1 off. At this instant, the ignition coil primary winding current is cut off sharply, causing a high output voltage to be induced in the secondary winding, a spark to be generated at the spark plug and the engine to start.

18 The engine is stopped by pressing the ENGINE STOP switch, which connects the primary winding current to ground.

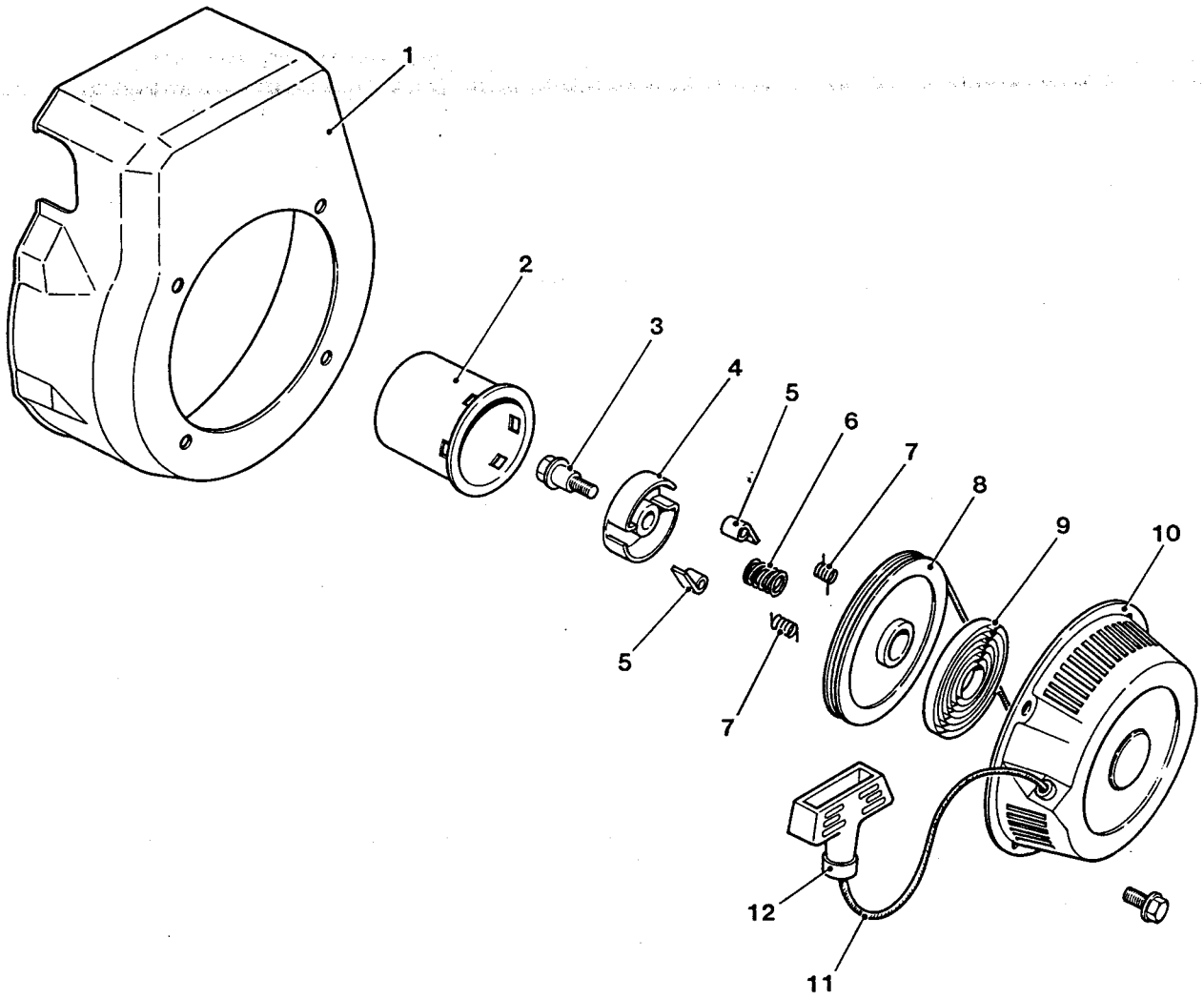


1 Engine flywheel
2 Magnet
3 Transistor/magnet ignition unit
4 Screened ignition lead
5 Engine stop switch
6 Electronic switch module
7 Spark plug

Fig 7 Ignition system schematic and circuit diagram

STARTING SYSTEM

19 A conventional recoil (rope) type starting system is incorporated at the rear end of the engine (Fig 8). When the starting rope is pulled, the ratchet dogs engage with the start pulley and turn the engine. On releasing the starting rope, the spiral spring acts to rewind the rope onto the rope reel.

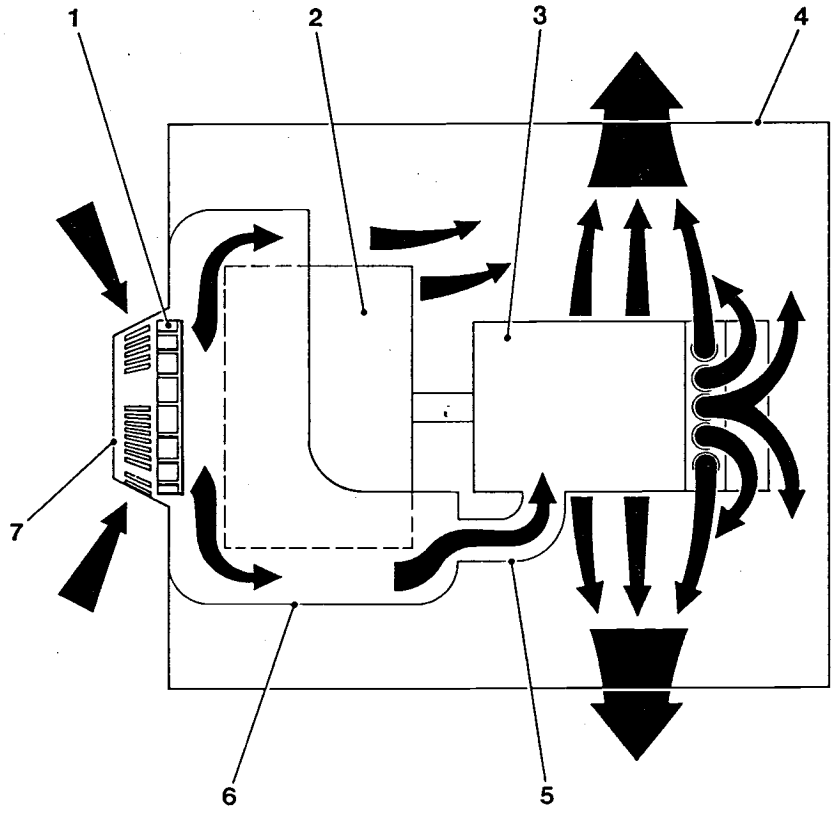


1	Engine fan cover	7	Ratchet dog spring
2	Start pulley	8	Rope reel
3	Centre screw	9	Spiral spring
4	Ratchet dog retainer	10	Recoil starter case
5	Ratchet dog	11	Pull grip
6	Brake spring	12	Rope

Fig 8 Recoil starter assembly

ENGINE COOLING

20 A forced air flow is maintained around the engine and through the alternator by a fan attached to the engine flywheel. Air is drawn in via the grills in the recoil starter case (Para 19) and flows around the engine and into the alternator via a short hose. Air is expelled from the alternator via holes in the castings and then passes under the generator set cover to the atmosphere. The cooling air flow through the generator set is shown in Fig 9.



1 Engine fan
2 Engine
3 Alternator
4 Acoustic cover
5 Cooling air hose
6 Engine fan cover and cowling
7 Recoil starter case

Fig 9 Cooling air flow - Plan view

CHAPTER 3

DETAILED ELECTRICAL DESCRIPTION

CONTENTS

INTRODUCTION

1 This chapter provides detailed descriptions of the electrical system assemblies and sub-assemblies that make up the 14/28 V, 300/500 W generator set. The main items of the electrical system are the alternator assembly and control box assembly. A functional block diagram for the generator set electrical system functions and how they interact is shown in Fig 1.

Electrical system functional overview

WARNINGS

(1) ELECTRIC SHOCK. AN EARTH PIN WILL NOT NECESSARILY PROVIDE IMMUNITY FROM ELECTRIC SHOCK. ENSURE THAT ADEQUATE UNIT SAFETY INSTRUCTIONS ARE HELD AND SAFE WORKING PRACTICES AND PROCEDURES IMPLEMENTED.

(2) EARTHING. THE EQUIPMENT MUST BE PROPERLY EARTHED BEFORE ATTEMPTING TO OPERATE THE GENERATOR SET.

Engine

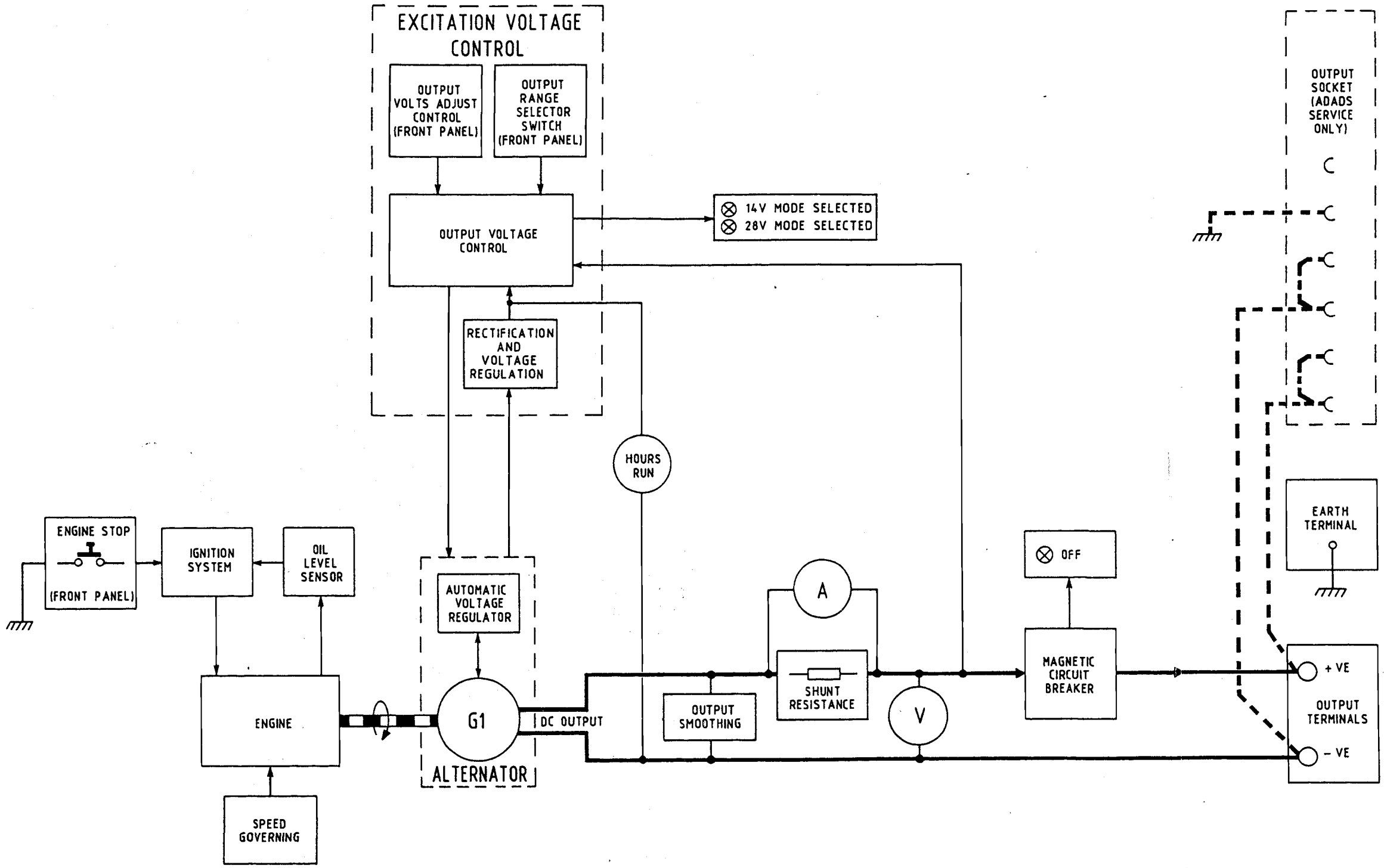
2 The engine ignition system is a transistor/magnet type incorporating an ignition coil to produce a high output voltage for generating a spark at the spark plug. Once the engine is started, the mechanical engine speed governing system maintains engine speed by compensating for load variations. When pressed, the ENGINE STOP pushbutton stops the engine by disabling the ignition system. An oil level sensing system detects a low engine oil level condition and disables the ignition system until the correct oil level is restored.

Alternator output voltage control

3 Alternator output voltage is controlled by an excitation voltage control circuit and an automatic voltage regulator (AVR) inside the alternator. Once the operator has set the output voltage level by setting the RANGE SELECTOR switch and ADJUST VOLTS control, the AVR automatically maintains the set level by responding to output load variations. The selected output voltage mode is indicated on the front panel.

Output voltage distribution

4 The d.c. output from the alternator is smoothed and passed to the output terminals via output voltage/current instrumentation and a magnetic circuit breaker. An indicator on the front panel lights when the circuit breaker is open.

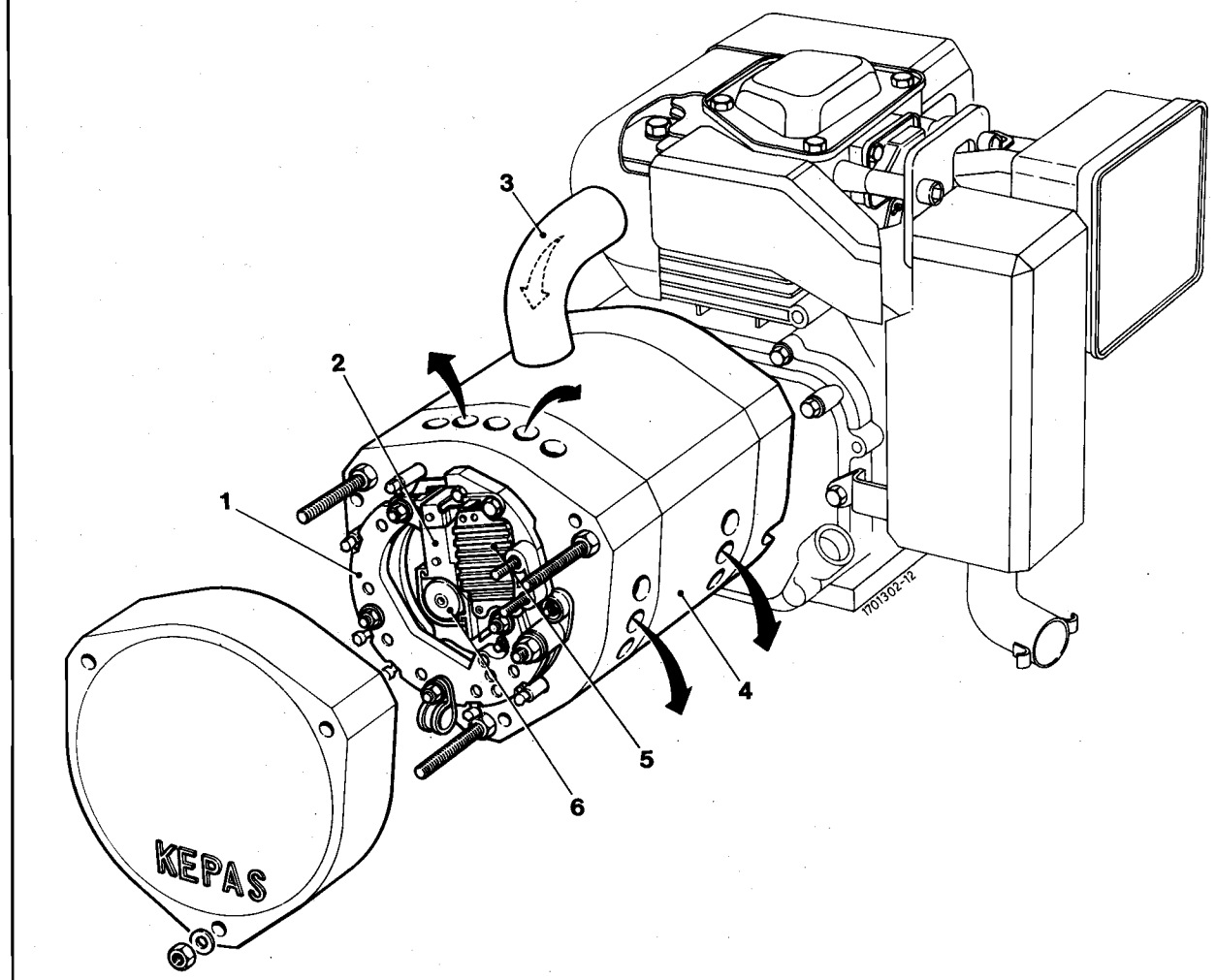


Electrical system - Functional block diagram

ALTERNATOR ASSEMBLY

General

5 The alternator assembly comprises mainly a separately excited, brush type alternator, an automatic voltage regulator module and a 3-phase rectifier unit (Fig 2).



1 3-phase rectifier unit
2 Brush guides
3 Cooling air hose
4 Alternator casing
5 Automatic voltage regulator module
6 Slip rings

Fig 2 Alternator assembly

6 The alternator is a two-stage machine comprising a six-pole permanant magnet rotor rotating inside a stationary exciter stator and a brush connected 12-pole main rotor winding rotating inside a stationary 3-phase main stator (Fig 3). The a.c. voltage produced by the exciter stator winding is passed to the excitation voltage control circuit in the control box, where it is processed to produce a stable d.c. excitation voltage. An ADJUST VOLTS control and RANGE SELECTOR switch on the control box front panel are used to set the excitation control voltage level at the alternator AVR module (Para 7), which controls the main rotor winding current and hence, the alternator output voltage. Alternator output voltage variations are sensed by the AVR, which restores the set voltage by increasing or decreasing the main stator field current. The main stator windings are connected in delta configuration and the 3-phase output produced is converted to d.c. by the 3-phase rectifier unit.

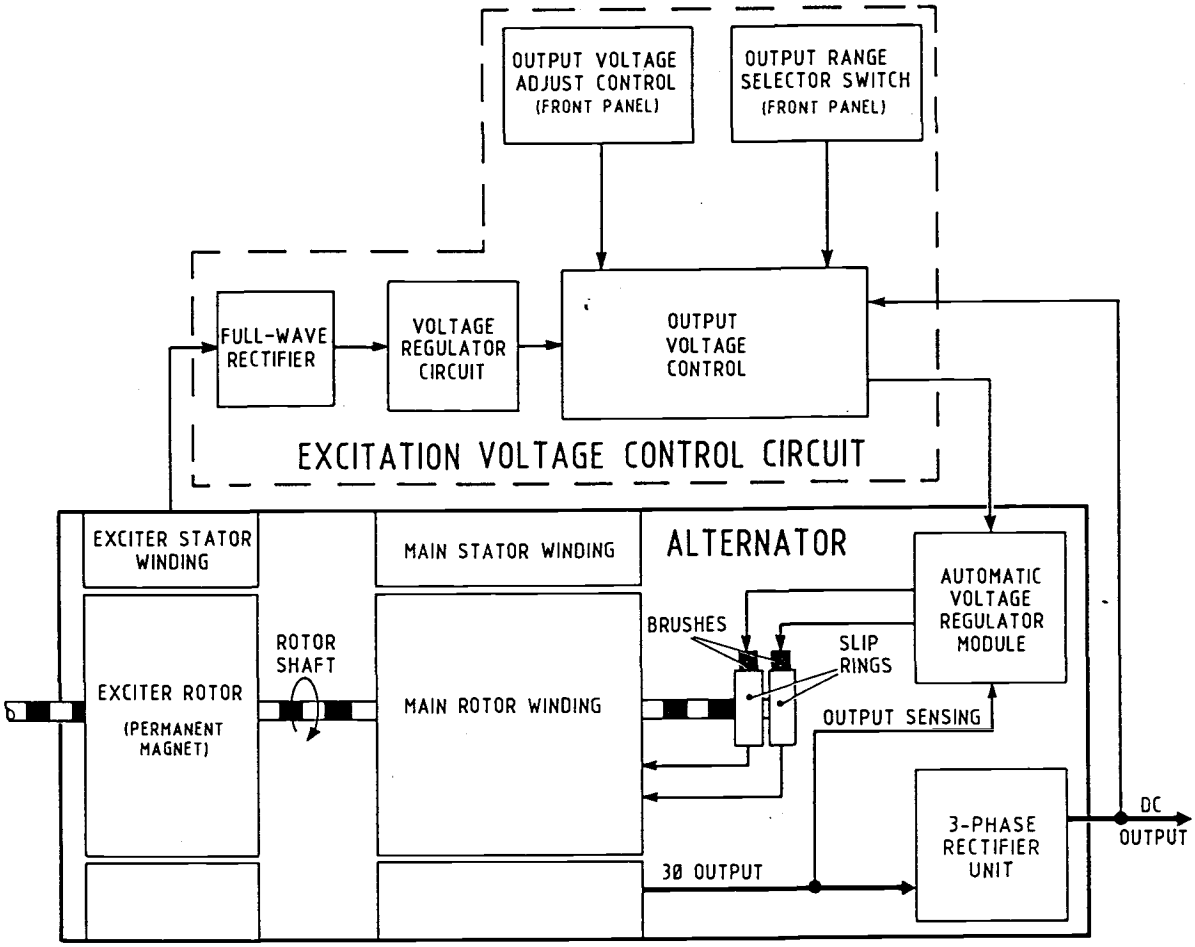


Fig 3 Alternator construction and control system schematic

Automatic voltage regulator module

7 The automatic voltage regulator (AVR) (Fig 4) is mounted on the rear end casting section of the alternator. Its purpose is to maintain the alternator output voltage under varying load conditions in accordance with a preset level. The AVR module comprises an integrated circuit set in a plastic housing, which also incorporates the brush guides. Maintenance is restricted to replacement of the two brushes. Functionally, the AVR module interlinks with the main stator winding and main rotor winding to provide closed loop control of the alternator output voltage. The 13.5 V d.c. voltage regulator module in the control box provides the operating power for the alternator AVR module.

8 The AVR module provides a number of operating features and the main functions used in this application are:

8.1 An excitation enable/disable function, which allows the field excitation to be switched off while the excitation input to the AVR is still applied.

8.2 Controlled field excitation at initial switch-on.

8.3 Controlled excitation current switching frequency for controlling the alternator output voltage.

9 Signal connections to the AVR module (Figs 4 and 7) are as follows:

9.1 W - +13.5 V AVR power/excitation voltage input from the voltage regulator module in the control box.

9.2 S - excitation control voltage input from the terminal board in the control box.

9.3 D - field excitation enable/disable input from the terminal board in the control box. (13.5 V d.c. = Enable, O V = Disable.)

9.4 Phase (unmarked) - sensing input from one phase of the main stator.

9.5 Negative (unmarked) - AVR module negative supply connection.

9.6 Suppression (unmarked) - integral suppression capacitor connection to the positive side of 3-phase rectifier unit.

9.7 Brush (unmarked) - brush connection points.

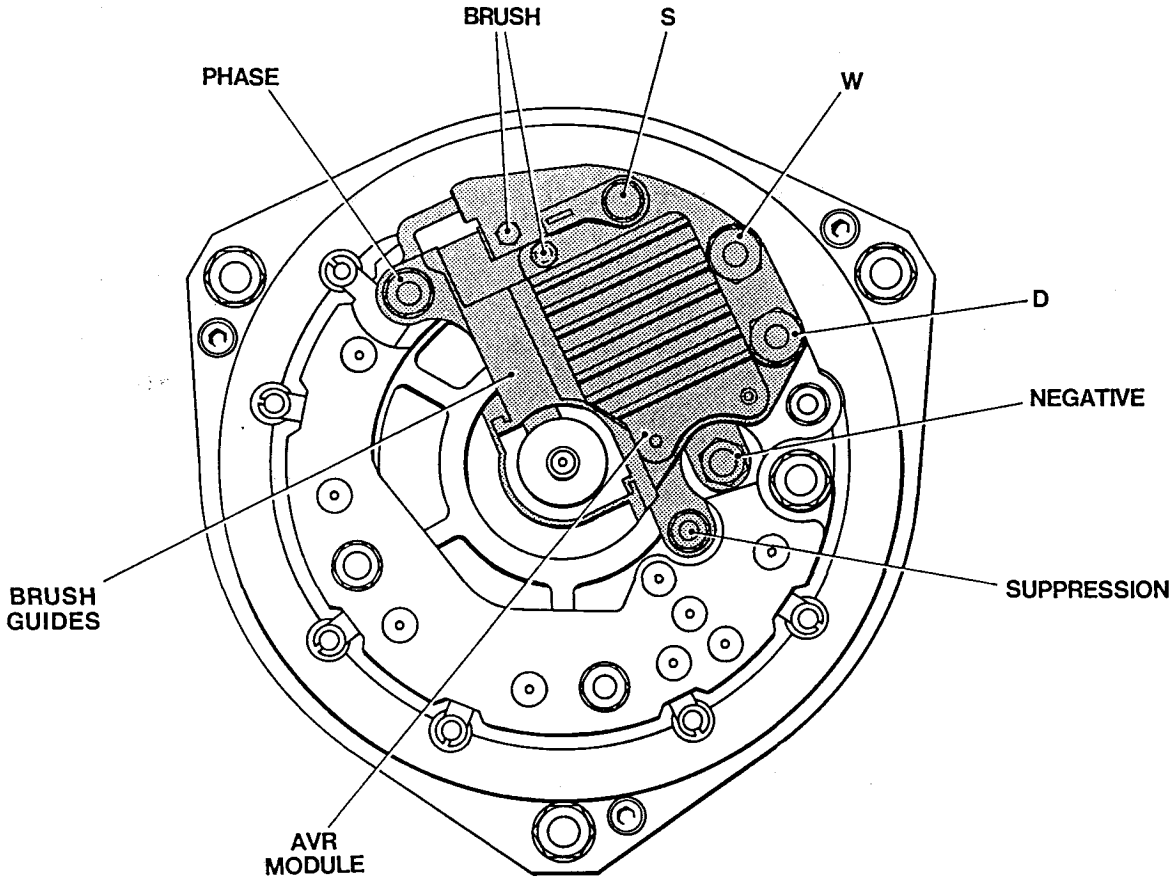


Fig 4 Alternator AVR module

TABLE 1 AUTOMATIC VOLTAGE REGULATOR SPECIFICATION

Serial (1)	Parameter (2)	Value (3)
1	Standby current	2.5 mA max. (at 25°C)
2	Regulation voltage (Vreg) setting accuracy	Vreg ±0.1 V
3	Load regulation (5% to 95% load change)	0.3 V max.
4	Switching frequency	50 Hz to 1200 Hz
5	Temperature compensation (Tc) (regulator temperature)	0 mV/°C
6	Output saturation voltage (at 3.25 A and 25°C)	1.2 V max. (between field and ground terminal)
7	Field current excitation at switch-on (no machine rotation; battery voltage less than Vreg)	0.4 A to 1.0 A average field current; frequency range 1.0 kHz to 4.5 kHz

AVR functional description

AVR enable/disable

10 When the RANGE SELECTOR switch is set in the 14 V or 28 V output mode position, 13.5 V d.c. is connected to the "D" input of the AVR to enable operation of the AVR functions. In the OFF position, the "D" input is disconnected (open circuit) to disable excitation of the alternator.

Excitation control at switch-on

11 During slow rotation of the alternator rotor assembly at initial start-up, an oscillator circuit in the AVR acts to switch the main rotor current off and on at a frequency of 1 kHz (25% on-time, 75% off-time). This limits the alternator output until the alternator is rotating fast enough to achieve the 4.5 V, half-wave, minimum ripple voltage level required at the "Phase" input to turn the AVR on fully.

Alternator excitation/output voltage control

12 The ADJUST VOLTS control RV3, RANGE SELECTOR switch SW2 and control box terminal board resistors RV1, RV2, R1 and R2 form part of the alternator excitation control circuit. Variable resistors RV1 and RV2 are set during manufacture to obtain the required output voltage swing between the maximum and minimum positions of front panel control RV3 for the 14 V and 28 V output modes. Fig 5 shows the arrangement of the resistor components and how the arrangement changes when the generator set output mode is switched from 14 V to 28 V.

13 The purpose of this resistance circuit is to maintain 12.3 V d.c at the "S" input of the AVR module by operating ADJUST VOLTS control RV3.

14 The AVR module generates excitation current when 12.3 V d.c. is applied to the "S" terminal and switches the excitation current off when this voltage exceeds 12.3 V d.c. An internal potential divider circuit converts the 12.3 V input to 3.26 V, which is fed to an internal comparitor circuit to switch the excitation current on.

15 In the 14 V mode, variable resistor RV2 and fixed resistors R1 and R2 are switched out. When VOLTS ADJUST control RV3 is set at zero, there is no resistance between the generator positive output and the AVR "S" input, and the voltage present at the "S" input AVR is greater than 12.3 V. This causes the excitation current to be switched off until the generator output voltage falls to 12.3 V. This means that the minimum possible generator operating voltage is 12.3 V. As the resistance of RV3 is increased, a higher generator output voltage is required to maintain 12.3 V at the "S" input. When RV3 is set to maximum resistance, the generator output voltage must be at 16 V to obtain 12.3 V at the "S" input. Therefore, for this resistor configuration, the output voltage range is 12.3 V to 16 V.

16 For the 28 V mode, RV3 provides a voltage swing of 8 V, which is double the 14 V mode voltage swing. To achieve this, a precise resistance, made up by resistors R1 and R2, is switched in between the "S" input and generator negative, and variable resistor RV2 is switched in between the positive generator output and RV1. For this configuration, more alternator output voltage is required to achieve 12.3 V at the "S" input, resulting in an output voltage range of 24 V to 32 V.

17 Once the required output voltage is set, any subsequent changes in output voltage due to load variations is sensed at the "S" input and the excitation is increased/decreased accordingly.

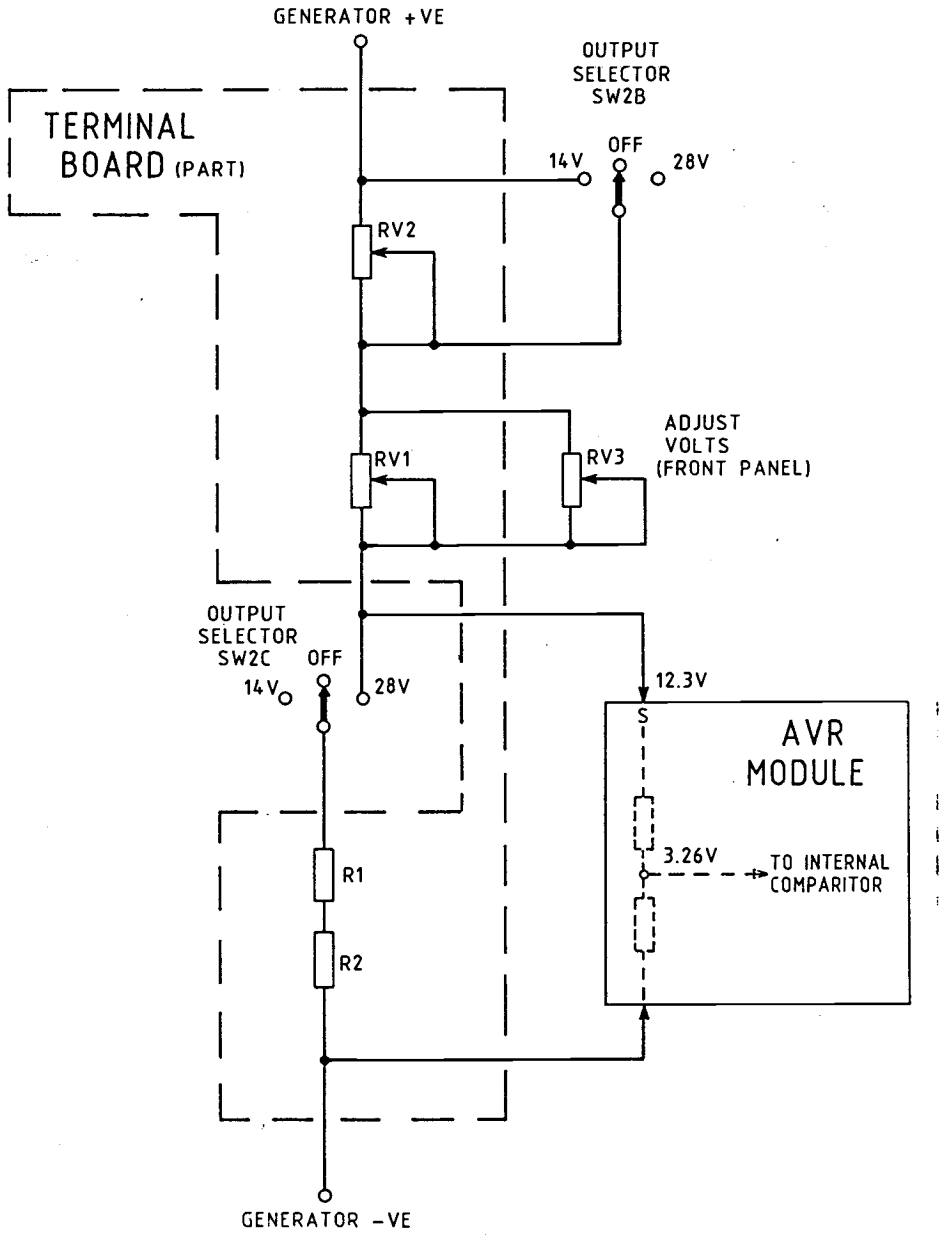


Fig 5 Alternator excitation control

3-phase rectifier unit

18 The 3-phase rectifier unit (Figs 6 and 7) is mounted on the rear casting section of the alternator, next to the AVR module, and is used to convert the main stator 3-phase output to d.c. The unit comprises two diode sub-assemblies and a moulded plastic termination sub-assembly. Each diode sub-assemblycontains three diodes mounted on a metal baseplate. One diode sub-assembly provides the positive half of the rectifer and the other, the negative half. The free ends of the diodes are soldered at six locations on the termination sub-assembly. If a diode fails, the complete 3-phase rectifier unit is replaced.

19 Connections to the 3-phase rectifier unit are as follows:

19.1 ⊕ - alternator positive d.c. output connection to the control box.

19.2 ⊖ - alternator negative d.c. output connection to the control box.

19.3 Main stator winding (unmarked) - six crimp-and-solder terminals for connecting the six main stator winding leads.

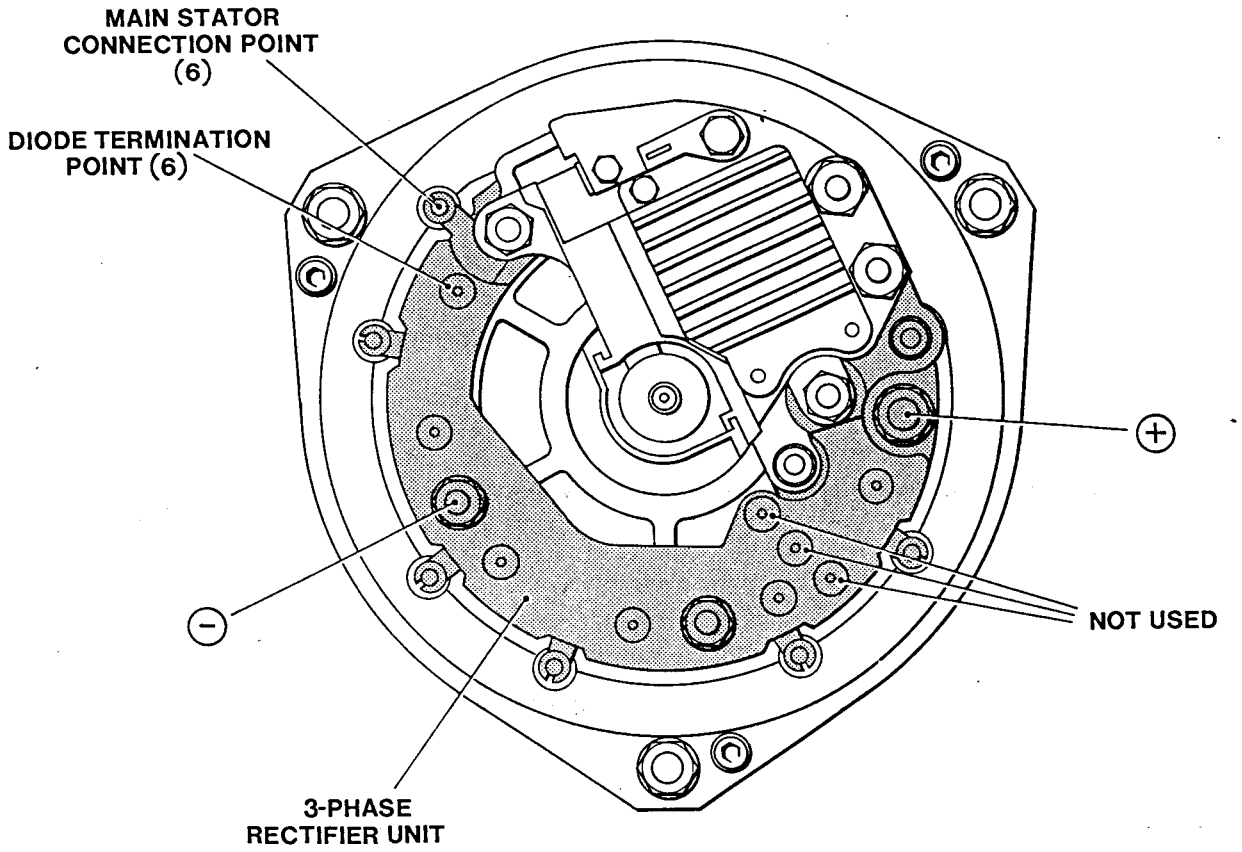


Fig 6 3-phase rectifier unit

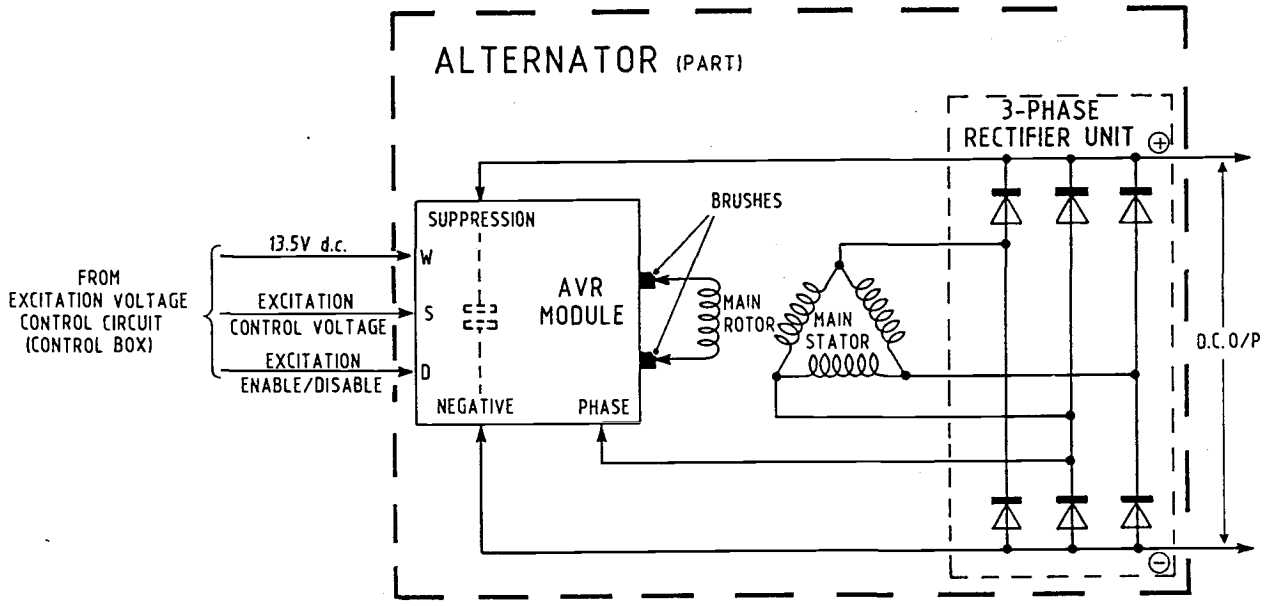


Fig 7 AVR module and 3-phase rectifier unit functional locations

CONTROL BOX ASSEMBLY

General

20 The control box assembly (Fig 8), located at the front of the generator set, houses the alternator excitation voltage control, output smoothing and output connection circuitry component items (Fig 9). All generator set controls (apart from engine start controls) and indicators are mounted on the control box front panel (Fig 10).

21 Two electronic sub-assemblies are contained inside the control box:

21.1 Voltage Regulator Module - provides a stabilised d.c. supply.

21.2 Terminal Board - incorporates various fixed and variable resistors used in the excitation control circuit (Para 12) and distributes the d.c. power provided by the voltage regulator module.

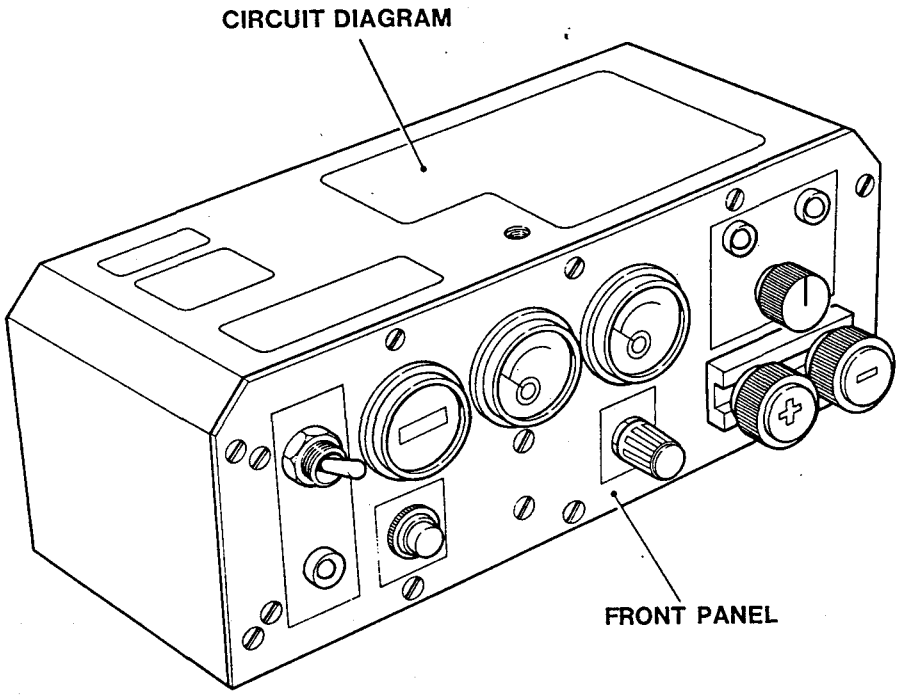
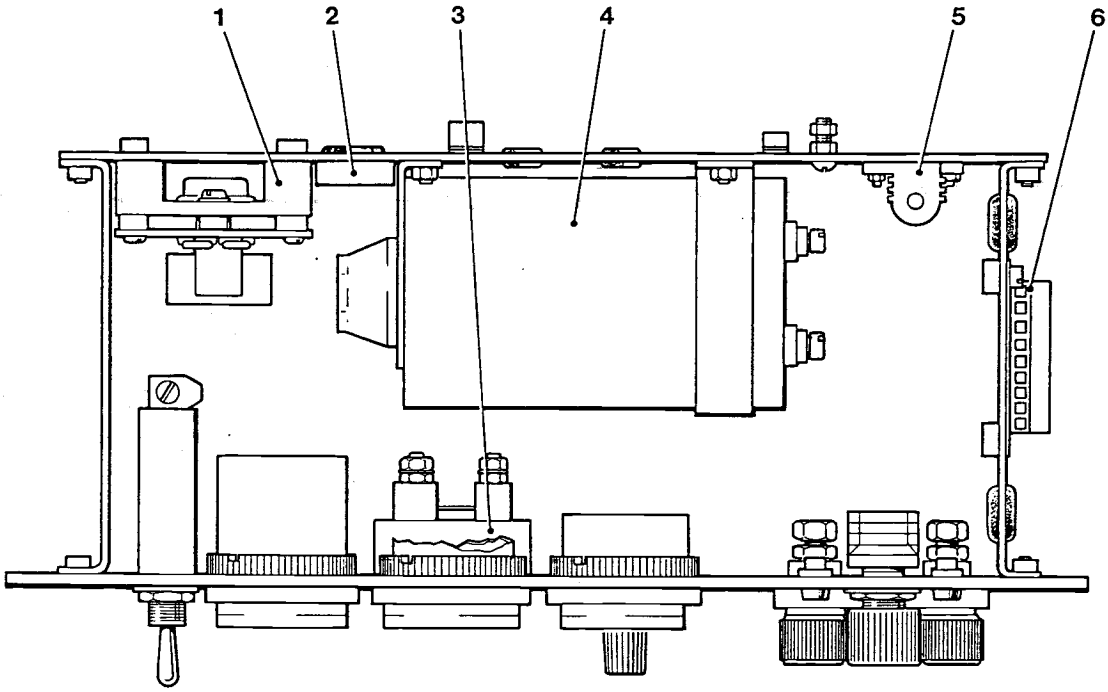
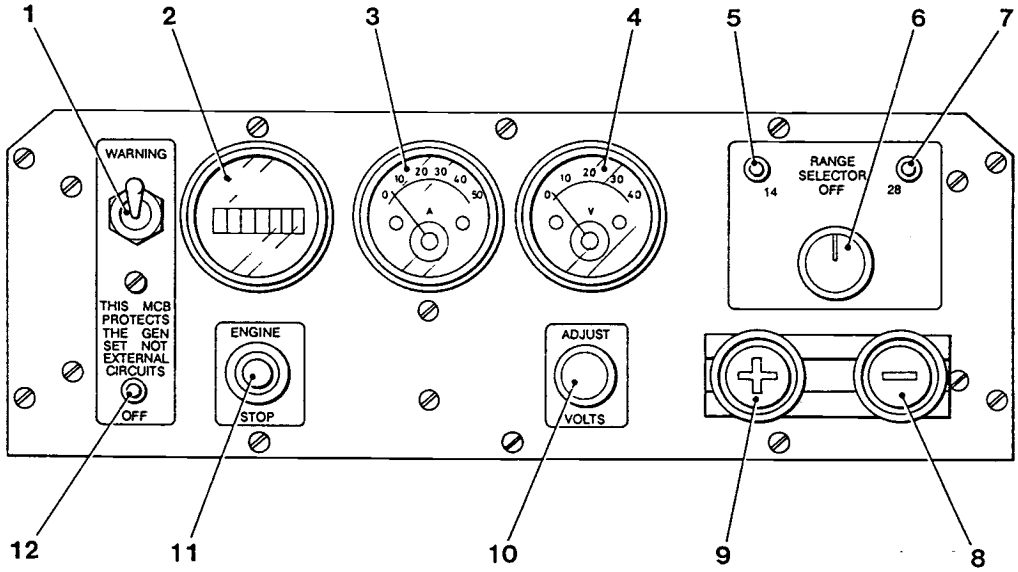


Fig 8 Control box - General view



1 Voltage regulator module
2 Rectifier bridge (MR1)
3 Ammeter shunt resistor
4 Smoothing capacitor (C3)
5 Ballast resistor (R7)
6 Terminal board

Fig 9 Control box - Internal view



1 Magnetic circuit breaker (SW1)
2 Hours run meter (M1)
3 Output ammeter (M2)
4 Output volts meter(M3)
5 14 V indicator (yellow)
6 Range selector switch (SW2)
7 28 V indicator (green)
8 Negative output terminal
9 Positive output terminal
10 Adjust volts control (RV3)
11 Engine stop switch (SW3)
12 Magnetic circuit breaker OFF indicator (red)

Fig 10 Front panel - Component locations

Voltage regulator module

General

22 The voltage regulator module is mounted on the inside of the control box rear panel and comprises a printed circuit board attached to a metal alloy heatsink, on which the voltage regulator device is mounted. The output produced by the voltage regulator module is 13.5 V d.c. and is connected to the terminal board (Para 25), from where it is distributed to power the alternator excitation control functions, the fuel pump, the LED indicators and the hours run meter. Fig 11 shows the physical layout of the voltage regulator components and connection terminals.

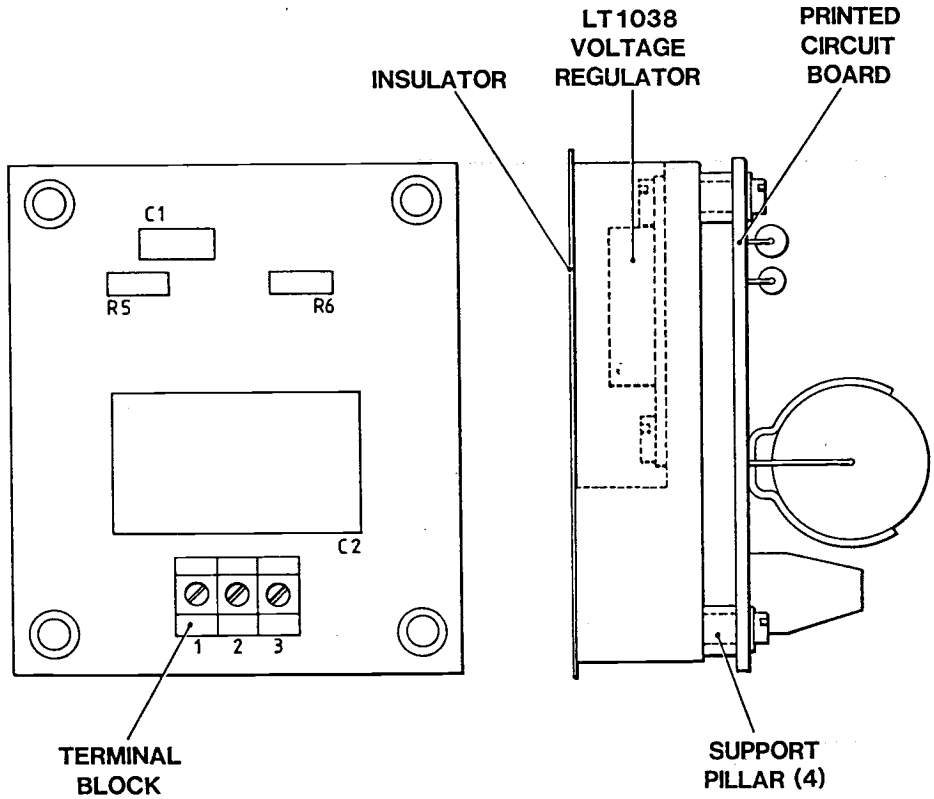


Fig 11 Voltage regulator module

Circuit description

23 When reading this description, it is necessary to refer to the generator set circuit diagram shown in Fig 13.

24 The a.c. voltage produced by the alternator exciter stator winding is full-wave rectified and smoothed by capacitor C2 of the voltage regulator module to provide 30-32 V d.c. at the input of the LT1038 type voltage regulator device. A regulated d.c. output of 13.5 V is generated by the voltage regulator device, which is capable of providing a maximum current of 10 A. The output voltage level is set by the regulator control voltage derived by resistors R5 and R6. Capacitor C1 smoothes out any ripple content in the regulated output.

Terminal board

General

25 The terminal board is mounted on the right-hand bracket inside the control box. It comprises a printed circuit board on which two rows of screw terminals, two variable resistors and various fixed resistors are mounted. The terminal board can be accessed by removing a metal plate on the right-hand side of the control box. Fig 12 shows the physical layout of the terminal board components.

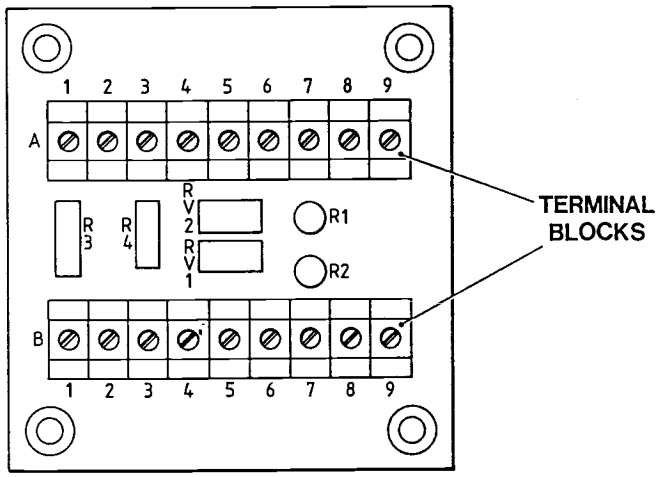


Fig 12 Terminal board

Functional description

26 When reading this description, it is necessary to refer to the generator set circuit diagram shown in Fig 13.

13.5 V d.c. distribution

27 The 13.5 V d.c. output from the voltage regulator module is connected to terminals 1, 2, and 3 of terminal row B. From these terminals it is distributed to the:

27.1 Excitation input (terminal "W") of the alternator AVR module.

27.2 AVR module enable/disable input (terminal "D"), via front panel RANGE SELECTOR switch SW2A and current limit resistor R4 on the terminal board.

27.3 Fuel pump.

27.4 Control panel LED indicators, via current limit resistor R3 on the terminal board.

27.5 Hours run meter (M1).

Alternator excitation control

28 Terminal board variable resistors RV1, RV2 and fixed resistors R1 and R2 form part of the alternator excitation control circuit. For details of their function, refer to Para 12.

Exciter stator voltage test points

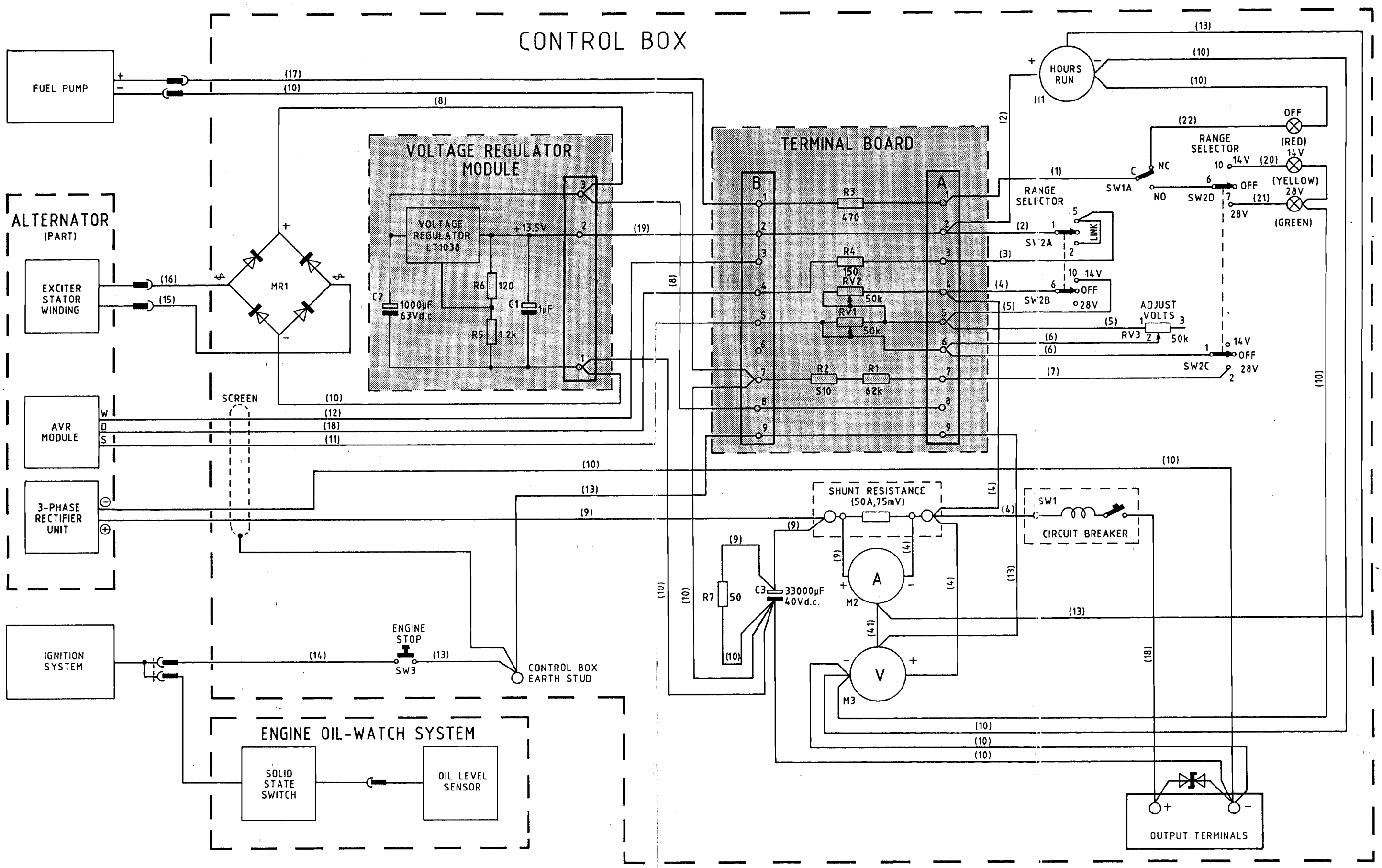
29 A test point facility is provided by the terminal board for measuring the rectified exciter stator voltage input to the voltage regulator module in the control box. The terminals used are:

29.1 Positive - terminal 8 of terminal row "A" and "B".

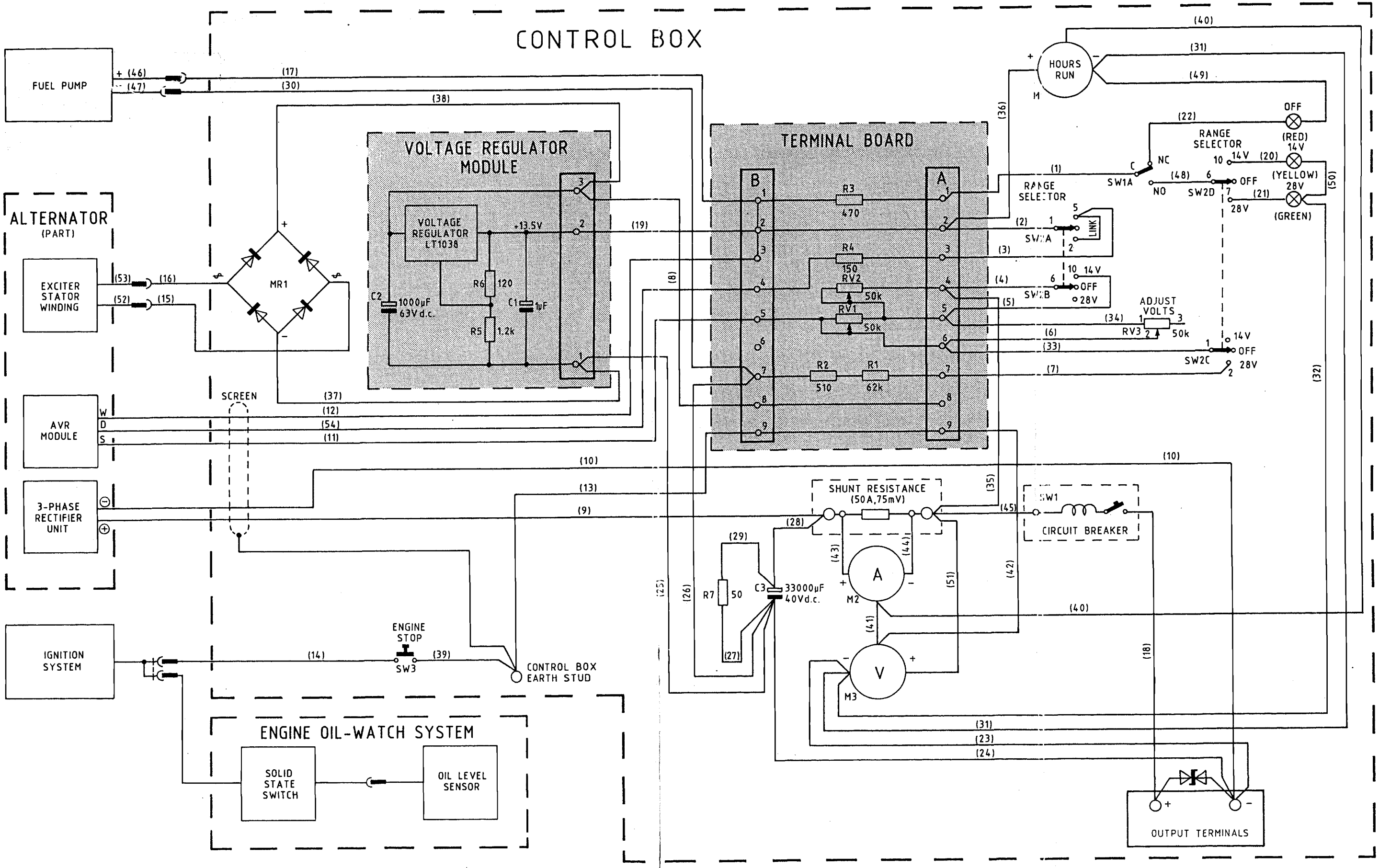
29.2 Negative - terminal 9 of terminal row "A" and B"

GENERATOR SET OVERALL CIRCUIT INFORMATION

30 Overall circuit/interconnection information is given in Fig 13 and Fig 14. The circuit/interconnection information is the same for both diagrams, but Fig 13 reflects the cable number configuration for generator sets with Equipment Serial Nos from 001 to 102, and Fig 14 reflects the cable number configuration for generator set with Equipment Serial Nos starting from 103.



Generator set circuit/interconnection diagram - Applicable to Equipment Serial Nos 001 to 102



Generator set circuit/interconnection diagram | Applicable to Equipment Serial Nos from 103

CONDITIONS OF RELEASE

1 [redacted]

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4 This information may be subject to privately owned rights.

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GENERATOR SET, ENGINE DRIVEN (GASOLINE), BATTERY CHARGING, 14/28 V, 300/500 W (HOPKINS)

FAILURE DIAGNOSIS

REPRINTED INCORPORATING AMDTS 1–4

This publication contains information covering the requirements of Category 5.1 at information levels 2 and 3

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INTRODUCTION

1 Service users should forward any comments on this publication through the channels prescribed in AESP 0100-P-011-013. An AESP Form 10 is provided at the end of this publication; it should be photocopied and used for forwarding comments on this AESP.

2 The subject matter of this publication may be affected by Defence Council Instructions (DCIs), Standing Operating Procedures (SOPs) or by local regulations. When any such instruction, order or regulation contradicts any portion of this publication it is to be taken as the overriding authority.

RELATED AND ASSOCIATED PUBLICATIONS

Related publications

3 The Octad for the subject equipment consists of the publications shown opposite. All references are prefixed with the first eight digits of this publication. The availability of the publications can be checked by reference to the relevant Group Index (see AESP 0100-A-001-013).

Category/Sub-category			Information Level			
			1 User/ Operator	2 Unit Maintenance	3 Field Maintenance	4 Base Maintenance
1	0	Purpose and Planning Information	101	101	101	101
	1	Equipment Support Policy Directives	*	*	*	*
	2	Purpose and Planning Information Medical and Dental	*	*	*	*
2	0	Operating Information	201	*	*	*
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	2	Training Aids	*	*	*	*
3		Technical Description	201	302	302	*
4	1	Installation Instructions	201	*	*	*
	2	Preparation for Special Environments	*	*	*	*
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	3	Inspection Standards	*	532	532	*
	4	Calibration Procedures	*	*	*	*
6		Maintenance Schedules	601	601	601	601
7	1	Illustrated Parts Catalogues	711	711	711	711
	2	Commercial Parts Lists	*	*	*	*
	3	Complete Equipment Schedules Production Edition	*	*	*	*
	4	Complete Equipment Schedules Service Edition (Simple Equipment)	*	*	*	*
	5	Complete Equipment Schedules Service Edition (Complex Equipment)	*	*	*	*
8	1	Modification Instructions	*	*	*	*
	2	General Instructions, Special Technical Instructions and Servicing Instructions	*	*	*	*
	3	Service Engineered Modification Instructions (RAF only)	*	*	*	*

* Category/Sub-category not published

Associated publications

4

Reference	Title
AESP 2085-B-900-octad	Engine, Gasoline, S/Cyl, OHV Kubota
AESP 6115-G-153-octad	Generator Set, Engine Driven (Gasoline), Battery Charging, 14/28 V, 300/500 W, (Hopkins)
AESP 6150-A-100-201	Earthing and Electrical Protection
SEI 14411	Safety Precautions for Electrical Equipment

Hazardous substances

5 Before using any hazardous substance or material, the user must be conversant with the safety precautions and first aid instructions:

5.1 On the label of the container it was supplied in.

5.2 On the material Safety Data Sheet.

5.3 In local Safety Orders and Regulations.

WARNINGS

(1) GASOLINE. GASOLINE FUEL VAPOUR IS EXPLOSIVE WHEN CONTAINED IN A CONFINED SPACE.

(2) GASOLINE. GASOLINE FUEL IS FLAMMABLE AND CONSTITUTES A FIRE HAZARD. DO NOT SMOKE CIGARETTES OR EXPOSE NAKED FLAMES IN THE VICINITY OF THE GENERATOR SET. SPECIAL CARE MUST BE TAKEN WHEN REFUELLING, SHUTDOWN OR PERFORMING MAINTENANCE ACTIVITIES

(3) EARTHING. THE EQUIPMENT MUST BE PROPERLY EARTHED BEFORE ATTEMPTING TO OPERATE THE GENERATOR SET. WHEN USED WITH ANCILLARY EQUIPMENT, IT IS ESSENTIAL THAT THE EARTHING INSTRUCTIONS FOR THAT EQUIPMENT BE FOLLOWED.

(4) ELECTRIC SHOCK. AN EARTH PIN WILL NOT NECESSARILY PROVIDE IMMUNITY FROM ELECTRIC SHOCK. ADEQUATE UNIT SAFETY INSTRUCTIONS ARE TO BE HELD AND SAFE WORKING PRACTICES AND PROCEDURES IMPLEMENTED.

(5) PERSONAL INJURY. MANUAL LIFTING OF THE TOTAL EQUIPMENT MUST BE CARRIED OUT BY TWO PERSONS.

(6) TOXIC FUMES. EXHAUST GASES ARE TOXIC AND CAN QUICKLY REACH TOXIC PROPORTIONS IF BASIC PRECAUTIONS ARE NOT FOLLOWED. IF THE GENERATOR IS TO BE USED IN A CONFINED SPACE, A STANDARD ISSUE EXHAUST EXTENSION MUST BE FITTED. THE EXHAUST EXTENSION MUST NOT BE FURTHER MUFFLED OR RESTRICTED IN ANY WAY FROM ITS ORIGINAL DESIGN AS THE RESULTING BACK PRESSURE COULD CAUSE ADDITION LEAKS TO OCCUR OR DAMAGE THE ENGINE. EXTREME CARE MUST BE TAKEN TO ENSURE THAT EXHAUST GASES ARE VENTED SAFELY AWAY FROM ANY PERSONNEL IN THE VICINITY WITH DUE CONSIDERATION BEING GIVEN TO TOPOGRAPHY AND PREVAILING WIND CONDITIONS. HARMFUL CONCENTRATIONS CAN BE ODOURLESS AND NOT VISUALLY PERCEPTIBLE.

(7) SKIN BURNS. THE ACOUSTIC CANOPY MUST BE FITTED TO THE GENERATOR SET WHEN IN OPERATION. DURING SCHEDULED MAINTENANCE OR REPAIR ACTIVITIES, EXERCISE EXTREME CARE WHEN CARRYING OUT TASKS ADJACENT TO THE EXHAUST SYSTEM, ENGINE OR ALTERNATOR, AS BOTH ITEMS CAN RETAIN HEAT FOR SEVERAL MINUTES AFTER SHUT DOWN.

(8) INFLAMMABLE GASES. HIGHLY INFLAMMABLE GASES ARE LIBERATED FROM LEAD-ACID BATTERIES DURING CHARGING AND UP TO ONE HOUR AFTER COMPLETION OF CHARGE. NAKED LIGHTS MUST NOT BE USED WHEN CHECKING ELECTROLYTE LEVELS NOR MUST LIVE ELECTRICAL CONNECTIONS/DISCONNECTIONS BE MADE DURING THESE PERIODS.

(9) LEAD ACID BATTERIES. CARE SHOULD BE TAKEN WHEN WORKING ON OR AROUND HIGH CAPACITY LEAD-ACID BATTERIES AS THE EXTREMELY HIGH CURRENTS GENERATED BY AN ACCIDENTAL SHORT CIRCUIT MAY CAUSE SEVERE BURNS OR THE BATTERY TO EXPLODE. THEREFORE WATCHES, RINGS, ETC. SHOULD BE REMOVED BEFORE COMMENCING BATTERY ASSOCIATED TASKS.

(10) FIRE HAZARD. WHEN THE JERRYCAN ADAPTOR ASSEMBLY IS STOWED IN THE VALISE, SEEPAGE OF FUEL INTO THE VALISE CAN CONSTITUTE A FIRE HAZARD. ENSURE THE JERRYCAN ADAPTOR ASSEMBLY IS DRAINED BEFORE STOWAGE.

(11) FIRE HAZARD. THE ACOUSTIC CANOPY MUST BE FITTED TO THE GENERATOR SET WHEN IN OPERATION TO PREVENT COMBUSTIBLE MATERIALS (IE CAMOUFLAGE NETTING) COMING INTO CONTACT WITH THE GENERATORS HOT SURFACES.

(12) PERSONAL INJURY. THE ACOUSTIC CANOPY MUST BE FITTED TO THE GENERATOR SET TO PREVENT THE RISK OF PERSONNEL BEING CUT ON SHARP UNPROTECTED EDGES.

(13) NOISE HAZARD. EAR DEFENDERS MUST BE WORN BY MAINTENANCE PERSONNEL DURING SCHEDULED MAINTENANCE OR REPAIR TASKS WHEN THE GENERATOR SET IS RUNNING WITH THE ACOUSTIC CANOPY REMOVED.

(14) FALLING HAZARD. THE ACOUSTIC CANOPY MUST NOT BE USED AS A SEAT OR STEP DURING MAINTENANCE OPERATIONS. THE ACOUSTIC CANOPY WILL NOT BARE WEIGHT WHEN REMOVED FROM THE GENERATOR SET.

(15) FIRE HAZARD. CARE MUST BE TAKEN WHEN DEPLOYING THE EXHAUST EXTENSION MUFFLER TO ENSURE THAT IT IS NOT CLOSE TO OR CAN COME INTO CONTACT WITH ANY COMBUSTIBLE MATERIAL.

(16) TOXIC FUMES. MATERIAL USED IN THE CONSTRUCTION OF THE GENERATOR SET GIVE OFF TOXIC AND IRRITANT FUMES WHEN BURNT. DO NOT INHALE SMOKE OR FUMES IF THE GENERATOR SET IS INVOLVED IN A FIRE.

(17) FIRE HAZARD. BEFORE USING THE GENERATOR SET, OPERATORS MUST BE FAMILIAR WITH THE LOCATION OF SUITABLE FIRE EXTINGUISHING EQUIPMENT.

(18) TOXIC FUMES. MAINTAINERS OF THE EQUIPMENT MUST ENSURE THAT NO PART OF THE WIRING LOOM IS ROUTED NEAR ANY POTENTIAL HOT SURFACE. I.E. EXHAUST SYSTEM, ALTERNATOR OR ENGINE. ENSURE THAT ONLY WIRES WITH SILICON INSULATION ARE USED IN ANY REPAIRS OR FUTURE MODIFICATIONS.

ARMY EQUIPMENT
SUPPORT PUBLICATION

XXXX-X-XXX-XXX
6115-G-153-512

COMMENT(S) ON AESP

To: ATSA DTS 3.2
Ha-Ha Road
Woolwich
LONDON SE18 4QF

From: .....
.....
.....
.....

Senders Reference	BIN Number	Date
AESP Title:		
Chapter(s)/Instruction	**Page(s)/Paragraph(s)**	

If you require more space please use the reverse of this form or a separate piece of paper.
Comment(s):

Signed: ..... Telephone No.: .....

Name (Capitals): ..... Rank/Grade: ..... Date: .....

✂ .....

ATSA DTS 3.2 USE ONLY

To: .....
.....
.....
.....

From: ATSA DTS 3.2
Ha-Ha Road
Woolwich
LONDON SE18 4QF

Thank you for commenting on AESP

Your reference ..... Dated .....

Action is being taken to:	Tick		Tick
Issue a revised/amended AESP		Under investigation	
Incorporate comment(s) in future amendments		No action required	
Remarks			

Signed: ..... Telephone No.: .....

Name (Capitals): ..... Rank/Grade: ..... Date: .....

INTRODUCTION

General

1 It is assumed for the purpose of this AESP category that the generator set start-up procedures, as described in AESP 6115-G-153-201, have been carried out correctly up to the point of failure.

2 Failure diagnosis by the operator is restricted to checking that routine maintenance operations have been carried out. When faults occur, action must initially be taken at Unit level (level 2), although Field or Base involvement may subsequently be required.

Failure diagnosis procedure format

3 The failure diagnosis procedures are presented in the form of tables providing columned step-by-step information on testing, results, possible cause of failure and the action to be taken. Each procedure must be carried out in the order given.

Tools and test equipment

4 The tools and test equipment required for carrying out the following inspection standards are listed in Table 1.

TABLE 1 TOOLS AND TEST EQUIPMENT

Item (1)	Nato Stock No. (2)	Designation (3)	Use (4)
1	Z4/6625-99-545-1446	Insulation resistance tester - Type Megohmeter set, 4 voltages, J4 Mk 2.	Insulation resistance measurements.
2	Z4/6625-99-252-3606	Multimeter, Fluke 25.	General electrical testing.
3	NYK	Resistance bridge.	Low resistance measurements.

300/500 W generator set circuit/interconnection diagram

5 In cases where a failure diagnosis procedure states circuit or cable number references, it is necessary to refer to the generator set circuit/interconnection diagram shown in Fig 1 or Fig 2, as appropriate. The circuit arrangement is the same for both diagrams, but the cable numbering is different, depending on the Equipment Serial No. Fig 1 shows the cable numbering for Equipement Serial Nos from 001 to 102, whereas Fig 2 shows the cable numbering for Equipment Serial Nos from 103, inclusive.

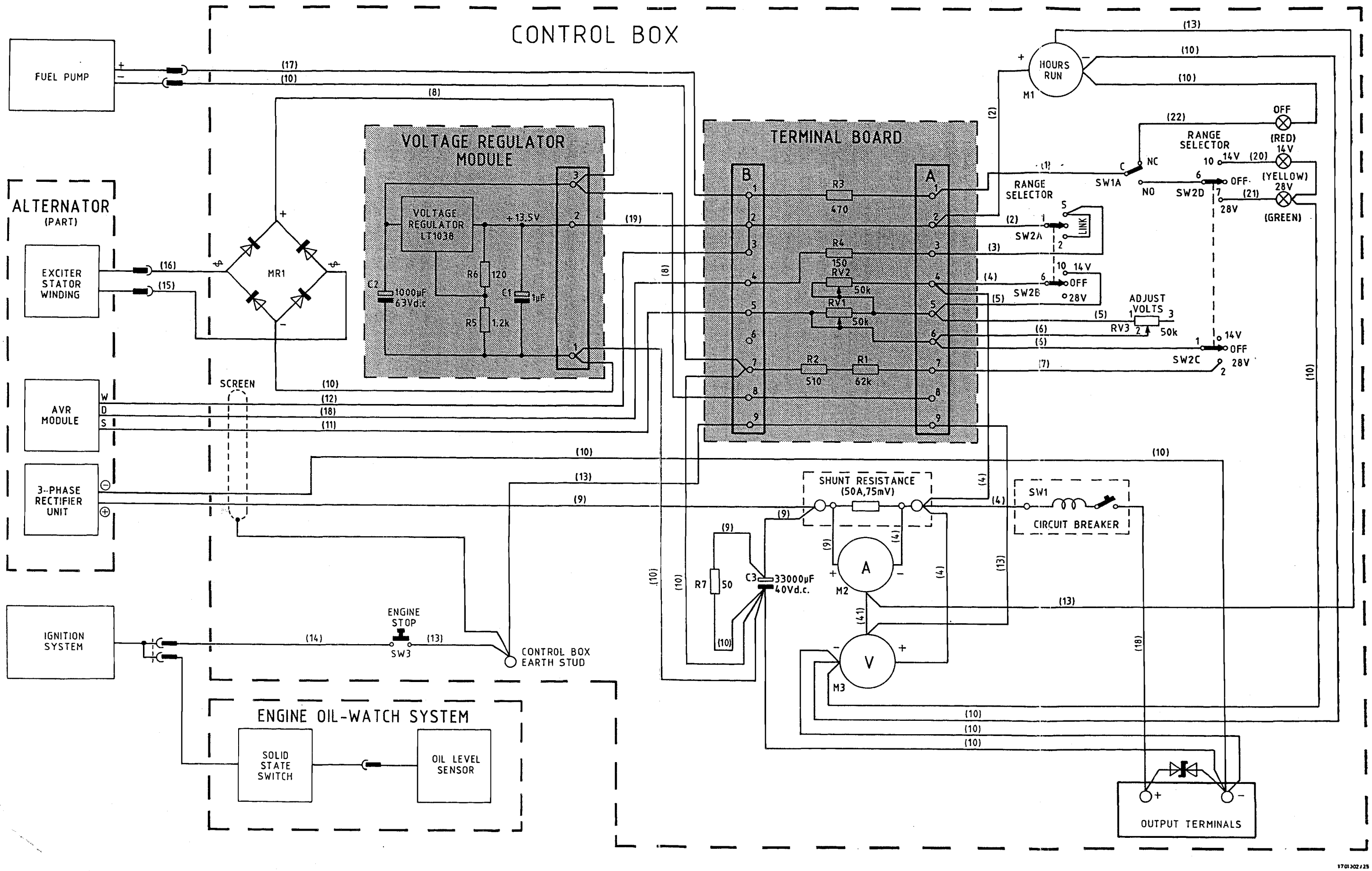


Fig 1 Generator set circuit/interconnection diagram - Equipment serial Nos 001 to 102

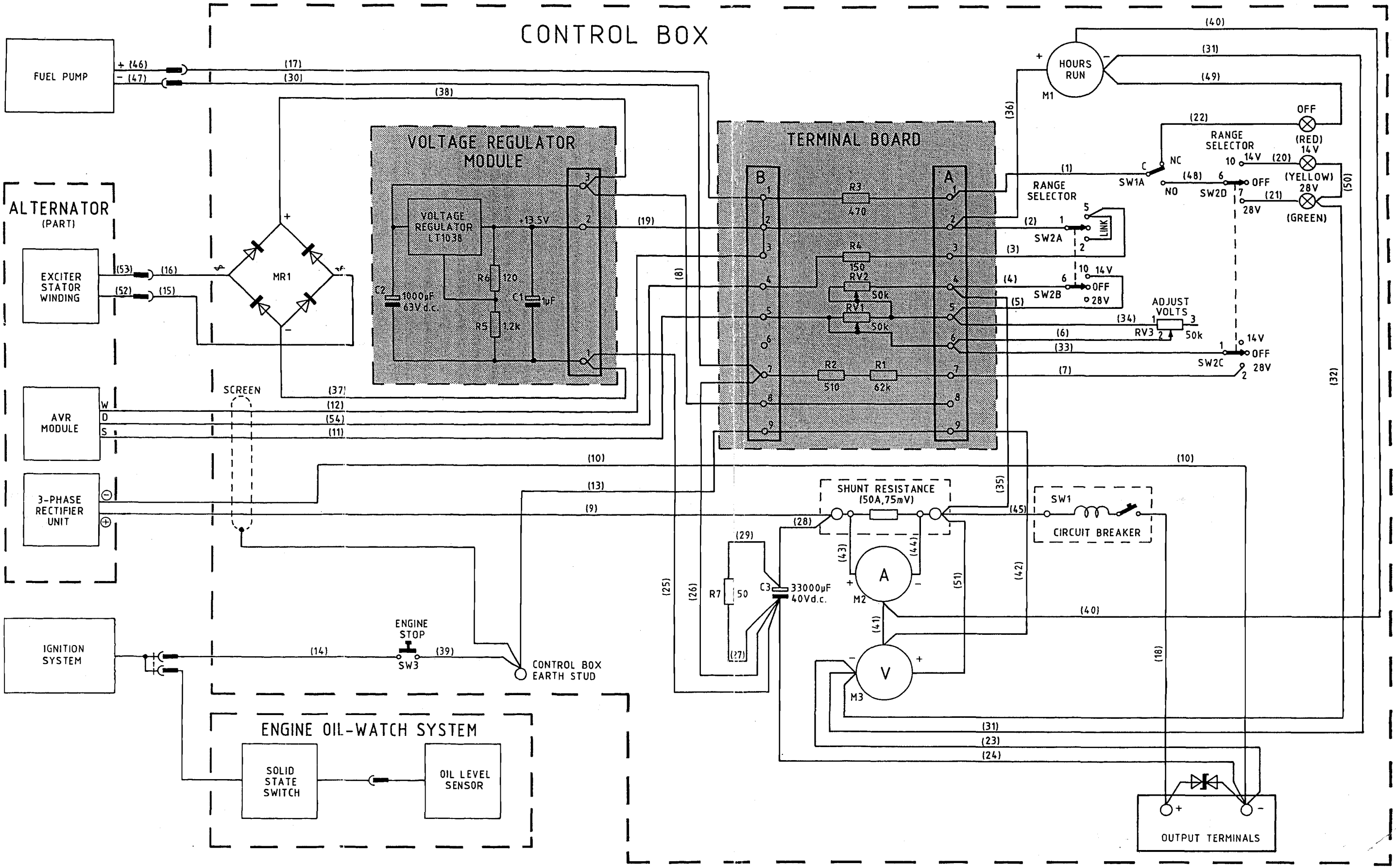


Fig 2 Generator set circuit/interconnection diagram - Equipment serial Nos from 10[illegible]

FAILURE DIAGNOSIS PROCEDURES

6 The failure diagnosis procedures are intended for use in conjunction with the generator set power-up algorithm shown in Fig 3. The algorithm shows the points in the sequence at which fault conditions would be indicated and refers to the relevant fault diagnosis procedure for corrective action. It also assumes that a suitable load is connected to the generator set.

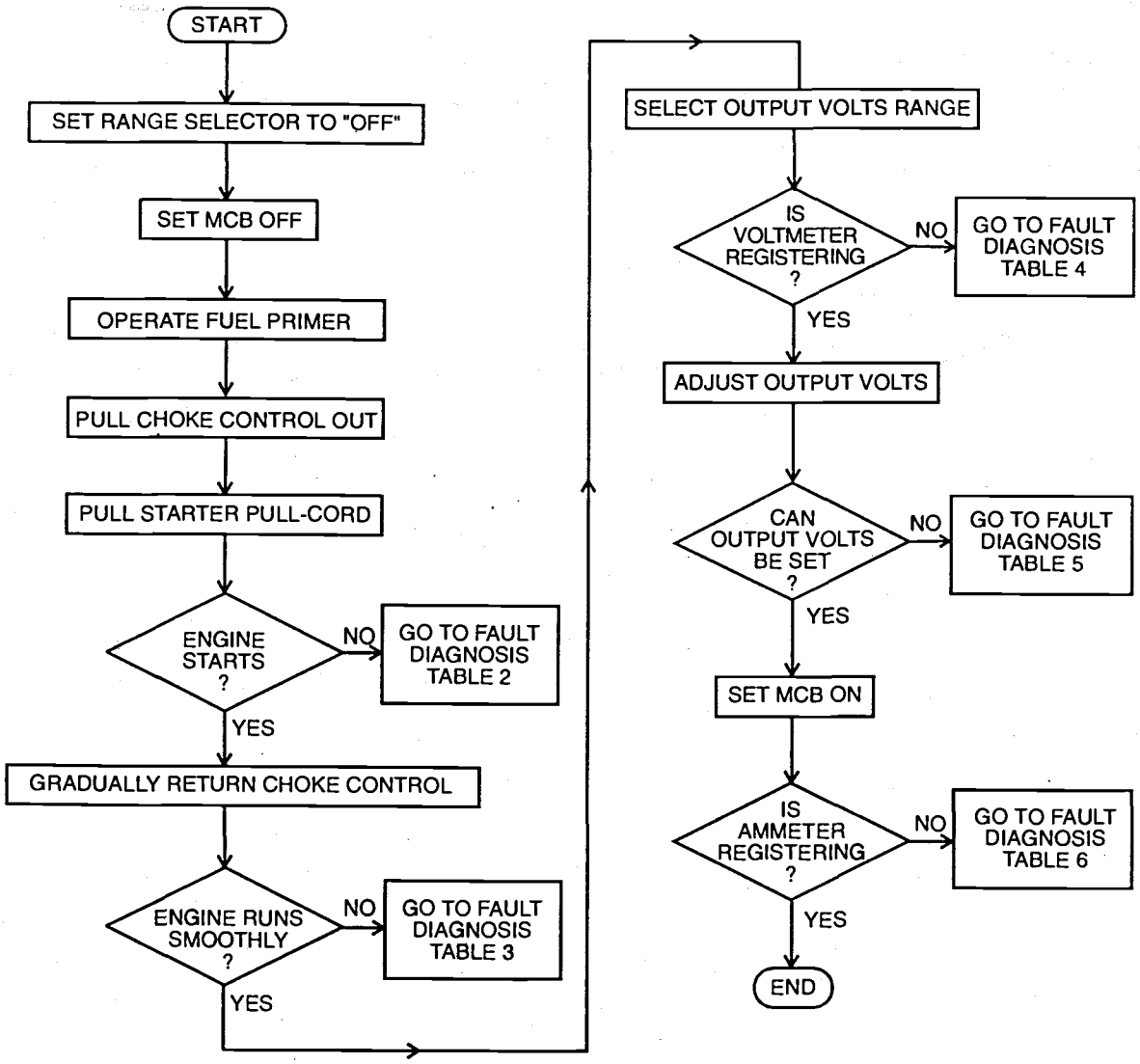


Fig 3 Generator set power-up algorithm

Engine fails to start - Failure diagnosis

7 Engine fails to start when using the recoil starter system.

TABLE 2 ENGINE FAILS TO START - FAILURE DIAGNOSIS

Serial (1)	Procedure (2)	Result (3)	Possible Cause (4)	Action (5)
1	Is choke control pulled out fully ?	Yes	-	Go to Serial 2.
		No	-	Pull choke control out fully and operate recoil starter.
2	Is fuel primer control operating ?	Yes	-	Go to Serial 3.
		No	Rubber bubble split.	Replace fuel primer.
			Fuel piping damaged, split.	Replace fuel piping.
			Defective fuel primer.	Check fuel primer operation and replace, if necessary.
			Jerrycan adaptor assembly dip-tube filter blocked.	Clean foreign matter from dip-tube filter.
3	Does the spark plug (with ignition lead attached) spark when held against the engine and the recoil starter operated ?	Yes	Clogged air filter.	Clean/replace air filter element.
			Defective fuel pump.	Check fuel pump operation and replace, if necessary.
			Defective carburettor.	Check serviceability of carburettor and replace, if necessary.
			Engine fault.	Replace engine unit, if necessary.
		No	Spark plug not serviceable.	Clean spark plug and set spark gap.
				If fault persists, go to Serial 4.

(continued)

TABLE 2 ENGINE FAILS TO START - FAILURE DIAGNOSIS (CONTINUED)

Serial (1)	Procedure (2)	Result (3)	Possible Cause (4)	Action (5)
4	Does short circuit condition exist between oil level sensor cable and frame?	No		Go to Serial 5.
		Yes	Oil level low.	Top up oil level.
			Defective oil level sensor.	Replace oil level sensor.
5	Does a short circuit condition exist between cable 14 and frame?	No	-	Go to Serial 6.
		Yes	Defective ENGINE STOP switch SW3.	Check operation of SW3 and replace, if necessary.
			Defective solid state switch.	Check operation of solid state switch and replace, if necessary.
6	Measure the resistance of the ignition coil primary winding - between cable 14 and frame.	Approx 1.2 ohms.	-	Go to Serial 7.
		Significantly greater or less than 1.2 ohms.	Defective ignition coil.	Replace transistor/magnet ignition unit.
7	Measure the resistance of the ignition coil secondary winding - between cable 14 and ignition lead.	Approx 11.7 k ohms.	-	No action.
		Significantly greater or less than 11.7 k ohms.	Defective ignition coil.	Replace transistor/magnet ignition unit.

Engine runs unevenly - Failure diagnosis

8 Engine does not run smoothly once started.

TABLE 3 ENGINE RUNS UNEVENLY - FAILURE DIAGNOSIS

Serial (1)	Procedure (2)	Result (3)	Possible Cause (4)	Action (5)
1	Is choke control returned to normal operation position ?	No	-	Return choke control fully.
		Yes	-	Go to Serial 2.
2	With spark plug (attached to ignition lead) held against engine, does sparking appear erratic when recoil starter is operated ?	Yes	Spark plug not serviceable.	Clean spark plug and reset electrode gap. If fault persists, go to Serial 3.
		No	Engine overheating.	Check engine cooling air inlet grills in starter casing for blockage.
			Clogged air filter.	Clean/replace air filter element(s), as appropriate.
			Defective fuel pump.	Check fuel pump serviceability and renew, if necessary.
			Clogged fuel filter.	Check fuel filter and renew, if necessary.
			Defective carburettor.	Clean/adjust/ renew carburettor, as appropriate.
			Governor system out of adjustment or loose parts.	Secure any loose parts and set up governor system.
			Engine head gasket leaking.	Renew head gasket.
			Engine fault.	Renew engine unit.

(continued)

TABLE 3 ENGINE RUNS UNEVENLY - FAILURE DIAGNOSIS (continued)

Serial (1)	Procedure (2)	Result (3)	Possible Cause (4)	Action (5
3	Measure the resistance of the ignition coil primary winding - between cable 14 and frame.	Approx 1.2 ohms.	-	Go to Serial 4.
		Significantly greater or less than 1.2 ohms.	Defective ignition coil.	Replace transistor/magnet ignition unit.
4	Measure the resistance of the ignition coil secondary winding - between cable 14 and ignition lead.	Approx 11.7 k ohms.	-	No action.
		Significantly greater or less than 11.7 k ohms.	Defective ignition coil.	Replace transistor/magnet ignition unit.

No output voltage indicated - Failure diagnosis

9 No output voltage indicated on the front panel voltmeter for both 14 V and 28 V output modes.

TABLE 4 NO OUTPUT VOLTAGE INDICATED - FAILURE DIAGNOSIS

Serial (1)	Procedure (2)	Result (3)	Possible Cause (4)	Action (5)
1	Is the associated output voltage mode LED on ?	Yes	-	Go to Serial 2.
		No	-	Go to Serial 4.
2	Are d.c. volts present at output terminals ?	No	-	Go to Serial 3.
		Yes	Defective wiring.	Check cables/connections between voltmeter, shunt resistance and negative output terminal.
			Defective voltmeter.	Renew voltmeter.
3	Is 13.5 V d.c. nom. present between Terminal Board/B4 and the negative output terminal ?	Yes	Loose connection to D terminal of alternator AVR Module.	Tighten D terminal connection.

(continued)

TABLE 4 NO OUTPUT VOLTAGE INDICATED - FAILURE DIAGNOSIS

Serial (1)	Procedure (2)	Result (3)	Possible Cause (4)	Action (5)
3 cont...			Worn or damaged alternator brushes.	Check serviceability of brushes and renew, if necessary.
			Defective AVR Module.	Renew AVR Module.
			Catastrophic failure of alternator 3-Phase Rectifier Unit.	Measure continuity (1 V min. pressure) across ⊕ and ⊖ terminals of 3-Phase Rectifier Unit with cable 9 disconnected - Open circuit in one direction and conduction in the other. Renew 3-Phase Rectifier Unit, if necessary.
			Defective main rotor winding.	Measure main rotor winding resistance across slip rings with brushes removed (2.5 ohms approx). If necessary, renew main rotor.
				Measure main rotor insulation resistance between one slip ring and rotor shaft (1 M ohm min.). If necessary, renew main rotor.
			Defective main stator winding.	Unsolder and remove the main stator winding leads from the 3-Phase Rectifier Unit and measure the resistance of each winding (0.7 to 0.9 ohms). If necessary, renew main stator.

(continued)

TABLE 4 NO OUTPUT VOLTAGE INDICATED - FAILURE DIAGNOSIS (continued)

Serial (1)	Procedure (2)	Result (3)	Possible Cause (4)	Action (5)
3 cont...				Measure main stator insulation resistance between windings and casing (1 M ohm min.).
		No	Defective wiring.	Check cables/ connections between Terminal Board/B4, Terminal Board/A3, RANGE SELECTOR switch SW2A and Terminal Board/A2.
			Defective RANGE SELECTOR switch segment SW2A.	Check operation of SW2A and renew SW2, if necessary.
			Defective Terminal Board.	Renew Terminal Board.
4	Is 20 - 25 V average a.c. (measured with moving coil meter) present between exciter stator flying leads (cables 52 & 53) ?	Yes	-	Go to Serial 5.
		No	Defective exciter stator winding.	Measure exciter stator winding resistance (0.05 ohms approx.).
5	Is 30 V d.c. nom. present between terminals 1 (-ve) and 3 (+ve) of the Voltage Regulator Module ?	Yes	-	Go to Serial 6.
		No	Defective wiring.	Check cables/connections between exciter stator leads, rectifier module MR1 and Voltage Regulator Module.
			Defective rectifier module MR1.	Renew MR1.

(continued)

TABLE 4 NO OUTPUT VOLTAGE INDICATED - FAILURE DIAGNOSIS (continued)

Serial (1)	Procedure (2)	Result (3)	Possible Cause (4)	Action (5)
6	Is 13.5 V d.c. nom. present between terminals 1 (-ve) and 2 (+ve) of Voltage Regulator Module ?	Yes	-	Go to Serial 7.
		No	Defective Voltage Regulator Module.	Renew Voltage Regulator Module.
7	Is 13.5 V d.c. nom. present between negative output terminal and Terminal Board/B2 ?	Yes	Defective Terminal Board.	Renew Terminal Board.
		No	Defective wiring.	Check cables/connections between Voltage Regulator Module/2 and Terminal Board/B2.

Output voltage incorrect - Failure diagnosis

10 Output voltage or voltage range not obtainable.

TABLE 5 OUTPUT VOLTAGE INCORRECT - FAILURE DIAGNOSIS

Serial (1)	Procedure (2)	Result (3)	Possible Cause (4)	Action (5)
1	Does ADJUST VOLTS control vary the output voltage ?	No	ADJUST VOLTS control associated wiring fault.	Check serviceability of associated wiring.
			Defective ADJUST VOLTS control RV3.	Check operation of RV3 control
				If fault persists, go to Serial 2.
		Yes, but volts range not correct.	RANGE SELECTOR switch associated wiring fault.	Check serviceability of SW2 associated wiring.
			Defective RANGE SELECTOR switch SW2.	Check operation of SW2B and SW2C switch segments.
				If fault persists, go to Serial 2.

(continued)

TABLE 5 OUTPUT VOLTAGE INCORRECT - FAILURE DIAGNOSIS

Serial (1)	Procedure (2)	Result (3)	Possible Cause (4)	Action (5)
2	Low no-load output voltage ?	No	-	Go to Serial 3.
		Yes	Defective AVR Module.	Renew AVR Module.
			Defective main rotor winding.	Measure main rotor winding resistance across slip rings with brushes removed (2.5 ohms approx). If necessary, renew main rotor.
				Measure main rotor insulation resistance between one slip ring and rotor shaft (1 M ohm min.). If necessary, renew main rotor.
			Defective main stator winding.	Unsolder and remove the main stator winding leads from the 3-Phase Rectifier Unit and measure the resistance of each winding (0.7 to 0.9 ohms). If necessary, renew main stator.
				Measure main stator insulation resistance between windings and casing (1 M ohm min.). If necessary, renew main stator.

(continued)

TABLE 5 OUTPUT VOLTAGE INCORRECT - FAILURE DIAGNOSIS (continued)

Serial (1)	Procedure (2)	Result (3)	Possible Cause (4)	Action (5)
2 cont...			Defective 3-Phase Rectifier Unit diode(s)	With the main stator leads disconnected from the 3-Phase Rectifier Unit, check each diode with a continuity tester (1 V min. pressure) - Open circuit in one direction, conduction in the other. If a diode has failed, renew the complete rectifier unit.
3	High no-load output voltage ?	No	-	Go to Serial 4.
		Yes	Defective wiring.	Check cables/connections between AVR Module terminal S and Terminal Board/B5. Check cables/connections between shunt resistance and Terminal Board/A4.
			Defective Terminal Board.	Renew Terminal Board.
			Defective AVR Module.	Renew AVR Module.
4	Low on-load output volts?	No	-	Go to Serial 5.
		Yes	No 13.5 V d.c.nom. present at AVR Module terminal W.	Check for 13.5 V d.c. and cable/connections between AVR Module terminal W and Terminal Board/B3.

(continued)

TABLE 5 OUTPUT VOLTAGE INCORRECT - FAILURE DIAGNOSIS (continued)

Serial (1)	Procedure (2)	Result (3)	Possible Cause (4)	Action (5)
4 cont...			Open circuit AVR Module PHASE link connection.	Check PHASE link connection.
			Defective AVR Module.	Renew AVR Module.
5	High on-load output voltage?	No	-	Go to Serial 5.
		Yes	Open circuit AVR Module S connection.	Check cable/connections between AVR Module terminal S and Terminal Board/B5.
			Defective AVR Module.	Renew AVR Module.
			Defective Terminal Board.	Renew Terminal Board.
6	Output voltage unstable ?	No	-	No action.
		Yes	Worn or damaged brushes causing intermittent contact.	Check serviceability of brushes and renew brushes, if necessary.
			Loose AVR Module connections.	Check security of AVR Module connections.
			Loose connections to 3-Phase Rectifier Unit.	Check security of 3-Phase Rectifier Unit connections.

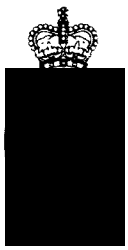
No output current indicated - Failure diagnosis

1.1 Output voltage correct, MCB closed and no output current indicated.

TABLE 6 NO OUTPUT CURRENT INDICATED - FAILURE DIAGNOSIS

Serial (1)	Procedure (2)	Result (3)	Possible Cause (4)	Action (5)
1	Has the MCB tripped out ?	Yes	Excessive load.	Reduce load.
			Load incorrectly connected (wrong polarity).	Check load connections.
			Defective MCB (oversensitive).	Renew MCB.
		No	Loose connections.	Check security of cable connections between load and generator set output terminals.
				Check security of cable connections between output terminals and alternator.
			Ammeter associated wiring fault.	Check serviceability of ammeter associated cables/ connections.
			Defective ammeter.	Renew ammeter.

[redacted]



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[redacted]

GENERATOR SET, ENGINE DRIVEN (GASOLINE) BATTERY CHARGING 14/28 V, 300/500 W (HOPKINS)

MAINTENANCE SCHEDULE

REPRINTED INCORPORATING AMDTS 1-5

This publication contains information covering the requirements of Category 6 at information levels 1.2.3 and 4

BY COMMAND OF THE DEFENCE COUNCIL

Ministry of Defence
Issued by
ARMY TECHNICAL SUPPORT AGENCY
DIRECTORATE OF TECHNICAL SERVICES

AMENDMENT RECORD

Amdt No.	Incorporated By (Signature)	Date
1	[redacted]	Sep 96
2		21/11/97
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PRELIMINARY MATERIAL Page

Para

Table

PREFACE

Sponsor :
DGES(A)
File ref:

Publication Agency :
ATSA Chertsey
Project No: 72111(204)
File ref: EEP/72111

INTRODUCTION

1 Service users should forward any comments on this publication through channels prescribed in AESP 0100-P-011-013. An AESP Form 10 is provided at the end of this publication; it should be photocopied and used for forwarding comments on this AESP.

RELATED AND ASSOCIATED PUBLICATIONS

Related publications

2 The Octad for the subject equipment consists of the publications shown below. All references are prefixed by the first eight digits of this publication. The availability of the publications can be checked by reference to the relevant Group Index (see AESP 0100-A-001-013).

Category/Sub-category			Information Level			
			1 User/ Operator	2 Unit Maintenance	3 Field Maintenance	4 Base Maintenance
1	0	Purpose and Planning Information	101	101	101	101
	1	Equipment Support Policy Directives	*	*	*	*
2	0	Operating Information	201	*	*	*
	1	Aide Memoire	*	*	*	*
	2	Training Aids	*	*	*	*
3		Technical Description	201	302	302	*
4	1	Installation Instructions	201	*	*	*
	2	Preparation for Special Environments	*	*	*	*
5	1	Failure Diagnosis	201	512	512	*
	2	Repair Instructions	201	512	512	*
	3	Inspection Standards	*	532	532	*
	4	Calibration Procedures	*	*	*	*
6		Maintenance Schedules	601	601	601	601
7	1	Illustrated Parts Catalogues	711	711	711	711
	2	Commercial Parts Lists	*	*	*	*
	3	Complete Equipment Schedule, Production	*	*	*	*
	4	Complete Equipment Schedule, Service Edition (Simple Equipment)	*	*	*	*
	5	Complete Equipment Schedule, Service Edition (Complex Equipment)	*	*	*	*
8	1	Modification Instructions	*	*	*	*
	2	General Instruction, Special Technical Instructions and Servicing Instructions	*	*	*	*
	3	Service Engineered Modification Instructions (RAF only)	*	*	*	*

* Category/Sub-category not published

Associated publications

3

Reference	Title
AESP 2805-G-900 Octad	Engine, Gasoline, S/CYL, OHV, KUBOTA
AESP 6115-G-153 Octad	Generator Set, Engine Drive (Gasoline), Battery Charging, 14/28 V, 300/500 W, (HOPKINS)
AESP 6150-A-100-201	Earthing and Electrical Protection
SEI 14411	Safety Precautions for Electrical Equipment

WARNINGS

(1) GASOLINE. GASOLINE FUEL IS FLAMMABLE AND CONSTITUTES A FIRE HAZARD. DO NOT SMOKE CIGARETTES OR EXPOSE NAKED FLAMES IN THE VICINITY OF THE GENERATOR SET. SPECIAL CARE MUST BE TAKEN WHEN REFUELLING, SHUTTING DOWN OR PERFORMING MAINTENANCE ACTIVITIES.

(2) LETHAL VOLTAGE. THE EQUIPMENT MUST BE PROPERLY EARTHED BEFORE ATTEMPTING TO OPERATE THE GENERATOR.

(3) TOXIC FUMES. EXHAUST GASES ARE TOXIC AND CAN QUICKLY REACH TOXIC PROPORTIONS IF BASIC PRECAUTIONS ARE NOT FOLLOWED. IF THE GENERATOR IS TO BE USED IN A CONFINED SPACE, A STANDARD ISSUE EXHAUST EXTENSION MUST BE FITTED. THE EXHAUST EXTENSION MUST NOT BE FURTHER MUFFLED OR RESTRICTED IN ANY WAY FROM ITS ORIGINAL DESIGN AS THE RESULTING BACK PRESSURE COULD CAUSE ADDITIONAL LEAKS TO OCCUR OR DAMAGE THE ENGINE. EXTREME CARE MUST BE TAKEN TO ENSURE THAT EXHAUST GASES ARE VENTED SAFELY AWAY FROM ANY PERSONNEL IN THE VICINITY WITH DUE CONSIDERATION BEING GIVEN TO TOPOGRAPHY AND PREVAILING WIND CONDITIONS. HARMFUL CONCENTRATIONS CAN BE ODOURLESS AND NOT VISUALLY PERCEPTIBLE.

(4) LIFTING. MANUAL LIFTING OF THE TOTAL EQUIPMENT MUST BE CARRIED OUT BY TWO PERSONS.

(5) SKIN BURNS. THE ACOUSTIC CANOPY MUST BE FITTED TO THE GENERATOR SET WHEN IN OPERATION. DURING SCHEDULED MAINTENANCE OR REPAIR ACTIVITIES, EXERCISE EXTREME CARE WHEN CARRYING OUT TASKS ADJACENT TO THE EXHAUST SYSTEM, ENGINE OR ALTERNATOR, AS THESE ITEMS CAN RETAIN HEAT FOR SEVERAL MINUTES AFTER SHUT DOWN.

(6) PERSONAL INJURY. WHEN THE ACOUSTIC CANOPY IS REMOVED FROM THE GENERATOR SET DURING MAINTENANCE ACTIVITIES, CARE MUST BE TAKEN TO AVOID THE RISK TO PERSONNEL BEING CUT ON SHARP UNPROTECTED EDGES.

(7) NOISE HAZARD. EAR DEFENDERS MUST BE WORN BY MAINTENANCE PERSONNEL DURING SCHEDULED MAINTENANCE OR REPAIR TASKS WHEN THE GENERATOR SET IS RUNNING WITH THE ACOUSTIC CANOPY REMOVED.

(8) FALLING HAZARD. THE ACOUSTIC CANOPY MUST NOT BE USED AS A SEAT OR STEP DURING MAINTENANCE OPERATIONS. THE ACOUSTIC CANOPY WILL NOT BEAR WEIGHT WHEN REMOVED FROM THE GENERATOR SET.

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(12) TOXIC FUMES. MAINTAINERS OF THE EQUIPMENT MUST ENSURE THAT NO PART OF THE WIRING LOOM IS ROUTED NEAR ANY POTENTIAL HOT SURFACE. I.E. EXHAUST SYSTEM, ALTERNATOR OR ENGINE. ENSURE THAT ONLY WIRES WITH SILICON INSULATION ARE USED IN ANY REPAIRS OR FUTURE MODIFICATIONS.

CAUTIONS

(1) EARTHING REQUIREMENT. When used with certain equipments the normal earthing method should not be used. Consult earthing instructions for ancillary equipment.

(2) AIR SUPPLY PRECAUTION. Do not obstruct air filter louvres in acoustic cover.

(3) OPERATING PRECAUTION. Do not connect or disconnect equipment with the generator running and the power switched 'ON'.

MAINTENANCE SCHEDULE

INTRODUCTION

Authority

1 This Maintenance Schedule is the authority for carrying out all maintenance tasks on the subject equipment.

Responsibilities

2 The Unit Commander is responsible for ensuring that the operations detailed in this Maintenance Schedule are properly carried out. He may order any operation to be carried out more frequently than is specified if the conditions under which the equipment operates render it necessary. He should consult his REME advisor before ordering such changes.

3 The unit commander may adjust the specified maintenance intervals by plus or minus 10 per cent to suit local circumstances.

4 The operator/driver is responsible for ensuring the equipment is fit for task. If the mechanical fitness is in doubt, the equipment is not to be used until advice has been sought.

Inspection and examinations

5 The unit commander is advised to arrange inspections to be carried out on receipt of the equipment and thereafter in accordance with JSP 341 Chap 16 Para 16.454.

6 Examination is carried out by REME in accordance with AGAI Vol 4 Para 142.031 – 142.036.

Records

7 Maintenance and inspections are to be recorded in the equipment documents.

Serial numbers

8 Serial numbers left blank may be taken up by amendment action at a later date.

Abbreviations

9

9.1 L1 – Level 1 (User Unit Maintenance).

9.2 L2 – Level 2 (REME Unit Maintenance).

9.3 L3 – Level 3 (REME Field Repair).

9.4 L4 – Level 4 (Base Repair, including contract repair and Manufacturer's Repair).

TABLE 1 EQUIPMENT APPLICABILITY

Serial (1)	Equipment Asset Code (2)	Designation (3)
1		Generator, Gasoline Engine 300/500 W (Battery Charger) Hopkins.

TABLE 2 FUELS, LUBRICANTS AND ASSOCIATED PRODUCTS

NOTES

(1) Only the products listed below are to be used on this equipment.

(2) The local REME advisor may authorize the use of OMD 30 where the ambient temperature is persistently below –15 deg C and the oil temperature is likely to reach –15 deg C for a significant period of time.

Serial (1)	Assembly (2)	Product		Capacity	
		Above –15 deg C (3)	Below –15 deg C (4)	Litres (5)	Pints (6)
1	Engine oil.	OMD 80	OMD 30	0.55	0.97
2	Fuel, general purpose, uses either: NATOGAS – NATO F–57 or 4 star gasoline to BS4040, or ULGAS – NATO F–67 or Unleaded Gasoline to BS7070/EN228. For all operating environmental temperatures. NOTE ULGAS is the preferred fuel.			Direct from jerrycan	
3	Exhaust extension face.	ROCAL J166	ROCAL J166		

TABLE 3 EQUIPMENT DATA

Serial (1)	Item (2)	Detail (3)	
	ENGINE		
1	Valve clearance (engine cold);		
	1.1 Inlet and exhaust.	0.05 to 0.10 mm	(0.0020 to 0.0039 in.)
2	Torque settings:		
	2.1 Spark plug.	9.8 to 24.5 Nm	(7.2 to 18.1 ft lb)
	2.2 Cylinder head screws.	24.5 to 32.4 Nm	(18.1 to 23.9 ft lb)
	2.3 Crankcase screws.	9.8 to 14.7 Nm	(7.2 to 10.8 ft lb)
	2.4 Connecting rod screws.	13.7 to 19.6 Nm	(10.1 to 14.5 ft lb)
	2.5 Rocker arm lock nut.	7.8 to 12.7 Nm	(5.8 to 9.4 ft lb)
	2.6 Governor lever screw.	6.9 to 11.8 Nm	(5.1 to 8.7 ft lb)
3	Spark plug gap.	0.6 to 0.7 mm	(0.0236 to 0.0276 in.)
4	Compression pressure.	196 to 245 kPa	(28 to 36 lbf/in^2)
5	Ignition timing:	0.44 rad (25 degrees) BTDC	
6	Engine oil capacity.	0.55 litres	

TABLE 4 ACTION ON RECEIPT

Serial (1)	Action (2)
	Check
1	Equipment for damage.
2	Tools and equipment against CES.
	Remove
3	Preservation, sealing and packaging where applicable.
	Refit
4	Any components removed to aid transit.
	Clean
5	Equipment, tools and attachments.
	Read
6	Operator/User Handbook and learn position and function of all controls.
	Report
7	Any defect or damage.
	Maintenance
8	Carry out column (5) tasks of Table 6.

TABLE 5 DAILY OPERATOR CHECKS

NOTES

(1) This maintenance is to be carried out on those days when the equipment is to be used.

(2) All faults are to be reported as soon as possible to L2.

Serial (1)	Task (2)	Product (3)
	WARNING **HEALTH PRECAUTIONS. BEFORE CARRYING OUT ANY MAINTENANCE, READ AND ABIDE BY THE WARNINGS ON PAGES (vii) AND (viii).**	
	Before starting the engine:	
1	Check/top up engine oil.	OMD 80
2	Connect exhaust extension if required, grease connecting face.	ROCAL J 166
3	Earth the machine to earth stud wing nut, using earth spike and lead provided.	
4	Connect fuel supply pipe between machine and jerrycan adaptor.	
5	Connect jerrycan adaptor to jerrycan, ensuring sufficient fuel is available.	Unleaded petrol
6	Ensure output control switch is set to 'ON'.	
7	Set voltage selector switch to the central 'OFF' position	
	After starting the engine:	
8	Check for oil, fuel and exhaust leaks.	
9	Check for correct operation of all gauges and warning lights.	
10	Check for unusual running noises.	
	After use:	
11	Close down.	
12	Check for damage/faults.	
13	Ensure equipment is ready for future use.	
14	Ensure relevant entries are made in equipment documents.	

TABLE 6 GENERATOR PERIODIC MAINTENANCE

NOTE

Column 5 tasks are to be carried out after a new or reconditioned engine has been fitted.

Serial (1)	Task (2)	Lubri –cant (3)	Support level (4)	First 20 hours (5)	Every 50 hours run (6)	Every 200 hours run (7)	Every 500 hours run (8)
	WARNING **HEALTH PRECAUTION. BEFORE CARRYING OUT ANY MAINTENANCE TASKS, READ AND ABIDE BY THE WARNINGS ON PAGES (vii) AND (viii).**						
	Renew						
1	Engine oil.	OMD 80	L1	X	X		
2	Fuel filter (external)		L1			X	
	Check						
3	Spark plug clearance.		L2			X	
4	Inlet/exhaust valve seats (relap if necessary)		L2				X
	Tighten/adjust						
5	Valve clearance		L2	X			X
6	All nuts, bolts, screws, connections, hose clips etc.		L1	X	X	X	X
	Clean						
7	Spark plug		L2		X		
8	Air cleaner element		L1	X	X		
9	Cylinder head (remove carbon deposits).		L2				X
10	Carburettor.		L2				X
11	Fuel filter element and pot (carburettor).		L2	X		X	

TABLE 7 OUT OF USE MAINTENANCE

NOTES

(1) This servicing inspection is to be carried out when the equipment is taken out of use for periods exceeding one month.

(2) An equipment taken out of use for periods exceeding four months is to be put into preservation in accordance with EMER Wh Veh A 019 Miscellaneous Instruction No. 9.

(3) The equipment is to be cleaned, dried and stored under cover where possible.

Serial (1)	Operation (2)
1	Prior to storage, the equipment is to be fully inspected at L2 and all necessary repairs completed.
2	Unit fire orders should be displayed and cover any fire risk created by the choice of location for stored equipment.
3	The equipment should be visually inspected monthly, or more frequently if considered necessary, for signs of deterioration.
4	Every two months during storage carry out Table 5 – Daily Operator Checks and ensure that the engine reaches the correct working temperature.
5	When an equipment is brought back into service carry out Table 5 – Daily Operator Checks.

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COMMENT ON AESP

To: ARMY TECHNICAL SUPPORT AGENCY
Directorate of Technical Services
Repository Road
Woolwich
London SE18 4QA

From: .....
.....
.....
.....
.....

Sender's Reference:

Tel No: .....

Date:

Title of AESP: Generator Set, Engine Driven (Gasoline) Battery Charging, 14/28 V, 300/500 W (Hopkins)

COMMENT

Signed .....

To: .....
.....
.....
.....
.....

From: ARMY TECHNICAL SUPPORT AGENCY
Directorate of Technical Services
Repository Road
Woolwich
London SE18 4QA

Thank you for commenting on AESP 6115–G–153–601

* Action is being taken to:

  * (i) Revise the AESP

  * (ii) Amend the AESP

* No action is considered necessary for the following reasons:

* Delete as necessary

Signed: .....

AESP Form 10

Date: .....

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SUPPORT PUBLICATON

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6115-G-153-711
January 1995

CONDITIONS OF RELEASE

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GENERATOR SET, ENGINE DRIVEN (GASOLINE), BATTERY CHARGING, 14/28V, 300/500 W (HOPKINS)

REPRINTED INCORPORATING AMDTS 1-2

ILLUSTRATED PARTS CATALOGUE

BY COMMAND OF THE DEFENCE COUNCIL

Ministry of Defence

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AMENDMENT RECORD

Amdt No.	Incorporated By (Signature)	Date
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PREFACE

Introduction

1. This Illustrated Parts Catalogue (IPC) is designed as an aid to the identification of component parts or assemblies of parts of the equipment, and to provide information necessary for the demanding of spares.

2. This IPC may list some or all of the parts comprising the equipment concerned, but only those parts assigned a NATO Stock Number, Service Catalogue or Reference Number will normally be available as spares. Should there be a requirement for an item not assigned a number, demands may be submitted quoting the AESP, Item Number, Figure Reference and Item Name. Where a manufacturer's reference is known, this should also be quoted.

Quantity

3. The figure in the 'Number off' column specifies the quantity for the unit, (or assembly, subassembly etc); it does not indicate the quantity to be demanded.

Demands

4. When demanding Spare Parts, the following particulars must be quoted:-

a. Management Code (Man Code).

b. NATO Stock Number.

c. Item name.

d. Name of Equipment for which part is required.

e. Manufacturers reference, if known.

Alternatives quoted apply only to the Equipment covered by this IPC.

Modification State

5. When appropriate, a list at the front of each chapter or sub-chapter will indicate the modification numbers which have been incorporated in the IPC by amendment action, subsequent to initial issue.

Annotations

6. a. AR When appearing in the 'Number off' column indicates that the quantity is 'as required'.

b. NI (Not Illustrated) when appearing with a number in the 'Fig Item' column indicates that the item is not illustrated

c. * (Obsolescent stock) - an asterisk in the 'Part Number' column indicates an obsolescent item, no further purchase of which will be made but stocks are to be used until exhausted.

d. NP (Non-provisioned) - when appearing in the 'NATO Stock Number' column indicates that the item may be illustrated, but not available from stock as a replacement item.

e. LM Indicates local manufacture, ie a part that is to be manufactured by service units from local resources.

f. Ref In the 'Number off' column indicates that the item is listed for reference purposes only.

PREFACE - Contd

Abbreviations

7. Abbreviations and symbols used in this IPC have been approved and are listed separately.

Amendments

8. Amendments to the catalogue will be published as and when necessary. They will be numbered consecutively, and the Amendment Record Sheet is to be completed for each Amendment List embodied.

9. New or amended material will be highlighted by side lining to show the extent of the amendment.

Indentations

10. Items are listed in a logical assembly/disassembly order and are indented by the 'Dot System' in which each 'dot' depicts the relationship of the item to the main assembly.

MAIN ASSEMBLY

Attaching parts for main assembly

. FIRST LEVEL OF BREAKDOWN (Subassembly or detail part of main assembly)

. Attaching parts for first level

. . SECOND LEVEL OF BREAKDOWN (Sub-assembly) or detail part of Subassembly)

. . Attaching parts for second level

. . . THIRD LEVEL OF BREAKDOWN (Sub-sub-subassembly or detail part of Sub-subassembly)

. . . Attaching parts for third level

Note: a. Attaching parts for the Main Assembly are listed at the end of the text of the Main Assembly.

b. Catalogue numbers quoted in this catalogue will supersede any number that may have been allocated previously.

Publication Information

11. Should any comment on the contents of the AESP be necessary, a locally produced copy of Form 10 (which can be found at the last page of this publication) should be completed and forwarded to the Publication Approving Authority at the address shown on the form, in accordance with 0100-P-011-013.

Abbreviations and symbols

Al	... ...	Aluminium
amp	... ...	Amplifier
AR	... ...	As required
AWG	... ...	American Wire Gauge
BA	... ...	British Association Screw Thread
Be Cu	... ...	Beryllium Copper
blk	... ...	Blackened (black)
BSP	... ...	British Standard Pipe Thread
BSP.F	... ...	British Standard Pipe, Fastening Thread
cap	... ...	Capstan Head
Cd	... ...	Cadmium
ch	... ...	Cheese
cres	... ...	Corrosion Resistant Steel
CRT	... ...	Cathode Ray Tube
csk	... ...	Countersunk
Cu	... ...	Copper
c/w	... ...	Complete with
dia	... ...	Diameter
F	... ...	Farad
h	... ...	Height (high)
hd	... ...	Head
hex	... ...	Hexagon
HTS	... ...	High Tensile Steel
id	... ...	Inside Diameter
in.	... ...	Inch
JIC	... ...	Joint industries conference
k	... ...	Kilo
kg	... ...	Kilogramme
LED	... ...	Light emitting diode
lg	... ...	Length (long)
lh) LH)	... ...	Left Hand
M	... ...	Metre
max	... ...	Maximum
M/C	... ...	Machine(d)
mm	... ...	Millimetre
n	... ...	Nano
ND	... ...	Not Drawn (No manufacturer's drawing)
neg	... ...	Negative
No.	... ...	Number
o/a	... ...	Over-all
od	... ...	Outside Diameter
o/s	... ...	Over size

p	... ...	Pico
PEC	... ...	Panel Electronic Circuit
pl	... ...	Plated
pos	... ...	Positive
pr	... ...	Pair
rh) RH)	... ...	Right Hand
s/d	... ...	Sodium Dichromate
sect	... ...	Section
skt	... ...	Socket
sq	... ...	Square
SWG	... ...	Standard Wire Gauge
thd	... ...	Thread(ed)
thk	... ...	Thickness
6UN	... ...	Unified 6-Thread Series
UNC	... ...	Unified Coarse Thread
UNF	... ...	Unified Fine Thread
V	... ...	Volt
W	... ...	Watt
w	... ...	Width
Zn	... ...	Zinc
u	... ...	Micro

Chapter 1

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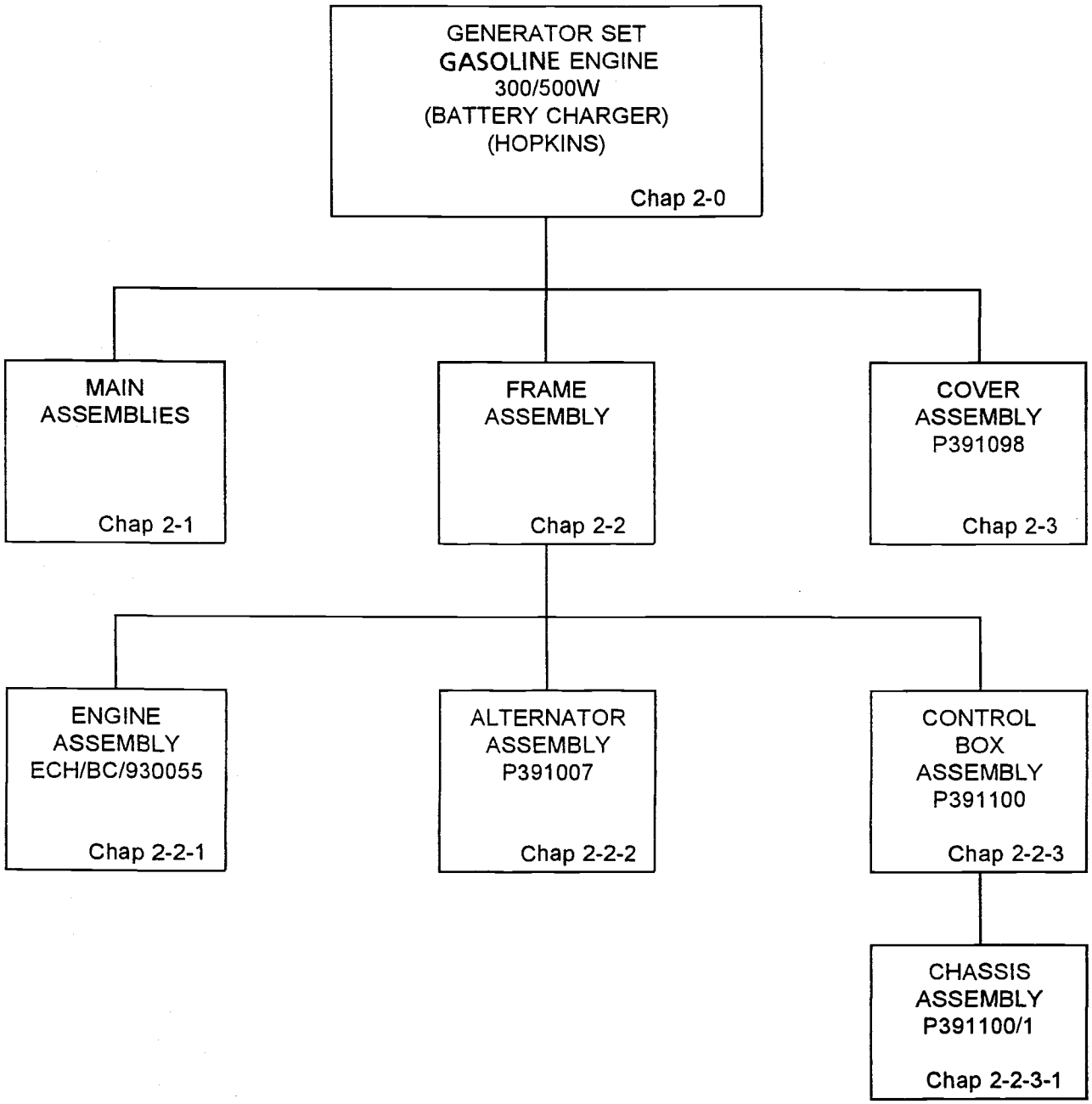
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(HOPKINS)
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GENERATOR SET,
GASOLINE ENGINE
300/500W 14/28V
(BATTERY CHARGER)
(HOPKINS)

RECORD OF MODIFICATIONS INCCRPORATED IN THIS CHAPTER

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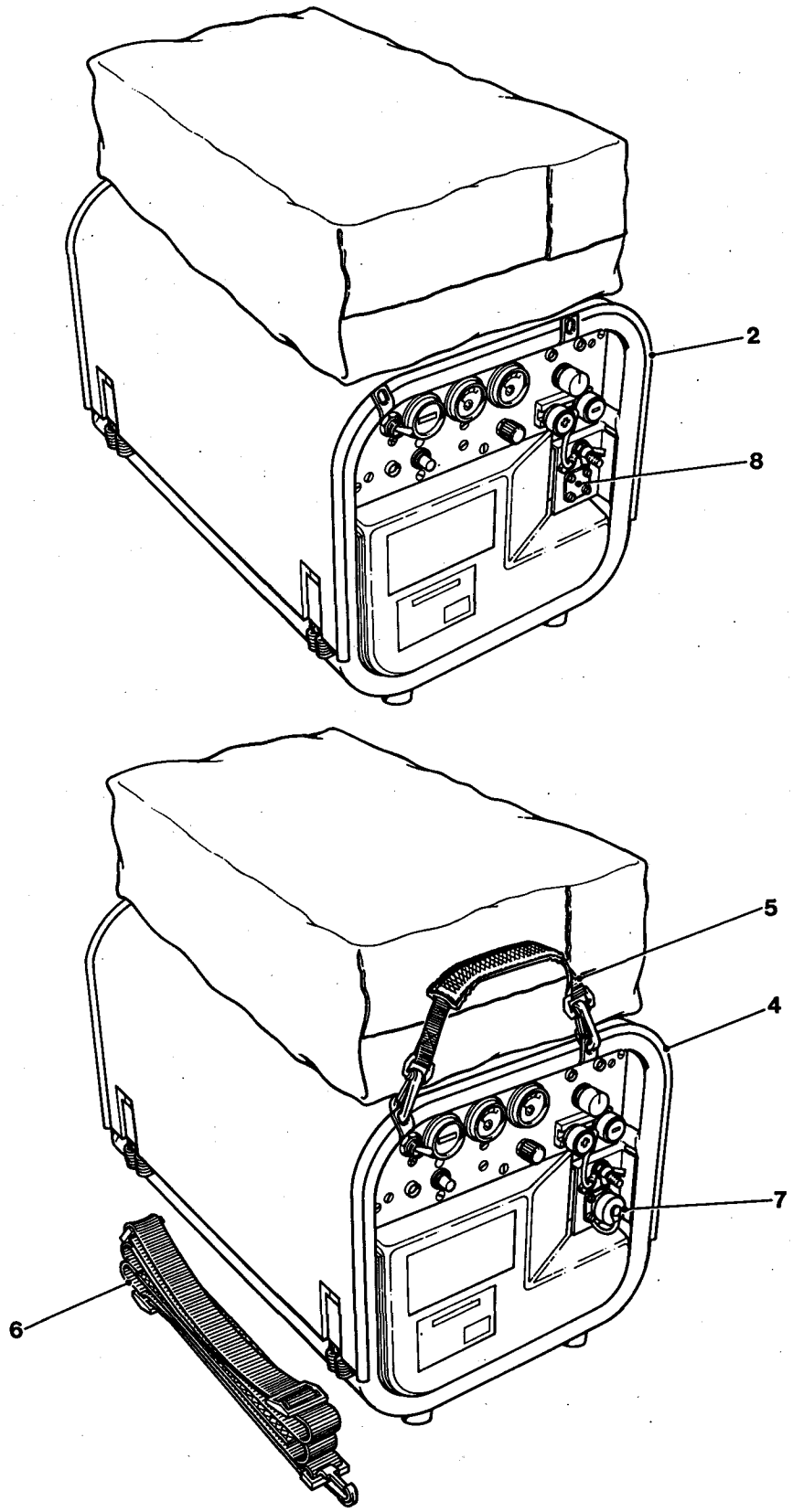

Fig.1 Generator set, gasolene engine 300/500W (Battery Charger) (Hopkins)

FIG. ITEM	ARMY MAN CODE	NATO STOCK NUMBER	ITEM NAME AND DESCRIPTION	PART NO. DRAWING NO.	NO. OFF.	ANNOTATIONS
			GENERATOR SET GASOLENE ENGINE 300/500W 14/28V		REF	
1-NI1	X2	6116-99-983-9538	. GENERATOR SET, gasolene engine 300/500W, general purpose, (battery charger) c/w spares pack and operating instructions	Complete Equipment Schedule 40652	REF	
2	X2	6115-99-463-2357	. . GENERATOR SET, gasolene engine 300/500W, general purpose, (battery charger)	P391354	REF	
NI3	X2	6115-99-396-0315	. GENERATOR SET, gasolene engine 300/500W, ADAD only version, (battery charger) c/w spares pack and operating instructions	Complete Equipment Schedule 40696	REF	))SEE)NOTE))
4	X2	6115-99-593-8403	. . GENERATOR SET, gasolene engine 300/500W, ADAD only version, (battery charger) Note:- ADAD Versions (items 3 & 4) is as general purpose machine (items 1 & 2) apart from the following:- Additional,	ECH/BC/ 930060	REF	))SEE)NOTE)
5	X2	6115-99-425-1839	. HANDLE CARRYING	ECH/BC/ 940001	2	
6	X2	6115-99-883-5813	. STRAP SHOULDER	ECH/BC/ 940002	2	
7		NP	. HARNESS ASSY (SOCKET)	PUW1297	1	
8		NP	. COVER PLATE	P391114	1	

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PARTS LIST

MAIN ASSEMBLIES

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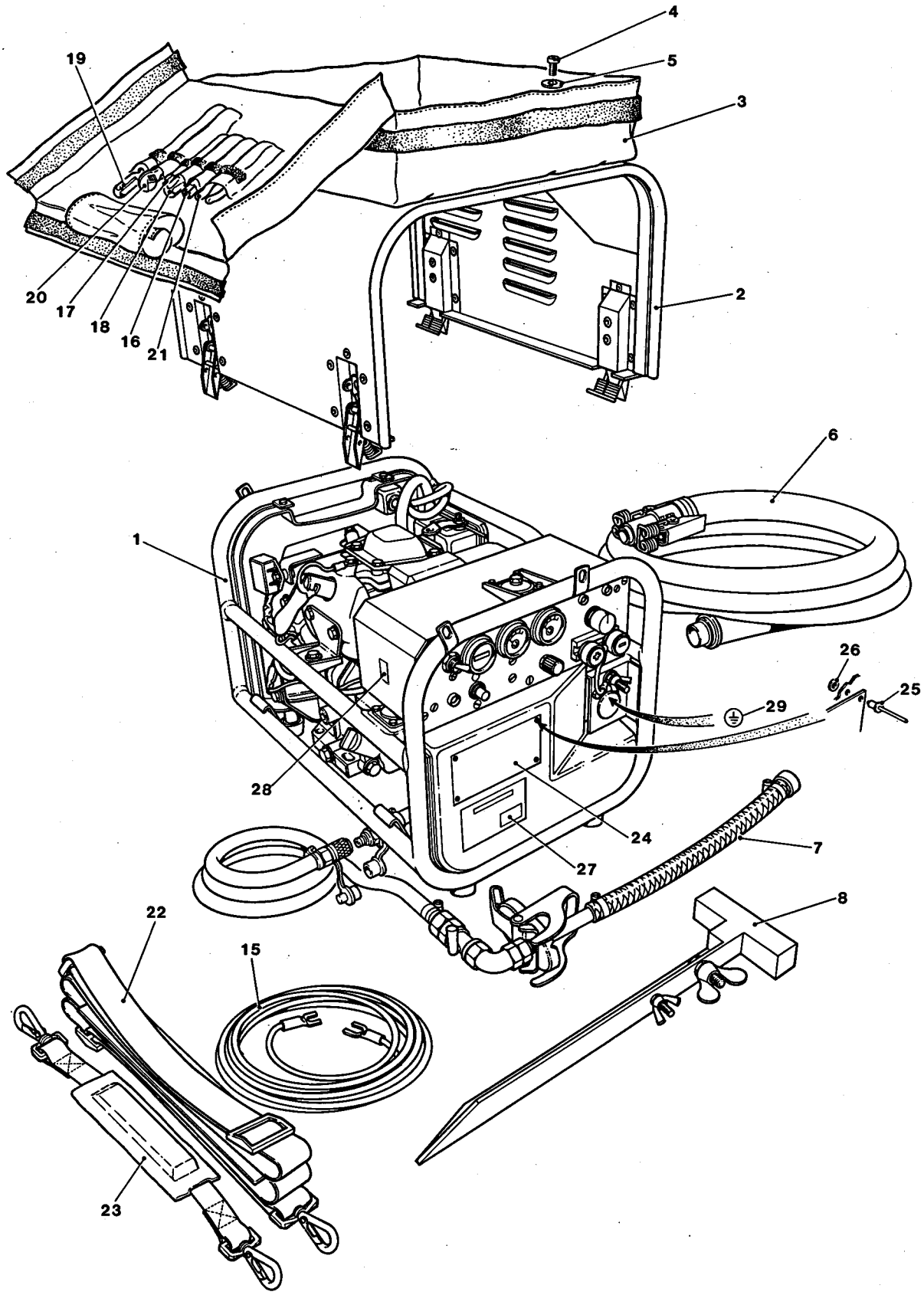

Fig. 1 Main assemblies

FIG. ITEM	ARMY MAN CODE	NATO STOCK NUMBER	ITEM NAME AND DESCRIPTION	PART NO. DRAWING NO.	NO. OFF.	ANNOTATIONS
			MAIN ASSEMBLIES		REF	
1-1		NP	. FRAME ASSEMBLY		REF	Chap 2-2
2		NP	. COVER ASSEMBLY	P391098	1	Chap 2-3
3	X2	6115-99-396-1448	. VALISE ASSEMBLY, containing accessories	ECH/BC/ 950032	1	
4	G1	5305-99-135-0438	. SCREW, PAN HD, M6 X 10 mm lg		6	
5	G1	5310-99-139-8995	. WASHER, RE-ENFORCING, M6		6	
6	X2	4720-99-623-9060	. EXHAUST EXTENSION ASSEMBLY	ECH/BC 950003	1	
7	X2	2910-99-701-5563	. JERRY CAN ADAPTOR AND EXTENSION HOSE	ECH/BC/ 930000	1	Chap 2-1 Fig 2
8	X2	6115-99-842-1503	. EARTH SPIKE ASSEMBLY	ECH/BC/ 930006	1	
NI9	G1	5305-99-941-3498	. . SCREW, MACHINE, HEX FILLISTER HD 1/2 in UNF x 1 1/2 in lg brass	BS1981	1	
NI10	G1	5310-99-941-3188	. . NUT, PLAIN, HEX 1/2 UNF tin pl. brass	BS1768	1	
NI11	G1	5310-99-941-3223	. . NUT,PLAIN, WING HS or DC No 7 1/2 in UNF tin pl brass	BS856-1969	1	
NI12	G1	5305-99-941-1341	. . SCREW, MACHINE, HEX hd 1/4 in UNF x 1 in lg brass	BS1768	1	
NI13	G1	5310-99-941-3188	. . NUT, PLAIN, HEX 1/4 in UNF tin pl brass	BS1768	1	
NI14	G1	5310-99-137-6970	. . NUT, PLAIN, WING HS or DC No 3 1/4 in UNF tin pl brass	BS856-1969	1	
15	X2	6115-99-016-8510	. CABLE ASSEMBLY, EARTH, 12 feet lg	ECH/BC/ 930024	1	Chap 2-1 Fig 3

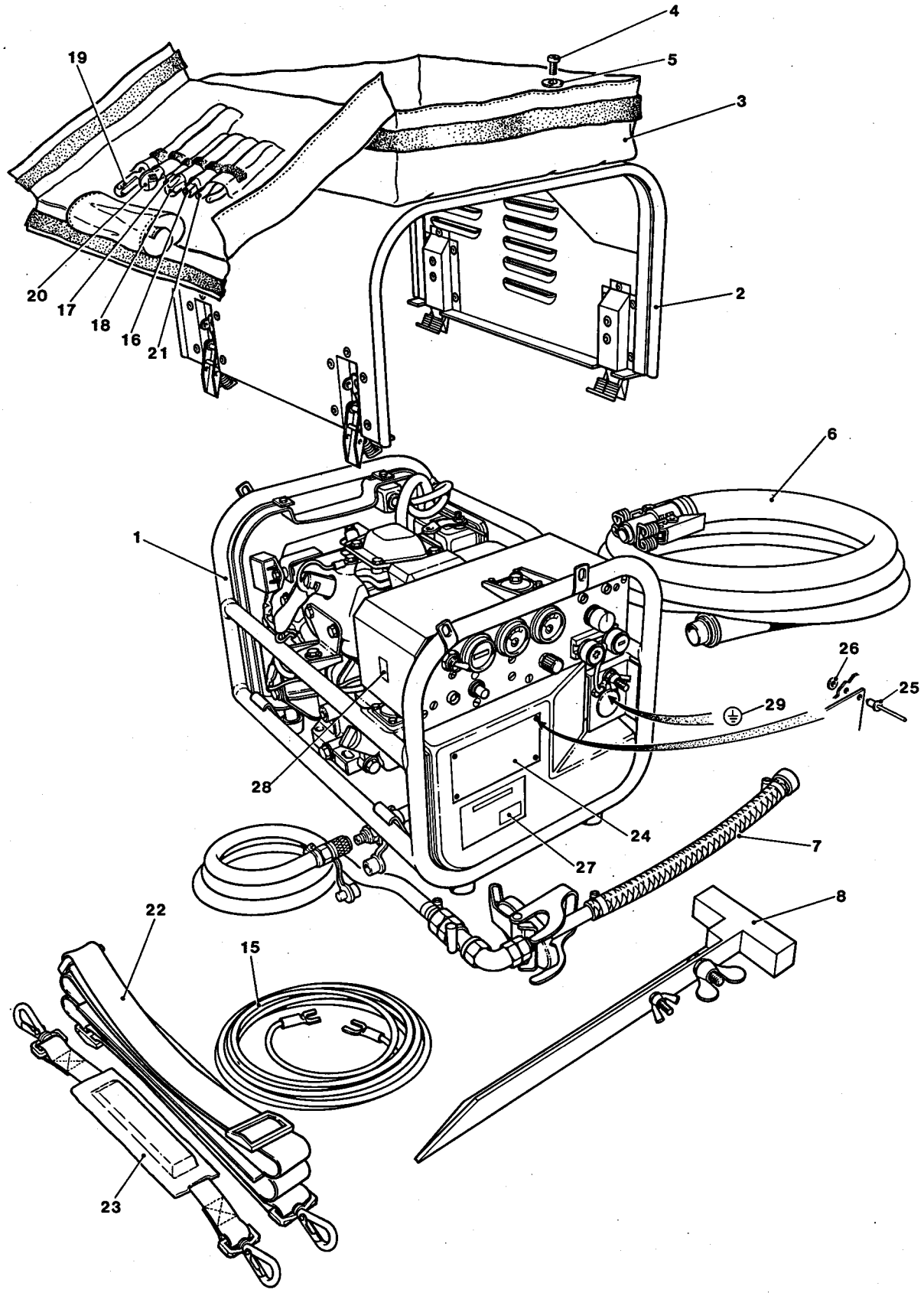

Fig. 1 Main assemblies

FIG. ITEM	ARMY MAN CODE	NATO STOCK NUMBER	ITEM NAME AND DESCRIPTION	PART NO. DRAWING NO.	NO. OFF.	ANNOTATIONS
			MAIN ASSEMBLIES (continued)			
16	F1	5120-99-910-6277	. . SPANNER, BOX 14mm	12401-9121-0	1	KUBOTA
17		NP	. . ROD, BOX SPANNER		1	KUBOTA
18	F1	5120-99-910-5866	. . SCREWDRIVER CROSS POINT		1	
19	F1	5120-99-136-5590	. . SCREWDRIVER FLAT BLADE		1	
20	F1	5120-99-910-5964	. . SPANNER, ADJUSTABLE, 8 in		1	
21	F1	5120-99-910-5525	. . PLIERS, SIDE CUTTING		1	
22	X2	6115-99-883-5813	. STRAP SHOULDER	ECH/BC/940002	2	)ADADS)SERVICE)ONLY
23	X2	6115-99-425-1839	. HANDLE CARRYING	ECH/BC/940001	2	)ADADS)SERVICE)ONLY
24	X2	9905-99-370-9643	. PLATE, INSTRUCTION	ECH/BC/930021	1	
25		NP	. RIVET, TUBULAR 3.2 mm x 8 mm lg		4	
26		NP	. WASHER, PLAIN M3		4	
27		NP	. PLATE IDENTIFICATION	ECH/BC/930022	1	
28	Y1	9905-99-942-9495	. PLATE MOD RECORD	ECH/BC/930019	1	
29		NP	. LABEL EARTH SYMBOL	ECH/BC/930020	1	

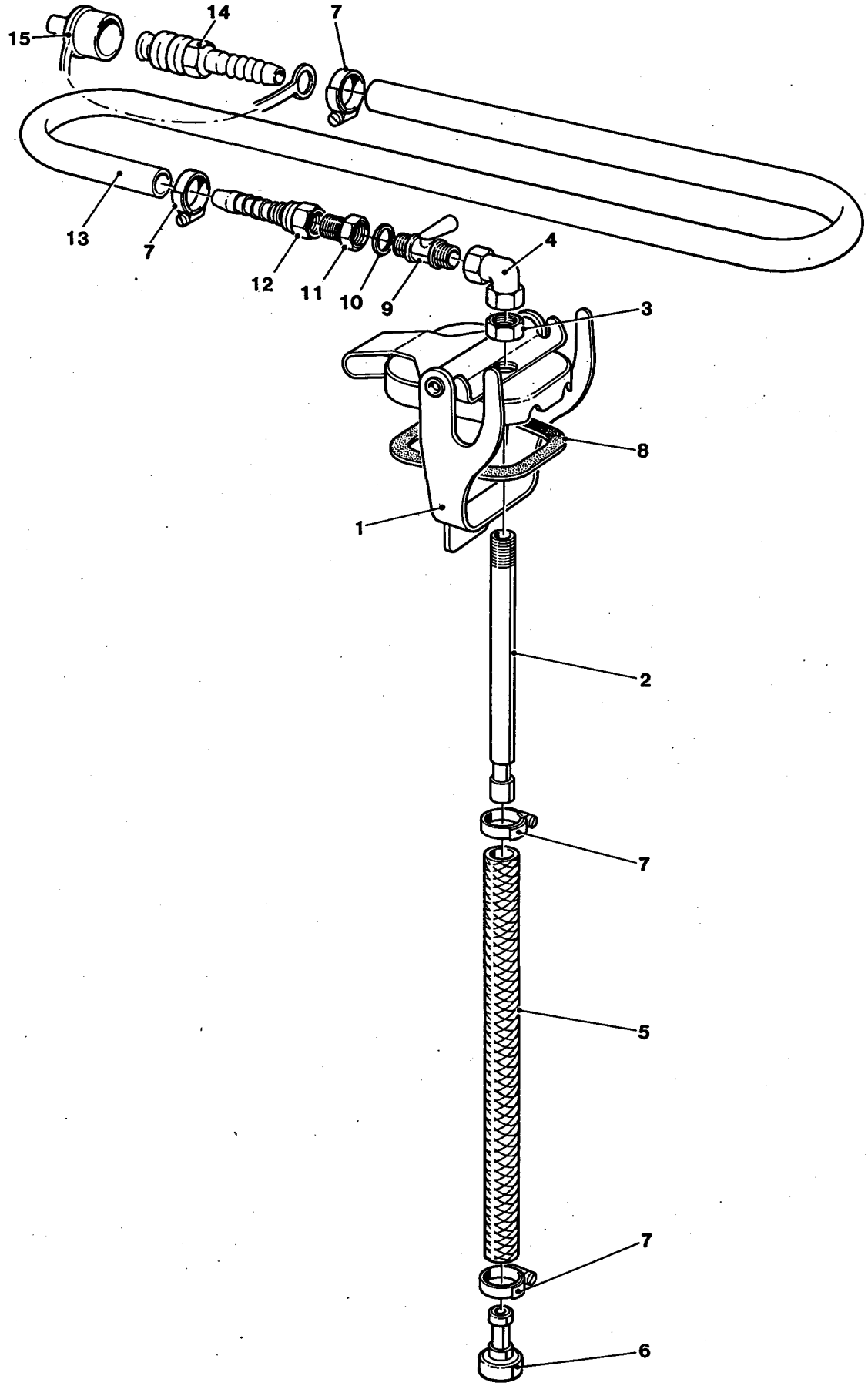

Fig.2 Jerry Can Adaptor

FIG. ITEM	ARMY MAN. CODE	NATO STOCK NUMBER	ITEM NAME AND DESCRIPTION	PART NO. DRAWING NO.	NO. OFF	ANNOTATION
	X2	2910-99-701-5563	JERRY CAN ADAPTOR	ECH/BC/ 930000	REF	
2-1		NP	. FILLER CAP	ECH/BC/ 930001	1	
NI 2		NP	. NIPPLE FUEL SYSTEM	ECH/BC/ 930004	1	
3	G1	5310-99-710-2851	. NUT, PLAIN, HEX 1/8 in BSP brass	D/94/82	1	LISTER
4		NP	. ELBOW, female/female 1/8 BSP	1/8DD/ 44B	1	
5	6MT6	4720-99-947-0962	. HOSE, POLYVINYL CHLORIDE dip tube	HN 45	1	GRIFLEX
6		NP	. FILTER ASSEMBLY	FV4/ 2045203	1	
7	6MT1	4730-99-352-3452	. CLAMP, HOSE, worm drive stainless 1/2 in - 5/8 in size 16	DEF STAN 47-13	4	
8		NP	. SEATING RING	FV4/ 2045197	1	
9	X2	2910-99-398-0610	. FUEL TAP 1/8 BSP Male x Male	ECH/BC 950037	1	
10		NP	. WASHER, PLAIN, COPPER 1/8 BSP		1	
11		NP	. FITTING 1/8 in BSP female x 7/16 in JIC	4/64X-S	1	LISTER
12		NP	. FITTING 7/16 in JIC x 1/4 in bore hose, reusable	X07JFO4		NORTON HYDRAULICS
13	X2	4720-99-730-4876	. HOSE, RUBBER SILICON 1/4 in id petrol oil resistant Fuel supply	BSAU108/ 2-L4/C4/R	1.5m	NORTON HYDRAULICS
14	X2	2910-99-968-2523	. COUPLING, self sealing, female c/w 1/4 in hose tail	21KBTFO6 MPX	1	
15	X2	2910-99-352-7060	. CAP, PROTECTIVE, socket	ECH/BC/ 950031	1	
NI 16		NP	. ADHESIVE	648	A/R	LOCTITE

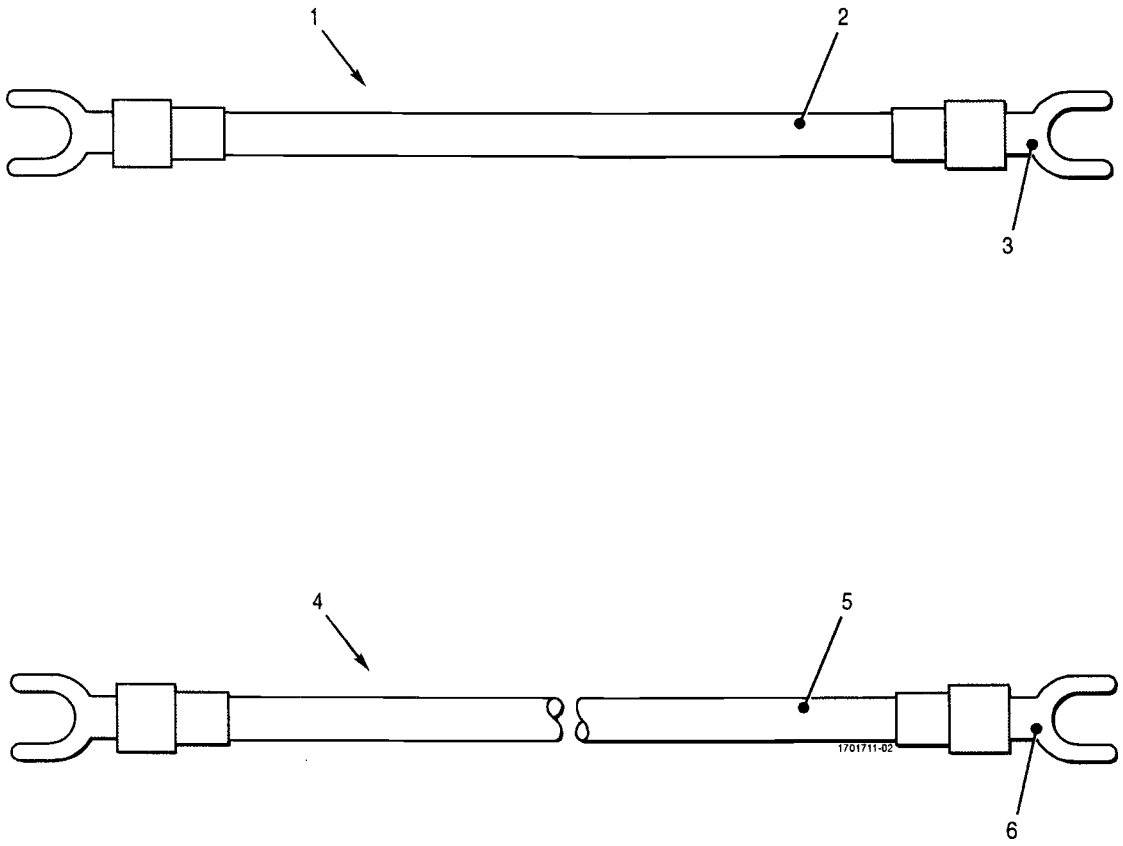

Fig. 3 Cables, earth

FIG. ITEM	ARMY MAN CODE	NATO STOCK NUMBER	ITEM NAME AND DESCRIPTION	PART NO. DRAWING NO.	NO. OFF.	ANNOTATIONS
			CABLES, EARTH		REF	
3-1		NP	. CABLE, ELECTRICAL, NEGATIVE EARTH LINK	ECH/BC/ 930009	1	
2	Y3	6145-99-620-5179	. CABLE, ELECTRICAL, PVC 6 mm sq cross sect area	BS6231	AR	
3	Z37	5940-99-104-6232	. TERMINAL, LUG, insulated crimp OBA yellow	A4665G	2	ELPRESS
4		NP	. CABLE, ELECTRICAL	ECH/BC/ 930024	12ft	
5	Y3	6145-99-620-5179	. CABLE, ELECTRICAL, PVC 6 mm sq cross sect area	BS6231		
6	Z37	5940-99-104-6232	. TERMINAL, LUG, insulated crimp OBA yellow	A4665G	2	ELPRESS

Chapter 2-2

PARTS LIST

FRAME ASSEMBLY

RECORD OF MODIFICATIONS
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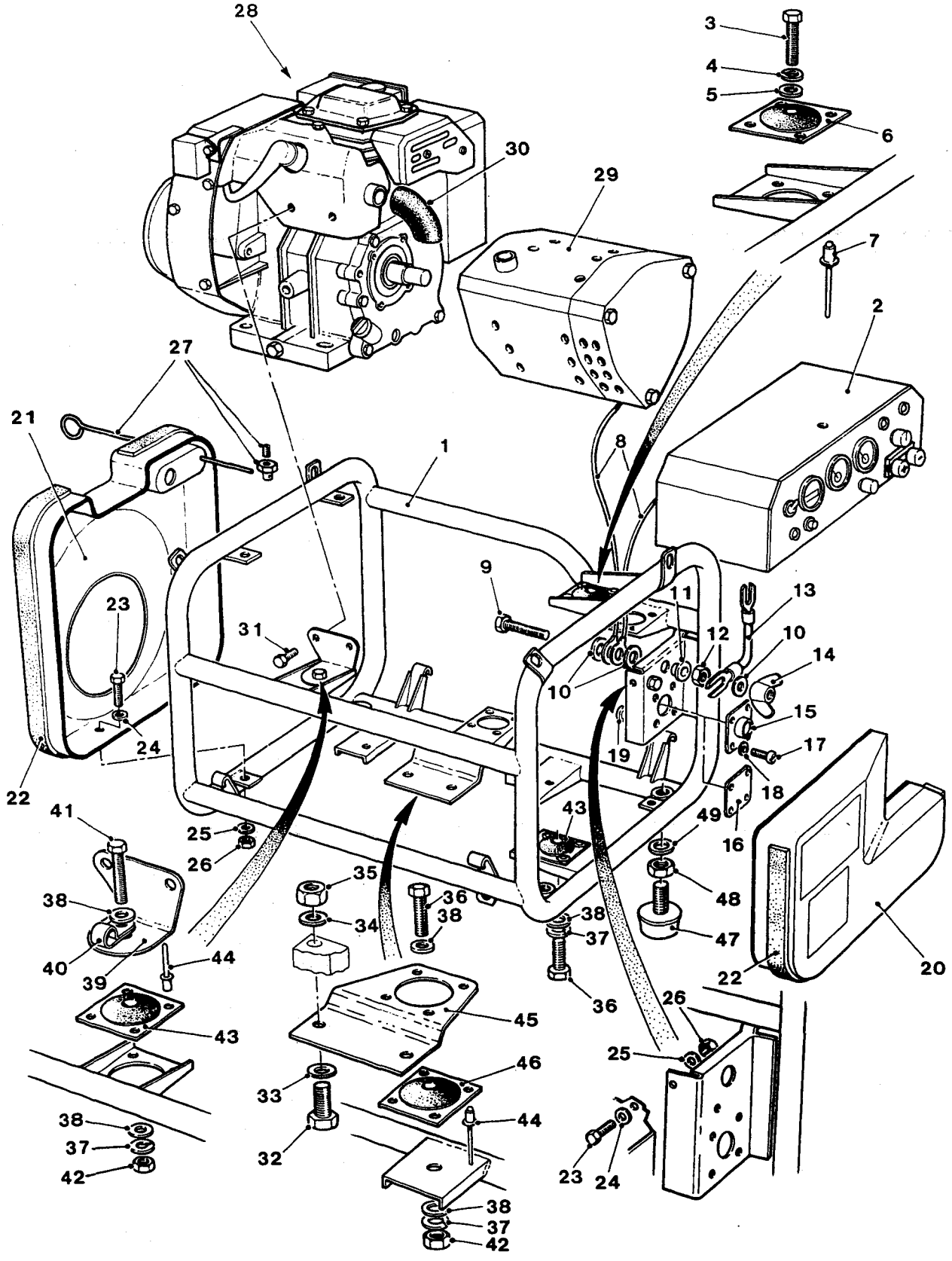

Fig.1 Frame Assembly

FIG. ITEM	ARMY MAN CODE	NATO STOCK NUMBER	ITEM NAME AND DESCRIPTION	PART NO. DRAWING NO.	NO. OFF.	ANNOTATIONS
			FRAME ASSEMBLY		REF	
1-1	X2	6115-99-257-7741	. FRAME ASSEMBLY, welded	P391099	1	KEPAS
2		NP	. CONTROL BOX ASSEMBLY	P391100	1	KEPAS
3	G1	5305-99-122-5362	. SCREW, MACHINE, M6 x 25 mm lg	BS 3692	3	
4		NP	. WASHER, LOCK, single coil M6		3	
5	G1	5310-99-122-6474	. WASHER, FLAT, M6 Zn pl	BS4320	3	
6	X2	5340-99-314-5831	. MOUNT, RESILIENT, control box (rubber) 50 shore hardness	BMSFM/3/C	3	R & B ASSOCIATES
7		NP	. RIVET, TUBULAR, 4 mm x 8 mm lg	ISO9002	12	
8		NP	. CABLE, EARTH		REF	Chap 2-1 Fig 3
9	G1	5305-99-122-5362	. SCREW, MACHINE, HEX hd M6 x 25 mm lg	BS 3692	1	
10	G1	5310-99-122-6482	. WASHER, FLAT, BRASS M6		3	
11	X2	5340-99-617-3459	. POST, ELECTRICAL-MECHANICAL EQUIPMENT, earth contact	P391029	1	KEPAS
12	G1	5310-99-135-0757	. NUT, PLAIN, HEX M6 Zn pl	BS 3692	1	
13		NP	. LEAD, ELECTRICAL, EARTH LINK negative	ECH/BC/930009	1	HOPKINS Chap 2-1 Fig 3
14	G1	5310-99-941-6432	. NUT, PLAIN, WING, brass M6	BS856-1939	1	
15		NP	. CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL, BRANCHED, (SOCKET) [ADADS SERVICE]	PUW 1297	1	PYLE NATIONAL LTD
16		NP	. COVER PLATE	P391114	1	KEPAS
17	G1	5305-99-122-5223	. SCREW, MACHINE, PAN hd M3 x 10 mm lg	BS4183-1967	4	
18	G1	5310-99-647-6504	. WASHER, LOCK, shakeproof M3 internal tooth Zn pl		4	

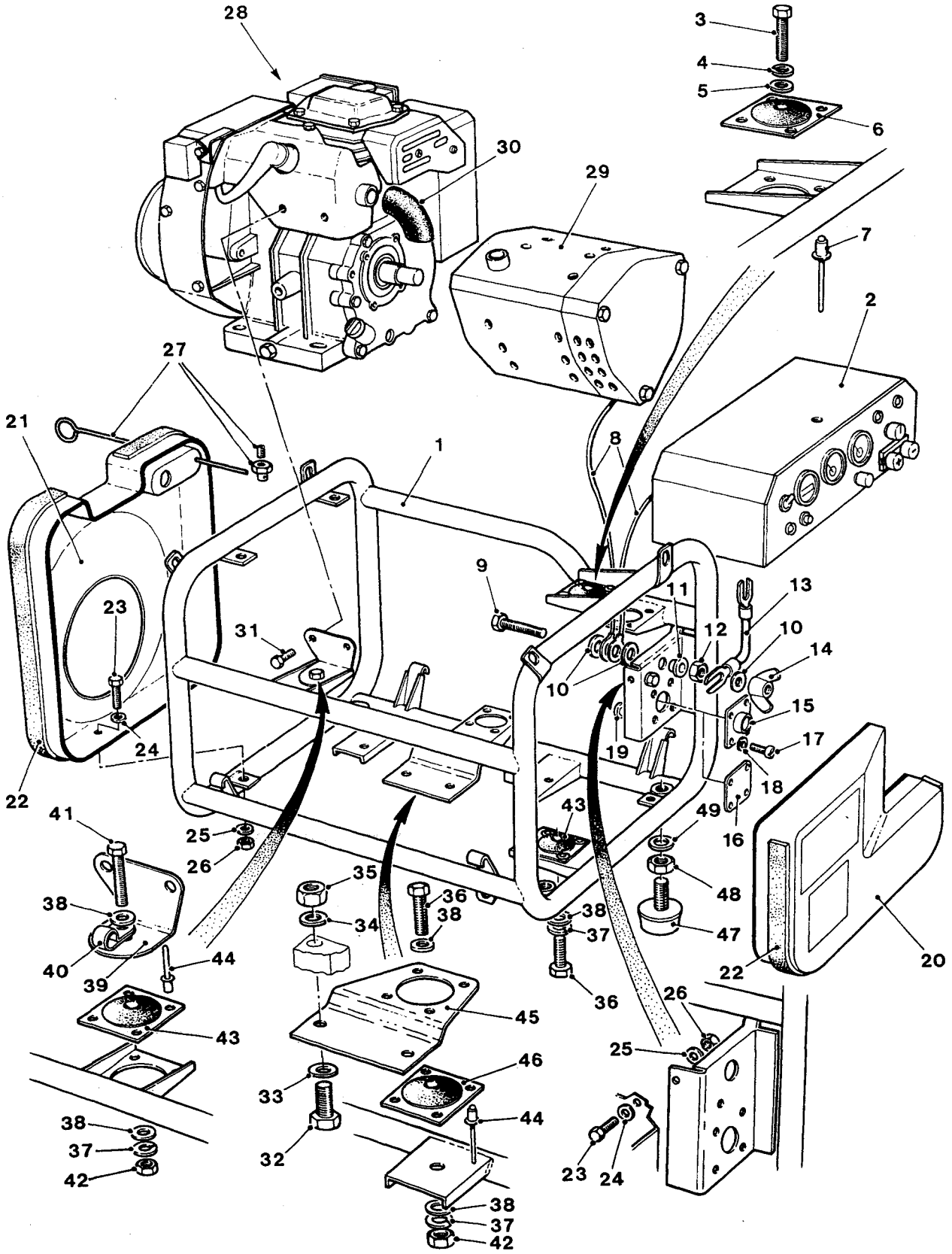

Fig.1 Frame Assembly

FIG. ITEM	ARMY MAN CODE	NATO STOCK NUMBER	ITEM NAME AND DESCRIPTION	PART NO. DRAWING NO.	NO. OFF.	ANNOTATIONS
			FRAME ASSEMBLY (continued)		REF	
19		NP	. NUT, PLAIN, BUSH RIVET M3		4	
20	X2	6115-99-996-0211	. COVER, GENERATOR SET, alternator end moulding	P391095	1	KEPAS
21	X2	6115-99-701-6719	. COVER, GENERATOR SET engine end moulding	P391087	1	KEPAS
22	X2	5330-99-020-7083	. SEAL, NON METALIC CHANNEL, edge strip	ECH/BC/ 930014	AR	
23	G1	5305-99-122-5356	. SCREW, MACHINE, HEX hd M5 X 16 mm lg		8	
24	G1	5310-99-756-9561	. WASHER, M5 heavy duty		8	
25	G1	5310-99-636-2987	. WASHER, LOCK, shakeproof internal tooth M5		8	
26	G1	5310-99-122-5294	. NUT, PLAIN, M5		8	
27	X3	2990-99-588-0603	. CONTROL WIRE, CHOKE c/w stop	ECH/BC/ 930011	1	HOPKINS
28	X3	2805-99-499-9679	. ENGINE, GASOLENE	ECH/BC/ 930055	1	Chap 2-2-1
29	X2	6115-99-549-3455	. ALTERNATOR, 14/28V 300/500W	P391007	1	KEPAS Chap 2-2-2
30		NP	. HOSE, AIR COOLING	P391128	1	KING INDUSTRIAL PRODUCTS
31	G1	5305-99-122-3020	. SCREW, MACHINE, HEX hd M8 x 15 mm lg		2	KUBOTA
32	G1	5305-99-135-8984	. SCREW, MACHINE, HEX hd M8 x 25 mm lg		2	
33	G1	5310-99-122-3034	. WASHER, FLAT, M8		2	
34	G1	5310-99-135-9293	. WASHER, LOCK, single coil M8		2	
35	G1	5310-99-139-0313	. NUT, PLAIN, M8		2	
36	G1	5305-99-122-5362	. SCREW, MACHINE, HEX hd M6 x 25 mm lg	BS 3692	2	

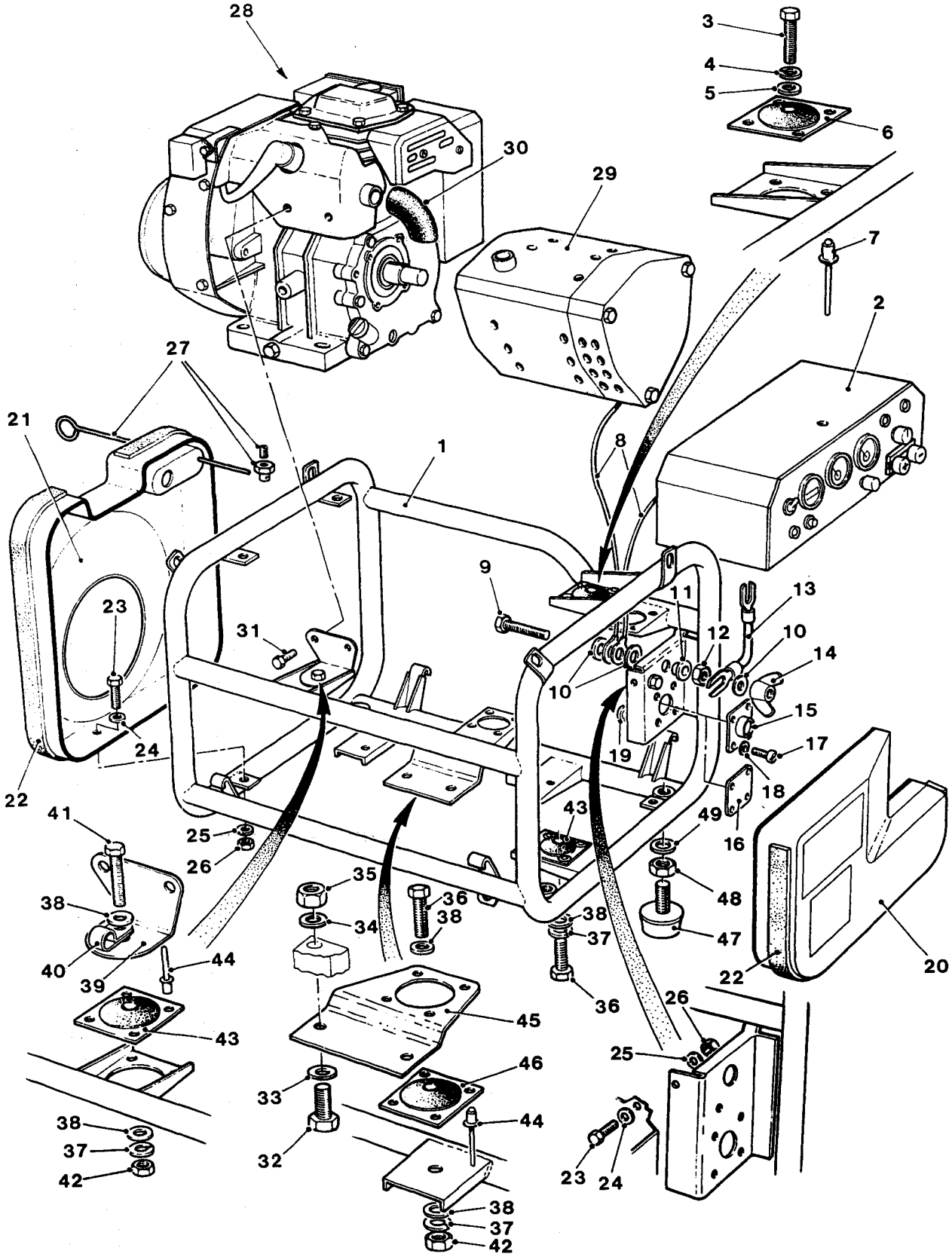

Fig.1 Frame Assembly

FIG. ITEM	ARMY MAN CODE	NATO STOCK NUMBER	ITEM NAME AND DESCRIPTION	PART NO. DRAWING NO.	NO. OFF.	ANNOTATIONS
			FRAME ASSEMBLY (continued)		REF	
37	G1	5310-99-137-9232	. WASHER, LOCK, single coil M6		3	
38	G1	5310-99-122-6474	. WASHER, FLAT M6 Zn pl	BS 4320	5	
39		NP	. MOUNTING BRACKET, ENGINE (upper)	P391012	1	KEPAS
40		NP	. CLAMP, CABLE, P clip	PCL1P10	1	
41	G1	5306-99-122-5363	. SCREW, MACHINE, HEX hd M6 x 30 mm lg		1	
42	G1	5310-99-135-0757	. NUT, PLAIN, HEX M6 Zn pl	BS 3692	2	
43	X2	5340-99-921-7092	. MOUNT, RESILIENT, engine upper/alternator lower (rubber)60 shore hardness	BMSFM/3/E	2	R & B ASSOCIATES
44		NP	. RIVET, TUBULAR 4 mm x 8 mm lg	ISO9002	8	
45		NP	. MOUNTING BRACKET ENGINE (lower)	P391014	1	KEPAS
46	X2	5340-99-577-6081	. MOUNT, RESILIENT, engine lower, neoprene 70 shore hardness	BMSFM/3/NEO5	1	R & B ASSOCIATES
47	X2	6115-99-304-1612	. FOOT, mounting	BM3520/0E0/3	4	R & B ASSOCIATES
48	G1	5310-99-122-5303	. NUT, PLAIN, HEX, M10		4	
49	G1	5310-99-138-9228	. WASHER, LOCK, single coil M10		4	

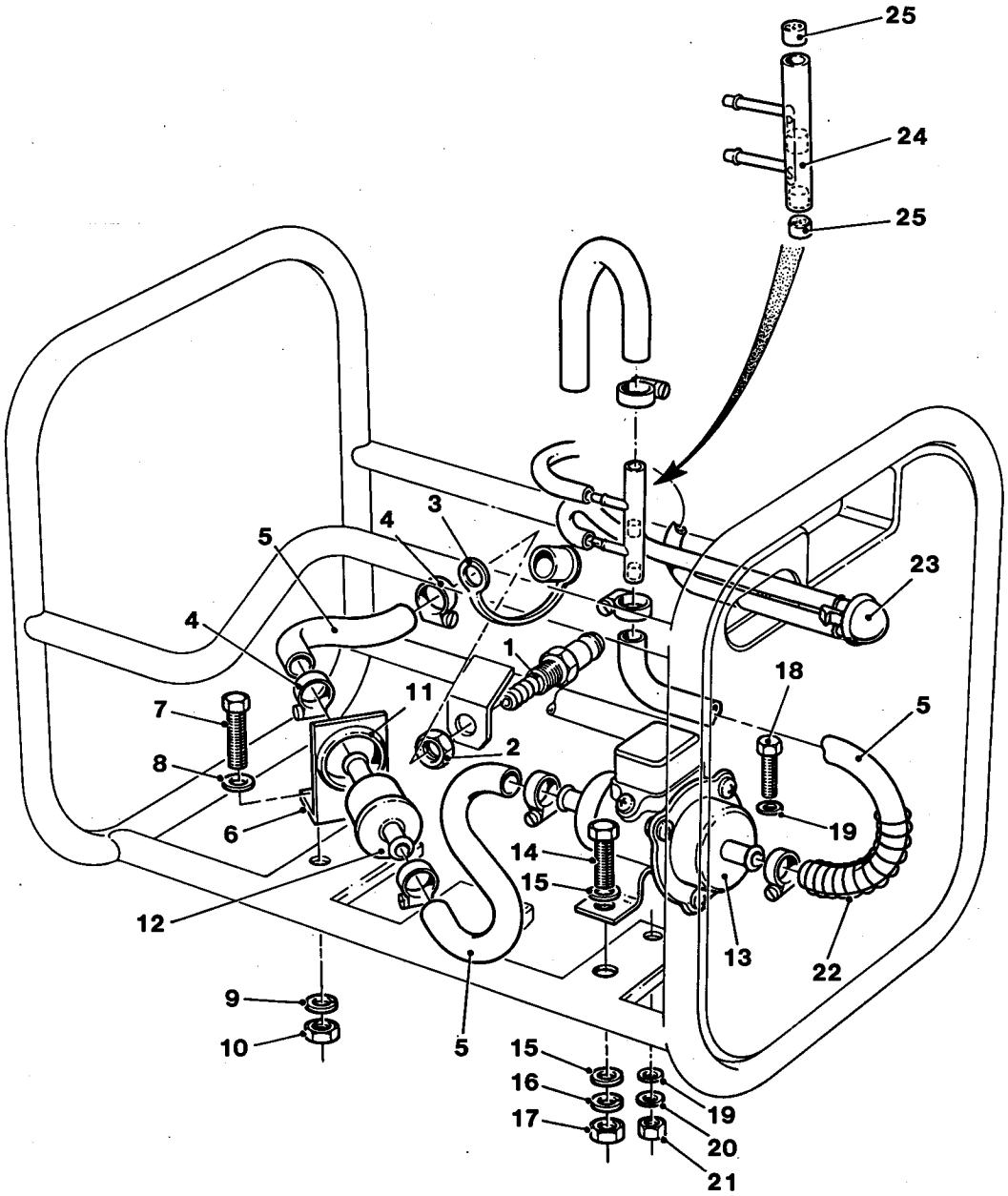

Fig.2 Fuel System

FIG. ITEM	ARMY MAN CODE	NATO STOCK NUMBER	ITEM NAME AND DESCRIPTION	PART NO. DRAWING NO.	NO. OFF.	ANNOTATIONS
			FUEL SYSTEM	ECH/BC 930016	REF	
2-1	X2	2910-99-905-5099	. COUPLING, self sealing, male, c/w 5/16 in hose tail	21SBTS08 MPX	1	
2	G1	NP	. . LOCK NUT, 7/16 in JIC Zn pl		REF	Part of Item 1
3	X2	2910-99-126-5372	. CAP PROTECTIVE, Plug	ECH/BC/ 950030	1	
4	6MT1	4730-99-352-3452	. CLAMP, hose size No. 15	DEF STAN	10	
5	X2	4720-99-500-3127	. HOSE, RUBBER SILICON 5/16 in id oil/petrol resistant	BSAU108/ 2-L4/C4/R	AR	
6		NP	. BRACKET, FUEL FILTER	P391086	1	
7	G1	5305-99-122-5355	. SCREW, MACHINE, HEX hd M5 x 10 mm lg		2	
8	G1	5310-99-122-3032	. WASHER, PLAIN M5		2	
9	G1	5310-99-636-2987	. WASHER, LOCK, shakeproof, internal tooth M5		2	
10	G1	5310-99-122-5294	. NUT, PLAIN, HEX M5		2	
11		NP	. GROMMET, 31 mm id 36 mm dia hole	MR122	1	MOUNTFORD RUBBER
12	X2	2910-99-430-6709	. FILTER PETROL	25120151 1VW	1	U.R.O. AUTOMOTIVE
13	X2	2910-99-168-8199	. PUMP PETROL, ELECTRIC	ECH/BC/ 930016/9	1	
14	G1	5305-99-122-3020	. SCREW, MACHINE, M8 x 16 mm lg		1	
15	G1	5310-99-122-3034	. WASHER, FLAT, M8		2	
16	G1	5310-99-135-9293	. WASHER, LOCK single coil M8		1	
17	G1	5310-99-139-0313	. NUT, PLAIN, M8		1	
18	G1	5305-99-122-5359	. SCREW, MACHINE, M6 x 12 mm lg		1	
19	G1	5310-99-122-6474	. WASHER, FLAT, M6		2	

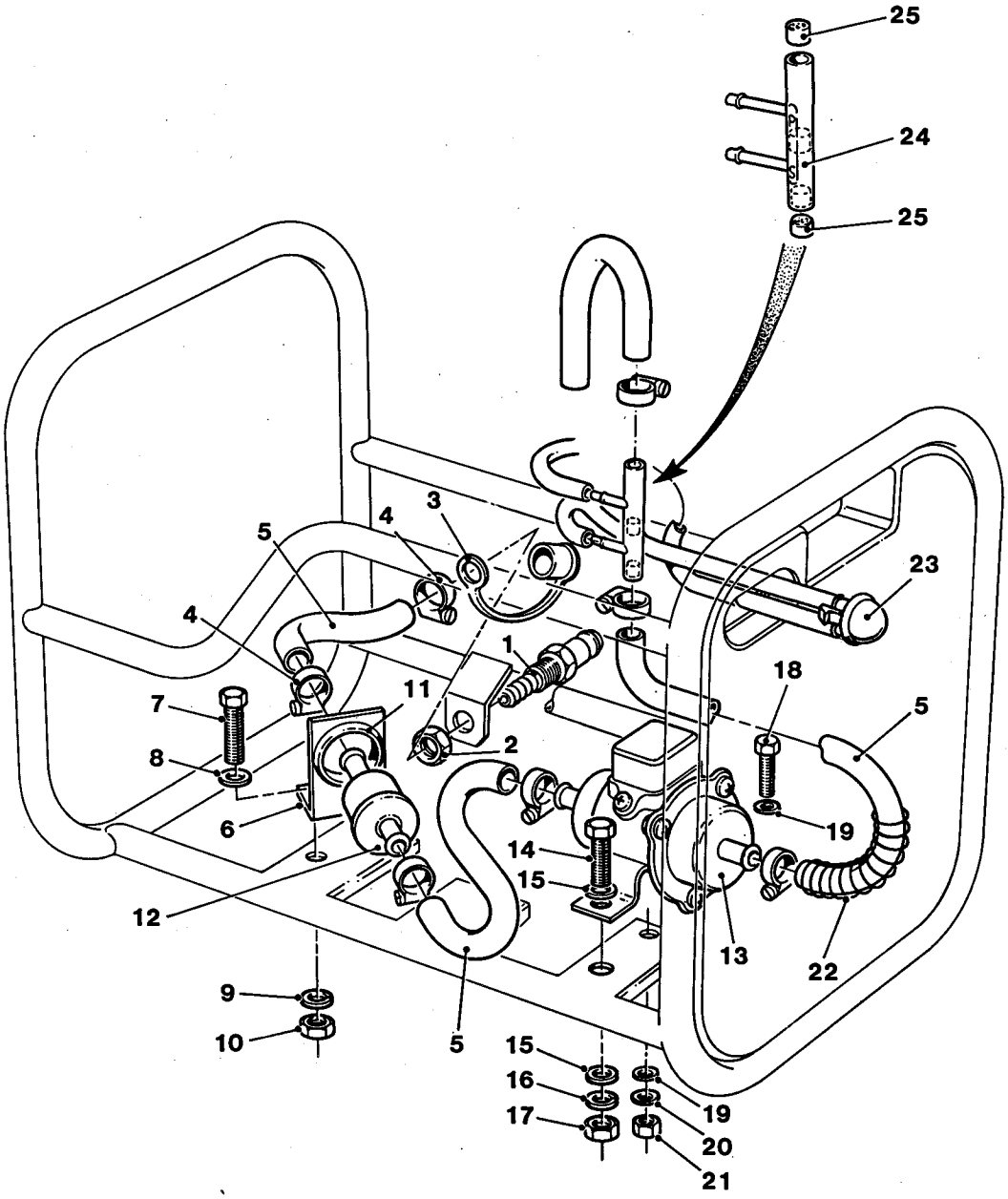

Fig.2 Fuel System

FIG. ITEM	ARMY MAN CODE	NATO STOCK NUMBER	ITEM NAME AND DESCRIPTION	PART NO. DRAWING NO.	NO. OFF.	ANNOTATIONS
			FUEL SYSTEM (continued)	ECH/BC 930016	REF	
20	G1	5310-99-137-9232	. WASHER, LOCK, single coil M6		1	
21	G1	5310-99-135-0757	. NUT, PLAIN, HEX, M6		1	
22	X3	4720-99-795-0335	. SPRING, REINFORCING, HOSE 14.2 id 5 mm pitch, 1.6 mm dia wire x 3 in lg	651422	1	BY
23	G1	2910-99-496-1153	. PRIMER FUEL c/w 7/64 in id hoses	ECH/BC 930016/16	1	
24	X3	2910-99-840-3478	. PRIMING MODULE	ECH/BC/ 950028	1	
25	X3	2910-99-149-2398	. . CHECK VALVE, non return	363-589	2	TILLOTSON

Chapter 2-2-1

PARTS LIST

ENGINE, GASOLENE
ECH/BC/930055
(X3 2805-99-499-9679)

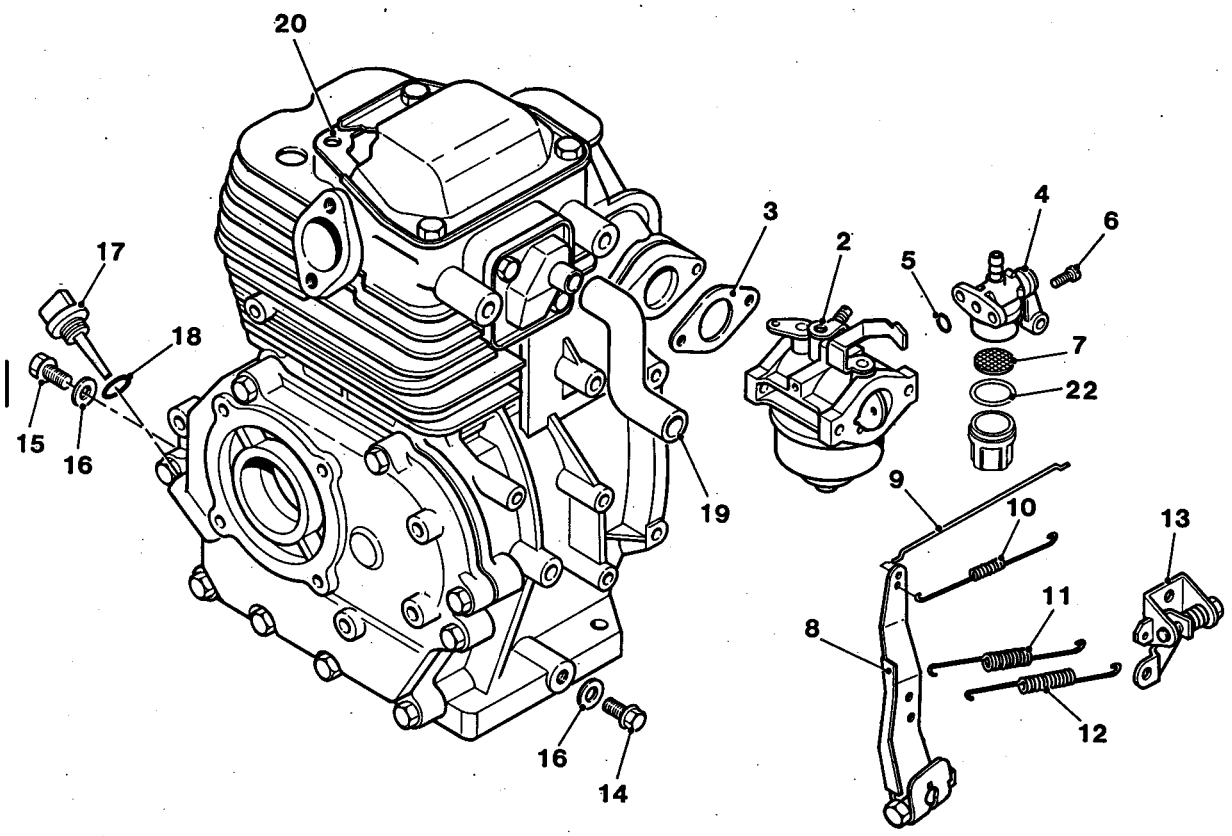

Fig.1 Engine, Gasolene

FIG. ITEM	ARMY MAN CODE	NATO STOCK NUMBER	ITEM NAME AND DESCRIPTION	PART NO. DRAWING NO.	NO. OFF.	ANNOTATIONS
			ENGINE, GASOLENE	ECH/BC/ 930055	REF	
NI1	X3	2805-99-499-9679	. ENGINE, GASOLENE	GH120-Q-4-W-UK2	1	KUBOTA
2	X3	2910-99-051-9621	. CARBURETTOR ASSEMBLY	ECH/BC 950002	1	
3	X3	2910-99-256-5269	. GASKET, CARBURETTOR	13901-4611-0	1	
4	X3	2910-99-701-5599	. FILTER ASSIMBLY, FUEL	12643-4301-0	1	
5	X3	2910-99-341-3860	. RING SEALING, TOROIDAL	12643-9675-0	1	
6	X3	2910-99-770-9885	. SCREW ASSEMBLY	03024-50512	2	
7	X3	2910-99-327-7725	. ELEMENT, FILTER, FUEL	12454-4316-0	1	
8	X3	2990-99-591-2681	. LEVER ASSEMBLY, governor	12643-5602-0	1	
9	X3	2990-99-757-0911	. . ROD, governor	12653-5635-0	1	
10	X3	2910-99-884-6145	. . SPRING, ROD	12653-5639-0	1	
11	X3	2910-99-974-5999	. . SPRING, governor	12641-5641-0	1	
12	X3	2910-99-305-3400	. . SPRING, governor	12641-5642-0	1	
13	X3	2910-99-795-0039	. SPEED CONTROL PLATE ASSEMBLY	12647-5701-0	1	
14	X3	5305-99-831-5531	. SCREW, MACHINE, sump plug	P391119	1	KEPAS
15	X3	2805-99-027-2853	. PLUG, oil	13901-3375-0	1	
16	X3	2805-99-031-7260	. GASKET	04724-00120	2	
17	X3	2805-99-730-3483	. PLUG ASSEMBLY, oil filler	13901-3308-2	1	

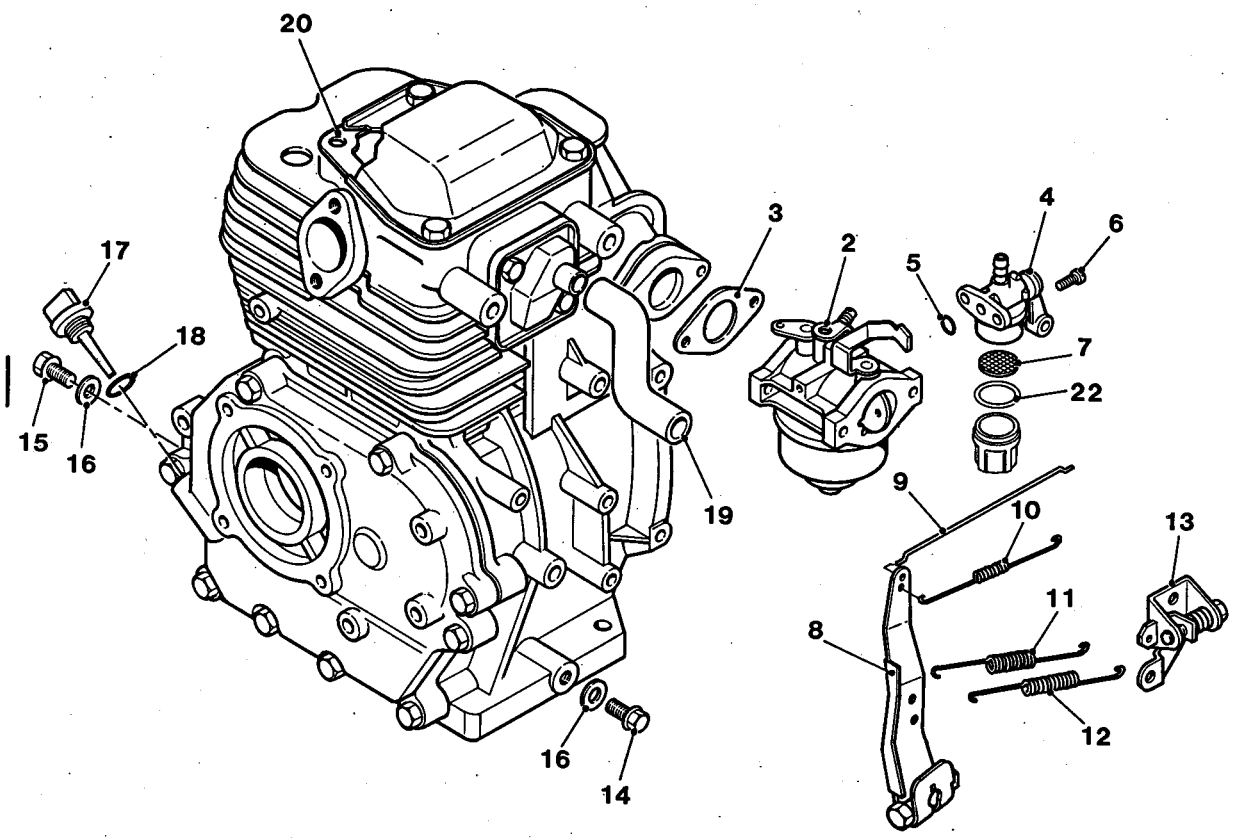

Fig.1 Engine, Gasolene

FIG. ITEM	ARMY MAN CODE	NATO STOCK NUMBER	ITEM NAME AND DESCRIPTION	PART NO. DRAWING NO.	NO. OFF.	ANNOTATIONS
			ENGINE, GASOLENE (continued)		REF	
18	X3	2805-99-244-6170	. . RING, SEALING TOROIDAL	04811-00160	1	
19	X3	2805-99-016-8530	. TUBE, BREATHER	12641-0551-0	1	
20	X3	2805-99-660-6108	. GASKET, HEAD COVER	12643-1452-0	1	
NI21	X3	2805-99-147-1019	. KIT, GASKET SET	07916-2936-0	1	
22	X3	2910-99-244-5995	. GASKET, FILTER BOWL	12866-4314-0	1	

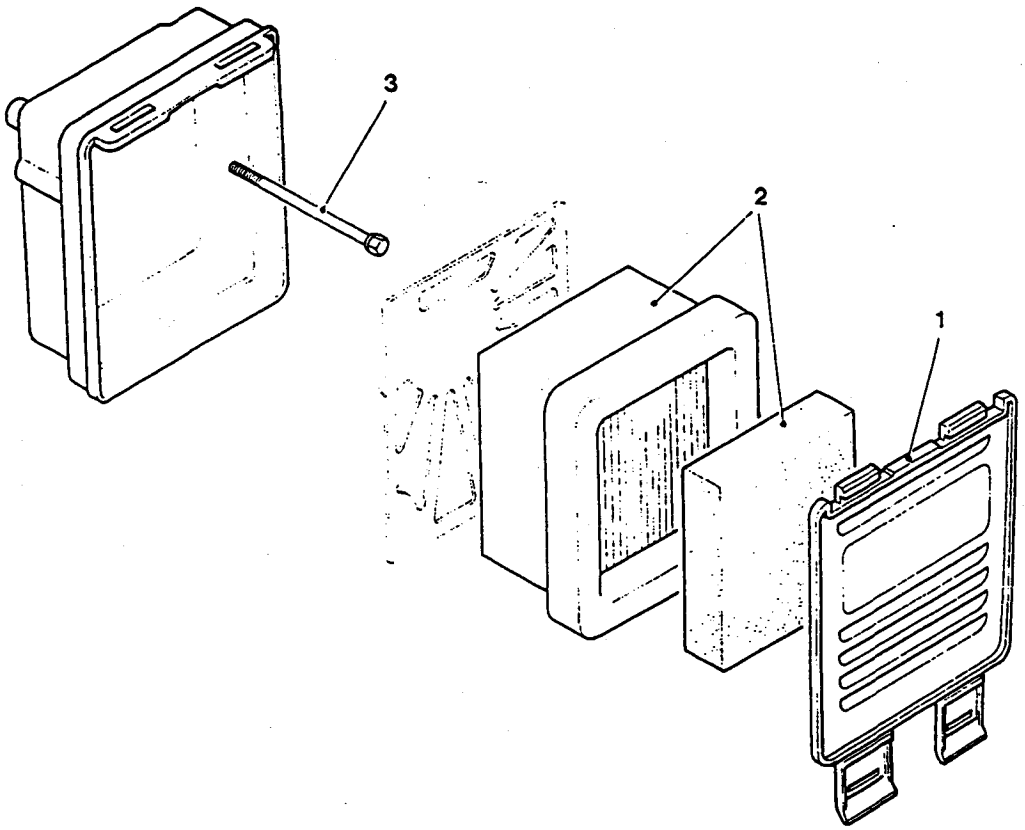

Fig.2 Air Cleaner

FIG. ITEM	ARMY MAN CODE	NATO STOCK NUMBER	ITEM NAME AND DESCRIPTION	PART NO. DRAWING NO.	NO. OFF.	ANNOTATIONS
			AIR CLEANER		REF	
2-1	X3	2940-99-822-0593	. . COVER, AIR CLEANER	12301-1116-0	1	
2	X3	2940-99-335-4668	. . ELEMENT	12812-1121-0	1	
3	X3	2940-99-980-8432	. BOLT	01023-50675	2	

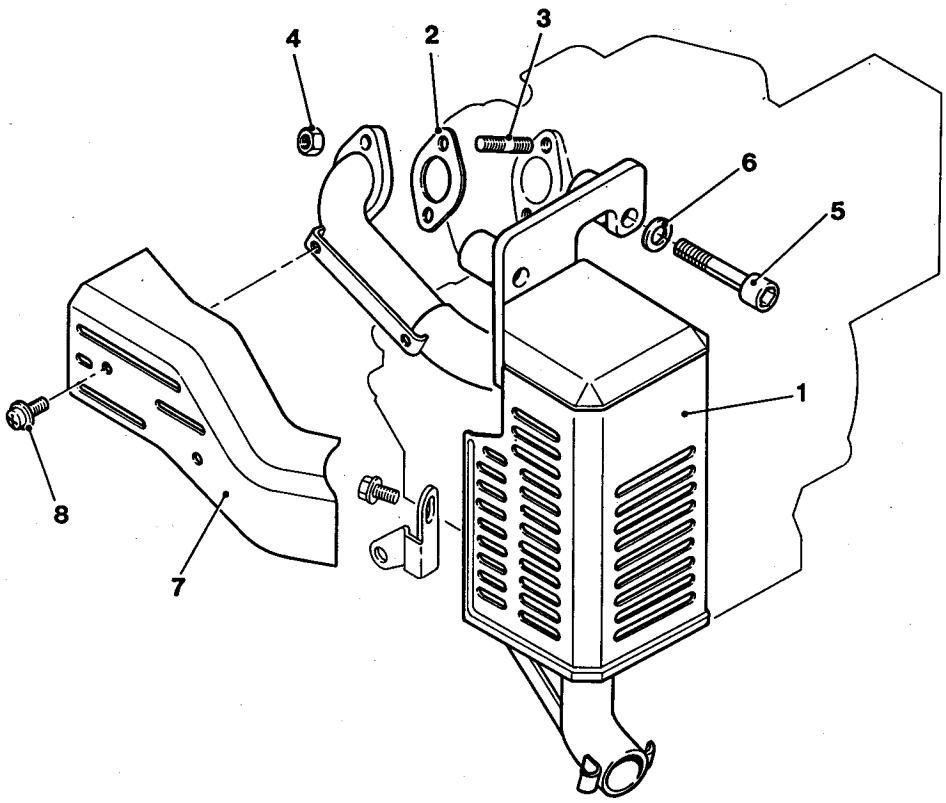

Fig.3 Silencer Assembly

FIG. ITEM	ARMY MAN CODE	NATO STOCK NUMBER	ITEM NAME AND DESCRIPTION	PART NO. DRAWING NO.	NO. OFF.	ANNOTATIONS
			SILENCER ASSEMBLY		REF	
3-1	X3	2990-99-083-2777	. SILENCER, modified	ECH/BC/ 950004	1	
2	X3	2990-99-151-2002	. GASKET, SILENCER	12643-1223-0	1	
3	X3	5307-99-757-0925	. STUD	12101-9152-0	2	
4	X2	2910-99-225-5161	. NUT	13901-9201-0	2	
5	G1	5305-99-135-1385	. . BOLT, cap, sk hd M8 x 40 mm lg	BS4168	2	
6	G1	5310-99-130-2196	. . WASHER, lock, s/coil M8 heavy duty		2	
7	X3	2990-99-300-7881	. COVER, SILENCER FLANGE	12641-1272-3	1	
8	X2	2990-99-842-0334	. SCREW, c/w washer	12641-9321-0	2	

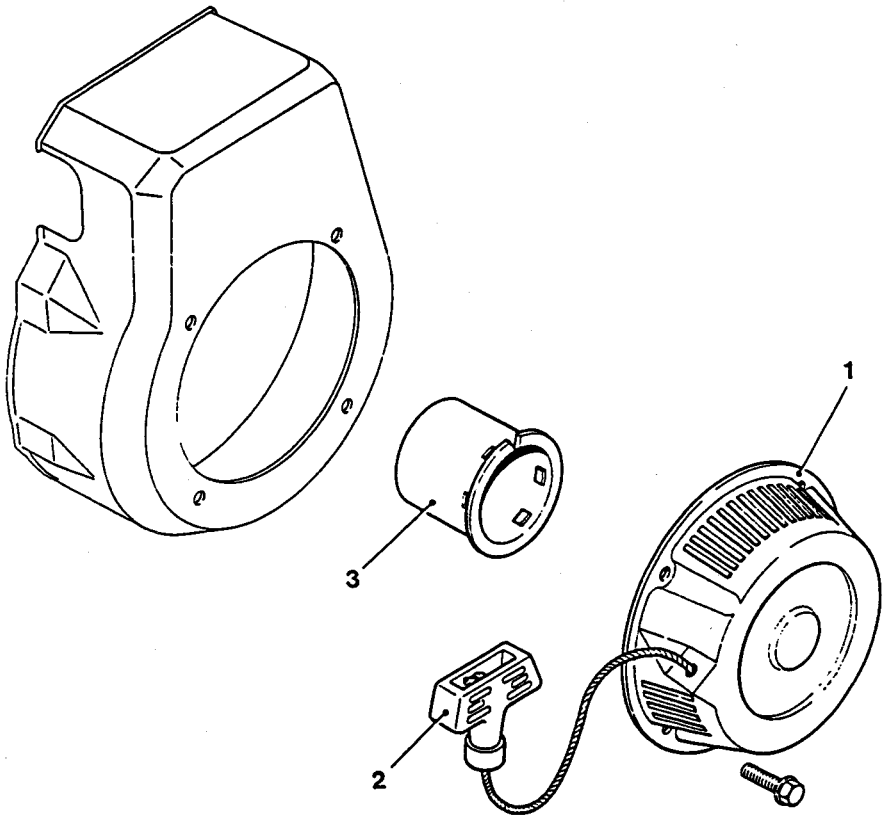

Fig.4 Recoil Starter Assembly

FIG. ITEM	ARMY MAN CODE	NATO STOCK NUMBER	ITEM NAME AND DESCRIPTION	PART NO. DRAWING NO.	NO. OFF.	ANNOTATIONS
			RECOIL STARTER ASSEMBLY		REF	
NI4-1	X3	2990-99-523-9299	. . STARTER ASSEMBLY, RECOIL SUB ASSEMBLY	12354-6108-0	1	
2	X3	2990-99-660-6109	. . ROPE ASSEMBLY, STARTER	12354-6109-0	1	
3	X3	2990-99-147-0815	. PULLEY, START	12815-6174-0	1	

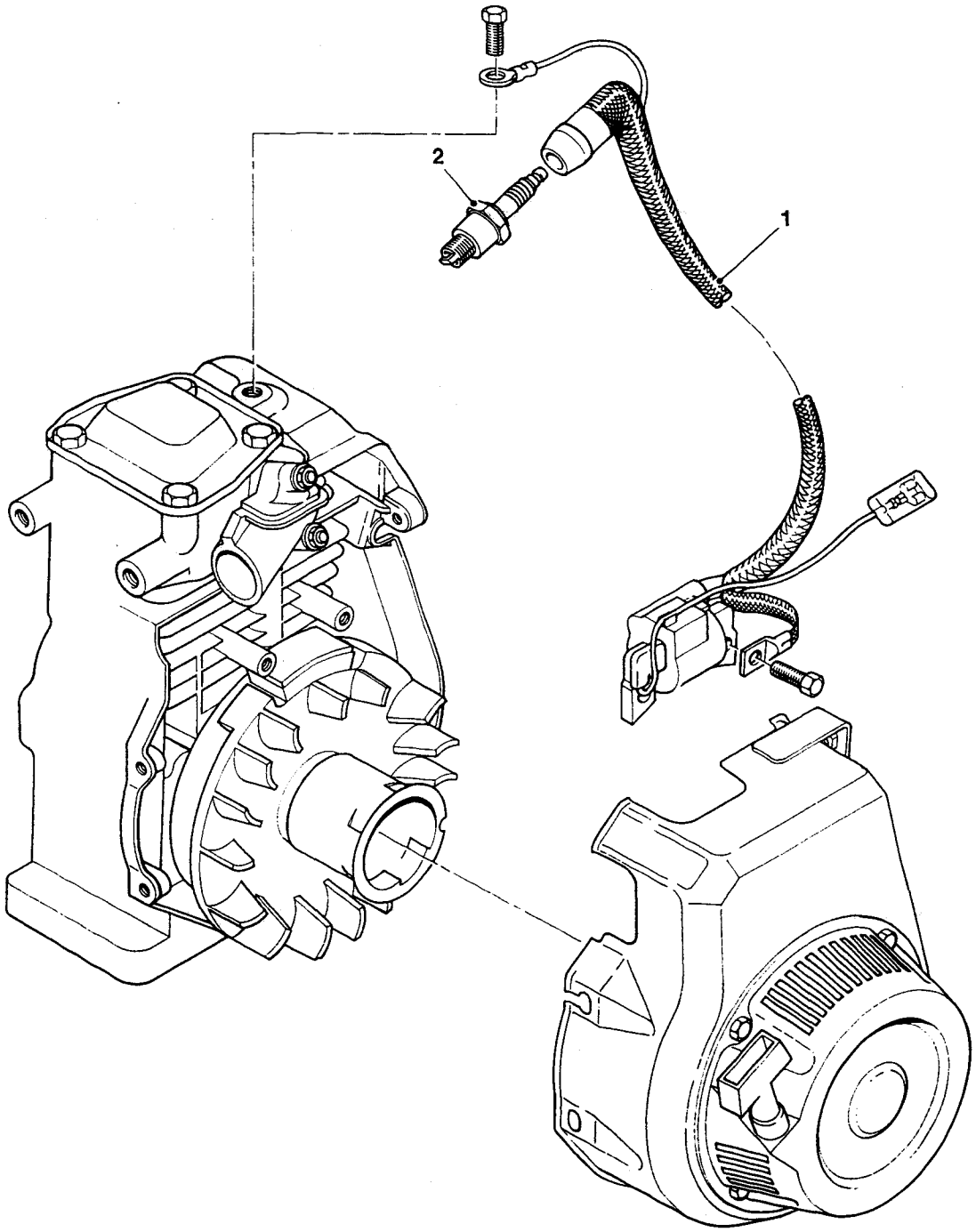

Fig.5 Magneto & Ignition Assembly

FIG. ITEM	ARMY MAN CODE	NATO STOCK NUMBER	ITEM NAME AND DESCRIPTION	PART NO. DRAWING NO.	NO. OFF.	ANNOTATIONS
			MAGNETO & IGNITION ASSEMBLY		REF	
5-1	X3	2920-99-835-9596	. IGNITION MODULE, EMC SUPPRESSED	ECH/BC/ 930010	1	
2	X3	2920-99-215-4125	. SPARK PLUG	BPR6H5 NGK	1	

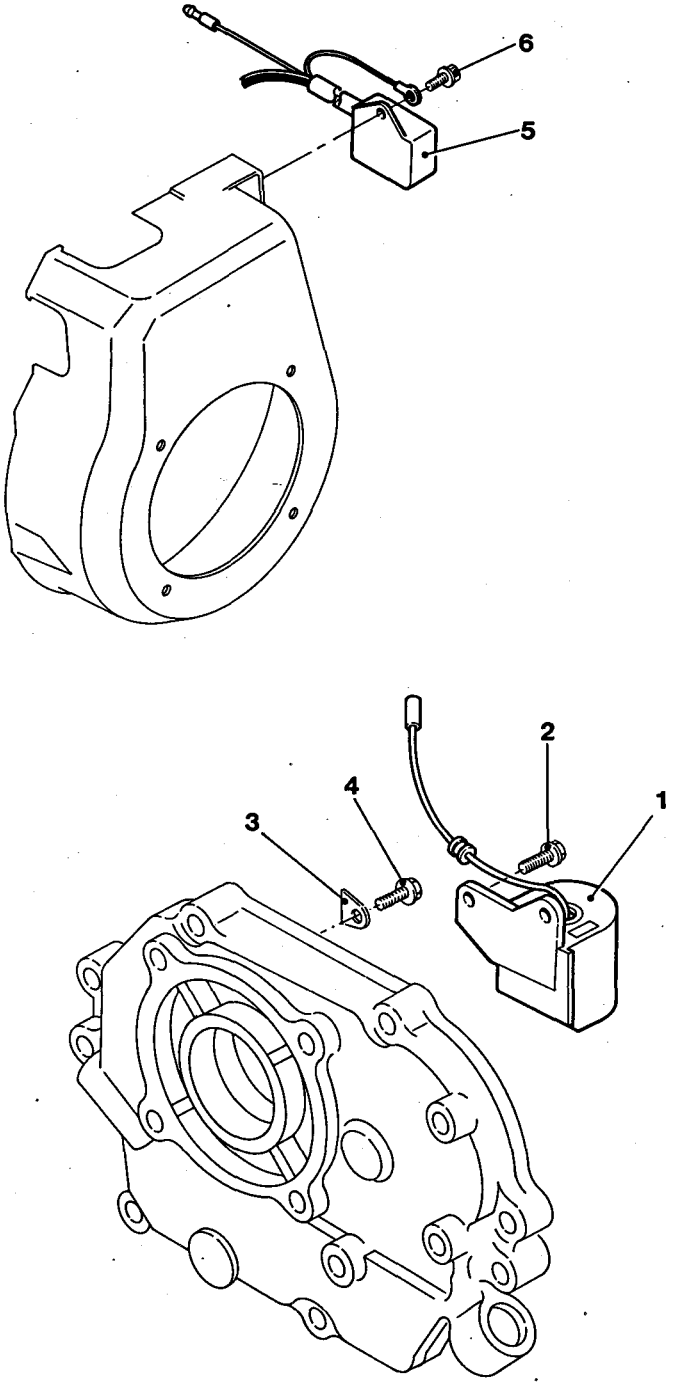

Fig.6 Oil Watch Unit

FIG. ITEM	ARMY MAN CODE	NATO STOCK NUMBER	ITEM NAME AND DESCRIPTION	PART NO. DRAWING NO.	NO. OFF.	ANNOTATIONS
			OIL WATCH SYSTEM		REF	
6-1	X3	2920-99-701-5600	. SENSOR, OIL WATCH UNIT	12647-3951-0	1	
2	X2	2920-99-314-1049	. BOLT	13901-9104-0	1	
3	X3	2920-99-660-6758	. RETAINER, CORD	12647-3955-0	1	
4	X3	2805-99-731-5634	. BOLT	13921-9104-0	1	
5	X3	2920-99-352-6806	. SWITCH, OIL WATCH UNIT	12652-6715-0	1	
6	X2	5306-99-932-6824	. BOLT	01202-50620	1	

Chapter 2-2-2

PARTS LIST

ALTERNATOR ASSEMBLY
14/28V 300/500W

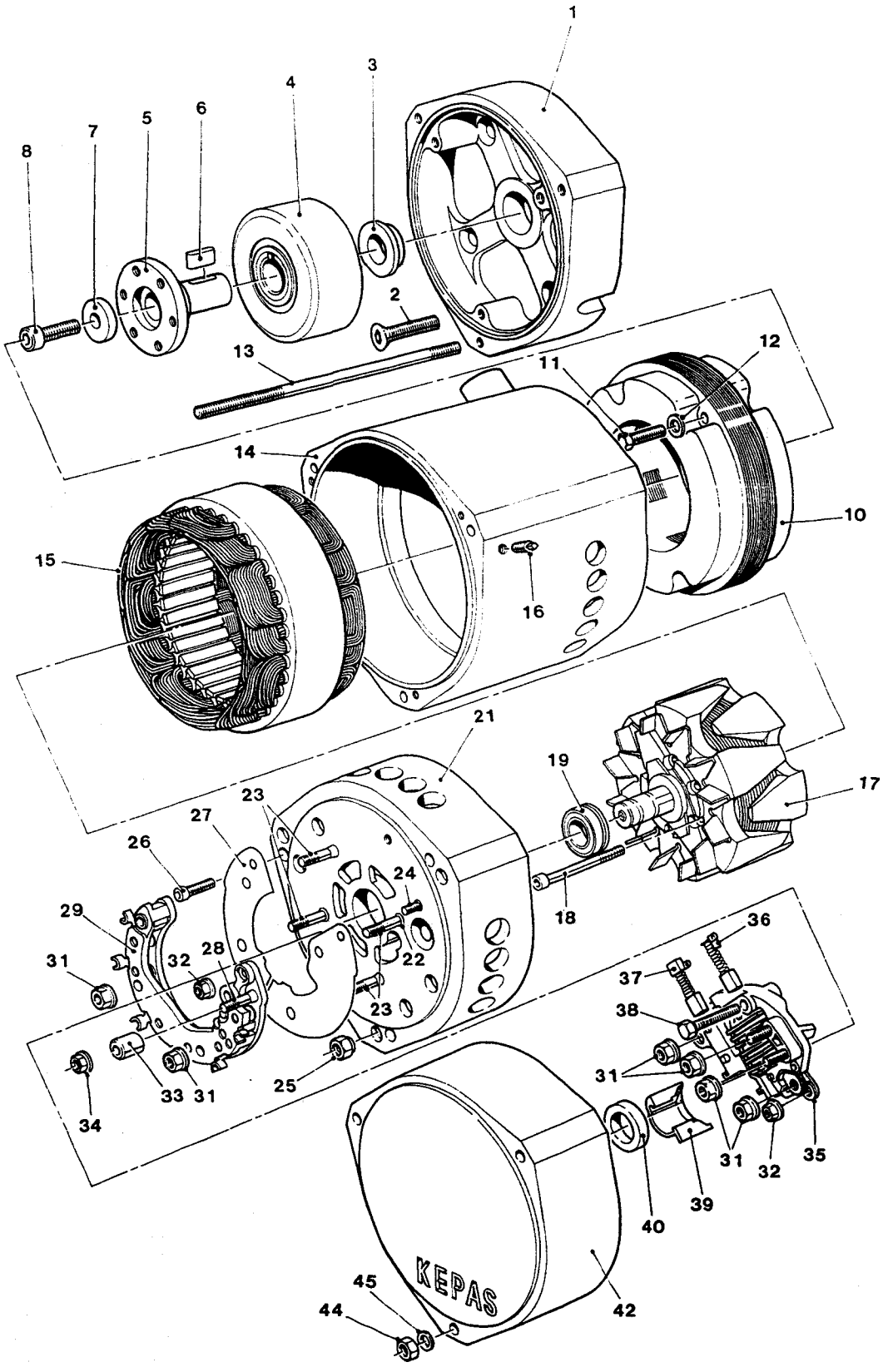

Fig.1 Alternator Assembly

FIG. ITEM	ARMY MAN CODE	NATO STOCK NUMBER	ITEM NAME AND DESCRIPTION	PART NO. DRAWING NO.	NO. OFF.	ANNOTATIONS
	X2	6115-99-549-3455	ALTERNATOR ASSEMBLY 14/28V 300/500W	P391007	REF	KEPAS
1-1		NP	. BRACKET DRIVE END	P391008	1	
2	G1	5305-99-122-5325	. SCREW, skt hd, csk M8 x 25 mm lg	BS4168	4	
3	X2	5365-99-870-6525	. SPACER, SLEEVE, crankshaft	P391035	1	
4	X2	6115-99-340-2300	. ROTOR GENERATOR MAGNET, permanent	RM21	1	LAP
5	X2	3120-99-244-6293	. BUSHING, SLEEVE, coupling	P391017	1	
6	X2	5315-99-950-2533	. KEY, MACHINE, crankshaft	P391037	1	
7	X2	5310-99-452-6263	. WASHER, FLAT, retainer	P391036	1	
8	G1	5305-99-122-5346	. SCREW, skt hd M8 x 20 mm lg	BS4168	1	
NI9		NP	. ADHESIVE, SCREW THREAD	290	AR	LOCTITE
10	X2	2920-99-300-8554	. STATOR, engine generator permanent magnet	RM21KX1	1	LAP
11	G1	5306-99-122-5245	. BOLT, MACHINE HEX hd M6 x 30 mm lg Zn pl	BS3692 ZP	3	
12	G1	5310-99-122-6474	. WASHER, FLAT M6 class 2 Zn pl	BS4320 ZP	3	
13	X2	5307-99-330-1592	. STUD, PLAIN	P391034	3	
14		NP	. BODY ALTERNATOR	P391024	1	
15	X2	6115-99-373-9593	. STATOR, GENERATOR ASSEMBLY	54208534	1	MAGNETI MARELLI
16	G1	5305-99-122-8526	. SCREW, GRUB, DOG POINT skt hd M4	BS4168 PT4	3	
17	X2	6115-99-547-8302	. ROTOR, GENERATOR	P391016	1	
18	G1	5305-99-122-0725	. SCREW, skt hd 10/32 UNF 2-1/2 in lg	BS2470	6	
19	X2	3110-99-701-5643	. BEARING, BALL	NSK6003 dw	1	NSK
NI20		NP	. BEARING ADHESIVE	641	AR	LOCTITE
21	X2	6115-99-305-3431	. BRACKET, SLIP RING, rear casing	P391006	1	

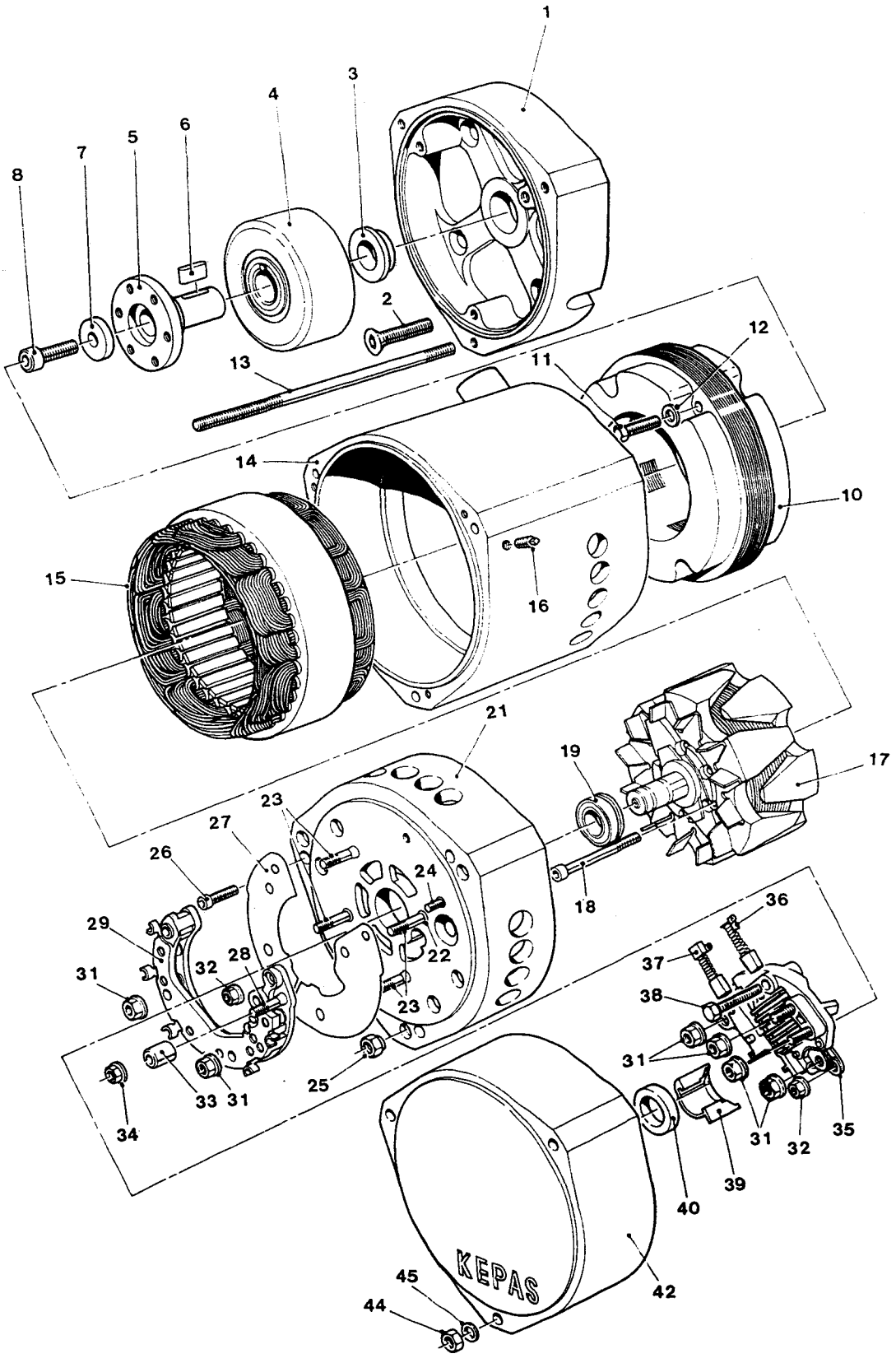

Fig.1 Alternator Assembly

FIG. ITEM	ARMY MAN CODE	NATO STOCK NUMBER	ITEM NAME AND DESCRIPTION	PART NO. DRAWING NO.	NO. OFF.	ANNOTATIONS
			ALTERNATOR ASSEMBLY 14/28V 300/500W (continued)		REF	
22	X2	5365-99-179-9444	. SPACER,SLEEVE, insulator, rectifier	P391051	2	
23		NP	. BOLT, SPECIAL M5 x 30 mm lg	54207677	4	MAGNETI MARELLI
24		NP	. BOLT, SPECIAL M4 x 15 mm lg	54208517	1	MAGNETI MARELLI
25	G1	5310-99-135-0757	. NUT, PLAIN HEX shouldered M6	BS3692	3	
26	X2	5305-99-801-3303	. SCREW, skt hd M4 x 35 mm lg cd pl	BS4168	3	
27		NP	. GASKET, INSULATION	54208819	1	MAGNETI MARELLI
28	X2	6115-99-149-8147	. BOLT, SPECIAL M6, pos connection	54208517	1	MAGNETI MARELLI
29	X2	5961-99-972-1820	. RECTIFIER ASSEMBLY	54208687	1	MAGNETI MARELLI
NI30		NP	. COMPOUND HEAT TRANSFER	340	AR	DOW CORNING
31		NP	. NUT, PLAIN, HEX, captive washer, M5	54134729	6	MAGNETI MARELLI
32		NP	. NUT, PLAIN, HEX, captive washer M4	54208123	2	MAGNETI MARELLI
33	X2	5365-99-056-3432	. SPACER, STEPPED, pos connection	P391106	1	
34	G1	5310-99-135-0757	. NUT, PLAIN HEX M6 Zn pl	BS3692 ZP	3	
35	X2	6110-99-325-2318	. VOLTAGE REGULATOR	54208776	1	MAGNETI MARELLI
36	X2	5977-99-832-0608	. . BRUSH ASSEMBLY, POSITIVE	54208048	1	MAGNETI MARELLI
37	X2	5977-99-300-7196	. . BRUSH ASSEMBLY,NEGATIVE	54208049	1	MAGNETI MARELLI
38	G1	5305-99-137-7590	. SCREW, MACHINE, HEX M4 x 30 mm lg Zn pl	BS3692 ZP	3	

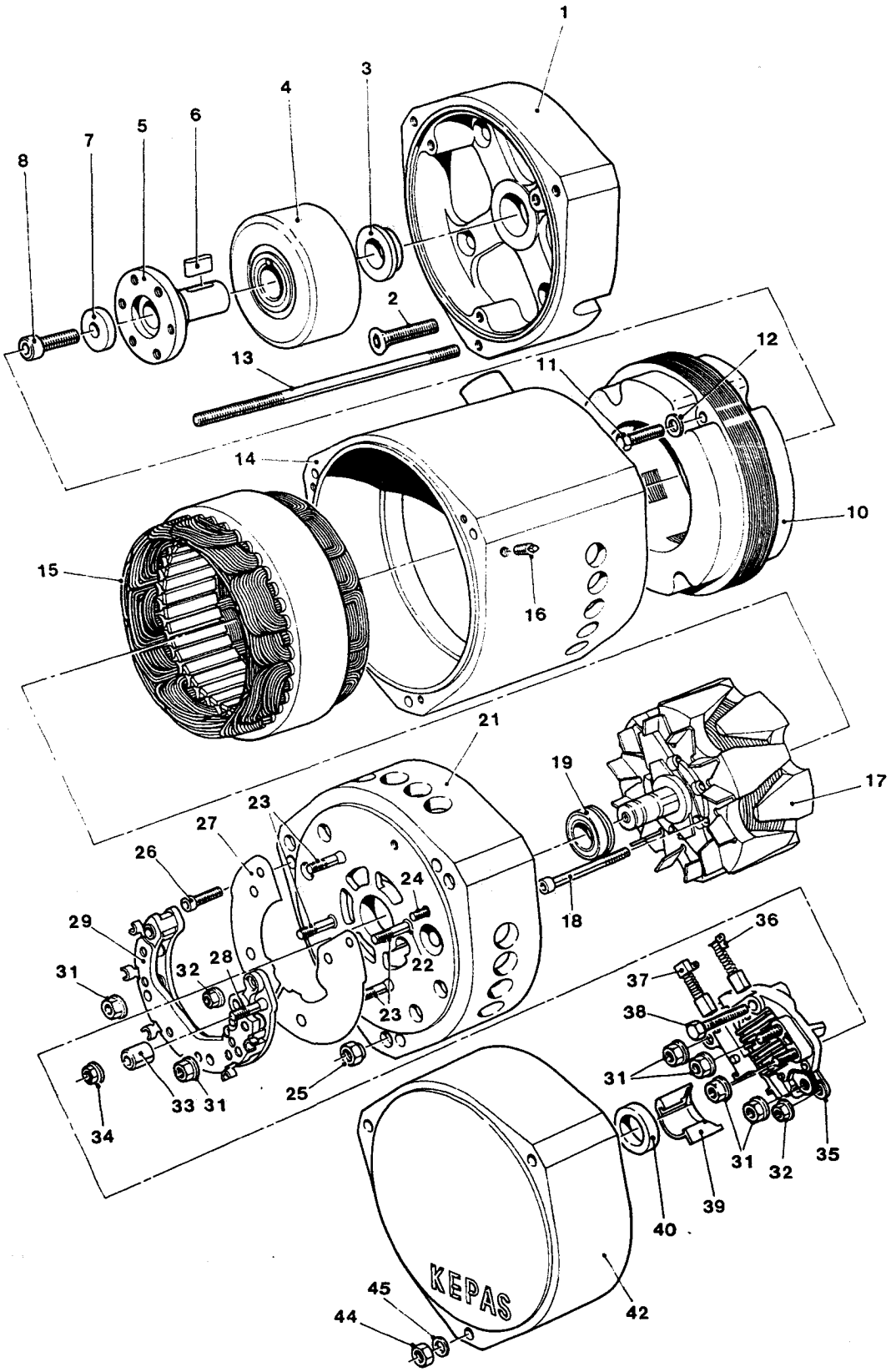

Fig.1 Alternator Assembly

FIG. ITEM	ARMY MAN CODE	NATO STOCK NUMBER	ITEM NAME AND DESCRIPTION	PART NO. DRAWING NO.	NO. OFF.	ANNOTATIONS
			ALTERNATOR ASSEMBLY 14/28V 300/500W (continued)		REF	
39	X2	6115-99-990-8616	. COVER, SLIP RING	54208280	1	MAGNETI MERELLI
40	X2	5975-99-051-7243	. BOOT, DUST & MOISTURE SEAL, SLIP RING	P391107	1	BAJOFELT
NI41		NP	. ADHESIVE, CONTACT		AR	
42		NP	. END COVER, ALTERNATOR	P391009	1	
NI43		NP	. INSULATION MATERIAL 3 mm	ESG 10797 IMF	AR	SISTOFLEX
44	G1	5310-99-135-0757	. NUT, PLAIN HEX M6 Zn pl	BS3692 ZP	3	
45	G1	5310-99-122-6474	. WASHER, FLAT M6 class 2 Zn pl	BS4320 ZP	3	
NI46		NP	. SOLDER MULTICORE 60/40	BS441	AR	

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PARTS LIST

CONTROL BOX ASSEMBLY

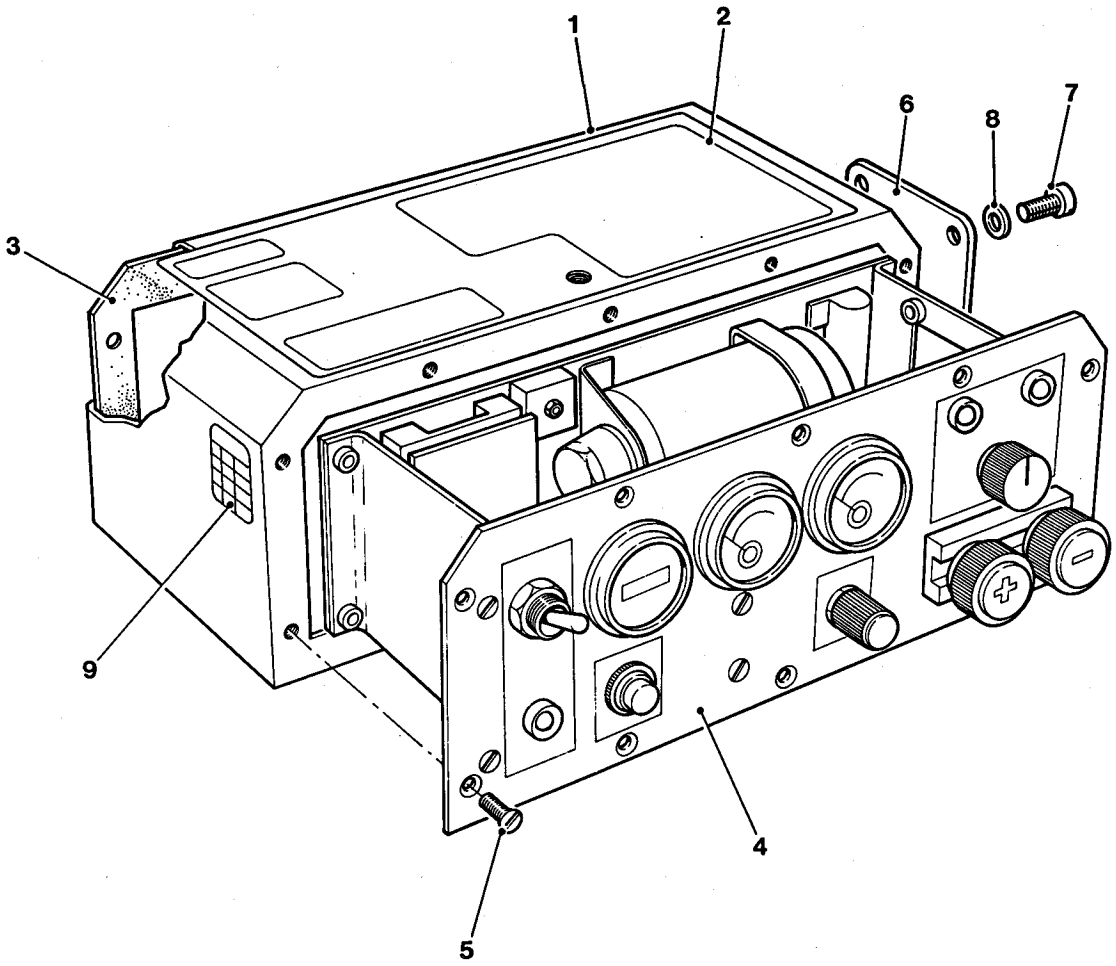

Fig.1 Control Box Assembly

FIG. ITEM	ARMY MAN CODE	NATO STOCK NUMBER	ITEM NAME AND DESCRIPTION	PART NO. DRAWING NO.	NO. OFF.	ANNOTATIONS
			CONTROL BOX ASSEMBLY	P391100	REF	
1-1		NP	. CASE, CONTROL BOX	P391004	1	
2	X2	9905-99-311-3444	. LABEL, SELF ADHESIVE, CIRCUIT DIAGRAM	ECH/BC/ 950029	1	
3		NP	. GASKET, rubber strip 9 mm x 4 mm self adhesive Tessmol, black	TMS/4772/ 009	1	THAMES RUBBER
4		NP	. CHASSIS ASSEMBLY, CONTROL BOX	P391100/1	1	See Chap 2-2-3
5		NP	. SCREW, MACHINE, csk hd M3 x 10 mm lg		10	
6		NP	. PLATE, cover	P391045	1	
7		NP	. SCREW, MACHINE, cap hd M3 x 10 mm lg	BS4168	4	
8		NP	. WASHER, PLAIN M3	BS4320 ZP	4	
9	Y1	9905-99-942-9495	. PLATE, MOD RECORD	ECH/BC/ 930019	1	
NI10		NP	. SEALANT		AR	HYLOMAR BLUE

Chapter 2-2-3-1

PARTS LIST

CHASSIS ASSEMBLY

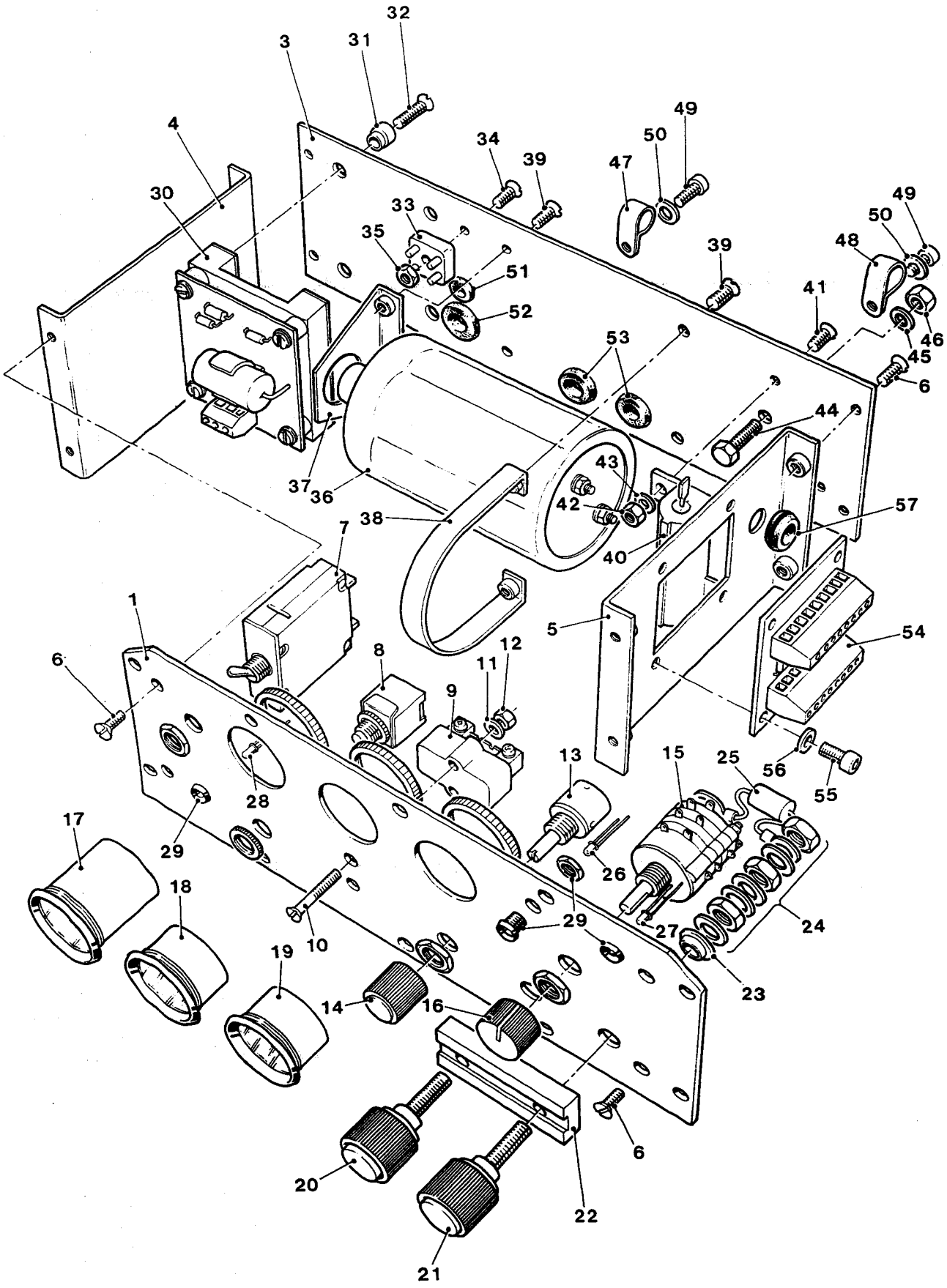

Fig.1 Chassis Assembly - Control Box

FIG. ITEM	ARMY MAN CODE	NATO STOCK NUMBER	ITEM NAME AND DESCRIPTION	PART NO DRAWING NO.	NO. OFF	ANNOTATION
			CHASSIS ASSEMBLY - CONTROL BOX	P391100/1	REF	
1-1		NP	. PANEL, CONTROL	P391083	1	
NI 2	X2	6115-99-859-1490	. PLATE INSTRUCTION, silk screen (front panel)	P391083/1	1	
3		NP	. PANEL, REAR	P391080	1	
4		NP	. BRACKET, CHASSIS, terminal end	P391081	1	
5		NP	. BRACKET, CHASSIS, 2	P391082	1	
6	G1	5305-99-122-5277	. SCREW, MACHINE csk hd M4 x 10 mm lg Zn pl	BS4183 (1967) ZP	8	
7	X2	5925-99-811-5220	. CIRCUIT BREAKER, MAGNETIC	APGN6-1 REC 4-51-503	1	HIGHLAND
8	X2	5930-99-396-0496	. SWITCH, ENGINE STOP BUTTON	1213C RED	1	HIGHLAND
9	Z22	6625-99-758-9339	. SHUNT 75mV 50A	A2181	1	BPL HEALEY
10	G1	5305-99-122-5280	. SCREW, csk hd M4 x 20 mm lg Zn pl	BS4183 (1967) ZP	2	
11	G1	5310-99-122-3031	. WASHER, FLAT M4 Zn pl	BS4320 ZP	4	
12	G1	5310-99-135-0755	. NUT, PLAIN HEX M4 Zn pl	BS3692 ZP	1	
13	X2	5905-99-610-4093	. SWITCH, POTENTIOMETER, voltage control	534-50K	1	FARNELL
14	X2	5355-99-147-2219	. KNOB, rotary switch c/w grub screw	P391117	1	KEPAS
15	X2	5930-99-127-3845	. SWITCH, rotary 3 position	ECH/BC/ 950036	1	
16	X2	5355-99-500-3126	. KNOB, rotary switch c/w grub screw	P391118	1	KEPAS
17	X2	6625-99-831-2826	. HOURS RUN COUNTER	CL 4608	1	PBL HEALEY
18	X2	6625-99-061-4034	. AMMETER 0-50A scale	CL 4607	1	PBL HEALEY
19	X2	6625-99-994-9430	. VOLTMETER 0-40V scale	CL 4606	1	PBL HEALEY

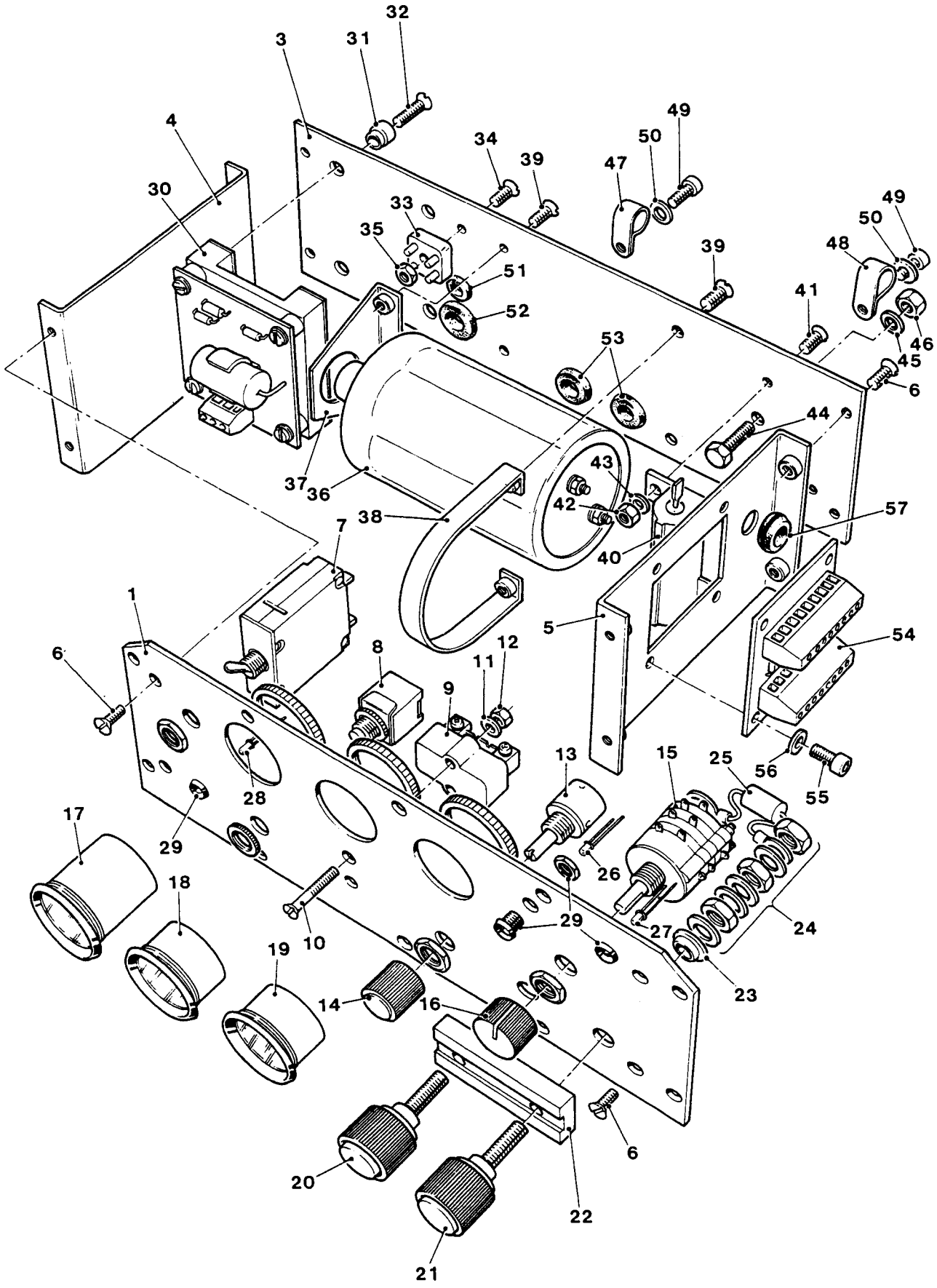

Fig.1 Chassis Assembly - Control Box

FIG. ITEM	ARMY MAN CODE	NATO STOCK NUMBER	ITEM NAME AND DESCRIPTION	PART NO DRAWING NO.	NO. OFF	ANNOTATION
			CHASSIS ASSEMBLY - CONTROL BOX (continued)	P391100/1	REF	
20	Z37	5940-99-214-1373	. TERMINAL POST, positive	L309/1 RED	1	BELLING LEE
21	6MT4	5940-99-541-9920	. TERMINAL POST, negative	L309/1 BLACK	1	BELLING LEE
22	X2	6115-99-798-1768	. TERMINAL INSULATION	P391044	1	
23	X2	6115-99-420-4959	. INSULATOR PANEL	P391049	2	
24		NP	. PANEL FITTING		REF	SUPPLIED WITH ITEM 20 AND 21
25	X2	5961-99-125-8536	. DIODE, transorb	IN6053A	1	HUNTER ELECTRONICS
26	Z42	5961-99-661-2285	. LIGHT EMITTING DIODE, yellow	CMD5353	1	FARNELL
27	X2	5980-99-758-8959	. LIGHT EMITTING DIODE, green	CMD64520	1	FARNELL
28	X2	5980-99-257-1587	. LIGHT EMITTING DIODE, red	CMD5753	1	FARNELL
29	X2	6115-99-349-5353	. MOUNT, LIGHT EMITTING DIODE	232312	3	ARCO-LECTRIC
30	X2	6110-99-979-0495	. VOLTAGE REGULATOR	P391056/1	1	Chap 2-2-3-1 Fig 2
31	X2	6115-99-836-0050	. INSULATOR, REGULATOR	P391058	4	
32	G1	5305-99-135-1347	. SCREW, skt hd, csk M3 x 10 mm lg Zn pl	BS4168 ZP	6	
33	X2	5961-99-957-9049	. BRIDGE, RECTIFIER	BR108	1	
34	G1	5305-99-122-5272	. SCREW, MACHINE csk hd M3 x 10 mm lg Zn pl	BS4183 (1967) ZP	3	
35	G1	5310-99-122-6455	. NUT, PLAIN HEX M3 Zn pl	BS3692 ZP	2	
36	Z31	5910-99-862-3086	. CAPACITOR 3300µf 40V (C3)	ALS 21A 333 MF040	1	AEROVOX
37		NP	. BRACKET, CAPACITOR MOUNTING	P391038	1	

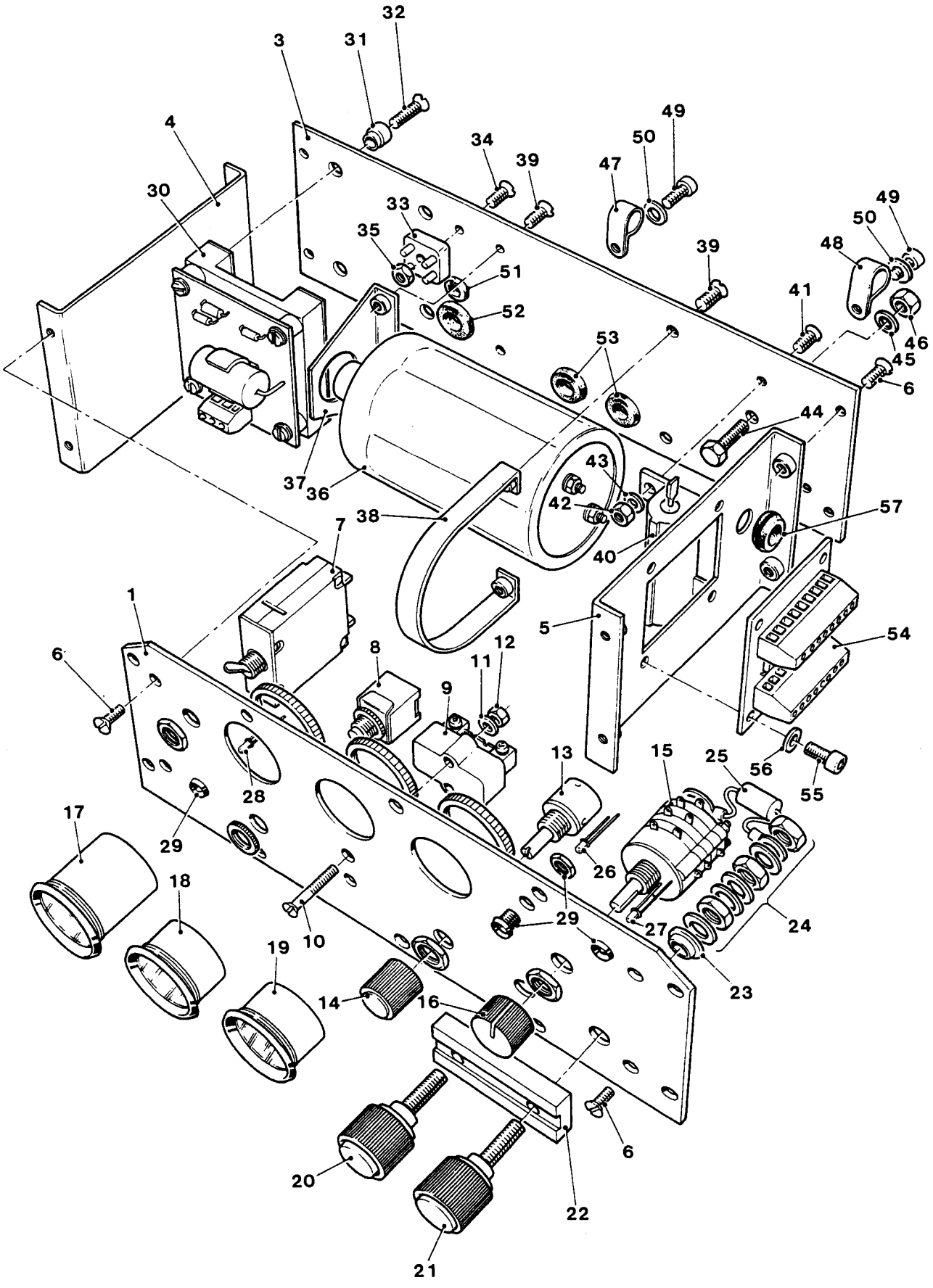

Fig.1 Chassis Assembly - Control Box

FIG. ITEM	ARMY MAN CODE	NATO STOCK NUMBER	ITEM NAME AND DESCRIPTION	PART NO. DRAWING NO.	NO. OFF.	ANNOTATIONS
			CHASSIS ASSEMBLY - CONTROL BOX (continued)	P391100/1	REF	
38		NP	. STEADY, capacitor	P391039	1	
39	G1	5305-99-122-5277	. SCREW, MACHINE csk hd M4 x 10 mm lg Zn pl	BS4183(1967) ZP	8	
40	X2	5905-99-796-9943	. RESISTOR, FIXED WIRE WOUND,ballast (R9)	WH50-50R	1	FARNELL
41	G1	5305-99-122-5272	. SCREW, MACHINE csk hd M3 x 10 mm lg Zn pl	BS4183(1967) ZP	3	
42	G1	5310-99-122-6455	. NUT, PLAIN HEX M3 Zn pl	BS3692 ZP	2	
43	G1	5310-99-122-3030	. WASHER, FLAT M3 Zn pl	BS4320 ZP	6	
44	G1	5305-99-137-9237	. SCREW, MACHINE hex hd M4 x 16 mm lg steel Zn pl	BS3692 ZP	1	
45	G1	5310-99-122-3031	. WASHER, FLAT M4 Zn pl	BS4320 ZP	4	
46	G1	5310-99-135-0755	. NUT, PLAIN HEX M4 Zn pl	BS3692 ZP	1	
47		NP	. CLIP LOOM	DSN095	1	
48		NP	. CLIP WIRE	DSN098	1	
49	G1	5305-99-135-1347	. SCREW, skt hd, csk M3 x 10 mm lg Zn pl	BS4168 ZP	6	
50	G1	5310-99-122-3030	. WASHER, FLAT M3 Zn pl	BS4320 ZP	6	
51	H9	5325-99-942-3407	. GROMMET RUBBER (6.5 mm dia hole)	DEF STAN 53-13	1	
52	H9	5325-99-942-3431	. GROMMET RUBBER (12.7 mm dia hole)	DEF STAN 53-13	1	
53	H9	5325-99-942-3423	. GROMMET RUBBER (9.5 mm dia hole)	DEF STAN 53-13	2	
54	X2	5998-99-192-8069	. TERMINAL PRINTED CIRCUIT BOARD	P391054	1	Chap 2-2-3-1 Fig 3
55	G1	5305-99-135-1347	. SCREW, skt hd, csk M3 x 10 mm lg Zn pl	BS4168 ZP	6	
56	G1	5310-99-122-3030	. WASHER, FLAT M3 Zn pl	BS4320 ZP	6	

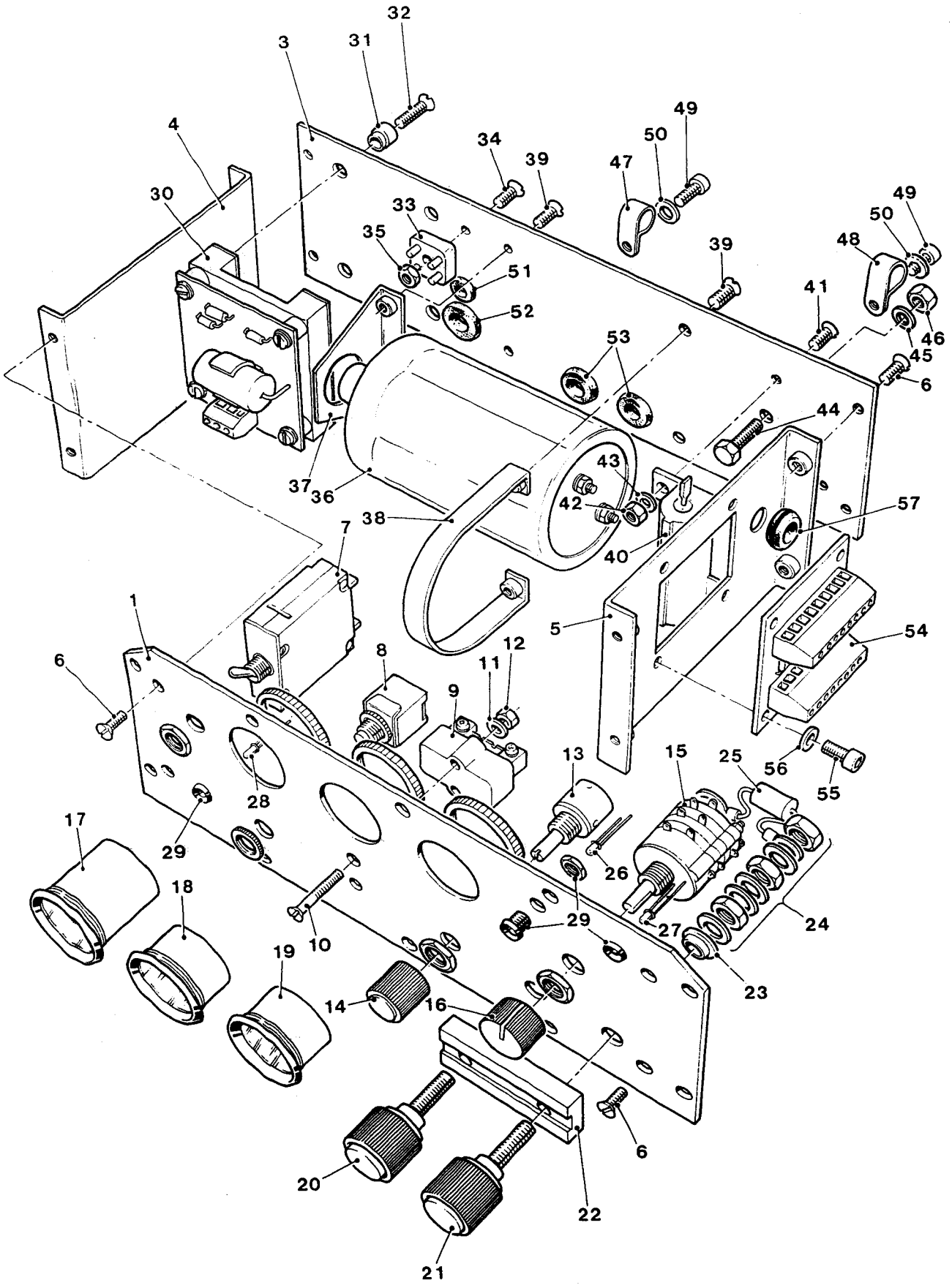

Fig.1 Chassis Assembly - Control Box

FIG. ITEM	ARMY MAN CODE	NATO STOCK NUMBER	ITEM NAME AND DESCRIPTION	PART NO. DRAWING NO.	NO. OFF.	ANNOTATIONS
			CHASSIS ASSEMBLY - CONTROL BOX (continued)	P391100/1	REF	
57		NP	. GROMMET RUBBER (15.5 mm dia hole)		2	

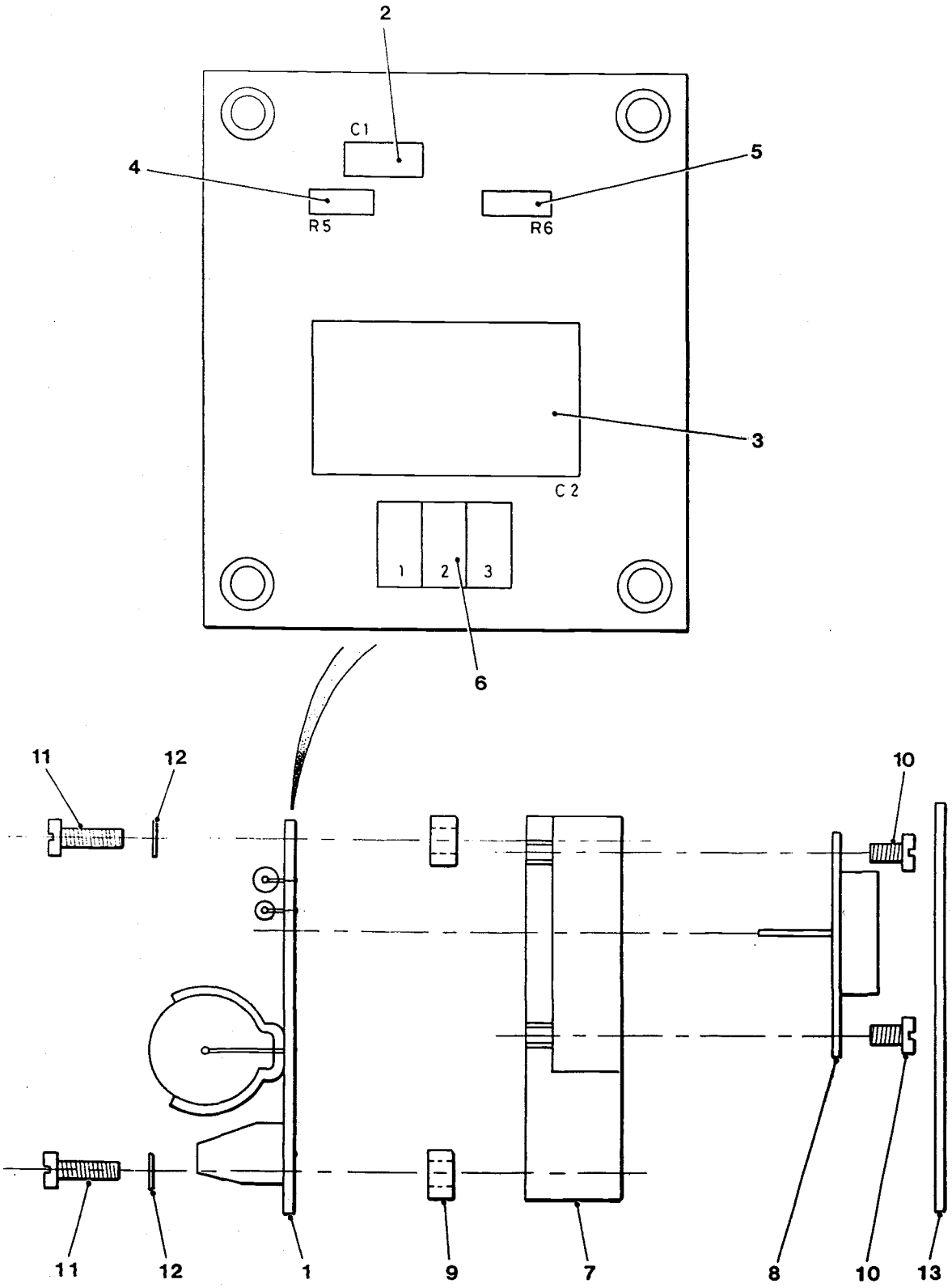

Fig.2 Voltage Regulator Assembly

FIG. ITEM	ARMY MAN CODE	NATO STOCK NUMBER	ITEM NAME AND DESCRIPTION	PART NO. DRAWING NO.	NO. OFF.	ANNOTATIONS
			VOLTAGE REGULATOR ASSEMBLY	P391056	REF	KEPAS
2-1	X2	6110-99-998-8992	. VOLTAGE REGULATOR PCB	P391056/1	1	
2	Z31	5910-99-015-8905	. CAPACITOR Tantilum 1mf (C1)	198976M	1	ESD HARLOW
3	X2	5910-99-030-9057	. CAPACITOR, FIXED ELECTROLYTIC 1000mf 63V	021 181 02	1	PHILLIPS
4	Z30	5905-99-798-4509	. RESISTOR FIXED FILM 1200Ω (R5)	MRS 25 CECC SPEC 40101-019	1	PHILLIPS
5	Z30	5905-99-595-6188	. RESISTOR 120Ω (R6)	MRS 25 CECC SPEC 40101-019	1	PHILLIPS
6	X2	6115-99-513-6962	. TERMINAL, BLOCK	MKDSFW 1.5/3	1	PHEONIX
7		NP	. BASE, VOLTAGE REGULATOR	P391057	1	
8	Z42	5962-99-354-7305	. VOLTAGE REGULATOR	LT1038CK	1	LINEAR
9		NP	. SPACER, VOLTAGE REGULATOR	P391059	4	
10	G1	5305-99-122-5228	. SCREW, MACHINE skt hd M4 x 6 mm lg	BS4183	4	
11	G1	5305-99-122-5229	. SCREW, cap hd M4 x 10 mm lg	BS4183	4	
12	G1	5310-99-122-3031	. WASHER, FLAT M4 Zn pl	BS4320 ZP	4	
13	X2	6115-99-883-8611	. GASKET, INSULATING	P391124	1	

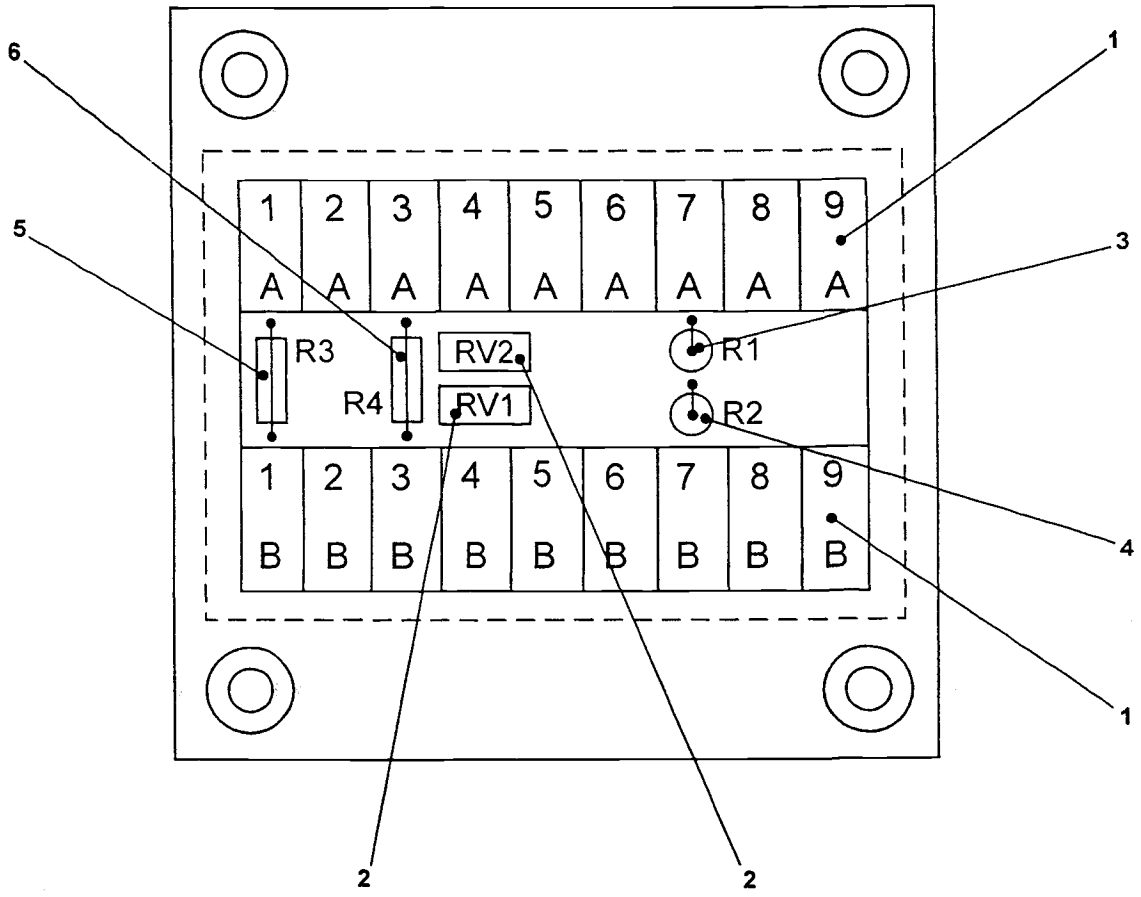

Fig.3 Terminal Board PCB Assembly

FIG. ITEM	ARMY MAN CODE	NATO STOCK NUMBER	ITEM NAME AND DESCRIPTION	PART NO. DRAWING NO.	NO. OFF.	ANNOTATIONS
	X2	5998-99-192-8069	TERMINAL BOARD PCB ASSEMBLY	P391054	REF	
3-1	X2	6115-99-096-3355	. BLOCK, TERMINAL PCB	MKDSL 5/3 5.08	2	PHEONIX
2	Z30	5905-99-767-6059	. POTENTIOMETER 50K (RV1, RV2)	3296W 50K	2	FARNELL
3	X2	6115-99-037-0279	. RESISTOR 62K Ω.6W (R1)	MRS 25 CECC SPEC 40101-019	1	PHILLIPS
4	Z30	5905-99-450-4277	. RESISTOR, FIXED FILM 510 Ω.6W (R2)	MRS 25 CECC SPEC 40101-019	1	PHILLIPS
5	Z30	5905-99-179-9185	. RESISTOR, FIXED FILM 470 Ω.6W (R3)	MRS 25 CECC SPEC 40101-019	1	PHILLIPS
6	Z30	5905-99-360-3986	. RESISTOR, FIXED FILM 220 Ω PRO1-1W (R4)	MRS 25 CECC SPEC 40101-004	1	PHILLIPS

Chapter 2-3

PARTS LIST

COVER ASSEMBLY

RECORD OF MODIFICATIONS
INCORPORATED IN THIS CHAPTER

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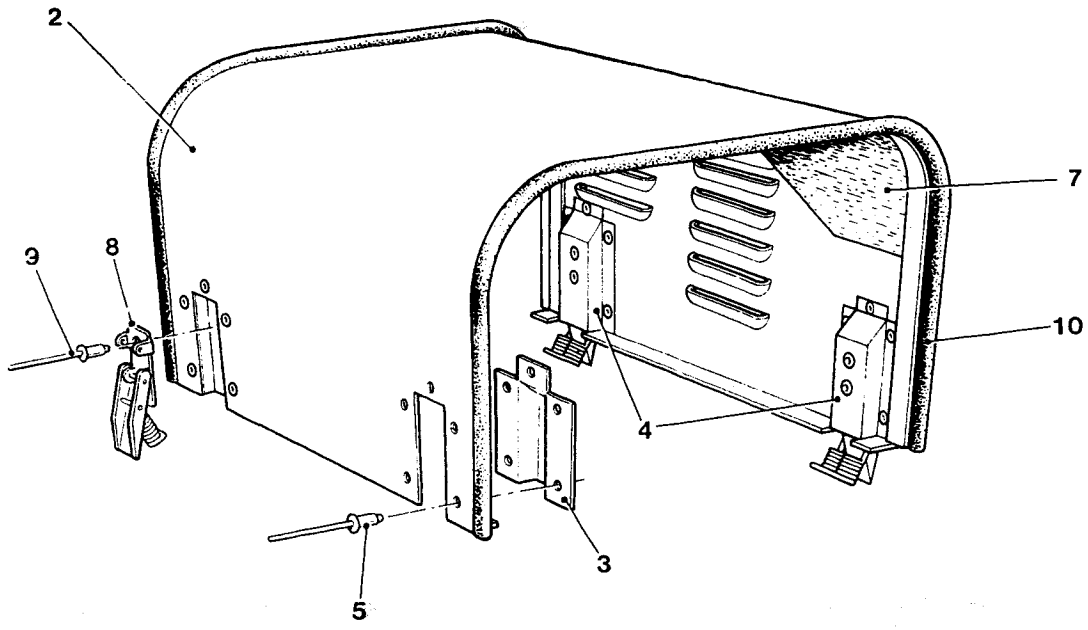

Fig.1 COVER ASSEMBLY

FIG. ITEM	ARMY MAN CODE	NATO STOCK NUMBER	ITEM NAME AND DESCRIPTION	PART NO. DRAWING NO.	NO. OFF.	ANNOTATIONS
			COVER ASSEMBLY	P391098	REF	
1-NI1		NP	. COVER SUB ASSEMBLY	P391098/1		
2		NP	. . COVER	P391011	1	
3		NP	. . CATCH POCKET 90	P391011/1	2	
4		NP	. . CATCH POCKET 80	P391011/2	2	
5		NP	. . RIVET, TUBULAR, A1 4 mm x 8 mm lg	ISO9002	16	
NI6		NP	. . NUT, PLAIN, BLIND RIVET M6		6	
7		NP	. ACCOUSTIC LINER	AM9/5A	1	BAJOFELT
8	X2	6115-99-701-5564	. CATCH, spring	271836 MSZN	4	PROTEX
9		NP	. RIVET, TUBULAR, 4 mm x 8 mm lg	ISO9002	8	
10		NP	. EDGESTRIP	BRS49	AR	KOPAK-WALKER

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5330-99-020-7083	2-2.7-22
2805-99-027-2853	2-2-1.3-15
5910-99-030-9057	2-2-3-1.11-3
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54208517	2-2-2.5-24
54208534	2-2-2.3-15
54208687	2-2-2.5-29
54208776	2-2-2.5-35
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641	2-2-2.3-20
648	2-1.9-16
651422	2-2.13/14-22

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COMMENT ON AESP

TO: ARMY SCALING & CATALOGUING AUTHORITY
HA HA ROAD
WOOLWICH
LONDON SE18 4QF

FROM: (Senders name & address)

Sender's Reference .....

Tel No .....

Date .....

Title of AESP

COMMENT

Signed: .....

TO: .....
.....
.....

FROM: ASCA
HA HA ROAD
WOOLWICH
LONDON SE18 4QF

Thank you for commenting on AESP.

*Action is being taken to:

*(i) Revise the AESP

*(ii) Amend the AESP

* No action is considered necessary for the following reasons:

*Delete as necessary

Signed: .....

Date: .....

AESP Form 10

CONDITIONS OF RELEASE

1 [redacted]

[redacted]

[redacted]

4 This information may be subject to privately owned rights.

GENERATOR SET, GASOLINE ENGINE DRIVEN,

BATTERY CHARGING, 14/28V, 300/500W, (HOPKINS)

MODIFICATION INSTRUCTION AND INDEX

[redacted]

BY COMMAND OF THE DEFENCE COUNCIL

Ministry of Defence
Issued by
LAND SYSTEMS TECHNICAL PUBLICATIONS AUTHORITY
Repository Road, Woolwich, London SE18 4QA

AMENDMENT RECORD

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PREFACE

Sponsor:
DGES(A)

Publication Agency:
ATSA Chertsey
Project No: 72012 (314)
File ref: KBCH

INTRODUCTION

1 The Publication Agency is the authority for allocation of instruction numbers.

2 All modification instructions as issued are to be recorded in manuscript by the recipient on the Numerical Modification Instruction Index provided. Amendments to individual instructions are to be recorded on the instruction Amendment Record. All extant instructions and amendments can be found listed in the main AESP index.

3 Service users should forward any comments on this publication through the channels prescribed in AESP 0100-P-011-013. An AESP Form 10 is provided after the preliminary pages of this publication; it should be photocopied and used for forwarding comments on this AESP.

MODIFICATION INSTRUCTION INDEX

This index is to be kept up to date by the User entering modification instructions as and when they are published.

Priority (Pty) is shown as: Immediate: I Routine: R

Mod No. (1)	Pty (2)	Subject (3)	Approval No./ Remarks (4)
1	I	Carburettor modification	
2	I	Fitting of new clamp to old style (Mk 1) exhaust extension.	
3	I	Fuel pipe to generator set quick release connector	
4			
5			
6			
7			
8			
9			

6115-G-153-811
XXXX-X-XXX-XXX

ARMY EQUIPMENT
SUPPORT PUBLICATION

COMMENT(S) ON AESP

To: ATSA DTS 3.2
Ha-Ha Road
Woolwich
LONDON SE18 4QF

From: .....
.....
.....
.....

Senders Reference	BIN Number	Date
AESP Title:		
Chapter(s)/Instruction	**Page(s)/Paragraph(s)**	
If you require more space please use the reverse of this form or a separate piece of paper. **Comment(s):**		

Signed: ..... Telephone No.: .....

Name (Capitals): ..... Rank/Grade: ..... Date: .....

✂ .....

ATSA DTS 3.2 USE ONLY

To: .....
.....
.....
.....

From: ATSA DTS 3.2
Ha-Ha Road
Woolwich
LONDON SE18 4QF

Thank you for commenting on AESP

Your reference ..... Dated .....

Action is being taken to:	Tick		Tick
Issue a revised/amended AESP		Under investigation	
Incorporate comment(s) in future amendments		No action required	
Remarks			

Signed: ..... Telephone No.: .....

Name (Capitals): ..... Rank/Grade: ..... Date: .....

AESP Form 10 (Issue 3 dated Oct 97)

GENERATOR SET, GASOLINE ENGINE DRIVEN,

BATTERY CHARGING, 14/28 V, 300/500 W (HOPKINS)

MODIFICATION INSTRUCTION No. 1

Sponsor:
DGES(A)

Publication Agency:
ATSA Chertsey
Project No: 72012(315)
File ref: KBCH

AMENDMENT RECORD

Amdt No.	Incorporated By (Signature)	Date
1		
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Amdt No.	Incorporated By (Signature)	Date
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SUBJECT: Carburettor modification

INTRODUCTION

1 The generator specification required the equipment to operate with the jerry can 1 m below the carburettor. When operated at the same height, the fuel pump pressure floods the carburettor causing a fire hazard. The aim of this modification is to fit a spring to the needle valve in order to prevent this hazard.

1.1 Limitations on use of equipment. Nil

APPLICABILITY

2 Generator Set, 300/500 W, General Purpose, Battery Charger, (Hopkins), X2/6115-99-983-9538 and Generator Set, 300/500 W, ADAD only, battery charger, (Hopkins), X2/6115-99-396-0315.

2.1 Fitted to subject equipment held by user units.

2.2 Unmodified stock, held at all levels of technical storage.

REASON FOR MODIFICATION

3 Code 1 - to improve safety

PRIORITY

4 ARMY: Immediate

ESTIMATED TIME REQUIRED

5

5.1 Embodiment: 0.8 man-hours

5.2 Testing: 0.3 man-hours

MODIFICATION IMPLEMENTATION PLAN

6

6.1 This modification is to be implemented by Units authorized to carry out levels 2, 3 or 4 maintenance and with the authority of ES42b(3).

6.2 Associated modification instructions. Nil

6.3 Modification plate strike action: After carrying out this modification, locate plate on side of control panel and strike out mod '1'.

Action required by

7

7.1 Units and establishments holding equipment.

7.1.1 Examine documents to see if modification is applicable.

7.1.2 Examine equipment or modification record plate to see if modification is embodied and where necessary Units with 1st Line REME Support demand the stores required.

7.1.3 ARMY - On receipt of stores, request REME to modify equipment.

7.1.4 ARMY - Record the modification subject and AESP number in equipment documents.

7.2 Army units authorized to carry out levels 2, 3 or 4 maintenance.

7.2.1 ARMY - When requested by users or during overhaul of equipments on charge without REME 1st Line Support, obtain the items listed in Para 8 and carry out this modification.

7.2.2 Erase mod '1' from modification record plate.

7.2.3 Record completion details of modification against appropriate entry in vehicle documents.

7.3 All recipients of this instruction. Add particulars to AESP 6115-G-153-811 Mod Instr Index.

Stores, tools and equipment

8

8.1 Stores to be demanded.

8.1.1 The following item is to be demanded quoting this instruction as authority for demand, and

8.1.2 Serial number of equipment held by user units.

8.1.3 Serial number of equipment for unmodified stock held at all levels of technical storage.

Item No.	DMC	NSN/Part No.	Designation	Qty per eqpt
1	X3	5360-99-234-4237	Spring helical, compression, carburettor, ECH/BC/950001	1
	8.2 Item to be modified.			
2	X3	2910-99-256-5269	Carburettor assembly	1

Sequence of operations

NOTE

The item numbers of Para 8 are used as references throughout this instruction.

9 Carry out the modification as follows:

9.1 Ensure that the generator is not running and that the engine is cold. Disconnect the jerry can adaptor hose at the generator connection.

9.2 Remove the acoustic cover.

9.3 Remove and retain the air filter cover, filter element and support plate.

9.4 Loosen the choke control trunnion grubscrew, withdraw the rod and remove the trunnion.

9.5 Disconnect and remove the breather hose between the cylinder head and air filter body.

9.6 Disconnect the fuel supply pipe at the carburettor.

9.7 Remove the air filter body by loosening and withdrawing the two bolts and associated washers located inside. On withdrawal, take care not to damage or loosen any of the four gaskets.

9.8 Withdraw the carburettor from the engine by unhooking the governor linkage arm and retaining spring.

9.9 Remove the carburettor float chamber and drain the fuel into a suitable container. Place the carburettor on a clean, well-lit workbench.

9.10 Remove the float arm pin, float needle valve and wire retainer clip. Note that the float arm pin has been flattened at one end to aid withdrawal from that end.

9.11 Invert the needle valve and place the modification spring (item 1) on the top. Refit the wire retainer clip passing through the first coil of the spring,in accordance with Fig 1. The other end of the spring should be inside the wire retainer. Refit the float by passing the tab between the wire retainer and the spring.

9.12 Invert the carburettor and refit the float/needle assembly. Refit the float arm pin, pushed from the flattened end. Refit the float chamber, ensuring that the rubber seal is in place. Refer to Fig 2 for complete assembly details.

9.13 Refit the carburettor in the reverse order to Sub-Para 9.1 to 9.8.

Testing after embodiment

10 Run the engine with the acoustic cover removed and check for fuel leaks.

EFFECT ON WEIGHT

11 Negligible.

PUBLICATION AMENDMENTS

NOTE

Necessary amendments will be issued separately.

12 Nil.

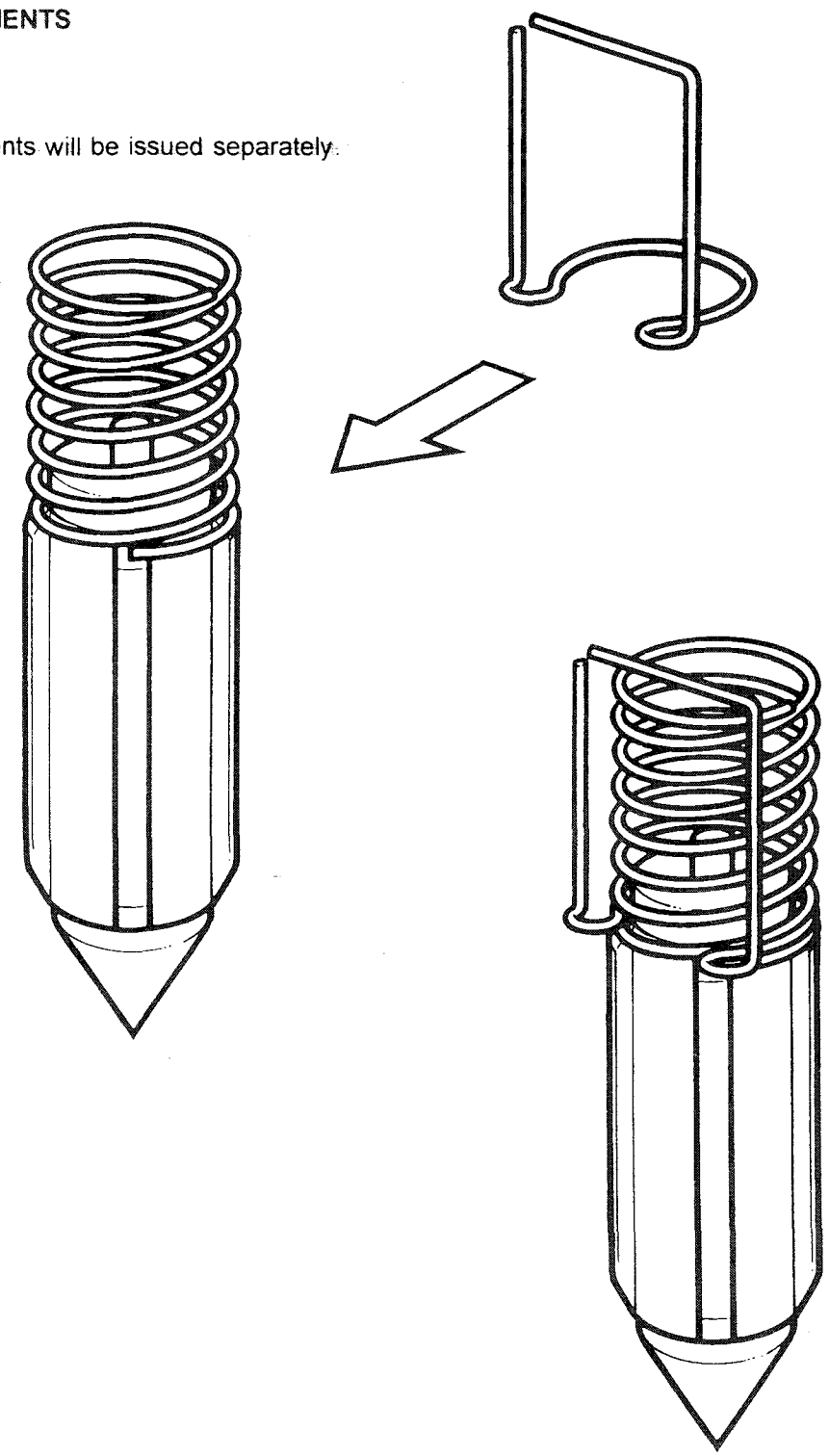

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Fig 1 Wire retainer clip and modification spring mounting on needle valve

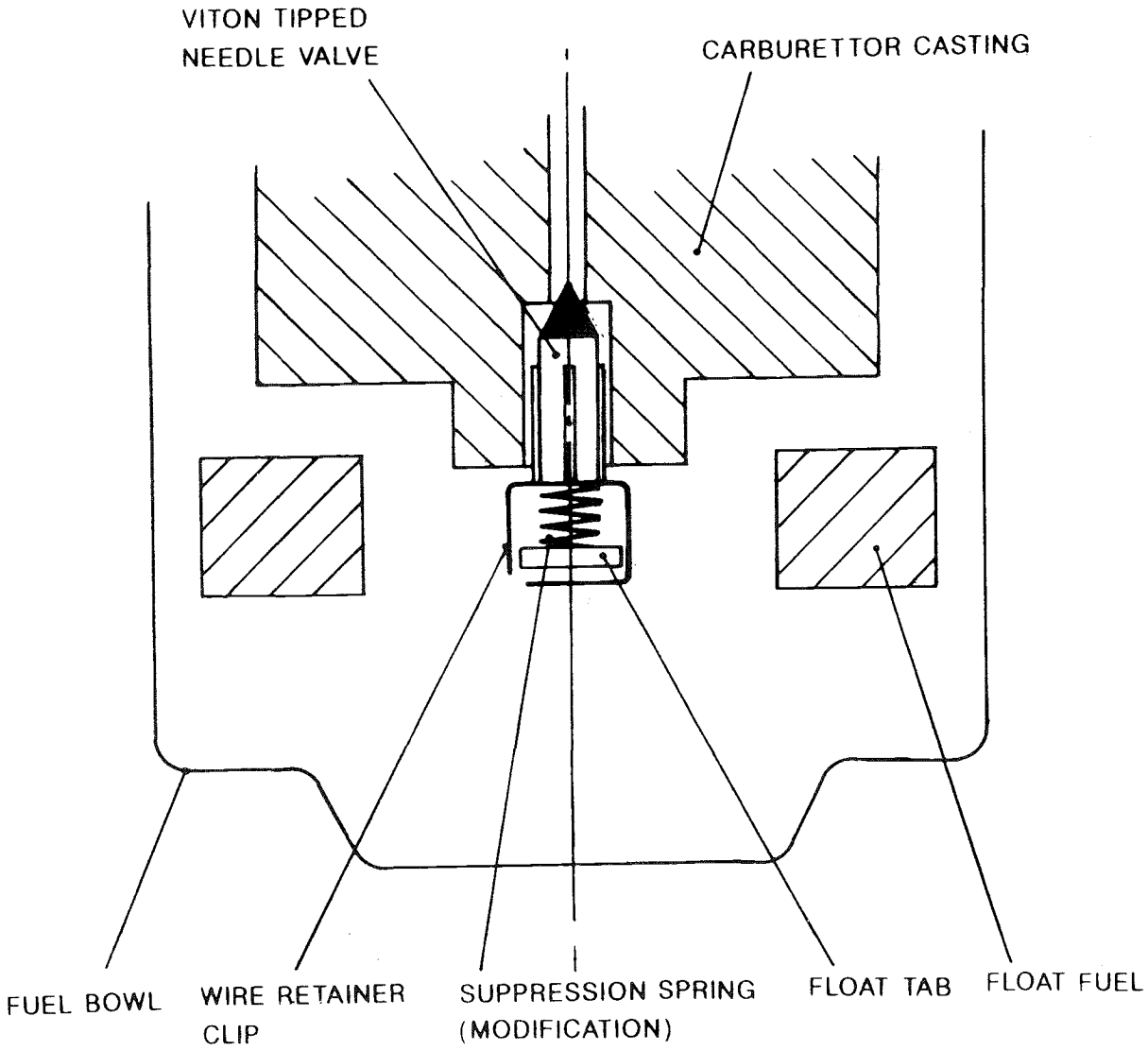

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Fig 2 Carburettor complete assembly

GENERATOR SET, GASOLINE ENGINE DRIVEN,

BATTERY CHARGING, 14/28V, 300/500W (HOPKINS)

MODIFICATION INSTRUCTION No. 2

Sponsor:
DGES(A)

Publication Agency:
ATSA Chertsey
Project No: 72012(314)
File ref: KBCH

AMENDMENT RECORD

Amdt No.	Incorporated By (Signature)	Date
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Amdt No.	Incorporated By (Signature)	Date
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SUBJECT: Fitting of new clamp to old style (Mk 1) exhaust extension.

INTRODUCTION

1 The existing cladding material clamp fitted to the Mk 1 exhaust extension has not proven to be robust enough for in-service handling. The aim of this modification is to fit a more durable and wider clamp to improve the life of the extension. Users should note that future issues of the exhaust extension may be to a Mk 2 standard which will not require the implementation of this instruction.

1.1 Limitations on use of equipment. Nil

APPLICABILITY

2 Exhaust extension assembly, X2/2990-99-517-1764, as fitted to Generator Set, 300/500W, General Purpose, Battery Charger (Hopkins), X2/6115-99-983-9538 and Generator Set, 300/500W, ADAD only, Battery Charger (Hopkins), X2/6115-99-396-0315.

2.1 Fitted to subject equipment held by user units.

2.2 Unmodified stock, held at all levels of technical storage.

REASON FOR MODIFICATION

3 Code 4 - to improve maintainability.

PRIORITY

4 ARMY: Immediate.

ESTIMATED TIME REQUIRED

5 Embodiment: 0.3 man-hours.

MODIFICATION IMPLEMENTATION PLAN

6

6.1 This modification is to be implemented by:

6.1.1 ARMY - Units authorized to carry out levels 2, 3 or 4 maintenance.

6.2 Associated modification instructions. Nil

6.3 Modification plate strike action: After carrying out this modification, strike out Mod '2'.

Action required by:

7

7.1 Units and establishments holding equipment.

7.1.1 Examine documents to see if modification is applicable.

7.1.2 Examine equipment or modification record plate to see if modification is embodied and where necessary Units with 1st Line REME Support demand the stores required.

7.1.3 ARMY - On receipt of stores, request REME to modify equipment.

7.1.4 ARMY - Record the modification subject and AESP number in equipment documents.

7.2 Army units authorized to carry out levels 2, 3 or 4 maintenance.

7.2.1 ARMY - When requested by users or during overhaul of equipments on charge without REME 1st Line Support, obtain the items listed in Para 8 and carry out this modification.

7.2.2 Erase Mod 2 from modification record plate.

7.2.3 Record completion details of modification against appropriate entry in vehicle documents.

7.3 All recipients of this instruction. Add particulars to AESP 6115-G-153-811 Mod Instr Index.

Stores, tools and equipment

8

8.1 Stores to be demanded.

8.1.1 The following item is to be demanded quoting this instruction as authority for demand, and

8.1.2 Serial number of equipment held by user units.

8.1.3 Serial number of equipment for unmodified stock held at all levels of technical storage.

Item No.	DMC	NSN/Part No.	Designation	Qty per eqpt
1	X2	4730-99-588-2202	Clamp, exhaust MIKALOR	1
8.2 Stores to be removed and reduced to scrap.				
2		047,0-706R	Clip, OETIKER	2
8.3 Items to be modified.				
3	X2	2990-99-517-1764	Exhaust extension assembly	1

Sequence of operations

NOTE

The item numbers of Para 8 are used as references throughout this instruction.

9 Carry out the modification as follows:

9.1 Remove the exhaust extension (item 3) from the generator, ensuring that the item is cold before handling.

9.2 Locate the two adjacent Oetiker clips (item 2) close to the exhaust input coupling. Remove both clips, taking care not to damage the cladding material.

9.3 Fit and tighten the new Mikalor clamp (item 1) in place of the existing items.

Testing after embodiment

10 Nil.

EFFECT ON WEIGHT

11 Nil.

PUBLICATION AMENDMENTS

NOTE

Necessary amendments will be issued separately.

12 Nil

GENERATOR SET, ENGINE DRIVEN (GASOLINE), BATTERY CHARGING, 14/28V, 300/500W (HOPKINS)

MODIFICATION INSTRUCTION NO. 3

Sponsor:
DGES(A)

Publication Agency:
ATSA Chertsey
Project No: 72212(99)
File ref: FERG/1/2/2

AMENDMENT RECORD

Amdt No.	Incorporated By (Signature)	Date
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Amdt No.	Incorporated By (Signature)	Date
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SUBJECT: Fuel pipe to generator set quick release connector

INTRODUCTION

NOTE

This modification is serial number sensitive. Refer to the relevant section as detailed in the following table.

Generator Set Serial No.	Section Reference
P391355 to P391405 (incl.)	Part A
0001 to 0658 (incl.)	Part A
0659 to 1349 (incl.)	Part B

1 Two build standards exist for the subject generator sets identified under **Parts A** and **B** of the above table. The generators falling under **Part A** have a screw on type fuel connection between the generator set and the fuel supply pipe of the Jerrycan Adaptor Assembly (JAA), requiring a spanner to complete. The modification at **Part A** details the fitting of a Quick Release Coupling (QRC) system together with a procedure for evacuating fuel trapped in the supply line of the JAA on disconnection.

2 The generators falling under **Part B** were manufactured with the QRC incorporated. However a safely problem has been identified because fuel is trapped in the supply pipe when the QRC is disconnected. To overcome this problem the modification instruction detailed under **Part B** introduces a revised cap protector to allow for a procedure to evacuate the trapped fuel upon disconnection.

2.1 Limitations on use of equipment. Nil.

APPLICABILITY

3 Generator Set, 300/500W, General Purpose Battery Charger (Hopkins), NSN X2/6155-99-983-9538.
Generator Set, 300/500W, Battery Charger (Hopkins), ADAD Version, NSN X2/6115-99-396-0315.

3.1 Held by user units.

3.2 Unmodified stock, held at all levels of technical storage.

REASON FOR MODIFICATION

4 Code 1 - to improve safety.

PRIORITY

5 ARMY: Immediate.

ESTIMATED TIME REQUIRED

6 Embodiment: **Part A** 1.5 man-hours
Part B 0.5 man-hours

MODIFICATION IMPLEMENTATION PLAN

7

7.1 This modification is to be implemented by:

7.1.1 Units authorized to carry out levels 2, 3 or 4 maintenance.

7.2 Modification plate strike action: **Part A** - mod strike 3 on control box mod plate. **Part B** - no action reqd.

Action required by

8

8.1 Units and establishments holding equipment:

8.1.1 Examine equipment documents to see if modification is applicable.

8.1.2 Examine equipment and modification record plate to ensure modification is embodied.

8.1.3 Record the AESP and instruction number in equipment documents.

8.1.4 Obtain the items listed in Para 9 **Part A** or **Part B** as applicable.

8.2 Units authorized to carry out levels 2, 3 or 4 maintenance:

8.2.1 When requested by users carry out this instruction.

8.2.2 Erase mod 3 from control box modification record plate for **Part A** only.

8.2.3 Record completion details of modification against appropriate entry in equipment documents.

8.3 All recipients of this instruction. Add particulars to AESP 6115-G-153-811 Mod Instr Index.

Stores, tools and equipment

9

9.1 Stores to be demanded:

9.1.1 The following modification set is to be demanded quoting this instruction as authority.

9.1.2 Serial number of equipment held by user units.

Item No.	DMC	NSN/Part No.	Designation	Qty per eqpt
Part A only				
	X2	6115-99-852-8835	Mod set: Fuel quick release connection comprising of:	1
1	X2	2910-99-905-5099	Fuel quick release coupling, plug bulkhead fitting x 5/16 in. hose tail c/w lock nut	(1)
2	X2	2910-99-968-2523	Fuel quick release coupling, socket x 1/4 in. hose tail	(1)
3	X2	2910-99-126-5372	Cap protector - plug	(1)
4	X2	2910-99-352-7060	Cap protector - socket (Iss 2)	(1)
5	9GWR	4720-99-736-5247	Fuel hose - coupling to filter 190 mm	(1)
6	6MT1	4730-99-352-3452	Worm drive clip size No. 15	(2)
Part B only				
7	X2	2910-99-352-7060	Cap protector - socket (Iss 2)	1

9.2 Stores to be removed and reduced to scrap:

Part A only				
8		X07J04	Fitting 7/16 in. JIC x 1/4 in. bore hose, reusable	1
9		X07JF05	Fitting, reusable swivel, 7/16 in. JIC x female for 5/16 in. id hose	1
10	X2	4720-99-500-3127	Hose, rubber, silicon, 5/16 in. id oil/petrol resistant	1
11	X2	5340-99-660-7324	Cap protective, dust and moisture seal, c/w cord	1
12	X2	2910-99-730-4019	Nipple, pipe, bulkhead fitting, 7/16 in. JIC male/male brass	1
13	G1	2910-99-420-4923	Lock nut, 7/16 in. JIC Zn pl	1
14	6MT1	4730-99-352-3452	Clamp hose 9/16 in. stainless	2
Part B only				
15	X2	2910-99-352-7060	Cap protector - socket (Iss 1)	1

9.3 Items to be modified:

Part A only				
16		NP	Connector bracket	1

Sequence of operations

10 Carry out this instruction as follows:

NOTE

The item numbers of Para 9 are used as reference throughout this instruction.

WARNINGS

FIRE HAZARD. EXERCISE EXTREME CARE WHEN IN PROXIMITY TO OR HANDLING GASOLINE FUEL, AS IT IS HIGHLY FLAMMABLE.

Part A Serial Nos P391355 to P391405 incl. and 0001 to 0658 incl.

10.1 Ensure that the generator is not running and that the engine is cold. If connected, disconnect the Jerrycan Adaptor Assembly (JAA) at both ends and drain any fuel into a suitable container.

10.2 Release the worm drive clip securing the 7/16 in. x 1/4 in. bore hose fitting (8) attached to the end of the fuel supply line of the JAA. Pull the fitting (8) from the hose and discard. Retain the worm drive clip.

10.3 Place the hose tail of the fuel quick release coupling - socket (2) through the retaining ring of the cap protector - socket (4) and fit on to the fuel hose of the JAA. Position the original worm drive clip on to the hose tail of the coupling and secure.

10.4 Remove the acoustic cover from the generator set.

10.5 Locate the fuel hose (1) between the frame mounted fuel connector and the fuel filter. Release the worm drive clip (14) at the fuel filter and disconnect the fuel hose (10). Drain any excess fuel into a suitable container. Release the fitting (9) attached to the rear of the fuel connector with a 14 mm spanner, disconnect, and discard the fuel hose assembly (9, 10 and 14).

10.6 Using two 17 mm spanners release the lock nut (13) at the rear of the frame mounted fuel connector (12) and remove. Pull the connector (12) out of the bracket and, together with the lock nut (13) and cap protective (11), discard.

10.7 Open out the connector bracket hole to 12.5 mm dia. Remove burrs and patch paint as reqd.

10.8 Remove the lock nut from the fuel quick release coupling - plug (1) and pass the hose tail through the frame connector bracket. Fit the lock nut to the coupling (1) and secure to the frame using two 17 mm spanners.

10.9 Place the retaining ring of the cap protector - plug (3) over the hose tail of the coupling (1) and position on the remainder of the threads.

10.10 Place the worm drive clips (6) at both ends of the fuel hose (5) and connect the fuel hose (5) between the frame mounted coupling and the fuel filter. Secure the worm drive clips (6) at each end of the fuel pipe (5).

Part B Serial Nos 0659 to 1349 incl.

10.11 Ensure that the generator is not running and that the engine is cold. If connected disconnect the JAA at both ends.

NOTE

Any fuel trapped in the line will be released when the following operation, Sub-Para 10.12 is carried out.

10.12 Suspend the jerrycan end of the JAA over a suitable container. Release the worm drive clip securing the fuel quick release coupling socket (2) to the generator end of the JAA and remove the coupling together with the cap protector - socket (Iss 1) (15). Retain worm drive clip. Discard cap protector - socket (Iss 1) (15).

10.13 Place the retaining ring of the cap protector - socket (Iss 2) (7) over the hose tail of the fuel quick release coupling - socket (2) and refit to the fuel hose of the JAA. Position worm drive clip and secure.

TESTING AFTER EMBODIMENT

WARNINGS

(1) TOXIC FUMES. EXHAUST GASES ARE TOXIC AND CAN QUICKLY REACH TOXIC PROPORTIONS IF BASIC PRECAUTIONS ARE NOT FOLLOWED. IF THE GENERATOR IS TO BE USED IN A CONFINED SPACE, A STANDARD ISSUE EXHAUST EXTENSION MUST BE FITTED. THE EXHAUST EXTENSION MUST NOT BE ADDITIONALLY MUFFLED OR RESTRICTED IN ANY WAY FROM ITS ORIGINAL DESIGN, AS THE RESULTING BACK PRESSURE COULD CAUSE SPURIOUS LEAKS TO OCCUR OR DAMAGE THE ENGINE. EXTREME CARE MUST BE TAKEN TO ENSURE THAT EXHAUST GASES ARE VENTED SAFELY AWAY FROM ANY PERSONNEL IN THE VICINITY WITH DUE CONSIDERATION BEING GIVEN TO TOPOGRAPHY AND PREVAILING WIND CONDITIONS. HARMFUL CONCENTRATIONS CAN BE ODOURLESS AND NOT VISUALLY PERCEPTIBLE.

(2) EARTHING. BEFORE THE GENERATOR IS STARTED UP, A GOOD EARTH CONNECTION MUST BE ESTABLISHED VIA THE GENERATOR SET EARTH TERMINAL.

11 **Part A** and **B**.

NOTE

If at any time fuel leakage is evident, stop the generator immediately and rectify the fault before proceeding with testing.

11.1 Inspect all fuel connections.

11.2 Prepare the generator for use in accordance with AESP 6115-G-153-201.

NOTE

With the new quick release coupling fitted a positive snap-lock should be experienced upon connection, with the sleeve of the coupling socket sliding forwards.

11.3 Check the fuel connection for security.

11.4 Carry out pre-starting checks in accordance with AESP 6115-G-153-201 Para 8 to 10.3.

11.5 Start the generator in accordance with AESP 6115-G-153-201 Para 12 to 13.5. Check all fuel connections for leaks.

CAUTION

The magnetic circuit breaker must remain in the off position as no load is connected.

11.6 Run the generator for 10 to 15 minutes and monitor for fuel leaks.

11.7 Shut down the generator in accordance with AESP 6115-G-153-201 Sub-Para 14.2 to 14.3. Check for fuel leaks.

11.8 Disconnect the fuel quick release coupling from the generator by pulling back the sleeve of the coupling. On disconnection no more than three or four drops of fuel should spill from the couplings.

11.9 Fit the cap protector to the generator fuel coupling.

11.10 With the JAA still connected to the jerrycan and its fuel tap still in the on position, drain the remaining fuel as follows:

11.10.1 Hold the end of the fuel supply line above the jerrycan and open the valve of the connector by inserting the nipple located on the rear of the cap protector. The sleeve of the connector will positively spring forward to confirm the valve is open.

11.10.2 Hold the fuel supply line above the jerrycan for approximately five seconds to drain the majority of the fuel content.

11.10.3 Disconnect the JAA and slowly withdraw from the jerrycan to allow the remaining fuel to drain.

11.10.4 When drained, fit the cap protector to the coupling that will automatically push back the sleeve, closing the valve.

NOTE

The Jerrycan Adaptor Assembly must not be stowed until the fuel content is fully drained.

EFFECT ON WEIGHT

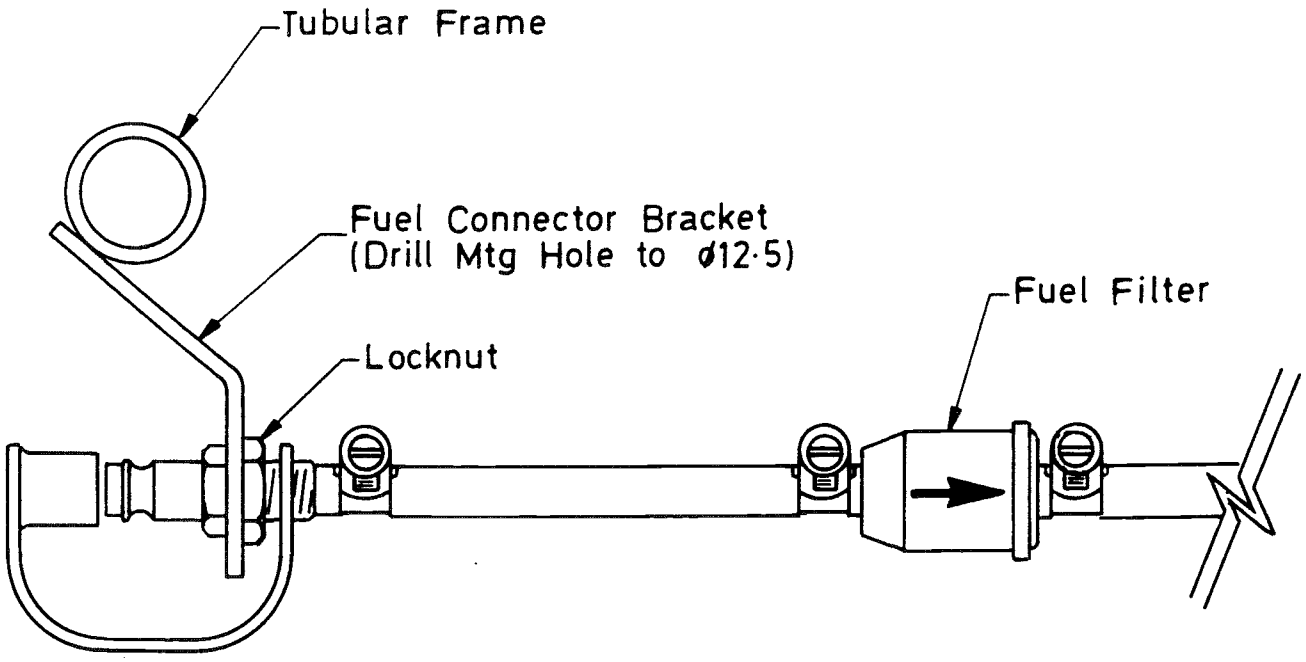
12 Negligible.

PUBLICATION AMENDMENTS

NOTE

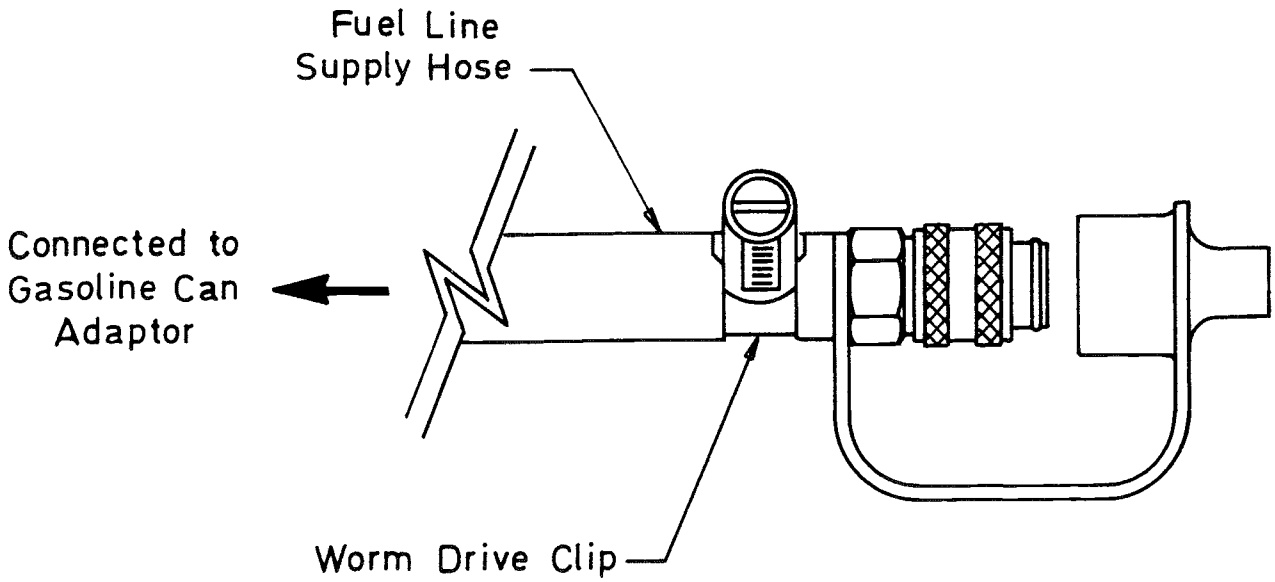
Necessary amendments will be issued separately.

13 Nil.



V13919/1

Fig 1 Generator modified fuel system



V13919/2

Fig 2 Modified gasoline can adapter hose