

TRUCK, FIREFIGHTING, ¾ ton, 4 x 4, Airfield crash rescue, Rover 9

AVC No.1700 - 0762

NSN (4210-99-893-3452)

Servicing Category: A

PURPOSE	The airfield crash rescue truck is designed to fulfil three main functions:- - Immediate rescue from crashed aircraft - Extinguishing aircraft wheel brake fires - Escorting aircraft to dispersal points as a precaution against taxi-ing fire hazards
ENGINE	Rover, 2,286 cc (139.5 cu inch), gasoline, four-cylinder, liquid-cooled, developing 55.22 kW (77 bhp) at 4,250 rev/min, compression ratio 7 : 1
CAPACITIES	
Fuel	90.91 litres (20 gal)
Coolant	9.94 litres (17½ pints)
Oil - Engine and filter	6.23 litres (11 pints)
ELECTRICAL SYSTEM	12V, positive earth
BRAKES	
Foot	Hydraulic, operating on all wheels
Hand	Mechanical, operating on transfer box output shaft
WHEELS AND TYRES	Well-base rim fitted with 7.50 - 16, 6-ply, cross-country tread tyres
CAB	Totally enclosed all metal with sliding backlights in rear bulkhead and an observation hatch in the double-skin tropical roof. Safety straps fitted behind cab seats. Radio telephone in cab. Floodlight and searchlight mounted on top of cab.
BODY	Open-truck type with fixed sides; quick-opening stowage lockers on both sides. Equipped with two dry powder fire extinguishing appliances, two portable fire extinguishers, portable pneumatic saw with power pack, two nitrogen cylinders (expellant for dry powder extinguishers), and rescue tools. An extending ladder 3.30-6.09 m (10 ft 8 inches to 20 ft 0 inches) is also carried.
TOWING EQUIPMENT	Trailer towing attachment and convoy light cable socket at rear.

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T5087/161

TRUCK, FIREFIGHTING, ¾ ton, 4 x 4, Airfield crash rescue, Rover 9

DIMENSIONS

Overall length	4.42 m (14 ft 7 inches)
Overall width	1.70 m (5 ft 7 inches)
Overall height	2.51 m (8 ft 3 inches)
Ground clearance	0.20 m (8 inches)
Wheelbase	2.77 m (9 ft 1 inch)
Turning circle	13.72 m (45 ft 0 inches)

WEIGHT DATA

Laden (including crew of two 90 kg (200 lb) each)

FAW	1067 kg (2352 lb)
RAW	1562 kg (3444 lb)
Total	2629 kg (5796 lb)

TRUCK, FIREFIGHTING, Crash (tactical), $\frac{3}{4}$ ton, 4 x 4, Rover II

AVC No.1702 - 0766

NSN (4210-99-806-8037)

TRAILER, TANKER, DRIVEN AXLE, Water, $\frac{3}{4}$ ton, 2 wheel, 200 gallon, Scottorn

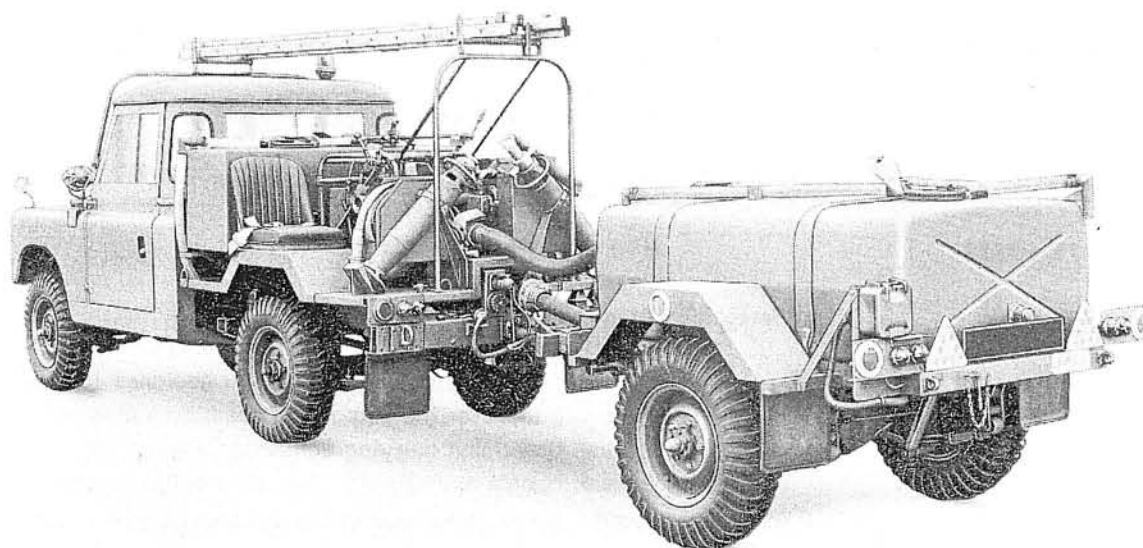
AVC No.2871 - 0828

NSN (4210-99-806-8038)

Servicing Category: A

PURPOSE	A truck/trailer vehicle combination designed to: provide foam for the purpose of combating aircraft crash fires; and carrying equipment needed for crash rescue operations. Can also deliver water under pressure for combating domestic fires.
ENGINE	Rover 2,286 cc (139.5 cu inches), four cylinder, in-line, gasoline, liquid cooled; developing 55.22 kW (77 bhp) at 4,250 rev/min, compression ratio 7 : 1
CAPACITIES	
Fuel	45.64 litres (10 gal)
Coolant	9.94 litres (17½ pints)
Oil - Engine and filter	7.11 litres (12½ pints)
ELECTRICAL SYSTEM	Two separate systems are provided. A 12V/24V negative earth system for pump and vehicle chassis lights and equipment, and an external mains charging system for the trickle charging of the battery and for feeding the various heater circuits.
BRAKES	
Foot	Hydraulic, two leading shoes on the front and leading and trailing shoes on the rear
Hand	Mechanical, operating on transfer box output shaft.
TRAILER	
Foot	Mechanical, on the over-run principle when foot brake is applied
Parking	Lever operated on trailer wheels
WHEELS AND TYRES	Divided rim type 5.50E-16 fitted with 7.50-16, 6 ply, cross-country tread tyres
BODY	Enclosed cab with open-type platform. Cab has accommodation for a driver and crew member with an additional bucket seat for the third crew member on the left hand side of the pumping equipment. A centrally placed tank behind the cab carries 227 litres (50 gal) of water, 145 litres (32 gal) of foam making compound. The pumping equipment is carried on an easily detachable sub-frame and a stowage locker is mounted on the right hand side of the pumping equipment. The trailer carries 909 litres (200 gal) tank of water to augment that carried by the vehicle.

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T5087/422



T5087/423

TRUCK, FIREFIGHTING, ROVER 11, with 200 gallon water, Scottorn, TRAILER

SECTION 9 - SHEET 2A

EQUIPMENT

Firefighting equipment carried includes:-
A 11.34 kg (25 lb) dry powder extinguisher,
Coventry Climax pump and engine. Two 23m of
45 mm bore (75 ft of 1¾ inch) hoses, a 76 mm
(3 inches) suction hose, foam producing compound
and rescue tools. A 3.05 m (10 ft) extending
ladder is carried on top.

TOWING CONNECTIONS

Vehicle

Standard service pattern hook at rear

Trailer

Heavy duty towing eye

DIMENSIONS

Overall length (including trailer)

7.54 m (24 ft 9 inches)

Overall width

1.65 m (5 ft 5 inches)

Overall height

2.15 m (7 ft 1 inch)

Ground clearance

0.25 m (9¾ inches)

Wheelbase

2.77 m (9 ft 1 inch)

Wheelbase (vehicle rear axle to trailer axle) ..

3.07 m (10 ft ¾ inches)

Turning circle (vehicle)

13.72 m (45 ft 0 inches)

Turning circle (with trailer)

14.98 m (49 ft 2 inches)

WEIGHT DATA

Vehicle laden

FAW 1028 kg (2268 lb)

RAW 1524 kg (3360 lb)

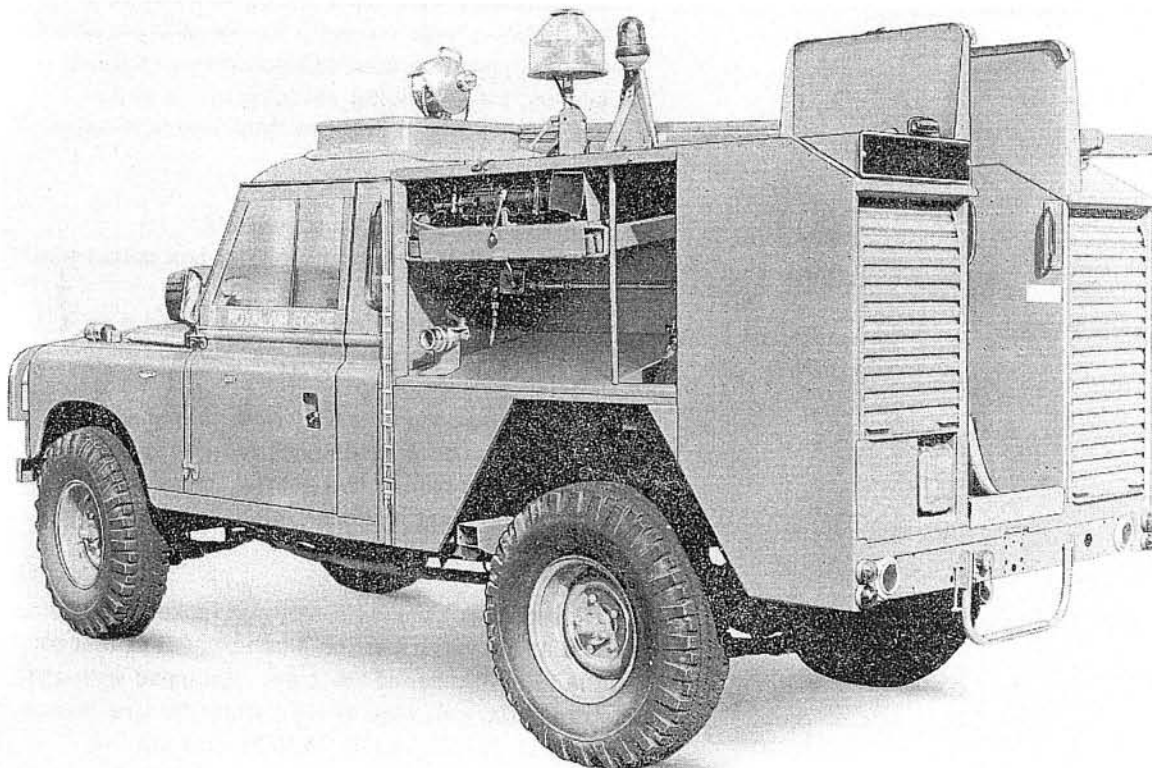
Total 2552 kg (5628 lb)

Trailer laden

1359 kg (2996 lb)



TS087/418



TS087/419

TRUCK, FIREFIGHTING, Airfield crash rescue, 1 ton, 4 x 4, Rover

TRUCK, FIREFIGHTING, Airfield crash rescue, 1 ton, 4 x 4, Rover

AVC No.1810 - 0750

NSN (4210-99-893-2500)

Servicing Category: A

PURPOSE	The airfield crash rescue truck carries a crew of three, two in the cab and one at the rear, and is designed to fulfil three main functions:-
	a. Immediate rescue from crashed aircraft
	b. Capable of acting in an unsupported role on advanced airfield operating with Harrier aircraft
	c. Capable of dealing with aircraft engine fires
ENGINE	Rover 2286 cc (139.5 cu inch) four cylinder, liquid cooled, gasoline, developing 60.5 kW (81 bhp) at 4250 rev/min, compression ratio 8 : 1
CAPACITIES	
Fuel	45.46 litres (10 gal)
Coolant	9.20 litres (17½ pints)
Oil	6.25 litres (11 pints)
ELECTRICAL SYSTEM	Two separate systems are provided. A 12V single-pole, negative earth for the chassis lights and equipment; and an external mains charging system, for the trickle charging of the battery and the heating of the immersion and pipe heaters
BRAKES	
Foot	Hydraulic, operating on all wheels
Hand	Mechanical, operating on transfer box output shaft
WHEELS AND TYRES	Divided/Well base rim 5.50 E-16, fitted with 9.00-16, 6-ply, standard tread tyres.
CAB	Totally enclosed all-metal, with an observation hatch in the double skinned tropical roof. Safety straps fitted behind cab seats. Radio telephone in cab. Floodlight and searchlight mounted on top of cab.
EQUIPMENT	A semi-open truck with stowage lockers each side and at the rear. Carries a centre seat at rear for the third member of the crew. Equipped with 454 litres (100 gal) tank of light water for fire "knock down". A 7.25 kg (16 lb) BCF first aid fire appliance. One 11 kg (25 lb) dry powder extinguisher, two hand BCF extinguishers, and two 36.57 m of 31.75 mm bore (120 ft of 1¼ inch) hoses. Portable pneumatic chisel with two cylinders of compressed air, and other rescue tools. An extending ladder 3.30 m - 6.09 m (10 ft 8 inches - 20 ft) is also carried, on top.
TOWING CONNECTION	Nil

DIMENSIONS

Overall length	4.42 m (14 ft 6 inches)
Width	1.92 m (6 ft 4 inches)
Height	2.59 m (8 ft 6 inches)
Wheelbase	2.77 m (9 ft 1 inch)
Ground clearance	0.25 m (10 inches)
Turning circle	13.72 m (45 ft 0 inches)

WEIGHT DATA**Laden (including crew of three)**

FAW	1143 kg (2520 lb)
RAW	996 kg (2184 lb)
Total	2139 kg (4704 lb)

TRUCK, FIREFIGHTING, 1¼ ton, 4 x 4, 110 inch, Rover

AVC No.1896 - 0750

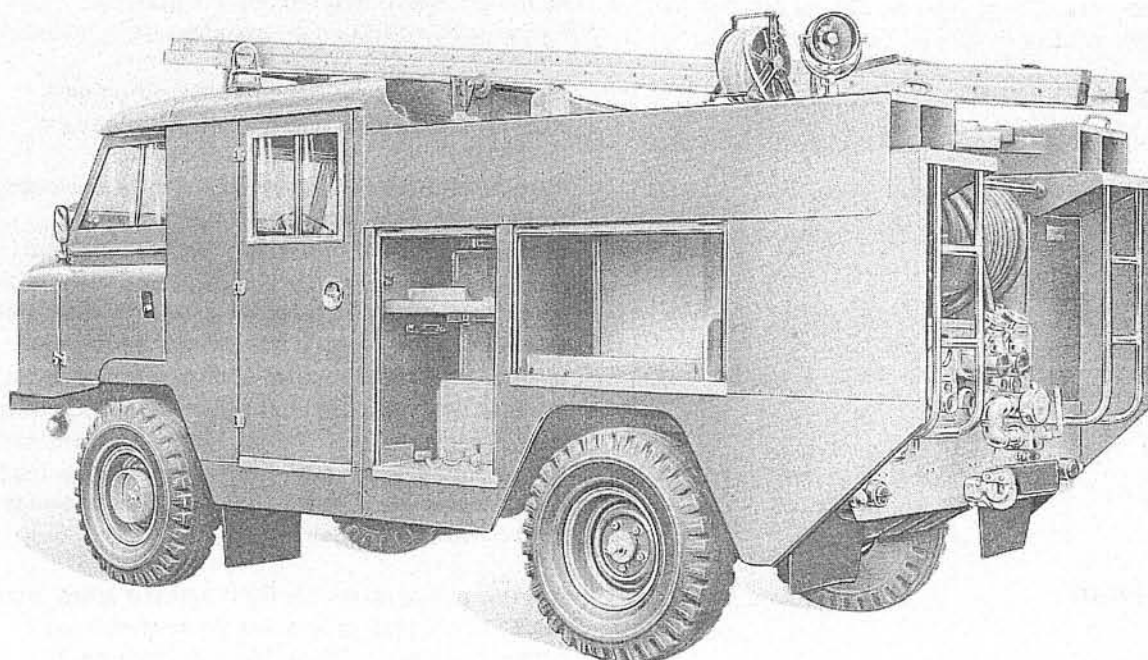
NSN (4210-99-893-3488)

Servicing Category: A

PURPOSE	Primarily for fighting domestic fires on RAF stations. Carries a 523 litre (115 gal) tank of water and a crew of four.
ENGINE	Rover, 2625 cc (160.3 cu inches), six cylinder, in-line, gasoline, liquid cooled; developing 65.62 kW (88 bhp) at 4500 rev/min, compression ratio 7:1
CAPACITIES	
Fuel	72.73 litres (16 gal)
Coolant	13.07 litres (23 pints)
Oil - Engine and filter	6.23 litres (11 pints)
ELECTRICAL SYSTEM	Two separate systems are provided. A 12V, single pole, negative earth for the chassis lights and equipment, and an external mains charging system, for the trickle charging of the battery and the heating of the immersion and pipe heaters.
BRAKES	
Foot	Hydraulic, servo-assisted on all wheels
Hand	Mechanical, operating on transfer box output shaft
WHEELS AND TYRES	One piece well base construction, fitted with 9.00-16. 6-ply, town and country tread pattern
BODY	Aluminium alloy body providing a fully enclosed driver's and crew compartment with seating accommodation for driver and one crew in front and two crew in the rear compartment. Behind the crew compartment is a locker assembly each side of a water tank. Above the lockers open ended tunnels for the stowage of suction hoses and at the rear two vertical metal tubular ladders secured to the rear bulkhead. Roller type metal gantries on top provides stowage for large extending ladder, with a metal frame just below providing stowage for a smaller ladder.
EQUIPMENT	A water pump, driven by PTO and fed either from the 523 litre (115 gal) water tank, or from an external source. Three 18.29 m of 19 mm (60 ft of ¾ inch) bore hoses. Four lengths of pump suction hose. Two extending ladders of 10.66 m (35 ft) and 4.57 m (15 ft) are carried along with various pieces of rescue equipment
TOWING CONNECTIONS	
Front	Towing eyes for recovery purposes only.
Rear	Service pattern towing hook



U.4241/2.



U.4241/3.

TRUCK, FIREFIGHTING, 1¼ ton, 4 x 4, 110 inch, Rover

DIMENSIONS	Overall length (including ladder) ...	6.40 m (21 ft 0 inches)
	Overall width	1.77 m (5 ft 10 inches)
	Overall height (over ladder)	2.76 m (9 ft 1 inch)
	Wheelbase	2.79 m (9 ft 2 inches)
	Turning circle	14.63 m (48 ft 0 inches)

WEIGHT DATA

Laden

FAW	1,588 kg (3,508 lb)
RAW	2,023 kg (4,461 lb)
Total	3,611 kg (7,969 lb)



Chapter 1

LEADING PARTICULARS

AVC code No. (Land Rover Series 2A Chassis)	...	...	...	1810-0750
AVC Code No. (Land Rover Series 3 Chassis)	...	...	...	1810-0778

Weights

Unladen

F.A.W.	...	...	...	...	...	...	...	...	1ton	0cwt	2qr
R.A.W.	...	...	...	...	...	...	...	...		19cwt	2qr
Total	...	...	...	...	...	...	...	...	2ton	0cwt	0qr

Laden (including crew of three ; 200lbs each)

F.A.W.	...	...	...	...	...	...	...	...	1ton	2cwt	2qr
R.A.W.	...	...	...	...	...	...	...	...	1ton	11cwt	2qr
Total	...	...	...	...	...	...	...	...	2ton	9cwt	2qr

Dimensions

Overall length	...	...	...	...	...	...	...	...	14 ft.	6 in.
Overall width	...	...	...	...	...	...	...	...	5 ft.	6 in.
Overall height	...	...	...	...	...	...	...	...	8 ft.	1 in.
Ground clearance	...	...	...	...	...	...	...	...		11 in.

Light Water/Foam Fire extinguishing system

Tank capacity	...	...	...	...	...	...	...	...	100 gal.
Operating pressure	...	...	...	...	...	...	...	...	150lb/in ²
Hoses	...	...	...	...	...	...	...	100 ft. each,	1½ in. bore
Effective distance of jet	...	...	...	...	...	...	...	60 ft. to	70 ft.
Effective spread of spray at 15 ft. from branch pipe	...	...	...	...	...	...	...		10 ft.

Ancillary Equipment

Searchlight	...	...	...	...	...	Francis, Model BS/CFD/9in.
Floodlight	...	...	...	...	...	Plessey, Model 10AMD/RF
Beacon lamp, blue	...	...	...	...	...	Ref.No.16E/23202
Fog light (2 off)	...	...	...	...	...	Ref.No.16E/21640
Radio telephone VHF	...	...	...	...	...	Pye AM 10B
Battery charger	...	...	...	...	...	Peregrine 12 volt 1 amp
Extending ladder	...	...	...	...	...	Light alloy, 10ft. to 16ft.
Demister/heater	...	...	...	...	...	Smiths, Model FHR3426
Cab heater 240 volt a.c.	...	...	...	...	...	Electrothermal Z978/3
Tachometer	...	...	...	...	...	Smiths 12 volt 4 cylinder
Pressure gauge	...	...	...	...	...	Smiths 0-250 lb/in ²
Immersion heater	...	...	...	...	...	Bray 1000W
Engine coolant heater	...	...	...	...	...	Bray 250W
Sump heater	...	...	...	...	...	Peregrine 150W
Pump lagging (2 off)	...	...	...	...	...	Thomas French 100W
Capillary tape	...	...	...	...	...	Thomas French 70W
Portable fire extinguisher, hand held	...	...	...	...	...	Ref.No.53/Y/4210-99-881-4274
Portable fire extinguisher, dry powder 25lb	...	...	...	...	...	Ref.No.4210-129-5134
Portable fire extinguisher BCF	...	...	...	...	...	Ref.No.4210-127-6334

LIST OF BULBS

Equipment	Manufacturer and Part No.	Specification
(1)	(2)	(4)
Floodlight	G.E.C. 10B27A	12V 144W/144W
Searchlight	Francis 3018	12V 100W Quartz Halogen
Beacon lamp, blue	Lucas No.2	12V 36W S.C.C.
Number plate	Lucas L467	12V 6W MCC
Stowage lockers	Lucas 209	12V 6W
Pump running lamp	Lucas 987	12V 2.2W MES
Pump control panel	Lucas 209	12V 6W

Chassis

For details of Land-Rover chassis refer to AP 4337E (U.H.) Tyre Pressures at Operating A.U.W.

Front	...	...	...	...	...	...	...	...	...	24lb/in ²
Rear	...	...	...	...	...	...	...	...	...	30lb/in ²

EQUIPMENT AND STOWAGE

Stowage position (1)	Ref.No. (2)	Equipment (3)	Quantity (4)
Roof, L.H. side	1A/4118	Crowbars, large	1
Hose rack	4210-129-5134	Extinguisher, fire, dry powder	1
compartment, R.H. side	3AP/NIV	Hydraulic rescue outfit, Epco (FF 145)	1
Hose rack	4210-127-6334	Extinguisher, fire, BCF, aircraft starting	1
compartment, L.H. side			
Wings, front	53Y/4210-99-881-4274	Extinguisher, fire, universal, hand held	2
Gantry	4210-99-129-5115	Ladders, extending, 10ft to 16 ft	1
Rear locker, L.H. side top shelf	5A/4190	Torch, electric (G.P.), flameproof	1
	5J/910-1101	Cells, dry	6
	21E/7210-99-942-4896	Blanket, coloured, single dark	1

TYPE T03A

Stowage position (1)	Ref. No. (2)	Equipment (3)	Quantity (4)
Middle shelf, (tray)	1C/6526	Saw, double edged	1
	1C/910-5746	Saw, hack, fixed	1
	1C/120-2547	Blades, saw, hack 10 in.	4
	1B/910-4652	Hammer 21b	1
	1L/7899	Screwdriver 6 in.	1
	1A/910-4276	Cutters, wire	1
	1B/1775	Pliers, insulated	1
	1L/308	Socket tools, Dzus fastener	1
	1L/310	Socket tools, Dzus fastener	1
	1L/311	Socket tools, Dzus fastener	1
	1L/3	Square drive, 3/8 in.	1
	1L/6	Handles, sliding bar	1
Middle shelf, behind tray	1A/4119	Crowbars, small	2
Bottom shelf	21F/4210-99-120-6248	Blanket, asbestos, 72 in. x 72 in.	1
	6545-99-211-0674	Kit, first aid G.P.	1
Rear locker, R.H. side, shelf floor	4210-99-942-5044	Rope, sizal, 2 in. x 50ft.	1
	3AP/4147	CP Rippagun, model 5XB	1
	71A/318	Cylinder, compressed air	2
	3AP/3196	Frame (for cylinders)	1
	3AP/3920	Harness (for cylinders)	1
	1A/4402	Axes, crash	1
	1A/120-0891	Cutters, 24 in.	1
	M.P.B.W. supply	Gloves, rubber, electrician	2 prs.
	22G/360-361	Gloves, leather, hedging	2 prs.



Fig.1. Truck airfield crash rescue - R.H. side

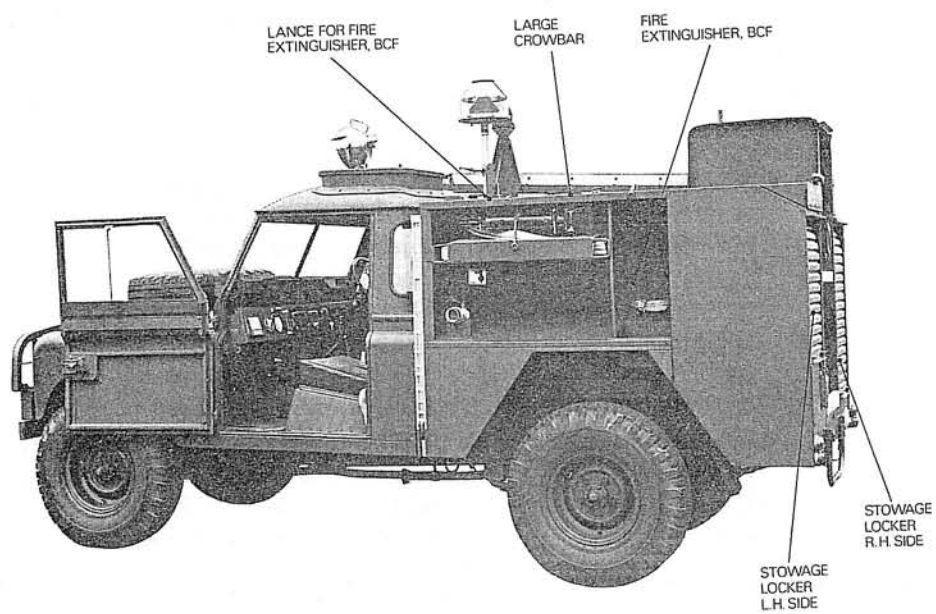


Fig.2. Truck airfield crash rescue - L.H. side

Chapter 2

DESCRIPTION

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Introduction

1. The airfield crash rescue truck fulfills the following main functions:-

- (1) Rescue of aircrew from crashed aircraft.
- (2) Extinguishing of small aircraft fires.

In addition the truck may be used for escorting aircraft as a precautionary measure against engine starting and taxiing fire hazards.

2. The main fire fighting equipment consists of a 100-gallon tank containing a light water or protein foam mixture, a single stage pump to pressurize the mixture and two 100 ft. hoses for distribution. Ancillary fire fighting equipment includes two portable fire extinguishers and two hand-held fire extinguishers. A rear view of the truck showing some of the major items of equipment is shown in fig.1.

3. All the fire fighting equipment, plus other items including a radio telephone, an extending ladder, rescue tools and lighting, are mounted on a Land-Rover Series III chassis. The truck is manned by a crew of three; a driver and first officer seated in the cab, and a crewman seated in a rear facing seat at the rear of the truck.

4. General instructions for aircraft fire fighting and crash rescue work are given in the R.A.F. Fire Manual (AP 957, Part 2).

CHASSIS

GENERAL (fig.1)

5. The Land-Rover chassis is driven by a four-cylinder gasoline engine. The gearbox unit consists of a main gearbox providing four forward and one reverse gear, and a transfer gearbox providing a two-speed drive to both front and rear axles. A power take-off unit, driven via its own dog clutch from the gearbox unit, provides the drive for the single stage pump. For further details of the chassis, reference should be made to AP 4337E, User Handbook.

6. The body of the truck is constructed of aluminium panels attached to an aluminium frame built up around the centrally mounted glass fibre tank. A recess on each side of the body houses a hose rack complete with hose and branch pipe, and a portable fire extinguisher.

7. The rear of the body is divided into three sections; the centre section houses the seat for the crewman and the two outer sections form two equipment stowage lockers. A roller blind mounted to the rear of the crewman's headrest may be extended over the top of the centre section to provide protection during inclement weather. Communication with the cab is by voice tube; a whistle provides the call facility and is also used as a stopper for the mouth piece. A rear towing bracket is not normally required and it has been removed to facilitate access to the rear seat. The bracket is stowed beneath the passenger seat in the cab.

8. Each stowage locker is fitted with an aluminium roller door, to allow quick access, and an interior light. Both lights are controlled by one switch, marked LOCKERS, located on the ignition switch panel.

9. The cab is fitted with an observation hatch in the roof to provide

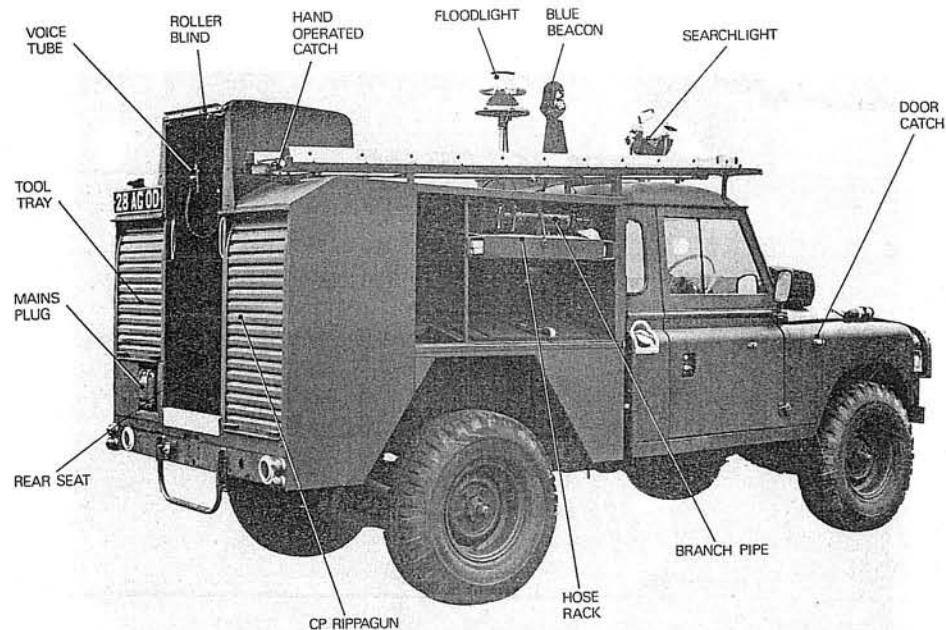


Fig.1. Rear view of truck

access for the first officer to operate a spotlight and a searchlight mounted on the cab roof. The cover of the observation hatch is retained in the closed position by a toggle catch. The cover is hinged on the right-hand edge and is secured in the fully open position by two Terry clips which engage with a bar attached to a gantry on the cab roof. The cab doors open fully forward and can be retained by spring-loaded catches. The mouth piece of the voice tube used for communication with the crewman is located on the rear bulkhead between the sliding backlights.

10. The extending ladder is mounted on a gantry on top of the right-hand side of the body and cab. The ladder is retained by a hand-operated catch which engages with one of the ladder rungs.

11. A crash guard and two fog lamps are mounted at the front of the truck. Both fog lamps are controlled by one switch, marked FOG LAMP, located above the central instrument panel. Both the seats in the cab and the crewman's seat are fitted with a Britax lap and diagonal safety belt.

CAB LAYOUT (fig.2)

12. In addition to the normal driving controls fitted as standard items, the cab contains a heater/demister, radio telephone, windscreen washers and a two-tone horn.

Heater/demister

13. The heater/demister for cab heating and windscreen demisting consists of a coil containing heated water and a motor driven fan. The water is supplied from the engine water-cooling system via an isolating valve at the rear of the engine. The electrical supply for the fan motor is taken from the chassis battery via a two position control switch which provides two speeds of operation. The switch, marked HEATER, is located on the left of the central instrument panel. Cab heating is selected by opening the small door on each side of the unit; leaving the doors closed provides windscreen demisting.

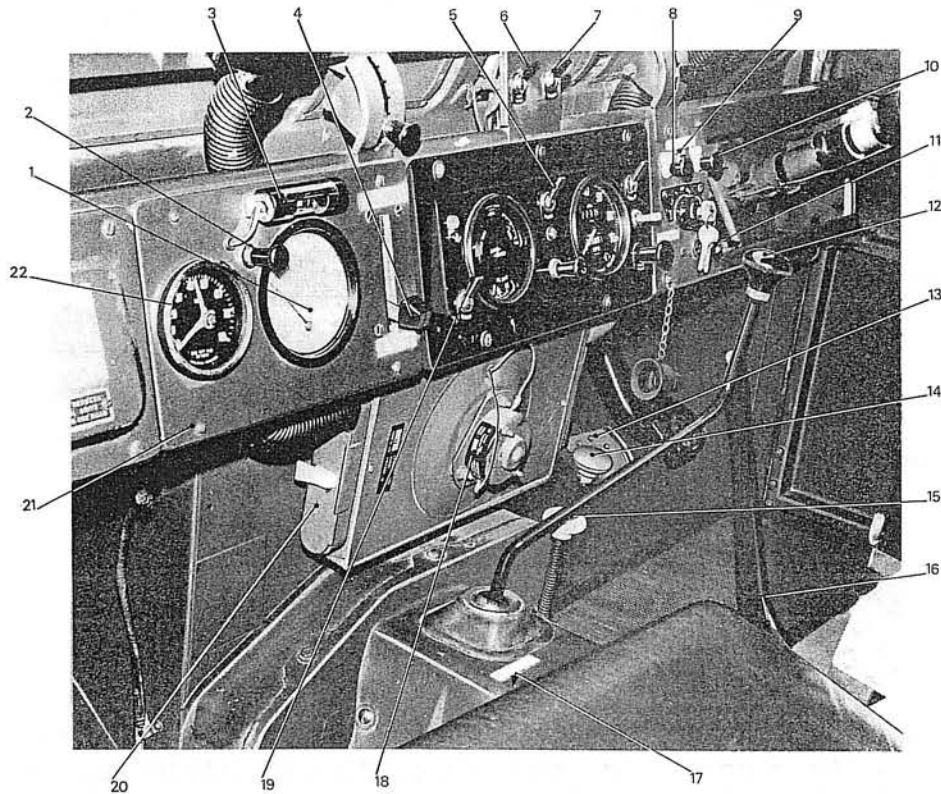


Fig.2. Cab layout

Key to fig.2

- | | |
|---|---|
| 1. PUMP PRESSURE GAUGE | 12. MAIN GEAR LEVER |
| 2. PANEL LIGHT SWITCH | 13. CLUTCH PEDAL |
| 3. PANEL LIGHT | 14. TRANSFER BOX GEAR LEVER (RED KNOB) |
| 4. HAND THROTTLE | 15. FRONT WHEEL DRIVE CONTROL (YELLOW KNOB) |
| 5. WINDSCREEN WIPER SWITCH | 16. POWER TAKE OFF LEVER |
| 6. FOG LAMP SWITCH | 17. MAIN FOAM VALVE REMOTE LEVER |
| 7. TWO-TONE HORN SWITCH | 18. CAB HEATER |
| 8. BLUE BEACON SWITCH | 19. CAB HEATER SWITCH |
| 9. PUMP RUNNING LAMP (GREEN) | 20. CAB HEATER DOOR |
| 10. STOWAGE LOCKERS INTERIOR LIGHT SWITCH | 21. PUMP CONTROL PANEL |
| 11. WINDSCREEN WASHER PLUNGER | 22. TACHOMETER |

Windscreen washers

14. The windscreen washers consist of two jet outlets, mounted one at the base of each windscreen wiper, a water bottle located at the front of the engine and a hand-operated plunger mounted on the ignition switch panel. The hand-operated plunger draws water from the bottle through a plastic tube, and forces it through both jet outlets onto the windscreen.

Radio telephone

15. A mobile ground radio telephone (Pye AM 10B VHF Type) is mounted between the seats and is connected to the chassis electrical circuit.

Two-tone horn

16. A two-tone warning horn is mounted in the engine compartment. It is controlled by a switch marked HORN located above the central instrument panel.

LIGHT WATER/FOAM FIRE EXTINGUISHING SYSTEM

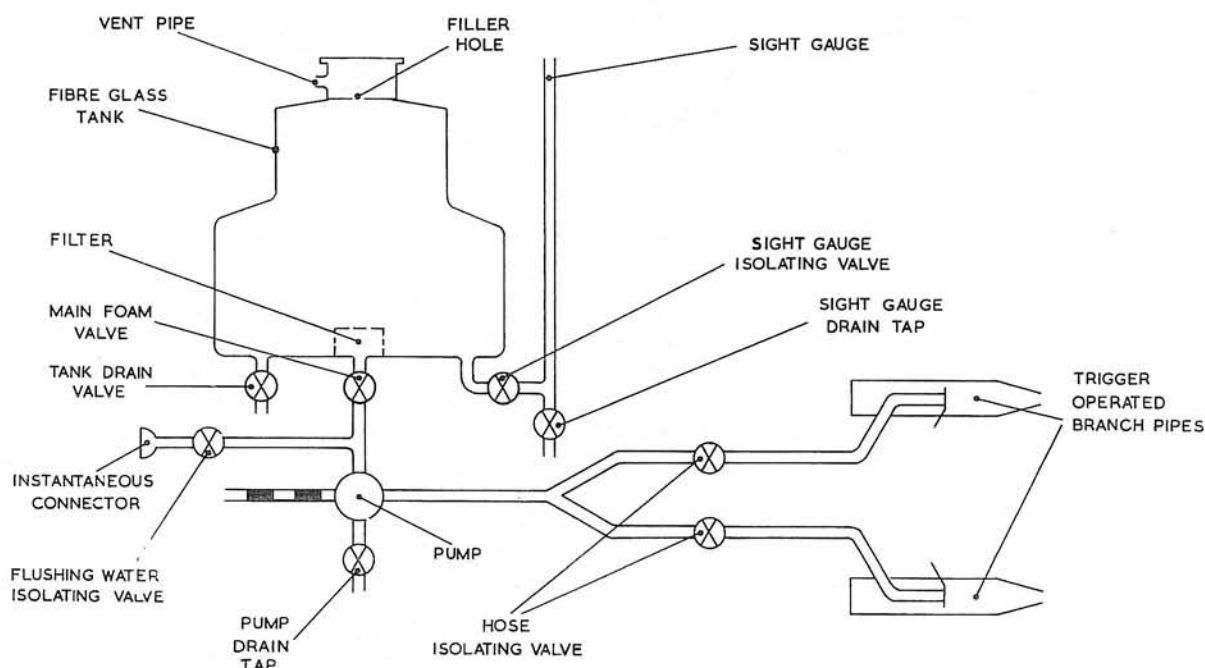


Fig.3. Fire extinguishing system - schematic layout

GENERAL (fig.3)

17. The light water/foam fire extinguishing system comprises a reservoir tank containing the chosen mixture, a pump to deliver the mixture under pressure and two hoses through which the mixture is distributed. The mixture may be one of either water and protein foam compound or water and light water as required. Figures quoted in this publication are based on the use of a mixture of 6% (by volume) of foam or light water and water, but other proportions may be used if a different expansion ratio is required. Both mixtures are non-toxic but the concentrated foam compound is highly corrosive.

18. The time of discharge of 100 gallons of light water/foam mixture if continuously applied is:-

- (1) One hose only - approximately 2 min 50s.
- (2) Both hoses simultaneously - approximately 1 min 25s.

The effective throw in still air using the jet is between 60ft and 70ft. The spray gives a spread of 10ft. at a distance of 15ft. from the branch pipe.

19. The tank, pump and hoses are connected by a suitable arrangement of pipes and valves to allow the mixture to be distributed through one or both hoses. Provision is made for flushing the entire pipework and pump system after pumping operations are completed.

20. When the truck is on standby the mixture is maintained at the correct operating temperature by an immersion heater fitted into the base of the tank.

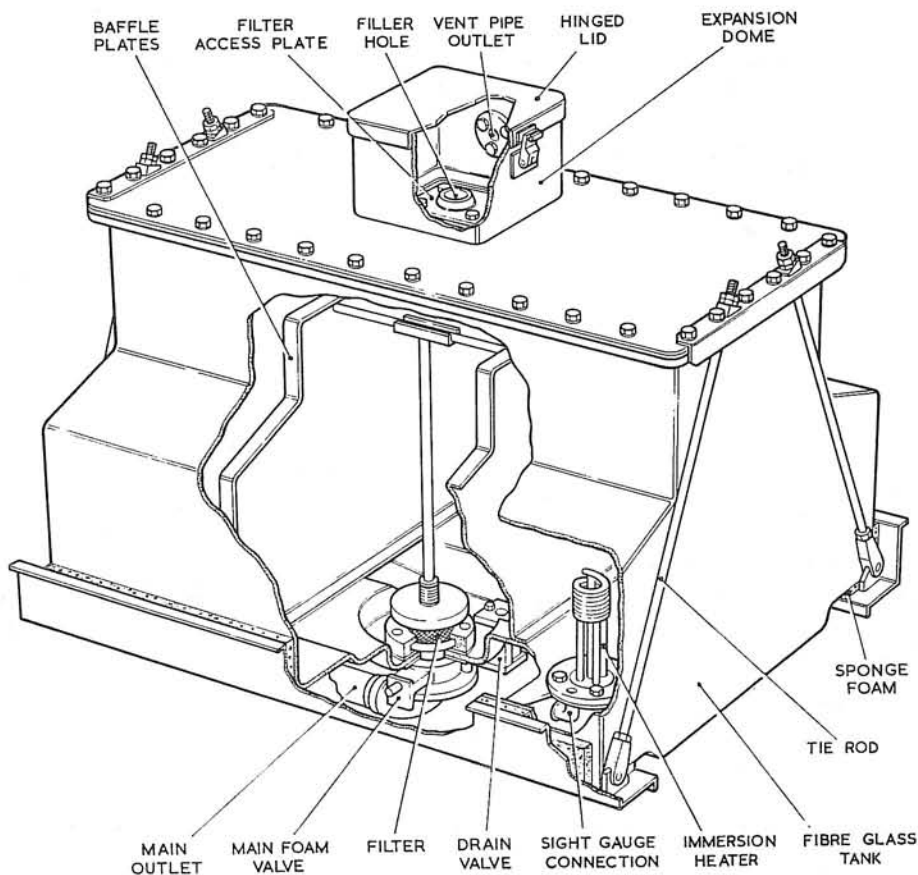


Fig.4. Tank - cutaway view

TANK (fig.4)

21. The tank is constructed of glass fibre and has a liquid capacity of 100 Imperial gallons. It is mounted in the centre of the truck body and the mounting angles are lined with sponge foam to prevent the tank being damaged by shock. The tank is secured by four tie rods. Baffle plates mounted inside the tank reduce the movement of the liquid when the truck is manoeuvring.

22. A hinged lid in the centre of the tank cover allows access to the expansion dome. A 7 in. square plate at the bottom of the expansion dome is secured to the tank cover by nylon screws and may be removed to facilitate the periodic filter changing and tank cleaning operations. The tank is filled through a 2 in. diameter hole in the plate. The lid is retained in the closed position by a toggle catch and when the catch is correctly engaged the lid rubber gasket is slightly compressed. The mixture in the tank is allowed to breath through a $\frac{1}{2}$ in. outlet in the side of the expansion dome. A pipe from this outlet vents behind the cab.

Filter

23. The filter, located inside the tank above the main outlet, consists of an $\frac{1}{8}$ in. mesh nylon filter stretched over a perforated metal drum. The metal drum is kept in place at the outlet by spring tension.

Main outlet

24. The main outlet is a 2 in. bore pipe in the base of the tank. The flow

of light water or foam mixture through this outlet is controlled by an Audco butterfly valve which is remotely operated using a lever in the cab. The lever, marked MAIN FOAM VALVE/OPEN/CLOSED, is located to the right of the first officer's seat and is retained in the vertical (closed) position by a spring catch. The Audco butterfly valve is opened by pushing the catch to the left, in order to release the lever, and simultaneously pushing the lever downwards until it rests on the floor-mounted stop.

25. The main outlet is connected to the single phase pump by a 2 in. bore flexible rubber pipe. A $\frac{1}{2}$ in. Kontite union is silver soldered into the side of the main outlet and is connected to the flushing water intake control valve.

Drain valve

26. The tank drain valve is located to the right of the tank main outlet in a trough which forms a sump. The valve is hand-operated and is used to completely empty the tank of its liquid contents.

Sight gauge

27. A plastic sight tube located on the left-hand side of the body directly behind the cab, gives an indication of the level of the liquid in the tank. It is calibrated from 10 gal to 100 gal in 10 gallon steps. The sight tube is connected by a plastic hose to an outlet in the base of the tank. A tap in the outlet pipe allows the sight tube to be isolated, and a tap located on the body just below the sight tube allows it to be drained.

Immersion heater

28. A thermostatically controlled 1000 watt immersion heater is set into the base of the tank and is connected to the a.c. mains plug. When the truck is on standby in cold conditions the heater maintains the liquid in the tank at a temperature of 140 deg.F.

PUMP

29. A Hathaway single stage pump is located below the vehicle chassis, directly behind the cab. The pump is fed from the tank main outlet via a flexible rubber hose. The pump outlet feeds both hoses via a 'T' pipe junction. When the truck is on standby in cold conditions the pump and exposed lengths of metal pipe are maintained at an operating temperature by lagging. The lagging is laced to the pump with nylon cord, and capillary tape bound round the pipe-work. The lagging and tape are connected to the a.c. mains supply plug.

30. The drive for the pump is through a Hardy Spicer 1300 series sliding joint shaft from the power take off unit which is powered by the chassis engine. The pump speed, and hence the pump delivery pressure, is controlled by the speed of the engine. The pump casing is drilled to accept a pipe which feeds a panel mounted pressure gauge. The pump casing is also drilled to accept a drain tap.

Power take-off unit

31. The power take off unit is bolted to the rear of the transfer box and the drive is taken from the gearbox main shaft via a dog clutch. The clutch selector unit is fitted on top of the transfer box and the remote operating

lever extends through the heel board into the cab just to the left of the drivers seat. The dog clutch is engaged by pulling the lever forward until the notch in the underside of the lever engages with the heel board. In this position the lever operates a microswitch which lights the green PUMP RUNNING lamp on the ignition switch panel. The dog clutch is disengaged by lifting the operating lever until the notch is clear of the heel board and then pushing the lever back towards the heel board.

Pump control panel

32. The pump control panel comprises a tachometer, a pressure gauge, a switched panel light and the engine hand throttle control. It is located in the cab to the left of the central instrument panel. After the power take off drive has been engaged the engine speed is adjusted using the hand throttle, to give a pump delivery pressure of 150 lb/in^2 indicated on the pressure gauge (calibrated from 0 to 250 lb/in^2). The red warning pointer on the tachometer (calibrated from 0 to 8000 rev/min) is set to indicate 4100 rev/min and the engine speed should not exceed this.

HOSES (fig.5)

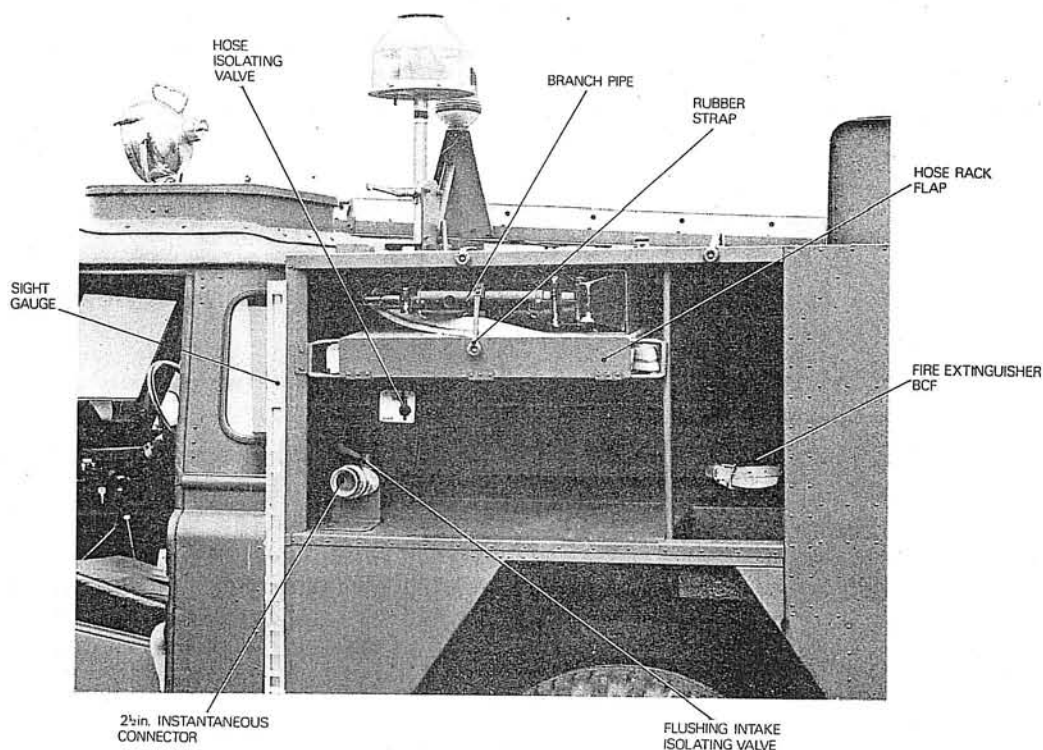


Fig.5. Left-hand hose rack compartment

33. Each of the two hoses consists of a 100 ft. length of rubber lined, reinforced, plastic covered Flame Fighter hose terminated at each end with a quick action hermaphrodite coupling. The hoses are carried, one on each side of the truck in a hose rack mounted in a recess in the body. A stainless steel strip is fitted to the front edge of each recess to prevent the hose being damaged when it is run out forward of the truck.

34. Each hose is connected to the common pump outlet pipe via its own hand-operated isolating valve mounted adjacent to the hose rack. A hand-held branch-

pipe is permanently connected to each hose but the quick action hermaphrodite couplings allow the hoses to be connected in series to provide a 200 ft. hose run for use where access to the fire is difficult.

Branch pipe

35. The branch pipe is used to distribute the light water/foam mixture either as a jet or as a spray. It incorporates a trigger-operated valve and an adjustable mouth piece. The mixture is released by pulling the trigger at the rear of the branch pipe and the jet is controlled by a lever at the front of the branch pipe. Pulling the lever to the rear will force together the metal jaws of the branch pipe outlet and increase the spread of the jet to form a spray. Each branch pipe is stowed in a bracket located on top of its associated hose rack and is secured by a quick release rubber strap which fastens onto a stud on the hose rack flap.

Flushing

36. A 2½ in. male instantaneous connector adjacent to the left-hand side hose rack, allows direct connection to a fire hydrant for flushing the entire pipework and pump system. The instantaneous connector is coupled via an isolating valve to the ½ in. pipe in the tank main outlet.

ANCILLARY EQUIPMENT

ELECTRICAL EQUIPMENT (fig.6)

37. The electrical equipment consists of those items connected to the chassis 12 volt electrical circuit and the heating elements and battery charger connected to the 240 volt a.c. mains supply plug. The 12 volt fuse boxes associated with the equipment are located on the right-hand side at the rear of the engine compartment. The wiring used for the a.c. circuit is enclosed in flexible metal conduit. A circuit diagram is shown in fig.6.

Electrical mains connection

38. Connection to a single phase 240 volt a.c. mains supply is made through a Niphan snatch socket which connects to a Niphan plug fixed in a recess at the rear of the truck. The plug is protected by a spring loaded cover. The a.c. supply must be taken via an earth leakage trip switch and a pilot earth is supplied on the fourth pin of the plug. The snatch socket allows quick removal of the supply and when a crash alarm is given the truck can be driven off without first disconnecting the supply. When required, the earth spike supplied with the truck may be connected using the wingnut on the rear chassis member.

Searchlight

39. The searchlight (Francis SB/CFD/9in) is fitted on a universal mounting on top of the cab and can be locked in any vertical or horizontal position by two handscrews. The 100 watt lamp is controlled by a switch on the right-hand side of the searchlight body. The beam of the searchlight is focussed using the knurled control at the rear. The searchlight is supplied via its own 25A fuse.

Floodlight

40. The floodlight (Plessey, Model 10 AMD/RF) is mounted on a pillar to the

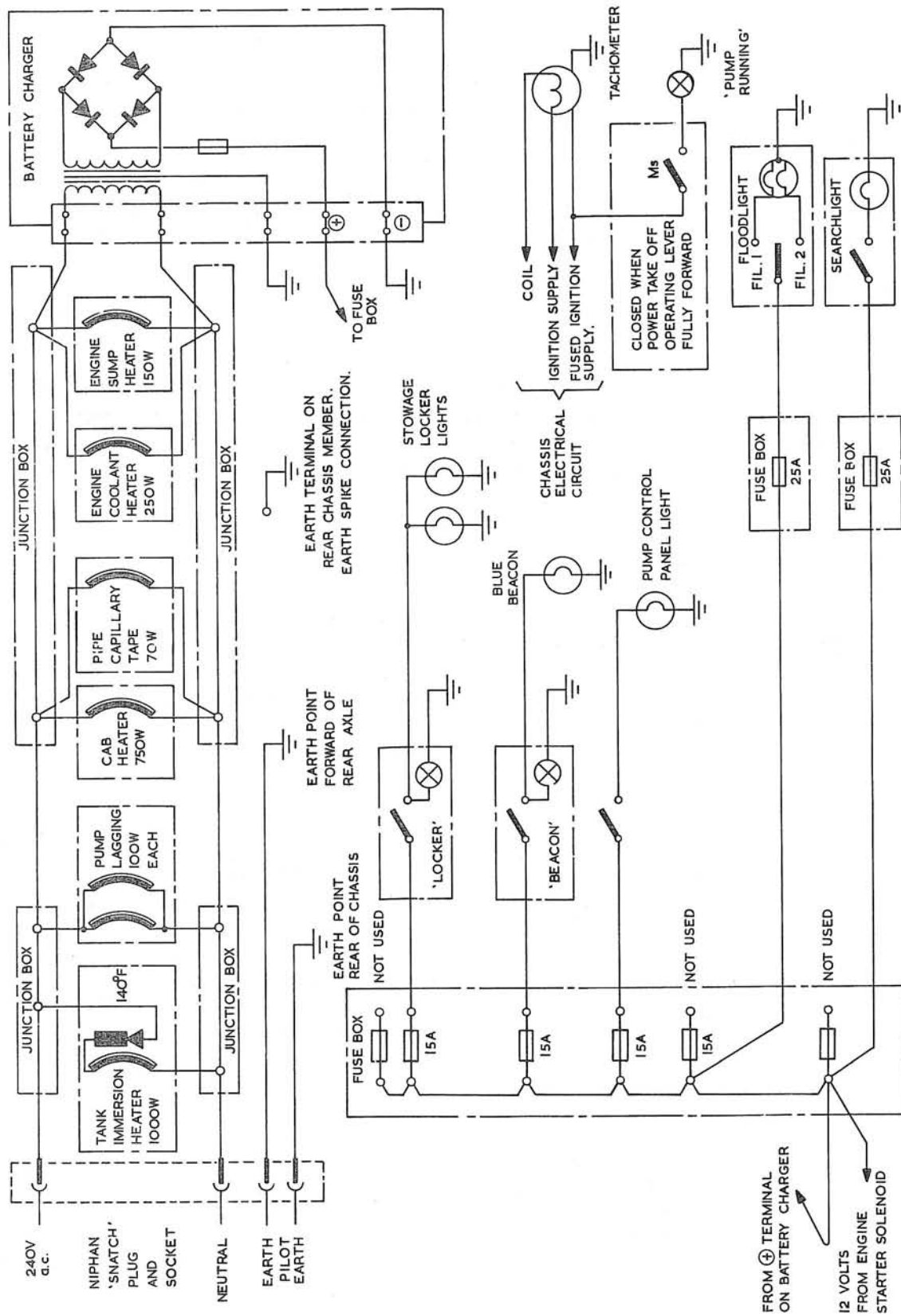


Fig.6. Equipment electrical circuit diagram

rear of the cab. The pillar is adjustable and when the floodlight is at the required height the pillar is locked in position by a clamp. The double filament lamp is controlled by a changeover switch so that only one filament is in use at a time. The switch is located on the underside of the floodlight and is marked FIL.1, OFF, FIL.2. The floodlight is supplied via its own 25A fuse through a junction box mounted on the rear of the pillar support bracket.

Locker interior lights

41. Both equipment stowage lockers are fitted with interior lights. Both interior lights are controlled by an illuminated switch marked LOCKERS, located in the cab on the ignition switch panel.

Blue beacon

42. A blue warning beacon is mounted on the gantry above the cab roof. It is controlled using an illuminated switch marked BEACON, located in the cab on the ignition switch panel.

Pump panel light

43. A pump panel light is mounted across the top of the pump control panel and is controlled using a switch located on the same panel. It provides illumination for the pump pressure gauge and the tachometer.

Standby equipment

44. When the truck is on standby during cold weather conditions a number of heating elements are supplied direct from the a.c. mains input plug as follows:-

- (1) A 1000 watt thermostatically controlled immersion heater in the reservoir tank; maintains the liquid at a temperature of 140 deg.F.
- (2) Pump lagging, in two pieces each 100 watt, laced around the foam supply pump.
- (3) A 750 watt black heater mounted on the rear bulkhead of the cab.
- (4) A length of 70 watt capillary tape wrapped around the exposed lengths of the foam main supply pipe.
- (5) A 150 watt engine oil heater located in the sump of the chassis engine.
- (6) A 250 watt coolant heater located in the block of the chassis engine.

Battery charger

45. The output of a 12 volt, 1 ampere trickle charger is permanently connected to the chassis battery. The battery charger is also supplied direct from the a.c. mains supply plug.

FIRE EXTRINGUISHERS

46. The crash rescue truck is equipped with two portable fire extinguishers and two hand-held fire extinguishers. A 25 lb. dry chemical power extinguisher (Ref.No.4210-129-5134) is stowed in a well in the right-hand hose rack

compartment. A BCF extinguisher (Ref.No.4210-127-6334) is stowed in a well in the left-hand hose rack compartment and is permanently connected to a lance applicator. The hose from the BCF extinguisher is looped around the body of the truck and the lance is then strapped to the roof directly above the hose rack compartment. Both of these extinguishers are secured in position using quick-release leather straps. The lance is secured using rubber straps. Instructions for use are inscribed on both extinguishers.

47. Two C.T.C. fire extinguishers are mounted one on each wing of the truck. These hand-pumped extinguishers are for dealing with chassis fires. Instructions for use are inscribed on the extinguishers.

RESCUE TOOLS

48. The rescue tools are stowed either in the two rear lockers, on the roof of the body or in the right-hand hose rack compartment; a complete list of stowage positions is given with the Leading Particulars. A large crowbar mounted in two locating troughs on the roof, on the left-hand side of the body, is secured by two quick-release rubber straps. Access to each rear equipment locker is obtained by lifting an aluminium roller door.

Rippagun

49. The Rippagun (Ref.No.3AP/4147) is stowed, together with its power pack, in the right-hand side rear locker. It is used for cutting holes in the fuselage of a crashed aircraft when blocked exits or fire hazards prevent the escape of the crew. Compressed air cylinders are fitted with a carrying harness and are permanently connected to the Rippagun by a length of hose. The saw and power pack are carried and operated by one man.

Epcu hydraulic rescue outfit

50. The Epcu hydraulic rescue outfit is carried in its own box which is secured in a light alloy flange in the right-hand hose rack compartment by a quick release leather strap.

Tool tray (fig.7)

51. A tool tray is stowed on the middle shelf of the left-hand side rear locker and is held in position by a strap fitted with quick-release pop-fasteners. The tray can be carried by one man and holds the following tools: double-edged saw, hacksaw and blades, hammer, screwdriver, wire cutters, insulated pliers and a set of socket tools for releasing the Dzus fasteners used to secure aircraft engine covers.

Quick-release leather straps

52. All the leather straps used to secure the ancillary equipment are of the quick-release type. A firm thumb pressure on the pivoted side member of the buckle will cause it to hinge and allow the strap to be quickly pulled out of the fastening. The buckle is easily re-assembled to re-fasten the strap.

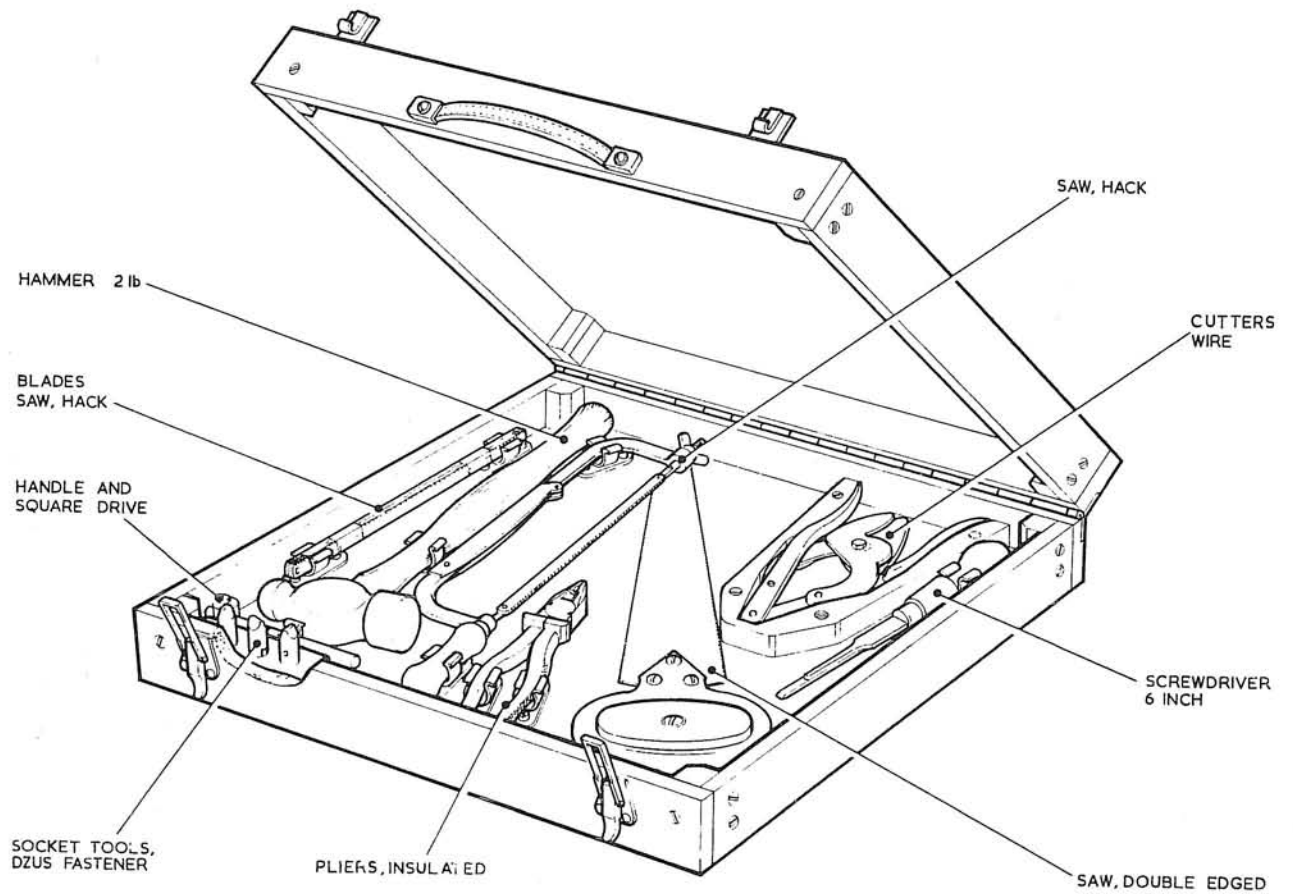


Fig.7. Tool tray

Chapter 3

INSTRUCTIONS FOR USE

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GENERAL

1. The instructions contained in this chapter deal with the operation of the light water/foam fire extinguishing system.

STANDBY

2. When the airfield crash rescue truck is on standby, the reservoir tank should be full and all valves in their closed position. If the truck is operating in low ambient temperature conditions, a 240V a.c. mains supply should be connected via the snatch socket to the plug at the rear of the truck. The supply cable should be anchored so that the truck may be driven off with the supply still connected.

WARNING...

- (1) THE A.C. MAINS MUST BE SUPPLIED VIA AN EARTH LEAKAGE TRIP SWITCH.
- (2) IF THE TRUCK IS SUPPLIED FROM A GENERATOR, AN EARTH SPIKE MUST BE CONNECTED AT THE WINGNUT ON THE CHASSIS.

CRASH ALARMCAUTION...

If the earth spike is in use it must first be disconnected at the wingnut on the chassis.

3. The truck may be driven off without disconnecting the electrical supply as the snatch plug and socket will separate under tension.
4. Position the truck such that one or both hoses can be run out forward of the vehicle.

OPERATION

5. The light water/foam extinguishing system is brought into operation as follows:-

- (1) Release the rubber strap(s) which secures both the branch pipe(s) and hose rack flap(s). Lift the branch pipe(s) from its bracket and ensure that the hose rack flap(s) drops fully open.

NOTE...

The quick-release hermaphrodite couplings used to terminate the hoses allow them to be quickly coupled in series to provide one 200ft hose run.

- (2) Open the hose isolating valve by turning the operating lever to ON.
- (3) Release the spring catch securing the main foam valve remote operating lever and push the lever forward (OPEN) until it rests on the floor mounted stop.
- (4) Engage the pump drive as follows:-
 - (a) Start the engine and allow to idle.
 - (b) Depress the clutch pedal.
 - (c) Select neutral position on the transfer box gear lever (red knob).
 - (d) Pull the power take off operating lever forward until the notch in the shaft engages with the heel board. The green PUMP RUNNING lamp should now be illuminated.
 - (e) Select 4th gear with the main gear lever.
 - (f) Slowly release the clutch pedal to start the pump rotating.
- (5) Run with the branch pipe to the site of the fire.
- (6) Use the hand throttle to increase the engine speed until the indicated pump pressure 150 lb/in². The hose becomes pressurised rapidly and will eject itself from its rack.

CAUTION...

The engine speed must not exceed 4100 rev/min.

- (7) To select a jet of water, push forward the lever on the adjustable deflector jaws on the branch pipe.
- (8) To select a spray of water pull the lever on the adjustable deflector jaws on the branch pipe, to the rear.
- (9) Control the foam discharge by using the trigger-operated valve at the rear of the branch pipe.
- (10) On completion of pumping operations, proceed as follows:-

- (a) Close the engine hand throttle control.
- (b) Disengage the pump drive as follows:-
 - (i) Depress the clutch pedal.
 - (ii) Select neutral gear with the main gear lever.
 - (iii) Lift the power take off operating lever and push it fully to the rear.
 - (iv) Release the clutch pedal.
- (c) Pull the main foam valve operating lever to the rear and lock in the vertical (CLOSED) position using the spring catch.
- (d) Turn the hose isolating valve operating lever to OFF (FLAKED HOSE).
- (e) Carry out the flushing operations detailed in para. 6 and 7.

FLUSHING

6. It is essential that any premixed solution remaining in the pump and pipework installation is removed as soon as possible after pumping operations are complete. The system should be flushed through with clean water under pressure from the pump. The 2½ in. instantaneous connector mounted in the left-hand side hose rack compartment allows the pump and pipework to be connected to a hydrant water supply.

7. To flush the system, position the truck near a fire hydrant and proceed as follows:-

- (1) Ensure that both hoses are fully withdrawn from their hose racks.
- (2) Connect the hydrant supply hose to the 2½ in. instantaneous connector.
- (3) Ensure that the main foam valve operating lever is in the vertical (CLOSED) position.
- (4) Engage the pump drive as follows:-
 - (a) Start the engine and allow to idle.
 - (b) Depress the clutch pedal.
 - (c) Select neutral position on the transfer box gear lever (red knob).
 - (d) Pull the power take-off operating lever forward, until the notch in the shaft engages with the heel board. The green PUMP RUNNING lamp should now be illuminated.
 - (e) Select 4th gear with the main gear lever.
 - (f) Slowly release the clutch pedal to start the pump rotating.
- (5) Open the hydrant supply valve.

- (6) Set the lever on the flushing water intake valve to ON.
- (7) Set the levers on both hose isolating valves to ON.
- (8) Increase the engine speed to obtain an indicated pump delivery pressure of 40 lb/in².
- (9) Operate the trigger control on each branch pipe and continue pumping until clear water is discharged through both branch pipes.
- (10) On completion of flushing operations, the system should be closed down as follows:-
 - (a) Close the engine throttle.
 - (b) Disengage the pump drive as follows:-
 - (i) Depress the clutch.
 - (ii) Select neutral gear with the main gear lever.
 - (iii) Lift the power take-off operating lever and push it fully to the rear.
 - (iv) Release the clutch pedal.
 - (c) Close the hydrant supply valve and disconnect the hose at the instantaneous connector.
 - (d) Set the operating levers on the hose isolating valves and the flushing water intake isolating valve to OFF.
 - (e) Open the pump casing drain valve.
 - (f) Make-up the hoses as detailed in para. 8.
 - (g) Close the pump casing drain valve.

MAKE-UP

8. To make-up (stow) a hose proceed as follows:-

- (1) Make-up the hose in folds in the rack. Mount the branch pipe in its bracket on top of the hose rack.
- (2) Close the flap on the hose rack and use the rubber strap to secure the branch pipe in its bracket and to hold the hose rack flap closed.

FILLING THE TANK (Chap.2, fig.4)

9. The tank is filled through the hole at the base of the expansion dome. To fill the tank proceed as follows:-

- (1) Release the toggle catch securing the tank lid and open the lid.

Note...

The lid may be reached by standing on the tread board lowered onto

the rear crewman's seat, with the roller blind fully retracted.

(2) Pour the required quantity of light water or protein foam (see para.10) into the tank.

(3) Top up the tank with clean water until the mixture is half-way up the expansion dome.

Note...

Filling is made easier if a 1 in. bore supply hose is used and fed through the 2 in. hole in the base of the expansion dome.

(4) Close the tank lid and retain in position with the toggle catch.

Contents

10. The contents of the tank is a premixed solution of either light water and water, or protein foam and water. A solution of 6% (by volume) of light water or protein foam (6 gallons to 94 gallons of water) is normally used but the ratio may be varied according to the expansion ratio required.

Chapter 4

SERVICING AND REPAIR

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GENERAL

1. This chapter deals with the servicing and repair of the equipment. For servicing of the chassis, reference should be made to AP 4337E User Handbook. The pump Hardy Spicer drive shaft should be serviced as detailed in AP 4337E (U.H.) for the front and rear axle propeller shafts.

PERIODIC SERVICING

2. It is recommended that the following servicing should be carried out at the intervals shown. The frequency should be increased if the equipment receives abnormally high use.

(1) 12-monthly

(a) Drain the pump bearing housing and refill with OEP 220 (NATO 0-184) grade oil as detailed in para. 7 and 8.

(b) On the cab heater/demister check the condition of the rubber hoses connecting the heater radiator to the engine cooling system and replace if necessary.

(2) 3-monthly

(a) Check the pump bearing housing oil level as detailed in para. 7. Check that the breather plug, located in the side of the housing when viewed from the left of the truck, is not blocked.

(b) Drain the foam reservoir tank. Remove and clean the tank main outlet filter as detailed in paras. 4 and 5. Using a 1 in. bore supply hose thoroughly flush out the tank with clean water. Replace the filter as detailed in para. 6 and refill the tank as detailed in Chap.3, para.9.

(c) Check the condition of all a.c. mains wiring and the pump and pipe lagging. Replace if damaged. Check the insulation resistance of the a.c. mains standby equipment as detailed in para. 34.

(d) Apply a small amount of molybdenum disulphide grease (NATO G-353) to all moving parts of the main foam valve remote operating lever and linkage.

DISMANTLING AND ASSEMBLY

TORQUE LOADING FIGURES

3. In the following assembly instructions, the torque loading figures listed in Tables 1 and 2 should be adhered to.

TABLE 1

Torque loading figures - glass fibre tank

Assembly (1)	Bolt size (2)	Torque (lb/ft) (3)
Tank main outlet and Audco valve to tank	$\frac{1}{2}$ in. UNF	10

TABLE 1 (cont)

Assembly (1)	Bolt size (2)	Torque (lb/ft) (3)
Immersion heater mounting to tank	3/8 in. UNF	10
Tank drain valve to tank	1/4 in. UNF	4
Tank cover to tank body	1/4 in. UNF	4
Tank securing tie rods	5/16 in. UNF	5

TABLE 2

Torque loading figures - metal to metal surfaces

Bolt size (1)	Torque (lb/ft) (2)
No.6 UNF	1
No.8 UNF	2
No.10 UNF	3.5
1/4 in. UNF	8
5/16 in. UNF	16
3/8 in. UNF	25
7/16 in. UNF	38
1/2 in. UNF	60

FILTER ASSEMBLYRemoval

WARNING...

THE TANK GLASS FIBRE COVER MUST NOT BE USED TO SUPPORT ANY WEIGHT.

4. The filter assembly is held in place at the tank main outlet by spring pressure. To remove the filter assembly proceed as follows:-

(1) Open the tank drain valve and drain off the contents of the reservoir tank. Close the valve.

(2) Fully retract the roller blind.

(3) Stand on the tread board lowered onto the rear crewman's seat and release the toggle catch securing the tank lid. Open the lid.

(4) Remove the hexagon-headed nylon screws securing the plate at the base of the expansion dome. Lift out the plate to expose the 6 in. diameter hole in the tank cover.

(5) Grip the vertical rod attached to the filter drum assembly and push downwards against the spring pressure until the channel section on top of the vertical rod is clear of the horizontal bar.

(6) Tilt the vertical rod towards the rear of the tank and lift the complete filter assembly out through the hole.

Cleaning

5. (1) Carefully remove the 1/8 in. mesh Netlon filter from the perforated metal drum.

Note...

If the Netlon filter shows any sign of damage it is to be renewed.

(2) Wash the Netlon filter and metal drum in clean water.

(3) Replace the Netlon filter on the metal drum ensuring that it does not extend beyond the end of the drum.

Replacement

6. To replace the filter assembly proceed as follows:-

(1) Hold the assembly by the rod and lower it into the tank to the rear of the horizontal bar.

(2) Position the perforated metal drum at the tank outlet ensuring that it is correctly seated on the Neoprene sealing ring.

(3) Push downwards against the spring pressure until the channel section is below the horizontal bar.

(4) Slowly release the assembly so that the horizontal bar locates in the channel section.

(5) Replace the plate over the hole in the cover taking care not to over tighten the 1/4 in. UNF nylon screws.

(6) Refill the tank as detailed in Chap.3, para. 9.

PUMP BEARING HOUSING OIL

7. To check the oil level in the pump bearing housing proceed as follows:-

(1) Ensure that the truck is standing on a level surface.

(2) Remove the housing filler plug; on the side of the housing when viewed from the right-hand side of the truck.

(3) Carefully top up the housing with OEP 220 (NATO 0-184) grade oil until it just runs out of the filler hole. Do not over-fill.

(4) Replace the filler plug.

8. To drain the bearing housing proceed as follows:-

(1) Remove the drain plug at the bottom of the housing.

- (2) Drain the oil into a suitable container (the housing holds approximately 1/3 pint).
- (3) Clean the drain plug.
- (4) Inspect the sealing washer and renew if damaged.
- (5) Replace the drain plug and refill the housing to the correct level as detailed in para. 7.

TANK ASSEMBLY

Removal

9. The glass fibre reservoir tank is mounted in the centre of the truck body and is secured by four tie rods. To remove the tank from the truck proceed as follows:-

- (1) Open the tank drain valve and drain off the contents. Close the valve.
- (2) Remove both hose racks as detailed in para. 13.
- (3) Remove the four bolts securing the gantry to the cab.
- (4) Remove the four bolts securing the gantry to the body and lift the gantry clear of the truck.
- (5) Fully retract the rear crewman's roller blind.
- (6) Remove the roller blind pivot bolt from the right hand side hose rack compartment.
- (7) Remove the three No.10 UNF bolts securing the small plate in the left-hand side hose rack compartment, and lift out the roller blind.
- (8) Remove the roller blind stop bar located just to the rear of the roller blind.
- (9) Extract the 34 bolts securing each hose rack compartment rear wall and roof fabrication to the aluminium framework. Remove the bolt securing the top end of the stainless steel strip at the front end of the hose rack compartment. Lift the fabrication clear.

Note...

Before lifting out the right-hand side fabrication remove the ten bolts securing the Epco hydraulic rescue outfit mounting flange and the sixteen bolts securing the two strengthening pieces to the floor of the hose rack compartment.

- (10) Remove the floodlight and mounting pole as follows:-
 - (a) Ensure that the floodlight adjustable mounting pole is clamped.
 - (b) Turn the floodlight head counter-clockwise to loosen it.
 - (c) Unclamp the mounting pole and, holding the floodlight head firmly, unscrew the pole from the head.

- (d) Lower the floodlight head through the cab roof hatch.
 - (e) Lift the mounting pole clear of the upper mounting bracket.
 - (f) Remove the bolts securing the upper mounting bracket to the body front bulkhead and remove the bracket.
- (11) On the base of the tank:-
- (a) Remove the split pin and pivot pin securing the remote operating lever linkage to the main foam valve operating lever.
 - (b) Unscrew the two hose clips securing the rubber hose to the main outlet pipe and pull the hose clear of the pipe.
 - (c) Unscrew the nut on the Kontite union in the bend of the main outlet pipe and release the flushing water inlet pipe.
 - (d) Remove the seven nuts and bolts retaining the thermostat cover on the immersion heater.
 - (e) Unscrew the grub screw securing the thermostat connection and the 2BA nuts securing the mains supply cable connections. Release the armoured cable cover and pull the cable clear.
 - (f) Turn the immersion heater counter-clockwise to unscrew it from its mounting and withdraw the heating element from the tank.
 - (g) Unscrew the hose clip securing the sight gauge supply tube to the tank outlet adjacent to the immersion heater and disconnect the tube.
- (12) Remove the nuts, locking nuts and taper washers on the four tie rods.
- (13) Carefully lift the tank clear of the body framework and support it on blocks to avoid damaging the outlets set into the base of the tank.

Tank cover removal and replacement

10. When the tank has been removed from the truck the cover may be removed as follows:-

- (1) Remove the six bolts at each end of the cover, then remove light alloy angle pieces.
- (2) Remove the ten bolts at each side of the cover and lift off the cover.
- (3) Inspect the rubber gasket and renew if damaged.

11. To replace the cover:-

- (1) Position the rubber gasket around the rim of the tank.
- (2) Place the cover on the tank ensuring that the holes in the tank lid, gasket and cover all line up.
- (3) Replace the light alloy angle piece at each end of the cover and

secure with six $\frac{1}{4}$ in. UNF x $1\frac{1}{4}$ in. long bolts, six plain washers, six spring washers, and six $\frac{1}{4}$ in. UNF nuts.

Note...

Ensure that the plain washers are fitted between the bolt heads and the glass fibre surface, and the spring washers are fitted under the nuts.

(4) Tighten the nuts to the appropriate torque loading figures detailed in Table 1.

(5) Replace the ten $\frac{1}{4}$ in. UNF x 1 in. long bolts and ten plain washers on each side of the cover.

Note...

Ensure that the plain washers are fitted between the bolt heads and the glass fibre surface.

(6) Refit ten spring washers and ten nuts.

(7) Tighten the nuts to the appropriate torque loading figures as detailed in Table 1.

Tank replacement

Note...

Before replacing the tank inspect the mounting angles foam rubber lining and replace as necessary.

12. Replace the tank as follows:-

(1) Lift the tank clear of the body framework and carefully lower it onto the foam rubber lined mounting angles.

(2) Position the tank sufficiently to the rear of the truck to avoid fouling the floodlight lower mounting bracket.

(3) Ensure that the four tie rods are located in the slots in the tank cover.

(4) Replace the 5/16 in. taper washers and 5/16 in. UNF nuts on the tie rods and tighten the nuts to the appropriate torque loading figures detailed in Table 1.

(5) Replace the locknuts.

(6) On the base of the tank:-

(a) Push the sight gauge supply tube onto the outlet adjacent to the immersion heater mounting and tighten the hose clips.

(b) Renew the 'O' ring on the immersion heater body and screw the heater firmly into its mounting.

(c) Connect the supply cable as follows:-

(i) Connect the 240 volt supply to the thermostat connection and tighten the grub screw.

(ii) Connect the neutral connection to the 2BA terminal and tighten the terminal.

(iii) Carry out the insulation resistance checks detailed in para. 34.

Replace the thermostat cover and tighten the seven nuts and bolts.

(d) Replace the flushing water inlet pipe and tighten the $\frac{1}{2}$ in. BSP Kontite union.

(e) Ease the rubber hose onto the main outlet pipe and tighten the two hose clips.

(f) Replace the remote operating linkage pivot pin using a new split pin.

(7) Replace the floodlight and mounting pole as follows:-

(a) Feed the floodlight mounting pole over the guide rod and bolt the upper mounting bracket onto the body front bulkhead.

(b) Screw the pole into the floodlight head until it is hand tight.

(c) Clamp the pole and turn the head until it is firmly screwed onto the pole.

(8) Position each hose rack compartment rear wall and roof fabrication and replace the $\frac{1}{4}$ in. UNF bolts and spring washers.

(9) Replace the roller blind as follows:-

(a) Replace the roller blind stop bar and the blind.

(b) Replace the small plate in the left-hand side hose reel compartment and the 5/16 in. UNF roller blind pivot bolt in the right hand side hose rack compartment.

(10) Position the gantry on the body and cab roof and replace the 5/16 in. UNF bolts and spring washers.

(11) Replace both hose racks as detailed in para. 14.

(12) Fill the tank as detailed in Chap.3, para.9.

HOSE RACKS

Removal

13. The hose racks are identical; one mounted left facing and one right facing. The removal procedure for both racks is as follows:-

(1) Remove all ancillary items from the hose rack compartment.

(2) Ensure the hose isolating valve control lever is in the OFF/FLAKED HOSE position.

- (3) Release the rubber strap securing the branch pipe and hose rack flap.
- (4) Lift off the branch pipe and withdraw the hose from the rack. Disconnect the hose from the vehicle by releasing the quick-release hermaphrodite coupling inside at the rear of the rack.
- (5) Ensure that the main foam valve is closed; the remote operating lever locked in the vertical OFF position.
- (6) Release the union which connects the hose isolating valve to the main foam supply pipe. Release the union which connects the supply pipe at the side of the hose rack.
- (7) Remove the two clips securing this length of pipe to the rear wall of the hose rack compartment and lift out the pipe complete with the isolating valve.
- (8) Remove the seven bolts securing the rack to the rear wall of the compartment.
- (9) Remove the two bolts securing the vertical stay bar, one at the top and one at the bottom.
- (10) Remove the two bolts securing the rack to the stainless steel edging strip at the front of the compartment and lift the rack clear of the truck.

Replacement

14. To replace the hose rack proceed as follows:-

- (1) Lift the hose rack into position in the hose rack compartment and replace the $\frac{1}{4}$ in. UNF bolts which secure it to the rear wall and front edge of the compartment. Replace the two $\frac{1}{4}$ in. UNF bolts securing the vertical stay bar.
- (2) Offer up the supply pipe and hose isolating valve assembly and tighten both unions. Replace the two clips which secure the pipe to the rear wall of the compartment.
- (3) Reconnect the hose at the hose rack hermaphrodite coupling. Make up the hose in folds in the rack and mount the branch pipe in its bracket on top of the rack.
- (4) Close the hose rack flap and secure it using the rubber strap.

VALVES

15. The valves used on the light water/foam fire extinguishing system require no maintenance and if any failure is suspected they should be replaced.

Main foam valve removal and replacement

16. To remove the 2 in. Audco Slimseal butterfly valve proceed as follows:-

(1) Open the tank drain valve and drain off the contents of the reservoir tank. Close the valve.

(2) Remove the split pin and pivot pin securing the remote operating lever linkage to main foam valve lever.

(3) Unscrew the two hose clips securing the rubber hose to the main outlet pipe and pull the hose clear of the pipe.

(4) Unscrew the nut on the Kontite union in the bend of the main outlet pipe and release the flushing water inlet pipe.

(5) Remove the four nuts from the securing studs and lower the outlet pipe and Audco valve. The securing studs are screwed into a plate which sits inside the tank. The plate will be held in place by the filter assembly but care should be taken not to push the studs and plate up into the tank.

17. To replace the main foam valve proceed as follows:-

(1) Inspect the rubber gasket which fits between the tank and the face of the valve and renew if damaged.

(2) Offer up the valve to the four studs, taking care not to push them into the tank, with the valve operating lever facing the left of the truck.

(3) Offer up the outlet pipe flange, with the pipe facing forwards, and replace the $\frac{1}{2}$ in. UNF nuts and spring washers.

(4) Tighten the nuts to the torque loading figures given in Table 1.

(5) Connect the flushing water inlet pipe at the bend in the main outlet pipe and tighten the $\frac{1}{2}$ in. BSP Kontite union nut.

(6) Ease the rubber hose onto the main outlet pipe and tighten the two hose clips.

(7) Replace the remote operating linkage pivot pin using a new split pin.

Hose isolating valves removal and replacement.

18. To remove a hose isolating valve:-

(1) Ensure that the main foam valve is closed; the remote operating lever locked in the vertical position.

(2) Release the union which secures the valve outlet union to the rigid hose supply pipe.

(3) Release the union which secures the main supply pipe to the right angle bend and lift out the valve.

(4) Remove the bolts securing the inlet and outlet unions to the valve.

19. To replace the hose isolating valve proceed as follows:-

(1) Fit the inlet and outlet unions to the valve.

- (2) Hold the valve such that when the operating lever is in the ON position it faces left. Offer up the valve to the rigid pipe work and tighten the two unions.

Tank drain valve removal and replacement

20. The $\frac{1}{2}$ in. Saunders valve mounted in the lowest point of the tank may be removed as follows:-

- (1) Drain the tank.
 - (2) Remove the two $\frac{1}{4}$ in. UNF nuts and spring washers and remove the valve. Take care not to push the bolts, and the plate to which they are welded, up into the tank.
21. To replace the tank drain valve proceed as follows:-
- (1) Inspect the rubber gasket which fits between the tank and the face of the valve and renew if damaged.
 - (2) Set the valve to the closed position such that the operating lever points forward and locate the valve on the securing studs.
 - (3) Replace the spring washers and $\frac{1}{4}$ in. UNF nuts.
 - (4) Tighten the nuts to the torque loading figures detailed in Table 1.

Flushing water inlet valve removal and replacement

22. The flushing water inlet valve isolates the $2\frac{1}{2}$ in. instantaneous connector from the tank main outlet pipe. To remove the valve:-

- (1) Ensure that the main foam valve is closed and the remote operating lever locked in the vertical position.
- (2) Remove the two countersunk bolts securing the $2\frac{1}{2}$ in. connector to its mounting bracket.
- (3) Release the pipe connected to the rear of the valve and lift out the valve complete with the $2\frac{1}{2}$ in. connector.

23. To replace the flushing water inlet valve proceed as follows:-

- (1) Connect the pipe to the valve outlet union and tighten the union nut.
- (2) Replace the two countersunk bolts which secure the instantaneous connector to the bracket mounted on the floor of the hose rack compartment.

PUMP

24. The Hathaway single stage pump is mounted below the chassis of the truck just to the rear of the cab. It consists of an aluminium alloy casing which houses the aluminium alloy impeller and an oil-filled bearing housing which houses the pump drive shaft ball bearings.

25. Water sealing is effected by carbon seals which are spring loaded and self adjusting. These seals should provide many hundred hours of running

without requiring attention. A conventional lip-type oil seal prevents the bearing oil entering the pump casing. Any oil or water seepage into the space between the rear water seal and the oil seal is allowed to drain through two small drain holes in the casing.

Removal

26. To remove the pump for repair proceed as follows:-

- (1) Remove the aluminium pump guard. Remove the bearing housing drain plug and drain the oil into a suitable container.
- (2) Renew the sealing washer if damaged and replace the drain plug.
- (3) Disconnect the a.c. mains supply at the input plug.
- (4) Extract the four screws securing the cover to the junction box mounted on the chassis adjacent to the pump.
- (5) Release the screws securing the pump and pipe lagging supply wires and pull the wires clear of the junction box.
- (6) Remove the pump lagging and the pipe lagging as necessary.
- (7) Remove the four bolts securing the pump drive shaft to the pump drive flange and lower the shaft clear of the pump.
- (8) Ensure that the main foam valve is closed, the remote lever locked in the vertical position, and unscrew the two hose clips at the pump intake pipe.
- (9) Pull the rubber hose clear of the pipe.
- (10) Remove the six 3/8 in. UNF setscrews securing the outlet pipe to the pump delivery flange.
- (11) Disconnect the pipe outlet on the rear casing of the pump; this supplies the pressure gauge.
- (12) Support the weight of the pump. Remove the four 1/2 in. UNF bolts securing the pump to its mounting plate and lower the pump.

Dismantling (fig.1)

27. If an excess of oil is noticed from the two drain holes in the pump casing the front oil seal should be renewed. If an excess oil seepage is noticed around the bearing housing end cap the rear oil seal should be renewed. If the efficiency of the water seals is suspect the seals should be inspected and any worn parts renewed. To facilitate the renewal of parts the pump may be dismantled as follows:-

- (1) Remove the 3/8 in. UNF dome nuts clamping the front and rear half of the pump casing together.
- (2) Remove the front half of the casing complete with the front carbon seal.
- (3) Remove the front sealing ring and 'O' ring which locate in the front

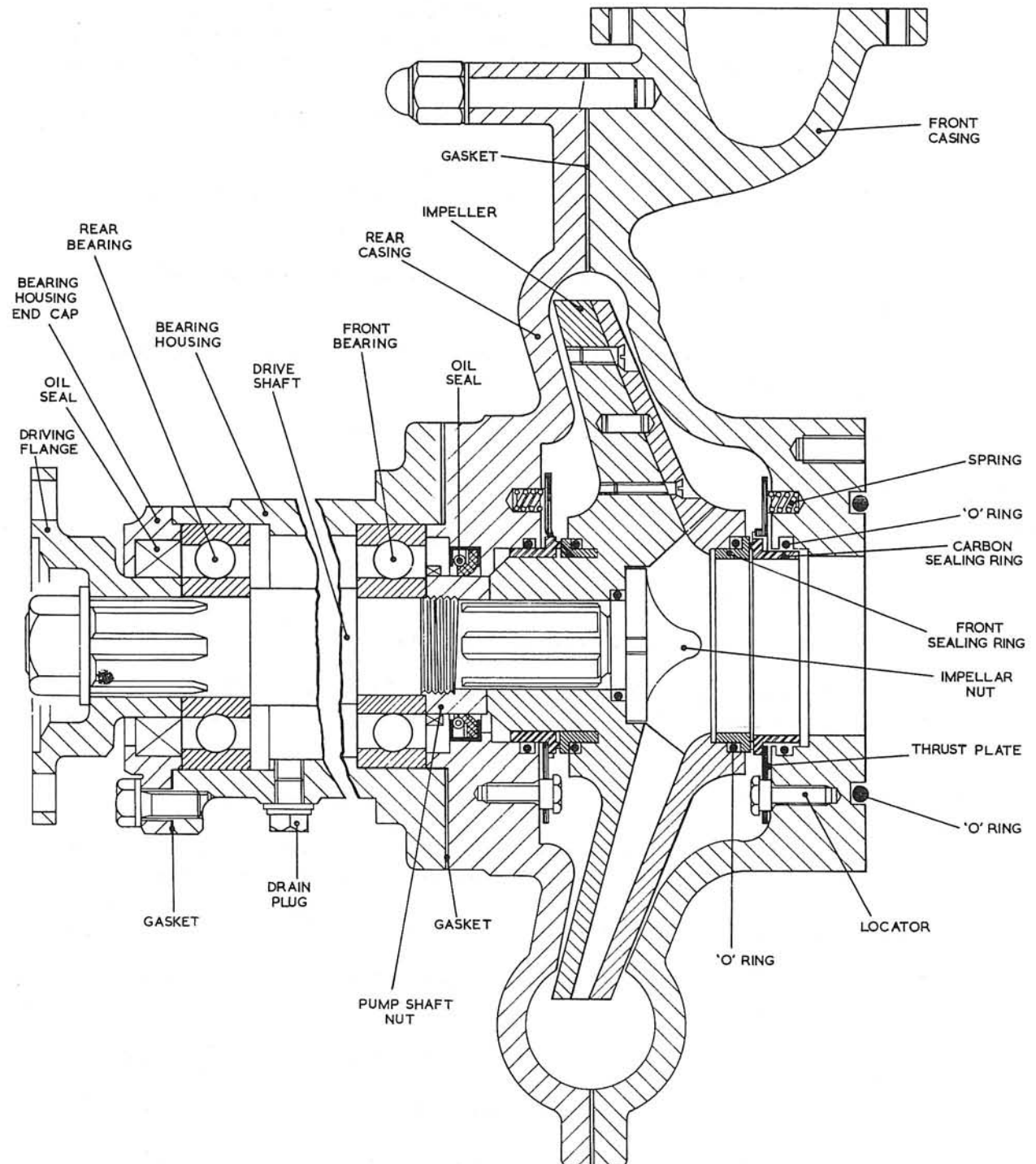


Fig.1. Cross-section of pump

on the impeller.

(4) Using the special spanner provided, stowed in the passenger seat locker, remove the special impeller nut and withdraw the impeller from its shaft complete with the rear sealing ring and 'O' ring.

(5) Unscrew the three locators securing the rear thrust plate and remove the thrust plate, the three springs and the rear carbon sealing ring.

- (6) Check that the oil has been drained from the bearing housing and unscrew the six 3/8 in. UNF socket-head cap screws visible in the centre of the pump rear casing. Withdraw the casing from the bearing housing.
- (7) Remove the pump shaft nut using the special spanner stowed in the passenger seat locker.
- (8) Remove the hexagon nut and washer securing the driving flange to the pump shaft.
- (9) Remove the 5/16 in. UNF bolts and withdraw the driving flange and bearing housing and cap together.
- (10) Using a hide or copper-faced hammer, hit the shaft at the pump end and drive out the shaft complete with the rear bearing.
- (11) Press out the front bearing.

Assembly (fig.1)

28. To assemble the pump, proceed as follows using new gaskets and 'O' rings:-

- (1) Inspect the bearings for wear and replace as necessary.
- (2) Press the front bearing into the housing.
- (3) Assemble the rear bearing on the drive shaft and, using a hide or copper-faced hammer, tap the shaft to drive the rear bearing into the housing.
- (4) Extract the oil seal from the bearing housing end cap.
- (5) Fit a new oil seal and carefully insert the drive flange into the end cap before sliding the drive flange onto the splined shaft.
- (6) Replace the 5/16 in. UNF bolts securing the end cap.
- (7) Replace the $\frac{3}{4}$ in. UNF hexagon nut and washer securing the drive flange to the shaft.
- (8) Replace the pump shaft nut and tighten using the special spanner.
- (9) Extract the oil seal from the pump rear casing and fit a new oil seal.
- (10) Slide the casing over the shaft and replace the 3/8 in. UNF socket-head cap screws.
- (11) Renew the 'O' ring in the rear casing.
- (12) Inspect the rear carbon sealing ring and thrust plate for signs of wear or damage and renew as necessary.
- (13) Assemble the rear thrust plate, springs and carbon sealing ring and tighten the locators. Ensure that the carbon sealing ring is free to move in the spring-loaded pressure plate.
- (14) Repeat the procedure detailed in (11) to (13) for the front carbon sealing ring located on the pump front casing.

- (15) Inspect both front and rear sealing rings for signs of damage or wear and renew as necessary.
- (16) Renew the 'O' rings in the impeller and assemble the rear sealing ring and the impeller onto the shaft.
- (17) Fit the special impeller nut and tighten, using the special spanner.
- (18) Assemble the front sealing ring in the impeller and offer up the front casing, using the two dowels to ensure that the two halves of the casing are correctly aligned.
- (19) Replace the 3/8 in. UNF dome nuts securing the two halves of the casing.

Replacement

29. The pump should be fitted to the truck as follows:-

- (1) Position the pump, with the driving flange facing forward, below its mounting plate and replace the $\frac{1}{2}$ in. UNF securing bolts, spring washers and nuts.
- (2) Connect the pressure gauge supply pipe to the outlet on the pump rear casing and tighten the union.
- (3) Ensure that the holes in the pump delivery flange are lined up with the outlet pipe flange and replace the 3/8 in. UNF setscrews.
- (4) Ease the rubber intake hose over the pump inlet pipe and tighten the hose clips.
- (5) Lace the pump lagging onto the pump and feed the lagging supply cables into the junction box.
- (6) Replace the pipe lagging, if removed, and feed the supply cables into the junction box.
- (7) Reconnect the cables and tighten the connector screws.
- (8) Replace the junction box cover and secure with four screws.
- (9) Carry out an insulation resistance check as detailed in para. 34
- (10) Connect the pump drive shaft to the pump drive flange.
- (11) Refill the bearing housing with oil as detailed in para. 7.
- (12) Replace the aluminium pump guard.

BRANCH PIPE

30. The branch pipe is constructed of aluminium and comprises an inlet pipe, a trigger-operated valve assembly, a 3 in. bore outlet tube and two adjustable deflector jaws. The valve controls the flow of foam through the outlet nozzle and the deflector jaws allow a jet or spray to be selected. The valve is opened by pulling the trigger lever back towards the inlet pipe; the trigger mechanism pushes back the trunnion and hence the valve plunger.

Dismantling the valve (fig.2)

31. To dismantle the valve proceed as follows:-

- (1) Disconnect the supply hose at the hermaphrodite coupling on the inlet pipe.
- (2) Remove the two pivot screws at the top of the trigger lever and lift off the complete trigger mechanism.
- (3) Unscrew the three self-tapping screws and pull the valve body clear of the outlet tube.
- (4) Unscrew the outlet nozzle and remove the valve seat and the two fibre washers.
- (5) Release the locking grub screw and unscrew the trunnion from the valve plunger. If necessary use fingers to grip the stopper through the front of the valve body. Remove the plunger and the spring and washer.
- (6) Tap out the 1/16 in. diameter pin securing the stopper to the plunger.

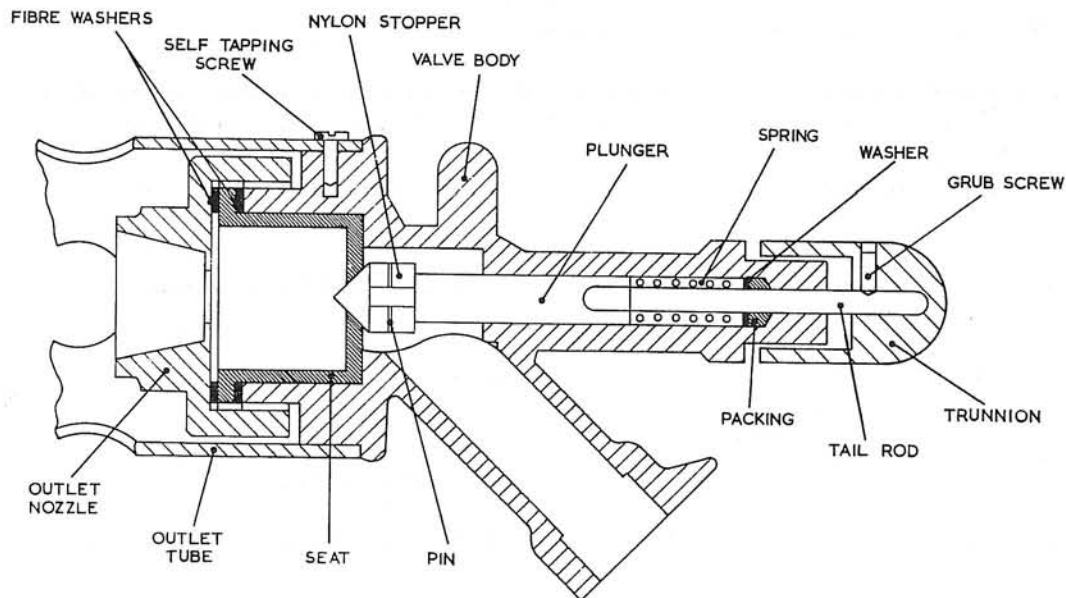


Fig.2. Cross-section of branch pipe valve

Assembling the valve

32. Wash all parts in clean water and inspect for any signs of wear or damage. Renew any suspect parts and assemble as follows:-

- (1) Fit the stopper to the plunger and tap the securing pin into place.
- (2) Apply a smear of light grease to all sliding surfaces of the plunger and trunnion.
- (3) Renew the tallowed hemp packing in the body of the valve.
- (4) Assemble the plunger, spring and washer, and locate them in the

Coverage

5-7 m²/kg (55-75 ft²/kg)

Drying time

12 hours at 20°C

30 minutes at 80-85°C following a
flash-off time of 20-30 minutes.

