TRUCK, DUMP, HEAVY, MC3 – MACK

TECHNICAL DESCRIPTION

This instruction is authorised for use by command of the Chief of Army. It provides direction, mandatory controls and procedures for the operation, maintenance and support of equipment. Personnel are to carry out any action required by this instruction in accordance with EMEI General A 001.

TABLE OF CONTENTS

LIST OF FIGURES

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INTRODUCTION

1. This EMEI describes the technical description of the Truck, Dump, Heavy, MC3 – Mack (Figure 1). All relevant weights, dimensions and performance figures are detailed in the Data Summary, EMEI VEH G 730 (Dump) or EMEI VEH G 730-l (Dump Winch) as applicable. For further information on the basic data, refer to the relevant EMEI.

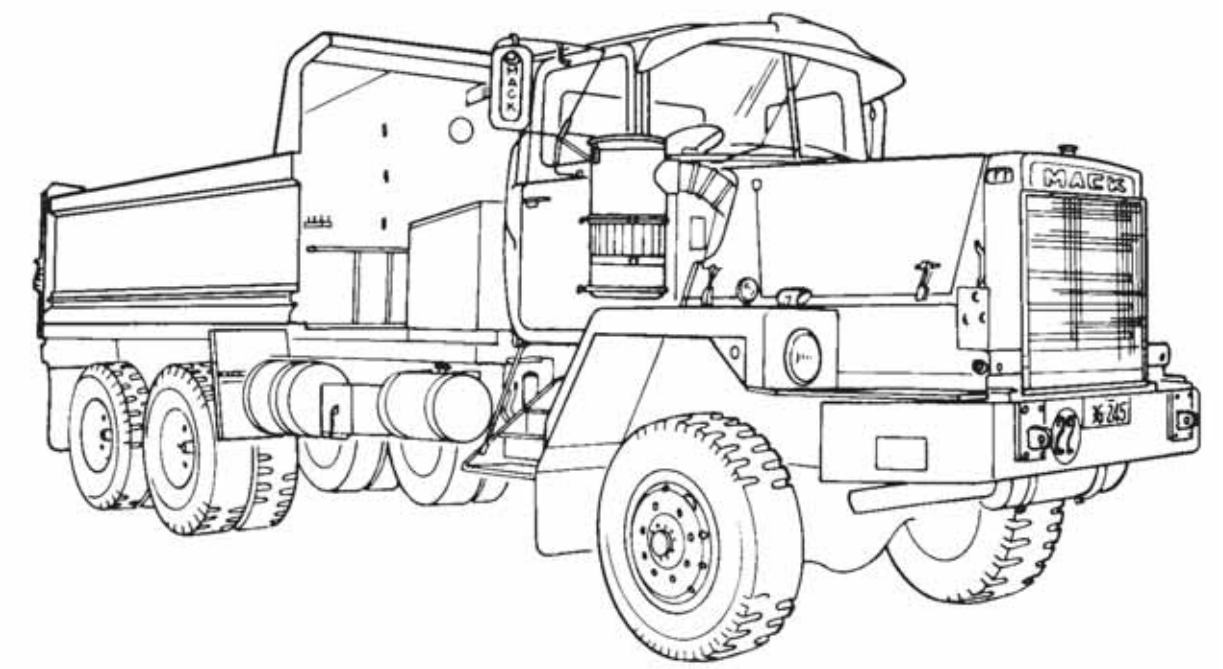


Figure 1 Truck, Dump, Heavy, MC3 – Mack

ARRANGEMENT OF THE EQUIPMENT

2. The dump truck utilizes an aluminium box section, end dumping body for load transportation. With the addition of side seats, the dump truck can be converted to transport troops. The sub-assemblies of the truck comprise the following:

a. Dump Body.

(1) Figure 2 illustrates the dump body of a winch model dump truck with side seats fitted for troop transportation. Canopy bows are installed to support a canvas canopy. The cab protector is secured to the front of the dump body by bolts.

(2) Removal of the dump body from the chassis is facilitated by the use of eye-bolts. Two eye-bolts are permanently installed in the floor of the dump body, one either side of the hoistwell at the front of the body, while two holes are situated near the tailgate for a further two eye-bolts. These holes are generally filled by blanking plugs and the eye-bolts are stowed externally on each side of the dump body. The rear eye-bolts are also used as the rear lift points for lifting the entire unladen truck.

NOTE

The front body eye-bolts have a maximum safe working load of 2 300 kg and must only be used for lifting the body or as load tie down points.

(3) All dump and dump winch bodies are fitted with a ladder and all have facilities for mounting troop seats and a canopy. The cab protector is removable for rail transportation and the headboard has been constructed to facilitate both rail transportation and canopy ventilation.

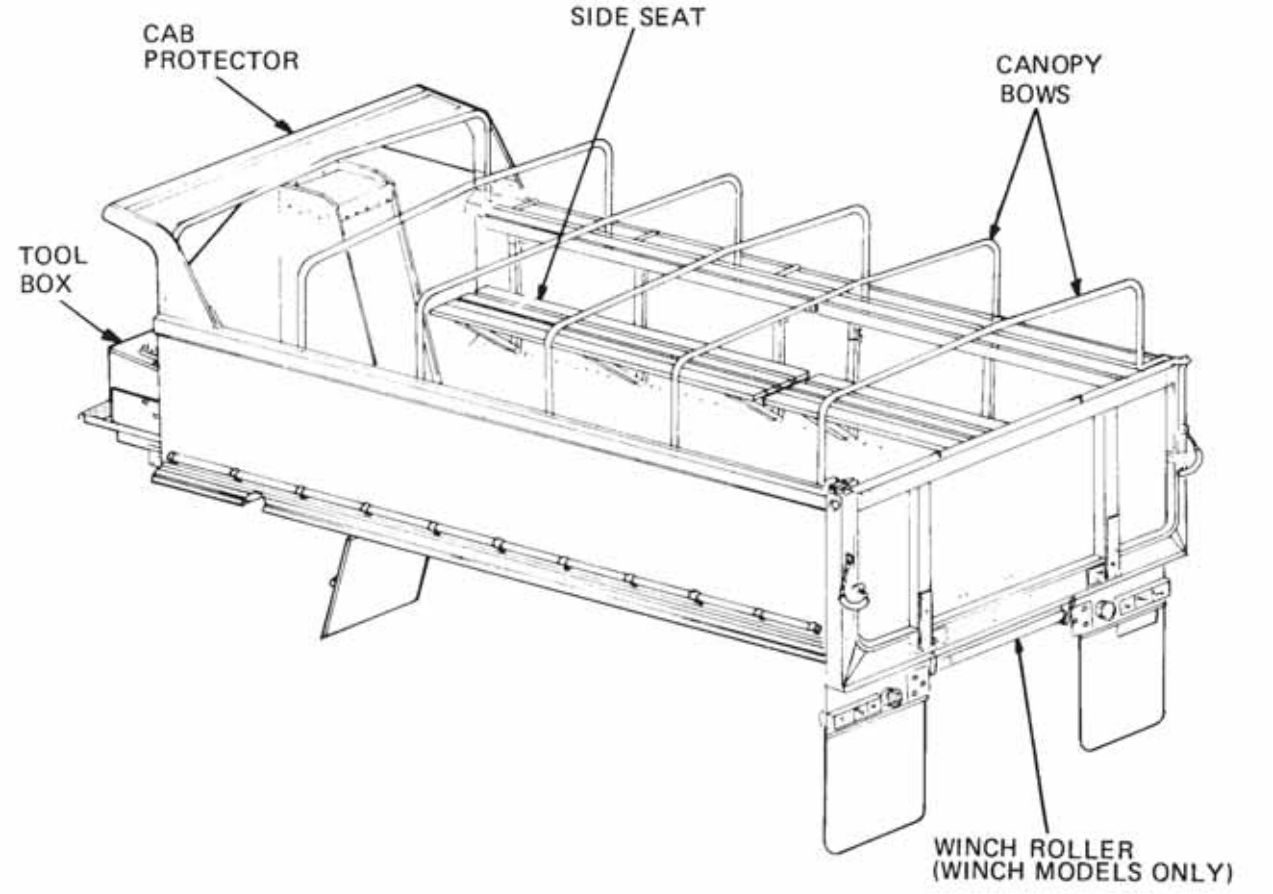


Figure 2 Dump Winch Body Assembly

b. Power Take-Off (PTO) – Hydraulic Pump. The PTO is a Powauto AH23BRll gear-driven single speed model, mounted on the right-hand side of the truck gearbox. When actuated by the floor mounted IN/OUT control, the PTO drives the hydraulic pump.

c. Hydraulic Pump. A Powauto CFS15 hydraulic pump is flange-mounted directly onto the drive end of the PTO. The pump is a two-gear, constant displacement design which draws hydraulic fluid from the oil reservoir and provides pressurized hydraulic fluid to the hoist controls.

d. Hydraulic Hoist.

(1) An ROC model hydraulic hoist is mounted on the truck. The base of the hoist is a solid profiled and machined trunnion which fits into two foot-mounts. The mounts are attached to a hoist crossmember which is pinned to the sub-frame. The top mount on the hoist comprises a clevis joint. The hoist is located inside the hoistwell which forms part of, and is situated at the front of, the dump body.

(2) The hoist is a single acting three stage telescoping unit and is capable of tipping at an angle of 48°. The hoist is extended under power but relies on the weight of the dump body to retract.

e. Dump Controls.

(1) The control box (Figure 3) for both the PTO and hoist is located on the cab floor between the seats. With the PTO engaged the hydraulic pump supplies hydraulic fluid under pressure to the hoist control valve, which is controlled by the hoist control knob.

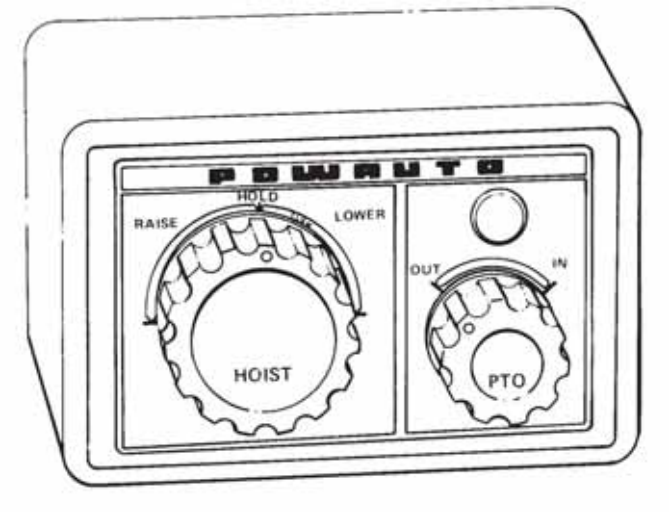


Figure 3 Hoist and PTO Controls

(2) Load limits for the dump truck can be checked on the load indicator gauge (Figure 4) mounted inside the cab, on the rear wall. This gauge indicates the pressure inside the hydraulic ram. The load limits are expressed in tonnes.

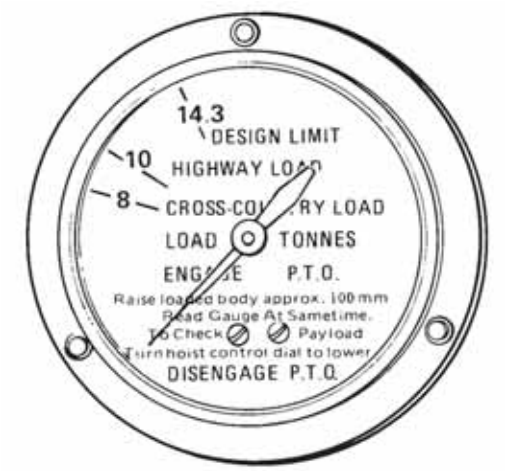


Figure 4 Load Indicator Gauge

(3) The tailgate release switch (Figure 5) is located below the dashboard on the right-hand side. This controls the locking and unlocking of the lower edge of the tailgate.

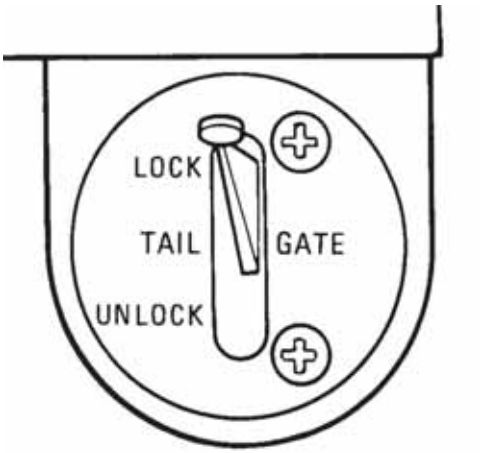


Figure 5 Tailgate Lock Control

3. An Ateco winch type 24L is fitted to some dump trucks to aid in self-recovery. This winch is identical to that fitted to the cargo truck and is detailed in the relevant EMEI.

4. Carrying volume of the dump truck is eight cubic metres.

DETAILED TECHNICAL DESCRIPTION

Dump Body

5. The truck is fitted with an aluminium alloy box-section end-dumping body. Two box-section beams (main bearers) are welded to, and run the full length of the body and are also the mounting points for the two rear upper pivot brackets. Wear plates are fitted to the front of the main bearers to prevent the sub-frame from wearing them. Figure 6 illustrates the location of various equipment around the dump body and chassis.

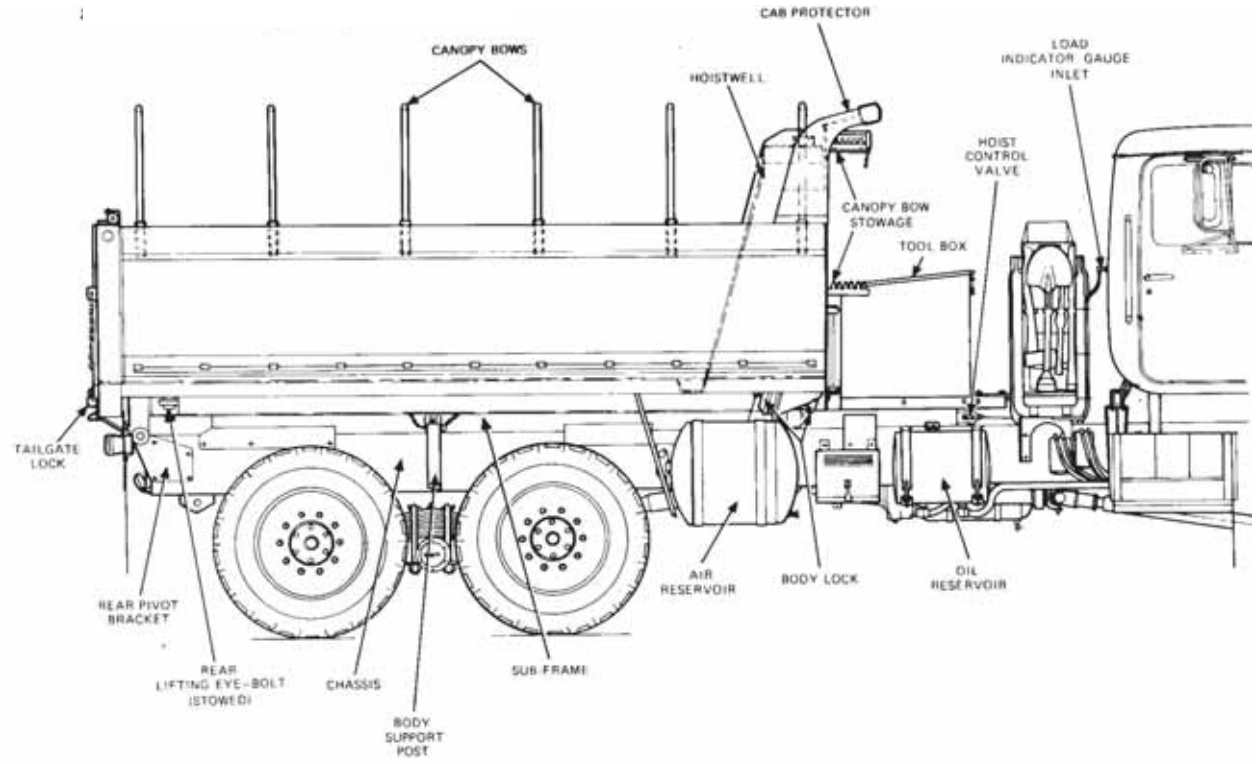


Figure 6 Dump Body and Chassis – Equipment Location

6. The dump body is mounted on a steel box-section sub-frame which is bolted to the truck chassis. The sub-frame is the main bearing member for the dump body. The two upper pivot brackets are bolted to the dump body and the two lower pivot brackets are bolted to the truck chassis. A steel shaft through the brackets secures the rear of the dump body to the truck and acts as the pivot point when the body is tilted (raised). On winch models, this pivot shaft also becomes the mounting shaft for the lower winch roller.

7. The truck can be converted for troop transport with the addition of side seats. A step ladder, normally stowed at the front of the dump body, provides access to the body. A canvas canopy can also be fitted to the body. This canopy is supported by six canopy bows which can be stowed at the front of the body, below the cab protector, when not in use.

8. A body lock and tailgate lock are fitted to the truck. The body lock (Figure 7) is located beneath the front right-hand side of the body. It utilizes a diaphragm type air brake chamber which locks the body in the travelling position. The control for the body lock is integrated with the PTO dump control and the body lock releases automatically when the PTO control knob is rotated to the engaged (IN) position. When the PTO control knob is rotated to the disengaged (OUT) position, the body lock automatically locks the body down.

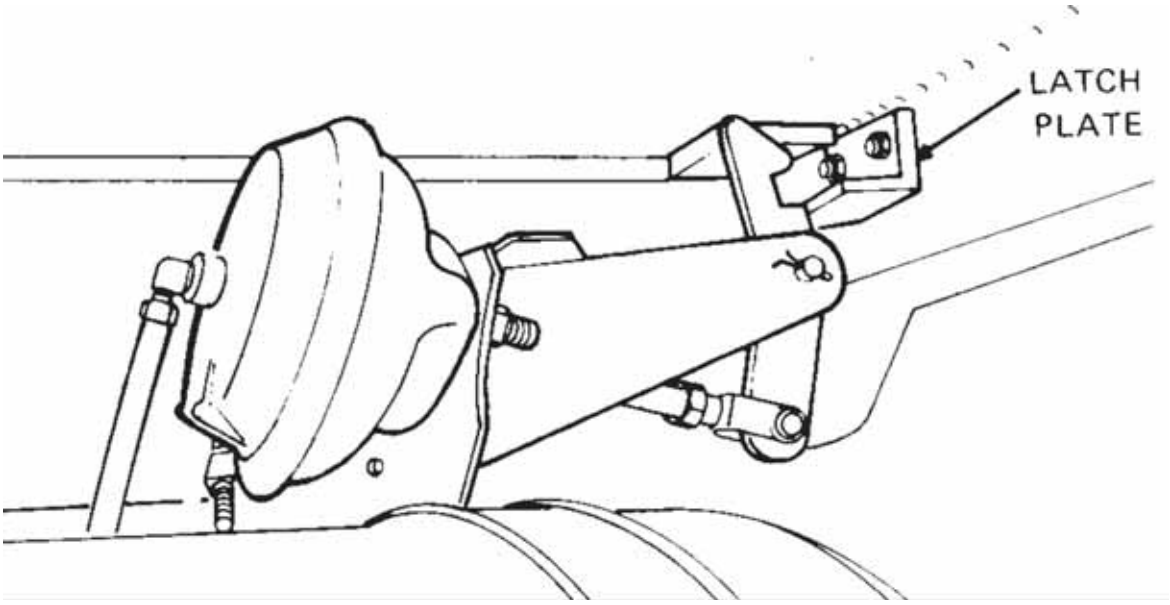


Figure 7 Body Lock

9. The tailgate lock (Figure 8), is a similar unit to the body lock and is controlled independently by the operation of an air valve located beneath the lower right-hand side of the dash panel, near the driver's door. This lock secures the tailgate in the closed (travelling) position, until released by the driver. The tailgate lock can also be manually operated by inserting a bar into the lever welded to the lock rod and exerting force to overcome spring pressure.

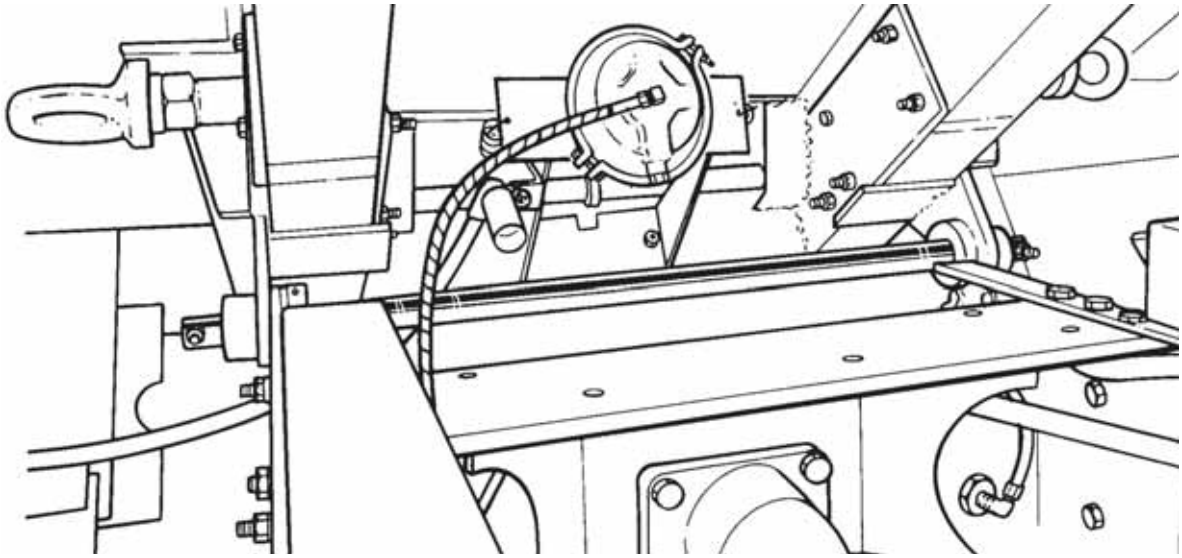


Figure 8 Tailgate Lock

Power Take-off (PTO) – Hydraulic Pump

10. The PTO is actuated by an IN/OUT control located on the PTO/hoist control box, which is mounted between the seats. When the control is placed in the IN position, compressed air is directed to the PTO where it actuates a piston which operates a gear selector fork. This selector fork, in turn, engages the selector gear which transfers the drive from the adapter gear, driven from the truck gearbox, to the PTO driven gear. This gear is splined with the output shaft which transfers the drive to the hydraulic pump.

11. The PTO is lubricated by oil from the truck gearbox.

Hydraulic Pump

12. The hydraulic pump (Figure 9) is flange mounted directly onto the drive output end of the PTO. The pump drive gear is splined to the PTO drive shaft. The drive gear and idler gear shafts are both mounted in bushes.

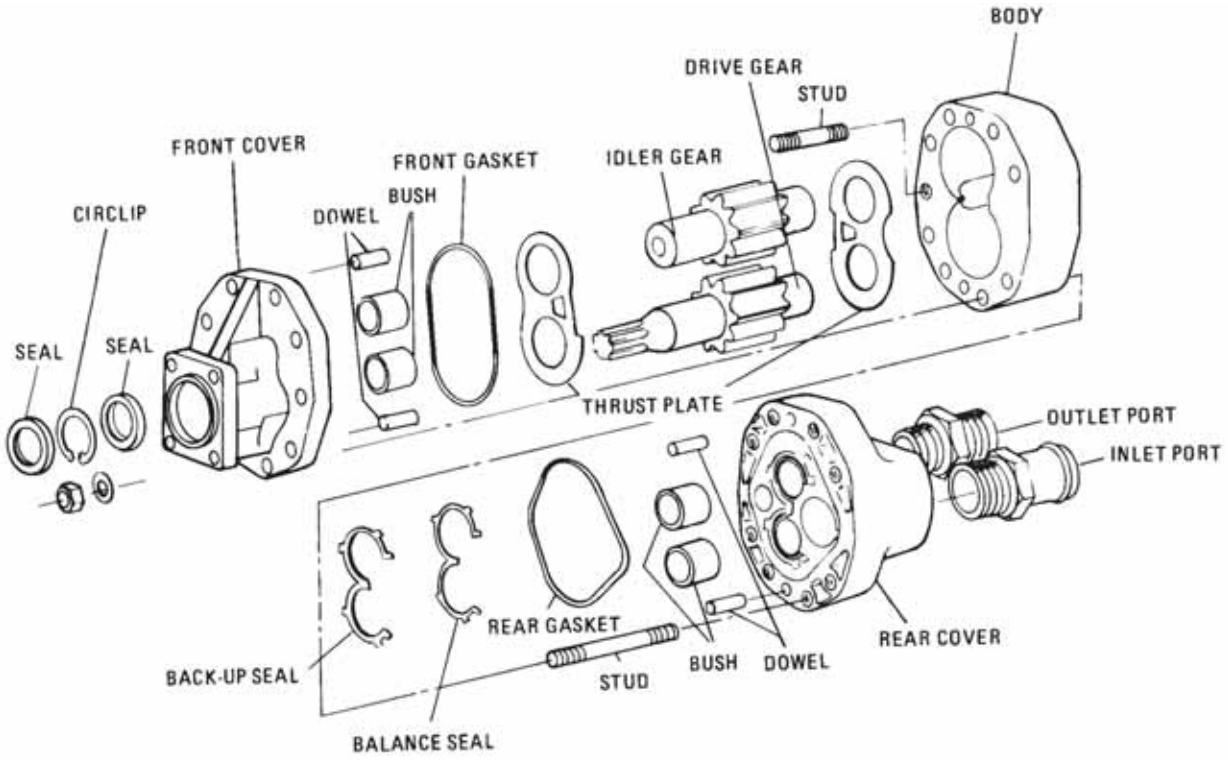


Figure 9 Hydraulic Pump

13. When operating, hydraulic fluid is drawn from the reservoir through the pump inlet port. The rotation of the gears forces the fluid out the outlet port under pressure.

14. The hydraulic fluid also provides lubrication for the working components of the pump.

Hydraulic Hoist

15. The hoist is a single acting three-stage telescoping unit which has a maximum stroke of 3.25 metres and a total lifting capacity of 16 tonnes.

16. The seals in the cylinders are of the multi-chevron type, located adjacent to long, large area bronze bushes. The seals are retained in adjustment by a gland nut which incorporates a wiper ring to prevent the ingress of dust and dirt to the sealing chamber. The seals can be adjusted for wear without dismantling any part of the assembly.

17. The steel piston base is a screw on type and is locked in position with locking screws. The first two stages are fitted with forged manganese-bronze rings.

18. An exploded view of the hydraulic hoist is shown in Figure 10 while Paras 29 to 33 details the complete hoist operation.

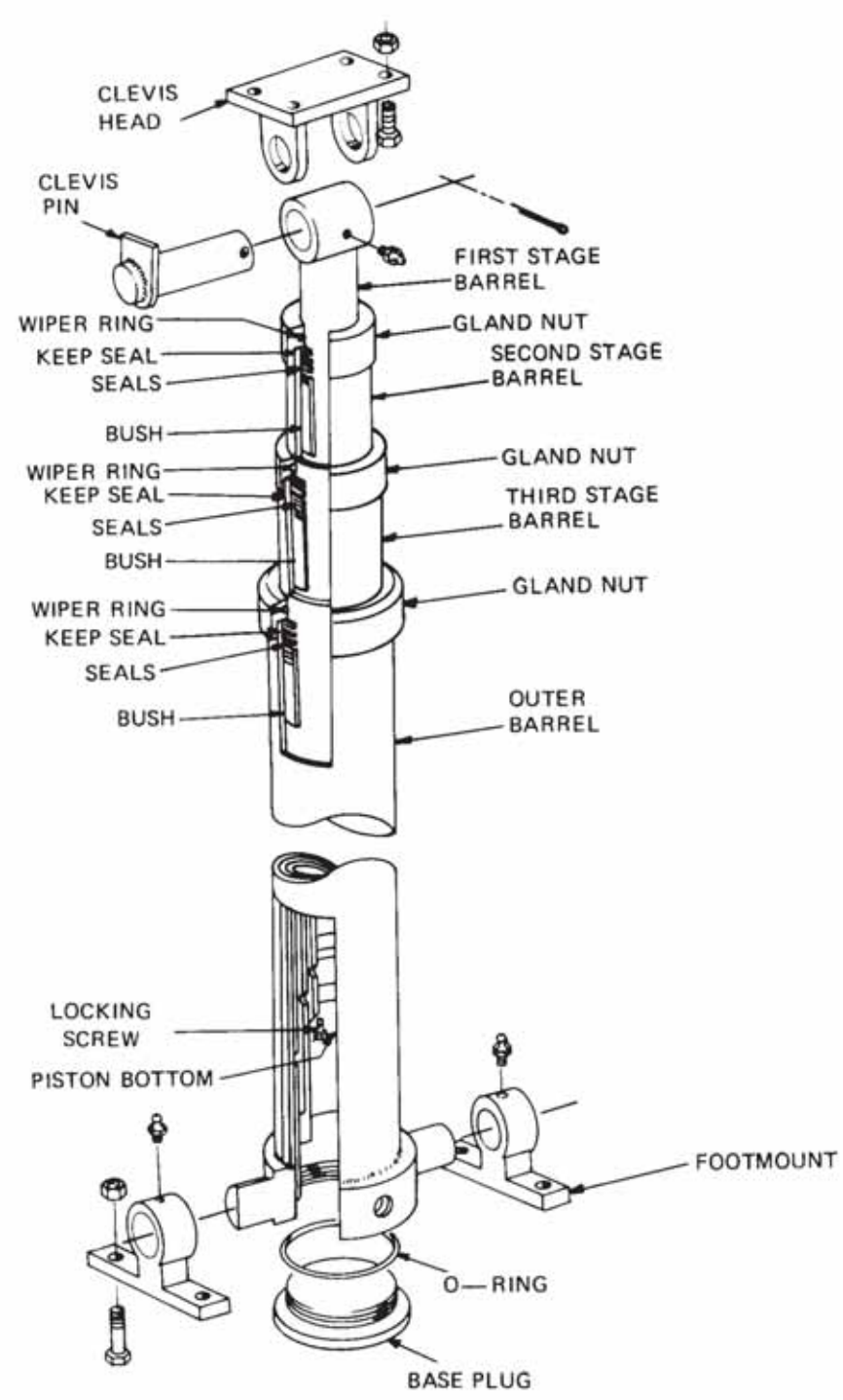


Figure 10 Hydraulic Hoist – Exploded View

Air Circuit – Dump Body Lock and Hoist

19. Figure 11 illustrates the dump body lock and hoist air circuit in a simplified form. Air is supplied by the secondary air reservoir through the pressure protection valve to the following circuits:

- **a.** tailgate lock,
- **b.** body lock,
- **c.** PTO air selector, and
- **d.** hoist control.

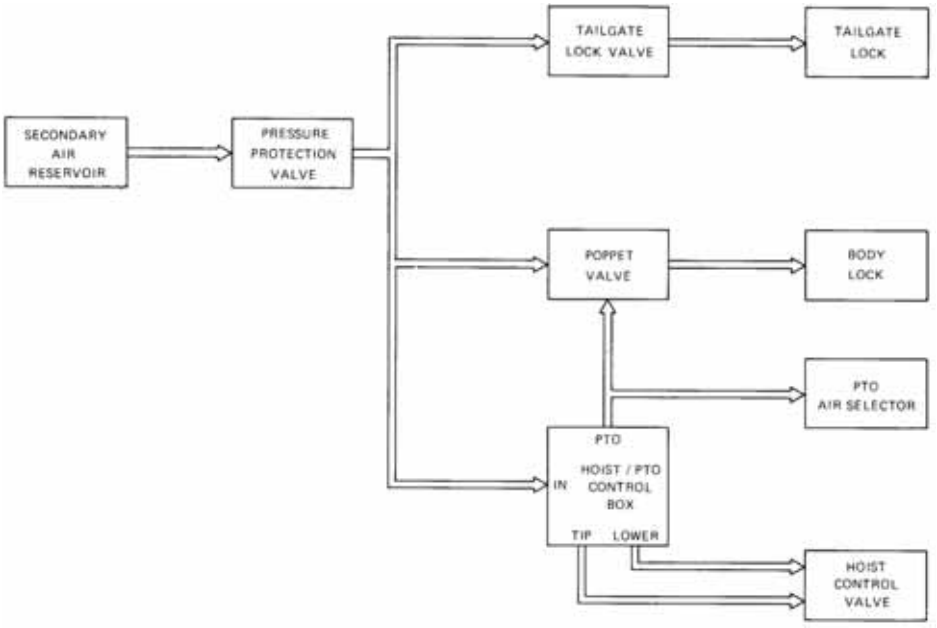


Figure 11 Air Circuit – Dump Body Lock and Hoist

20. The pressure protection valve (Figure 12), closes automatically should an air reservoir failure occur. The closing pressure is preset to 450 kPa (65 psi).

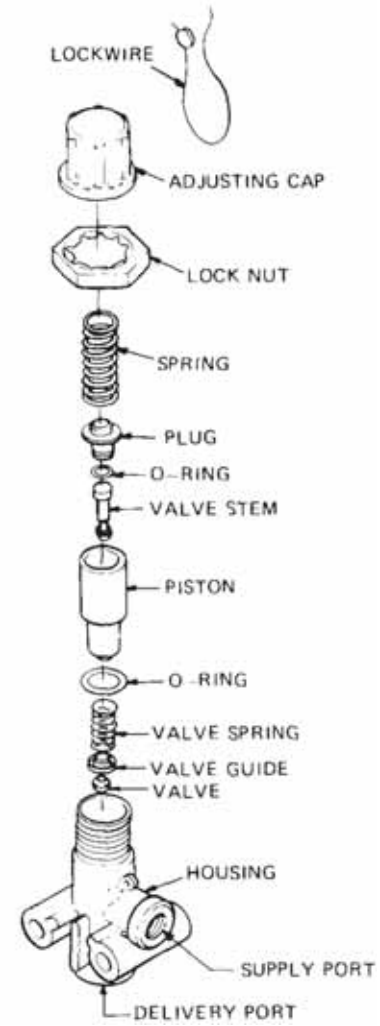


Figure 12 Pressure Protection Valve – Exploded View

Tailgate Lock Air Circuit

21. Air supplied via the pressure protection valve is applied to the inlet port of the tailgate lock valve (Figure 13), which is situated under the dashboard to the right of the driver.

22. When the tailgate-valve lever is moved to the UNLOCK position, the valve plunger allows air to flow directly to the tailgate lock air chamber which releases the securing latch when air pressure acts upon the diaphragm. With no air pressure applied, a return spring forces the diaphragm back into the air chamber thereby locking the tailgate.

23. When the tailgate-valve lever is returned to the LOCK position, air from the chamber is exhausted via the tailgate lock valve. This allows the return spring to reassert itself and lock the tailgate.

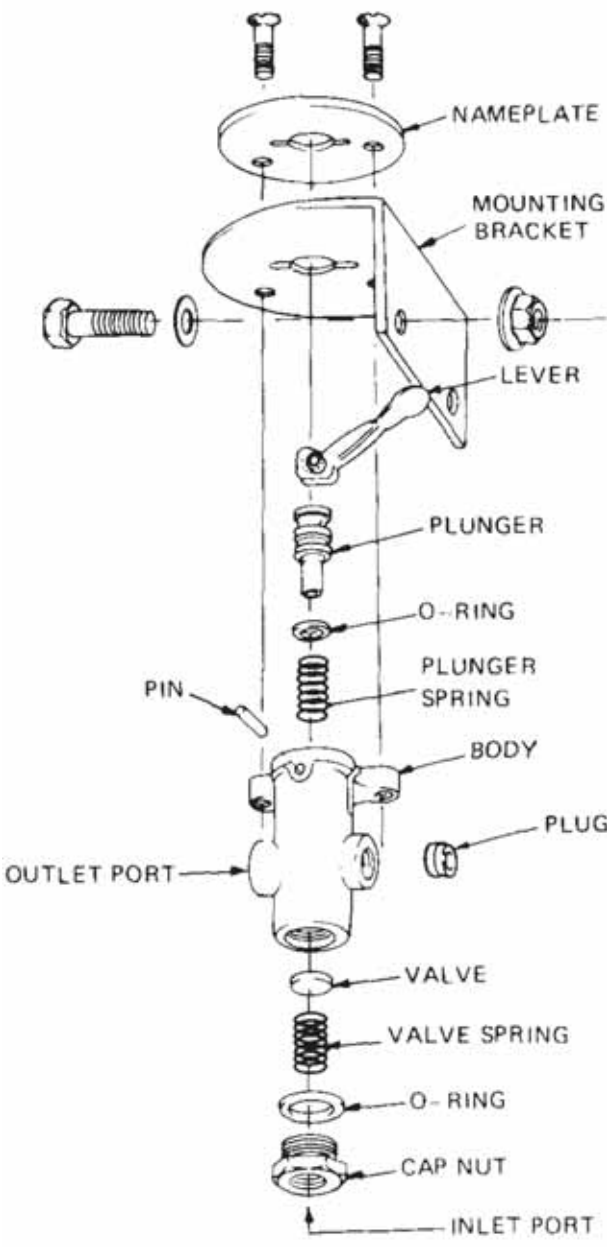


Figure 13 Tailgate Lock Valve – Exploded View

Body Lock Air Circuit

24. Air supplied via the pressure protection valve is applied simultaneously to the inlet ports of the poppet valve (Figure 14) and the PTO/hoist control box. When the PTO select switch has been moved to the IN position, signal pressure air is directed to the operating head on the poppet valve. The signal pressure forces the support button onto the stem, which in turn moves the valve seat thereby allowing air to flow from the inlet port to the outlet port.

25. The poppet valve outlet port is connected to the body lock air chamber. When air pressure acts upon the diaphragm, the body securing latch releases and stays released while the air pressure is maintained. With no air pressure applied, the return spring forces the diaphragm back into the air chamber thereby locking the dump body to the chassis.

26. When the PTO control is moved to the OUT position, air is exhausted from the chamber via the poppet valve. This allows the return spring to reassert itself and lock the dump body to the chassis.

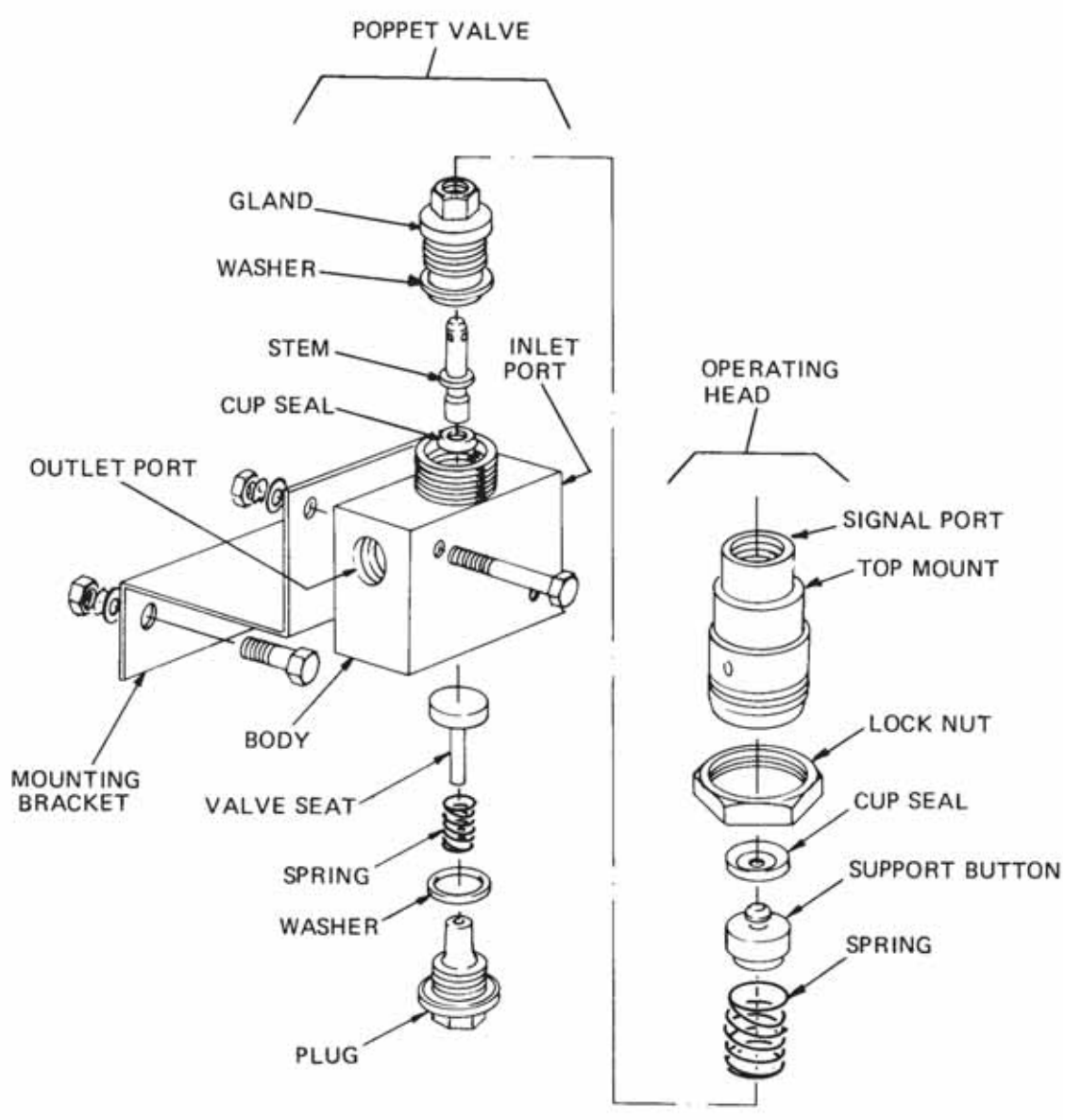


Figure 14 Poppet Valve – Exploded View

PTO Air Selector

27. When the PTO switch on the PTO/hoist control box is moved to the IN position, air is directed to the PTO air selector. This engages the PTO which, in turn, drives the hydraulic pump to provide pressurized hydraulic fluid to the hoist.

28. When the PTO switch is moved to the OUT position, air in the line exhausts through the valve (IN/OUT switch) in the control box allowing the PTO to disengaged by spring pressure.

Hoist Control Air Circuit

29. The hoist control on the PTO / hoist control box can be set to either the RAISE, HOLD, or LOWER positions and operates as follows:

a. In the RAISE position, air is directed to the TIP port of the hoist control valve. This air pressure acts on a piston within the control valve which moves the valve spool, thereby opening the outlet port permitting pressurized hydraulic fluid to flow to the hoist. Simultaneously, the air in the opposite line (LOW port) is exhausted via the valve within the hoist control knob.

b. In the HOLD position, no air flow is permitted to the HOIST control valve. Internal spring pressure within the control valve positions the piston and spool so that no hydraulic fluid flow is possible to or from the hoist. Consequently, the hoist will remain rigidly in position. When in the HOLD position, air in both lines to the control valve exhausts through the valve within the hoist control knob.

c. In the LOWER position, air is directed to the LOW port of the hoist control valve. This air pressure acts on a piston within the hoist control valve which moves the valve spool, thereby connecting the hoist port to the oil reservoir port allowing hydraulic fluid to flow from the hoist to the oil reservoir. When in the LOWER position, air in the opposite line (TIP port) is exhausted via the valve in the hoist control valve.

Hoist Hydraulic Circuit

30. Figure 15 illustrates the dump body hoist hydraulic fluid circuit in a simplified form. Hydraulic fluid is drawn from the oil reservoir and pumped to the hoist control valve by the hydraulic pump. Depending on the position of the hoist control knob on the PTO/ hoist control box, fluid will flow straight to the hydraulic hoist (RAISE), straight back to the oil reservoir (HOLD), or from the hydraulic hoist to the oil reservoir (LOWER).

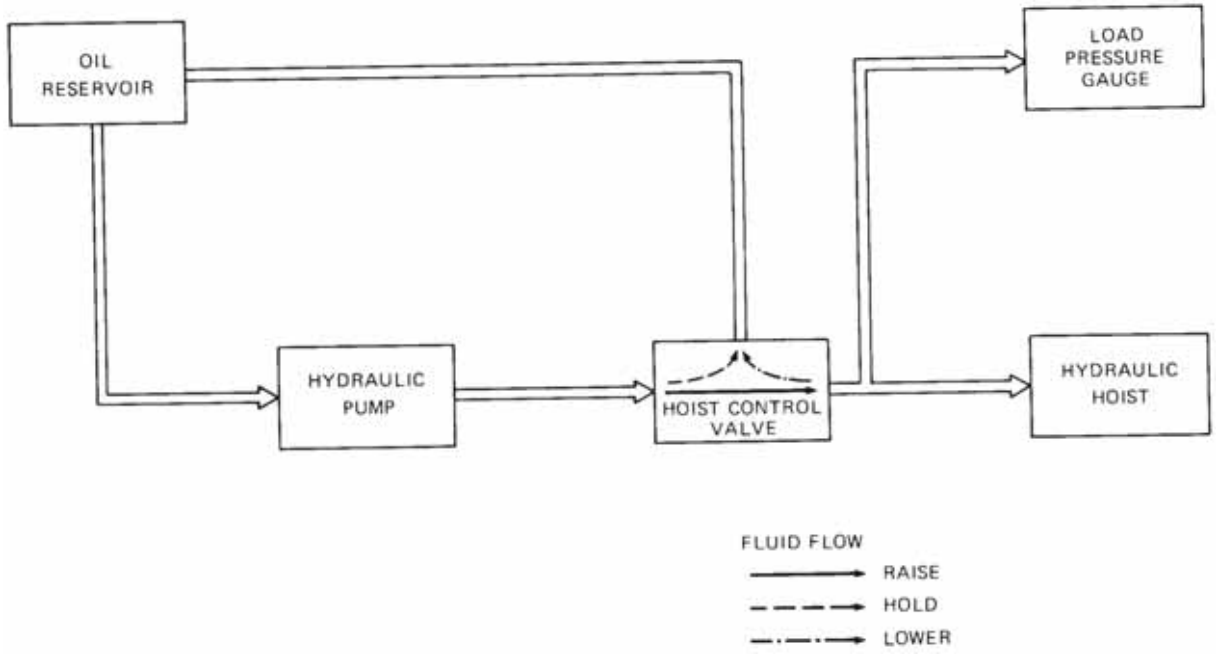


Figure 15 Hoist Hydraulic Circuit

Hoist Control Valve

31. The hoist control valve (Figure 16) is a Powauto AIR 83 three-position hydraulic spool valve with integral relief and check valves. The relief valve is incorporated on the primary or pump side of the spool valve as it is designed for use with equipment not provided with inbuilt by-pass or relief valves. The check valve is incorporated to ensure that the load is safely held should the fluid supply be interrupted.

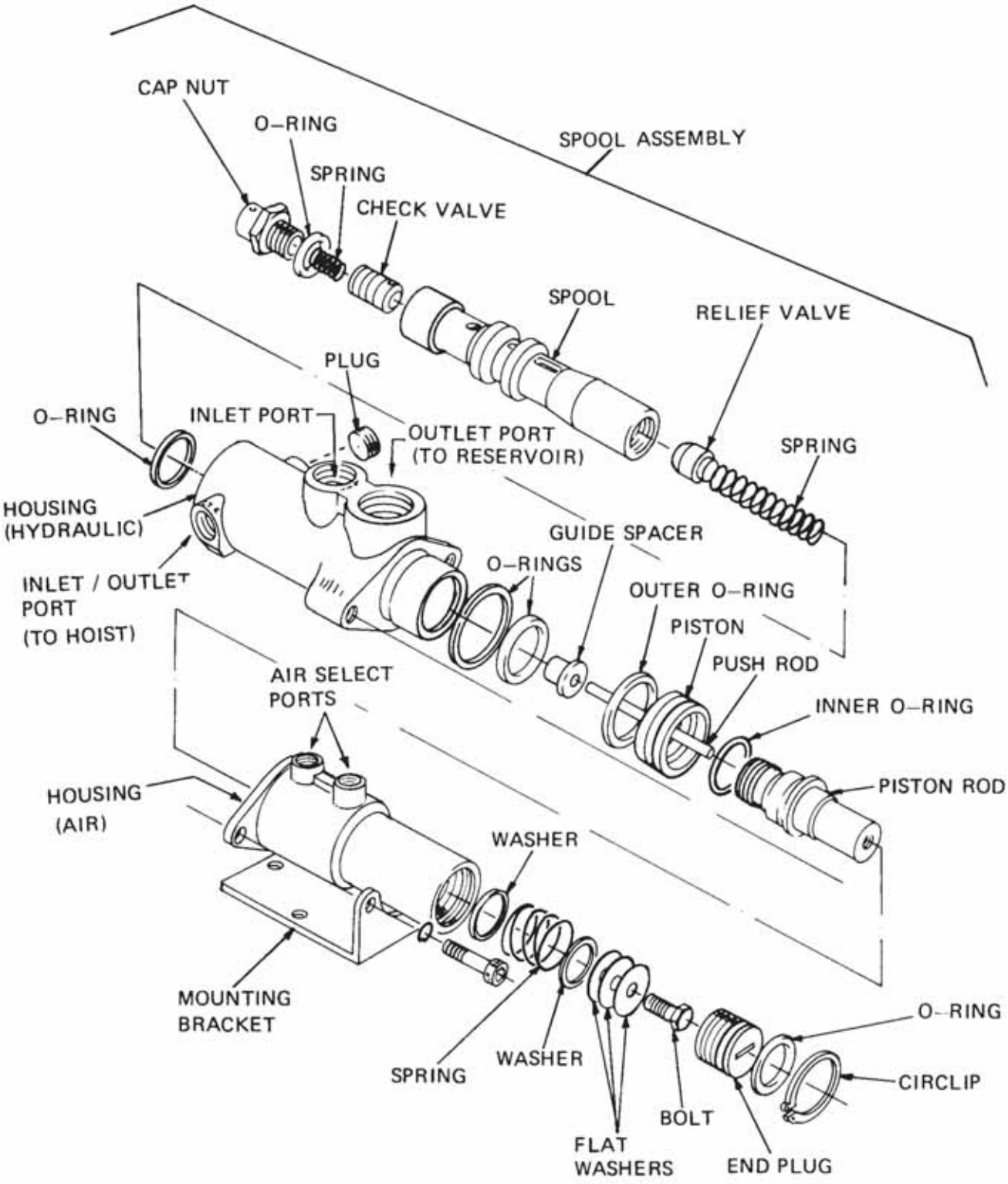


Figure 16 Hoist Control Valve – Exploded View

32. The valve is pedestal mounted on the right-hand side of the body sub-frame and is connected into the system by hydraulic and air line couplings. Valve operation is covered in Para 29.

33. The maximum working pressure of the valve is 17 250 kPa (2 500 psi) and the relief valve setting is adjustable between 7 000 kPa (1 000 psi) and 17 250 kPa (2 500 psi). The actual relief valve setting is 12 057 kPa (1 750 psi).

Wiring Harnesses

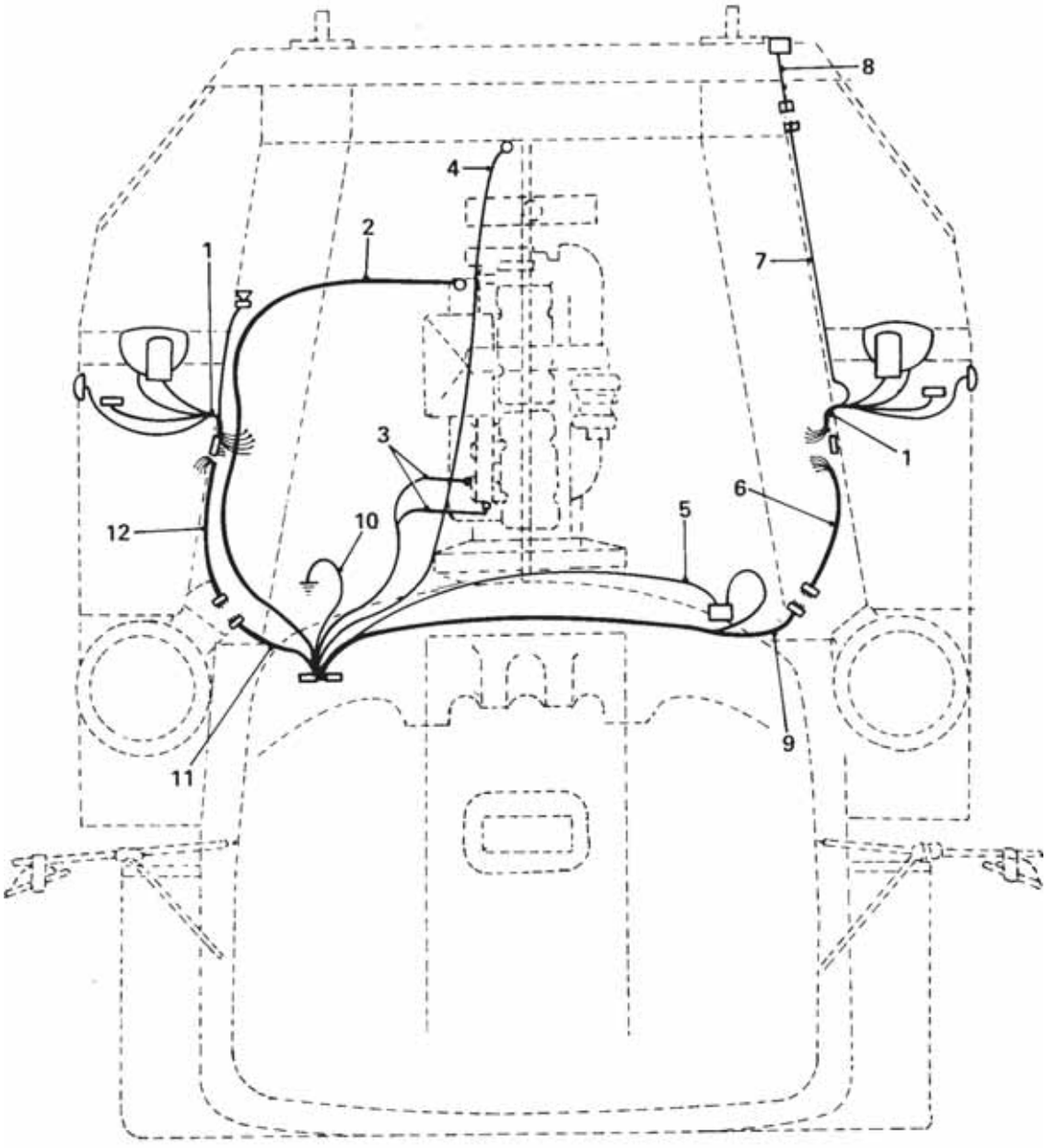
34. For ease of illustration, the wiring harnesses are broken down into three figures as follows:

a. front wiring harnesses (Figure 17);

b. cab wiring harnesses (Figure 18); and

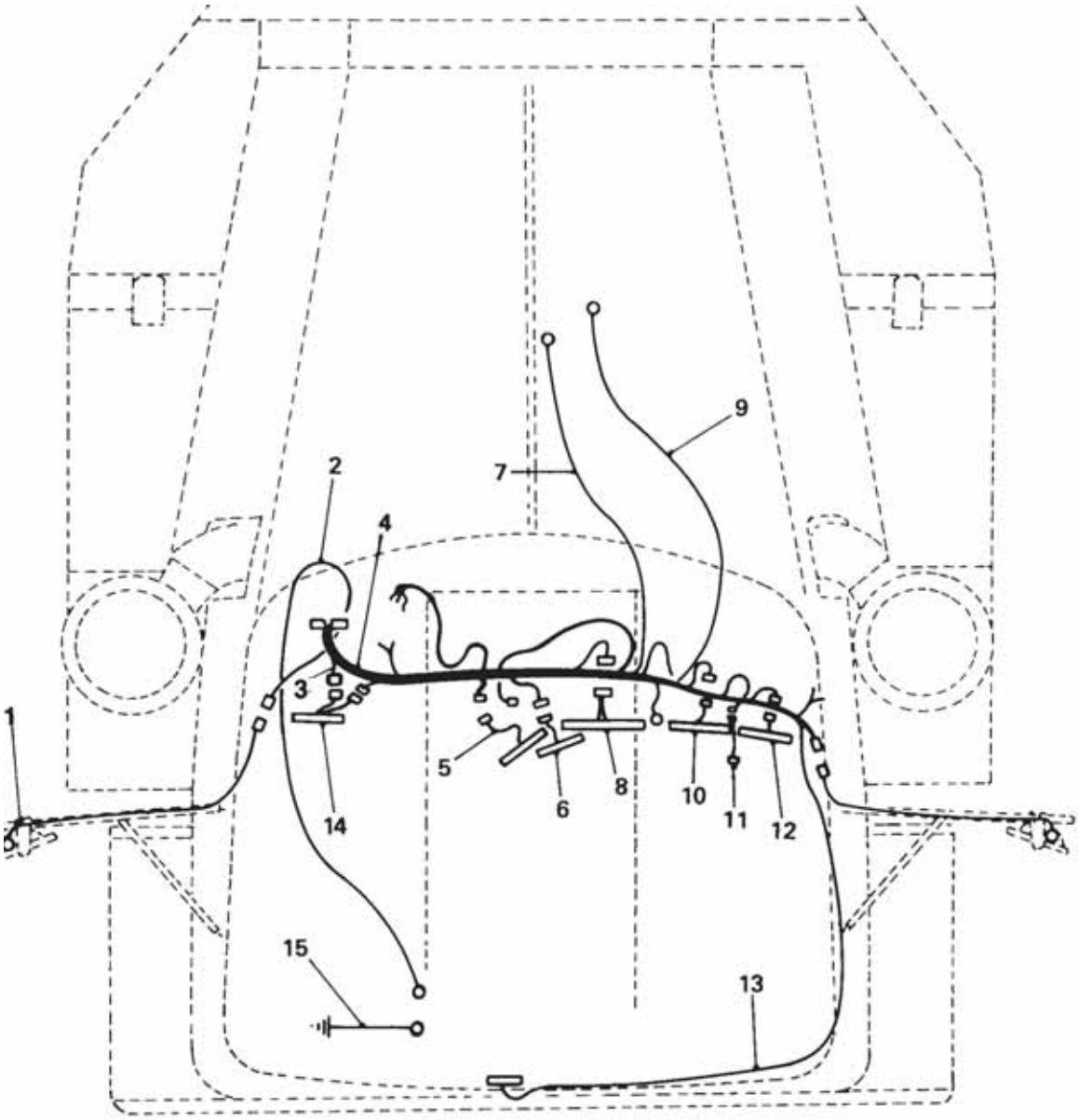
c. rear wiring harnesses (Figure 19).

35. Each figure is accompanied by an explanatory legend.



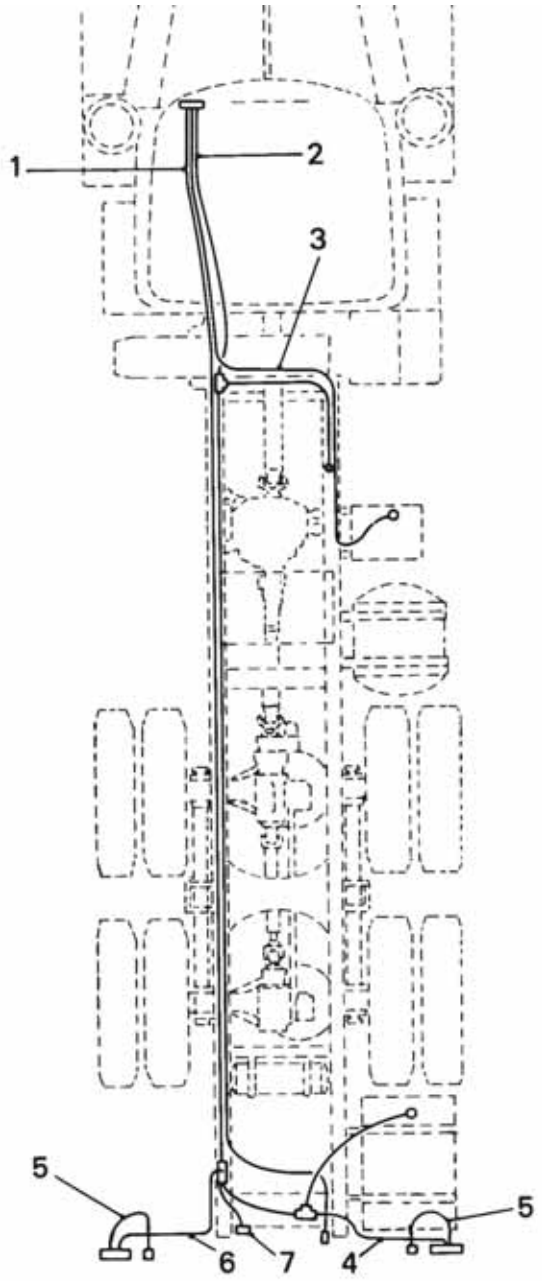
1. Front Lights and Horn
2. Generator
3. Water Temperature Alarm
4. Low Water Level
5. Stop Lamp
6. RH Mudguard to Cab
7. Reduced Head Light
8. Reduced Head Lamp
9. Cab to RH Mudguard
10. Cab to Chassis (Earth)
11. Cab to LH Mudguard
12. LH Mudguard to Cab

Figure 17 Front Wiring Harness



1. Mirror Lamps
2. Reverse Lamp
3. Kysor Board to Plug to Peg Board
4. Main Cab
5. LH Panel
6. Gearbox to Chassis
7. Pyrometer to Sender
8. Pyro Panel to Plug
9. Dynatard
10. Speedo
11. Steering Column
12. Upper Console RH Panel
13. Roof
14. Kysor Panel Main Loom to Fuses
15. Chassis to Gearbox (Earth)

Figure 18 Cab Wiring Harness



1. Main Chassis
2. Auxiliary Chassis
3. Battery
4. RH Tail Lights
5. Blackout Lamp
6. LH Tail Lights
7. 12-pin NATO Socket

Figure 19 Rear Wiring Harness

END

Distribution List: **VEH G 26.0 – Code 1** (Maint Level)
(Sponsor: LV SPO Hvy B Vehicles)
(Authority ECO LVSPO 037/08)