Service Manual

Midi CX Backhoe Loader

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Specifications

Binary Pressure Switch Settings:	Low Pressure -	1.96 bar (2.0 kgf/cm², 28.4 lbf/in²)
	High Pressure -	27.5 bar (28 kgf/cm², 400 lbf/in²)
Thermostatic Switch Settings:	Cut out	-0.6 °C (33.0 °F)
	Cut in	4.2 °C (39.5 °F)
Refrigerant Type:	R-134a	
Quantity	1.2 Kg (2.65 lb) Maximum charge	
Oil Type:	PolyAlkylene Glycol (PAG)	
Quantities - Recharge the system (1)		
Component Replacement:		
Condenser	34 ml (1.2 fluid oz.)	
Evaporator	68 ml (2.4 fluid oz.)	
Receiver Drier	8.5 ml (0.3 fluid oz.)	
Compressor	None - pre charged	
Hoses	If more than 4 metres of hose is replaced, then add 15 ml (0.5 fluid oz.) for every metre over 4 metres.	

(1) The quantity of oil replaced should be the same as that taken out during 'Recovery' procedure.

R134a Refrigerant

TB 016

Refrigerants are the basic ingredient of all air conditioning systems and are used to transfer the heat energy around the system. Refrigerant type R134a is used in the air conditioning system. It's full chemical name is:

1, 1, 1, 2-Tetraflouroethane (CH2FCF2)

R134a is a HFC (HydrFlouroCarbon) and is non-toxic, non-flammable and non-explosive at normal atmospheric temperature and pressure. It can be flammable under certain pressure and air mixtures.

Due to environmental concerns, the use of ozone depleting chlorofluorocarbons (CFCs) in the air conditioning systems is being gradually phased out. The R-12 refrigerant used in some systems contains CFCs. Air conditioning systems using R-134a refrigerant are not compatible with systems using R-12 refrigerant. No attempt should be made to charge R-134a systems with R-12 refrigerant.

***Important:** Refer to the safety procedures within this section before handling refrigerants.*

Good installation practice is required to avoid the release of refrigerant into the atmosphere. Refrigerant R134a contains no chlorine and has an Ozone Depleting Potential (ODP) of zero, and a Global Warming Potential (GWP) of 0.1.

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Example of Schematic Circuit

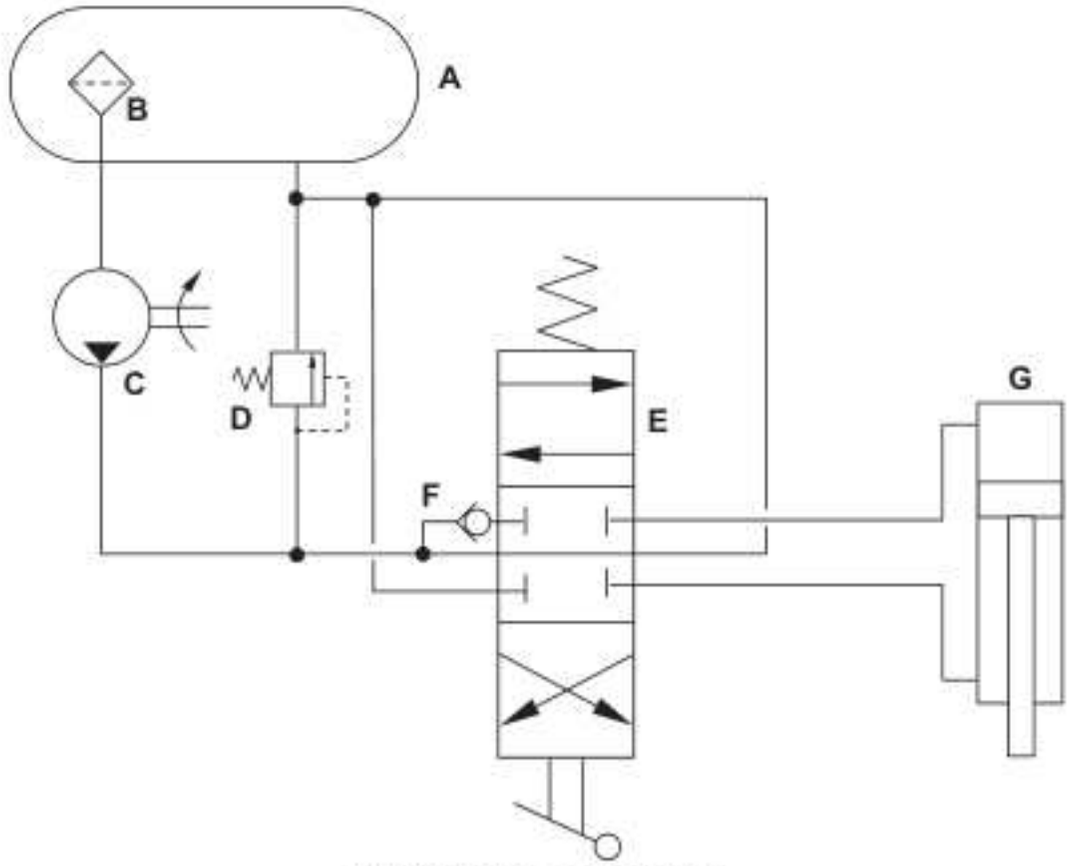


Fig 50. Simple Schematic Circuit

Some of the symbols described on the preceding pages have been arranged into a simple schematic circuit. ⇨ *Fig 50. (E-46)*.

Hydraulic tank **50-A** is a pressurised tank with an internally mounted strainer **50-B** on the suction line to the fixed displacement pump **50-C**. System pressure is limited to the setting of relief valve **50-D**.

Valve spool **50-E** is an open-centre spool that is in neutral position; flow from the pump passes through the spool and returns to the hydraulic tank.

If the lever operated spool is moved away from neutral position hydraulic fluid is directed to either head side or rod side of hydraulic ram **50-G**. Notice that the fluid must first open one way valve **50-F** before flowing to the ram.

Example Circuit Key

50-A	Hydraulic Tank
50-B	Strainer
50-C	Fixed Displacement Pump
50-D	Relief Valve
50-E	Spool
50-F	One Way Valve
50-G	Double Acting Hydraulic Ram

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Table 8. Brakes not releasing.

Possible Cause	Action
Brake pedal spring fault.	Fit a new spring.
Master cylinder fault (plunger stuck in bore).	Check master cylinder in single and coupled pedal modes to identify fault area, service as required.
Blocked hole in master cylinder reservoir cap.	Fit a new reservoir cap.
Brake pedal free travel incorrect.	Adjust pedal free travel.
Fluid contamination and seal damage.	Flush system and renew hydraulic seals.
Annular brake piston(s) binding in axle	– Check that correct brake fluid has been used (incorrect fluid could swell the annular brake piston seals). – Check if annular brake piston seals in good condition. – Check that annular brake piston rotates freely in its housing with no seals fitted. – Check that the annular brake piston seal retracts the piston approximately 0.5 mm (0.020 in).
Kinked or crushed brake pipes.	Check and renew pipes as required.
Friction and counter plates not free on splines or dowels.	Check friction and counter plates for free movement, renew if required - BOTH sides of relevant axle.

Table 9. Excessive brake noise in operation.

Possible Cause(1)	Action
Deterioration of axle oil or wrong type of axle oil.	Change axle oil.
Axle oil loss.	Refill axle with correct oil and check for leaks.
Friction plates worn beyond limits.	Renew friction and counter plates.
Friction and counter plates in poor condition.	Check for distortion or surface pitting and roughness of friction and counter plates (annular grooving of counter plates is acceptable).

(1) Due to the metal to metal contact of oil immersed brakes, limited noise can be heard which is consistent with this type of design - this is normal.

Table 10. Fluid loss when machine standing - overnight.

Possible Cause(1)	Action
Severe damage or slight cut or nick in the brake piston seal, see ***Service Procedures - Brake Piston Seal Leakage Test.***	Strip axle, replace seal.

(1) Confirm fault is as indicated by checking that the brake pedal DOES NOT touch the floor under constant pressure.

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Loader Arms Raise

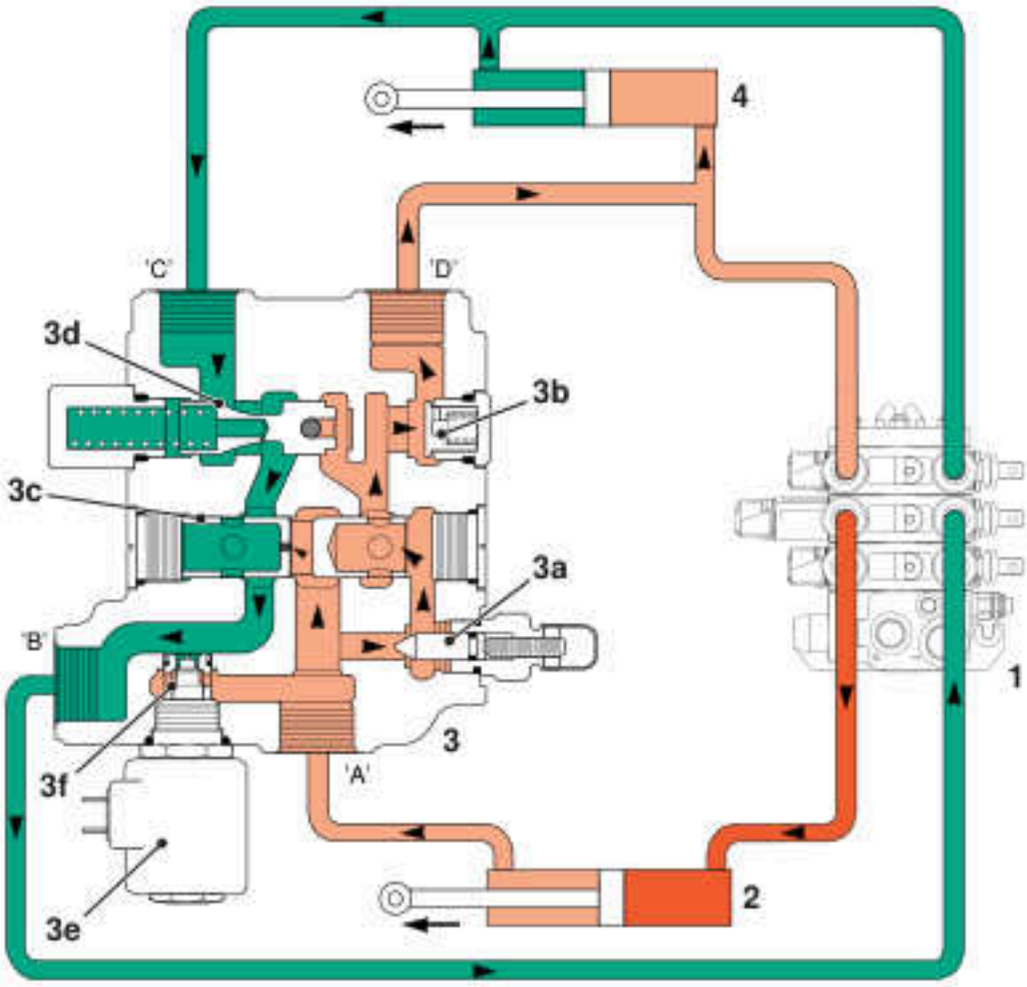


Fig 37.

With the shovel spool in 'neutral' and the arms lift spool selected to 'raise', oil from the loader valve **1** is directed to the head side of the loader arm lift rams **2**. As the lift rams extend, oil from the rod side enters the self level valve **3** port (A).

Inside the self level valve **3**, the oil flow is divided. Some of the oil passes through an adjustable orifice **3a**, and is directed through check valve **3b** and port (D) to the head side of the shovel rams **4**. The remainder of the oil flow passes through a fixed orifice in the flow divider spool **3c**, and out of port (B) to the loader valve and back to tank. The amount of oil flow to move the shovel is determined by the setting of the adjustable orifice **3a**.

As the shovel rams **4** extend, oil from the rod side enters the self level valve **3** port (C). The oil passes across the unloading spool **3d**, around the flow divider spool **3c** and out of port (B) to the loader valve and back to tank.

Machines with smooth ride system (SRS): Solenoid **3e** energises when SRS is ON. While the solenoid is energised, poppet valve **3f** opens to allow all the oil flow from the rod side of the lift rams to pass directly from port (A) through port (B) to the loader valve and back to tank. In this condition the shovel rams **4** will not move automatically, the self level circuit is bypassed when SRS is ON.

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Transmission Pump

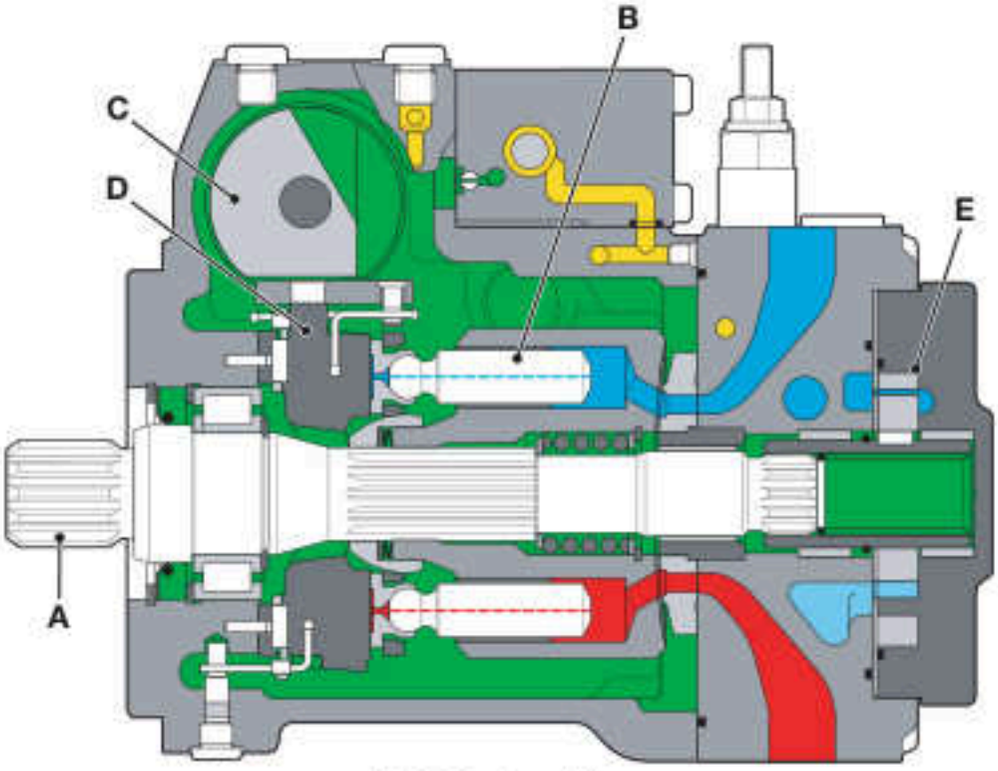


Fig 26. Sectioned View

The transmission hydraulic pump is a variable displacement axial piston pump, which uses the swashplate design principle.

Rotation of the input drive shaft **A** produces linear movement of the axial pistons **B**. The pump output is controlled via the swash control piston **C**. The piston varies the angle of the tilting swashplate **D**, which alters the displacement (stroke) of the pistons.

Integral with the transmission pump is the charge pump **E**, which generates the control pressure for the pump control circuits. ⇨ *Pump Control Circuit (F-21)*.

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