BI001590
A6474X397
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Operation and Maintenance Manual

CM345-N Continuous Miner

A6474X397 (Hydraulic)

Hydraulic Pump Assembly

Hydraulic power for all of the hydraulically actuated functions originates with the pump assembly (Fig. 44). This pump utilizes three working sections designated as follows: A1 (primary pressure circuit), A2 (high speed cutter head raise circuit), and A3 (pilot pressure circuit). Oil is supplied from the oil reservoir through a suction line and a locking ball valve (optional) to the pump inlet ports.

Hydraulic Pump A1 - Primary Pressure Circuit

Hydraulic pump gear section A1 powers the primary pressure circuit. The A1 gear section is rated at 31.4 gpm at a pressure of 2,800 psi (143 Lpm at 193 bar). This open-center circuit supplies oil flow to the Main Control Valve (MCV). The MCV operates the conveyor raise, conveyor swing, stabilizer (stab) shoe, gathering head cylinders, cutter head raise cylinders. From the pump, oil enters a 10 micron by-passing pressure filter and continues to the MCV, whose main relief valve is set at 3,046 psi (210 bar).

Hydraulic Pump A2 - High Speed Cutter Head Raise Circuit

Hydraulic pump gear section A2 powers the high speed cutter head raise circuit. The A2 gear section is rated at 23.7 gpm at a pressure of 2,000 psi (108 Lpm at 138 bar)). This open-center circuit supplies oil flow to the manually controlled, pilot-operated cutter head directional control valve. From the pump, oil continues to the high speed cutter head raise section of the main control valve, whose main relief valve is set a 3,046 psi (210 bar).

Hydraulic Pump A3 - Pilot Pressure Circuit

Hydraulic pump gear section A3 powers the pilot pressure circuit. The A3 gear section is rated at 8.1 gpm at a pressure of 600 psi (371 Lpm at 41 bar)). Pilot pressure is maintained by a relief valve. This closed center circuit supplies oil to all pilot functions on the machine including:

- Hydraulic conveyor chain take-up section of multi-purpose valve
- Pilot supply manifold supplying:
  - Dust/fire/scrubber solenoid manifold
  - Brake control valve
  - Gathering head raise/hold/float-lower circuit on multi-purpose valve

From the pump, oil enters a 10 micron by-passing pressure filter and splits to supply the hydraulic conveyor chain take-up circuit and a 3 micron non by-passing pressure filter. The oil continues from the 3 micron non-bypassing filter to supply the pilot supply manifold.

Fig. 4: Hydraulic pump circuit

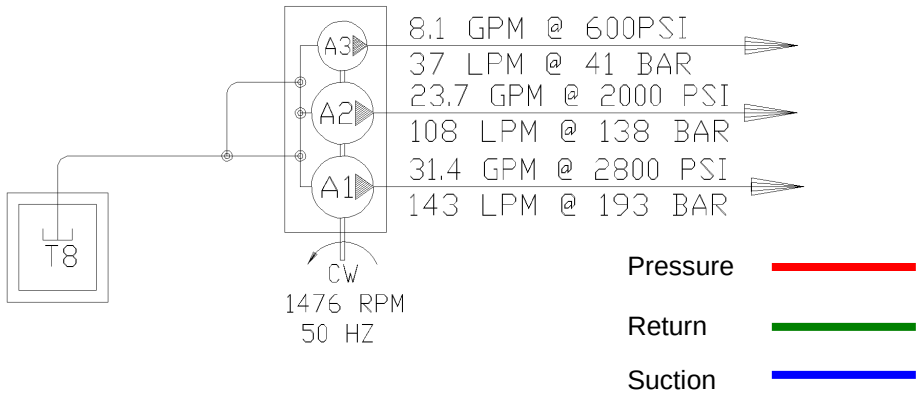
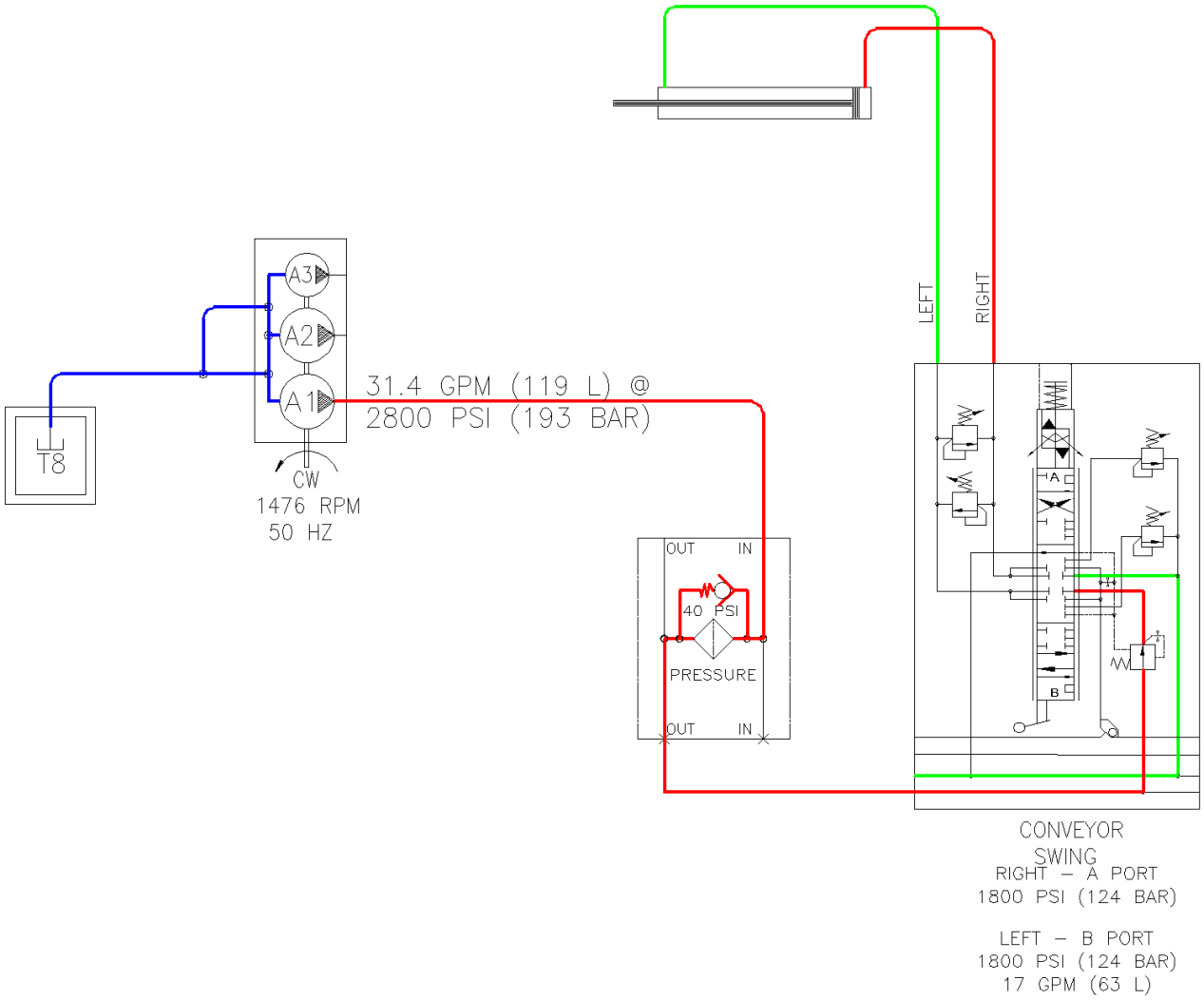


Fig. 11: Conveyor swing cylinder circuit - right



Pressure

Return

Suction

Dust - Scrubber - Fire Sprays Hydraulic Circuit

This circuit is used to activate the dust sprays, the scrubber sprays, and the fire sprays. Pilot oil is supplied to the pressure port of the solenoid manifold. The manifold is connected to an accumulator that is pre-charged with nitrogen to 400 psi. The difference between the pilot circuit pressure of 600 psi and the accumulator pressure of 400 psi provides a volume of oil to allow for remote operation of the fire suppression when the pump is not operational. There is a gauge for monitoring the accumulator pressure, which should closely track the pilot pressure. If the accumulator pressure falls below 450 psi, shutdown the machine and call for maintenance.

The three solenoids in the manifold operate in the same manner. When the solenoid coil is energized, it shifts the spool, allowing oil to travel to a 2 way/2 position water valve. The spool in the water valve is shifted, allowing water to pass through it.

When the dust or scrubber spray solenoid cell is de-energized, the hydraulic pilot valve shifts back to its neutral position, which vents the hydraulic pilot pressure on the water control valve. This venting allows the water control valves to return to their normally closed positions.

The spool in the fire spray water valve has a detent spool which keeps the water valve open if the battery backup dies. This water valve must be manually rest to reset the deluge fire spray circuit.

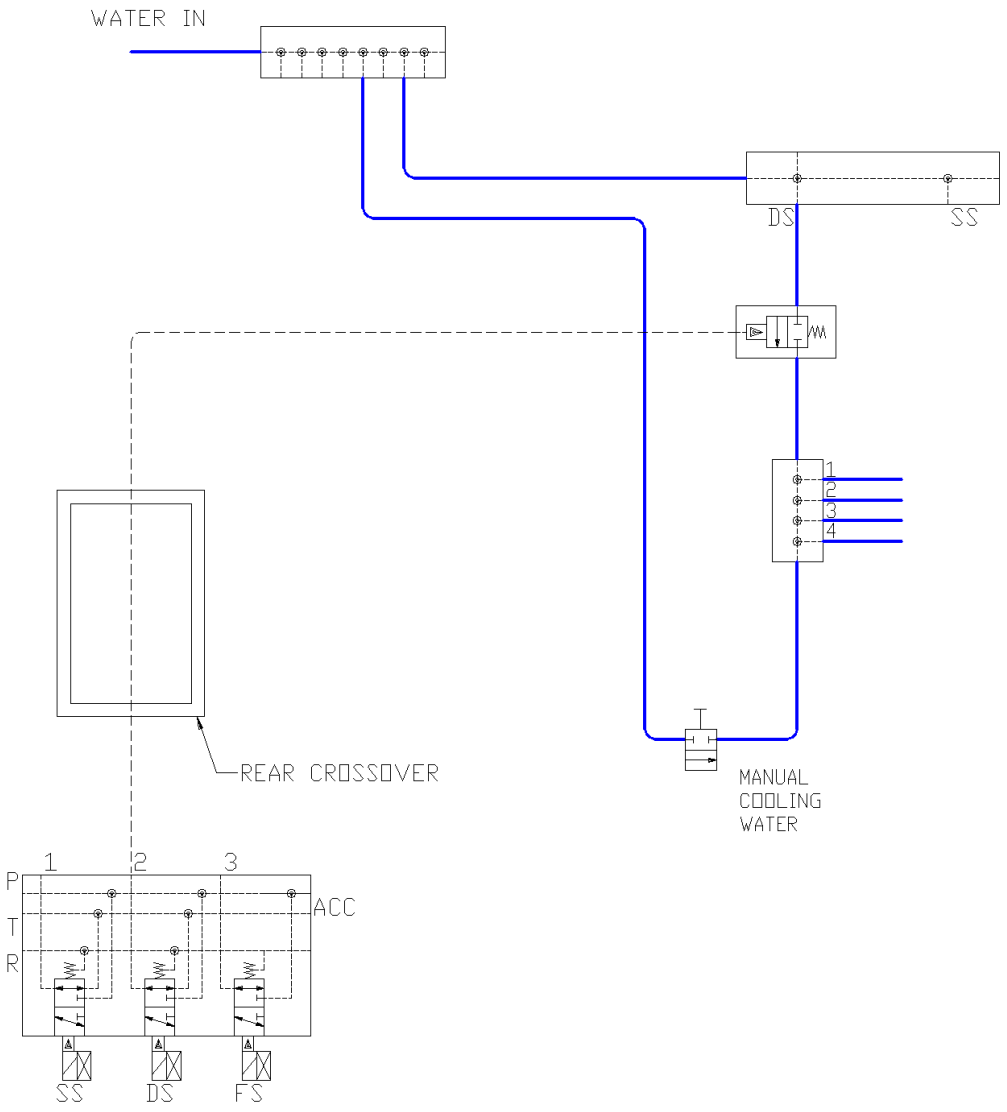
Dust Cooling Water Supply Circuit

The dust-cooling water circuit (Fig. 24) utilizes water supplied by the water distribution manifold and is operated by remote solenoid control. When the dust-cooling solenoid (“DS”) is energized, it shifts a spool, allowing hydraulic oil to travel to the hydraulic pilot operated normally closed water valve. The hydraulic oil shifts the spool, allowing water to pass through it to the secondary dust-cooling water manifold. Water can also be supplied to the manifold via a manual cooling water valve.

The secondary dust-cooling water manifold distributes water to the four unique dust-cooling circuits:

1. Right hand cutter motor cooling circuit
2. Left hand cutter motor cooling circuit
3. Left hand chassis cooling circuit
4. Right hand chassis cooling circuit

Fig. 24: Dust water supply circuit

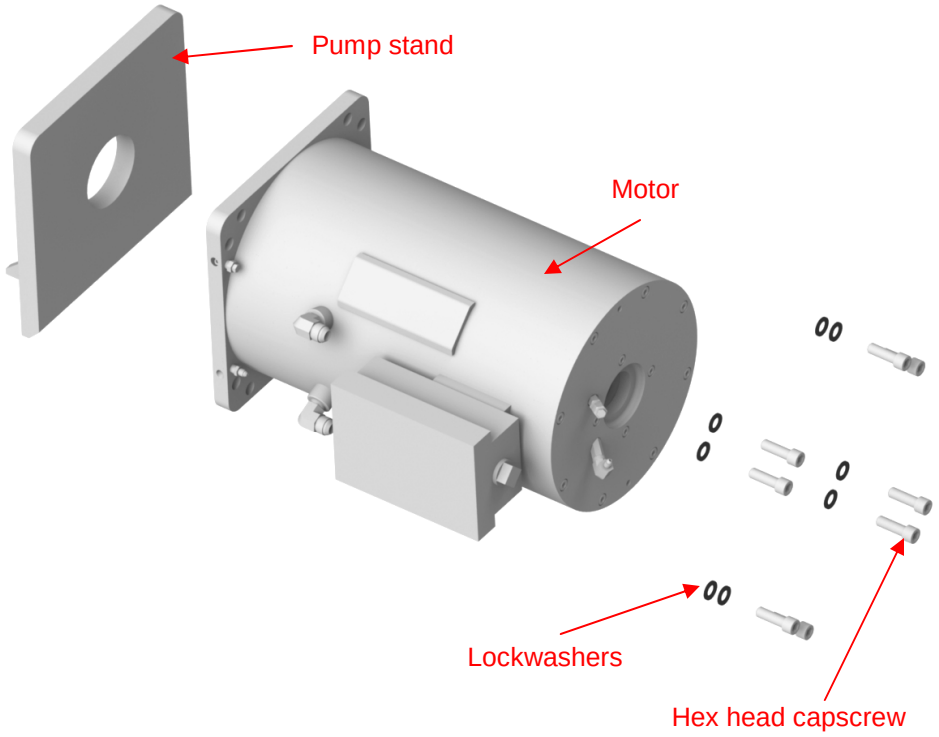


Hydraulic Pump Motor Removal

To remove the hydraulic pump motor (Fig. 31):

1. Lower the conveyor tail section it is level with the floor.
2. Lower the gathering head and cutter head until they touch the floor.
3. Disconnect the trailing cable to de-energize the miner.
4. Remove the hydraulic pump (see Hydraulic pump removal procedure in this chapter).
5. Remove the four (4) 3/4 X 1 1/2” hex head capscrews that secure the motor to the pump stand.
6. Remove the four (4) 1/2 X 1 1/2” hex head capscrews and lockwashers that secure the pump stand to the tractor frame and remove the pump stand.

Fig. 31: Hydraulic pump stand removal



Pressure readings

1. High Speed Cutter Head	1. Activate the high speed cutter head raise circuit to fully raise the cutter head. The main control pressure gauge should read 2,800 psi (193 bar). 2. Activate the high speed cutter head lower circuit to fully lower the cutter head and raise the front of the machine off the ground. The main control pressure gauge should read 2,800 psi (193 bar).
2. Cutter Head	1. Activate the cutter head raise circuit to fully raise the cutter head. The main control pressure gauge should read 2,800 psi (193 bar). 2. Activate the cutter head lower circuit to fully lower the cutter head and raise the front of the machine off the ground. The main control pressure gauge should read 2,800 psi (193 bar).
3. Conveyor Raise/Lower	1. Activate the conveyor raise circuit to fully raise the conveyor. The main control valve pressure gauge should read 1,800 psi (124 bar). 2. Activate the conveyor lower circuit to fully lower the conveyor. The main control valve pressure gauge should read 1,400 psi (97 bar).
4. Conveyor Swing	1. Activate the conveyor swing left circuit to fully swing the conveyor to the left. The main control valve pressure gauge should read 1,800 psi (124 bar). 2. Activate the conveyor swing right circuit to fully swing the conveyor to the right. The main control valve pressure gauge should read 1,800 psi (124 bar).
5. Gathering Head	1. Activate the gathering head raise circuit to fully raise the gathering head. The main control valve pressure gauge should read 1,800 psi (124 bar).
6. Stabilizer Shoe	1. Activate the stabilizer shoe raise circuit to fully raise the stabilizer shoe. The main control valve pressure gauge should read 1,400 psi (97 bar). 2. Activate the stabilizer shoe lower circuit allow to fully lower the stabilizer shoe. The main control valve pressure gauge should read 2,800 psi (193 bar).

Table 3: Flow chart III for troubleshooting incorrect flow

No Flow		Low Flow		Excessive Flow	
Cause	**Remedy**	**Cause**	**Remedy**	**Cause**	**Remedy**
Pump not receiving fluid	A	Flow control set too low	D	Flow control set too high	D
Pump drive motor not operating	E	Relief or unloading valve set too low	D	RPM of pump drive motor incorrect	H
Pump to drive coupling sheared	C	Flow by-passing thru partially open valve	E of F	Improper size pump used for replacement	H
Pump drive motor turning in wrong direction	G	External leak in system	B		
Directional control set in wrong position	F	RPM of pump drive motor incorrect	H		
Entire flow passing over relief valve	D	Worn pump, valve, motor, cylinder, or other component	E		
Damaged pump	C	Pilot filter clogged	A		
Improperly assembled pump	E				
Pilot filter clogged	A				

Remedies

A. Any or all of the following:

1. replace dirty filters
2. clean clogged inlet line
3. clean reservoir breather vent
4. fill reservoir to proper level
5. overhaul or replace supercharge pump

B. Any or all of the following:

1. tighten leaky inlet connections
2. bleed air from system

C. All of the following:

1. check for damaged pump or pump drive
2. replace and align coupling

D. Adjust setting on valve

E. Overhaul or replace part

F. Any or all of the following

1. check position of manually operated controls
2. check electrical circuit on solenoid operated controls
3. repair or replace pilot pressure pump

G. Reverse rotation

H. Replace with correct unit