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Operation and Maintenance Manual

CM240 Continuous Miner

Serial Number: GEW00763, GEW00772, GEW00798, GEW00802

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Characters and symbols used

The following characters and symbols are used for safety instructions and important information in the operating manual.

Try to memorize the symbols and their meanings.



DANGER!
Points in the text marked with this symbol draw your attention to immediately impending danger. Possible consequences are: very serious injury or even death.



WARNING!
These points contain information on dangerous situations. Possible consequences are: very serious injury or even death.



CAUTION!
This symbol draws attention to dangerous situations. Possible consequences are: light to moderately serious injuries and machine damage.



NOTICE!
Points in the text marked with this symbol draw attention to harmful situations. Possible consequences are: damage to the machine or damage in the immediate vicinity.



IMPORTANT!
Points in the text marked with this symbol contain useful tips and information intended to facilitate work for you. They do not warn about harmful or dangerous situations.

- Items in lists are marked with bullets.
  - Points in sub-lists are marked with a long dash at the start of the line.

☞ Points in text marked in this way describe individual operations. Follow these instructions step by step. They will help you carry out your work faster and more importantly, safer.

Installation and start-up

inclined face

On inclined faces secure all component parts by chains, e.g. to the support.

environmental acceptability

When working with oils, greases and other chemical substances, observe the safety regulations applicable to the product. Safety regulations can be found on the container or on the Material Safety Data Sheet (MSDS) for the product.

Dispose of cleaning rags, etc. which have been soiled with oil, grease or other chemical substances in an environmentally safe manner.

controls

When starting up machine, do not operate any controls located inside the operator's compartment (optional) from outside the compartment.

starting procedures

Follow the starting procedure instructions in the operations manual.

red zone

Do not operate any levers, pedals or controls if anyone is in the red zone. (See Red Zone in Chapter 5 of this manual)

Operation

training

Operate the machine only if you have a profound knowledge of the control elements and their functions. It is necessary that you have been task trained on the respective Continuous Miner.

before start-up

Before start-up, ensure that there are no persons or obstructions in your line of travel or in the articulation area when steering the unit.

protective devices

Check that all protective devices are installed on the machine and function properly.

operator's compartment (optional)

Clean the operator's compartment at regular intervals. Ensure that the operating symbols are legible in order to avoid any operator errors and resulting accidents.

Never climb onto, or climb out of the machine while it is in motion.

Do not operate the machine with any part of your body outside of the operator's compartment in order to prevent body parts from being crushed between the machine and outside objects .

traveling

Use extreme caution when traveling in close quarters or in congested or blind-travel areas.

passengers

Never carry passengers. Passengers may be thrown off the machine or crushed between the machine and outside objects.

safety rules

Always follow all safety rules of each particular mine when operating the machine.

problems and malfunctions

If problems or malfunctions are encountered while operating the unit, it must be properly shutdown and the problem corrected immediately.

Overview of safety instructions



WARNING!
Warn “ALL CLEAR” before starting the conveyor. Failure to do so may result in serious injury or death.



IMPORTANT!
The “CONV ON” key must be released before “SHIFT”. If “SHIFT” is released first, the conveyor motors will shut off.



IMPORTANT!
The “FAN ON” key must be released before “SHIFT”. If “SHIFT” is released first, the fan motor will shut off.



CAUTION!
Always ensure operator safety while operating the machine.



CAUTION!
Always be alert to hazardous conditions and take corrective action as necessary.



IMPORTANT!
Care should be taken not to stall cutters or conveyor during cutting operations. Severe damage to motors and gear boxes could occur if cutters or conveyor are repeatedly stalled.



IMPORTANT!
Tram is limited in the forward direction while the cutters are running with the cutter head feedback circuit. As the cutters begin to cut the material from the face the sump speed will automatically slow the tram to prevent over sumping the machine.



IMPORTANT!
Inspection of the bits and bit blocks before the start of each shift will reduce later problems. Mining with dull, bent or broken bits and bit blocks increases dust and noise levels, as well as putting excessive strain on both cutter motors and tram components.



WARNING!
Failure to maintain the hydraulic system will result in damage to its hydraulic components which will result in increased wear and premature failure.



IMPORTANT!
Schematics may vary from one unit to the next. Consult the parts book for the schematic for your machine.



IMPORTANT!
During disassembly of control valves, give particular attention to identification of parts for reassembly. Spools are selectively fitted to valve bodies and must be returned to the same bodies from which they were removed. Spools are NOT interchangeable between valve bodies.

Overview of safety instructions



WARNING!
Each stabilizer cylinder is extremely heavy. The next steps will remove the cylinder from its tractor frame mounting. Be prepared to support the weight from its tractor frame mounting. Be prepared to support the weight of the cylinder when it becomes free from the mounting.



IMPORTANT!
To obtain maximum performance, the duocone seals must be installed accurately to insure uniform loading at the mating faces and achieve a stable running position. Misalignment or cocking of seal rings during assembly can produce non-uniform loading and wobbling of the seals in their housings resulting in leakage due to scoring and/or pumping of debris past the toric rings. Improper installation can also result in breakage of the metal seal rings.



NOTICE!
Improper care and installation of duocone seals can result in immediate leakage or reduced service life.



IMPORTANT!
The toric must lie uniformly in the seal with the sealing ring and parallel to the seat face. Be sure that the toric is not twisted and that it rests uniformly against the retaining lip or not deeper in one side of the seat than the other.



IMPORTANT!
Do not get any oil onto the rubber torics!



IMPORTANT!
Even a small piece of lint can hold the faces apart and cause leakage!



IMPORTANT!
A mixture of marking compound and spindle oil is good lube for the gears under light loads for 2-3 revolutions only. Check tooth patterns all round to make sure the pattern/markings are uniform.

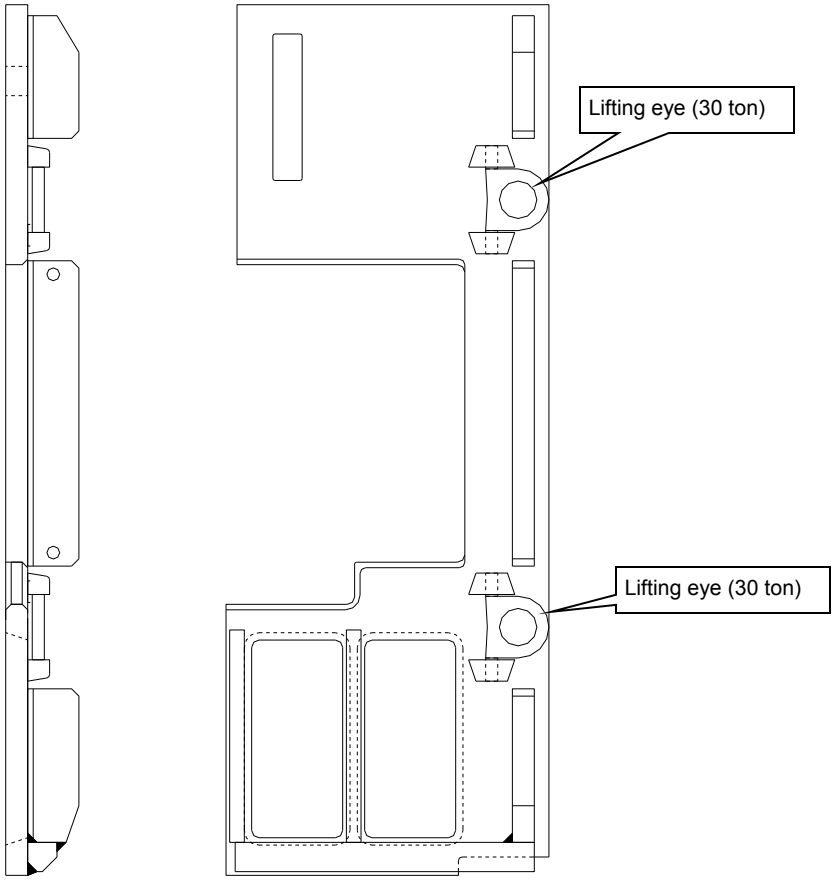


CAUTION!
Be careful not to set fire to any grease or lubricant when heating bearings!



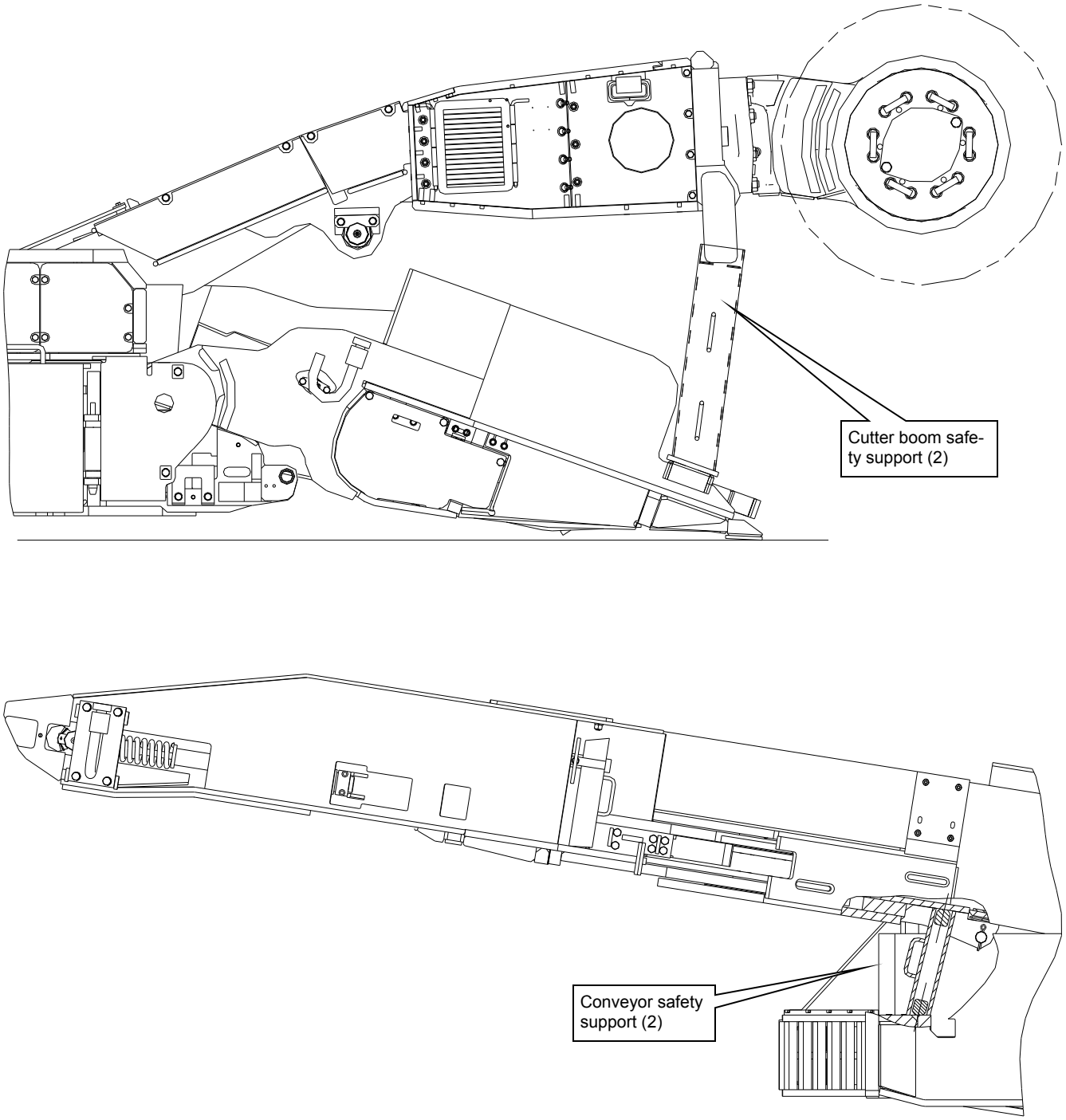
IMPORTANT!
Observe all applicable fire and safety regulations when heating bearings!

Fig. 5 (continued): Lifting points



Bumper

Fig. 6 (continued): Safety features on the Continuous Miner



Electrical metering package (optional)

The optional electrical metering package (Fig. 12) consists of a group of meters that monitor current draw on the motors, machine voltage, and cutter and conveyor hours of operation.

"LEFT CUTTER MOTOR" and "RIGHT CUTTER MOTOR"

The "LEFT CUTTER MOTOR" and "RIGHT CUTTER MOTOR" ammeters monitor the current draw by the cutter motors. During normal operation, the two meters should indicate approximately the same current draw. If one meter consistently reads higher than the other meter, shutdown the machine (see Shutdown procedure in this chapter) and contact Maintenance.

"LEFT CONVEYOR MOTOR" and "RIGHT CONVEYOR MOTOR"

The "LEFT CONVEYOR MOTOR" and "RIGHT CONVEYOR MOTOR" ammeters monitor the current draw by the conveyor motors. During normal operation, the two meters should indicate approximately the same current draw. If one meter consistently reads higher than the other meter, shutdown the machine (see Shutdown procedure in this chapter) and contact Maintenance.

"MACHINE VOLTAGE"

The "MACHINE VOLTAGE" voltmeter indicates the control circuit voltage. During normal operation, the indicator should stay between 855 and 1,045 volts (950V ± 10%). Should the meter indicate high or low voltage, shutdown the machine (see Shutdown procedure in this chapter) and contact Maintenance.

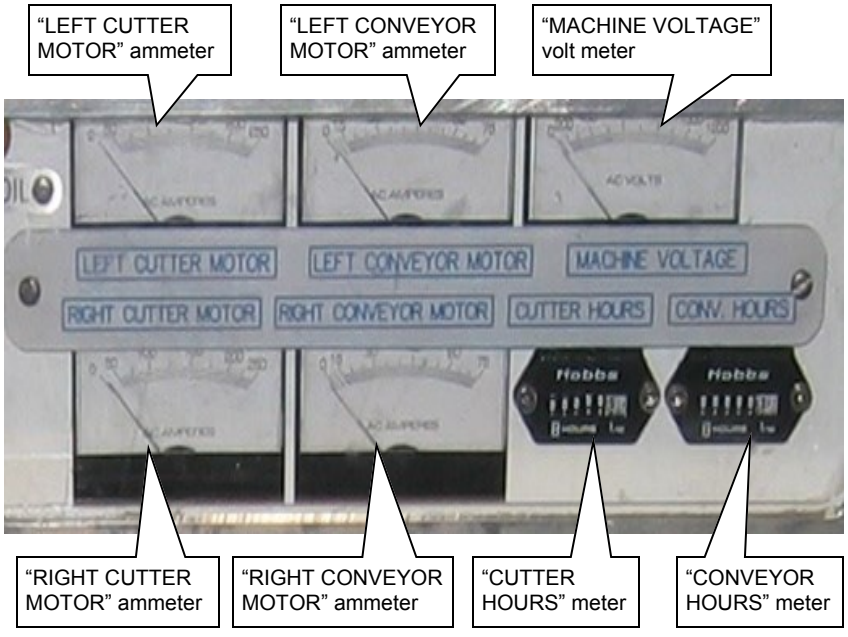
"CUTTER HOURS"

The "CUTTER HOURS" meter indicates the hours of running time for the cutter head motors.

"CONVEYOR HOURS"

The "CONVEYOR HOURS" meter indicates the hours of running time for the conveyor motors.

Fig. 12: Electrical metering package (optional)

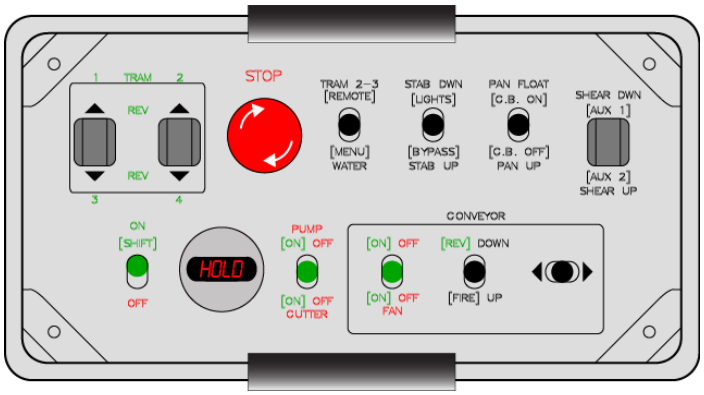


radio remote

The radio remote (Fig. 22) is a battery powered remote used to control the continuous miner during normal operations.

WARNING!
Radio remote control systems are dangerous. The continuous miner operator cannot operate a remote system until he is properly trained in the operation of the system. Remote control systems sometimes have automatic features of which untrained operators and workers may not be aware.

Fig. 22: Radio remote (typical)



The radio remote shown may vary from the remote that shipped with your machine.

Pillaring red zones (Fig. 33) Remote control offers a significant safety advantage in partial or complete removal of the pillars in retreat mining because it places the operator further away from potential collapsing roof.

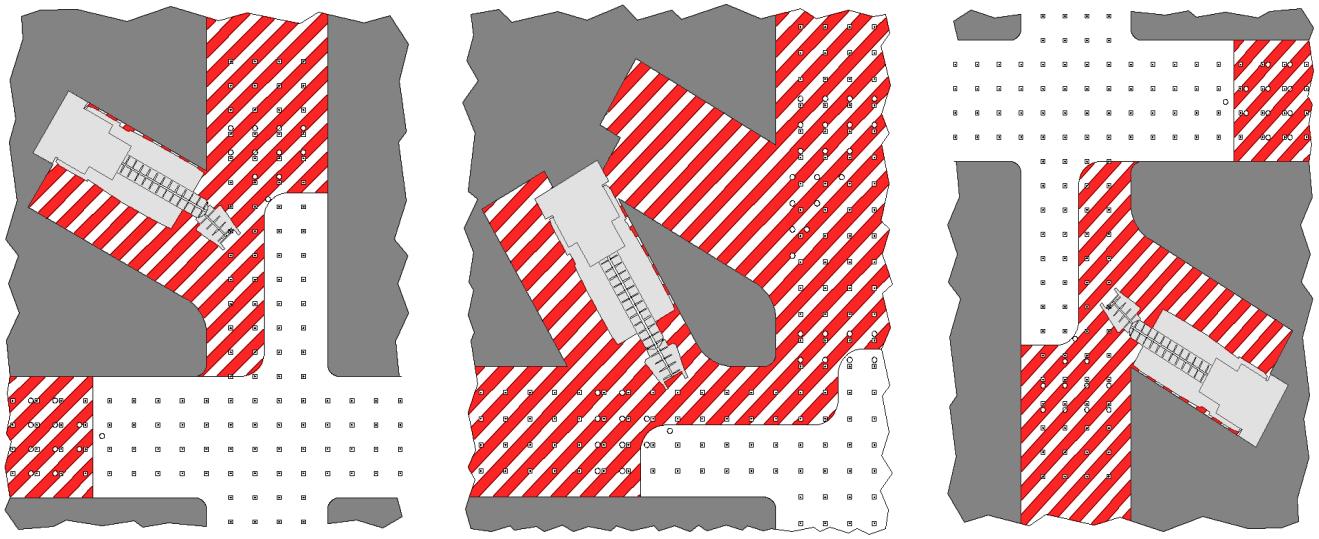
Much of the area around the miner must be considered a red zone, mostly because of extensive unsupported roof and the need for temporary supports under weakened roof. With remote control, the operator can position himself safely away from the miner while still retaining a good view of the mining cycle.

A red zone around the miner is no longer applicable when working in the opposite right hand pillar, as the operator is now excluded from the entire working area because of failing roof considerations, even with the existence of temporary roof supports

When making an additional end cut into the pillar, creating a fender of coal between the two cuts, additional temporary roof supports are installed.

Because of roof pressures, the fender will tend to slough its ribs in the process of eventually crushing. Hence, the operator must stay away from this fender as well as avoiding the entry and crosscut areas as shown.

Fig. 33: Pillaring red zones



Pillaring in a left hand cut red zone

Pillaring in a end cut red zone

Pillaring in a right hand cut red zone

Fire suppression in radio remote

The control system uses a solenoid output to drive the fire suppression system on the continuous miner. The fire suppression can be activated at any time from the remote control console. If the machine is fitted with the battery backup version of the power supply, the fire suppression can also be activated in battery standby mode. The system will remain in battery standby mode for at least ten minutes after loss of main power to the machine.

When in radio mode, the fire suppression can be activated from the radio as follows:

- ☞ Press the “SHIFT” and “FIRE” keys at the same time and hold for two (2) full seconds.
- ☞ After two seconds, the fire suppression system will activate. At this time, the “SHIFT” and “FIRE” keys can be released.

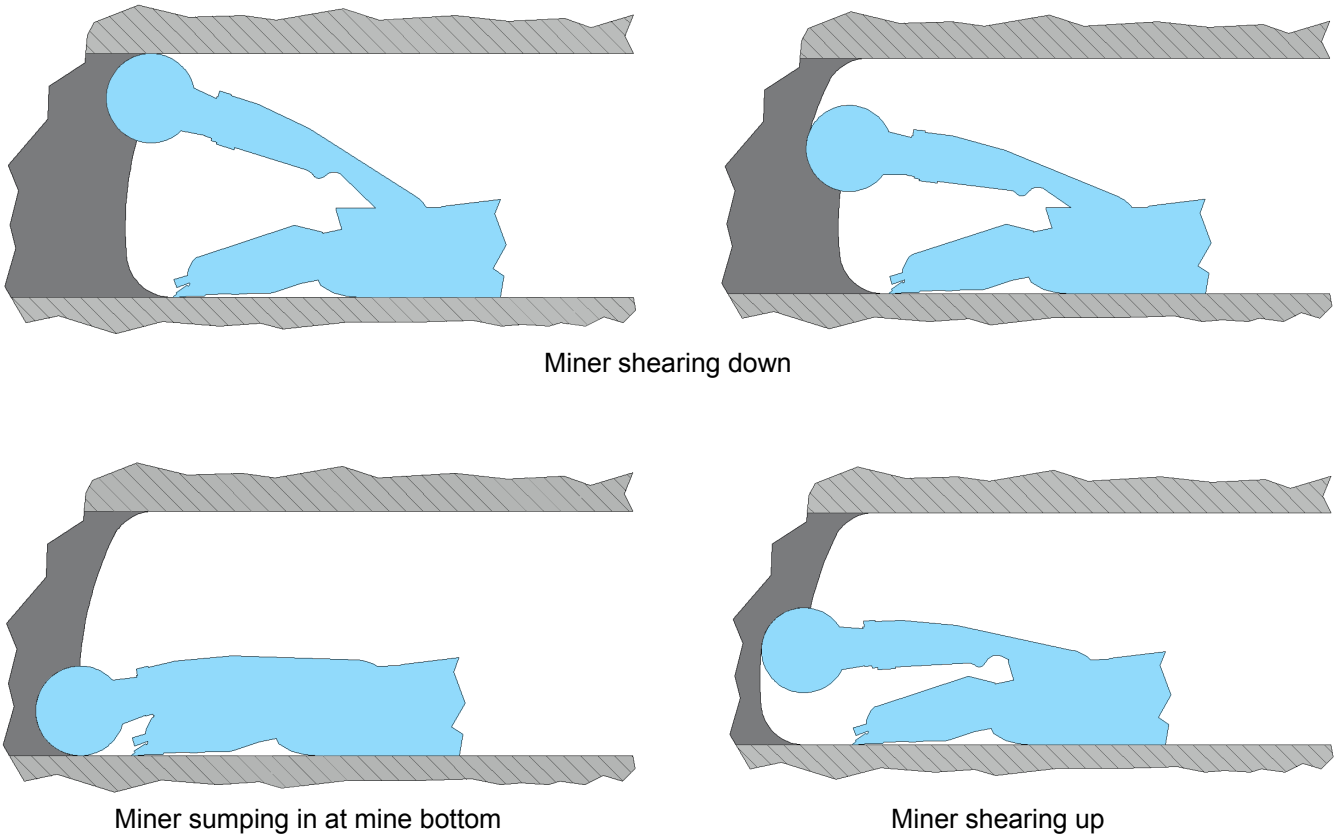
The first view in Fig. 37 shows the miner having sumped in at the top of the coal face. If the operator intends to shear down and up, the depth of sump should be no more than half a drum diameter; otherwise, a cusp will be left at the bottom or top after shearing which will require trimming.

The second view shows the miner in the middle of the downcut.

Having completed the downcut, the third view shows the miner sumped in about half a drum diameter at the mine bottom.

Finally, the last view shows the miner in the middle of the upcut. The technique of successively shearing up and down is particularly productive when the miner is working in conjunction with a continuous haulage system.

Fig. 37: Shearing up and down



Hydraulic system schematics

Abbreviations and Symbols

Troubleshooting is easier when you can readily read and understand the diagrams and blueprints of a hydraulic network. To do this, you need to know hydraulic symbols.

Graphic symbols denote the type of function a component performs but do not necessarily show its shape or construction. These schematic symbols are used to trace the system flow from the reservoir to the actual work being performed and then back to the reservoir. The symbols used are shown individually with a functional description where needed. The study of these symbols helps in understanding the system and thereby aids in troubleshooting the system.

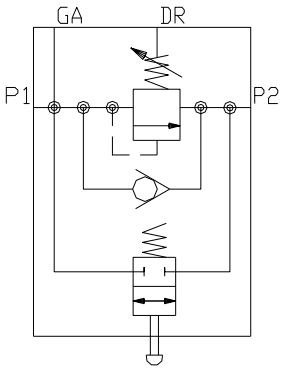
In a hydraulic schematic, components are represented on a schematic diagram by symbols. Using the hydraulic symbols to trace a circuit will help to define the relationships of the components and circuits. The component symbols are linked together by lines, which represent the hydraulic hoses and pipes on the miner.

A schematic diagram is an illustration which shows the hydraulic relationship of the various components in the circuits. A schematic diagram does not show the physical location of the components.

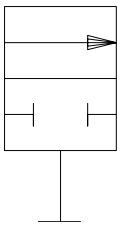


IMPORTANT!
Schematics may vary from one unit to the next. Consult the parts manual for the correct schematic for your machine.

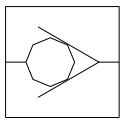
Fig. 53: Valve hydraulic symbols



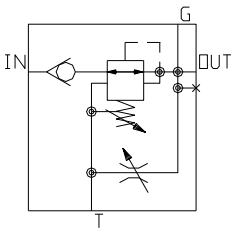
Anti-chatter/maintenance valve



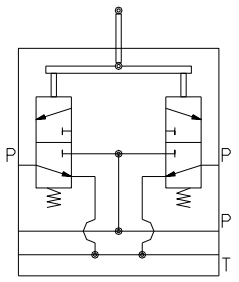
Ball valve



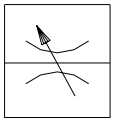
Check valve



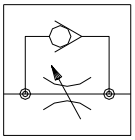
Conveyor chain take -up valve



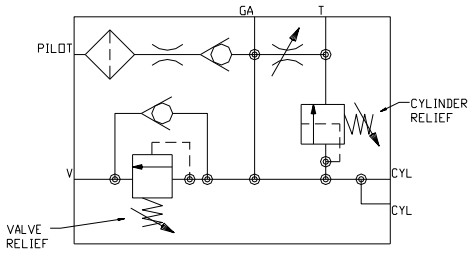
Directional control valve



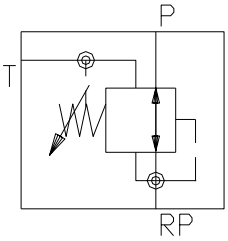
Flow control valve



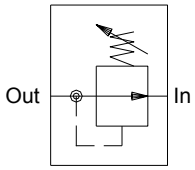
Flow control valve with internal check



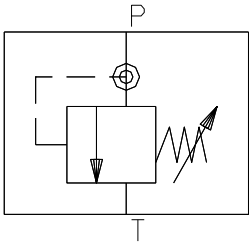
Gathering head float valve



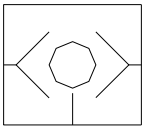
Pressure reducing valve



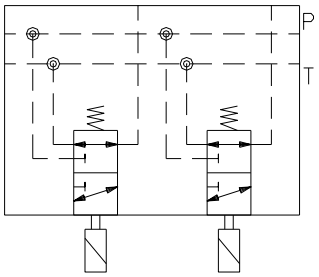
Pressure regulator valve



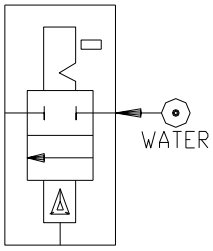
Relief valve



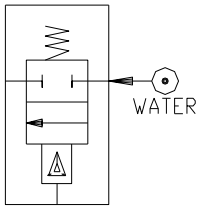
Shuttle valve



Solenoid valve 2-unit



Water valve, detent hydraulic operated



Water valve,

Conveyor swing circuit

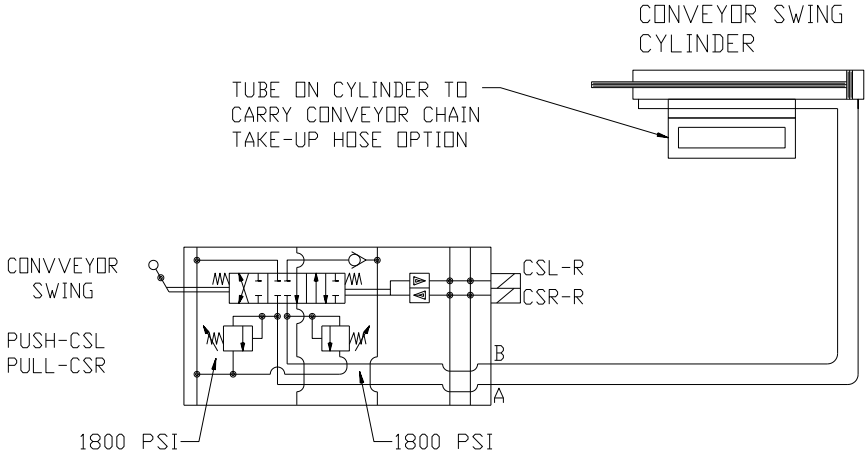
Oil is supplied by hydraulic pump section A1 through a 10-micron by-passing pressure filter (tri-filter) to the conveyor swing working section on the main control valve. By manual or remote solenoid control, the spool allows oil to enter the swing circuit. The swing cylinder is a double -acting cylinder. The range on the cylinder will allow the conveyor tail to move 45 degrees off the centerline of machine in both directions. There are two (2) port reliefs in the working section on the main control valve both of which are set at 1,800 psi. The purpose of the port reliefs is to protect the swing cylinder from damage in either right or left direction in the event of an excessive external load due to the impact of the conveyor tail with the rib, haulage vehicle, or some other object.

Push the handle and the left hand cylinder will retract, moving the conveyor tail to left. Pull the handle out and the cylinder will extend, moving the discharge conveyor to the right. The left and right movement is based off standing at the rear of machine looking forward to the cutter head.

An optional right hand cylinder may be required for attaching haulage. The flow output to the two cylinders powers each in the opposite direction. The right hand cylinder retracts as the left hand cylinder extends and vice-versa.

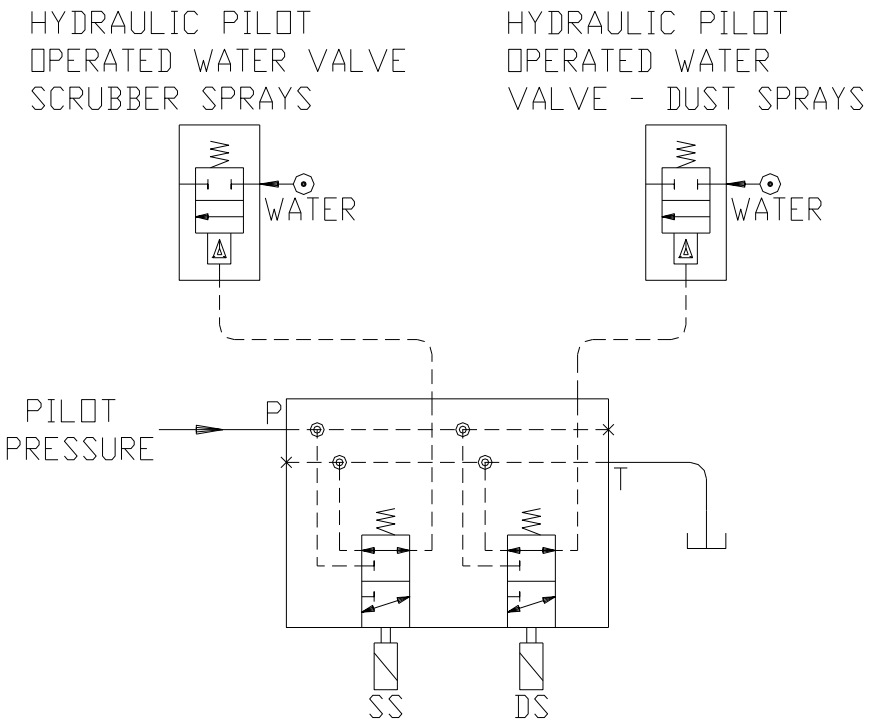
The schematic shown is Fig. 61 is a typical conveyor swing cylinder circuit. Always refer to the schematic in the parts book for your machine.

Fig. 61: Conveyor swing cylinder circuit



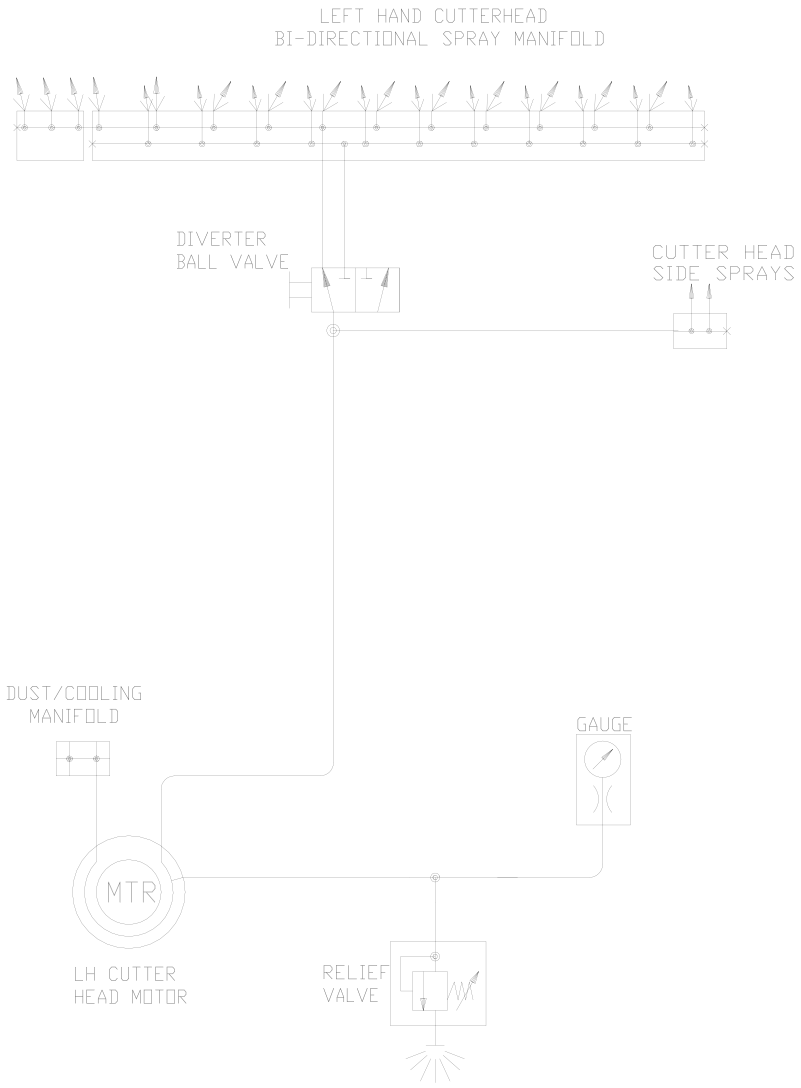
Note: Solenoid designations are CSL-R (conveyor swing left – rear solenoid) and CSR-F (conveyor swing right – front solenoid).

Fig. 67: Dust sprays hydraulic circuit



Note: See water circuit in Water section of this chapter.

Fig. 75: Dust-cooling left hand cutter motor circuit



Relays

ANSI defines a relay as “...an electrically controlled device that opens and closes electrical contacts to affect the operation of other devices in the same or another electrical circuit”. Relays are one of the most common auxiliary devices used in electrical circuits. They are used for switching control circuits and for controlling light loads.

instantaneous overload relay

The adjustable instantaneous overload relays, designated “OL1”, “OL3”, “OL5”, and “OL7”, protect the miner from sudden surges of current. While called “instantaneous” overloads the current sensing relays have an adjustable start-up delay after which they operate as soon as the motor current exceeds the preset level. The instantaneous overloads have normally open contacts in the motors’ control circuit which close when controlled voltage is applied. The instantaneous overloads protect the motors from stall currents.

time-delay relays

Time-delay relays (TDs) are used to cause a time lapse between the time a circuit is energized and the time the contactors close in a circuit.

thermally operated overload relay

The thermally operated overload relays are located in the main controller assembly. They are used to protect the motors against long, steady current overloads which are not strong enough to trip the instantaneous overloads.

The heart of the thermally-operated overload relay is two thin sheets of different kinds of metal bonded together. Heater strips, connected to a line voltage through “CTs” ratio current reducing transformers, provide a heat source for the thermally operated overloads. When a continuous overload causes these strips to heat up, the bimetallic strips are heated. As they are heated, the metal strips try to expand but, being different types of metal they want to expand at different rates. Since the strips re bonded together, they bend when heated and trip the overload relay, causing a break in the protected circuit and shutting down the motor.

After the heater strips cool, the bimetallic strips return to their normal position. When a thermal overload has been tripped, the fact is indicated by a visual trip indicator built into the relay unit. A selector switch permits a tripped thermal overload relay to be reset automatically or manually. The relays are normally adjusted for automatic reset operation.

machine stop/e-stop switch

The machine stop/e-stop switch is located on the left side of the miner, opposite the operator’s area. The contacts in the machine stop/e-stop switch are normally closed. Depressing the large mushroom push button causes the moving contact to be pushed away from the stationary contact, breaking the control circuit and de-energizing all the coils wired in the main control circuit. The de-energized coils open all their contacts, shutting down the miner except for the headlights. Once the button is released, the spring pushes the moving contact back against the stationary contact so power is again available up to the control circuit.

Main controller case - inside swing panel

The swing panel of the main controller case (Fig. 84) is accessed by opening the controller cover and then opening the swing panel. It is typically located on the left side of the machine, midway the tractor frame inside the crawler frame.

IMPORTANT!
This component location information is typical. Always verify component layout with the information in the parts book for your machine.

vacuum contactor "CF" Vacuum contactor "CF" is the forward contactor for the left and right gathering head motors.

vacuum contactor "CR" Vacuum contactor "CR" is the reverse contactor for the left and right gathering head cutter motors.

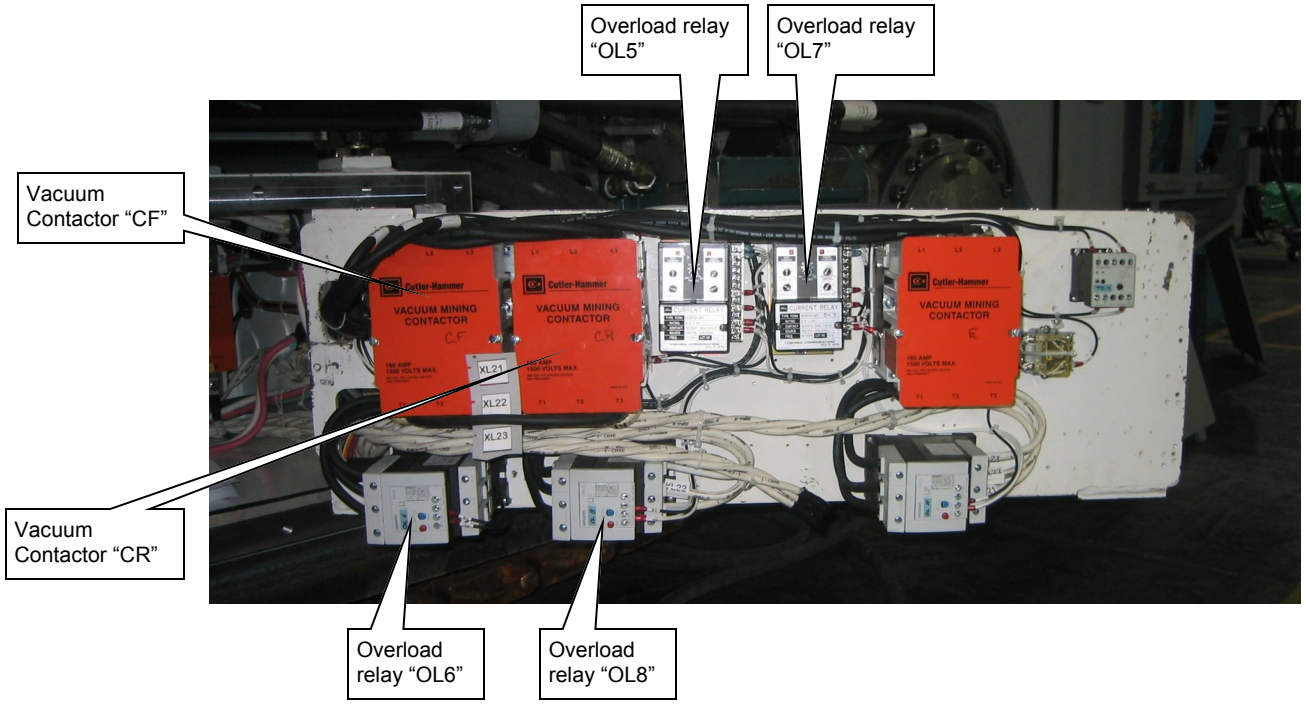
overload relay "OL5" "OL5" is an instantaneous overload relay for conveyor forward.

overload relay "OL6" "OL6" is a thermally-operated overload relay for conveyor forward.

overload relay "OL7" "OL7" is an instantaneous overload relay for conveyor reverse.

overload relay "OL8" "OL8" is a thermally-operated overload relay for conveyor reverse.

Fig. 84: Main controller case - inside swing panel



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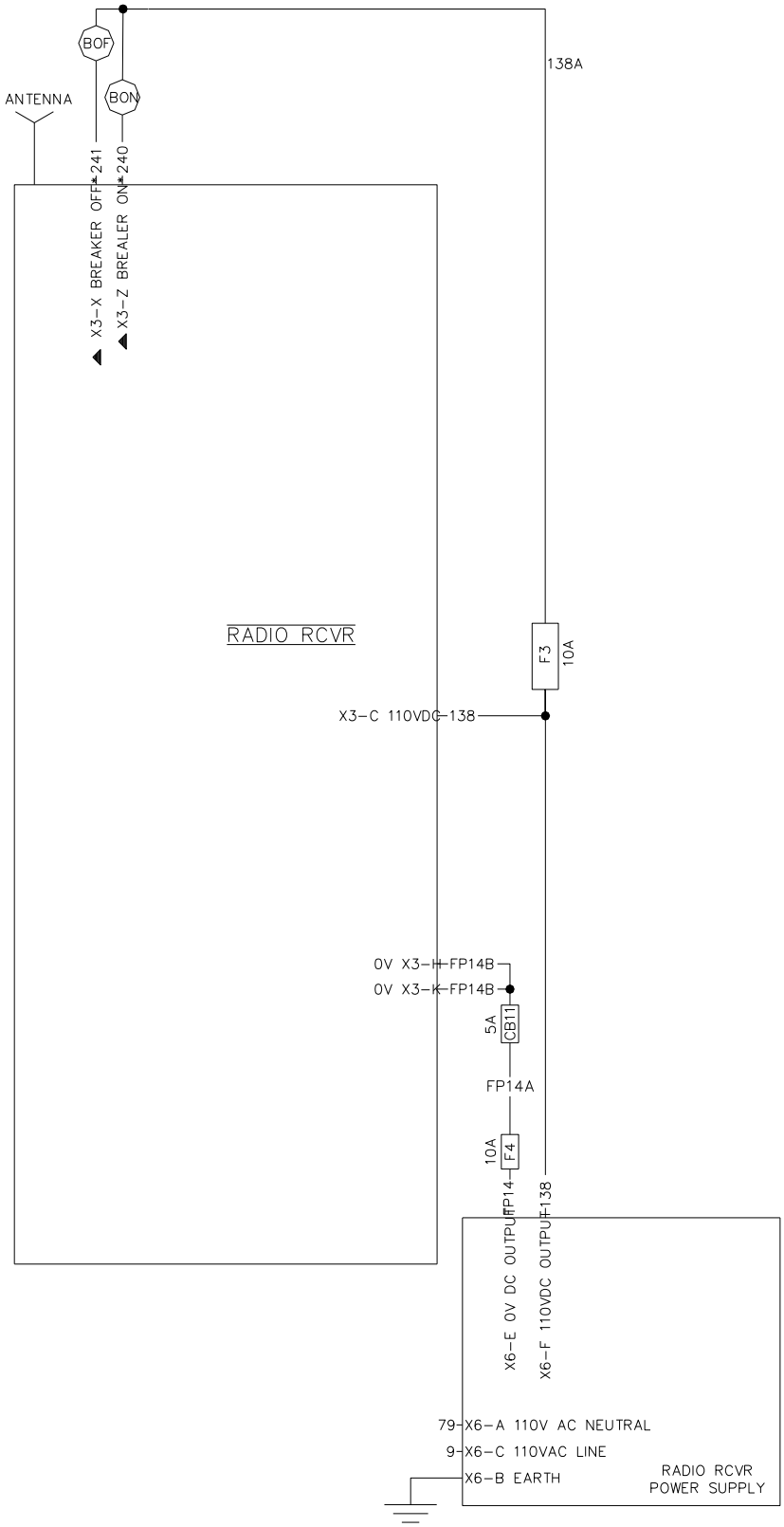
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Conveyor motor circuit with control

The pump motor must be running before the conveyor motors will start. The conveyor motors can be started in manual by depressing the momentary switch. This completes the circuit across coil conveyor forward (CF) and will start both conveyor motors. There are four (4) overloads in the conveyor circuit. There are two (2) thermal overloads and two (2) instantaneous overloads: one (1) for each motor OL5, 6, 7 and 8 for the control circuit when the conveyor contactor comes in the “CF” interlock closes. This completes the holding circuit. To stop the conveyor motor, depress the momentary conveyor stop switch.

The schematic shown in Fig. 92 is a typical conveyor motor circuit. Always refer to the schematic in the parts book for your machine.

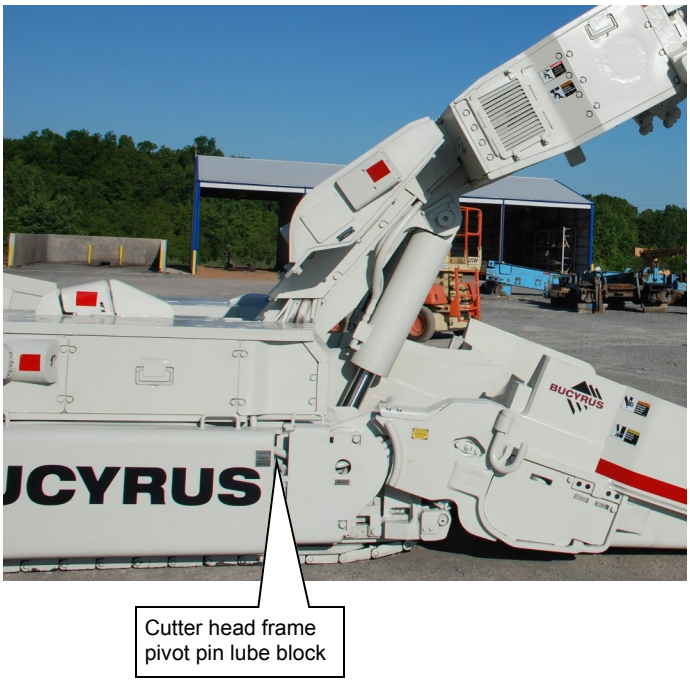
Fig. 99: Breaker on/off in radio remote schematic



cutter head frame pivot pin (left and right)

Lubricate left and right cutter head pivot points through the grease fittings located on the left and right front lubrication blocks (Fig. 104). Pump approximately 3 cu. in. (50 cu. cm) of grease into each fitting.

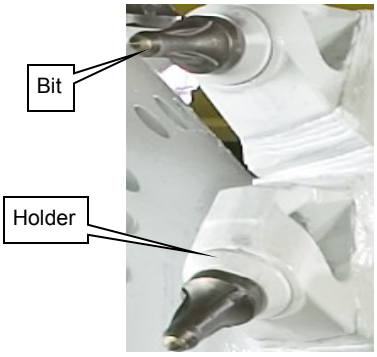
Fig. 104: Cutter head frame pivot pins



cutter head bits

Inspect the cutter head bits to ensure that they will rotate in their holders and for damaged or missing bits (Fig. 105). Replace bits immediately if any are missing or damaged.

Fig. 105: Cutter head bit



Monthly

CLA head pot assembly

Change the oil in both CLA head pot assemblies (Fig. 120).

- ☞ Level the miner, raise the gathering head pan, and secure in place.
- ☞ Clean dirt and debris from around the drain plug located under the gear case.
- ☞ Remove the drain plug and allow oil to completely drain from the gear case.
- ☞ Clean and reinstall drain plug.
- ☞ Clean dirt and debris from around the check plug and remove the plug.
- ☞ Clean dirt and debris from around the fill plug and remove the plug.
- ☞ Slowly add oil through the fill plug until oil begins to flow from the check plug hole. Allow sufficient time for the oil to ravel through the gear case when filling.
- ☞ Clean and reinstall the check and fill plugs.

CLA head transfer case

Change the oil in both CLA head transfer cases (Fig. 120).

- ☞ Level the miner, raise the gathering head pan, and secure in place.
- ☞ Clean dirt and debris from around the drain plug located under the gear case.
- ☞ Remove the drain plug and allow oil to completely drain from the gear case.
- ☞ Clean and reinstall drain plug.
- ☞ Clean dirt and debris from around the check plug and remove the plug.
- ☞ Clean dirt and debris from around the fill plug and remove the plug.
- ☞ Slowly add oil through the fill plug until oil begins to flow from the check plug hole. Allow sufficient time for the oil to ravel through the gear case when filling.
- ☞ Clean and reinstall the check and fill plugs.



NOTICE!
If the gear case is scheduled for oil drain and refill, obtain the oil sample prior to the oil change.



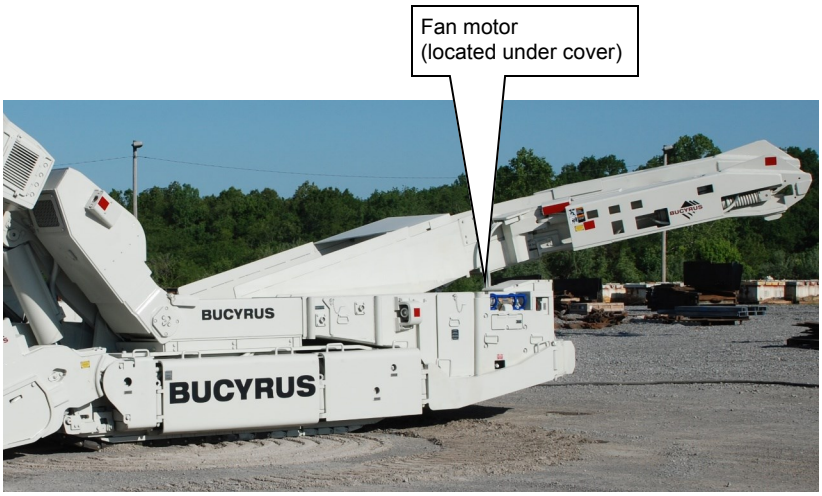
IMPORTANT!
Always collect oil samples using a siphon pump. Do not remove the drain plug and collect oil by allowing it to run out into the bottle.

- If the grease fitting on the exit side of the motor bearing is fitted with a plug:
  - Remove the plug.
  - Lubricate both motor bearings using the button fitting until new grease appears out of the exit side of the bearing.
  - Operate motor (s) for five (5) minutes.
  - Inspect for any grease leakage in the area around the bearing.
  - Replace grease plug (s) in all port (s).



NOTICE!
Incorrect grease or over greasing of the electric motor may cause serious damage to the motor. Follow the greasing procedure outlined in previous instructions.

Fig. 127: Fan motor bearings



3. Conveyor raise/lower port relief

   ☞ Activate the conveyor raise circuit to fully raise the conveyor. The main control valve pressure gauge should read 2,100 psi.

   ☞ Activate the conveyor lower circuit to fully lower the conveyor. The main control valve pressure gauge should read 1,400 psi.

   Note: Be sure that the ball valve is closed on the tank oil fill part of this circuit.

4. Conveyor swing port relief

   ☞ 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.

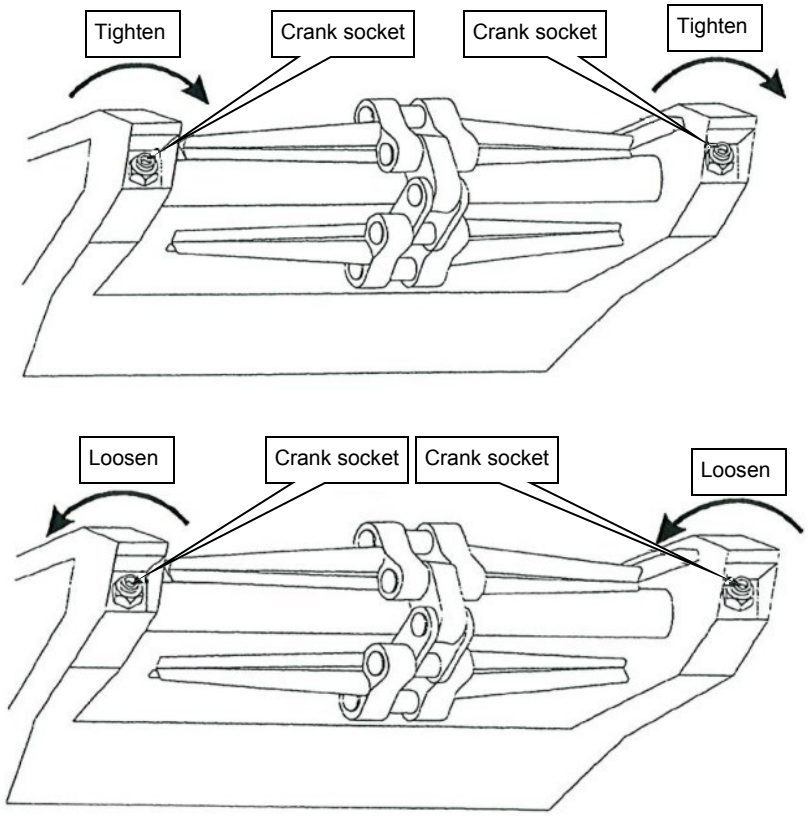
   ☞ Activate the conveyor swing right circuit to fully swing the conveyor to the right. The main control valve pressure gauge should read 1,800 psi.

5. Gathering head port relief

   ☞ Activate the gathering head raise circuit to fully raise the gathering head. The main control valve pressure gauge should read 1,700 psi.

   ☞ If 1,700 psi is not obtainable, check that the relief in the gathering head float valve that is stamped “CR” is set to 1,800 psi (see Gathering head raise/hold/float-lower circuit in the Hydraulic section of this chapter).

Fig. 138: Chain tension adjustment



☞ 8. When the proper chain tension has been reached, tighten the two hex bolts that secure the rod guide to the conveyor's right take-up rod. The take-up rod should be securely clamped between the split block.

☞ 9. Repeat step 6 or 7 if loosening or tightening the conveyor chain.

☞ 10. Connect the trailing cable to energize the miner.

☞ 11. Slowly raise the conveyor tail section and carefully remove the blocking from underneath.

☞ 12. Start the conveyor and CLAs running and observe the chain for proper tension.

☞ 13. When the chain tension is properly adjusted with the conveyor tail straight behind the miner, slowly swing the tail section from left to right behind the miner and check the chain's tension when the tail section is farthest from center (Fig. 139).

☞ 7. Insert the pin retaining plate and secure to the boom clevis with hex head capscrews and lock washers.

☞ 8. Repeat steps 4 through 7 on the left shear cylinder.

☞ 9. Connect the trailing cable to energize the miner.

☞ 10. Once the shear cylinders are secured to the cutter boom, remove the boom blocking to allow the cylinders to move the boom.

☞ 11. Contract the shear cylinders to pull the cutter boom pivot points into position in the tractor frame boom pivot clevises.



IMPORTANT!
In addition to the shear cylinders, the stabilizer and gathering head can also be used to adjust the cutter boom's position to allow easier insertion of the cutter boom pivot pins.

☞ 12. Install both cutter boom pivot pins (see Boom pivot pin procedure - note that there are two procedures: one for straight boom pivot pins and one for tapered (McSweeney) pins).

☞ 13. Replace the motor cooling water hoses onto the cutter head boom.

☞ 14. Replace the electrical power cables onto the cutter head boom.

End cutter drum

end cutter drum removal

To remove the end cutter drum

☞ 1. Lower the gathering head completely until it touches the floor. Lower the conveyor tail assembly until it is level with the floor.

☞ 2. Raise the cutter head assembly to its highest position. Place blocking underneath the cutter head assembly and lower the cutter head assembly onto the blocking.

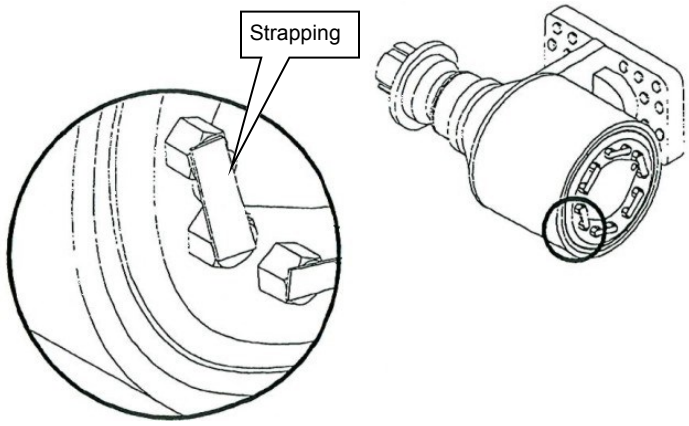
WARNING!
You could be seriously injured or killed by falling loads. Observe the safe working load limits of lifting devices and keep a safe distance from suspended loads.

☞ 3. Disconnect the trailing cable to de-energize the miner. Follow all Federal and mine lockout/tagout regulations.

WARNING!
Follow all Federal and mine lockout/tagout regulations and procedures. Failure to do so could result in machine damage or serious injury or death to personnel.

☞ 4. Using the chisel and hammer, remove the strapping (Fig. 150) that pairs the cutter end drum and capscrew heads.

Fig. 150: Strapping



☞ 5. Remove the hex head capscrews that secure the end drum cover plate.

☞ 6. Remove the end drum cover plate.

☞ 7. Remove the hex head capscrews and washers that secure the end drum to the cutter drum drive gear case (Fig. 151).

WARNING!
You could be seriously injured by falling loads. Use extreme caution when working near suspended loads.

Drum drive torque limiting clutch

drum drive motor torque limiting clutch removal

To remove the drum drive torque limiting clutch

☞ 1. Lower the gathering head completely until it touches the floor. Lower the conveyor tail section until it is level with the floor.

☞ 2. Raise the cutter head assembly to its highest position. Place blocking underneath the cutter head assembly. Lower the cutter head assembly onto the blocking.



WARNING!
You could be seriously injured or killed by falling loads. Observe the safe working load limits of all blocking devices.

☞ 3. Disconnect the trailing cable to de-energize the miner. Follow all Federal and mine lockout/tagout regulations.



WARNING!
Follow all Federal and mine lockout/tagout regulations and procedures. Failure to do so could result in machine damage or serious injury or death to personnel.

☞ 4. Remove the hex head capscrews and lock washers that secure the debris guard under its retaining strap.

☞ 5. Remove the retaining strap and debris guard.

☞ 6. Locate the clutch housing on the rear of the cutter motor assembly (Fig. 158).

☞ 7. Remove the hex head capscrews and lock washers that secure the clutch housing to the motor housing.

☞ 8. Remove the clutch housing to expose the clutch assembly.

☞ 9. At the center of the clutch assembly, locate the drum drive shaft.

☞ 10. Using the screwdriver, remove the retaining ring that secure the cutter shaft inside the clutch assembly.

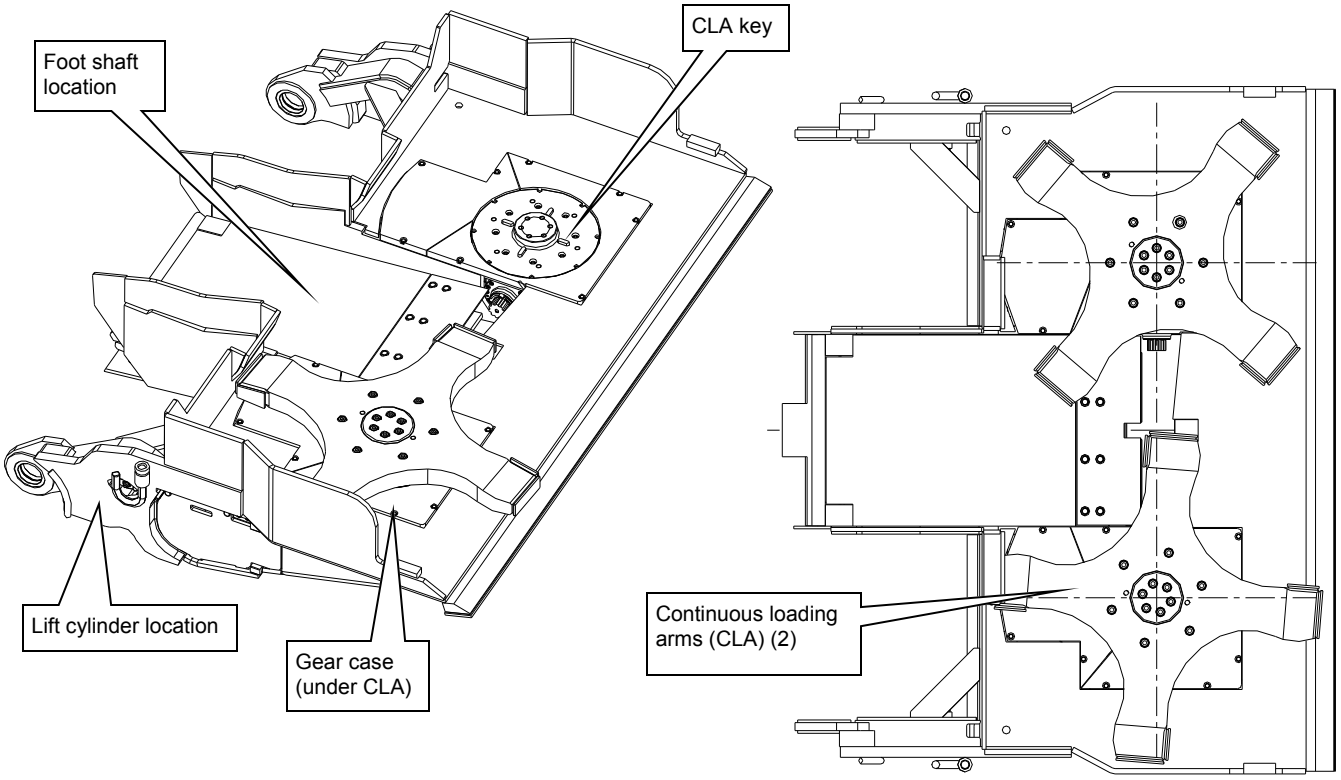
☞ 11. Pull the cutter shaft from the motor and clutch assemblies.

☞ 12. Store the cutter shaft in a clean, safe place.

Gathering head assembly

The gathering head assembly (Fig. 168) consists of the gathering pan, the continuous loading arms (CLAs), lift cylinders, and drive motors.

Fig. 168: Gathering head assembly



gathering head assembly removal

To remove the gathering head assembly

☞ 1. Lower the conveyor tail section until it is level with the floor. Lower the gathering head until it rests on the floor. Place blocking under the rear of the gathering head to stabilize its position during and after removal of the pivot pins and disconnection of the lift cylinders.

☞ 2. Raise the cutter head to its highest point and place blocking underneath it. Lower the cutter head onto the blocking.

WARNING!
You could be seriously injured or killed by falling loads. Observe the safe working load limits of blocking devices.

☞ 3. Disconnect the trailing cable to de-energize the miner. Follow all Federal and mine regulations for lockout/tagout.

WARNING!
Follow all federal and mine lockout/tagout regulations. Failure to do so could result in machine damage or serious injury or death to personnel.

Gathering head gear case removal and installation

gathering head gear case removal

To remove the gathering head gear case

☞ 1. Lower the conveyor tail section until it is level with the floor. Lower the gathering head until it touches the floor.

☞ 2. Raise the cutter head assembly to its highest position. Place blocking underneath the cutter head assembly. Lower the cutter head assembly onto the blocking.

WARNING!
You could be seriously injured or killed by falling loads. Observe the safe working load limits of blocking devices.

☞ 3. Disconnect the trailing cable to de-energize the miner. Follow all Federal and mine regulations for lockout/tagout.

WARNING!
Follow all federal and mine lockout/tagout regulations. Failure to do so could result in machine damage or serious injury or death to personnel.

☞ 4. Remove the gathering head motor's side cover by removing the hex head capscrews and lock washers that secure the side cover to the gathering head assembly.

☞ 5. Remove the cover to expose the end of the motor.

☞ 6. Remove the square-headed pipe plug on the end of the gathering head motor.

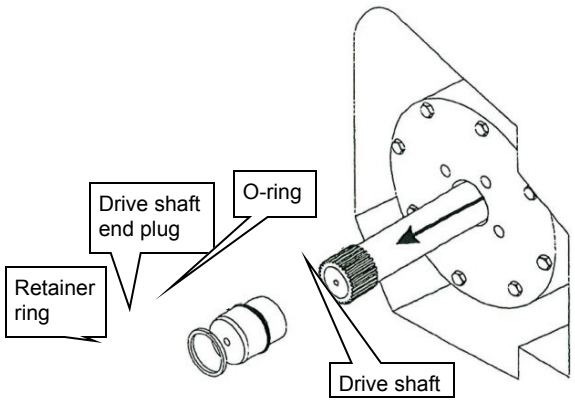
☞ 7. Remove the retaining ring that secures the shaft end plug inside the motor housing (Fig. 175).

☞ 8. Using a slide hammer, pull out the drive shaft end plug.

☞ 9. Pull the drive shaft from the motor and store in a safe place.

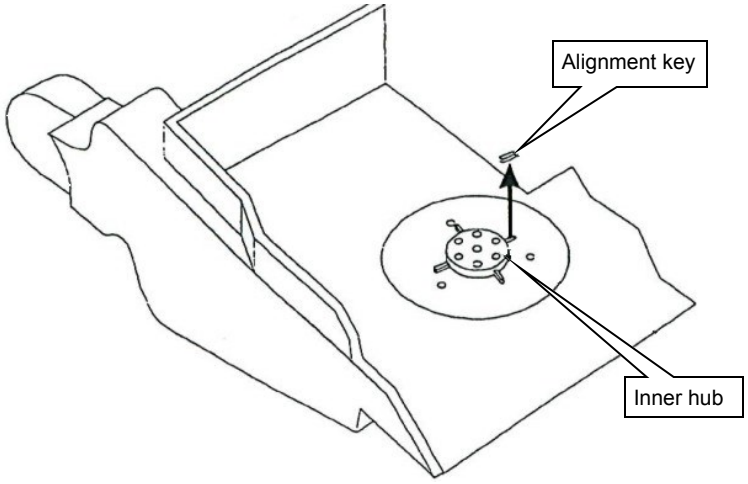
☞ 10. Replace the pipe plug into the end of the motor.

Fig. 175: Motor shaft removal



☞ 7. Remove the four CLA alignment keys (Fig. 184) from the exposed gathering head gear case turntable and store the keys in a safe place.

Fig. 184: CLA alignment key removal



CLA installation

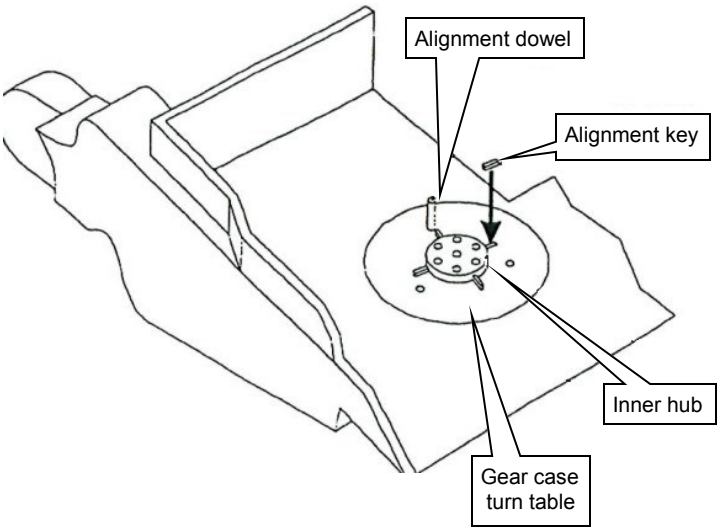
To install the CLA

☞ 1. On the CLA exterior, mark the bolt hole (outer set of three holes) located directly adjacent to a key cut-out.

☞ 2. Place an alignment dowel (Fig. 185) in the gatherin5g head gear case turntable bolt hole (outer set of three holes) that is directly adjacent to a key cut-out.

☞ 3. Place the four keys into their cutouts on the gathering head gear case turntable.

Fig. 185: Alignment dowel placement



10. Torque the sixteen socket head capscrews to the appropriate amount (see Torque tables in Chapter 6 of this manual).

11. Install the tram motor in the tram case (see Tram motor removal and installation procedure in this chapter).

12. Replace the tram rub rail between the two adjacent rub rails and secure it with the two rub rail pins.

13. Refill the tram gear case with oil.

☞ 11. Disconnect the trailing cable to de-energize the miner. Follow all Federal and mine regulations for lockout/tagout.



WARNING!
Follow all federal and mine lockout/tagout regulations. Failure to do so could result in machine damage or serious injury or death to personnel.

☞ 12. Remove the guide wires from the tram track.

☞ 13. Connect the two ends of the tram track and using the hammer and punch, insert the track pin to secure the two track links together.

☞ 14. Using the hammer and punch, insert the two roll pins into the track pin to secure the pin in the links.

☞ 15. Adjust the tram track tension (see Tram track adjustment procedure in the Adjustment procedures section of this chapter).

☞ 16. Close the front rub rail cover and replace the hex head capscrews and lock washers that secure the front rub rail to the tractor frame.

☞ 17. Replace the tram rub rail between the two adjacent rub rails and secure it with the two rub rail pins.

☞ 18. Connect the trailing cable to energize the miner.

☞ 19. Remove blocking.

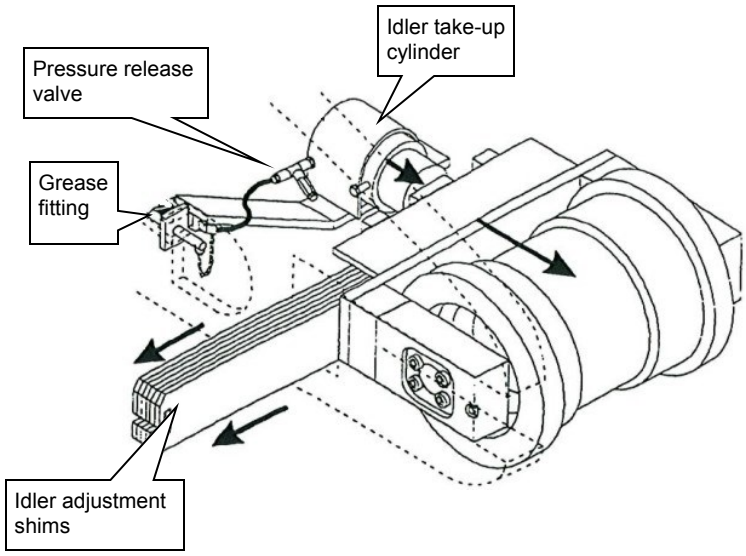


WARNING!
You could be seriously injured or killed by falling loads. Follow mine procedure to remove blocking devices and use caution.

☞ 12. Remove all the idler adjustment shims and store the shims in a safe place.

☞ 13. Open the pressure release valve for the front idler take-up jack and allow the cylinder to contract.

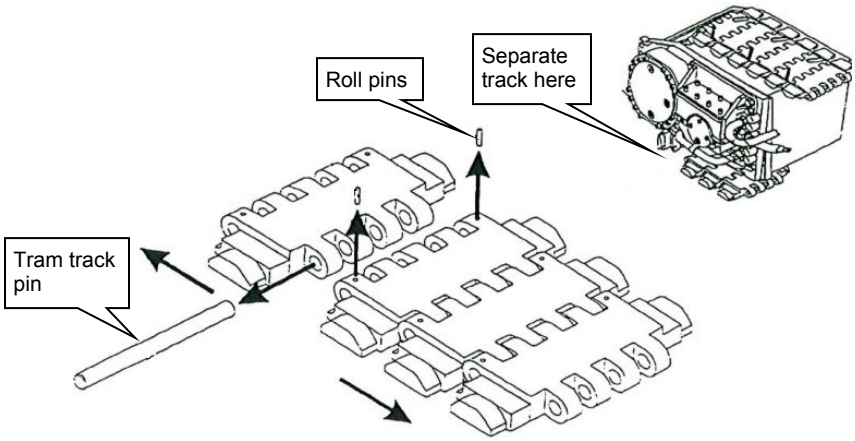
Fig. 209: Idler adjustment shim removal



☞ 14. Locate a tram track link near the track entry opening at the bottom of the tram case (Fig. 210) and, using the hammer and punch, remove the two roll pins that secure the tram track pin between the links. Store the roll pins in a safe place.

☞ 15. Using the hammer and punch, remove the tram track pin to disconnect the links and separate the track. Store the track pin in a safe place.

Fig. 210: Tram track removal



Front idler take-up cylinder removal and installation

front idler cylinder removal

To remove the front idler take-up cylinder

☞ 1. Lower the conveyor tail section until it is level with the floor.

☞ 2. Lower the gathering head and cutter head until these two assemblies touch the floor.

☞ 3. Disconnect the trailing cable to de-energize the miner. Follow all Federal and mine regulations for lockout/tagout.

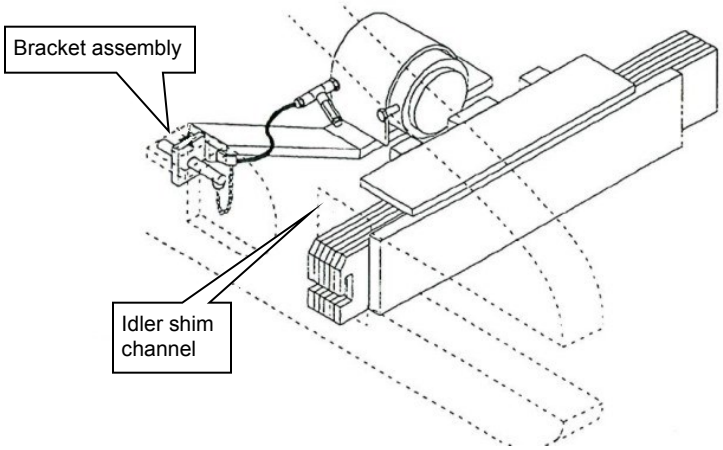
WARNING!
Follow all federal and mine lockout/tagout regulations. Failure to do so could result in machine damage or serious injury or death to personnel.

☞ 4. Remove the hex head capscrew and lock washer that secures the front rub rail to the tractor frame and open the front rub rail cover.

☞ 5. Remove the hex head capscrews that secure the fill plate to the frame and remove the fill plate.

☞ 6. Locate the front idler take-up cylinder bracket assembly (Fig. 221) which is mounted to the rear of the idler shim channel.

Fig. 221: Front idler take-up cylinder bracket



☞ 6. Pull the flip pin (Fig. 222) from the half link to release the take-up cylinder bracket from the tractor frame.

☞ 7. Lower the end of the bracket until it clears the half link and pull the bracket straight out to remove it from the tractor frame.

fan/motor installation

To install the fan/motor

1. Carefully insert the fan/motor assembly into the tractor frame.
2. Orient the fan/motor so the motor drain is directly at the bottom of the assembly. Ensure that the fan/motor is positioned correctly for airflow out the rear vent of the miner.
3. Insert and tighten the twelve hex head capscrews and lockwashers to secure the fan/motor assembly to the tractor frame.
4. Remove the four hex head capscrews and lockwashers that secure the junction box cover and remove the cover and its o-ring.
5. Insert the three lugs of the power cable (with gland and stuffing box already installed) into the motor's junction box.
6. Replace the stuffing box's half-moon clamp in its channel to secure the stuffing box in the junction box.
7. Tighten the two socket head capscrews to secure the clamp to the junction box.
8. Inside the junction box, locate the motor's lug connections. Match the motor lug connections to the corresponding power cable lugs (refer to the wiring diagram supplied in your parts manual).
9. Attach the first motor lug to its corresponding power cable lug by inserting a hex head capscrew through the motor lug, through the power cable lug, through a flat washer, and through a lockwasher. Secure the capscrew with a hex nut. Repeat this step for the other two lugged connections.
10. When all three connections have been secured, wrap each of the three connections with a layer of rubber tape, then a layer of black tape and finally a layer of glass tape.
11. Replace the junction box O-ring and cover.
12. Insert the four hex head capscrews and lockwashers to secure the junction box cover and tighten.
13. Replace the rub rail hinge post.
14. Insert and tighten the four hex head capscrews and lockwashers to secure the rub rail hinge post to the tractor frame.
15. Close both rub rails and secure with the rub rail pin.

Troubleshooting procedures

The following section lists possible problems encountered when servicing the Continuous Miner ® and can aid in locating and correcting these problems.

This section covers basic components, with each listed in a trouble-cause-remedy format.



WARNING!
Some procedures must be carried out with the cover of the electrical controller removed and some procedures require the controller to be energized during the tests. It is extremely important that you take all necessary precautions to prevent accidental electrical shock while working within the controller. An MSHA-certified electrician must supervise and inspect all work performed.

For maintenance procedures and tests that DO NOT require the controller to be energized, precautions include:

- Before removing the controller cover, remove power from the system by disconnecting the trailing cable. Follow all mine, local, State, and Federal lockout/tagout procedures.
- Use insulated gloves and tools where possible.
- All connections must be tight and care must be taken to prevent bolts, nuts, washers and other small metal fasteners from being dropped or lost inside the controller. These lost fasteners could cause electrical shorts inside the controller.

For procedures that DO require that the controller be energized while the cover is off:

- At no time should you reach inside the controller while it is energized. If it becomes necessary to make adjustments or to replace parts inside the controller, the machine circuit breaker must be turned to the “OFF” position and the capacitor bank discharged (see above). Once the circuit breaker is in the “OFF” position and the capacitor bank discharged, adjustments or parts replacements can be made.
- Use insulated gloves and tools where possible.
- All connections must be tight and care must be taken to pre vent bolts, nuts, washers and other small metal fasteners from being dropped or lost inside the controller. These lost fasteners could cause electrical shorts inside the controller.

Table 5: 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:

- ☞ replace dirty filters
- ☞ clean clogged inlet line
- ☞ clean reservoir breather vent
- ☞ fill reservoir to proper level
- ☞ overhaul or replace supercharge pump

B. Any or all of the following:

- ☞ tighten leaky inlet connections
- ☞ bleed air from system

C. All of the following:

- ☞ check for damaged pump or pump drive
- ☞ replace and align coupling

D. ☞ adjust setting on valve

E. ☞ overhaul or replace part

F. Any or all of the following

- ☞ check position of manually operated controls
- ☞ check electrical circuit on solenoid operated controls
- ☞ repair or replace pilot pressure pump

G. ☞ reverse rotation

H. ☞ replace with correct unit

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