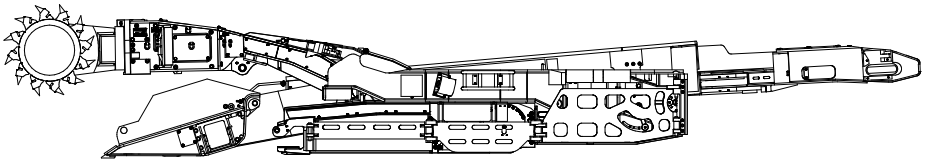
Operation Manual

Bucyrus - Continuous Miner
Model - 30M3L

Doc. No.: A6474X319



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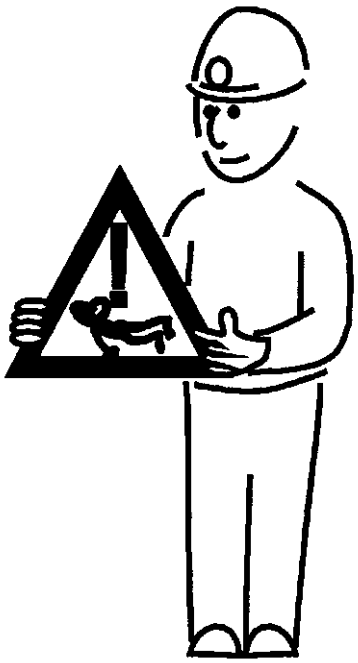
2 Your safety



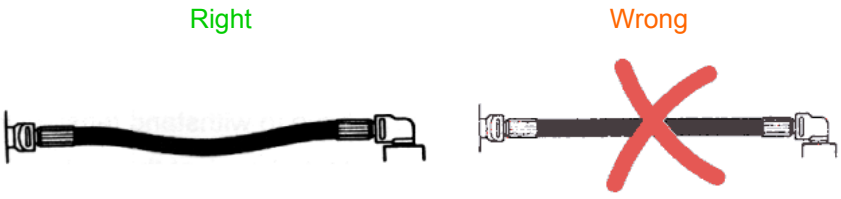
installing hydraulic hoses

Install the hydraulic hoses properly behind the brackets and clamps provided for them.

Always install hydraulic hoses so they:

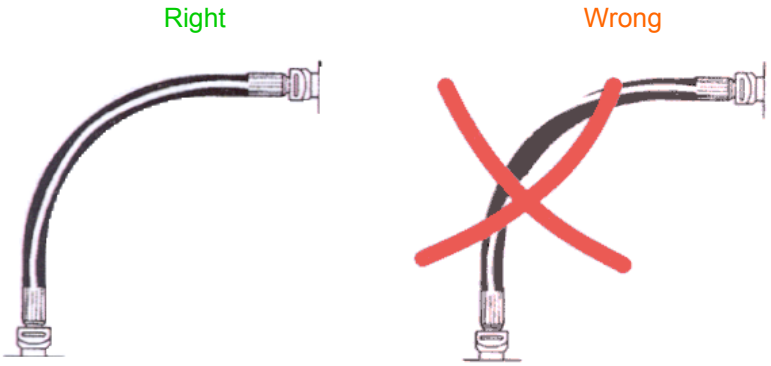
- always have a little slack.

Fig. 1: Installing hydraulic hoses, slack



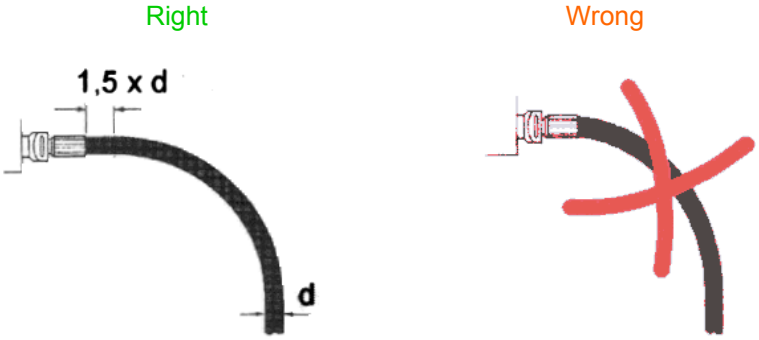
- are not twisted.

Fig. 2: Installing hydraulic hoses, twisting



- are not bent directly behind the connections. (distance min. 1.5 x nominal diameter).

Fig. 3: Installing hydraulic hoses, bending



Overview of safety instructions

WARNING!
Use extreme caution when inspecting for leaks with the machine running. Unexpected machine movement, or contact with moving parts, could result in injury.

Escaping fluids under pressure can penetrate skin and cause serious injury. Do not attempt to locate hydraulic leaks be feeling hoses and fittings with bare hands. Pin hole leaks can penetrate the skin.

WARNING!
Follow all Federal and mine regulations regarding lockout/tagout procedures. Failure to do so may result in serious injury or death.

NOTICE!
Switch assembly seals beneath the engraved plate are the primary seal; a secondary seal within the switch itself and an integral neoprene seal operate as a barrier to moisture ingress.

IMPORTANT!
Do not use caustic solvents or displacement solutions, as this may cause premature seal failure.

IMPORTANT!
Do not use metal implements to dig out coal, mud or soapstone that may be found in the charge receptacle.

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.

IMPORTANT!
Always use the collection hose provided with each bottle. Always discard hose immediately following collection of the oil and do not use it for the next sample. To do so will contaminate the next sample with oil from the previous sample.

IMPORTANT!
For motor bearings that require high temperature lithium complex grease (Spec. 100-15), Bucyrus provides a special “button” style lubrication fitting (Fig. 122) to prevent the accidental use of multi-purpose lithium complex grease at these locations.

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

Storage and transport

machine electrical components

Electronic components must be stored at temperatures between -10° C and 55° C (14° F and 131° F).

traction drives

The traction drives should be stored at -10 to 50 °C (14 to 122 °F).

Major problems with condensation can occur if a drive is stored in a cold environment and is then taken into a deep mine where the temperature is much higher. Even though the humidity may be at an acceptable level, condensation will occur on the cold drive. Slight exposure to a condensing environment is not harmful provided the drive is completely dry before electrical power is applied.

random sample inspection

After a storage period of approximately two years, a random sample inspection must be performed to determine whether the measures taken and the method of storage has prevented damage.
On request, the inspection can be carried out by Bucyrus America, Inc.

natural aging

Even with proper storage, seals and hoses are subject to natural ageing. Do not use these parts if they have been stored for more than two years.

HFA fluids

Instructions on the storage of concentrates for hydraulic fluids can be found, if required, in chapter 6 in this operating manual.

IMPORTANT!
Take care to insure that new maintenance supplies are stored separately from existing stock and that removal takes place on the "first in, first out" principle.

Long-term storage of spare components

hydraulic components

If a component is to be stored more than six months, the hydraulic component must be completely filled with a corrosion inhibiting fluid. Fill the hollow areas of hydraulic components (e.g. the piston chambers) in horizontal position (ports facing upwards) until they start to overflow then seal the ports with plastic or steel plugs.

miscellaneous components

Store the electrical equipment, electronic components, spare parts of rubber or plastic – such as seals and hoses – and hydraulic fluids only in closed rooms at temperatures of 15° C to 25°C (60° F to 77° F).

motors

Refer to the motor manufacturer's storage procedure guide in your Bucyrus America, Inc. parts manual.

fan assembly

Rotate the impeller 1-1/4 turn once per month to prevent dimpling of the motor bearings rollers.

plastic deformation

In order to prevent plastic deformation of the seal elements, cylinders must be stored in an upright position. Some cylinders must be removed so that they can be stored upright.

blowing system (optional)

The Continuous Miner is equipped with an optional blowing system that allows the Miner operator to apply fan induced air to the face during operation. The fan draws the air from either intake located at the left and right rear of the Miner. Air is then drawn from the rear intakes through the fan and ductwork, to the crossover hood, which is located on the cutter head support frame. The blowing system assembly is located on the left hand side of the Miner.

guards and covers

The machine is equipped with guards and covers to reduce the possibility of personnel coming in contact with rotating or moving parts. All guards and covers must be installed and securely fastened during operation.

DANGER!
Do not operate the machine with any of the guards or covers removed. You or other personnel could be seriously injured from moving or rotating parts.

cutter boom safety supports

There are two cutter boom safety supports, one on each side of the cutter boom. The supports are used to block up the cutter boom during maintenance operations.

conveyor safety supports

There are two conveyor safety supports, one on each side of the conveyor. The supports are used to block up the conveyor during maintenance operations.

methane monitor

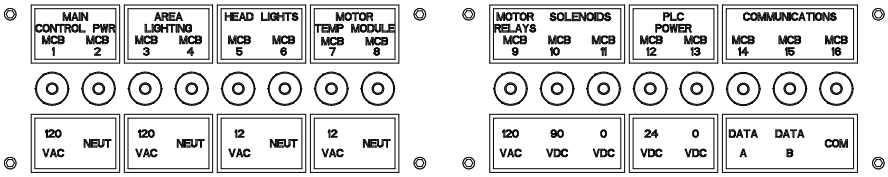
The machine is equipped with a methane monitor that detects the presence of methane in the mine atmosphere. When the miner is being powered up, the monitor looks for methane before any other function is energized. If the methane monitor detects a level of methane within a preset tolerance, the methane monitor relay will close and power will be supplied to the other functions on the machine. (The machine can have optional dual sniffer heads or dual readouts.)

control breaker switches

There are sixteen control breaker reset buttons located across the top of the operator's case (Fig. 10). The button will pop out when the circuit breaker trips. To reset a circuit breaker, push the button in.

See the Electrical section in this chapter for detailed information on the individual breakers.

Fig. 10: Control breaker reset switches



"CONVEYOR HOUR METER"

The "CONVEYOR HOUR METER" (Fig. 11) indicates the hours of running time for the conveyor motors.

"CUTTER HEAD HOUR METER"

The "CUTTING HEAD HOUR METER" (Fig. 11) indicates the hours of running rime for the cutter head motors.

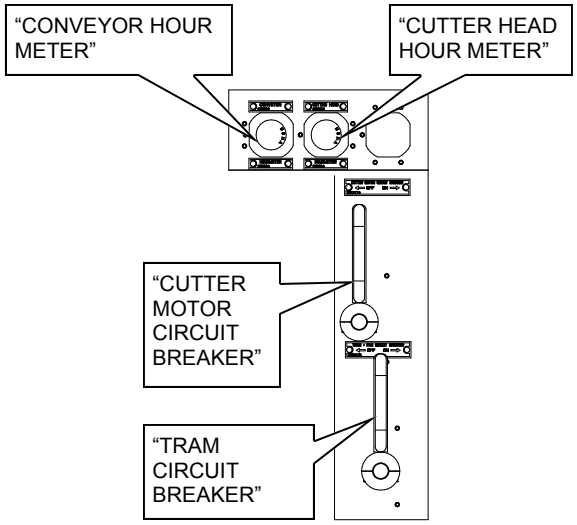
"CUTTER MOTOR CIRCUIT BREAKER"

The "CUTTER MOTOR CIRCUIT BREAKER" lever (Fig. 11) is used to turn the circuit breaker for the cutter motors. This breaker must be on before the cutter motors will start. To turn the circuit breaker on, move the lever to the right. To turn the circuit breaker "OFF", move the lever to the left.

"TRAM CIRCUIT BREAKER"

The "TRAM CIRCUIT BREAKER" lever (Fig. 11) is used to turn the circuit breaker for the tram motors. This breaker must be on before the tram motors will start. To turn the circuit breaker on, move the lever to the right. To turn the circuit breaker "OFF", move the lever to the left.

Fig. 11: "CONVEYOR HOUR METER," "CUTTER HEAD HOUR METER", "CUTTER MOTOR CIRCUIT BREAKER" and "TRAM CIRCUIT BREAKER"



System Menu

The control system provides information, diagnostic, and setup screens that are grouped together in the system menu (Fig. 19). The system menu is accessed by using either display module and a remote control handset.

To access and navigate the system menu using the radio remote:

☞ Press the SHIFT and MENU key to access the system menu screen.

IMPORTANT!
All functions and motors are shut down and disable when the system menu is selected.

☞ Press CONV UP or CONV DOWN to move the cursor up and down the list.

☞ Press SHIFT and MENU to select the highlighted item

☞ To leave the menu and return to remote mode, press SHIFT and REMOTE.

Fig. 19: System menu, example

Graphics display

Red zone

Remote controlled continuous miners

The remote control of miners introduces certain potential safety hazards which the miner operator must watch for and be aware of. While the operator is now free to position himself for convenient visibility of mining operations at the face, he can easily expose himself to the danger of being near mobile heavy equipment.

Most significantly, the operator's greatest danger is from his Continuous Miner, especially when he is maneuvering it during mining operations. The miner is capable of slewing when turning, especially when the crawlers are split. The discharge conveyor can also swing. In each of these cases, the miner operator is in danger of being hit, or worse yet, run over by his own machine. Equally dangerous is the possibility of the operator being pinned against the rib by his own miner.

Miner operator danger areas, or Red zones

Some typical situations dangerous to the miner operator are illustrated on the following pages. The danger area, or red zone (Fig. 26) is indicated by alternating red and white diagonal stripes.

Fig. 26: Red zone

Remote console - tram speed control

The system allows the tramming to be driven in three discrete speeds (SPEED 1, SPEED 2, and SPEED 3). SPEED 1 is the default tramming speed.

To advance a speed:

☞ Press the tram levers and “TRAM 2-3” keys together to move from SPEED 1 to SPEED 2.

☞ Once in SPEED 2, press the tram levers and “TRAM 2-3” together to move from SPEED 2 to SPEED 3.

The following tramming configurations are enforced by the control system for safety reasons:

- Spilt track tramming is limited to SPEED 1 when cutter motors are not running.
- Single track tramming is normally limited to SPEED 1.
- It is possible to speed up a single track from SPEED 1 to SPEED 2 providing that tramming is started in SPEED 1.
- Tramming is limited to sump speed while the cutters are on.
- While the cutters are running, reverse speed can be incremented while the reverse keys are being pressed. Note that this option is used when the miner is retreating or pillar mining.

Mining operations

It is presumed that the operator of this machine is experienced in continuous mining techniques. This section of the manual will present some basic rudiments of Continuous Miner mining operations, but should not be considered in any way as a complete how-to of mining techniques. It is recognized that each mine will have their own methods and techniques which work best for them.

One of the keys to good productivity with a Continuous Miner is to know the correct depth of sump which, when the cutting cycle is completed with shear-down, gives enough coal to adequately fill one haulage vehicle.

Another important factor is to do as much advance cutting as possible, while awaiting the haulage vehicle, to load up the gathering head pan. When the vehicle arrives, the gathering head can then work at maximum efficiency to load out the accumulated coal while the remainder of the cutting cycle is being completed.

The following discussion outlines the various steps of an efficient Continuous Miner mining cycle.

Preparation of the face for the next cut

The first view in Fig. 31 shows a continuous miner approaching a freshly cut face. The operator has the cutter head lowered to prepare for making a 2 to 3 inch deep sump cut at the bottom of the face. This is done to make clearance for the gathering head blade when the miner is sumping at the top of the face. In this manner, the miner can make a deeper sump into the top of the face.

The next view in the figure shows the miner having made a 30 inch sump cut at the bottom of the face. The operator will now back the miner out of the cut and raise the cutter head to the mine roof.

In the final view, the operator has backed out of the bottom cut and raised the cutter head to the roof, positioning the miner for making a top sump.

Cutting head assembly

The cutting head assembly (Fig. 40) is attached to the main chassis at right and left hand independent pivot points around which the assembly is articulated for vertical ranging cutting. The independent pivots allow removal of the cutting head assembly without disturbing the gathering head or conveyor components.

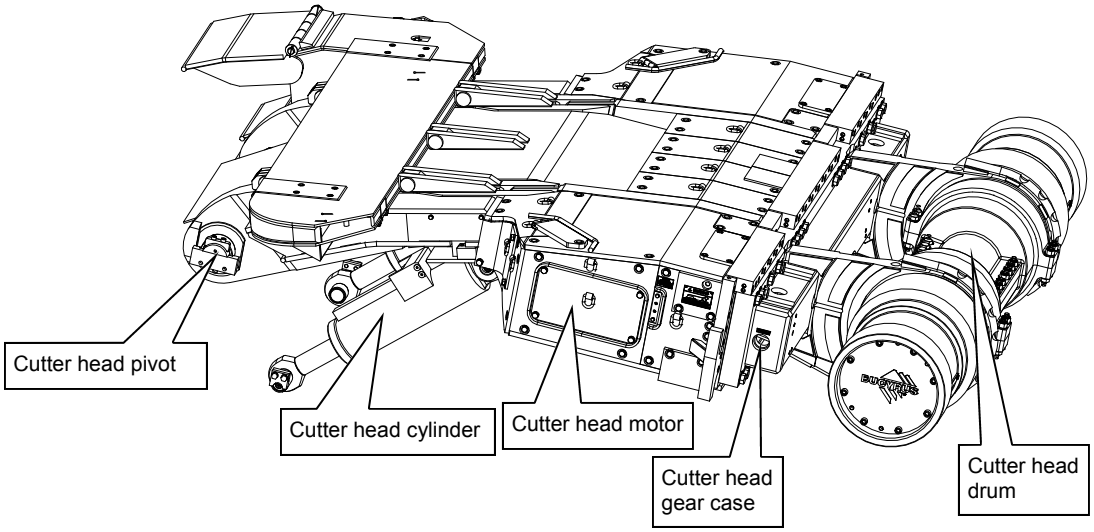
The cutting head assembly consists of the following:

- The cutting head support frame. The frame is a heavy duty box structure which includes the right and left pivot points for attaching to the main chassis, upper mounting clevises for the two cutting head raise cylinders, and a bolting flange to which the cutting head drive assembly mounts.
- The cutting head gear case assembly, which consists of an input gear case and water-cooled electric drive motor for each of the right and left hand sides, a final drive gear case which includes drive gearing, a main drive shaft, and mounting points for the right, left, and center drums, and a bolting flange for mounting onto the cutting head support frame.
- Provides for both front and rear flange support of the cutter motors.

The cutting head assembly is raised and lowered by two (2) heavy duty hydraulic cylinders mounted to the main chassis at their lower ends and to the main longitudinal structural members of the cutting head support frame at their upper ends. These cylinders enable the cutting head assembly over a predesigned range (see the general arrangement drawing for you machine for dimensions).

The power train of the cutting head consists of right and left sides, which tie together at the common main drive shaft, allowing the combined power of both electric drive motors to be available at one point on the cutting drums.

Fig. 40: Cutting head assembly



flow meter — A flow meter (Fig. 47) is a visual device which indicates the volume of fluid passing through it per unit of time.

orifice — An orifice (Fig. 47) is a device that restricts flow.

pressure/return manifold — A pressure manifold (Fig. 47) has one inlet port and many outlet ports to supply flow to many circuits. A return manifold has many inlet ports and only one outlet port for flow to return to tank. Note: You can have the same part number for a pressure or return manifold.

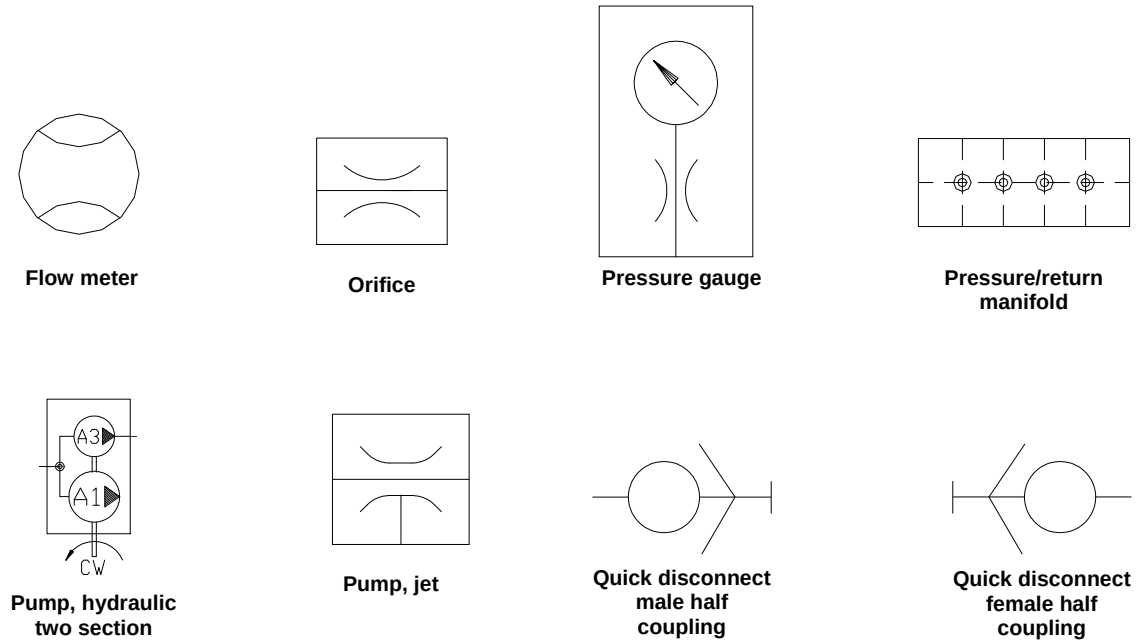
pressure gauge — A pressure gauge (Fig. 47) is a visual device used to indicate the pressure in a hydraulic or water circuit.

pump — The purpose of a pump (Fig. 47) is to produce flow; it does not pump pressure. Pressure is caused by a resistance to flow. All system components have some resistance to flow. Hydraulic cylinders, which power machine functions, are the major components causing this resistance. Each circuit is protected by a relief valve so that the pressure in the system will not exceed the rating of its components. To ensure that everything works correctly and in proper sequence, relief valve pressure settings closely match the load requirements.

The miner is equipped with a multi-section gear-type fixed displacement hydraulic pump assembly. Each section consists of two closely-meshed gears inside a tightly-fitted housing.

quick disconnect female/male coupling — A quick disconnect (Fig. 47) is a coupling which can quickly join or separate lines.

Fig. 47: Hydraulic symbols



Flow meter | Orifice | Pressure gauge | Pressure/return manifold

Pump, hydraulic two section | Pump, jet | Quick disconnect male half coupling | Quick disconnect female half coupling

Cutter head cylinder circuit

DANGER!
The area under and around the raised cutter head is dangerous. Securely block the head before performing maintenance on or below it. Failure to block the raised cutter head could result in serious injury or even death.

Oil is supplied by hydraulic pump section A1 through a 10-micron by-passing pressure filter to the cutter head working section of the main control valve. By manual or remote solenoid control, the valve spool allows oil to enter the cutter head cylinder circuit. The cutter head cylinder is a double acting cylinder with a load holding cartridge. there are two (2) cutter head cylinders, one on each side of the machine.

To manually raise the cutter head (extend the cutter head cylinders), move the handle on the remote control valve down. This increases the pressure in the B port on the remote control valve which increases the pressure in the pilot cylinder (raise) on the cutter head directional control valve moving the spool to allow oil to flow to the B port on the cutter head directional control valve. Oil flows from the B port on cutter head directional control valve to Port P2 on anti-chatter/maintenance section of the Multipurpose Valve free flowing through the check valve to Port P1 on to the extend port on the cutter head cylinders, free flowing through the check valve of the load holding cartridge to extend the cylinders and raise the cutter head. Oil from the retract side of the cutter head cylinder returns to the A port of the cutter head directional valve. The cutter head raise circuit is protected by a port relief that is set at 207 bar (3,000 psi).

To manually lower the cutter head (retract the cutter head cylinders), move the handle on the remote control valve up. This increases the pressure in the A port on the remote control valve which increases the pressure in the pilot cylinder (lower) on the cutter head directional control valve moving the spool to allow oil to flow to the A port on the cutter head directional control valve. Oil flows from the A port on cutter head directional control valve to the retract port on the cutter head cylinders, piloting open the load holding cartridge to allow flow out of the extend port on the cylinder. Oil from the extend side of the cutter head cylinder flows to the P1 Port on the anti-chatter/maintenance section of the Multipurpose Valve through a counterbalance valve to Port P2 then to the B port of the cutter head directional valve.

Conveyor chain take-up circuit (optional)

The pilot-auxiliary hydraulic pressure circuit is powered by hydraulic pump gear section A3 which is rated at 28Lpm at 35 bar (7.5 gpm at 500 psi). From the pump, oil flows from the 10 micron by-passing pilot pressure filter to the “In” port of the hydraulic conveyor chain take-up section of the Multipurpose valve and “Out” to the two conveyor chain take-up cylinders. The conveyor chain take-up section consists of a check valve to hold pressure in the circuit and a pressure reducing/ relieving cartridge maintain a constant pressure of 200 psi in the circuit. The reducing/relieving valve reduces pilot pressure to 200 psi and relieves any pressure spikes caused by forces acting against the conveyor of the miner.

An adjustable needle valve allows for the bleeding off of pressure for maintenance. ***This needle valve is to remain closed except for performing maintenance.*** A gauge is incorporated into the valve block for maintenance and troubleshooting.

DANGER!
Never run the conveyor without the needle valve closed. Injury or death may occur.

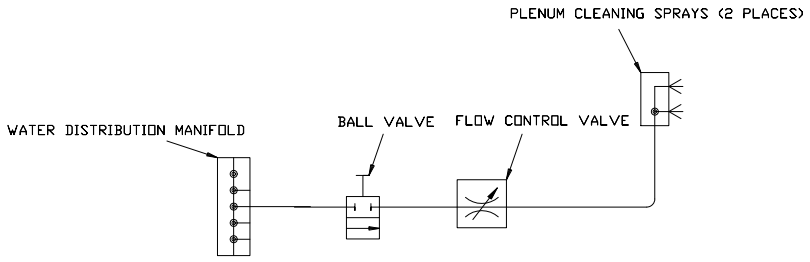
Fig. 59 is a typical conveyor chain take-up circuit. Always refer to the schematic in your Bucyrus America, Inc. Parts Book for your machine.

Blowing system cleaning spray circuit

From the water distribution manifold, water is supplied to the blowing system cleaning spray circuit where it supplies spray water to the plenum in 2 places.

The blowing system cleaning spray circuit described above is for a typical Bucyrus 30M3L series miner. The circuit for your machine may vary depending on your dust plan and unique requirements. Always refer to the schematic in the Bucyrus parts book for your machine.

Fig. 66: Blowing system cleaning head spray circuit



Controller case swing panel - front side

The front side of the swing panel (Fig. 74) is accessed by opening the controller cover. Typically mounted on the front of the swing panel are ground fault monitors, contactors, overloads, miniature circuit breakers, the tram pendant interface, an intrinsically safe barrier and relays.

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

e-stop relay "ESR" — E-stop relay "ESR" is an 18A contactor in the emergency stop circuit. When this contactor is opened, all machine functions capable of producing a machine movement will shutdown.

methane monitor relay "MMR" — Methane monitor relay "MMR" is an 18A relay in the methane monitoring circuit and interlocks with cutter contactors A and B. When "MMR" opens, the cutter contacts will open, stopping the cutters when the methane monitoring system determines there is high methane concentrations.

ground fault monitor "GFM" — The machine is equipped with a ground fault monitor for the protection of human life and equipment. The ground fault monitor "GFM" monitors for ground in the 1040V circuit.

contactor "L" — Contactor "L" is a 32A contactor for the front lights.

pump e-tram mode overload "PTOL" — The pump e-tram mode overload "PTOL" is the pump thermal overload for ETRAM only. If the pump motor is overloaded during ETRAM operations, "PTOL" will shutdown the pump motor.

left tram e-tram mode overload "LTOL" — The left tram e-tram mode overload "LTOL" is the left tram thermal overload for ETRAM only. If the left tram motor is overloaded during emergency tramming operations, "LTOL" will shut the pump motor down.

right tram e-tram mode overload "RTOL" — The right tram e-tram mode overload "RTOL" is the right tram thermal overload for ETRAM only. If the right tram motor is overloaded during emergency tramming operations, "RTOL" will shut the pump motor down.

methane monitor power supply "MMPS" — The methane monitor power supply "MMPS" supplies power to the methane monitor system.

I.S. relay "ISL" — I.S. relay "ISL" is the back intrinsically safe relay for the tram pendant.

I.S. relay "IST" — I.S. relay "IST" is the front intrinsically safe relay for the tram pendant.

e-tram mode relay "ETR" — "ETR" is the emergency tram relay. It is used to shut off power to the control system and place the miner in the emergency tram mode. The relay is normally off and is turned on when the "MACHINE" mode of operation switch is placed in the "ETRAM" position.

Tram pendant circuit

In the event that the radio transmitter (remote control) cannot communicate with the miner, the miner may be operated, with limited functions, using the tram pendant. The control system allows tramming, stab raise, and cutter raise and lower. There are pump and tram motor thermal overloads built into the tram pendant circuit that will shutdown the pump.

The schematic shown in Fig. 91 is a typical. Always refer to the schematic in the Bucyrus parts book for your machine.

Fig. 81: Tram pendant circuit

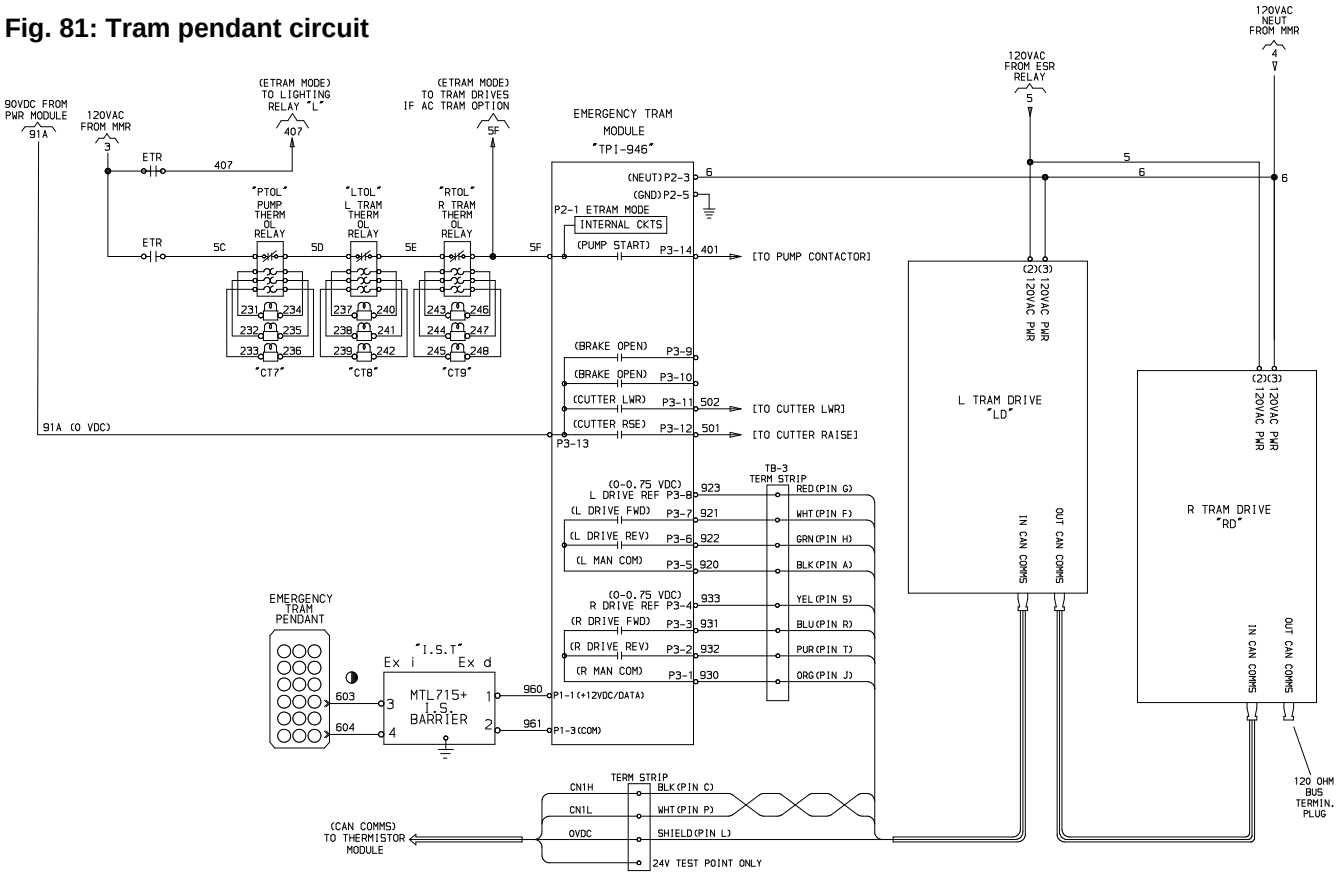


Table 3 (continued): Lubrication and maintenance

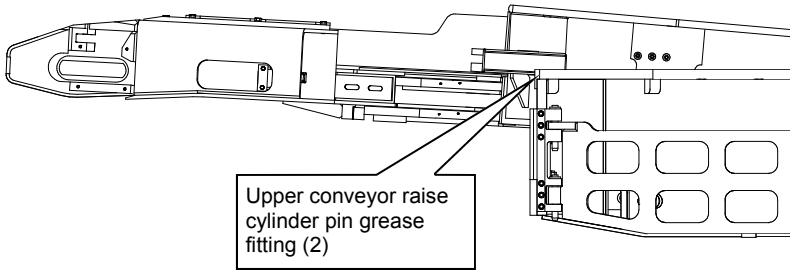
Item	Description	Places	Lubricant	Specification
	Every 2 Weeks			
39	Clean remote control console / inspect switch seals			
	Monthly			
40	CLA head pot assembly (Change)	2	High demulsibility EP gear oil	Spec. 100-15
41	CLA head transfer case (Change)	2	High demulsibility EP gear oil	Spec. 100-15
42	Input cutter head gear case (Change)	2	High demulsibility EP gear oil	Spec. 100-15
43	Main cutter head gear case (Change)	2	High demulsibility EP gear oil	Spec. 100-15
44	CLAs	Inspect		
45	Input cutter head gear case	2	Sample	See Note 1
46	Main cutter head gear case	2	Sample	See Note 1
47	CLA head pot assembly	2	Sample	See Note 1
48	CLA head transfer case	2	Sample	See Note 1
49	Tram gear case	2	Sample	See Note 1
50	Main hydraulic tank	1	Sample	See Note 1
	Every three months			
51	Cutter motor	4	High temperature lithium complex grease	Spec. 100-14
52	Gathering head motor	4	High temperature lithium complex grease	Spec. 100-14
53	Pump motor	2	High temperature lithium complex grease	Spec. 100-14
54	Blowing system motor	2	High temperature lithium complex grease	Spec. 100-14
	Every six months			
55	Tram gear case (Change)	2	High demulsibility EP gear oil	Spec. 100-15
56	Hydraulic oil (Change)	1	AW hydraulic oil	Spec. 100-1
57	Suction strainer, hydraulic oil tank (Change)	2		See Parts Book
58	Breathers	All		See Parts Book
59	Water filter (strainer) (Change)	2		See Parts Book
60	Gathering head float valve filter (Change)	1		See Parts Book

Note 1: When the oil sample and oil change interval are identical, a sample of the old oil is to be taken and sent for analysis prior to changing the oil (see the Oil sampling procedure in this chapter). Always inspect breathers when taking hydraulic oil samples.

upper conveyor raise cylinder pin (left and right)

Lubricate the upper conveyor raise cylinder pins through the grease fittings located on the right side of the conveyor (Fig. 97). Pump approximately 3 cu. in (50 cu. cm) of grease into each fitting.

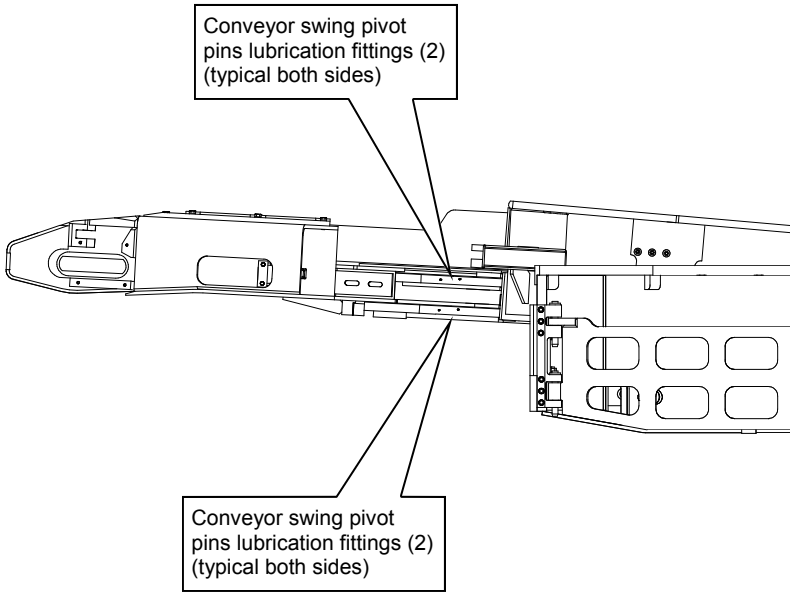
Fig. 97: Upper conveyor raise cylinder pin lubrication



conveyor swing pivot pins

Lubricate the conveyor swing pivot pins through the four (4) grease fittings located each side of the conveyor (Fig. 98). Pump approximately 3 cu. in (50 cu. cm) of grease into each fitting.

Fig. 98: Conveyor swing pivot pin



blowing system cleaning

To clean out the blowing system (Fig. 112):

☞ 1. Lower the gathering head and cutter head assemblies until they touch the floor.

☞ 2. Lower the conveyor assembly until it is level with the floor.

☞ 3. Disconnect the trailing cable to de-energize the miner.

WARNING!
Follow all Federal and mine regulations regarding lockout/tagout procedures. Failure to do so may result in serious injury or death.

☞ 4. Insert a hose in the blowing system air intakes at the left and right rear of the miner. Thoroughly flush the blowing system inlet duct.

☞ 5. Remove any accumulated debris from inside the duct. Insert the hose into the duct and thoroughly flush it with water.

Fig. 112: Blowing system cleaning

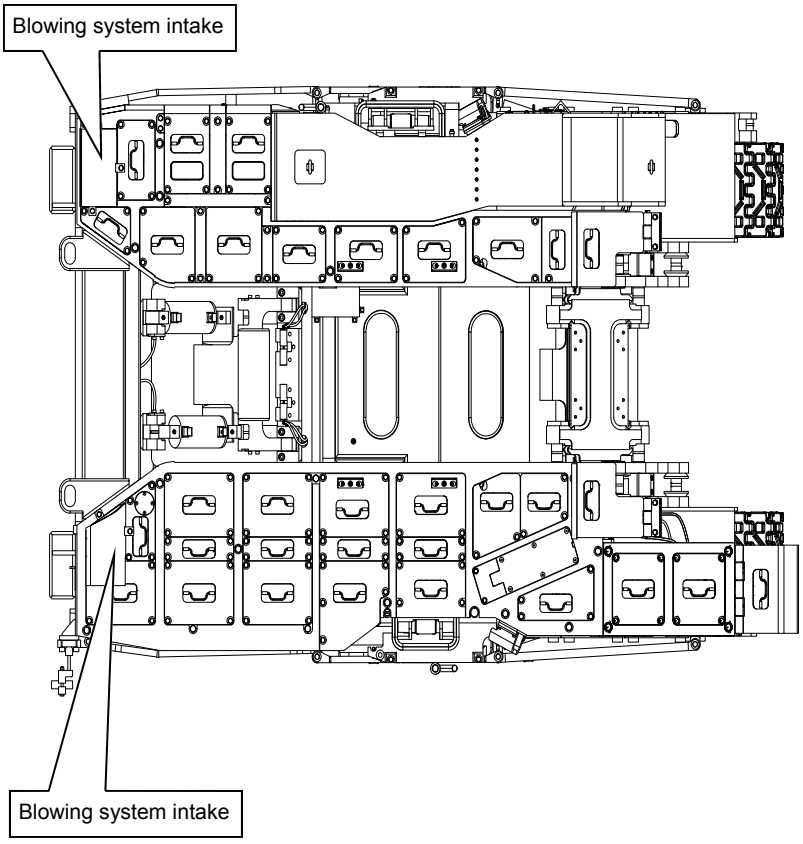
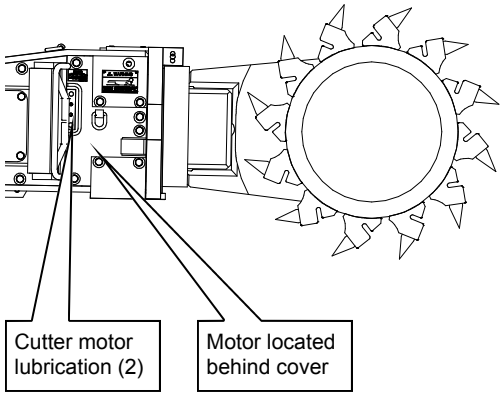


Fig. 119: Cutter motor bearing lubrication (typical each side)



Button type grease fitting

Spring loaded grease relief fitting

Pilot/auxiliary pump circuit relief valve adjustments

The following procedure is for start up of new and rebuilt machines.

IMPORTANT!
Reference the Hydraulic section in this chapter for individual circuit information. Always refer to the hydraulic schematic in your Bucyrus America, Inc. parts manual for your miner.

WARNING!
Two people are required to adjust pressure settings. One person will make the adjustments while the second person must remain at the machine stop at all times during the adjustment procedure. Failure to do so may result in serious injury or death.

☞ 1. Pilot pressure circuit: loosen the nut on the relief valve cartridge and turn the screw fully out (counter-clockwise) using an Allen wrench to prevent over pressuring the gauge on this circuit.

☞ 2. Conveyor chain take-up circuit: open the needle valve by turning the knob fully counter-clockwise, opening flow to tank.

☞ 3. Start the pump motor (see Startup procedure in this chapter) and adjust the pilot relief valve.

☞ Loosen the nut on the valve cartridge and, using an Allen wrench, turn the screw in (clockwise) to increase pressure or out (counter-clockwise) to decrease pressure. The pressure should be set at 35 bar (500 psi).

IMPORTANT!
Before making any further adjustments, verify that the hydraulic oil is at operating temperature.

☞ 4. Adjust the conveyor chain take-up valve.

☞ Close the needle valve by turning the knob clockwise, opening flow to the take-up cylinders. The pressure reading should be 14 bar (200 psi).

☞ Remove the hex socket head plug to adjust the inner spool. Using an Allen wrench, turn the screw in (clockwise) to increase pressure or out (counter-clockwise) to decrease pressure.

☞ Replace the hex socket head plug.

☞ 5. Readjust the pilot relief valve, if necessary, to 35 bar (500 psi).

Tail shim adjustment

As the conveyor wears the tail section may sag relative to the conveyor front section. The conveyor has been designed to allow correction of the sag by adding shims.

☞ 1. Lower the cutter head and gathering head assemblies until they touch the floor.

☞ 2. Position the conveyor tail section directly behind the miner and raise it to its highest position.

☞ 3. Insert blocking under the tail section and lower the tail onto the blocking. The conveyor should be at an angle with the rear end of the tail section slightly higher than the front.

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

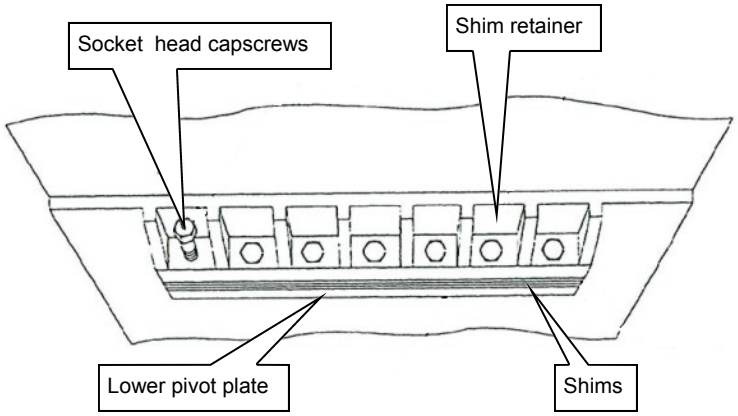
☞ 4. Insert blocking between the top of the tractor frame and the bottom of the conveyor, leaving about 51 mm (2 inches) of space between the blocking and the conveyor bottom.

☞ 5. 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.

☞ 6. Loosen the socket head capscrews that secure the shims between the shim retainer and the conveyor lower pivot plate (Fig. 130).

Fig. 130: Shim removal



Replacement of wear parts

cutter head assembly installation

To install the cutter head assembly (Fig. 135):

- ☞ Slowly tram the machine forward towards the raised end of the boom until the pivot pins clear the gathering head backboard.
- ☞ Lower the boom pivot points until the shear cylinders can reach their clevises. Block the boom to keep it in a secure position.

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

- ☞ Extend the shear cylinders until the rod end bearings can be inserted into the cutter boom clevises.
- ☞ Disconnect and lock out the electrical power to the miner. Follow all applicable mine, State, and Federal regulations regarding lockout/tagout procedures.

WARNING!
Failure to follow all Mine, State, and Federal lockout/tagout procedures may result in machine damage or serious injury or death of personnel.

- ☞ Install the shear cylinder boom clevis pin on each side of the machine.
  - ☞ Position the right shear cylinder's rod end bearing in the boom clevis.

WARNING!
Do not use your fingers to check the alignment of the rod bearing in the clevis. Shifting of the parts could result in serious injury.

  - ☞ Insert the rod end pin through the aligned clevis bushing and rod end bearing.
  - ☞ Insert the keeper plate and secure to the boom clevis with the two (2) socket head cap screws lock washers.
- ☞ Connect electrical power to the machine.
- ☞ Once the shear cylinders are secured to the cutter boom remove the boom blocking to allow boom movement.
- ☞ Retract 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 be used to adjust the cutter boom's position to allow easier installation of the cutter boom pivot pins.

Replacement of wear parts

end drum removal

End drum removal and installation

To remove an end drum (Fig. 140):

- ☞ Place the miner so that the cutting head is easily accessible and there is side clearance to pull the end drum off of the cutting head.
- ☞ Disconnect and lockout the trailing cable. Follow all Mine, State, and Federal lockout/tagout procedures.

WARNING!
Failure to follow all Mine, State, and Federal lockout/tagout procedures may result in machine damage or serious injury or death of personnel.

- ☞ There may be an optional cap on the end of the drum. If the end cap is present, remove the eight (8) socket head cap screws that secure it to the drum. Apply heat as necessary to liquefy Loctite used when the cap screws were installed.
- ☞ Using the four puller holes in the end cap and four of the eight socket head screw just removed, remove the end cap.

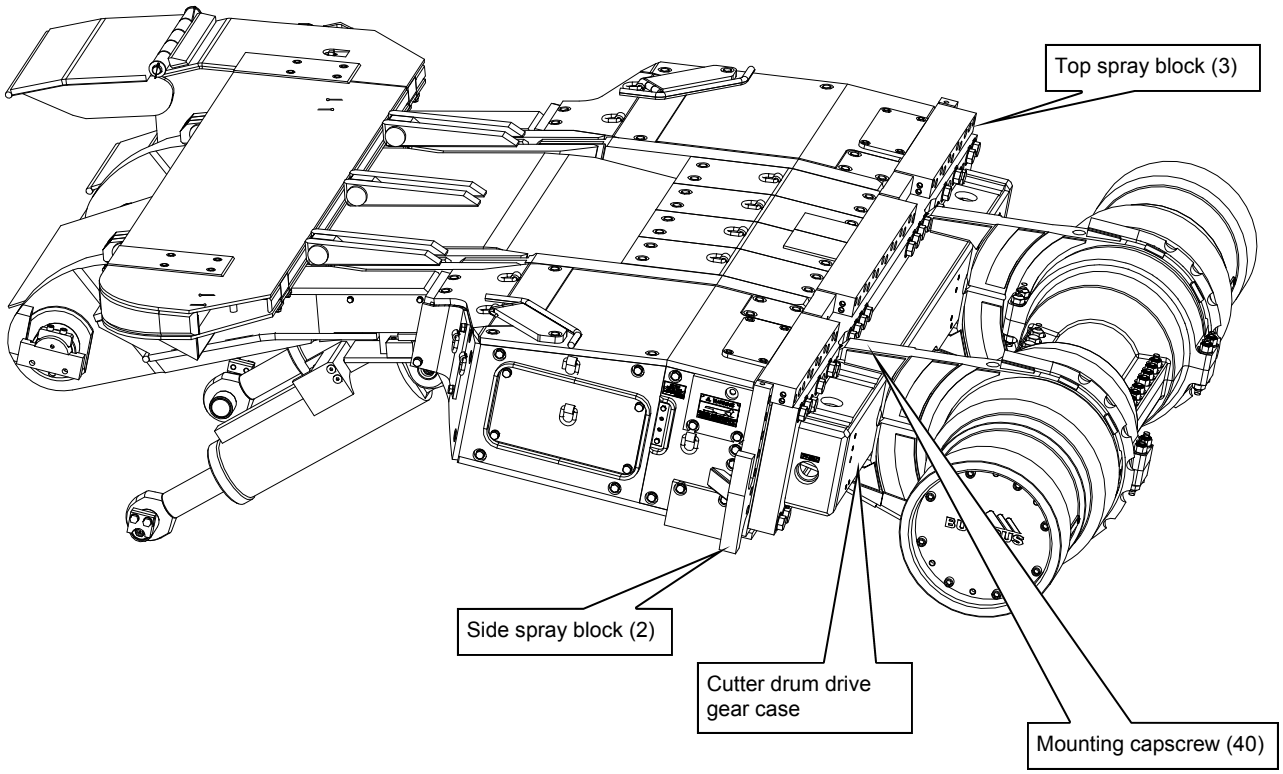
CAUTION!
If the assembly is seized, it may be necessary to pry on the edges. Care must be taken not to damage the o-ring or its seal land.

- ☞ Attach a lifting device to the end drum and apply tension so that the weight of the drum is supported by the lifting device.

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

- ☞ Loosen the eighteen (18) socket head cap screws that secure the wedge block assembly and the drum to the cutting head hub.
- ☞ Match mark both the end drum and the cutting head hub so that the cutting bit arrangement is not disturbed upon reassembly.
- ☞ Remove the six (6) socket head cap screws securing each key retainer plate to the end drum.
- ☞ Remove the spacers and then the keys.
- ☞ Slowly pull the end drum off of the main assembly, maneuvering it away from the miner.

Fig. 144: Cutter drum drive gear case removal and installation

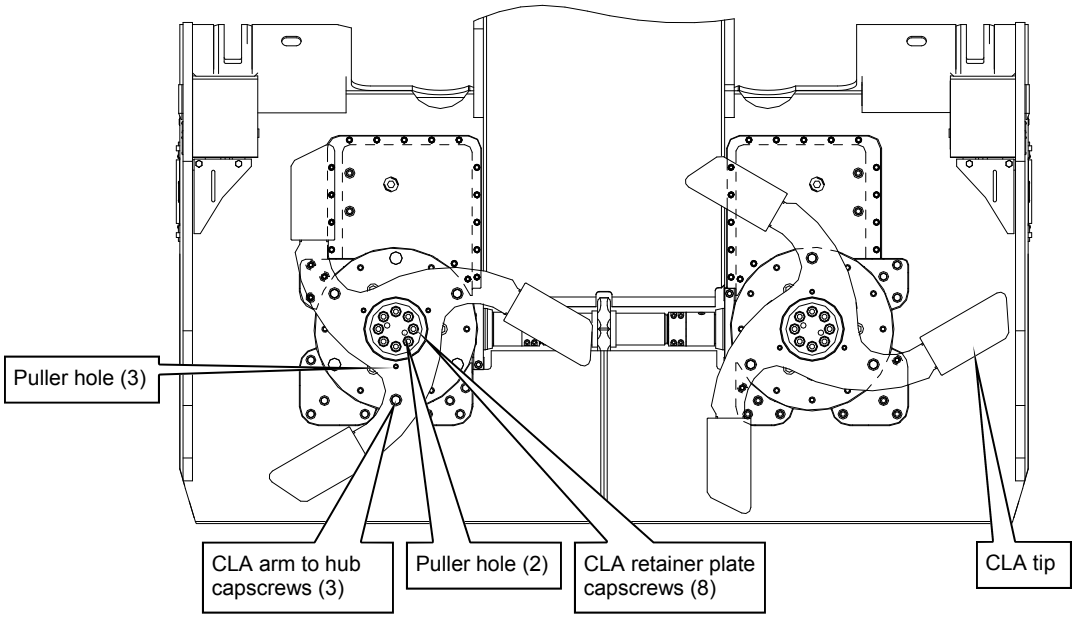


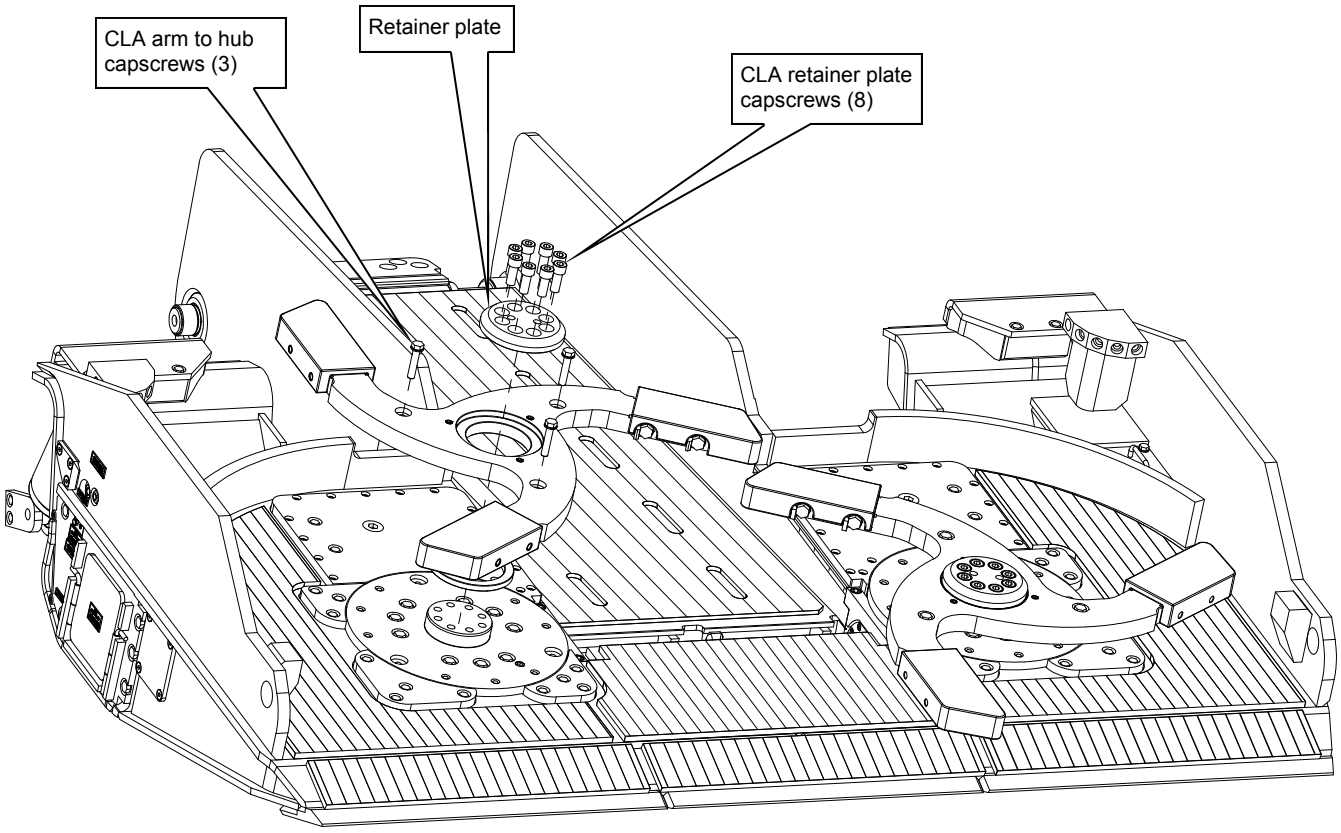
gathering head motor installation

To install a gathering head motor (Fig. 147):

- ☞ Ensure mating surfaces of the frame and motor are clean and free of contaminants.
- ☞ Carefully position the motor in the frame.
- ☞ Insert the motor mounting bolts and torque appropriately.
- ☞ Insert the torque shaft into the motor.
- ☞ Replace the plug and snap ring over the end of the torque shaft.
- ☞ Replace the bearing cap cover.
- ☞ Reconnect the water hoses to the motor.
- ☞ Reconnect the power cable to the motor.
- ☞ Replace the motor access cover on the side of the gathering head frame.
- ☞ Replace the top cover over the input gear case.

Fig. 152: CLA removal and installation





Replacement of wear parts

tram motor installation

To install the tram motor (Fig. 155):

- ☞ Clean the motor and the motor cavity in the tram case thoroughly.
- ☞ Install a new o-ring (lubricated) on the motor mounting flange (rear bell).
- ☞ Oil the bore of the input planetary (in the motor cavity) to ease installation.
- ☞ Carefully position the motor in the tram case, being careful not to damage the motor or the o-ring on the rear bell.
- ☞ Continue to position the motor into the bore of the input planetary and the flange ears on the motor are flush with the tram case. If the ears are not flush within 0.5 mm (0.020 inches), the motor is not seated properly.
- ☞ Install the motor quill shaft, rotating it until the splines on the end inside the motor mesh with the internal splines of the pinion ear in the input planetary assembly.
- ☞ Install the shaft plug and o-ring and the snap ring on the end of the shaft.
- ☞ Install the motor end cap and secure with capscrews. Tighten to the correct torque.
- ☞ Install the two (2) clamp bars, two (2) hardened steel washers, and two (2) socket head capscrews to secure the motor to the tram case. Tighten to the correct torque.
- ☞ Install the two (2) socket head capscrews and two (2) hardened steel washers to secure the motor to the tram case. Tighten to the correct torque
- ☞ Refill the tram gear case with high demulsibility, extreme pressure gear oil (Spec. 100-15) to the correct level. Check the oil level using the sight gauge on the outer face of the gear case.
- ☞ Reconnect the power cable to the motor.
- ☞ Reconnect the cooling water lines to the motor.
- ☞ Reconnect power to the miner and check for tram correct operation.

WARNING!
Stay clear of the blocked miner while the machine is energized. Failure to follow this warning may result in sever injury or death.

crawler chain installation

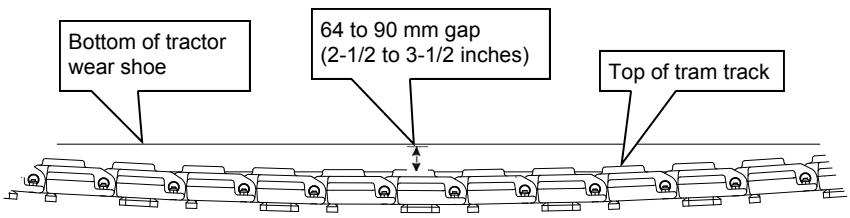
To install the crawler chain (Fig. 159):

- ☞ Ensure that the miner is correctly cribbed.
- ☞ Lay the crawler chain on the mine floor under the crawler frame and extending forward in front of the mine. The grousers should be on the facing down.

IMPORTANT!
Be sure that the rousers are in the correct direction before installing the chain into the machine. Check the parts book for your machine to verify the correct direction.

- ☞ Attach a pull cable to the rear of the crawler chain.
- ☞ Feed the loose end of the pull cable around the drive sprocket and into the upper crawler chain return deck. Continue feeding the pull cable forward until it is at the front of the crawler frame and past the take-up roller. Run the cable forward where it can be attached to a vehicle or other pulling device.
- ☞ Slowly pull the crawler chain into position on the drive sprocket so that the sprocket teeth engage the pockets in the first crawler pad. Continue pulling the chain slowly as it engages the rest of the exposed sprocket teeth and moves forward on the upper crawler chain return deck. Pull the end of the chain clear of the take-up roller until it drapes over the roller.
- ☞ Block the bottom of the chain near the front.
- ☞ Coat the connecting pins with EP#2 multi-purpose grease.
- ☞ Remove the pull cable and mate the two ends of the chain using the two connecting pins.
- ☞ Apply Loctite 271 to the bolts then secure the pins with the flat head socket capscrews and nuts.
- ☞ Ensure that the needle valve on the grease take-up cylinder has been closed (Fig. 160).
- ☞ Pump grease into the take-up cylinder grease fitting until the proper chain sag is achieved (Fig. 160).

Fig. 160: Crawler chain sag measurement



Replacement of wear parts

- ☞ Disconnect, tag, and cap the lubrication lines going to the right and left pivot pins.
- ☞ Release any pressure that might exist between the lateral sway guides and the guide discs by backing out the set screw on each side.
- ☞ Remove the capscrews from the conveyor pivot pin retainer and remove the retainer.
- ☞ Push the conveyor pivot pins toward the center until they are free.

NOTICE!
If the pivot pin is tight, be sure the lifting device is not binding the pivot. If the pivot is not in a bind, use the puller hole to aid in pin removal.

- ☞ With the lifting device, slowly maneuver the conveyor assembly away from the machine.

Replacement of wear parts

tail roller installation

To install the tail roller (Fig. 166):

- ☞ Position the tail roller in in the conveyor.
- ☞ Slide the insert into each end of the tail roller.
- ☞ Insert a roll pin into each end of the tail roller to secure the insert to the roller.
- ☞ Slide the take-up cylinders back into position with the end of the cylinder sliding through the hole in the tail roller insert.
- ☞ Insert a cotter pin into the end of each take-up cylinder rod
- ☞ Secure the attachment block to the end of each cylinder with socket head capscrews (two (2) on each side).
- ☞ Install the side cover over each side of the tail roller and secure with four (4) capscrews.
- ☞ Make sure the valve is closed in the conveyor chain take-up circuit.
- ☞ Reconnect the conveyor chain (see Conveyor chain installation procedure in this chapter).
- ☞ Connect the trailing cable to energize the miner.
- ☞ Operate the conveyor and check for correct chain tension.

Troubleshooting

Table 4: Flow chart II for troubleshooting excessive heat

Pump Heated		Motor Heated		Relief Valve Heated		Fluid Heated	
Cause	**Remedy**	**Cause**	**Remedy**	**Cause**	**Remedy**	**Cause**	**Remedy**
Fluid heated	See Fluid Heated	Fluid heated	See Fluid Heated	Fluid heated	See Fluid Heated	System pressure too high	D
Cavitation	A	Relief or unloading valve set too high	D	Valve setting incorrect	D	Unloading valve set too high	D
Air in fluid	B	Excessive load	C	Worn or damaged valve	E	Fluid dirty or low supply	F
Relief or unloading valve set too high	D	Worn or damaged motor	E			Incorrect fluid viscosity	F
Excessive load	C					Faulty fluid cooling system	G
Worn or damaged pump	E					Worn pump, valve motor, cylinder, or other component	E

Remedies

A. Any or all of the following:

- ☞ replace dirty filters
- ☞ clean clogged inlet line
- ☞ clean reservoir breather vent
- ☞ change system fluid
- ☞ change to proper pump drive motor speed
- ☞ overhaul or replace supercharge pump

B. Any or all of the following:

- ☞ tighten leaky inlet connections
- ☞ fill reservoir to proper levels: with few exceptions, all return lines should be below fluid level in the reservoir
- ☞ bleed air from system
- ☞ replace pump shaft seal; also replace shaft if worn at seal journal

C. All of the following:

- ☞ align unit
- ☞ check condition of seals, bearings, and coupling
- ☞ locate and correct mechanical binding
- ☞ check for workload in excess of circuit design

D. ☞ install and/or adjust pressure gauge; keep at least 125 psi difference between valve settings

E. ☞ overhaul or replace defective parts

F. ☞ change filters
- ☞ check system fluid viscosity; change if necessary
- ☞ fill reservoir to proper level

G. ☞ clean cooler and/or strainer
- ☞ replace cooler control valve
- ☞ repair or replace cooler

Troubleshooting

Bearings

Table 11: Bearing troubleshooting

Trouble, symptom or cause	Probable cause	Test, check and/or remedy
overheating bearing	☞ Wrong type of grease or oil.	☞ Consult the lubrication chart for the proper lubricant.
	☞ Low oil level; loss of lubricant through seal; excessive grease.	☞ Oil level should normally be at the center of lowest ball or roller in bearing; check seals for signs of leaking.
	☞ Insufficient clearance in bearing.	☞ Replacement bearing should be identical to original equipment to ensure proper internal clearance.
	☞ Housing bore out of round; housing warped; excessive distortion of housing; undersized housing bore.	☞ Check and scrape housing bore to relieve pinching of bearing; be sure pedestal surface is flat and shims cover entire area of pillow block base when applicable.
	☞ Shaft out of line.	☞ Correct alignment and be sure shafts are coupled in a straight line.
noisy bearing	☞ Insufficient clearance in bearing.	☞ Replacement bearing should be identical to original equipment to ensure proper internal clearance.
	☞ Foreign matter acting as abrasive.	☞ Clean bearing housing and replace worn seals.
	☞ Housing bore out of round; housing warped; excessive distortion of housing; undersized housing bore.	☞ Check and scrape housing bore to relieve pinching of bearing; be sure pedestal surface is flat and shims cover entire area of pillow block base when applicable.
	☞ Shaft and other parts of bearing assembly distorted.	☞ Replace bearing, shaft and other parts as needed.
vibrating bearing	☞ Enlarged housing bore causing spinning of outer ring in housing.	☞ Re-bore housing and press steel bushing in bore, then machine bore to correct size.
	☞ Foreign matter acting as abrasive.	☞ Clean bearing housing and replace worn seals.
	☞ Unbalanced loading	☞ Check balance of rotating parts and rebalance as needed.
unsatisfactory performance	☞ Chip in bearing housing; insufficient clearance in bearing; Ball or roller dented from extreme loading.	☞ Replace with OEM bearing; do not hammer on any part of bearing; clean housing and use fresh lube.

Table 13 (continued): Control system fault codes

Fault	Explanation	Possible Cause	Checks to Carry Out
0061 PUMP TEMPERATURE WARNING			
0062 LEFT CUTTER TEMPERATURE WARNING			
0063 RIGHT CUTTER TEMPERATURE WARNING			
0064 LEFT CONVEYOR TEMPERATURE WARNING			

Table 13 (continued): Control system fault codes

Fault	Explanation	Possible Cause	Checks to Carry Out
0153 TRAM TRANS-FORMER TEM-PERATURE WARNING			
0154 TRAM TRANS-FORMER OVER TEMPERATURE			
0201 ILLEGAL PUMP CONTACTOR FEEDBACK DE-TECTED			
0202 TBA			
0203 TBA			
0204 TBA			
0205 TBA			
0206 TBA			
0207 ILLEGAL VOLT-AGE ON PUMP RUN CIRCUIT			

Table 13 (continued): Control system fault codes

Fault	Explanation	Possible Cause	Checks to Carry Out
0279 LEFT CONVEYOR MOTOR INSTANTANEOUS OVERLOAD			
0280 LEFT CONVEYOR MOTOR THERMAL OVERLOAD			
0281 LEFT CONVEYOR MOTOR OVER TEMPERATURE			
0282 RIGHT CONVEYOR MOTOR MATE FAULTY			
0283 RIGHT CONVEYOR NO LOAD CURRENT			
0284 RIGHT CONVEYOR MOTOR PHASE LOSS			

Table 13 (continued): Control system fault codes

Fault	Explanation	Possible Cause	Checks to Carry Out
0367 RIGHT TRACTION FROZEN INTERNAL			
0368 RIGHT TRACTION FROZEN EXTERNAL			
0369 RIGHT TRACTION OPEN INTERNAL			
0370 RIGHT TRACTION OPEN EXTERNAL			
0371 DEADMAN SWITCH OPEN			
0372 DEADMAN SWITCH FROZEN			
0373 TRACTION MODULE COMMS FAILURE			
0374 LEFT TRACTION NO LOAD CURRENT			
0375 LEFT TRACTION MULTIPLE INSTANT OVERLOAD			
0376 RIGHT TRACTION NO LOAD CURRENT			
0377 RIGHT TRACTION MULTIPLE INSTANT OVERLOAD			

Table 13 (continued): Control system fault codes

Fault	Explanation	Possible Cause	Checks to Carry Out
0489 RIGHT RMS NO REVERSE RE-SPONSE			
0490 GROUND FAULT RELAY STATUS			
0491 FAN PT100 SHORT CIRCUIT			
0492 FAN PT100 OPEN CIRCUIT			
0494 TBA			
0495 TBA			

Technical data

This chapter contains the most important technical data on the 30M3L Continuous Miner. Further data can be found in the spare parts lists. At the end of this chapter you will find information on the bolt tightening torques, HFA fluids, greases, etc. Read this chapter through carefully, and pay particular attention to the safety instructions.

IMPORTANT!
The technical data listed in this chapter is for stock machines only. Customer specials may not be listed.

Components of the 30M3L Continuous Miner

Technical data sheet

Note: All dimensions and rates are for a Miner with a 9 inch ground clearance and a 44 inch diameter cutting drum.

operating dimensions	Recommended mining range	approx. 66 to 156 in (3,962 mm)
	Minimum height over cutter boom assembly	approx. 49 in (1,245 mm)
	Maximum mining height	approx. 158 in (4 m)
	Minimum mining height (Zero Cut)	approx. 54 in (1.4 m)
	Maximum reach	approx. 158 in (4 m)
	Ground clearance	approx. 9 - 12 in (.23 - .30 m)
	Length (bumper to face)	approx. 16 ft 6 in (4.9 m)
transport dimensions	Width (outside of rub rails)	approx. 10 ft 2 in (3.09 m)
	Overall length	approx. 37 ft (11.3 m)
	Height (cover line)	approx. 54 in (1372 mm)
	Weight (total)	approx. 160,000 lbs (72,575 kg)
cutter unit	Cutter drum diameter	approx. 44 in (1,119 mm)
	Cutter drum width	approx. 11 ft 9 in (3.6 m)
	Cutter head speed	approx. 720 fpm (62 rpm) (3.54 m/sec)
	Cutter motors (continuous rating)	2X280 HP/209 kW