



EM021401 (BI001987)
A6474X319
March 2016

Operation and Maintenance Manual

CM340 Continuous Miner

Serial Number: GEZ00699, GEZ00722, GEZ00723, GEZ00724, GEZ00746,
GEZ00757, GEZ00758, GEZ00763, GEZ00764, GEZ00773, GEZ00781, GEZ00785,
GEZ00796, GEZ00797

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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.

Safety instructions

Stopping

parking Always park the unit on solid, level ground. If this is not possible, park the unit at a right angle to the slope to prevent accidental movement of the machine.

Use proper flags, warnings or barriers when parking in areas of traffic.

radio There is a unique code switch setup which permits each operator to activate only his designated miner, allowing several remote-controlled miners to operate in the same area without getting their radio signals crossed. In addition, an improperly decoded radio signal will automatically shut-off the miner. Follow the general safety notices and safety recommendations listed in the remote control system guide.

Maintenance and repair

Be sure to observe the prescribed maintenance and inspection intervals.

Inform the supervisory personnel and the face crew of any maintenance and repair operations. Give them information on the intended operations and the anticipated duration.

trailing cable uncoupled and locked and tagged out

Before attempting any repairs, a **DANGER** sign must be attached to the appropriate circuit at the power distribution box. It is mandatory that the trailing cable be uncoupled, tagged and locked-out from the power source to provide visual evidence that the miner is de-energized. Follow all applicable regulations regarding lockout/tagout.

securing

Secure your working area over a wide range, in order to avoid endangering other persons.

Disconnect the power from the machine to prevent unauthorized and unintentional restarting.

Protect your work area against falling rocks.

Pass defective components removed on for servicing without delay in order to prevent these parts being reinstalled elsewhere.

original parts

Use only spare parts which satisfy the specified technical requirements. This is only ensured with original spare parts. Please refer to the spare parts lists or parts catalog for the order numbers.

methane monitoring

Before attempting any repairs or maintenance, methane air monitoring must be completed before and during the repair and maintenance.

Storage and transport

Transport

Load units: dimensions and weights

Observe the transport sheets for the machine and spare parts. They contain information on:

- dimensions,
- weights,
- lifting points, etc.

Additional information on the dimensions and weights can be found in chapter 6 and in the lifting weight guide (Table 1) in this operating section. Fig. 5 illustrates the position of lifting eyes on the miner.



WARNING!

Use only load handling devices complying with the technical and legal regulations for the transport of loads. You could be seriously injured or even killed by falling loads. Use only suitable load handling devices.

Table 1: Lifting weights of Continuous Miner Assemblies

Description	Approximate Weight
Complete Machine	160,370 lbs (72,742 kg)
Tractor Frame Assembly	75,000 lbs (34,019 kg)
Cutting Head Assembly	47,000 lbs (21,319 kg)
Gathering Head Assembly	19,300 lbs (8,754 kg)
Conveyor Assembly	15,800 lbs (7,167 kg)
Conveyor Chain Assembly	3,270 lbs (1,483 kg)

removal and installation of heavy components

Whenever possible, all removals should be accomplished using an adjustable lifting beam. All supporting members (chains and cables) should be parallel to each other and as nearly perpendicular as possible to the top of the object being lifted.

When it is necessary to remove a component on an angle, remember that the capacity of an eyebolt diminishes as the angle between the supporting members and the object increases. Eyebolts and brackets should never be bent.

When an eyebolt is provided to lift a component, use it to lift only that component.



WARNING!

You could be seriously injured or killed as a result of falling loads. Do not use the eyebolt to lift the component and its related assemblies.

Installation

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.)

Operation

“MACHINE STOP”

The “MACHINE STOP” button (Fig. 9) is a large red push button located on the left of the operator’s case. Pushing “MACHINE STOP” will shut down the pump, causing the miner to shut down. To restart the miner after pushing the “MACHINE STOP” button, follow the normal start up procedure for the pump (see Start up procedures in this chapter).

“MINER” operation selector switch

The “MINER” operation selector switch (Fig. 9) is located to the right of the “MACHINE STOP” button. The selector switch has three positions:

- **“E-TRAM”** - Turning the switch to this position allows the miner to be trammed from the pendant controls. “E-TRAM” is used in the event that the operator loses his radio link with the miner.
- **“REMOTE”** - During normal mining operations, the switch should be in the “REMOTE” position. This allows the miner to be controlled by the radio remote system.
- **“GND CHK”** - Placing the operation switch in the ground check position should cause the mine power center to trip, thereby shutting down all power to the miner.

“MACHINE LIGHTING” operation selector switch

The “MACHINE LIGHTING” operation selector switch (Fig. 9) is located to the right of the “MINER” operation selector switch. The selector switch has four positions:

- **“ALL ON”** - Located at 3 o’clock, turning the switch to this position allows all machine lighting to be turned on, including headlights and area lights. (The headlights can be turned on or off from the transmitter. The area lights are hard-wired and cannot be turned off by the transmitter.)
- **“ALL OFF”** - Located at 12 o’clock and 6 o’clock, turning the switch to this position allows all machine lighting to be turned off.
- **“AREA LIGHTS ONLY”** - Located at 9 o’clock, turning the switch to this position allows only area lights to be turned on.

Fig. 9: “MACHINE STOP,” “MINER” and “MACHINE LIGHTING” selector switches

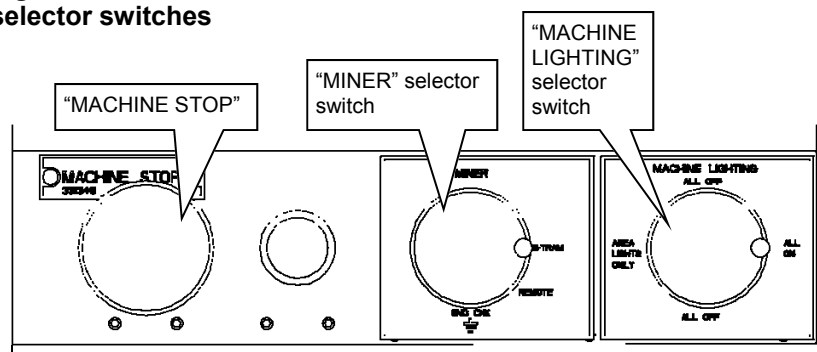


Fig. 18: Main page, example



Graphics display



Text display

Tram pendant

The machine can be operated using a pendant control (Fig. 25) connected to the miner by an umbilical cable. This control is used in the event that the operator loses radio link with the mine to safely recover the miner from the face to an area under supported roof for troubleshooting and maintenance.

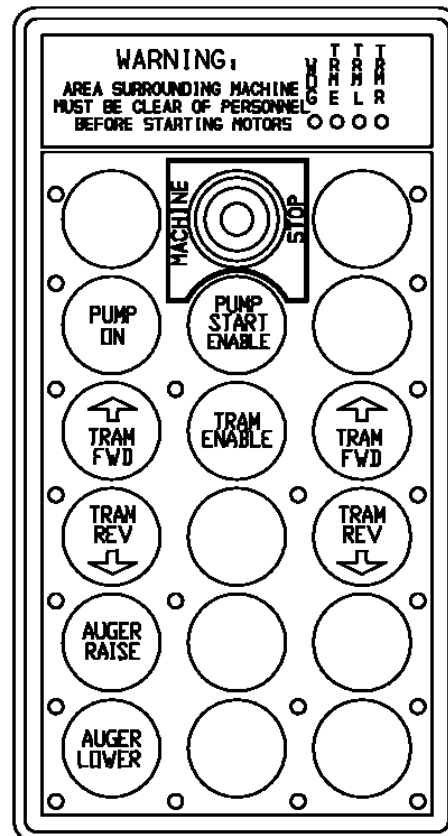
The pendant controller allows limited operation of the machine: tramming and pump motor activation to provide hydraulic power to raise or lower the cutting head.

In order to use the pendant, it must be connected to the machine via a pigtail. After plugging in the umbilical cord, the "MACHINE" mode of operation switch must be rotated to the "E-TRAM".

**IMPORTANT!**

The pendant controller and its umbilical cord should be stored in a protected location on the working section, away from the miner, to prevent damage.

Fig. 25: Tram pendant



Tramming the miner

Tramming requires cooling water to prevent damage.



NOTICE!

The Continuous Miner has skid type steering: it is capable of turning within its own limits.



WARNING!

Tramming requires cooling water to the tram motors. Failure to cool the motors will result in motor damage and premature failure.

- ☞ Ensure that the stabilizer shoe is away from the mine floor.
- ☞ Raise cutter boom to best possible position to allow clearance from roof, ribs, and floor.
- ☞ Raise gathering head away from the mine floor.
- ☞ Adjust conveyor boom to best possible position to allow clearance from roof, walls, and floor.



WARNING!

Adjust conveyor boom to allow clearance from roof, walls, and floor. Failure to do so will result in damage to the conveyor boom.

- ☞ Ensure adequate clearance at all times while tramming machine. Be aware of people, equipment, and cables.

Remote control - tram enable

- ☞ To enable machine tramming, press and release the “TRAM 2-3” key.
- ☞ Once enabled, the tram levers can be used to drive left and right tramming tracks forwards and backwards. If the tram levers are released for a continuous period of five (5) seconds, the tram becomes disabled.
- ☞ To re-enable the tram function, press and release the “TRAM 2-3” key.

Remote control - tram track console

- ☞ Press the “LEFT FWD” tram key to turn the left tramming track forward.
- ☞ Press the “LEFT REV” tram key to turn the left tramming track backwards.
- ☞ Press the “RIGHT FWD” tram key to turn the right tramming track forward.
- ☞ Press the “RIGHT REV” tram key to turn the right tramming track backwards.

Operation

- ☞ Shear down (lower cutter head). The shear down rate is controlled by a shear down relief valve to limit the hydraulic pressure being applied to the cylinders. This is an adjustable feature and can be easily changed as mining conditions change.
- ☞ To maintain smooth, level floor conditions, it may be necessary to tram the machine backward approximately 36 in., thus trimming ridges and smoothing the floor. This may or may not be necessary each cut sequence depending on mine conditions.
- ☞ Repeat this procedure to desired depth of cut.
- ☞ Turning crosscuts is accomplished by making a series of partial cuts (sumps) until the machine can be turned to the desired angle.

Relocating the miner

- ☞ Ensure rear stabilizer is raised from the floor.
- ☞ Position cutter boom so as to prevent it from hitting roof, ribs, or floor.
- ☞ Raise gathering head.
- ☞ Lower conveyor boom down and position so it will not hit roof, ribs, floor or any other equipment or obstacles.
- ☞ Ensure that trailing cable out of the path of travel.
- ☞ Ensure there is enough clearance when relocating to avoid damage to machine and ensure operator safety.
- ☞ Be alert to any people, obstacles, or other machines.
- ☞ Know the position of fellow workers.
- ☞ Engage tram in desired direction and speed.

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. 48: Valve hydraulic symbols

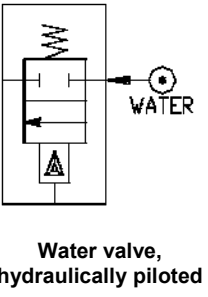
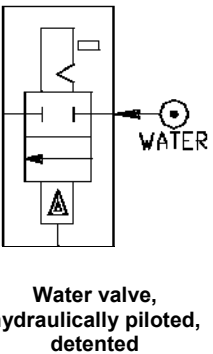
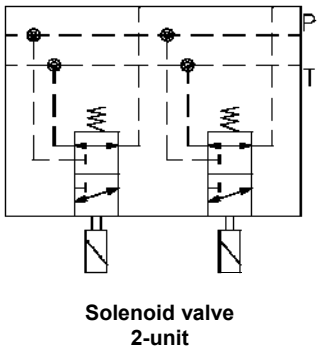
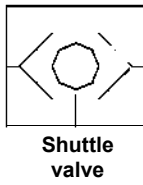
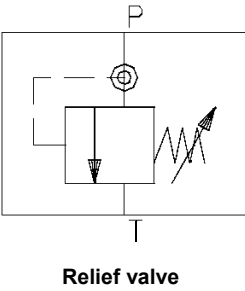
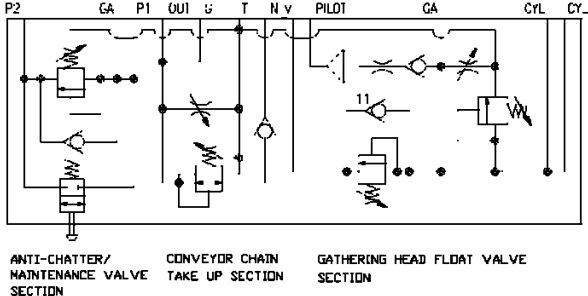
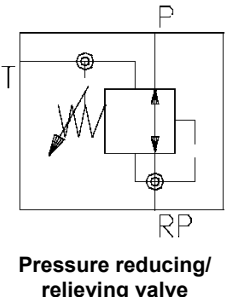
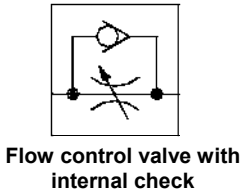
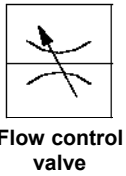
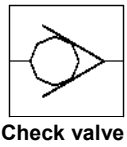
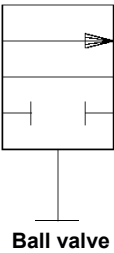


Fig. 55: Conveyor raise/lower

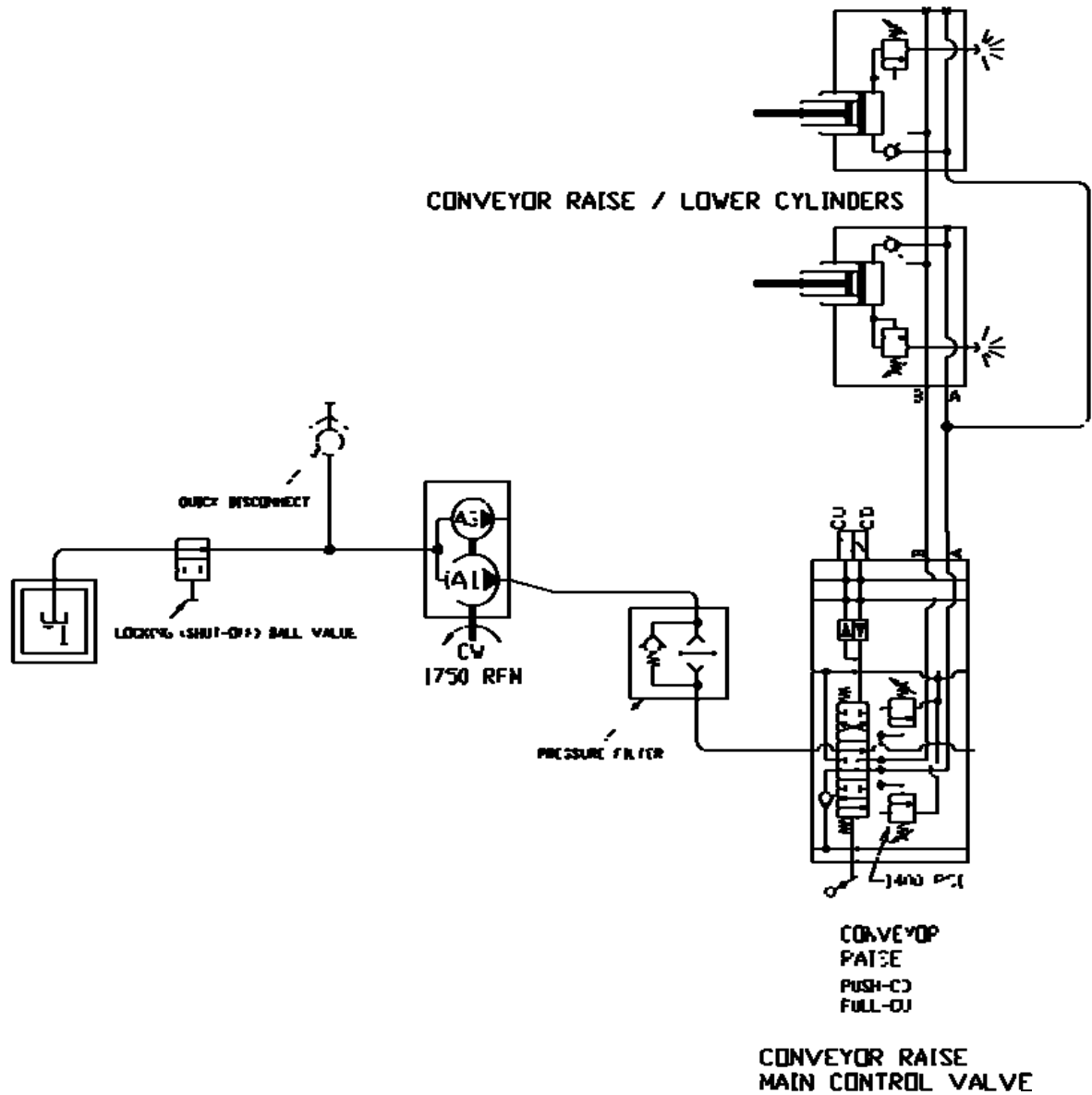


Fig. 61: Dust-cooling component locations

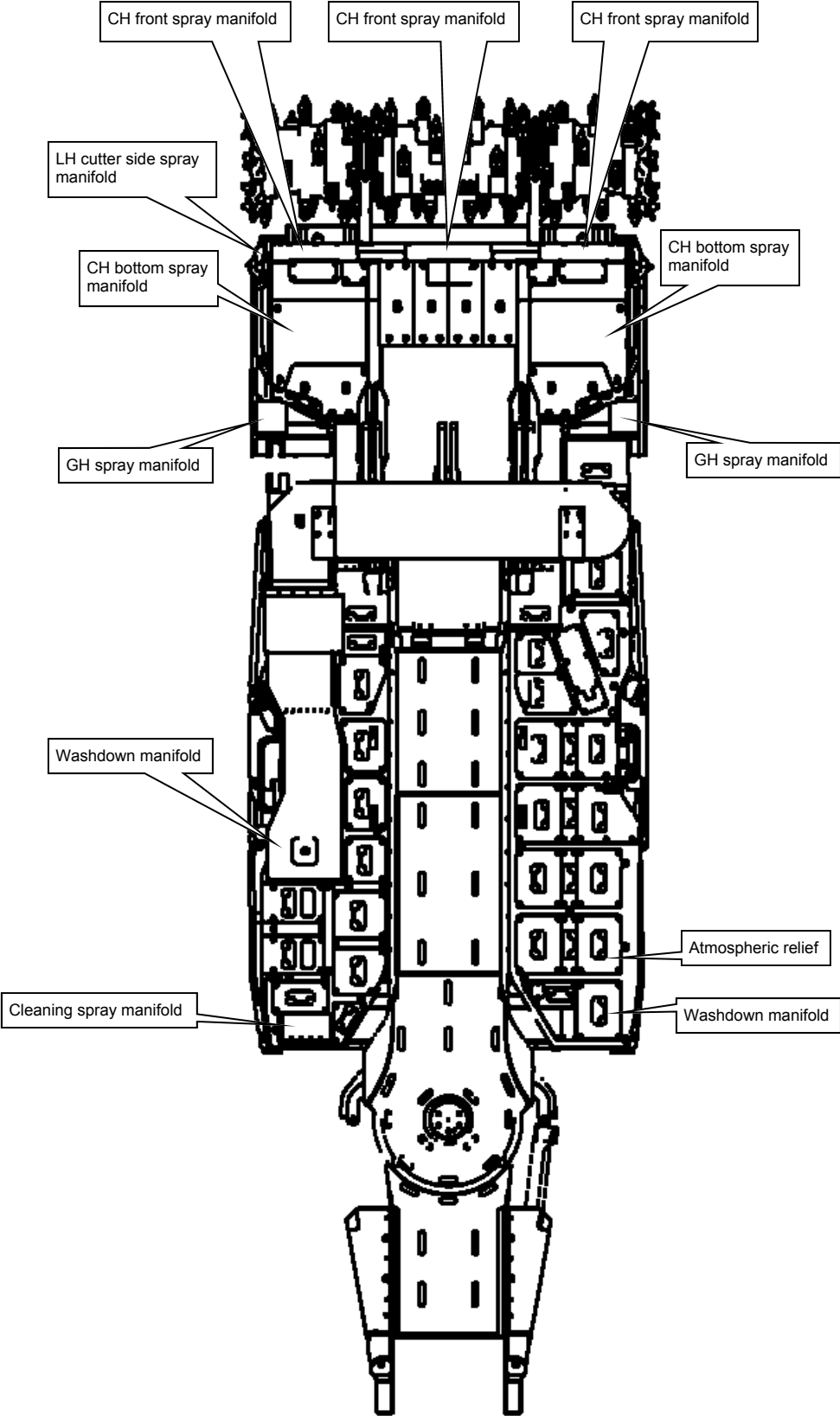
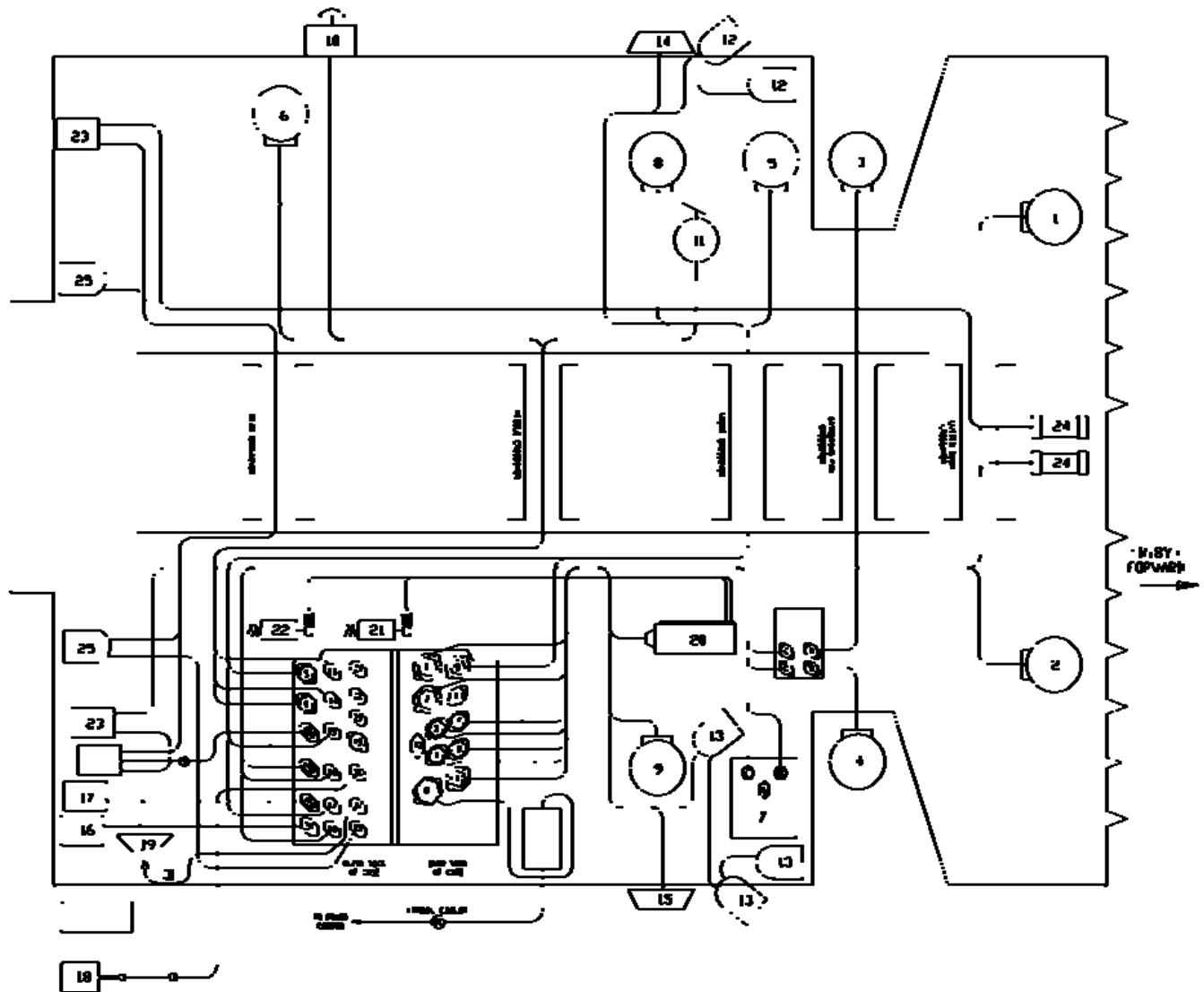


Fig. 69: Electrical component layout



- | | |
|--------------------------------|----------------------------|
| 1. Left cutter motor | 15. Area lights |
| 2. Right cutter motor | 16. Graphic display |
| 3. Left CLA motor | 17. Text display |
| 4. Right CLA motor | 18. Emergency tram pendant |
| 5. Pump motor | 19. Antenna |
| 6. Blowing system motor | 20. Solenoid junction box |
| 7. Tram transformer case | 21. Dust Spray |
| 8. Left tram motor | 22. Fire spray |
| 9. Right tram motor | 23. Methane displays |
| 10. Left emergency stop | 24. Methane sensors |
| 11. Hydraulic oil level switch | 25. Methane warning light |
| 12. Headlights | |
| 13. Headlights | |
| 14. Area lights | |

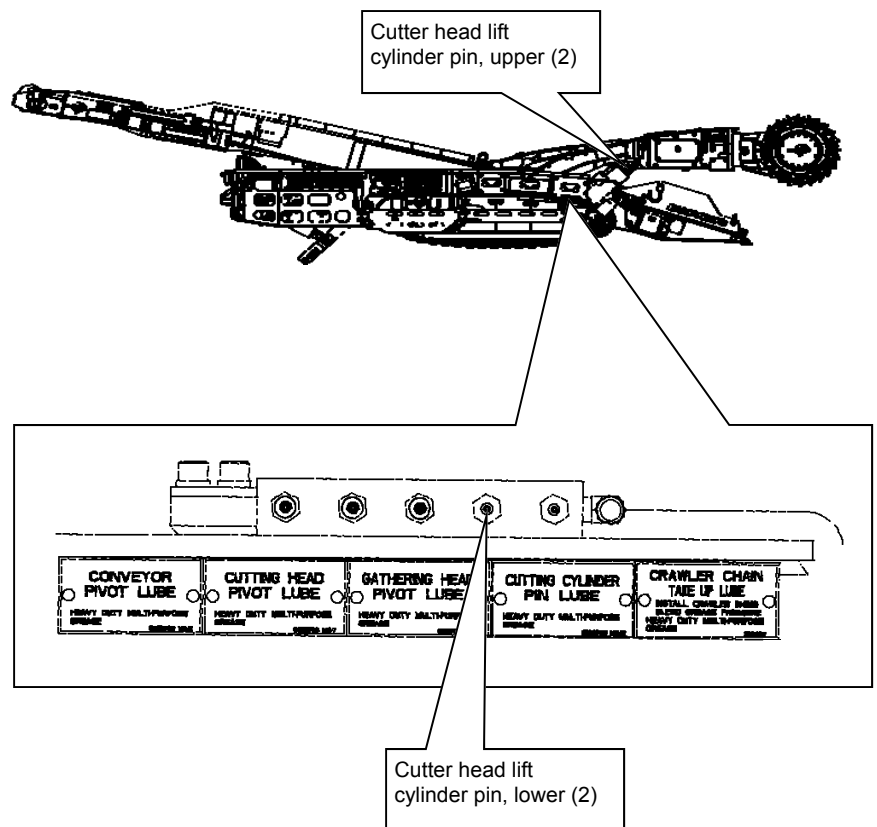
Controller case - front wall

Mounted on the front wall of the controller case (Fig. 76) are an e-stop button, the "MINER" mode of operation selector switch, control breakers, conveyor and cutter motor hour meters, and the tram circuit breaker.

main rotary switch "RS1"	The main rotary switch, "RS1", is the mode of operation selector switch. The machine can be operated in "REMOTE", which means it is controlled by the remote transmitter, "ETRAM", which means it can only be operated by the emergency tram pendant and that there are limited functions available or "GND CHECK", which is used to perform a control voltage ground check of the machine.
e-stop "CASE ES"	The control case e-stop button, "CASE ES", can be used to quickly shut down the machine. Depressing the button will shut the pump motor down, thereby shutting down all machine functions.
lighting rotary switch "LS1"	The lighting rotary switch, "LS1", can be used to turn all lights on, all lights off, or can be set to turn on area lights only.
cutter hour meter "HM1"	The cutter hour meter, "HM1", records the total number of running hours for the cutter motors.
conveyor hour meter "HM2"	The conveyor hour meter, "HM2", records the total number of running hours for the conveyor motors.
	There are sixteen (16) circuit breakers mounted with their shafts through the wall so that they can be reset from the front of the controller case.
circuit breaker "MCB1"	"MCB1" is a 15A breaker for the 120VAC+ side of the control power circuit.
circuit breaker "MCB2"	"MCB2" is a 15A breaker for the 120VAC- side of the control power circuit.
circuit breaker "MCB3"	"MCB3" is a 15A breaker for the 120VAC+ side of the area light circuit.
circuit breaker "MCB4"	"MCB4" is a 15A breaker for the 120VAC- side of the area light circuit.
circuit breaker "MCB5"	"MCB5" is a 25A breaker for the 12VAC+ side of the head light circuit.
circuit breaker "MCB6"	"MCB6" is a 25A breaker for the 12VAC- side of the head light circuit.
circuit breaker "MCB7"	"MCB7" is a 5A breaker for the 12VAC+ side of the RTD module circuit.
circuit breaker "MCB8"	"MCB8" is a 5A breaker for the 12VAC- side of the RTD module circuit.
circuit breaker "MCB9"	"MCB9" is a 5A breaker for the 120VAC+ side of the contactor circuit.
circuit breaker "MCB10"	"MCB10" is a 5A breaker on the 90VDC+ side of the solenoid circuit.
circuit breaker "MCB11"	"MCB11" is a 5A breaker on the 0VDC- side of the solenoid circuit.

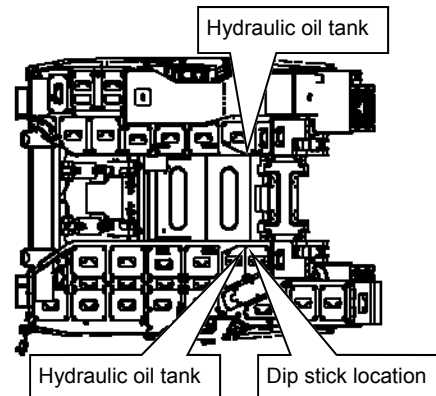
Specific lubrication and maintenance procedures**Every shift****cutter head lift cylinder pins
(upper and lower)**

Lubricate the upper and lower cutter head cylinder pins (right and left). The upper pins are lubricated through the grease fittings located on each pin (Fig. 88). The lower cylinder pins are lubricated through a lubrication block mounted on each side of the machine (Fig. 88). Pump approximately 50 cubic cm (3 cubic inches) into each fitting.

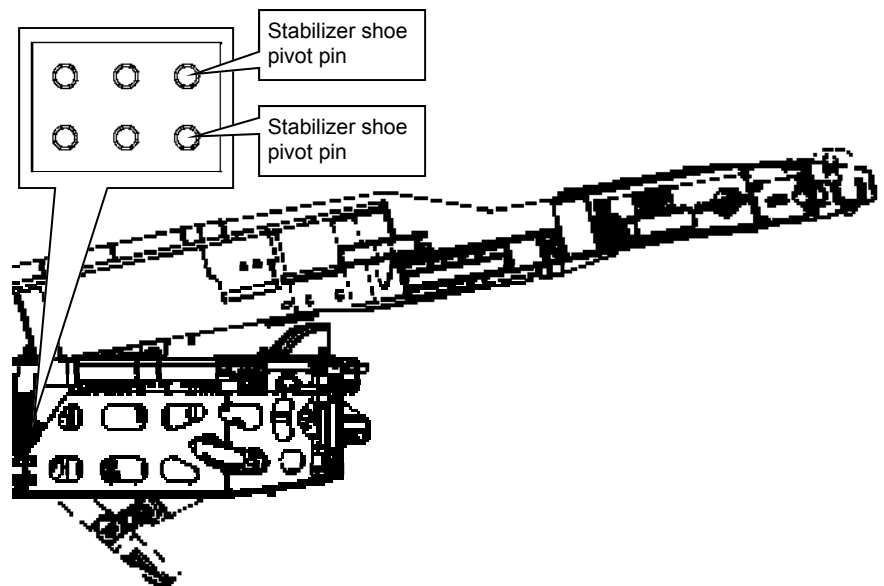
Fig. 88: Cutter head cylinder pins (typical both sides)

hydraulic oil level

With all of the machine cylinders in the fully collapsed position, check the hydraulic oil level (Fig. 104). Remove dipstick from tank and wipe clean. Insert dipstick back into tank and remove. The oil should be level with the full line indicated on dipstick. If oil level is low, add oil until full level is met.

Fig. 104: Hydraulic oil tank level**stabilizer shoe pivot pins**

Lubricate the stabilizer shoe pivot pins through the two (2) grease fittings located on left rear lubrication block (Fig. 105). Pump approximately 3 cu. in (50 cu. cm) of grease into each fitting.

Fig. 105: Stabilizer shoe pivot pin lubrication

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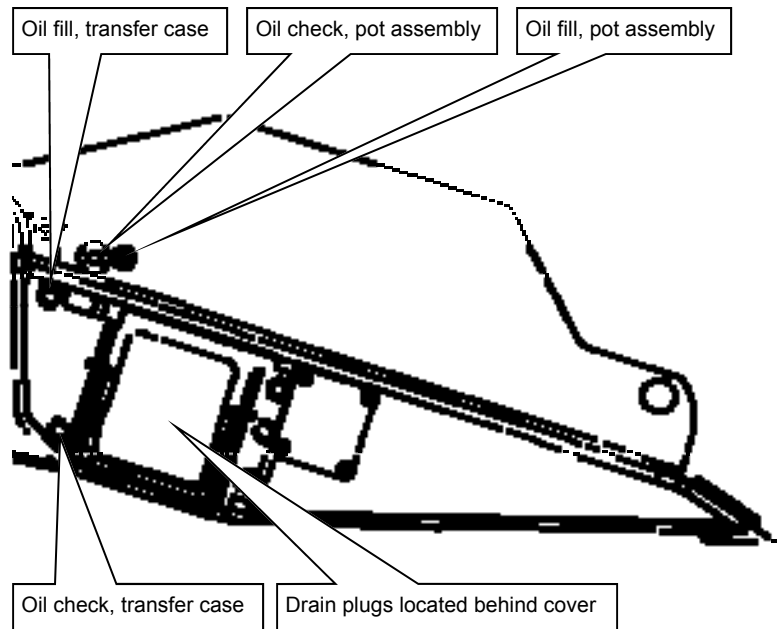
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Fig. 114: CLA pot assembly and input transfer case



blowing system motor bearings

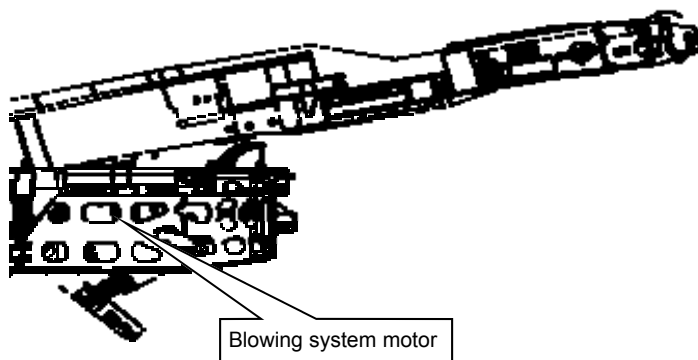
Lubricate the blowing system motor bearings (Fig. 122) with high temperature lithium complex grease (Spec. 100-14) as follows:

**IMPORTANT!**

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

- ☞ Remove the cover to access the motor.
- ☞ Inspect the grease fittings on the exit side of the front and rear motor bearing.
- ☞ If the exit side motor bearing ports are equipped with spring loaded relief fittings:
 - ☞ Lubricate both motor bearings using the button type fittings until new grease appears out of the relief port on the exit side of the bearing.
 - ☞ Operate the motor for five minutes.
 - ☞ Inspect for any grease leakage in the area around the bearing.

Fig. 122: Blowing system motor



Spring loaded grease relief fitting

Adjustment procedures

3. 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 124 bar (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 124 bar (1,800 psi).

4. Gathering head port relief

- ☞ Activate the gathering head raise circuit to fully raise the gathering head. The main control valve pressure gauge should read 117 bar (1,700 psi).
- ☞ If 117 bar (1,700 psi) is not obtainable, check that the relief in the gathering head float valve that is stamped "CR" is set to 124 bar (1,800 psi) (see Gathering head raise/hold/float-lower circuit in the Hydraulic section of this chapter).

5. Stabilizer shoe port relief

- ☞ Activate the stabilizer shoe raise circuit to fully raise the stabilizer shoe. The main control valve pressure gauge should read 83 bar (1,200 psi).
- ☞ Activate the stabilizer shoe lower circuit allow to fully lower the stabilizer shoe. The main control valve pressure gauge should read 193 bar (2,800 psi).

Adjustment procedures

Cutter motor feedback adjustment

The tram motor speed voltages are limited in the forward direction when the cutter motors are running. How much the tram speed is limited is controlled by the load on the cutter motors. When the load is light, as in a clean-up operation, the tram speed is less limited than when there is high cutter motor loading, as in a sumping operation. The cutter motor loading is monitored by using a current transformer, and electronic overload CTs.

The following procedure should be used to properly set the sump speed when using a Super Simpson control system.

- ☞ 1. Enter the "SUMP SETUP MENU" (Fig. 133) in the Engineering level and record all existing parameter values.
- ☞ 2. Set the "Max Left Hand Sump Speed" and "Max Right Hand Sump Speed" at 20%.
- ☞ 3. Set the "Min Left Hand Sump Speed" and "Min Right Hand Sump Speed" at 5% below the max speed.
- ☞ 4. Start the cutter head and observe and record the running current in free air for the cutter motors.
- ☞ 5. Go to the "SUMP CONFIG MENU" (Fig. 133) and set the "Cutter in Face Current" at approximately 30 amps above the free air current observed in Step 4.
- ☞ 6. Operate the miner in the face and observe the peak current reached during sumping operation on the "PRODUCTION MONITOR" screen (Fig. 1333).
- ☞ 7. Enter the peak current observed in Step 6 as the "Sump Tram Max Cutter Current" on the "SUMP CONFIG MENU".
- ☞ 8. Set the "Sump Tram Min Cutter Current" 30 amps below the max value obtained in Step 7.
- ☞ 9. Raise the max sump tram cutter current in small increments until the cutter current levels out, as seen on the "PRODUCTION MONITOR".
- ☞ 10. Enter the current observed in Step 9 as the "Sump Tram Max Cutter Current".
- ☞ 11. Set the "Sump Tram Min Cutter Current" 30 amps below the value obtained in Step 10.
- ☞ 12. Start raising the "Max Left Hand Sump Speed" and "Max Right Hand Sump Speed" on the "SUMP SETUP MENU" until the crawlers start to break traction. This is the max sump speed.
- ☞ 13. Set the "Min Left Hand Sump Speed" and "Min Right Hand Sump Speed" at 5% below the max speed obtained in Step 12.

Replacement of wear parts

center cutter drum installation

To install the center cutter drum (Fig. 139):

- ☞ Place the four (4) alignment keys into the keyway slots around the outer edges of the bottom half of the center drum.
- ☞ Slowly rotate the cutter head until the center drum drive keys are positioned directly on top and bottom of the cutter head assembly.
- ☞ Slowly lower the cutter head assembly onto the bottom half of the center drum.
- ☞ 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.

- ☞ Attach a lifting device to the upper half of the center drum.

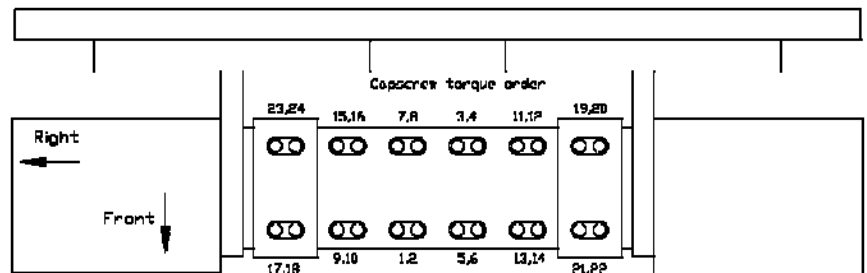


WARNING!

You could be seriously injured or killed by falling loads. Observe the safe working load limits of all lifting and blocking devices and stay clear of suspended loads.

- ☞ Lower the upper half of the center drum onto the cutter head assembly, making sure that the keyways align with the keys on the bottom half.
- ☞ Check that the upper half of the center drum is fully seated on the bottom half. Using a rod, check the bolt holes for alignment. Adjust the position of the upper half of the center drum as necessary to align the bolt holes.
- ☞ Install the twenty-four (24) socket head bolts that secure the two halves of the center drum to each other, placing a flat washer under the head of the bolt and between the bolt and the nut. Install the bolt heads in the direction of rotation, if lacing permits.
- ☞ Torque the bolts appropriately using the pattern shown in Fig. 145.

Fig. 139: Center drum bolt torque pattern



Replacement of wear parts

cutter drum drive gear case removal

The cutter head gear case may be removed with cutter drum installed but it is easier with it removed.

To remove the cutter drum drive gear case (Fig. 144):

- ☞ 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.

- ☞ Remove the cutter head center drum (see Center cutter drum removal procedure in this chapter).
- ☞ Remove the cutter head end drums (see End drum removal procedure in this chapter).
- ☞ Remove the spray blocks by removing the cap screws that secure them to the miner.
- ☞ Ensure that the cutter head assembly is adequately blocked.
- ☞ Securely block the cutter head gear case so that it will not fall when it is unbolted from the frame.



WARNING!

Observe the safe working load limits of all lifting and blocking devices. You can be seriously injured or killed by falling loads.



IMPORTANT!

During the removal of the cap screws that secure the gear case to the frame, it may be necessary to adjust the blocking under the gear case. Ensure that the gear case is securely blocked at all times and that it does not shift as it is unbolted.

- ☞ Carefully loosen and remove the forty (40) capscrews that secure the cutter head gear case to the cutter head support frame.
- ☞ Connect the trailing cable to energize the miner.



WARNING!

Stand clear of the miner and the gear case while tramming the miner. You could be seriously injured or killed by falling loads.



WARNING!

Do not attempt to start the cutter head motors. You could be seriously injured or killed.

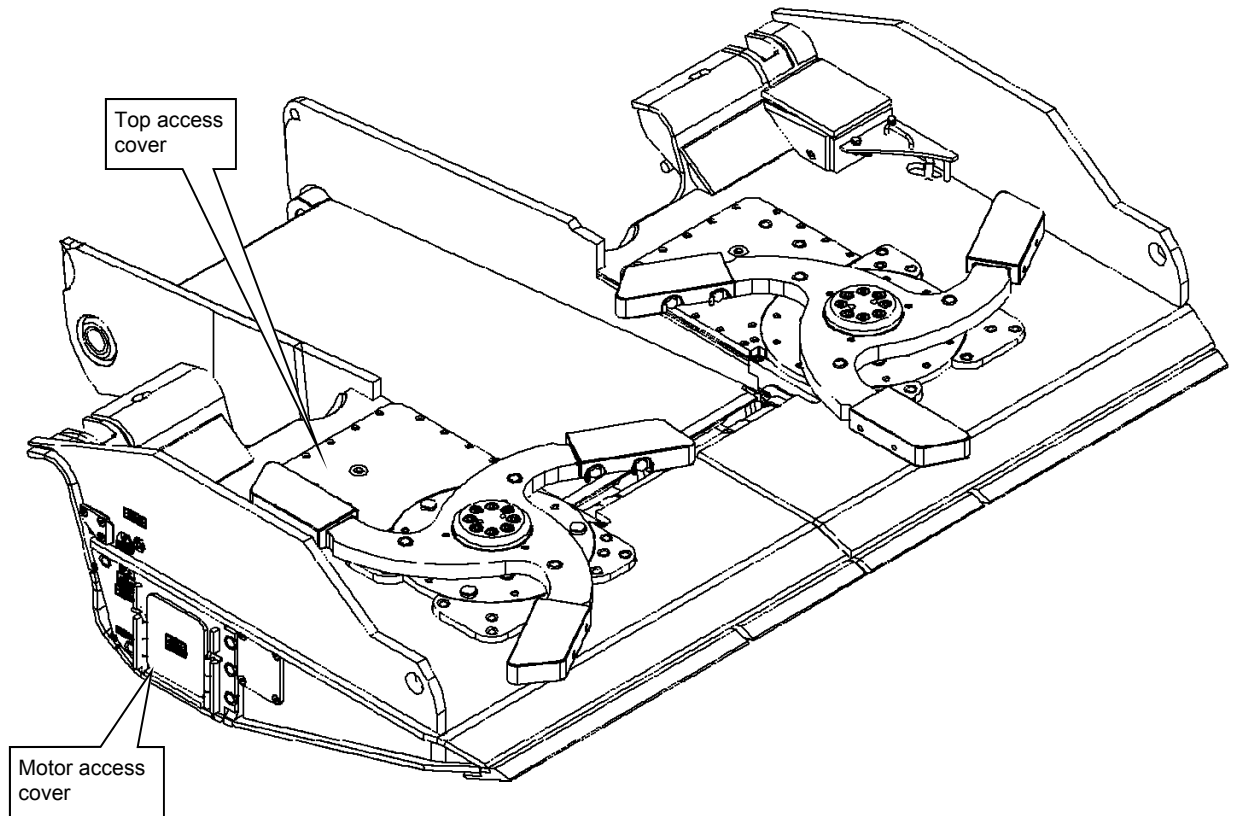


CAUTION!

Use care when tramming the miner away from the gear case. While each cutter motor is supported by a bracket at the rear of the motor, excessive bumping could cause the motor to fall.

Replacement of wear parts

Fig. 147: Gathering head motor removal and installation



Replacement of wear parts

CLA removal and installation

CLA removal

To remove a continuous loading arm (CLA) (Fig. 152):

- ☞ Lower the gathering head assembly until it touches the floor.
- ☞ Raise the cutter head assembly to its highest position and block.



WARNING!

Observe the safe work load limits of all blocking devices. You can be seriously injured or killed by falling loads.

- ☞ Disconnect and lock out the electrical power to the miner. Follow all applicable mine, State, and Federal regulations regarding lock-out/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.

- ☞ Remove the eight (8) M24 socket head capscrews from the CLA retainer plate and remove the retainer plate. There are two puller holes, protected by cup-point set screws, in the retainer plate to assist with its removal.
- ☞ Remove the three capscrews located where the arms meet the CLA hub. There are three puller holes, protected by cup-point set screws, in the arm to assist with its removal.
- ☞ Remove the three dowel pins, which position the CLA to the pot disc and keep for reassembly.
- ☞ The CLA is now free and can be removed.

Replacement of wear parts

- ☞ Remove the nine (9) screws from the mounting plate (four (4) on the rear/sprocket side and five (5) on the forward/motor side).
- ☞ Insert a screw into the four jacking holes and, using these holes, slowly jack the main case free of the frame.
- ☞ Position a loading device, such as a scoop, at the bottom edge of the main case. Connect a couple of chains between the loading device and the back of the mounting plate.

**WARNING!**

Observe the working load limits of chains. Overstressing the chains could cause the chain to break, resulting in serious injuries.

- ☞ Slowly maneuver the gear case and motor assembly clear of the machine and onto the loading device.
- ☞ Cover the tram case compartment in the crawler assembly to keep out dirt and debris.

Replacement of wear parts

crawler take-up roller installation

To install the crawler chain take-up idler roller (Fig. 161):

- ☞ Apply a thin coating of grease to the top and bottom take-up slide areas of the crawler frame.
- ☞ Verify the proper oil fill on the inside of the take-up roller housing. Place the assembly on its side with the roller shaft vertical. Remove both pipe plugs visible on the side of the roller. Pour gear oil into one hole until it runs out the other hole.
- ☞ Position the crawler take-up assembly in front of the slide area of the crawler frame.
- ☞ Slide the assembly into the main frame, then rearward until it stops against the piston of the take-up cylinder.
- ☞ Ensure that the piston end of the take-up cylinder fits properly into the take-up plug in the roller assembly.
- ☞ Reconnect the crawler chain.
- ☞ Unblock the chain and check for proper tension (Fig. 163). If necessary, adjust the shims until the required sag is achieved.
- ☞ Connect the trailing cable to energize the miner.
- ☞ Remove all blocking.
- ☞ Check the crawler assembly for correct operation.

Replacement of wear parts

Discharge conveyor removal and installation

discharge conveyor removal

To remove the conveyor discharge (Fig. 165):

- ☞ Position the machine so that the top and bottom of the conveyor can be reached and there is enough room at the back for removal of the conveyor chain and the discharge conveyor.
- ☞ Raise the conveyor far enough to provide adequate work space under the swing pivot. Securely block the intermediate conveyor section ensuring that the swing pivot remains accessible.



WARNING!

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

- ☞ Align the discharge conveyor straight with the centerline of the intermediate conveyor.
- ☞ 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.

- ☞ Relieve the pressure in the conveyor chain take-up circuit (see Conveyor chain removal procedure in this chapter).
- ☞ Attach lifting devices to the discharge conveyor take up slack in the lifting device without raising the conveyor.



WARNING!

Observe the safe working load limits of all lifting devices. You may be seriously injured or killed by falling loads.

- ☞ Disconnect the conveyor chain at a connecting pin close to the end of the discharge conveyor (see Conveyor chain removal procedure in this chapter).
- ☞ Disconnect, tag, and cap the hydraulic lines from the conveyor swing cylinders. Cap the ports in the cylinders.



WARNING!

Never disconnect a hydraulic hose if the circuit is pressurized. If a hose is disconnected while the circuit is pressurized, machine damage or severe injury may result.

- ☞ Remove the forward swing cylinder pin at the intermediate conveyor section.
- ☞ Remove the bolts and stop nuts that attach flexible sideboards to each side of the intermediate conveyor.

**WARNING!**

Never disconnect a hydraulic hose if the circuit is pressurized or there is a load on the circuit. If a hose is disconnected while the cylinder is supporting a load, the load will fall.

Typical hydraulic problems

The most common causes for improper function are:

- contaminated oil or poor oil quality
- low or insufficient oil in the system
- using the wrong type of oil or wrong viscosity grade
- air in the hydraulic system
- internal or external leakage of the hydraulic system
- improper mechanical adjustments, such as reliefs
- mechanical or structural damage leading to component failure
- components by-passing (internal leaking or inability to hold pressure) which leads to erosion of bushings, valve spools, and other costly, critical components

The greatest aid to troubleshooting a hydraulic system is the confidence that comes with knowing the intended operation of the system, along with a fundamental understanding of basic hydraulic principles. Every component in the system has an intended purpose. The construction and operating characteristics of each of these components should be clearly understood before attempting to troubleshoot the machine. For example, understanding that a solenoid controlled directional valve can be manually actuated will save considerable time in isolating a defective solenoid. Please familiarize yourself with the operational descriptions of the hydraulic circuits given in the Hydraulics section of this chapter.

It is also important to know the capabilities of the system. Each component in the system has a maximum rated speed, flow, torque, or pressure. If the system is loaded beyond the specifications, the possibility of failure is greatly increased. The correct operating pressures of a system must be known and must always be checked and set with a pressure gauge. Refer to the hydraulic schematic in the parts manual supplied with your machine for the correct operating parameters. When in doubt, always assume that the correct pressure is the lowest pressure that will allow adequate performance of the system function(s) while remaining below the maximum rating of the machine's components.

Troubleshooting
Table 6: Flow chart IV for troubleshooting incorrect pressure

No Pressure		Low Pressure		Erratic Pressure		Excessive Pressure	
Cause	Remedy	Cause	Remedy	Cause	Remedy	Cause	Remedy
No flow	See Table 5	Pressure relief path exists	See Table 5	Air in fluid	B	Pressure reducing, relief, or unloading valve misadjusted	D
		Pressure reducing valve set too low	D	Worn relief valve	E	Pressure recuing, relief, or unloading valve worn or damaged	E
		Pressure reducing valve damaged	E	Contamination in fluid	A		
		Damaged pump, motor, or cylinder	E	Accumulator defective or has lost charge	C		
				Worn pump, motor, or cylinder	E		

Remedies

- A. ☞ replace dirty filters and system fluid
- B. ☞ tighten leaky connections
☞ fill reservoir to proper level and bleed air from system
- C. ☞ gas valve for leakage
☞ charge to correct pressure
☞ overhaul if defective
- D. ☞ adjust valve
- E. ☞ overhaul or replace part

Troubleshooting

The following is a complete list of all error messages in the control system.

Table 13: Control system fault codes

Fault	Explanation	Possible Cause	Checks to Carry Out
0001 SOL BOARD COMMS FAIL			
0002 RELAY BOARD COMMS FAIL			
0003 THERMISTOR MODULE FAILURE			
0004 LEFT DRIVE COMMS BAD			
0005 LEFT DRIVE WRONG SOFTWARE			
0006 LEFT DRIVE INIT FAILURE			
0007 RIGHT DRIVE COMMS FAIL- URE			
0008 RIGHT DRIVE WRONG SOFTWARE			
0009 RIGHT DRIVE INIT FAILURE			
0010 RC HANDSET LOW BATTERY			
0011 VOLTAGE TRANSDUCER FAILURE			

Troubleshooting

Table 13 (continued): Control system fault codes

Fault	Explanation	Possible Cause	Checks to Carry Out
0072 LEFT CUTTER PT100 OPEN CIRCUIT			
0073 RIGHT CUTTER PT100 OPEN CIRCUIT			
0074 LEFT CONVEY- OR PT100 OPEN CIRCUIT			
0075 RIGHT CON- VEYOR PT100 OPEN CIRCUIT			
0076 CUTTER BREAKER OPEN			
0077 CB2 OPEN			
0078 TRAM BREAK- ER OPEN			
0079 LEFT TRAM MOTOR MATE FAILURE PHASE A			
0080 LEFT TRAM MOTOR MATE FAILURE PHASE B			

Troubleshooting
Table 13 (continued): Control system fault codes

Fault	Explanation	Possible Cause	Checks to Carry Out
0215 THERMISTOR MODULE FAIL- URE			
0216 LEFT TRAC- TION DRIVE COMMS FAIL- URE			
0217 LEFT TRAC- TION DRIVE WRONG SOFT- WARE VER- SION			
0218 LEFT TRAC- TION DRIVE INITIALIZATION FAILURE			
0219 LEFT TRAC- TION DRIVE INTERNAL ER- ROR			
0220 LEFT TRAC- TION DRIVE FATAL ERROR			
0221 LEFT TRAC- TION DRIVE AC PHASE LOSS			
0222 LEFT TRAC- TION DRIVE PHASE IMBAL- ANCE			

Troubleshooting

Table 13 (continued): Control system fault codes

Fault	Explanation	Possible Cause	Checks to Carry Out
0293 FAN NO LOAD CURRENT			
0294 FAN MOTOR PHASE LOSS			
0295 FAN MOTOR PHASE IMBAL- ANCE			
0296 FAN MOTOR INSTANTANE- OUS OVERLOAD			
0297 FAN MOTOR THERMAL OVERLOAD			
0298 FAN MOTOR OVER TEMPER- ATURE			
0299 SOLENOID SHORT CIRCUIT			

Troubleshooting

Table 13 (continued): Control system fault codes

Fault	Explanation	Possible Cause	Checks to Carry Out
0388 NO RIGHT CUT- TER START CURRENT			
0389 NO LEFT CON- VEYOR START CURRENT			
0390 NO RIGHT CON- VEYOR START CURRENT			
0391 NO FAN START CURRENT			
0392 PUMP THERMIS- TOR SHORT CIRCUIT			
0393 PUMP THERMIS- TOR OPEN CIR- CUIT			
0394 LEFT CUTTER THERMISTOR SHORT CIRCUIT			
0395 LEFT CUTTER THERMISTOR OPEN CIRCUIT			
0396 RIGHT CUTTER THERMISTOR SHORT CIRCUIT			
0397 RIGHT CUTTER THERMISTOR OPEN CIRCUIT			

Troubleshooting
Table 14: Control system pin outs, continued
**Super Simpson receiver control unit
Connector X2 - 19 Burndy Female**

Pin No.	Signal Name	Signal Type
X2-A	Aux. Supply Output 24V+	24V Output
X2-B	Aux. Supply Output 0V	0V Output
X2-C	Supply Input 24V+	24V Input
X2-D	Supply Input 0V	0V Input
X2-E	Data Logging (Methane) RS485-A	Ext. Communication
X2-F	Data Logging (Methane) RS485-B	Ext. Communication
X2-G	Data Logging (Methane) RS485-Reference	Ext. Communication
X2-H	External Slaves RS485-A	Ext. Communication
X2-J	External Slaves RS485-B	Ext. Communication
X2-K	External Slaves RS485-Reference	Ext. Communication
X2-L	RS422 TX-P	Ext. Communication
X2-M	RS422 TX-N	Ext. Communication
X2-N	RS422 RX-P	Ext. Communication
X2-P	Frequency Selection #1	24V Digital Input
X2-R	Frequency Selection #2	24V Digital Input
X2-S	Frequency Selection #3	24V Digital Input
X2-T	24V Input - Spare	24V Digital Input
X2-U	RS422 RX-N	Ext. Communication
X2-V	Supply Output	24VDC Output

Tightening torques

Tightening torques



IMPORTANT!

Due to the application of fasteners being subject to great stresses and heavy or extreme vibration, it is imperative that all bolts be applied with an adequate amount of torque. For this reason this list of recommended torque settings for different types and sizes of fasteners used has been compiled. The tightening torques stated in the spare parts lists have to be observed, as well, for installation and maintenance.



IMPORTANT!

Use a calibrated torque wrench for accuracy!

Table 12: Hex head bolts, Grade 8 (calculated at 75% proof load)

Bolt size	Recommended torque setting (ft-lbs) (dry)	Recommended torque setting (ft-lbs) (wet)
1/4	12	6
5/16	25	12
3/8	44	22
7/16	70	35
1/2	107	53
9/16	154	77
5/8	212	106
3/4	376	188
7/8	606	303
1	909	454
1-1/8	1287	644
1-1/4	1875	938
1-3/8	2382	1191
1-1/2	3161	1581
1-3/4	4988	2494
2	7500	3750
2-1/4	10969	5484
2-1/2	15000	7500
2-3/4	17794	8897
3	23507	11753
3-1/4	30286	15143
3-1/2	38266	19133
3-3/4	47545	23773
4	58100	29085

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