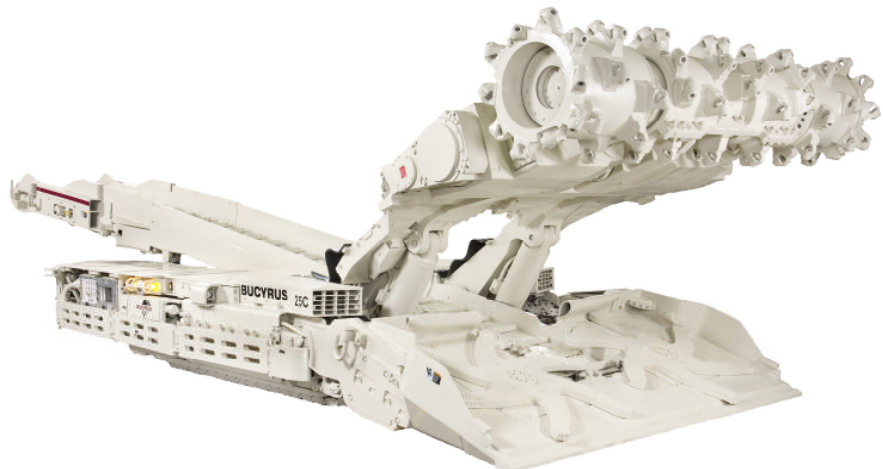




# Operation Manual

**Bucyrus - Continuous Miner  
Model - 25C**

**Doc. No.: A6474X308**



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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.

### Installation and start-up

<b>inclined face</b>	On inclined faces secure all component parts by chains, e.g. to the support.
<b>environmental acceptability</b>	<p>When working with oils, greases and other chemical substances, observe the safety regulations applicable to the product.</p> <p>Dispose of cleaning rags, etc. which have been soiled with oil, grease or other chemical substances in an environmentally safe manner.</p>
<b>controls</b>	When starting up machine, do not operate any controls located inside the operator's compartment (optional) from outside the compartment.
<b>starting procedures</b>	Follow the starting procedure instructions in the operations manual.
<b>red zone</b>	Do not operate any levers, pedals or controls if anyone is in the red zone. (See Red Zone in Chapter 5 of this manual)

### Operation

<b>training</b>	Operate the machine only if you have a profound knowledge of the control elements and their functions. It is necessary that you have been task trained on the respective Continuous Miner.
<b>before start-up</b>	Before start-up, ensure that there are no persons or obstructions in your line of travel or in the articulation area when steering the unit.
<b>protective devices</b>	Check that all protective devices are installed on the machine and function properly.
<b>traveling</b>	Use extreme caution when traveling in close quarters or in congested or blind-travel areas.
<b>passengers</b>	Never carry passengers. Passengers may be thrown off the machine or crushed between the machine and outside objects.
<b>safety rules</b>	Always follow all safety rules of each particular mine when operating the machine.
<b>problems and malfunctions</b>	If problems or malfunctions are encountered while operating the unit, it must be properly shutdown and the problem corrected immediately.

## 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.

**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.**

**Table 1: Lifting weights of Continuous Miner Assemblies**

Description	Approximate Weight
Complete Machine	140,000 lbs. (63,503 kg)
Tractor Frame Assembly	65,000 lbs. (29,484 kg)
Gathering Head Assembly	23,000 lbs. (10,433 kg)
Conveyor Assembly	17,000 lbs. (7,711 kg)
Cutter Head Support Frame with Drum Drives and Drums	35,000 lbs. (15,846 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.**

Fig. 5 (continued): Safety features



## Gauge

There is a multi-station gauge located on the right hand side of the machine, above the tram case (Fig. 12). The gauge will measure six (6) different pressures in the hydraulic system. There are zero points between measurements where the pressure is relieved back to tank.

To obtain pressure readings:

- ☞ Turn the dial so that the arrow points to the zero directly before the pressure you want to read. The gauge should read zero.
- ☞ Turn the dial so that the arrow points at desired position on the gauge (see position designations below).



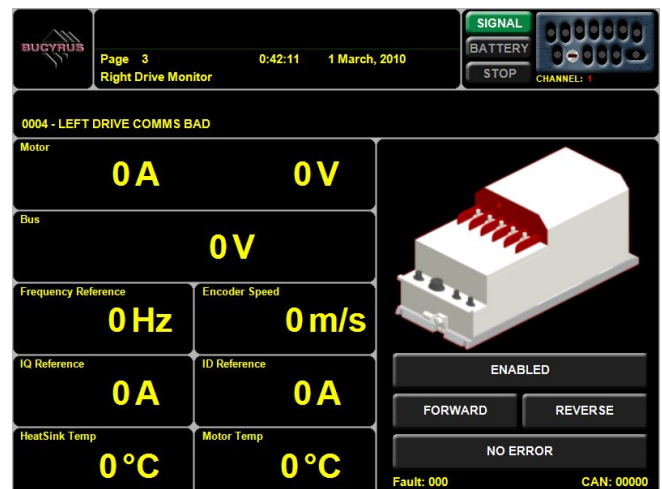
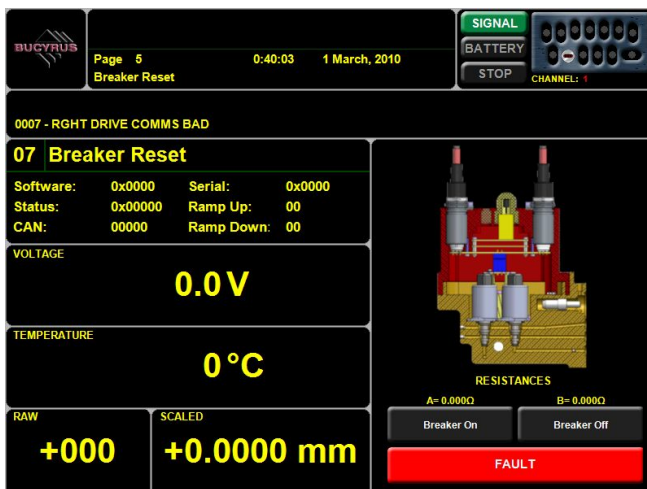
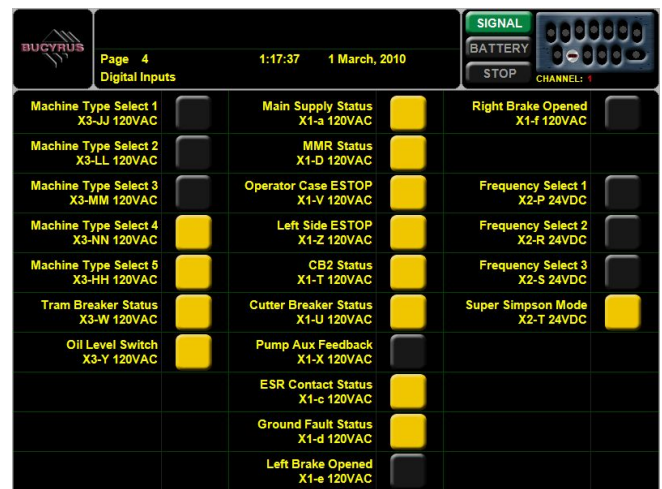
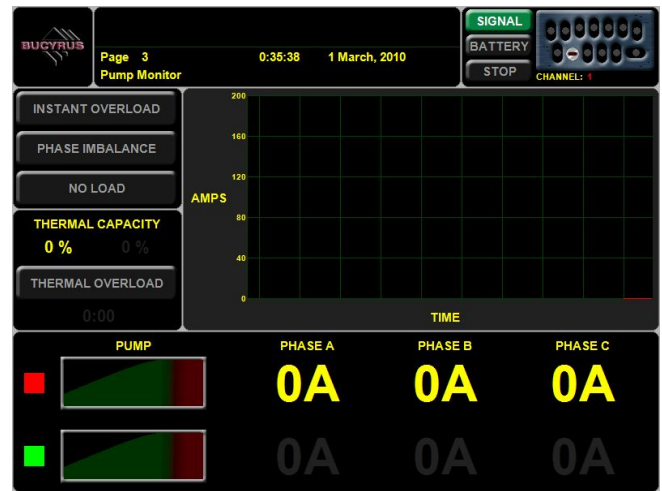
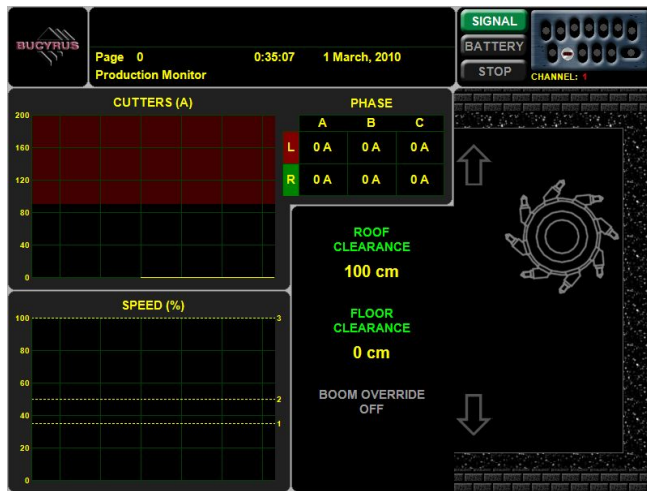
### **IMPORTANT!**

**The gauge must be allowed to zero out between readings in order to obtain an accurate reading.**

The gauge designations are as follows:

- Position 1:** Main pressure (P1 as labeled on the pressure manifold) - used to measure the pressure in the main flow - primary pressure circuit. See the Main flow - primary pressure circuit in the Hydraulic section of this chapter for further information.
- Position 2:** Pilot pressure (P2 as labeled on the pressure manifold) - used to monitor the supply pressure for all pilot functions. See the Pilot pressure circuit description in the Hydraulic section of this chapter for further information.
- Position 3:** Shear pressure (load sensing pressure) (SH as labeled on the pressure manifold) - used to monitor the pressure of the cutting head cylinder circuit during shear down operations. See the Cutter head cylinder circuit description in the Hydraulic section of this chapter for further information.
- Position 4:** Regulated pilot pressure (RPG as labeled on the water pressure manifold) - used to monitor the regulated pressure for all pilot functions activated from the water pressure manifold. See the Regulated pilot pressure circuit in the Hydraulic section of this chapter for further information.
- Position 5:** Gathering head float valve (gathering head assist) pressure - used to monitor the pressure in the gathering head circuit during gathering head float operations. See the Gathering head raise/hold/float-lower circuit in the Hydraulic section of this chapter for further information.
- Position 6:** Conveyor chain take-up pressure - used to monitor the pressure of the automatic conveyor chain tensioner. See the conveyor take-up circuit in the Hydraulic section of this chapter for further information.

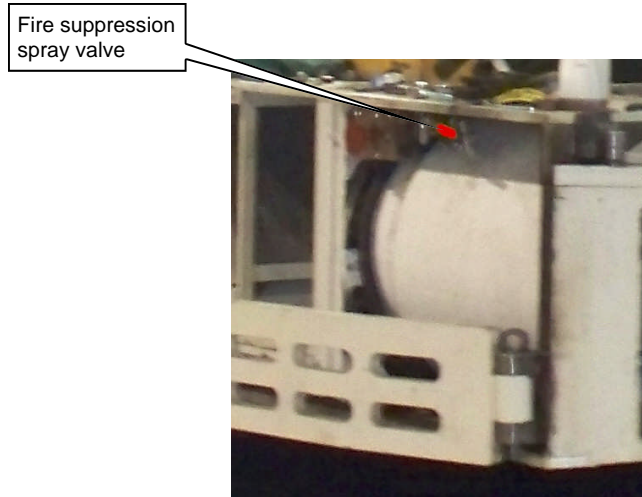
Fig. 19: Graphics display diagnostic pages, examples



**fire suppression sprays  
(optional)**

The optional fire suppression spray valve (Fig. 26) is a ball valve typically located on the left hand side of the machine. This valve is activated manually by pulling to turn on and by pushing to turn off. The valve must be manually reset in order to reset the fire suppression circuit.

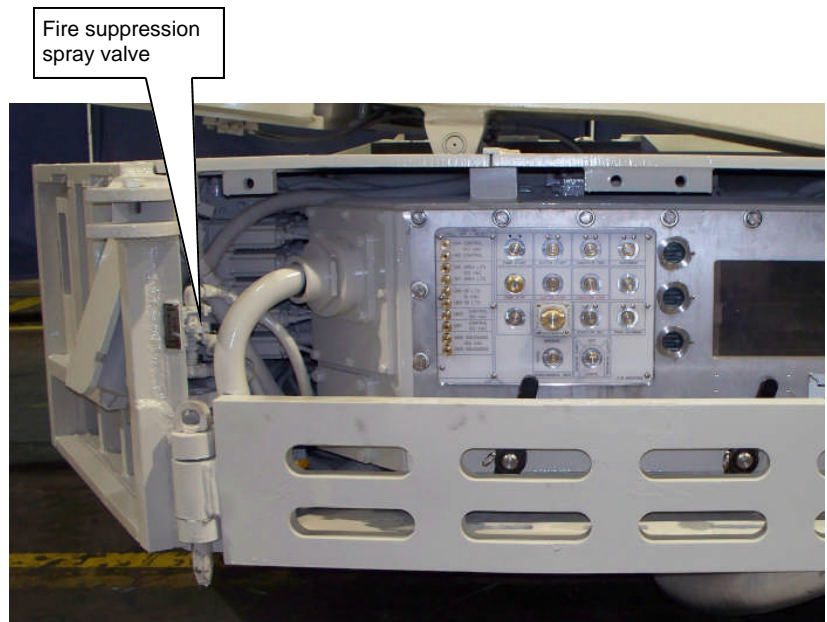
**Fig. 26: Fire suppression spray (typical)**



**fire suppression spray valve**

The fire suppression spray valve (Fig. 27) is a valve typically located on the left hand side of the machine. This valve is activated manually by using the handle to turn on and off.

**Fig. 27: Fire suppression spray**



## Shutdown procedure

The Continuous Miner must be properly shutdown before leaving the area or before performing any maintenance or service. Some maintenance or service procedures may require additional steps to insure the safety of the maintenance personnel working on or around the machine and will be listed in the maintenance section of this guide.

- ☞ Back the miner about one foot from the face providing sufficient clearance and shut off the cutter head motors (see Cutter operation in this section).
- ☞ Tram the miner to an area of well supported roof. Park the machine in its designated parking area out of traffic, on flat, solid ground. If it is not possible to park the machine on flat ground, park the machine at a right angle to the slope.

### **WARNING!**

**After turning off the power to the machine, never walk away and leave the radio remote turned on. Failure to turn the radio remote off could result in an accident causing serious injury or loss of life.**

- ☞ Empty the conveyor and shut it off (see Conveyor operation in this chapter).
- ☞ Lower the cutter head to the floor.
- ☞ Lower the conveyor and gathering head.
- ☞ Press and hold the "PUMP OFF" key. The pump motor should shutdown immediately.
- ☞ Release the "PUMP OFF" key.
- ☞ Turn off the water sprays.
- ☞ Shut off the main power supply.

## **E-stop Bypass**

The continuous miner is equipped with a mushroom style emergency stop button on the left side of the machine. This button is normally used to shutdown the machine in an emergency. In difficult mining conditions, it is possible for the left side of the machine to become jammed against the wall (rib) of the mine. In these cases, the emergency stop button can become held in the on position by the wall, preventing the pump motor from being started.

To allow the machine to be started, and moved away from the wall, there is an emergency stop bypass feature in the control system that can be activated from the radio remote. When activated, the bypass function gives the operator a 30 second window where the emergency stop button is bypassed and the pump motor can be started. During this window, the operator is able to tram the machine away from the wall and allowing the emergency stop button on the machine to be reset.

To activate the E-stop bypass:

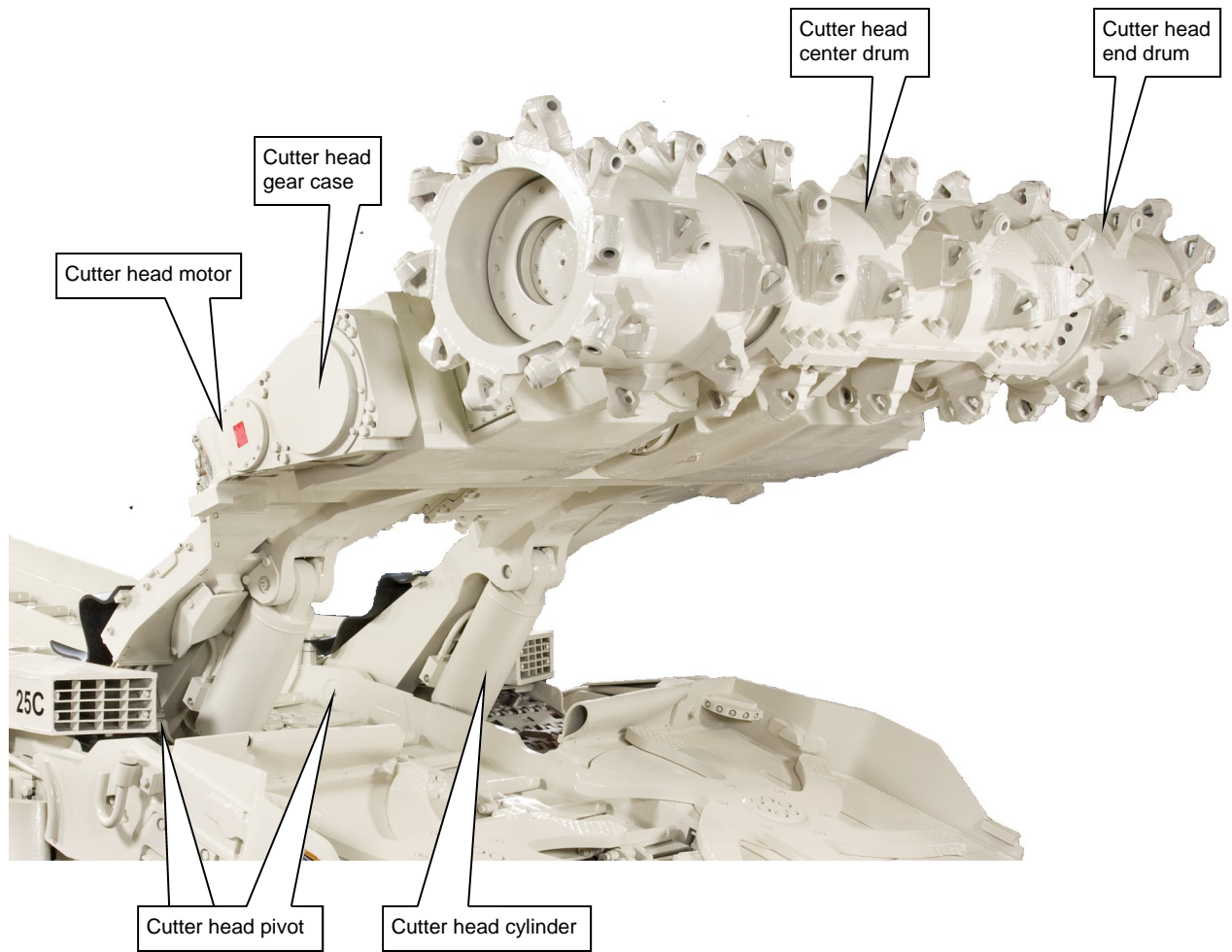
- ☞ Press and hold the “SHIFT” and “BYPASS” keys together for a continuous 5 seconds.

When the keys are held, the diagnostic display on the miner will show a countdown timer. The timer counts the 5 second period that the keys must be held in order for the bypass function to become enabled.

Once the 5 second delay has passed, the system will enter the E-stop bypass mode. The “SHIFT” and “BYPASS” keys can then be released. The screen will then show that the bypass is active and will feature another countdown timer, which will countdown the 30 second bypass interval.

Once the 30 second window has expired, the bypass will be disabled. Bypass mode can be reactivated following the above procedure.

Fig. 41: Cutter head assembly



## Main control valve

The main control valve consists of a series of directional control valves assembled in a row. This row of valves is commonly referred to as a valve bank. The main control valve directs fluid flow to perform a specific function of work that transforms hydraulic energy into mechanical energy. Control is initiated electrically (through the solenoid pilot valve).

The main control valve (Fig. 48) is typically located on the right side of the machine.

Each working section on a control valve has a uniquely designed internal spool. Typically, there are (5) five working sections. Spools may be spring-loaded to return the spool to a preset position (usually neutral) when not held in the required position. When more than one function is activated, those functions will slow down in comparison to operating a single function.



### **IMPORTANT!**

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

### **WARNING!**

**Do not salvage spools in valve bodies for later use in “new” combinations. Damaged or improper components used during assembly may result in internal leakage or “sticking” (“hanging up”) of the spool in the valve body. Incorrect component combinations may result in improper operation of the valve section, possibly causing unexpected machine operation that could result in machine damage or injury to personnel.**

If the valve sections are separated for any reason, make sure that all reassembled parts are in their proper location and that all mating surfaces are free of burrs and foreign items (paint, dirt, etc.). Assembly stud nuts or screws should be tightened to specified torques. The presence of foreign items between sections or incorrect torque of assembly hardware can result in improper operation of the valve due to warping or distortion of the sections. This can cause machine malfunction.

Periodic inspection of spool operation, oil condition, and pressure connections saves time-consuming breakdowns and unnecessary parts replacement.

- All hydraulic connections must be tight. Loose connections not only allow leakage, but also permit air to be drawn into the system, resulting in noisy and erratic operation.

### Main flow - primary pressure circuit

The main flow-primary pressure circuit (Fig. 54) is powered by hydraulic pump gear section EF. The EF gear section is rated at 32 gpm at a pressure of 3,500 psi. The main control valve operates the cutter head, conveyor raise and swing, gathering head, and stabilizer shoe cylinders along with oil tank fill. After passing through the 2" locking ball valve and pump gear section EF, oil enters a 10 micron by-passing pressure filter, through the pump control manifold, and then continues to the main control valve whose relief is set at 3,500 psi. The pump control manifold unloads the primary pressure system and diverts flow back to tank when no function on the main control valve is active. When a function is activated, the pump control manifold will divert flow the main control valve. The pump control manifold also facilitates the optional high speed cutter head raise. On the return side of the system, oil exits the main control valve. There is a tee to allow external filling of the reservoir (see conveyor raise/lower circuit). Oil enters a 10 micron by-passing return filter before entering the oil reservoir. Once in the reservoir, the oil is forced to flow through and around baffle plates for cooling and de-aerating before re-entering the suction line. Also, located in the reservoir are floor magnets which will trap ferrous metal particles.

The schematic shown in Fig. 54 is a typical primary pressure circuit. Always refer to the schematic in the Bucyrus parts book for your machine.

Fig. 54: Main flow-primary pressure circuit

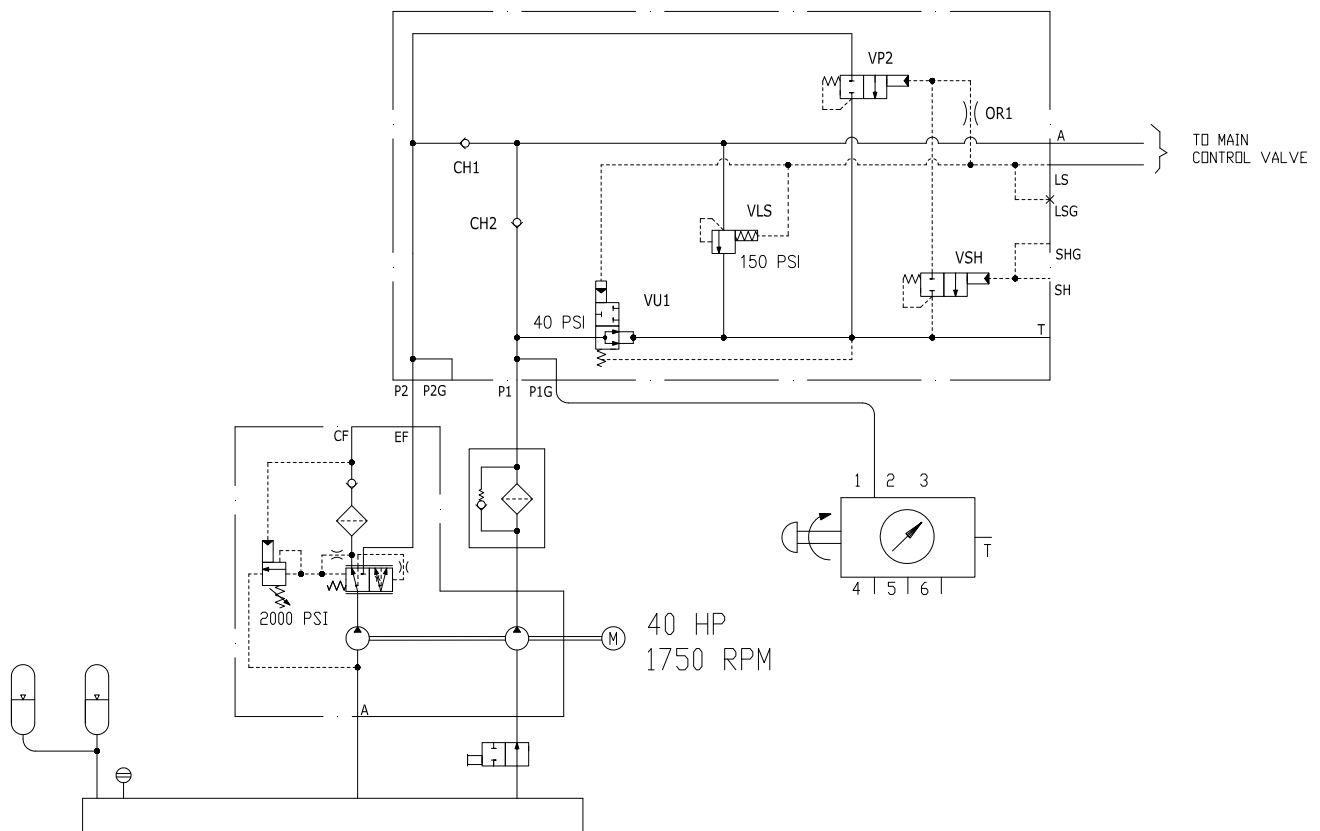
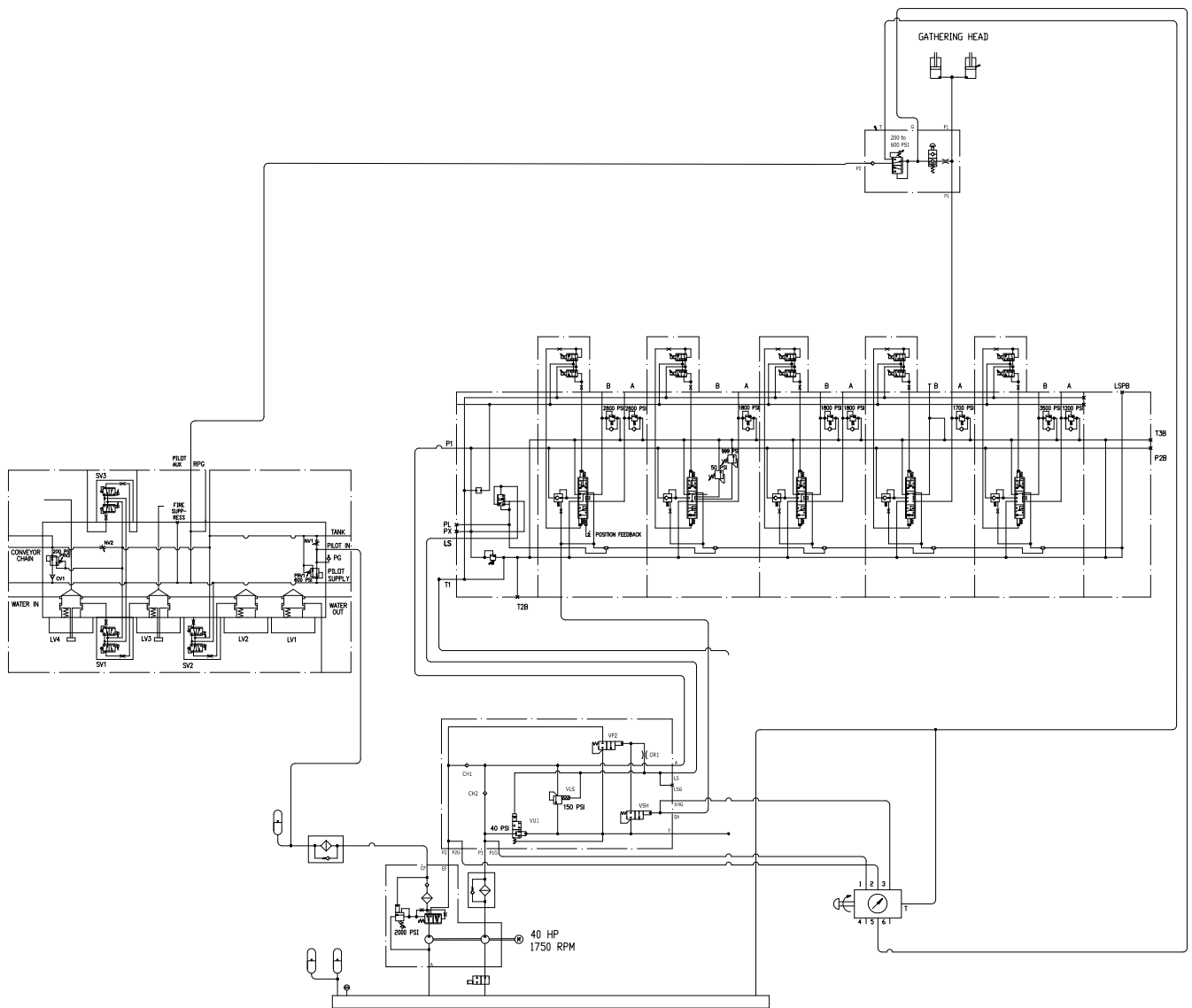


Fig. 59: Gathering head circuit



## Deluge water fire circuit

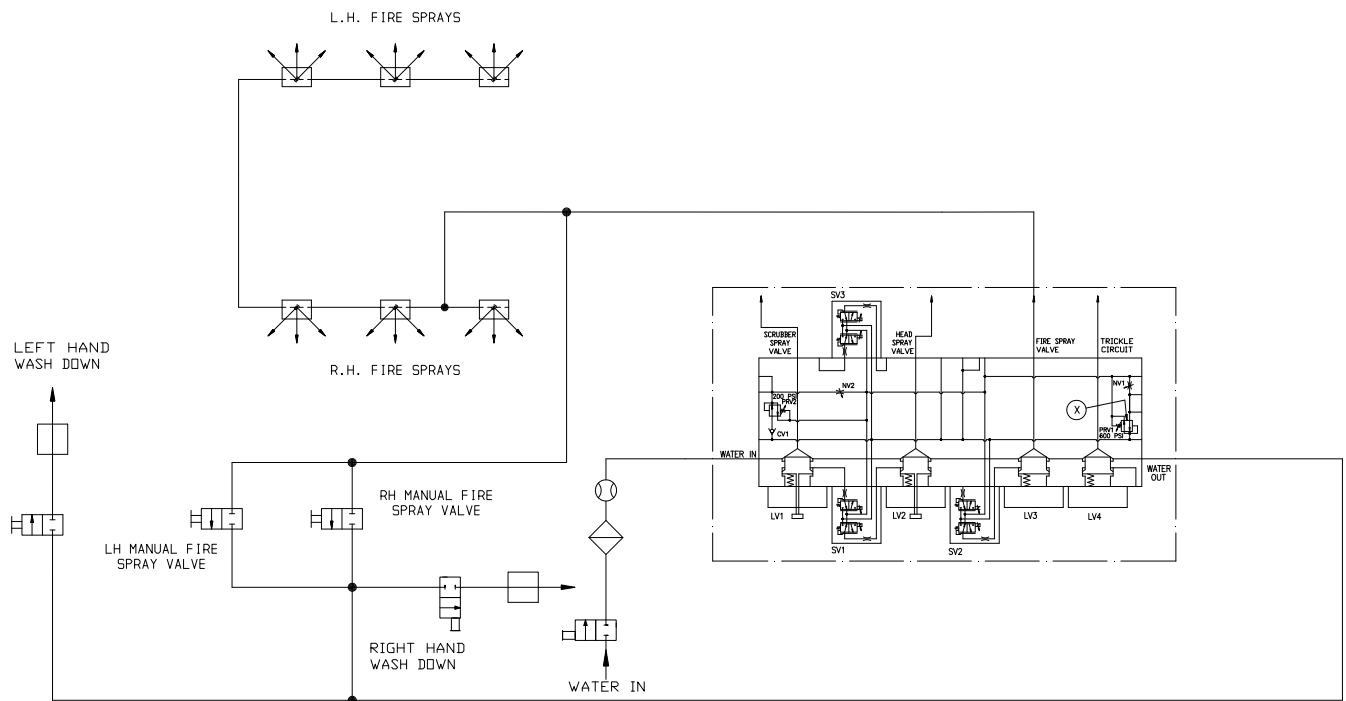
The deluge fire suppression circuit (Fig. 64) can be operated by manual or remote solenoid control (see Electrical section in this chapter). When the solenoid coil is energized, it shifts a spool, allowing hydraulic oil to travel to a 2-way, 2-position water valve. The hydraulic fluid shifts the spool, allowing the water to pass through it to the deluge fire spray manifolds. For the hydraulic portion of this circuit, see the Hydraulic section of this chapter. The water valve has a detent spool, which keeps the valve open. The 2-way, 2-position valve can be operated manually and must be manually reset to reset the fire suppression circuit.

In addition, there are two ball valves used to manually operate the fire suppression circuit typically located on the right hand side of the machine. The valves must be manually turned off to reset the fire suppression system.

The optional left hand washdown hose water is supplied by the deluge fire suppression system.

The fire suppression circuit must be tested once per shift, minimum (see Maintenance section in this chapter).

**Fig. 64: Deluge water fire circuit**



## Trailing cable

A trailing cable with three power conductors, labeled L1, L2, L3, two (2) ground conductors (G), and a ground check conductor (GC) supplies power to the machine. A three-conductor 2/0 to 4/0 cable is used with the 950V machines.

Cables are designed with a fire-proof, tough outer jacket to withstand the constant abuse of flexing, reeling, and the exposure to sharp objects on the mine floor. They are not designed to withstand being run over by mobile equipment, especially Continuous Miners. Trailing cables exposed to moving equipment are required to be hung to prevent damage to insulation.



### **IMPORTANT!**

**Hang trailing cables to prevent damage from moving equipment!**

### **WARNING!**

**Never run over an unprotected trailing cable. Damaged cables should be repaired immediately.**

The trailing cable may have breaks in its insulation. These defects in the insulation could cause exposure to high electrical currents. Never handle an energized trailing cable without the properly rated personal protective equipment (electrically insulated gloves and shoes or boots). Never let the energized trailing cable come in contact with unprotected (non-insulated) parts of your body.

### **DANGER!**

**Never handle energized trailing cable without proper protective equipment. Contact with an energized trailing cable with compromised insulation could result in death by electrocution.**

Trailing cables on reels can present a hazard. The reels keep the trailing cable under tension at all times. Starting and stopping of the equipment causes a tension change on the trailing cable causing the cable to move or flex constantly. The closer to the machine, the more noticeable the movement. Anyone standing near or crossing over the trailing cable could be tripped or struck by the trailing cable as it flexes.

### **WARNING!**

**Always use caution when standing near or crossing trailing cables. The trailing cable may move as the machine moves.**

### **Temporary splices**

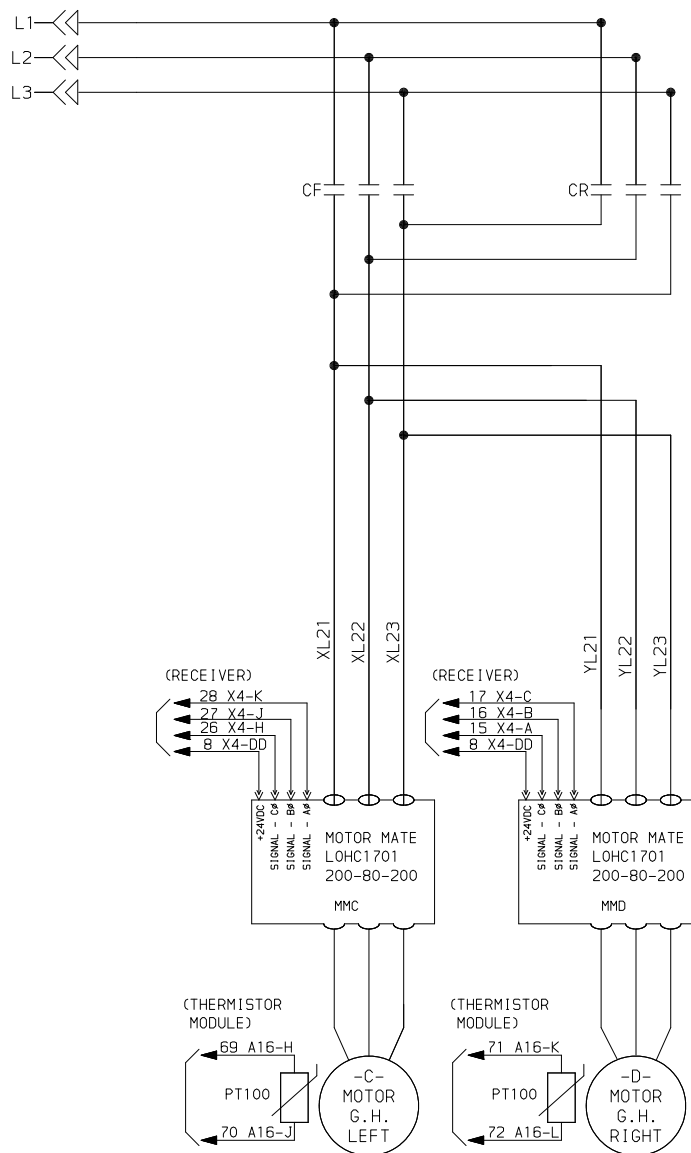
Trailing cables may only be repaired under certain conditions and following specific guidelines which are outlined in MSHA 30 CFR Part 75, Subpart G (Trailing Cables).

### Conveyor (gathering head) motor circuit with control

The pump motor must be running before the conveyor (gathering head) motors will start. The conveyor motors are started by pressing and holding the “SHIFT” key on the remote and then pressing the “CONV ON” key. This completes the circuit across coil conveyor forward (CF) and will start both conveyor motors. To stop the conveyor motors, press the “CONV OFF” key. There are motor mates and thermistors on both motors that provide feedback to the control system on the operating state of the motors. In the event that an operating parameter exceeds a preset value, the operating system can shutdown the motors.

The schematic shown in Fig. 75 is a typical conveyor motor circuit. Always refer to the schematic in the Bucyrus parts book for your machine.

**Fig. 75: Conveyor (gathering head) motor circuit with control**



### Torque values

When installing bolts, refer to the torque values on the drawings in the Bucyrus America, Inc. part book for your machine. If a torque value is not listed, refer to Chapter 6 of this manual for standard torque values.

### Lubricants and fluid capacities

**Table 3: Lubricants and fluid capacities**

Location	Specification	Get capacities	
		Approximate capacity	Notes
Hydraulic oil tank	Spec. 100-1	72 gal (273 L)	
GH Assembly CLA Primary	Spec. 100-15	1 gal (3.79 L)	
GH Assembly CLA POT	Spec. 100-15	2.5 gal (9.46 L)	
Tram Drive Assembly	Spec. 100-15	3 gal (11.36 L)	
Input Cutter Head Gear Case	Spec. 100-15	3.7 gal (14.01 L)	
Reach Cutter Head Gear Case	Spec. 100-15	6 gal (22.71 L)	
Final Cutter Head Gear Case	Spec. 100-15	3.5 gal (13.25 L)	
Motor Lube Hoses	Spec. 100-14	Variable	1

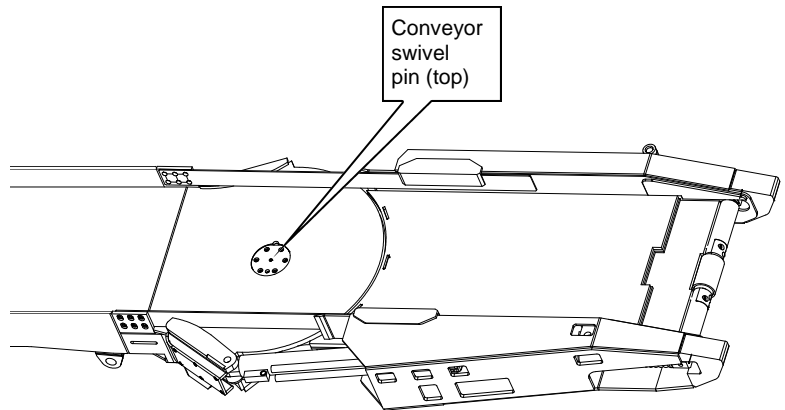
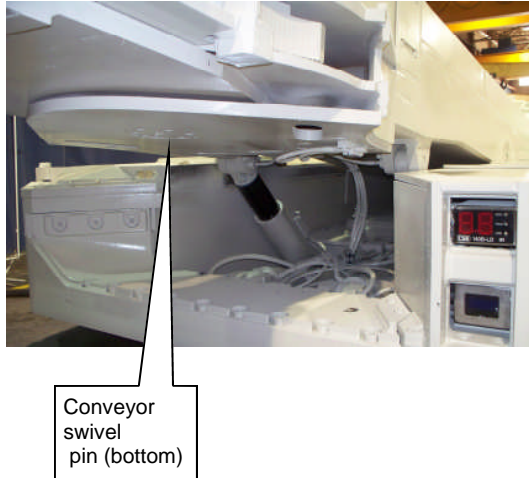
**Notes:**

1. All motor lube hoses are to be filled with high temperature electric motor grease (Spec. 100-14) before assembling them to the electric motor to ensure that there are no air gaps between the grease nipple and the point where the grease enters the motor.

**conveyor swing pivot pins  
(top and bottom)**

Lubricate the top and bottom conveyor swivel pin located on the pins (Fig. 90). Pump approximately 3 cu. in (50 cu. cm) of grease into each fitting.

**Fig. 90: Conveyor swivel pins**



**gathering head raise cylinder pins  
(left and right)**

Lubricate the gathering head raise cylinder pins (Fig. 91) through the grease fittings located on each end of the cylinder. Pump approximately 3 cu. in (50 cu. cm) of grease into each fitting.

**Fig. 91: Gathering head raise cylinder pins**

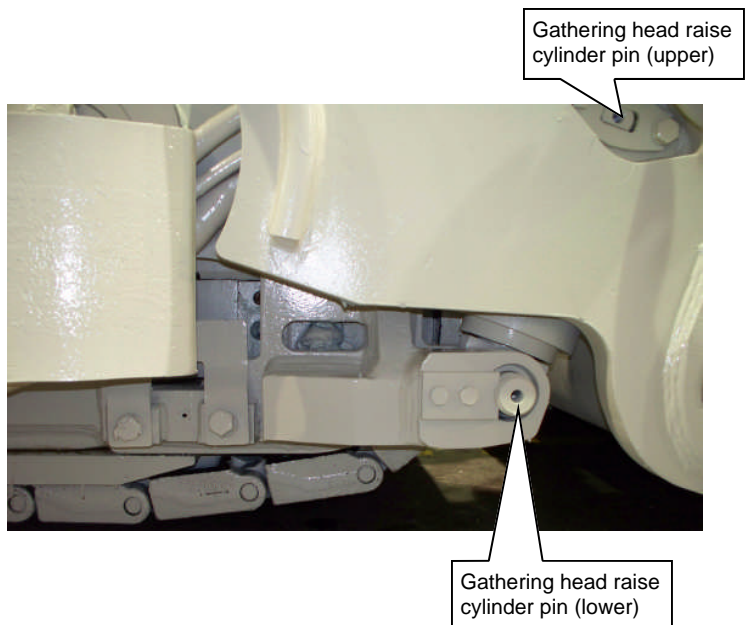
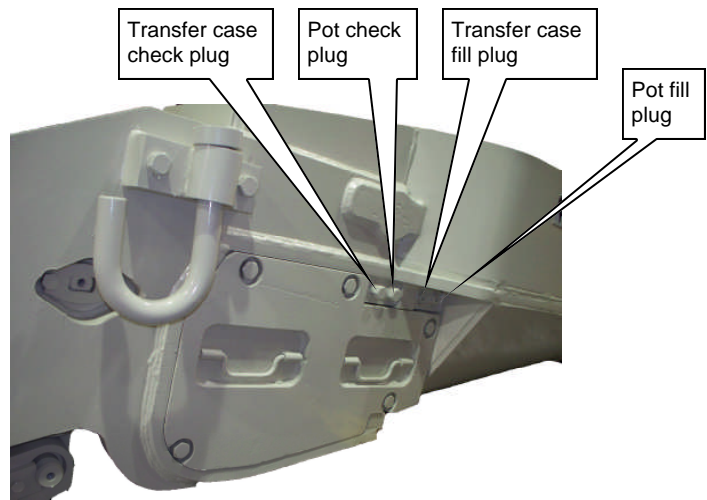


Fig. 103: CLA pot assembly and transfer case



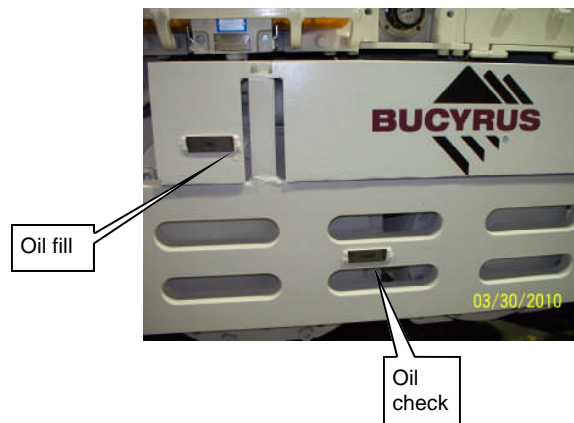
### Every six months

#### tram gear cases

Change the oil in both tram gear cases (Fig. 112).

- ☞ Remove the drain plug and allow oil to completely drain from the gear case.
- ☞ Clean and reinstall the drain plug.
- ☞ Remove the fill plug located on top of the gear case.
- ☞ Add oil through the fill plug hole until oil is visible in the sight glass. When filling, allow sufficient time for the oil to travel throughout the gear case.
- ☞ Clean and reinstall the fill plug.

**Fig. 112: Tram gear case**



- ☞ If the tram track is too loose, readjust the idler position using the following steps:
- Pump grease into the idler take-up jack to extend the cylinder, move the idler assembly forward and tighten the tram track until it is at the correct location. The tram track is at the proper tension when it hangs 2 1/2" to 3 1/2" from the bottom wear shoes when the tractor frame is blocked off the floor.
  - Insert shims (Fig. 119) into the idler slide channel until the space between the tractor frame and the pusher plate is filled.
  - Open the pressure release valve for the front idler take-up jack and allow the cylinder to contract. The idler adjustment shims will keep the idler stationary and the track tensioned.
  - Evaluate the resulting track tension and repeat these steps until the track reaches proper tension.

### CAUTION!

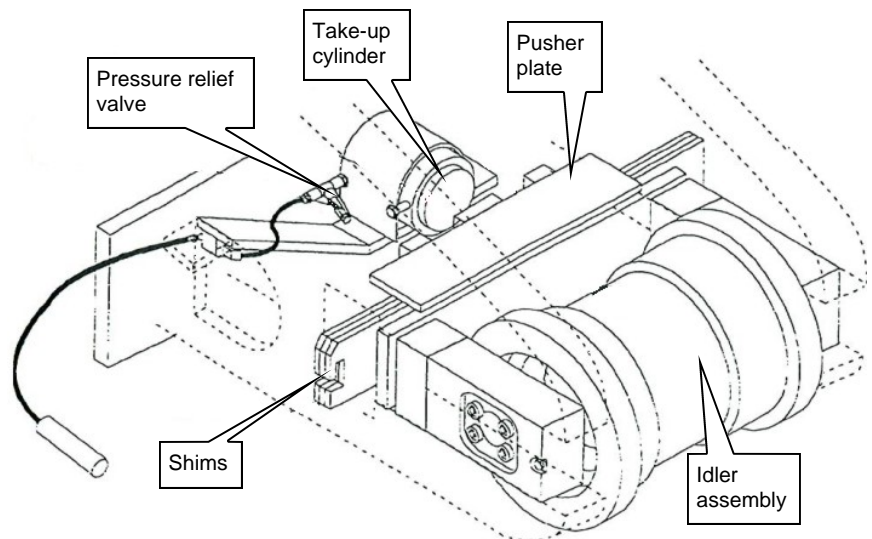
Shims must be inserted completely into the idler slide channel. A shim that is not correctly seated on the idler slide channel's inside surface provides uneven support that can cause idler slant. A slanted idler can cause uneven wear and stress on the tram track and can cause improper operation of or damage to the tram system.



### IMPORTANT!

Check that the shims are correctly seated on the idler slide channel's inside surface by looking at the channel's inside surface from the opposite side of the miner through the space between the gathering head and the idler assembly.

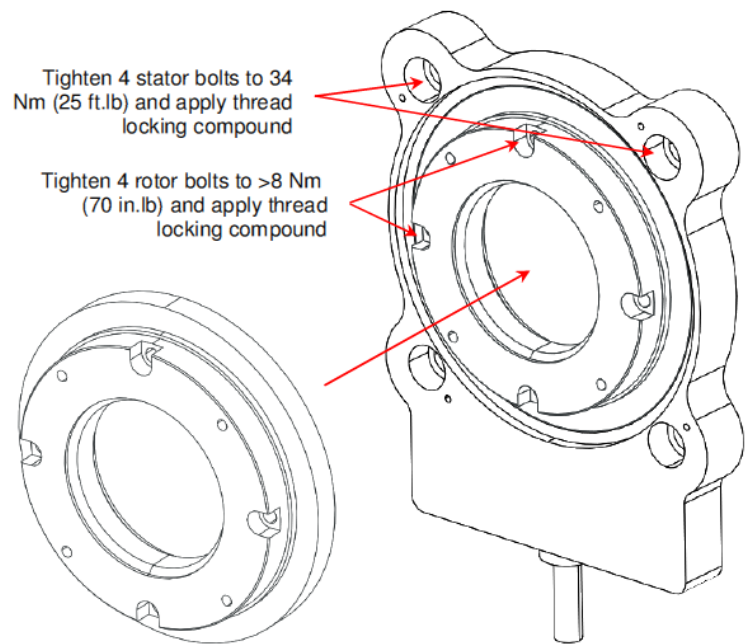
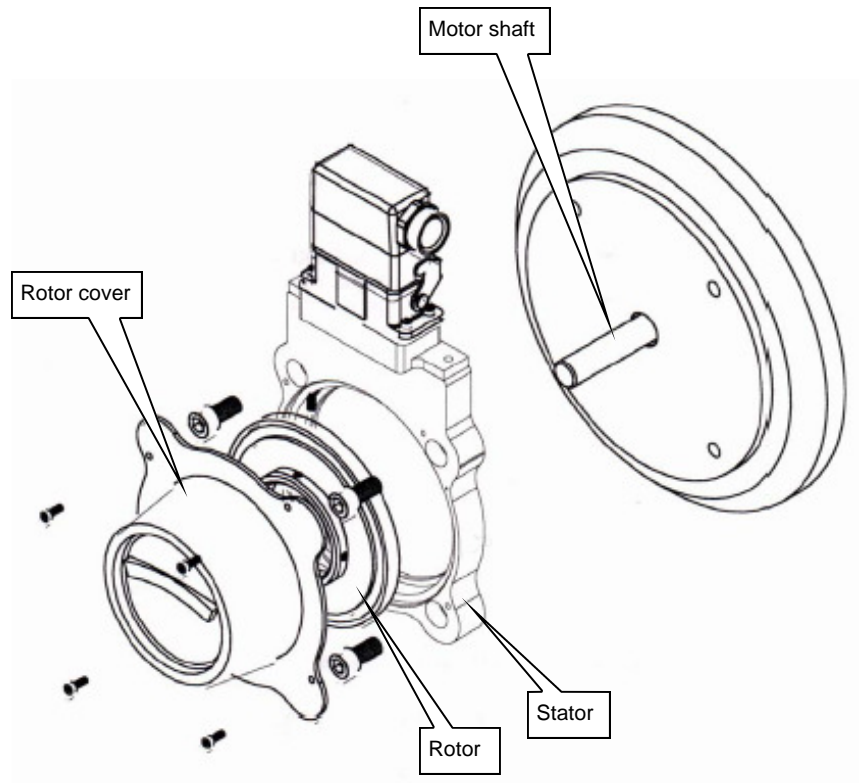
Fig. 119: Tram track adjustment



**Table 6, continued: AC traction adjustable parameters**

<b>Menu</b>	<b>Parameter</b>	<b>Description</b>	<b>Value</b>	<b>Change</b>	<b>Default</b>
Sump Settings, continued	MAX SUMP CUTTER CURRENT (A)	Determines maximum threshold for cutter current that determines if the machine is increasing or decreasing speed output	110 - 250A	1A	170
	MIN SUMP CUTTER CURRENT (A)	Determines minimum threshold for cutter current that determines if the machine is increasing or decreasing speed output	20 - 200A	1A	120
	STOP CURRENT (A)	Determines the threshold for cutter current at which the machine will halt until the current level drops below the Stop current value	250 - 400A	1A	350
	SHEAR UP STOP CURRENT (A)	Sets the threshold for cutter current that determines when to stop shear up control. When the current falls below this, shear up will restart	0 - 500A	1A	250
	SHEAR DOWN STOP CURRENT (A)	Sets the threshold for cutter current that determines when to stop shear down control. When the current falls below this, shear down will restart	0 - 500A	1A	250
	CUTTER IN COAL CURRENT (A)	Determines the point at which the machine will engage automatic sumping/traction control. Above this point, algorithm will activate	60 - 250A	1A	120
	FWD CLEAN UP SPEED (%)	Determines the forward speed that will be available when the cutters are running before the cutter in face current threshold has been reached	0 - 50%	1%	35
	HIGH SPEED PREVENT (YES/NO)	When set to YES, inhibits the maximum reverse speed to 2nd speed when cutters are running	YES/NO	N/A	NO
	REVERSE ANTI SLEW SPEED (%)	Determines the speed in the reverse direction when tramming in single track or pirouette when the system has determined that the machine is cutting in the face	20 - 70%	1%	35

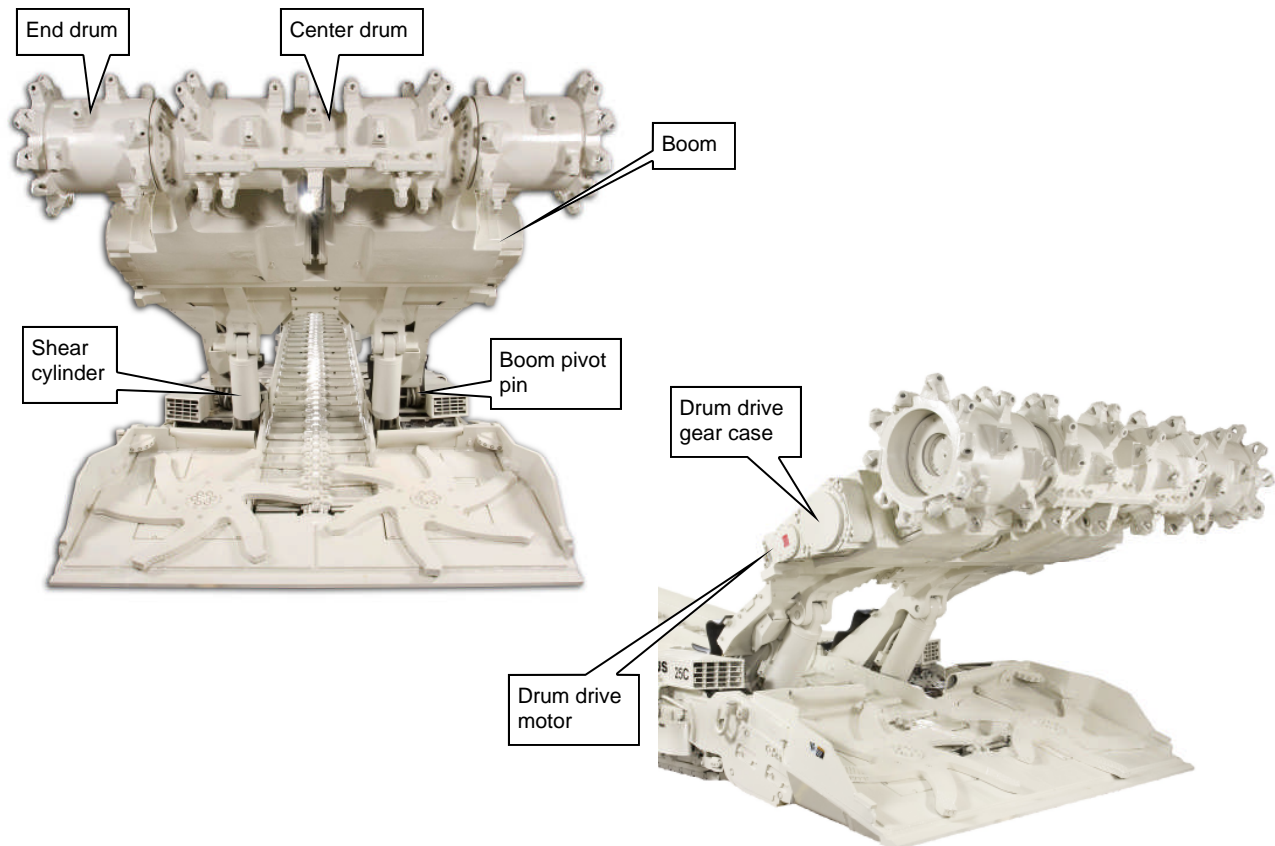
Fig. 129: Motor encoder



### Cutter head (boom) assembly

The cutter head assembly (Fig. 137) can be removed as an assembly or in individual components.

Fig. 137: Cutter head assembly



#### cutter head assembly removal

When removing the cutter head assembly, follow all Federal, State, and local safety regulations and observe the following:

#### **WARNING!**

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

#### **WARNING!**

**Follow all Federal and mine regulations for lockout/tagout. Failure to do so may result in serious injury or death.**

13. Slowly extend the shear cylinder so that the piston end is near the boom mounting clevis.
14. Disconnect the trailing cable to de-energize the miner. Follow all Federal and mine lockout/tagout regulations.
15. Position the shear cylinder's piston end bearing in the boom clevis.
16. Insert the pin through the aligned mounting clevis and bushing, ensuring that the retaining channel remains outside the bushing.
17. Insert the pin retaining plate in the pin's channel to secure the pin in the clevis.
18. Insert and tighten the hex head capscrews and lock washers to secure the pin retaining plate to the boom clevis.
19. Reconnect the trailing cable and cycle the shear cylinder to ensure correct operation.

### Drum drive motor

#### drum drive motor removal

When removing the drum drive motor, follow all Federal, State, and local safety regulations and observe the following:

**WARNING!**

**You could be seriously injured or killed by falling loads. Observe the safe working load limits of all blocking devices. Do not stand near the blocked cutter head.**

**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.**

**To remove the drum drive motor:**

1. Lower the gathering head until it touches the floor. Lower the conveyor tail assembly until it is level with the floor.
2. Level the cutter head assembly and place blocking underneath.
3. Disconnect the trailing cable to de-energize the miner. Follow all Federal and mine lockout/tagout regulations.
4. Remove the hex head capscrews and lockwashers that secure the junction box cover and remove the cover and O-ring.
5. Locate the three taped power connections. Tag the connections for reconnection and then strip off the three layers of tape covering these lug connections.



**IMPORTANT!**

**Before detaching the lugs, mark the wires to facilitate reconnection during motor installation.**

6. Tag the lugs for correct reconnection then remove the hex head capscrew, flat washer, lock washer and hex head nut that secure the three power cable lugs to the three motor lugs.
7. Remove the socket head capscrews and lockwashers that secure the stuffing box's half-moon clamp to the junction box.
8. Remove the clamp and slide the stuffing box out of the junction box. The power cable should be completely disconnected from the motor.

**WARNING!**

**While the power cable is detached from the motor, the trailing cable should not be reconnected to energize the miner. Damage to the miner, personal injury or death could result.**

### drum drive gear case installation

When installing the drum drive gear case, follow all Federal, State, and local safety regulations and observe the following:

**WARNING!**

**You could be seriously injured or killed by falling loads. Always observe the safe working load limits of blocking devices.**

**WARNING!**

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

To install the drum drive gear case:

1. Securely block the gear case so that the miner's boom can be trammed forward into position behind it.
2. Insert four guides into the cutter boom face, spacing the guides equally over the boom face.
3. Mark the holes on the exterior of the gear case mounting brace that corresponds to the positions of the guides on the boom face.
4. Connect the trailing cable to energize the miner.
5. Using the guide pins to direct placement, tram the miner forward until the gear case is positioned against the cutter boom face. The guide pins should come out of the marked holes in the mounting brace.

**WARNING!**

**Use extreme caution when tramping the miner forward to position the boom face against the gear case.**

6. Disconnect the trailing cable to de-energize the miner. Follow all Federal and mine lockout/tagout regulations.
7. Insert the hex head capscrews into the open holes (those not blocked by the guides) in the cutter drum drive gear case mounting brace.
8. Remove the alignment guides and insert the remaining four hex head capscrews through the gear case mounting brace and into the threaded holes in the cutter boom face.
9. Using the pattern shown in Fig. 152, torque the fourteen (14) capscrews in two steps as follows:

Step 1: 500 lb-ft (675 N-m)

Step 2: 2,138 ± 150 lb-ft (2,900 ± 200 N-m)

### gathering head drive motor installation

When installing the gathering head drive motor, follow all Federal, State, and local safety regulations and observe the following:

**WARNING!**

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

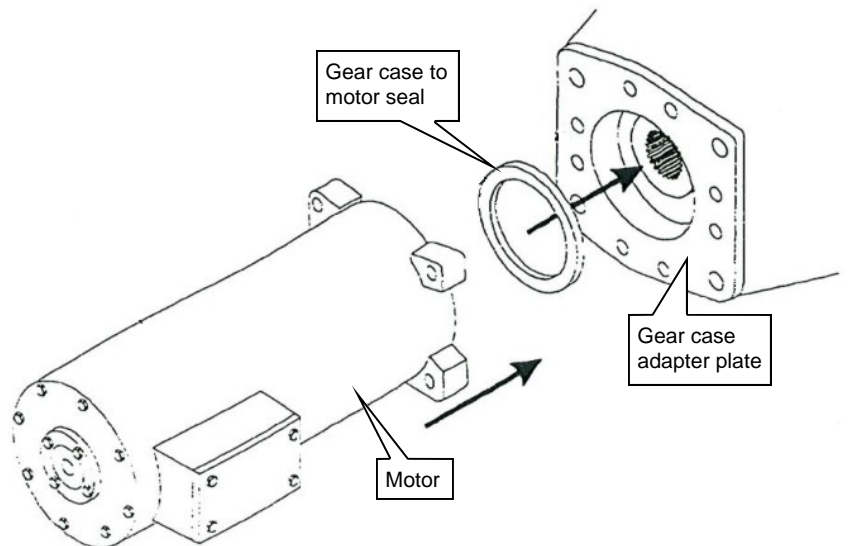
**WARNING!**

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

**To install the gathering head drive motor:**

1. Insert the gear case to motor seal between the adapter plate and the gear case (Fig. 158). When the motor is inserted, the seal should be located between the surfaces of the motor and the gear case.
2. Insert the gathering head motor through the slide cover opening, attachment bolt holes first. The junction box of the motor should be positioned toward the front of the gathering head.

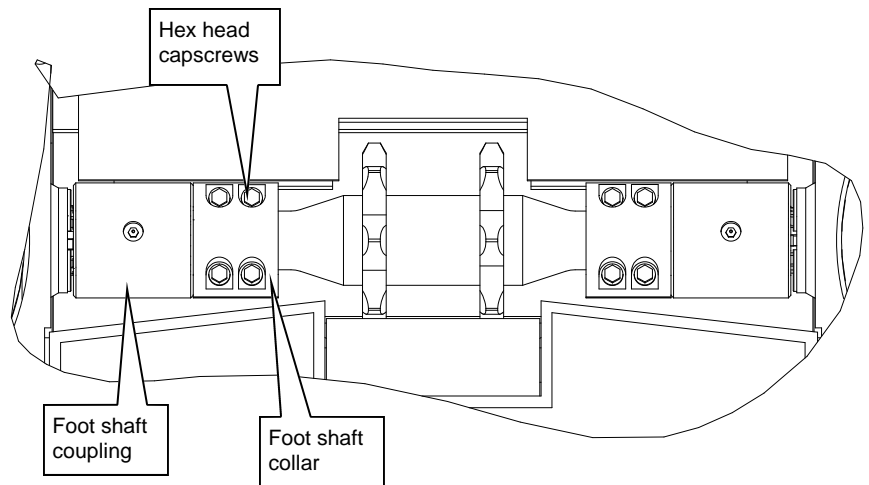
**Fig. 158: Gear case to motor seal installation**



3. Position the motor against the gear case adapter plate and align the four attachment bolt holes on the gear case side of the motor with the four holes on the corners of the adapter plate.
4. Apply Loctite 242 (blue) to the four socket head capscrews.
5. Insert and tighten the socket head capscrews to secure the motor to the gear case adapter plate.

11. Slide the foot shaft couplings from the ends of the foot shaft toward the sprocket in the center. Once the couplings have been moved, the foot shaft is disconnected from the gear case bevel pinions.
12. The foot shaft can now be removed from the gathering head.

**Fig. 164: Foot shaft removal**



### **gathering head foot shaft installation**

When installing the foot shaft, follow all Federal, State, and local safety regulations and observe the following:

#### **WARNING!**

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

#### **WARNING!**

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

**To install the gathering head foot shaft (Fig. 164):**

1. Slide a coupling onto each end of the foot shaft.
2. Insert the gathering head foot shaft into position between the two gathering head gear case bevel pinions.



#### **IMPORTANT!**

**Position the foot shaft so its sprocket will engage the conveyor chain links when the chain is reconnected.**

3. Align the foot shaft splines with the bevel pinions' splines.
4. Slide the right coupling over the foot shaft spline onto the bevel pinion splines until it touches the gear case seal carrier. Repeat with the left coupling.

13. Remove the cooling water fittings from the top left and right corners of the tram motor and store in a safe place.
14. Remove the hex head capscrews and disc lock washers that secure the tram motor bracket to the tram case.
15. Remove the socket head set screws that secure the tram motor bracket to the tram motor.
16. Remove the tram motor bracket from the tram motor.
17. Carefully slide the tram motor out from the tram case until the motor's electrical connection and junction box cover are accessible.
18. Remove the socket head capscrews and hi-collar lockwashers that secure the junction box cover to the motor housing.
19. Remove the junction box cover and its o-ring from the motor housing.
20. Remove the socket head capscrews and lock washers that secure the stuffing box's half moon clamp to the junction box.
21. Tag and disconnect the power cable lugs and the communication connections.
22. Remove the clamps and slide the stuffing box out of the junction box. The power cable and communication cable should be completely disconnected from the motor.

**WARNING!**

**Do not reconnect the trailing cable to the miner while the power cable is detached from the motor. Serious injury or death or damage to the machine may result.**

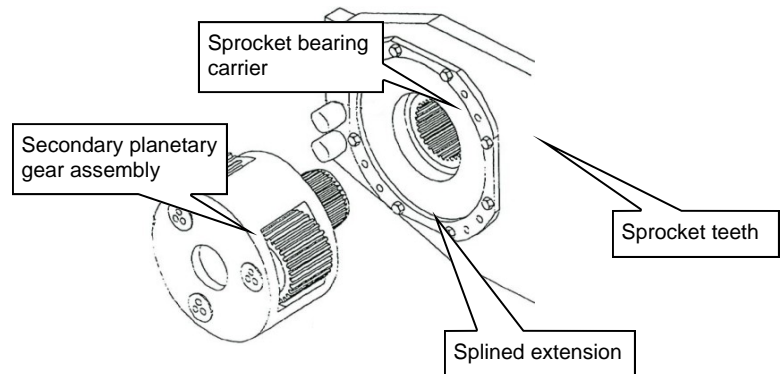
23. To prevent damage to the power cable lugs and gland assembly, cover the power cable and communication cable, and secure them to the miner in a safe location.
24. To protect the motor's electrical connections, replace the motor junction box cover and o-ring and secure using the socket head capscrews and hi-collar lock washers.
25. Carefully remove the tram motor from the tram case and slide onto blocking.

### secondary planetary gear removal

To install the tram secondary planetary gear:

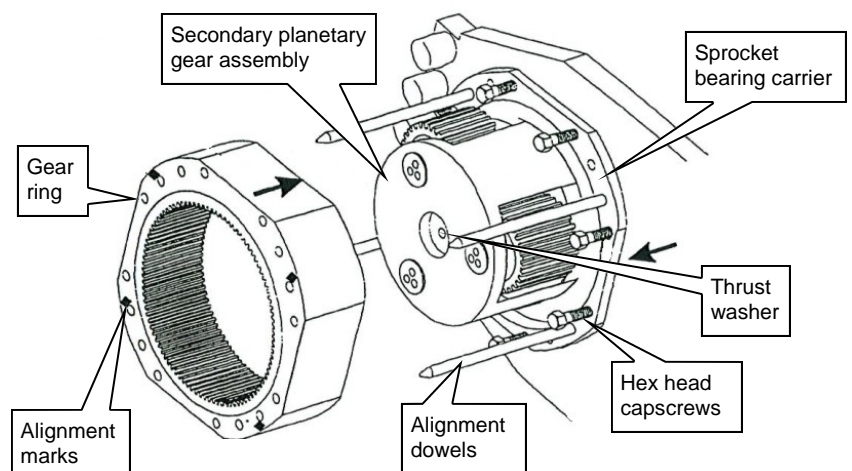
1. Carefully insert the secondary planetary gear assembly into the sprocket bearing carrier (Fig. 177), ensuring that the splined extension of the planetary carrier seats securely in the interior teeth of the sprocket.

**Fig. 177: Planetary carrier installation**

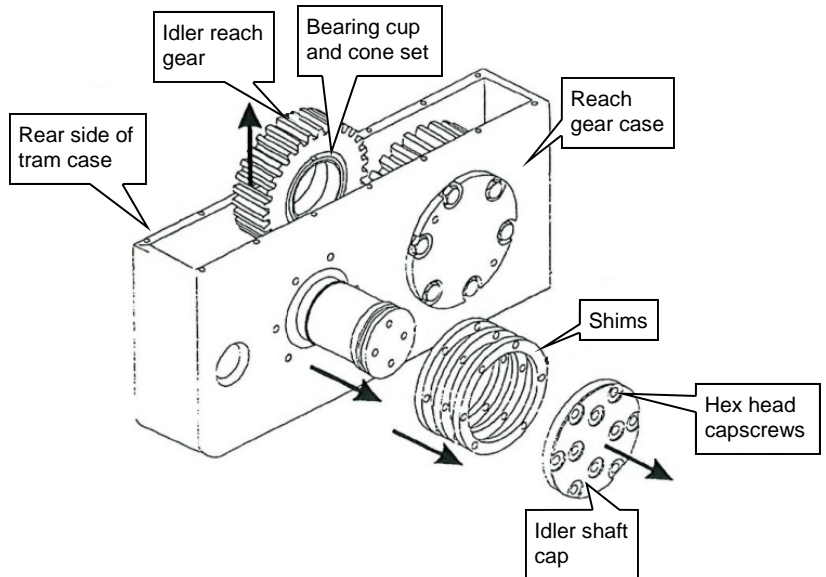


2. Slide the secondary tram drive shaft through the secondary planetary gear assembly and into the tram drive sprocket and reach gear set (the drive shaft end without the threaded hole should be inserted first). The shaft may require some adjustment so that the end fits into the reach gears.
3. Insert four alignment dowels into the holes in the sprocket bearing carrier not blocked by the eight hex head capscrews (Fig. 178).
4. To facilitate gear ring insertion, mark the mounting holes of the secondary planetary gear ring that corresponds to the holes in which the dowels were placed.
5. Remove the eight hex head capscrews that secure the sprocket bearing carrier to the tram.

**Fig. 178: Gear ring installation**

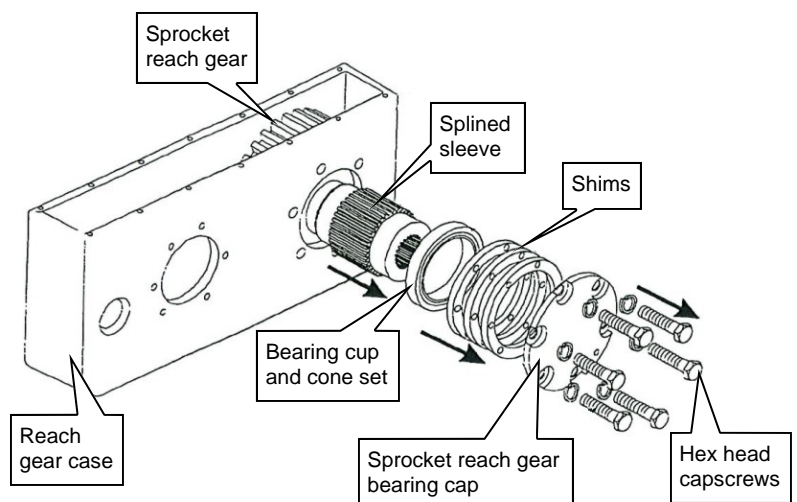


**Fig. 184: Idler reach gear and idler shaft removal**



25. Remove the hex head capscrews and lock washers that secure the sprocket reach gear bearing cap to the reach gear case (Fig. 185).
26. Remove the bearing cap and the three steel shims under the cap.
27. Remove the bearing cone and cup set from the end of the splined sleeve.
28. Carefully slide the splined sleeve out of the sprocket reach gear.
29. Remove the sprocket reach gear through the top opening of the reach gear case.
30. Remove the second splined sleeve bearing cone and cup set from the rear of the reach gear case, located behind the sprocket reach gear.

**Fig. 185: Sprocket reach gear removal**



5. Insert and tighten the three set screw into the bearing sleeve to secure the seal sleeve in the bearing sleeve.
6. Insert the bearing/seal sleeve assembly into position at the rear of the sprocket bay of the tram case.
7. Install the two Duo-Cone seals into the channel in each end of the sprocket. The rubber side of the seals should face into the sprocket channel; the metal rings of the Duo-Cone seals should face outward.
8. Insert the end of the sprocket into the seal sleeve so that it seats into the spherical bearing. Push the sprocket until the metal rings of the Duo-Cone seals are securely against each other.
9. Install the other spherical bearing into the remaining bearing sleeve.
10. Install the o-ring into the outside channel of the bearing sleeve.
11. Install a Duo-Cone seal into the remaining seal sleeve. The rubber side of the seal should face toward the sleeve; the metal ring of the seal should be facing outward.
12. Insert the seal sleeve into the bearing sleeve.
13. Insert and tighten the three set screws into the bearing sleeve to secure the seal sleeve in position.
14. Slide the bearing/seal sleeve assembly onto the end of the sprocket. Push the sleeve assembly until the end of the sprocket seats into the spherical bearing and the metal rings of the Duo-Cone seals are securely against each other.
15. Replace the bearing carrier over the bearing sleeve and end of the bearing sleeve and end of the sprocket.
16. Install the Secondary planetary gear assembly (see the Secondary planetary gear assembly removal and installation procedure in this chapter).
17. While feeding the tram track from the front of the miner (near the idler), pull on the tram track guide wires until a link of the tram track engages the sprocket.
18. Connect the trailing cable to energize the miner.

**WARNING!**

**Stand clear of the miner when using the motor to pull the tram track through the tram case.**

19. Use the tram motor to slowly rotate the sprocket and pull the tram track through the case until the end appears out the bottom.

### hydraulic pump installation

To install the hydraulic pump:

1. Slide the pump assembly into the pump motor (Fig. 205).
2. Insert and tighten, hex head capscrews and lockwashers to secure the pump assembly to the motor.
3. Insert the hydraulic hose fittings into the pump assembly and tighten.
4. Attach and tighten the exit pilot and valve hoses to the pump fittings.
5. Attach the inlet hose to the pump.
6. Replace the rub rail between the two adjacent rub rails and secure it with the two rub rail pins.
7. Check the hydraulic fluid level.
8. Jog pump motor on and off a few times to prime the pump before starting.

### Swivel pin assembly removal and installation

#### swivel pin assembly removal

When removing the swivel pin, follow all Federal, State, and mine safety regulations and observe the following:

**WARNING!**

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

**WARNING!**

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

To remove the swivel pin assembly (Fig. 209):

1. Lower the cutter head and gathering head assemblies until they touch the ground.
2. Position the conveyor tail section to the extreme right or left of the miner so that the chain is drawn to one side as far as possible and the conveyor swivel pin is exposed.
3. Lower the conveyor tail section until it is level with the floor.
4. Insert blocking between the conveyor tail section and the floor.
5. Disconnect the trailing cable to de-energize the miner. Follow all Federal and mine regulations for lockout/tagout.
6. Remove the socket head capscrews from the upper swivel pin.
7. Remove the center setscrew from the center of the upper conveyor swivel pin.
8. Use a slide hammer to remove the upper conveyor swivel pin.
9. Remove the center setscrew from the center of the lower conveyor swivel pin.
10. Remove the socket head capscrews from the lower conveyor swivel pin.
11. Use a slide hammer to remove the lower conveyor swivel pin.
12. Reach into the conveyor chain return channel and retrieve both upper and lower swivel pin retainers

**seal test** After the entire unit is reassembled, it may be a good practice to test the seals. A vacuum test is more sensitive than a pressure test and can be performed during a vacuum fill operation.

- ☞ Carefully fill the compartment to the correct fluid level.
- ☞ Slowly rotate the assembly several revolutions to seat the seals.
- ☞ A vacuum test will catch severe seal damage such as broken seal rings or cut torics that may be damaged in the last phases of assembly. The torics are not designed to seal air. Some leakage can be expected using such a procedure.

### Fig. 214: Installation issues

Toric sliding on retainer ramp.      Toric caught on housing retainer lip.

Toric sliding on seal ramp.

### installation process

With the lower half of the rubber toric seal still wet, use the installation tool to position the seal ring and the rubber toric squarely against the housing (Fig. 214). For smaller diameter seals, use sudden and even pressure to push the rubber toric under the retaining lip of the housing.

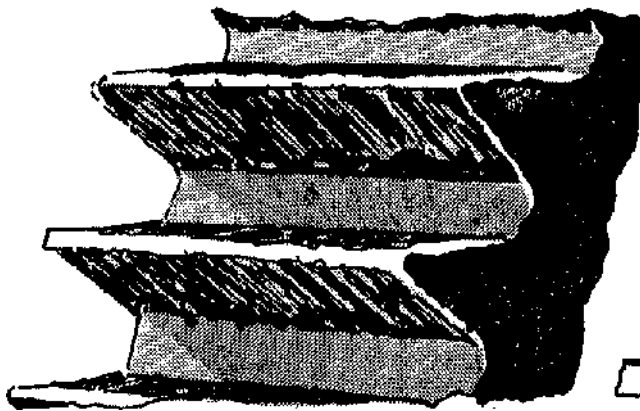
For larger diameter seals which will not press in with sudden and even pressure, it is acceptable to work the toric past the retaining lip by starting on one side and tapping the opposite side of the installation tool with a rubber mallet until it is engaged past the retaining lip of the housing.

Check the assembled height (height "A", Fig. 215) in at least four places, 90° apart, using a caliper, tool makers' rule or any other calibrated measuring device. The difference in height around the ring must not be more than 1mm. If small adjustments are necessary, do not push or pull directly on the seal ring. Use the installation tool to push down and your fingers to pull up uniformly on the rubber toric and seal ring.

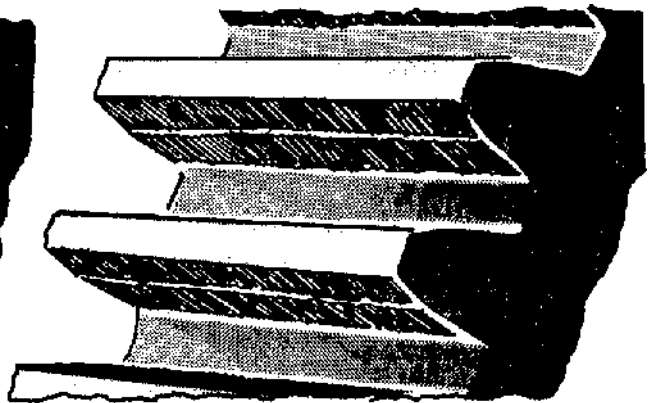
The rubber toric can twist if it is not wet all around during installation or if there are burrs or fins on the retaining lip of the housing. Twists, misalignment, and bulges of the toric will result in seal failure. If correct installation is not obvious, remove the seal from the housing and repeat the process.

The rubber torics must never slip on the ramps of either the seal ring or the housing. To prevent slippage, allow adequate evaporation time for the lubricant before proceeding with further assembly. Once correctly in place, the rubber toric must roll on the ramp only.

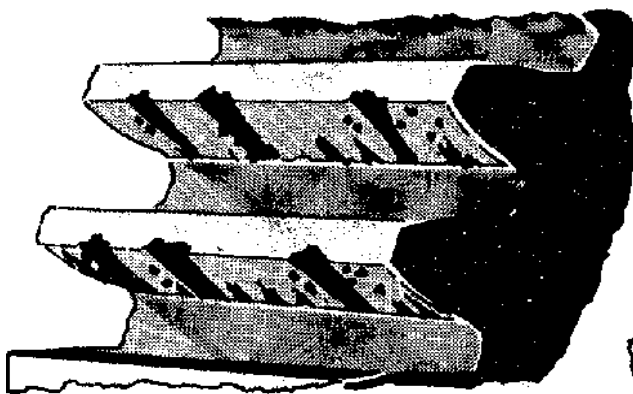
Fig. 219: Examples of worn gear teeth



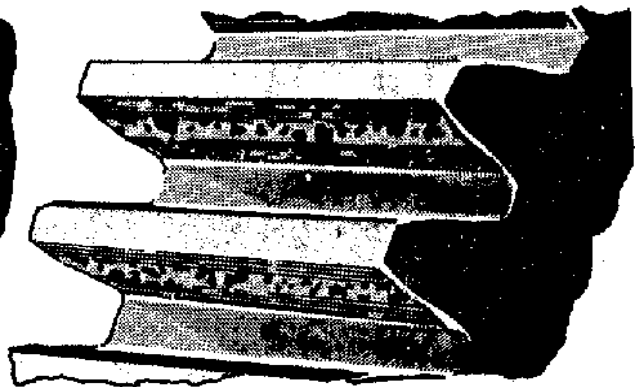
Shock loading



Improper type of lubricant



Bent or broken teeth



Contaminated lubricant

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### Conveyor lower

- ☞ Check the directional control valve for proper operation.
- ☞ Check to see that piping has not been crossed, especially if the problem occurs after maintenance or repair work.
- ☞ Verify that pilot pressure is being applied to open the piloted built-in checks.
- ☞ Verify that cylinders are not bypassing.

### Conveyor swing

- ☞ Check the directional control valve for proper operation.
- ☞ Check for any mechanical bind or any obstruction blocking movement, either to the cylinder itself, the main pivot area, or to some point along or under the discharge conveyor itself. Also check to ensure that the pivot bushings have not frozen up from lack of lubrication.
- ☞ Verify that the cylinder is not bypassing.

### Stabilizer raise

- ☞ Check the directional control valve for proper operation.
- ☞ Check to see that piping has not been crossed, especially if the problem occurs after maintenance or repair work.
- ☞ Check the lubrication network for bound bushings.
- ☞ Check for any mechanical bind or any obstruction blocking movement.
- ☞ Check cylinder for bypassing.

### Stabilizer lower

- ☞ Check the control valve for proper operation.
- ☞ Check to see that piping has not been crossed, especially if the problem occurs after maintenance or repair work.
- ☞ Check the lubrication network for bound bushings.
- ☞ Check for any mechanical bind or any obstruction blocking movement.
- ☞ Check cylinder for bypassing.

## Bearings

**Table 13: Bearing troubleshooting**

Trouble, symptom or cause	Probable cause	Test, check and/or remedy
<b>overheating bearing</b>	<ul style="list-style-type: none"> <li>☞ Wrong type of grease or oil.</li> <li>☞ Low oil level; loss of lubricant through seal; excessive grease.</li> <li>☞ Insufficient clearance in bearing.</li> <li>☞ Housing bore out of round; housing warped; excessive distortion of housing; undersized housing bore.</li> <li>☞ Shaft out of line.</li> </ul>	<ul style="list-style-type: none"> <li>☞ Consult the lubrication chart for the proper lubricant.</li> <li>☞ Oil level should normally be at the center of lowest ball or roller in bearing; check seals for signs of leaking.</li> <li>☞ Replacement bearing should be identical to original equipment to ensure proper internal clearance.</li> <li>☞ 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.</li> <li>☞ Correct alignment and be sure shafts are coupled in a straight line.</li> </ul>
<b>noisy bearing</b>	<ul style="list-style-type: none"> <li>☞ Insufficient clearance in bearing.</li> <li>☞ Foreign matter acting as abrasive.</li> <li>☞ Housing bore out of round; housing warped; excessive distortion of housing; undersized housing bore.</li> <li>☞ Shaft and other parts of bearing assembly distorted.</li> </ul>	<ul style="list-style-type: none"> <li>☞ Replacement bearing should be identical to original equipment to ensure proper internal clearance.</li> <li>☞ Clean bearing housing and replace worn seals.</li> <li>☞ 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.</li> <li>☞ Replace bearing, shaft and other parts as needed.</li> </ul>
<b>vibrating bearing</b>	<ul style="list-style-type: none"> <li>☞ Enlarged housing bore causing spinning of outer ring in housing.</li> <li>☞ Foreign matter acting as abrasive.</li> <li>☞ Unbalanced loading.</li> </ul>	<ul style="list-style-type: none"> <li>☞ Re-bore housing and press steel bushing in bore, then machine bore to correct size.</li> <li>☞ Clean bearing housing and replace worn seals.</li> <li>☞ Check balance of rotating parts and rebalance as needed.</li> </ul>
<b>unsatisfactory performance</b>	<ul style="list-style-type: none"> <li>☞ Chip in bearing housing; insufficient clearance in bearing; Ball or roller dented from extreme loading.</li> </ul>	<ul style="list-style-type: none"> <li>☞ Replace with OEM bearing; do not hammer on any part of bearing; clean housing and use fresh lube.</li> </ul>

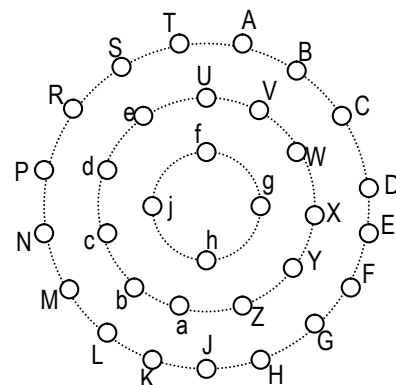
AC Traction System Interfacing Connectors and Cabling

Table 17: Inverter control connector (CN2)

Cable	Cable Marker	Pin	Description	Wire Marker	Color
15C + SHIELD	CONTROL	S	RTD RED (2 or 3 wire)	RTD1	BLK
		P	RTD WHITE (3 wire only)	RTD2A	WHT
		R	RTD WHITE (2 or 3 wire)	RTD2B	RED
		M	TSTAT+	TSTAT+	GRN
		N	TSTAT-	TSTAT-	ORG
		A	LOGIC COM (+24V)	24V	BLU
		B	MASTER ENABLE	ENABLE	WHT/BLK
		f	CAN ADDRESS LSB	CANLSB	RED/BLK
		g	CAN ADDRESS MSB	CANMSB	GRN/BLK
		C	MANUAL TRAM FWD	EFWD	ORG/BLK
		D	MANUAL TRAM REV	EREV	BLU/BLK
		T	SPARE	SPARE	BLK/WHT
		E	RELAY NO	RLYNO	RED/WHT
		Y	RELAY NC	RLYNC	GRN/WHT
		L	RELAY COM	RLYCOM	BLU/WHT
6C + SHIELD	ENCODER	Z	ENCODER SUPPLY+	ENCV+	BLK
		G	ENCODER A	ENCA	WHT
		H	ENCODER A\	ENCA\	RED
		J	ENCODER B	ENCB	GRN
		K	ENCODER B\	ENCB\	ORG
		A	ENCODER SUPPLY-	ENCV-	BLU
		F	ENCODER SHIELD	SHD	SHIELD
3C + SHIELD	AUXREF	U	TRAM REF SUPPLY (+5V)	5V	BLK
		V	MANUAL TRAM REF	REF	WHT
		W	ANALOG COMMON	0V	RED
		X	ANALOG SHIELD	SHD	SHIELD

Fig. 222: Inverter control connector (CN2)

NOTE: Colors indicated follow primary/secondary where the secondary color is a stripe.



**Table 21, continued: Solenoid fault and warning codes**

Alarm Code	Description	Device Action	System Error (if detected when pump off)		System Fault (if detected when pump on / traction idle)		System Fault (if detected when pump on / traction active)		Possible Cause	Possible Solution
			Message	Control System Reaction	Message	Control System Reaction	Message	Control System Reaction		
10	Under Temperature Fault	Re-settable Fault	Solenoid Under Temp Fault	None	Solenoid Under Temp Fault	Inhibit valve	Solenoid Under Temp Fault	Inhibit valve	<ol style="list-style-type: none"> <li>1. temperature below -40° C (-40° F).</li> <li>2. Solenoid board temperature circuit faulty.</li> </ol>	<ol style="list-style-type: none"> <li>1. Cycle power to device.</li> <li>2. Assure slice is not operating at temperature.</li> <li>3. Replace electronics.</li> </ol>
11	Over Temperature Fault	Re-settable Fault	Solenoid Over Temp Fault	None	Solenoid Over Temp Fault	Inhibit valve	Solenoid Over Temp Fault	Inhibit valve	<ol style="list-style-type: none"> <li>1. Temperature voltage above 85° C (185° F).</li> <li>2. Solenoid board temperature circuit faulty.</li> </ol>	<ol style="list-style-type: none"> <li>1. Cycle power to device.</li> <li>2. Assure slice is not operating at temperature.</li> <li>3. Replace electronics.</li> </ol>
12	Communication Timeout	Re-settable Fault	Solenoid Communications Timeout	None	Solenoid Communications Timeout	Inhibit valve	Solenoid Communications Timeout	Inhibit Pump then Inhibit Valve only	<ol style="list-style-type: none"> <li>1. No command received 250ms while active.</li> <li>2. CAN bus connection broken.</li> <li>3. CAN bus fault other than solenoid.</li> </ol>	<ol style="list-style-type: none"> <li>1. Cycle power to device.</li> <li>2. Check CAN connection to device.</li> <li>3. Check display for network layout.</li> </ol>

**Table 27: Extreme pressure motor bearing grease (Spec. 100-3)**

	<b>Supplier</b>	<b>Brand name</b>
1	Amoco Oil Company	Amolith Grease 2 EP Rykon Premium Grease 2 EP
2	Gulf Oil	Gulfcrown grease EP#2
3	Mobil Oil Corporation	Mobilux EP-2
4	Chevron U.S.A.	Chevron Dura-Lith Grease EP-2 NLGI 2
5	Sun Oil Company	Sun Prestige 742EP
6	Unocal 76	Multiplex EP2
7	Shell Oil Company	Alvania EP-2
8	Century Lubricating Oils, Inc.	Hullith EP2 Multipurpose Grease or Replex2 or Uniwrl 2 or Uniwrl EMB or Hullith GP 2 or Hullith EP 2
9	Texaco Lubricants Company	Texaco Multifak EP 2
10	Exxon	Lidok EP 2
11	Pennzoil	Pennlith EP 712 Grease
12	Lubricating Engineers	3752 Almagard Vari-Purpose Lubri- cant
13	Conoco Inc.	EP Conolith grease No. 2 or Super Sta Grease No. 2
14	Hydrotex	LC-65 Hyplex
15	Phillips	Philube EP Grease
16	Atlantic Richfield	Litholine H EP-2 Grease

**Table 28: Semi-fluid grease (Spec. 100-4)**

	<b>Supplier</b>	<b>Brand name</b>
1	Texaco Lubricants Company	Novatex EP 000
2	Century Oils Limited	Joy Loader Semi-Fluid grease
3	Hydrotex	MPD-60 Ultra E.P. 000
4	Pennzoil	Semi-Fluid 760 Grease
5	Unocal	MM Grease
6	Exxon	Lidok E.P. 000

# Forced Potato

Super Impson Remote Control  
System

(Bucvrus 25M Miner Version)



Operator's Manual

Issue: SY0101.B



### **“Receiver”**

(Integrated radio control  
receiver and machine  
control unit)

Part No. 377873



### **“Standard Power Supply**

(no battery backup)

No. 295



### **“Battery Backup Power Supply”**

(automatic battery backup)

Part No. 295275





## Cleaning the Remote Control Console (TITO)

The TITO remote console is designed for long term use in harsh underground mining environments. As such, the unit is totally self contained and requires very little routine maintenance. To extend the life of the control switches and ensure that switches remain free of mud and debris, regular cleaning of the switch plate is recommended.

Typically the cleaning procedure should be observed once every 2 weeks or as often as required.

### Step (1) Disassembly

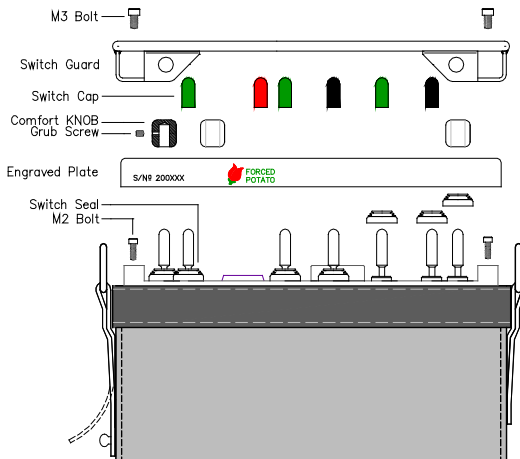
Remove the M3 bolts.

Remove the switch guard.

Remove the switch caps.

Remove the comfort knobs by loosening the grub screw.

Remove the engraved plate.





## Remote Console Stabilizer Jack Raise/Lower

Remote control of the stabilizer jack requires that the pump motor be running.

to lift the stabilizer jack.

The stabilizer jack solenoid will remain energized until the key is released.

to lower the stabilizer jack.

The down solenoid for the stabilizer remains on until the key is released.

STAB DWN  
[LIGHTS]



[BYPASS]  
STAB-UP



## (11) Automatic and Special Features

Super Simpson (Bucyrus 25M Miner Version) is fitted with a number of special and automatic functions. These special features either improve machine productivity or provide for compliance with special safety or statutory requirements.



**The control system provides for user configuration of different functions. It is important that operators are aware of which features are setup on the machine that they are using. Please contact mine management for more details as to the exact configuration of the machine you are using.**

### Automatic Scrubber Fan Control

When enabled (See [Automatic Scrubber Fan Control](#)), the automatic scrubber fan option turns on the scrubber fan 3 seconds after the start of the cutter motors and turns the fan off 10 seconds after the cutters have been shut

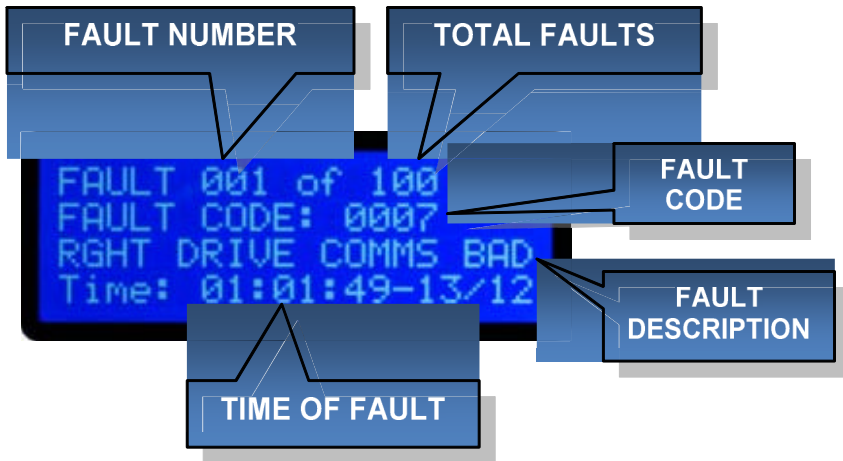
Even if the automatic scrubber fan is enabled, the operator may still start and stop the fan at any time using the remote control console.



## Main Menu Option 2 Fault Log



og allows the user to review the last 100 faults that have occurred since the log was last cleared.



number of fault in order of occurrence most recent (001) to oldest (100).

This is the total number of faults currently listed in the

Specific Code that identifies the fault displayed. Fault codes 0 to 199 are error codes; fault codes 200 and above are detected faults.

### FAULT DESCRIPTION

A brief description of the fault.

This is the time the fault occurred. It is expressed as Hour : Minute : Second



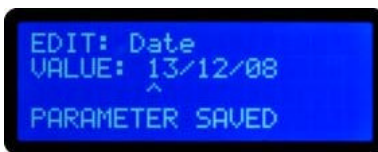
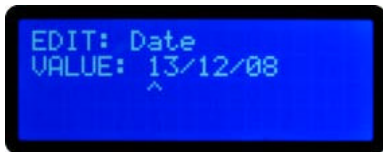
## Tradesman Option 4



The control system features a real time clock that keeps track of the time of day and the date, even when power is removed from the receiver control unit.

review/change

DATE SETUP screen. use the keys to move to the portion of the date that you wish to



the cursor is beneath the parameter you wish to change may modify the value by using the keys on the remote console.

Note that international date format is used by the control system:

**DAY / MONTH /**

For example, the date

Once the correct date is entered, press to the system menu and save the date



Allows the user to specify if the Auxiliary Output #1 is to operate in a "Latching" or "Non Latching" fashion. If this option is  , the Auxiliary Output #1 will remain on after keys are released and the output can be switched off by re asserting the




**Pump Lock Aux 2** This parameter allows the user to specify if the pump must be running in order for the Auxiliary Output # to be available. If  , the operator must first start the pump motor before the Auxiliary Output #

Allows the user to specify if the Auxiliary Output #1 is to operate in a "Latching" or "Non Latching" fashion. If this option is  , the Auxiliary Output # will remain on after keys are released and the output can be switched off by re asserting the



	<p><b>Checks to Carv Out</b></p> <p>Check all modules are properly connected to the daisy chain cable</p> <p>Check that there are no short circuits of the CAN bus wiring</p> <p>Replace the Traction Drive.</p>
<b>Fault Number</b>	<b>Fault Name</b>
	<b>RIGHT DRIVE WRONG</b>
	<b>Explanation</b>
	drive is reporting a revision of software that is not compatible with this system.
	<b>Possible Causes</b>
	Drive has incorrect revision of software
	Internal Drive failure.
	<b>Checks to Carv Out</b>
<b>Fault Number</b>	<b>Fault Name</b>
	<b>DRIVE INIT FAILURE</b>
	<b>Explanation</b>
	There was either an internal failure or a communications failure of the Right Traction Motor Drive.
	<b>Possible Causes</b>
	Internal Drive Failure.
	<b>Checks to Carv Out</b>
	Cycle 110VAC control power to and allow it to reboot.
	Replace drive is problem is persistent.



Fault Number	Fault Name
	<p data-bbox="410 266 833 321"><b>LEFT GATHERING HEAD MOTORMATE FAIL IIRF PHASE R</b></p> <p data-bbox="410 329 592 362"><b>Explanation</b></p> <p data-bbox="410 367 879 423">from motor mate is not healthy (healthy is between 4 mA and 20 mA)</p> <p data-bbox="410 431 663 464"><b>Possible Causes</b></p> <p data-bbox="410 469 913 586">24VDC supply to the motor mate One or more signal lines have gone open  signal lines have been</p> <p data-bbox="410 618 902 708">Motor Mate is faulty Super Simpson is faulty (interface to the Motor Mate)</p> <p data-bbox="410 716 707 748"><b>Checks to Carry Out</b></p> <p data-bbox="410 753 902 927">1. Check 24 VDC supply wiring is OK (+24 VDC line is provided by output pin X4 2. Check that each signal line is not open or short circuit 3. Replace the Motor Mate 4. Replace the Super Simpson</p>
Fault Number	Fault Name
	<p data-bbox="410 974 833 1029"><b>LEFT GATHERING HEAD MOTORMATE FAIL IIRF PHASE C</b></p> <p data-bbox="410 1037 592 1070"><b>Explanation</b></p> <p data-bbox="410 1075 879 1131">from motor mate is not healthy (healthy is between 4 mA and 20 mA)</p> <p data-bbox="410 1140 663 1172"><b>Possible Causes</b></p> <p data-bbox="410 1177 913 1294">24VDC supply to the motor mate One or more signal lines have gone open  signal lines have been</p> <p data-bbox="410 1326 902 1416">Motor Mate is faulty is faulty (interface to the Motor Mate)</p>



<b>Fault Number</b>	<b>Fault Name</b>
	<b>PUMP MOTOR OVER TEMPERATURE</b>
	<b>Explanation</b>
	Motor thermistor is reading over allowed operating temperature.
	<b>Possible Causes</b>
	Motor is damaged. Motor Thermistor is faulty. Thermistor module is faulty
	<b>Checks to Carry Out</b>
	1. Check thermistor circuit resistance and verify that thermistor module is correctly reporting that value. 2. Check if thermistor reading is rapidly fluctuating, if so thermistor is damaged or there is noise in the circuit. Thermistor module.
<b>Fault Number</b>	<b>Fault Name</b>
	<b>LEFT CUTTER THERMAL</b>
	<b>Explanation</b>
	The motor has been operator at a current level above the recommended FI A
	<b>Possible Causes</b>
	The motor is faulty. Motor Mate is Faulty. Simpson is Faulty.
	<b>Checks to Carry Out</b>
	1. Verify actual operating current Check that motor mate is reporting actual operating current. 3. Replace pump motor, motor mate, or super simpson.
<b>Fault Number</b>	<b>Fault Name</b>
	<b>LEFT CUTTER MOTOR OVER TEMPERATURE</b>



<b>Fault Number</b>	<b>Fault Name</b>
	<b>METHANE MONITOR</b>
	<b>Explanation</b>
	The MMR has been detected as open
	<b>Possible Causes</b>
	Methane Gas Level is above trip percentage. MMR is faulty. Digital Input on receiver is faulty
	<b>Checks to Carry Out</b>
	Check methane gas level and verify sensor is correctly reporting. Replace MMR. 3. Replace Super Simpson.
<b>Fault Number</b>	<b>Fault Name</b>
	<b>MMR Status Wire Broken</b>
	<b>Explanation</b>
	MMR input is detected as open but other digital inputs are still reporting 110VAC
	<b>Possible Causes</b>
	D wire is broken. Digital Input is faulty
	<b>Checks to Carry Out</b>
	D wire and voltage reading. Replace Super Simpson
<b>Fault Number</b>	<b>Fault Name</b>
	<b>RIGHT SIDE E</b>
	<b>Explanation</b>
	Stop detected as pressed but other digital inputs still reporting 110VAC levels.
	<b>Possible Causes</b>
	Stop switch is faulty.



	<b>Possible Causes</b>
	PT100 wiring has been short circuited Thermistor Module Failure (L0LH09)
	<b>Checks to Carry Out</b>
	1. Check motor. Check condition of wiring to RTD circuit
	3. Replace Thermistor Module (L0LH09)



<b>Fault Number</b>	<b>Fault Name</b>
	<b>RIGHT TRAM MOTORMATE FAILURE PHASE(C)</b>
	<b>Explanation</b>
	from motor mate is not healthv (healthy is between 4 mA and 20 mA)
	<b>Possible Causes</b>
	24VDC supply to the motor mate more signal lines have gone open  signal lines have been  Motor Mate is faulty Super Simpson is faulty (interface to the Motor Mate)
	<b>Checks to Carv Out</b>
	1. Check 24 VDC supply wiring is OK (+24 VDC line is provided by output pin X4 2. Check that each signal line is not open or short circuit 3. Replace the Motor Mate 4. Replace the Super Simpson
<b>Fault Number</b>	<b>Fault Name</b>
	<b>EXTERNAL PUMP OVERLOAD</b>
	<b>Explanation</b>
	Pump circuit overload relay detected as
	<b>Possible Causes</b>
	Pump motor current is too high relay is faulty digital input failure
	<b>Checks to Carv Out</b>
	motor current. replace motor relay contact, replace relay 110VAC signal to receiver, replace receiver.



	<b>Checks to Carry Out</b>
	1. Check Coolant flow and level. 2. Check proper installation of drive.



<b>Fault Number</b>	<b>Fault Name</b>
	<b>RH VFD ENCODERELESS</b>
	<b>Explanation</b>
	<b>Possible Causes</b>
	<b>Checks to Carv Out</b>
	Replace rectifier

<b>Fault Number</b>	<b>Fault Name</b>
	<b>GROUND FAULT STATUS OPEN</b>
	<b>Explanation</b>
	The Ground Fault Relay has been detected as open.
	<b>Possible Causes</b>
	1. Ground Fault Relay auxillary contact is
	2. wire is broken
	3. digital input failure
	<b>Checks to Carv Out</b>
	1. Verify 110VAC input to receiver from
	2 Replace Super Simpson

<b>Fault Number</b>	<b>Fault Name</b>
	<b>LEFT RMS INTERNAL COMMS</b>
	<b>Explanation</b>
	RMS drive is reporting an internal CAN communications loss
	<b>Possible Causes</b>
	<b>Checks to Carv Out</b>

<b>Fault Number</b>	<b>Fault Name</b>
	<b>RIGHT RMS INTERNAL COMMS</b>



	3. Replace Super Simpson
<b>Fault Number</b>	<b>Fault Name</b>
	<b>SOLENOID SHORT</b>
	<b>Explanation</b>
	A solenoid has been detected as Short
	<b>Possible Causes</b>
	wiring has been short circuited, solenoid coil is damaged Solenoid board failure
	<b>Checks to Carv Out</b>
	system solenoid test Replace solenoid 3. Replace Super Simpson
<b>Fault Number</b>	<b>Fault Name</b>
	<b>SOLENOID OVER CURRENT</b>
	<b>Explanation</b>
	A solenoid has been detected as drawing too much current
	<b>Possible Causes</b>
	wiring has been short circuited, solenoid coil is damaged Solenoid board failure
	<b>Checks to Carv Out</b>
	1. Run system solenoid test Replace solenoid 3. Replace Super Simpson



	Replaced the receiver.
--	------------------------



	AC power conductor is broken Failure of the traction power transformer traction drive is faulty
	<b>Checks to Carv Out</b>
	Verify AC power to drive. Replace drive
<b>Fault Number</b>	<b>Fault Name</b>
	<b>RIGHT TRACTION DRIVE PHASE</b>
	<b>Explanation</b>
	While the right traction drive was running, a significant difference in the incoming AC phase currents was detected. Normally all three phase currents for a motor s approximately equal. The traction was
	<b>Possible Causes</b>
	Motor power conductor is broke Failure of the traction power transformer traction drive is faulty
	<b>Checks to Carv Out</b>
	Verify all three phases going into the
	2. Replace the drive.



Fault Number	Fault Name
	<p data-bbox="498 266 847 293" style="text-align: center;"><b>LOW HYDRAULIC OIL TRIP</b></p> <p data-bbox="408 298 592 326"><b>Explanation</b></p> <p data-bbox="408 337 888 451">While the pump was running the low oil switch was detected as continuous 5 MINUTE period. The pump motor was shutdown.</p> <p data-bbox="408 461 663 488"><b>Possible Causes</b></p> <p data-bbox="408 500 908 675">Low hydraulic oil level Low oil switch (or the IS switch relay) is faulty or disconnected Signal wire from the switch relay to pin X3 JJ on the receiver is broken Receiver is faulty</p> <p data-bbox="408 685 709 712"><b>Checks to Carry Out</b></p> <p data-bbox="408 724 904 865">1. Check switch     Check that there is 120VAC ACTIVE to JJ when switch is closed. 3. Replace the switch 4. Replace the Super Simpson</p>
Fault Number	Fault Name
	<p data-bbox="408 912 908 967" style="text-align: center;"><b>NO VOLTAGE AT INTERNAL CUTTER RELAY OUTPUT</b></p> <p data-bbox="408 979 592 1006"><b>Explanation</b></p> <p data-bbox="408 1018 896 1159">When the internal left cutter relay was on (Relay Output X1 L) there should have been voltage at the output of the relay X1 . but no voltage was detected. motors were shutdown</p> <p data-bbox="408 1169 663 1196"><b>Possible Causes</b></p> <p data-bbox="408 1208 877 1414">Input voltage (120VAC ACTIVE) for the relay was not provided to input pin X1  There is no 120VAC NEUTRAL connection of the receiver The internal left cutter run relay (X1 Output) is faulty. Receiver needs to be</p>



<b>Fault Number</b>	<b>Fault Name</b>
	<b>RIGHT CUTTER PHASE LOSS</b>
	<b>Explanation</b>
	While the right cutter was running, at least one of the phase currents went to Amperes for unknown reasons. possible that the motor lead is not connected from the motor. It is also possible that the motor itself has internal failure. The cutter motors were
	<b>Possible Causes</b>
	Motor power conductor is broken Serious motor failure Cutter Motor Mate is faulty Receiver is faulty (inputs from motor mate)
	<b>Checks to Carry Out</b>
	1. Check proper functionality of cutter  2. Verify motor mate feedback against hand held meter. Replace motor mate. 4. Replace Super Simpson
<b>Fault Number</b>	<b>Fault Name</b>
	<b>RIGHT CUTTER MOTOR</b>
	<b>Explanation</b>
	While the cutter motors were running a significant difference in the right phase currents was detected. Normally all three phase currents for a motor should be approximately equal. The cutter motors were shutdown.
	<b>Possible Causes</b>
	Motor power conductor is broken Serious motor failure Cutter Motor Mate is faulty Receiver is faulty (inputs from motor mate)



	<b>Checks to Carv Out</b> 1. Check proper functionality of motor. 2. Verify motor mate feedback against hand held meter. Replace motor mate. 4. Replace Super Simpson
<b>Fault Number</b>	<b>Fault Name</b>
	<b>LEFT CONVEYOR MOTOR OVER TEMPERATURE</b>
	<b>Explanation</b> The temperature of the motor windings in motor is over the safe temperature eshold. Conveyors are shutdown. fault is only available if a thermistor module is installed in the svstem
	<b>Possible Causes</b> Cooling system of the motor is impeded by debris or other factors, preventing  Internal failure of the motor is causing the become unusually hot ure of thermistor in motor or in the wiring from the thermistor to the system thermistor module Thermistor module is faulty
	<b>Checks to Carv Out</b> Check proper functionality of motor. Verify thermistor feedback resistance hand held meter. Replace Thermistor Module



<b>FAN MOTOR THERMAL</b>	
	<b>Explanation</b>
	motor current was too high for too long a period. This can cause overheating and damage to the motor. The motor was shutdown and is prevented from several minutes to prevent motor damage.
	<b>Possible Causes</b>
	causing overloading of Failure of gearbox that is overloading or jamming the motor shaft serious failure of the
	<b>Checks to Carry Out</b>
	1. Check proper functionality of motor. 2. Verify motor mate feedback against hand held meter. Replace motor mate. 4. Replace Super Simpson



	message to the receiver for more than a
	<b>Possible Causes</b>
	The sensor has suffered an internal failure A communication wire has broken between the sensor and the receiver The sensor has lost power receiver has failed
	<b>Checks to Carry Out</b>
	1. Verify sensor is not reporting an internal  2. Check communications twisted pair to methane sensor Check that sensor has power. 4. Replace Super Simpson



	<b>LOW HYDRAULIC OIL LEVEL</b>
	<b>Explanation</b>
	The hydraulic oil level is low.
	<b>Possible Causes</b>
	Low hydraulic oil level Oil level switch failure
	The receiver has failed
	<b>Checks to Carry Out</b>
Check oil level Check 120VAC to X3 3. Replace Super Simpson	
<b>Fault Number</b>	<b>Fault Name</b>
	<b>LEFT CONVEYOR TORQUE SHAFT OVERLOAD</b>
	<b>Explanation</b>
	conveyor motor torque shaft has
	<b>Possible Causes</b>
	The torque shaft has broken There is no load on the motor There is a serious failure on the motor The motor gearbox has failed
	<b>Checks to Carry Out</b>
	1. Check motor. Compare left and right motor readings. Replace torque shaft. 4. Replace motor mate Replace Super Simpson



	<b>Possible Causes</b>
	RIGHT CONVEYOR CONTACT SHORT 2.MOTORMATE FAULTY 3.RECEIVER FAULTY
	<b>Checks to Carv Out</b>
	1 Check that contactor is closed 2. Check wiring to contactor for 120VAC 3. Verifv motor mate feedback 4. Replace motor mate. 5. Replace Super Simpson.
<b>Fault Number</b>	<b>Fault Name</b>
	<b>Explanation</b>
	RESERVED FOR FUTURE USE
	<b>Possible Causes</b>
	<b>Checks to Carv Out</b>



	<b>RIGHT TRACTION NO LOAD</b>
	<b>Explanation</b>
	While the machine was tramming, the current feedback from the right traction motor went low.
	There is no load on the motor The motormate is faulty The motor is faulty The drive is faulty
	<b>Checks to Carry Out</b>
	1. Check motor mate feedback against hand held meter. 2. Replace motor mate 3. Replace Super Simpson.
<b>Fault Number</b>	<b>Fault Name</b>
	<b>RIGHT TRACTION MULTIPLE INSTANT OVERLOAD</b>
	<b>Explanation</b>
	The tram motor has tripped on instant overload numerous times in the last
	<b>Possible Causes</b>
	Track is damaged Motor is faulty MotorMate is faulty Receiver is faulty
	<b>to Carry Out</b>
	1. Verifv that track is clear from  2. Check motor mate feedback against hand held meter. 3. Replace motor mate 4. Replace Super Simpson
<b>Fault Number</b>	<b>Fault Name</b>
	<b>ILLEGAL LEFT TRACTION CURRENT FEEDBACK</b>





<b>Fault Number</b>	<b>Fault Name</b>	
	<b>LEFT VFD MOTOR OVERLOAD</b>	
	<b>Explanation</b>	
	The inverter has detected an overload	
	<b>Possible Causes</b>	
	Tram load is too high Motor settings not properly set Motor has stalled	
	<b>Checks to Carry Out</b>	
	Resume tramming at low speed Check motor setup Remove cause of motor stall	
	<b>Fault Number</b>	<b>Fault Name</b>
	<b>LEFT VFD IGBT OVER TEMPERATURE</b>	
	<b>Explanation</b>	
	<b>Possible Causes</b>	
	<b>Checks to Carry Out</b>	
	<b>Fault Number</b>	<b>Fault Name</b>
	<b>LEFT VFD IGBT EXTERNAL</b>	
	<b>Explanation</b>	
	<b>Possible Causes</b>	
	<b>Checks to Carry Out</b>	



	Replace the inverter Replace the rectifier
<b>Fault Number</b>	<b>Fault Name</b>
	<b>RECTIFIER CAN COMMUNICATIONS FAILURE</b>
	<b>Explanation</b>
	The rectifier unit has detected a CAN loss
	<b>Possible Causes</b>
	Broken communications wiring Rectifier faulty
	<b>Checks to Carry Out</b>
	Check CAN wiring in traction enclosure
<b>Fault Number</b>	<b>Fault Name</b>
	<b>I FFT VFD OVERVOLTAGE TRIP</b>
	<b>Explanation</b>
	<b>Possible Causes</b>
	<b>Checks to Carry Out</b>



<b>Fault Number</b>	<b>Fault Name</b>
	<b>RIGHT RMS OVERSPEED</b>
	<b>Explanation</b>
	<b>Possible Causes</b>
	<b>Checks to Carv Out</b>
<b>Fault Number</b>	<b>Fault Name</b>
	<b>RIGHT RMS PHASE SYNC LOSS</b>
	<b>Explanation</b>
	<b>Possible Causes</b>
	<b>Checks to Carv Out</b>
<b>Fault Number</b>	<b>Fault Name</b>
	<b>RIGHT RMS LOST THREE PHASE SUPPLY</b>
	<b>Explanation</b>
	<b>Possible Causes</b>
	<b>Checks to Carv Out</b>

<b>Fault Number</b>	<b>Fault Name</b>
	<b>RIGHT RMS LOST CAN COMMUNICATIONS</b>
	<b>Explanation</b>
	<b>Possible Causes</b>
	<b>Checks to Carv Out</b>



<b>Battery Backup Power Supply 8 Pin Burndy Male</b>		

<b>Receiver Control Unit Graphics Display</b>		

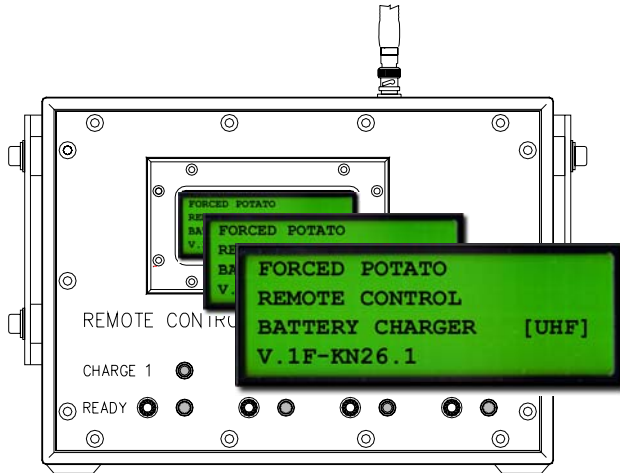
<b>Receiver Control Unit</b>		

<b>Simpson Display Unit (4X20 "Lil' Blue") Terminal Connections J3, J4</b>		
	Auxiliary Supply I/P 24V+	
	Auxiliary Supply I/P 0V	



## Remote Control Battery Charger

Connect the Remote Control Battery Charger to your mains power outlet. During initial power-up, the firmware release information is displayed for 10 seconds.



After this period, the charger will then display the main screen which details the charge status.





## Maintenance

The maintenance required for Remote Consoles is basically limited to assembly, cleaning & inspection. Coal dust and other particulate deposits foul switch operation and can eventually lead to premature seal failure if not regularly expunged.

### Inspection Frequency

The following routines should be undertaken **daily**.

- Determine if cleaning and disassembly is necessary. Onsite conditions should be used to determine the regularity of this procedure. If cleaning is required, see the following pages. Typically, cleaning on a weekly basis is sufficient.
- Perform a functional test on the Remote Control Battery Charger.

### Factory Service Frequency

Factory Service of this equipment is required 12-months from the date of dispatch with an allowance of 1-month for logistics.

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