Simple Setworks

Safety, Operation, Maintenance & Parts Manual

SW for Remote mills rev. A.00 - L.03

Safety is our #1 concern! Read and understand all safety information and instructions before operating, setting up or maintaining this machine.

February 1998

Form #890-CS

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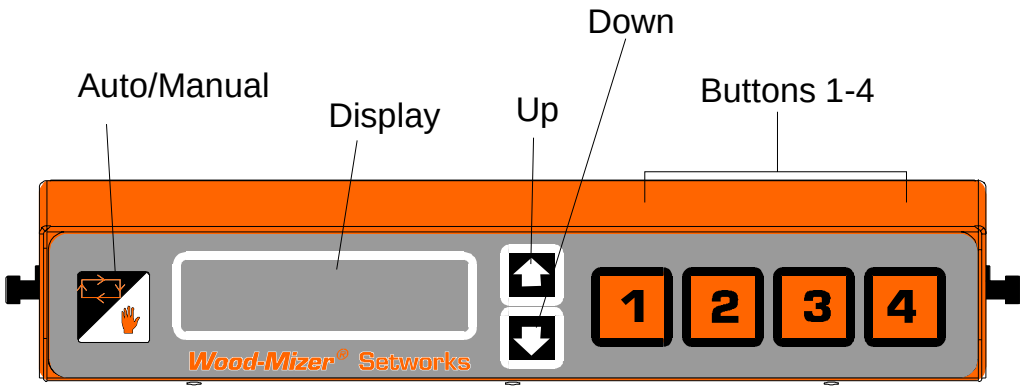
SECTION 1 OPERATION

IMPORTANT! Read and understand the entire Operation section before using your Setworks!

Simple Setworks is a sawmill option which automatically lowers the cutting head by one of 4 pre-programmed “sets”. These sets can be easily modified and saved. Each set includes information for board thickness and kerf allowance.

See Figure 1-1. The graphic below shows the Setworks control panel.



3H0345

FIG. 1-1

1.1 Initial Start-Up

WARNING! Be sure the power feed switch is in the neutral position before turning the key switch to the ON (#1) or ACC (#3) position. This prevents accidental carriage movement which may cause serious injury or death.

1. Turn the sawmill control panel key to the ON (#1) position. Setworks will start up in the manual (disabled) mode.

2. Press the down arrow to select your model mill from the listed choices. Press “1” for a ‘97 Super model mill or “2” for a ‘97 Standard model mill.

   NOTE: “3” is for pre-97 mills.

3. Save the display settings.

   - CS ONLY: To return Setworks to default factory settings (as needed in such a case that the operator might choose the wrong model mill), adjust the kerf value to 255. Save settings. Turn mill off, then back on.

1.2 Auto/Manual Toggle Switch

To switch back and forth from Manual to Automatic mode, press the Auto/Manual toggle switch. The active mode will show in the display window.

In Automatic mode, Setworks is activated. The up/down switch on the sawmill control panel can be used to automatically lower the cutting head to the next cutting position. *See Section 1.5*.

In Manual mode, Setworks is disabled. The up/down switch on the sawmill control panel is used to raise/lower the cutting head (movement is continuous as long as switch is engaged). While Setworks is disabled, the Setworks programming menus may be accessed. *See Section 1.4*.

1.3 Setworks Version

To display which setworks version you are running, place Setworks in Manual mode. Press the down arrow.

1.4 Programming Menus

To access the Programming menus, place Setworks in Manual mode. Press the up arrow to scroll through available menus. Each menu enables you to view the pre-set value for the corresponding Setworks function and to modify that value if desired. The menus include: Save all modified settings, Kerf Allowance, Unit of Measure, and Language.

Save all modified settings:

To save all modified settings,

1. Press “1” to access the Save Settings menu.
2. Press “1” again to save all modified settings, or “2” to exit.

Kerf allowance:

To modify the kerf allowance value,

1. Press “2” to move to the Adjust Kerf menu.
2. Press the up/down arrows to increase/decrease kerf values by increments of 0.00625”.
3. Press “1” to save the modified setting, or “2” to exit.

Kerf is the measurement of the material removed by the blade as it passes through the wood. Kerf allowance is preset to 0 (.00000”).

Most cutting applications will require a kerf allowance. Use the table below for exact kerf setting values based on standard factory specifications of .021 left and right set (.042 blades) or .025 left and right set (.045 blades).

See Table 1-1.

Blade Thickness with set of .021	Kerf Allowance (Kerf Size)
.042”	13 (.08125”)
.045”	15 (.09375”)

TABLE 1-1

To determine other kerf allowance settings, multiply blade tooth set by 2 and add blade thickness. This is your kerf size (the size of groove the blade will cut as it passes through the wood). For the corresponding kerf allowance setting, divide kerf size by .00625.

For example, if the tooth set of a .042" blade is .018:
((.018 x 2) +.042) / .00625 = 12.48.
Rounded to the nearest whole value, the kerf allowance setting is 12.

NOTE: If you plan on using the 4/4, 5/4, 6/4, or 8/4 lumber scale on your mill, leave the kerf allowance at '0' and use the up/down arrows to adjust the board thickness dimension to correspond to the lumber scale.

Unit of measure:

To change the unit of measure,

1. Press "3" to move to the Unit of Measure menu.
2. Press "1" for inches, or press "2" for millimeters.
3. Press "1" to the save modified setting, or "2" to exit.

Language:

To choose a different language,

1. Press "4" to move to the Language menu.
2. Press "1" for English, "2" for French, "3" for German, or "4" for Spanish.
3. Press "1" to the save modified setting, or "2" to exit.

1.5 Automatic Mode

In Automatic mode, you may choose one of the four pre-programmed sets by pressing the corresponding button (1 through 4). Each set includes information for board thickness and kerf allowance. The selected board thickness will show in the display window.

- To change the board thickness dimension, use the up/down arrows to increase/decrease cutting values in 1/16” increments. Be sure to save all modified settings before turning off sawmill power.

  IMPORTANT! Settings must be saved or changes will be lost when the sawmill power is turned off.

- To change kerf allowance, see *See Section 1.4*.

- To operate Setworks in Automatic Mode, see *See Section 1.6*.

1.6 Operation

WARNING! Be sure the power feed switch is in the neutral position before turning the key switch to the ON (#1) or ACC (#3) position. This prevents accidental carriage movement which may cause serious injury or death.

1. Turn the sawmill control panel key to the ON (#1) position. Setworks will start up in the manual (disabled) mode.

2. Use the up/down switch on the sawmill control panel to raise or lower the cutting head to the desired height.

3. Select a “set” by pressing “1”, “2”, “3”, or “4”. The board thickness dimension will show in the window. **NOTE:** Setworks will automatically switch to the Automatic mode when “1”, “2”, or “3” is pressed.

4. **To move the cutting head down to the next cutting position** (board thickness plus kerf allowance), move the up/down switch on the control panel to the down position and release. The cutting head will continue to move until the next cutting position is reached.

   To move the cutting head down several cutting positions at once, hold the up/down switch in the down position until the cutting head reaches the approximate desired location, then release. The cutting head will continue to move until the next cutting position is reached.

   IMPORTANT! To move the cutting head to a random position (as is often necessary after turning a log, etc), temporarily place Setworks in Manual Mode. *See Section 1.2*. Lower the head and make the first cut, then return Setworks to Automatic Mode by selecting a “set”.

   To raise the cutting head, move the up/down switch to the up position, hold until the cutting head reaches the desired height, then release. **NOTE:** Upward movement of the cutting head **will not** affect the set program. To return to the next cutting position, push the up/down switch to the down position and release.

   See Figure 1-2.

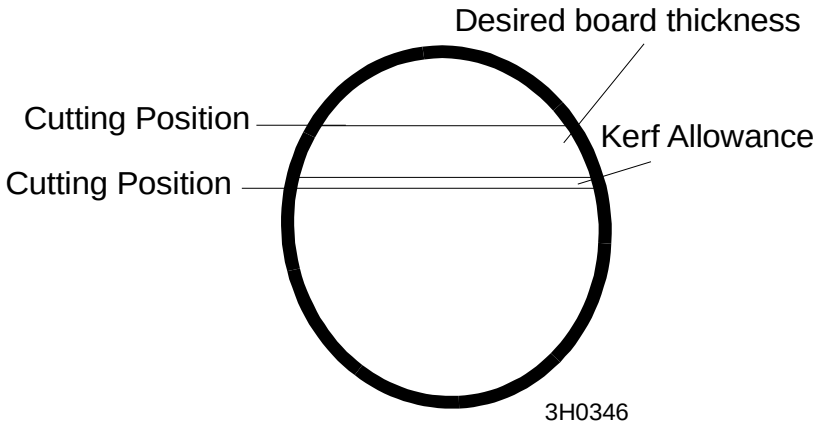

Desired board thickness
Cutting Position
Kerf Allowance
Cutting Position
3H0346

FIG. 1-2

1.7 Calibration

Calibration should be performed to regain set accuracy if the encoder is functioning properly, but Setworks is moving the saw head to an inaccurate cutting position in Automatic mode.

Prior to calibration, make sure the vertical mast rails and the up/down chains are clean and free of debris. See the Maintenance Section in your Sawmill Operator's Manual for cleaning instructions and recommended lubricants.

To calibrate:

1. Make sure the up/down chain is clean and free of sawdust buildup.

2. From the Configuration menus, press "2" to access the Kerf menu.

3. Press "3" to access the Calibration menu. Select the PID setting you would like to adjust:

   - **Kd** (Derivative Gain) - This value controls how Setworks stops the saw head when it nears the desired setting increment. Decreasing this value may improve Setworks accuracy but will also slow down the speed at which the saw head moves to the desired increment setting. Desired values are in the range of 30-250.

     To adjust the Kd setting, press "3" a second time, then use the up/down arrows to raise or lower the value. Adjust the Kd setting in intervals of 5 and check the performance of the Setworks. **NOTE:** If you reach the upper or lower Kd limit without achieving desired results, adjust Kd to the factory default settings: 200 for standard and 65 for super sawmills, then adjust Ki as described below.

   - **Ki** (Integral Gain) - This setting affects the descent and stopping rate of the saw head. **NOTE:** The factory default setting of Ki is "2" for standard and "1" for super sawmills. Small adjustments (no more than ±1) of the Ki setting may improve performance on a specific sawmill depending on the mechanical condition of the sawmill up/down system.

     To adjust, press "1" to access, then use the up/down arrows to raise or lower the value. Desired values are in the range of 1-3.

- **Kp** (Proportional Gain) - This value is a multiplier that determines the speed that Setworks moves the saw head to the setting increment. **NOTE:** The factory default setting for Kp is “4” for standard and “2” for super sawmills. After adjustment the Kp value will probably never need to be changed. Increasing the Kp value will allow Setworks to move the saw head faster but may also cause the control to drastically overshoot the desired setting.

  To adjust the Kp setting, press “2” to access then use the up/down arrows to raise or lower the value.

See Table 1-1. The factory default PID settings for standard and super sawmills are shown in the table below.

PID Value	Standard Sawmill	Super Sawmill
Kd	200	65
Ki	2	1
Kp	4	2

TABLE 1-1

1.8 CS ONLY: Parameter Menus

Within the setworks menu system, there are parameter menus. These parameter menus are for engineering diagnostic purposes only and are not meant for customer access. However, though unlikely, unintentional customer access is possible.

If any value located in these menus is unintentionally altered, raise the kerf value to 255, save, then turn the key switch “Off” and back “On” to return all values to the default setting.

Contact engineering for further information prior to setting any value located in these menus to a non-default setting.

The parameter menus are shown in the following graphics for your reference.

Changing Parameters on Setworks

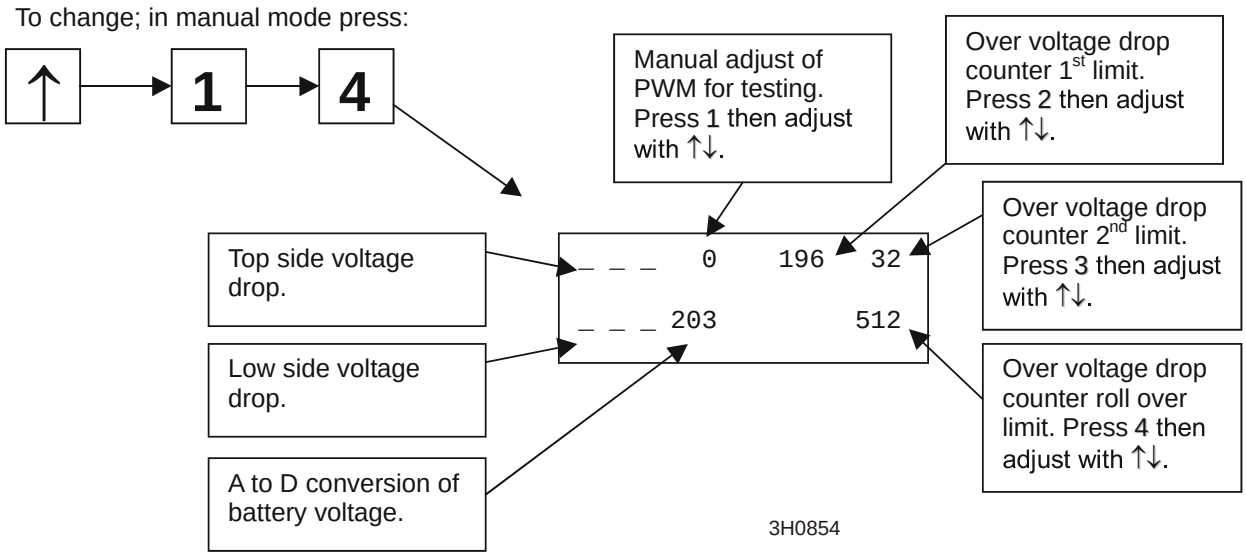


FIG. 1-3

Changing Parameters on Setworks

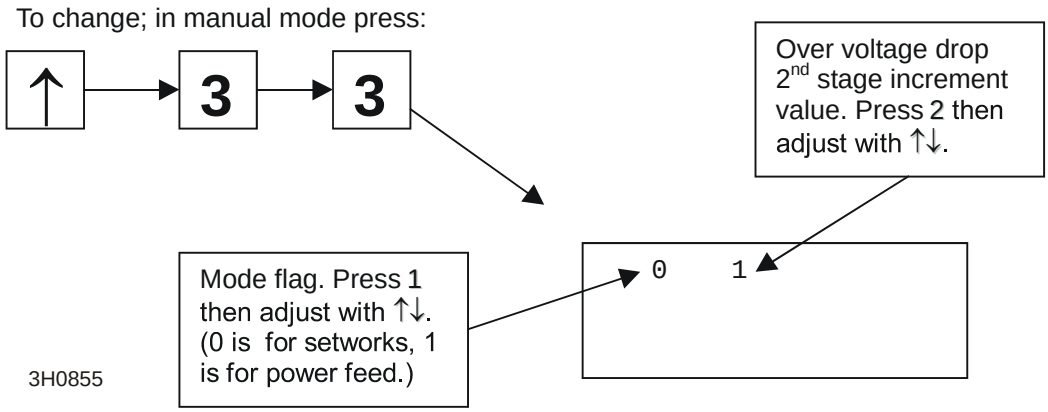


FIG. 1-4

Changing Parameters on Setworks

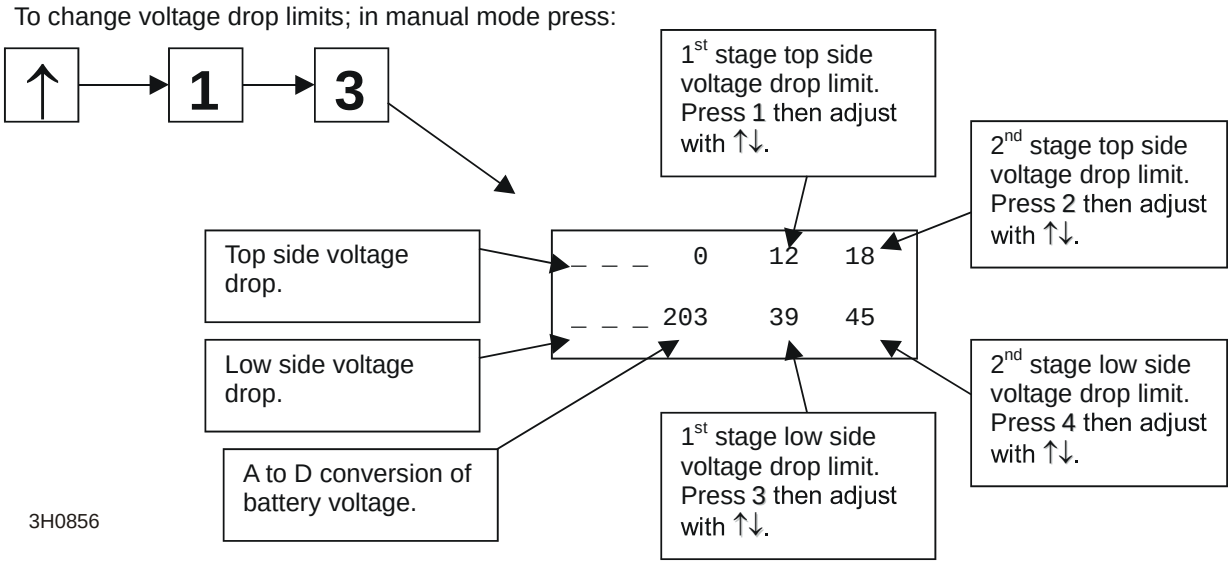


FIG. 1-5

SECTION 2 MAINTENANCE & TROUBLESHOOTING

2.1 Up/Down Chain

Sawdust buildup in the up/down chain can affect the accuracy of the Setworks encoder. Periodically clean the up/down chain by brushing any sawdust buildup from the chain links.

2.2 Diagnostic Messages

Each time the sawmill is powered up, the Setworks control processor checks each mosfet module for a shorted condition. If a short is detected, a diagnostic message will show in the display window. In addition, built-in diagnostics continually check the integrity of the Setworks motor drive. If a problem is found, a diagnostic message will show in the Setworks display window.

See Table 2-1. See the chart below for a listing of possible diagnostic messages.

PROBLEM	CAUSE	SOLUTION
Display reads 44MDJE@^%#$%# (or has similar characters)	Display cable conductor bad	Replace Setworks control assembly. **Optional**: Replace display assembly. The display's adhesive is strong and may make removal of the existing display impossible. Even successful removal will render display inadequate for future use. To make sure problem will be corrected before attempting removal, disconnect existing display and connect new display. If problem is corrected, attempt removal. If removal is not possible, replace entire control assembly.
Display reads "BL Module Bad" or "BR Module Bad"	Water in up/down motor	Remove brush covers on motor and allow motor to dry.
	Heavy condensation or water in control box	Remove the four screws which secure the Setworks control assembly to the sawmill control box. Prop the Setworks control assembly in an upward position and allow to dry.
	Mosfet module bad	To make sure the correct "bad module" diagnostic message is being displayed, turn the Setworks unit off. Disconnect and insulate the up/down motor leads and turn the unit back on. The resulting diagnostic message should accurately indicate the bad mosfet module (as labeled on the CPU board). Replace module.

TABLE 2-1

Display reads “TL Module Bad” or “TR Module Bad”	Heavy condensation or water in control box	Remove the four screws which secure the Setworks control assembly to the sawmill control box. Prop the Setworks control assembly in an upward position and allow to dry.
	Mosfet module bad	To make sure the correct “bad module” diagnostic message is being displayed, turn the Setworks unit off. Disconnect and insulate the up/down motor leads and turn the unit back on. The resulting diagnostic message should accurately indicate the bad mosfet module (as labeled on the CPU board). Replace module.
Display reads “Caution Overload”	Loose battery connections or low battery charge	Check battery connections and condition. Recharge or replace battery if necessary.
	Accessory solenoid bad	Replace solenoid with accessory solenoid kit.
	Handle is not in neutral position	Release the up/down handle and allow it to return to the neutral position.
	Head has reached limit of travel or is otherwise prevented from further travel	Turn the sawmill control box key switch to the OFF (#0) position. Remove any objects and/or debris from the path of the saw head. Turn the key switch to the ON (#1) position and resume operation. **WARNING!** Be sure the power feed switch is in the neutral position before turning the key switch to the ON (#1) or ACC (#3) position. This prevents accidental carriage movement which may cause serious injury or death.

TABLE 2-1

Display is blank; Setworks still works	Heavy condensation or water in control box	Remove the four screws which secure the Setworks control assembly to the sawmill control box. Prop the Setworks control assembly in an upward position and allow to dry.
	Solder flux shorting out display solder connections on display	Use a thin knife blade to clean flux between solder connections; replace control assembly. **Optional**: Replace display assembly. The display's adhesive is strong and may make removal of the existing display impossible. Even successful removal will render display inadequate for future use. To make sure problem will be corrected before attempting removal, disconnect existing display and connect new display. If problem is corrected, attempt removal. If removal is not possible, replace entire control assembly.
	Display cable conductor bad	Replace Setworks control assembly. **Optional:** Replace display assembly. The display's adhesive is strong and may make removal of the existing display impossible. Even successful removal will render display inadequate for future use. To make sure problem will be corrected before attempting removal, disconnect existing display and connect new display. if problem is corrected, attempt removal. If removal is not possible, replace entire control assembly.
Inaccurate set	Up/down chain is dirty	Clean up/down chain.
	Mast slide pads not properly adjusted, mast surface rusted or dirty	Clean vertical mast or adjust slide pads.
	Encoder not properly aligned	Make sure encoder is squared and centered on outer up/down chain.
	Encoder not functioning properly	Check Encoder. *See Section 2.3*.
	Setworks not calibrated properly	Calibrate Setworks. *See Section 1.7*.

TABLE 2-1

Head drops up to 1/2” from beginning of cut to end of cut	Loose motor connections	Tighten motor wires. Check brushes for corrosion and replace if necessary.
Setworks moves from one setting to another or between manual and automatic modes on its own	Buttons inadvertently pressed by operator	DO NOT unintentionally press buttons.
	Loose up/down motor connections	Tighten motor wires.
Setworks does not work; No display or up/down head movement	Up/down circuit breaker tripped	Reset breaker. (If auto reset circuit breaker is used, wait to allow breaker to reset.)
Setworks does not work; No display, up/down, fwd/rev or blade guide movement; Sawmill front panel indicator lights DO work	Accessory solenoid is bad	Replace solenoid with accessory solenoid kit.
Setworks Works in Manual Mode But Not in Automatic Mode	Encoder not functioning properly	Check Encoder. *See Section 2.3*.

TABLE 2-1

2.3 Encoder Set Accuracy

If, when in the automatic mode, Setworks fails to move the saw head or moves the sawhead to an inaccurate cutting position, check the encoder to ensure it is functioning correctly. To check:

1. First make sure the encoder accuracy in not being affected by sawdust buildup in the up/down chain. Use a brush to remove any sawdust from the up/down chain links.

2. Place Setworks in the Manual Mode.

3. Check the LCD display while raising the sawhead. There should be a plus sign (+) in each of the four corners of the display.

4. Next, check the LCD display while lowering the sawhead. There should be a minus sign (-) in each of the four corners of the display.

   If these signs are not present or do not change appropriately, the encoder should be replaced.

2.4 Setworks By-Pass

When waiting for service assistance or repair parts it may be desirable to bypass Setworks.

To bypass Setworks on REMOTE mills prior to rev. H4.00:

WARNING! Before performing setworks bypass, disconnect the terminal from the negative battery post.

At the control box:

- Unbolt and remove the rear and front panels from the sawmill control box.
- Unfasten the setworks control from the sawmill control box.
- Remove four wires from cable #39 (red from 12VDC, green from MOTR, white from MOTL, black from GND) terminals on the setworks circuit board.
- Disconnect the red and black up/down switch wires from the UP and DOWN terminals on the setworks circuit board. Wrap the ends of the wires in electrical tape.
- Pull cable #39 into the sawmill control box and wrap the red wire terminal with electrical tape. Repeat with the black wire terminal.
- Locate the black wire jumper from the up/down drum switch terminal #1 in the control box and connect to the green wire of cable #39.
- Locate the red wire jumper from the up/down drum switch terminal #4 in the control box and connect to the white wire of cable #39.

At the power junction box:

- Open the door of the remote power junction box.
- At the top of the door, remove red wire #14 from the MOTR terminal of the setworks distribution circuit board.
- Remove black wire #15 from the MOTL terminal of the setworks distribution circuit board.
- Remove the large red wire from the 12VDC terminal of the setworks distribution circuit board. Wrap the metal terminal end of the wire with electrical tape.

- Remove four wires from cable #39 (red from 12VDC, green from MOTR, white from MOTL, and black from GND) terminals on the setworks distribution circuit board.

- Remove wire ties as necessary to route cable #39 and wires #14 and #15 to the up/down solenoids at the back of the remote junction box. It may be helpful to remove the up/down solenoid panel from the remote junction box.

- Connect red wire #14 to the red jumper wire from the top-left terminal of the top up/down solenoid. Slide the rubber boot up the jumper wire and use the existing nut and bolt to fasten to wire #14. Be sure to tighten securely. Slide the rubber boot back down over the connection.

- Connect black wire #15 to the black jumper wire from the top-left terminal of the bottom up/down solenoid. Slide the rubber boot up the jumper wire and use the existing nut and bolt to fasten to wire #15. Be sure to tighten securely. Slide the rubber boot back down over the connection.

- On cable #39, wrap the red wire terminal with electrical tape. Repeat with the black wire terminal.

- Connect the green wire from cable #39 to the middle-front terminal on the right side of the bottom up/down solenoid.

- Connect the white wire from cable #39 to the middle-front terminal on the right side of the top up/down solenoid.

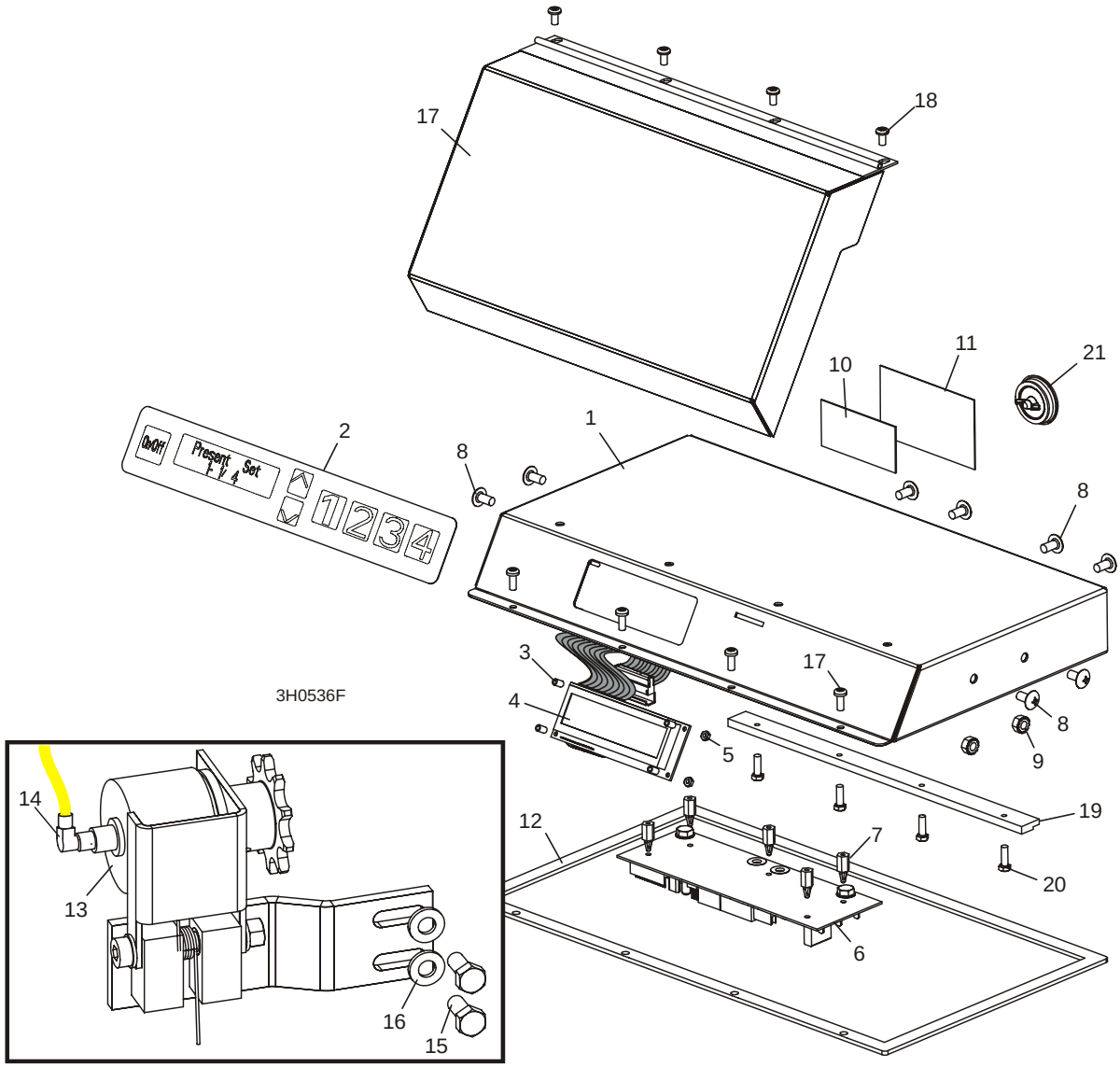
- Close the remote junction box door securely.

- Reconnect the negative battery terminal.

The sawmill can now be manually operated. Reverse the instructions to return to setworks operation.

SECTION 3 REPLACEMENT PARTS

3.1 Setworks Control & Encoder

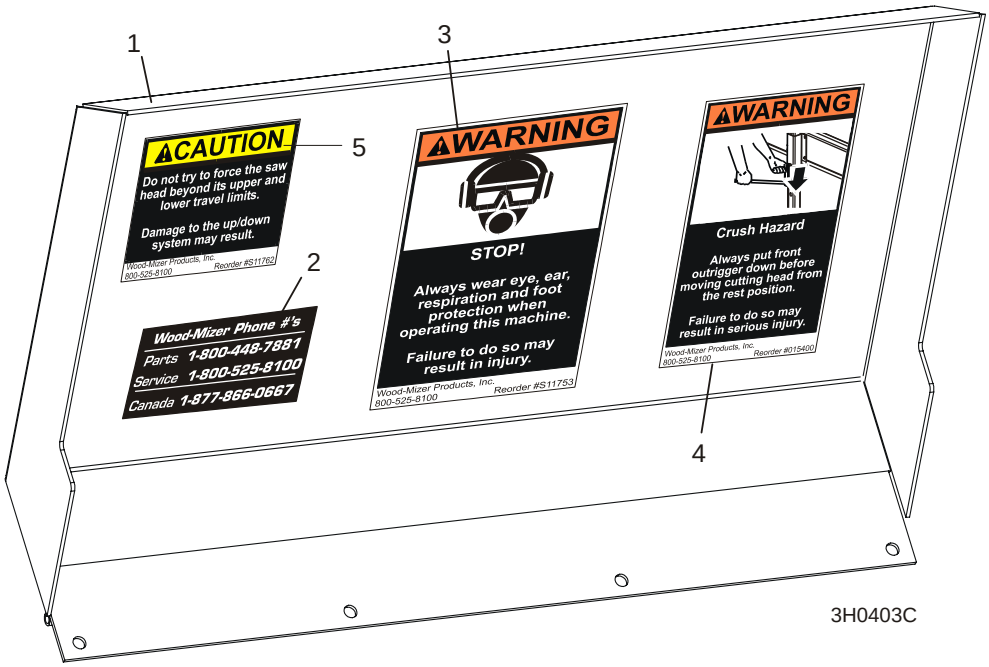


REF	DESCRIPTION (◆ Indicates Parts Available In Assemblies Only)	PART #	QTY.	
	BOARD, SETWORKS DISTRIBUTION PCB (Not Shown - located in Remote Power Box)	*024270*	1	
	CONTROL ASSEMBLY, REMOTE SETWORKS '97	*024175*	1	
1	Box Weldment, Setworks Control	015355 [1]	1	◆
2	Switch, Lexan Membrane	*014530*	1	
	Display Kit, Setworks Backlit	*024621* [2]	1	
3	Spacer, .115" ID x 3/16" OD x 5/16" Long Nylon	*024595* [2]	4	

4	Display Assembly, 16 x 2" LCD Backlit	024179 [2]	1	◆
	Instruction Sheet, Setworks Display Replacement	*024621-912*	1	
5	Nut, #4-40 Hex Nylon	*F05020-159*	4	
6	Board Assembly, Remote Setworks Control Printed Circuit	*024269*	1	
7	Standoff, #6 x 1/2" PCB	*023147*	5	
8	Screw, 1/4-20 x 3/8" Phillips Round Head	*F05005-17*	8	
9	Nut, 1/4-20 Hex Self-Locking	*F05010-9*	8	
10	Decal, Setworks Revision	016187 [3]	1	◆
11	Decal, Revision Overlay	*016200* [3]	1	
12	Gasket, SW97 Control	*015980*	1	
13	**ENCODER KIT, SETWORKS '97**	*016060*	1	
	Encoder Assembly, Setworks '97	015513	1	◆
14	Cable, Encoder to Setworks '97+	*024738* [4]	1	
	Tie Wrap, 3/16" x 5 1/2" UV Black	*F05089-3*	6	
15	**WASHER, 5/16" SAE FLAT**	*F05011-17*	2	
16	**BOLT, 5/16-18 X 3/4" HEX HEAD**	*F05006-5*	2	
17	**COVER PARTS** (*See Section 3.2*)			
18	**SCREW, #10-24 X 3/8" PHILLIPS PAN HEAD**	*F05004-3*	8	
19	**BRACKET, SETWORKS CONTROL MOUNT**	*015296*	1	
20	**BOLT, #10-24 X 1/2" HEX HEAD**	*F05004-27*	4	
21	**PLUG, AS075 OILTITE PAINTED**	*024250*	1	

[1] 015355 replaces 024175 originally supplied prior to 3/99.
[2] Use 024621 Display Kit to service all Setworks displays. 024595 Spacers replace C03736 and C05657 originally supplied prior to Rev. L.01. Single spacers eliminate risk of incorrect spacer stackup which can result in improper display position and damage to the control membrane.
[3] 016187 Decal and 016200 Overlay replace Revision Plate 005801-SW and #6 x 1/4" Screws F05015-4 used prior to 10/99.
[4] For encoder units mfg AFTER 1/00, the cable (yellow) is external to the unit and is available as separate replacement item 024738. For encoder units mfg prior to 1/00, the cable (gray) is internal to the unit and is not available as a separate replacemet item.

3.2 Cover and Decals



REF	DESCRIPTION (◆ Indicates Parts Available In Assemblies Only)	PART #	QTY.	
	COVER ASSEMBLY, BOX SETWORKS '97	015934	1	
1	Cover Weldment, Box Setworks 97	015294	1	◆
2	Decal, 800 Number	S12117	1	
3	Decal, Eye/Ear Protection Warning	S11753	1	
4	Decal, Front Outrigger Warning	015400	1	
5	Decal, Up/Down Caution	S11762	1	

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