

microcut[®]

Owner's Manual for the *BASIC with H3 Drive* *Paper Cutter Automation System*



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Date of installation	
Installed by	
Machine manufacturer	
Machine model	
Machine size	
Machine serial number	
microcut serial number	
Extras	
Notes	

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NOTE: Revisions occur as requests are made from operators, supervisors, and others. This manual may be incomplete. Refer to our website referenced on the cover sheet for updated material.

INTRODUCTION

Thank you for purchasing a **microcut** control system for your paper cutter. Having done so, you have joined tens of thousands of **microcut** users worldwide who are enjoying the benefits of computer-controlled cutting. **microcut** is a state of the art system for controlling back gauge movement, with an intuitive, easy to use operator interface. After turning the power on and getting started, there are four basic operating methods—

- Manual operation.
- Programming new jobs.
- Reviewing existing jobs.
- Automatic operation using an existing job.

Many of the features you will find in **microcut** have resulted from operator's ideas throughout the world. If you have any suggestions, we encourage your input. Where possible, we will make the revisions and update your unit. Our special thanks to all who have helped make **microcut** the world leader in cutter automation.

Requirements for installation and use:

- The machine is to conform to present safety requirements in your area.
- Supplied power is to be 110/220±10% VAC, 50/60 Hz protected by a 15 or 20 amp breaker.
- The installation is to be performed per the instructions included in this manual.
- All of the safety elements must remain intact and correctly functional.
- All nip, pinch, crush, or cutting zones must be properly guarded.

INSTALLATION BASICS

The **microcut** installation is basically mechanical. It involves mounting the display console; the H-drive box; the DC motor to drive the back gauge; the shaft encoder to signal back gauge movement to the computer; and four sensing switches to inform the computer of the machine status (clamp, knife, clamp shoe, and position). All voltage cables are plug-in type. There is an optional input for a hand wheel sense as well as outputs for air table control and cut disable.

The following text gives a conceptual approach toward the installation. Use this manual to learn what each component must do. Mount each component in the fashion best suited to fulfill its purpose.

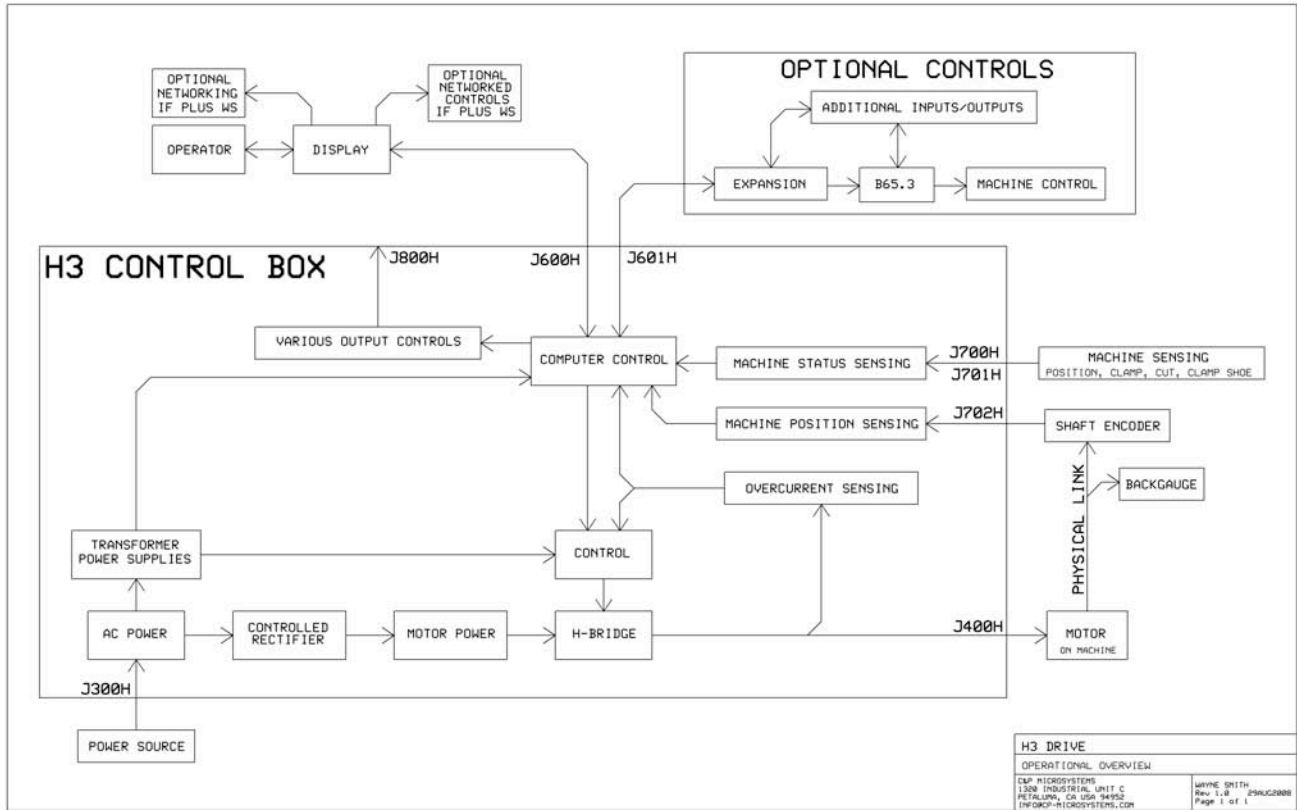
microcut is a retrofit system so every installation is unique. Install the components for function as well as fit. The brackets are designed with extra holes and slots. They are easily modified, and can be adapted for almost any requirement. Installation variables include the encoder sprockets and motor pulley (Schneider cutters have a flat belt drive). If the lead screw diameter is known at the time of shipment, the lead screw sprocket will be bored to the proper dimension. Otherwise, it may be necessary to have the sprocket bored to size. Check the sprocket before beginning the installation. If it must be bored, take care of this NOW to avoid unnecessary delays later. Cut the sprocket in half to allow easier installation.

Every display console is identical regardless of machine type. A setup routine is resident in the computer to allow simple adaptation to any machine. This routine *must* be completed on every installation in order for **microcut** to know the machine it is installed on and to operate safely and correctly.

Hints—

1. Inspect the machine to insure all operations are correct BEFORE beginning the installation. Fix problems now, not later.
2. The boxes are packed to facilitate the installation. The installation will be easier if the parts are not mixed up. **Box 1** contains the back gauge drive motor. **Box 2** contains the motor drive, encoder, sensors, and various brackets. **Box 3** contains the encoder sprockets, display, mounting bracket, and manual.
3. Lay out the entire installation before beginning, taking care to make sure that there are no interferences, that the cables are long enough, and that there are safe routes to run the cables
4. Use the thinnest drive belt possible to minimize belt flex around the pulley. Use only one belt per pulley. Multiple belts on any pulley will cause slower settling. The H-drive servo control unit works best when the belt is fairly tight.
5. Do not over-tighten the back gauge. If there are nylon gliders supporting the back gauge keep them *loose* to minimize lead screw flex.
6. Use the demonstration mode to allow the operator to learn the system while you are doing the installation. To do this, plug in the cable between the display and the H3 drive box. Remove the communication wire from the H3 to the display (J600H pin 4—see H3 Terminal Connections later in this manual). Wire the H-Drive to line power. Without communications from the H3 drive the display will force demonstration mode when power is supplied.

SYSTEM OVERVIEW

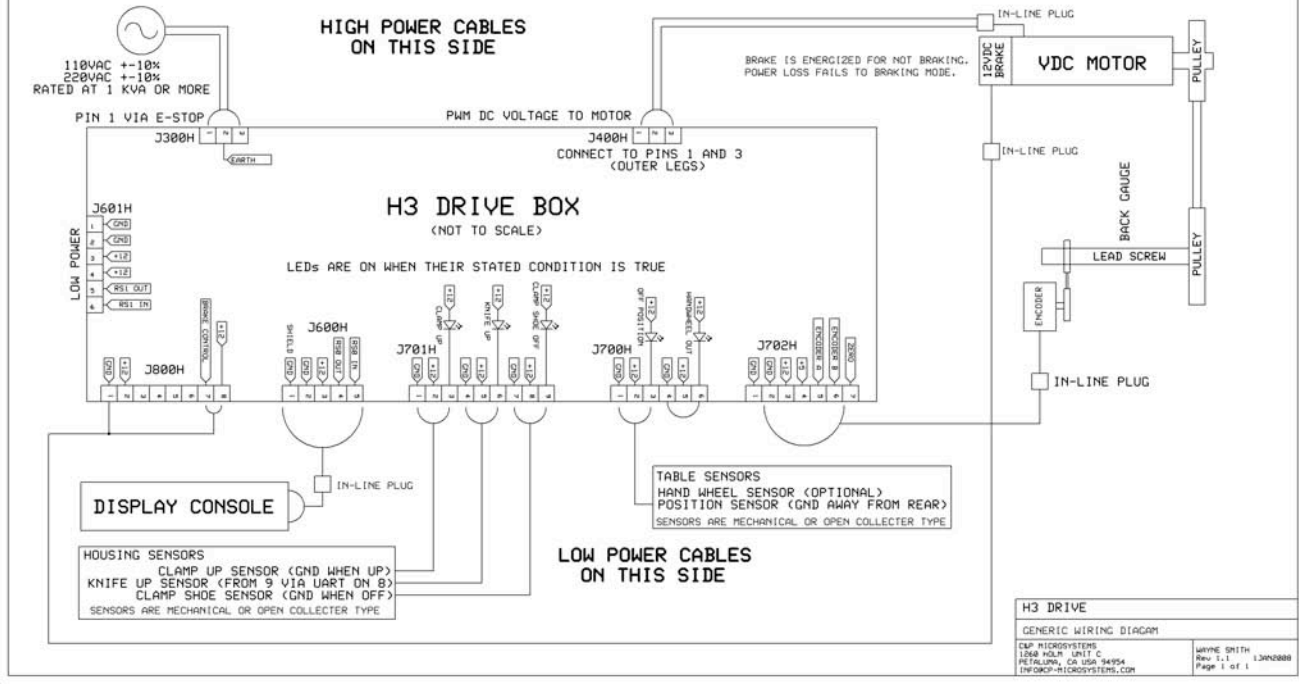


Depending upon the customer's needs there are several options for the installation. Auxiliary outputs can be connected for air table and cut disable controls. An Expansion PCB can be added for side loading (PLUS WS display only) or programmable clamp pressure control. A full B65 clamp/cut control circuit can be added. The display can be supplied in retrofit or OEM panel configuration as well (see the photo on the cover). Please feel free to contact your dealer, representative, or C&P Microsystems directly for more information.

Notes:

BASIC LAYOUT

LOW POWER CABLES MUST BE SEPARATED FROM HIGH POWER CABLES:
 LOW POWER CABLES INCLUDE J601H, J800H, J600H, J701H, J700H, J702H
 HIGH POWER CABLES INCLUDE MACHINE CABLES, VAC TO J300H, AND MOTOR TO J400H

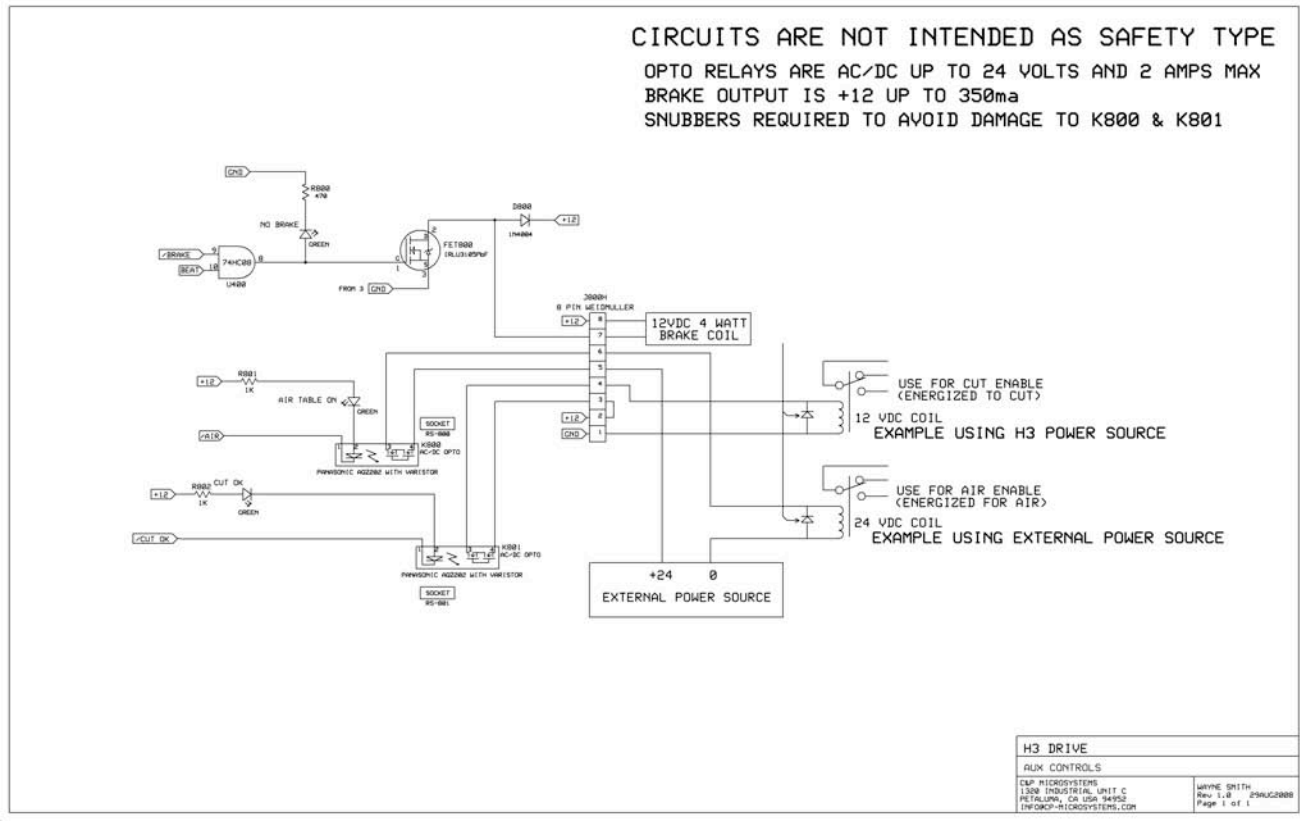


The H3 drive box acts as a junction for all of the parts you will be installing. Mount it in a central location where the various cables can be safely routed. The methods you use to mount each item will depend upon the machine, the additional systems you may require, the physical environment, and the operator’s preferences.

The power and main motor cables should be run away from the other cables (the other cables should avoid high power wiring).

Notes:

OPTIONAL AUXILIARY CONTROLS

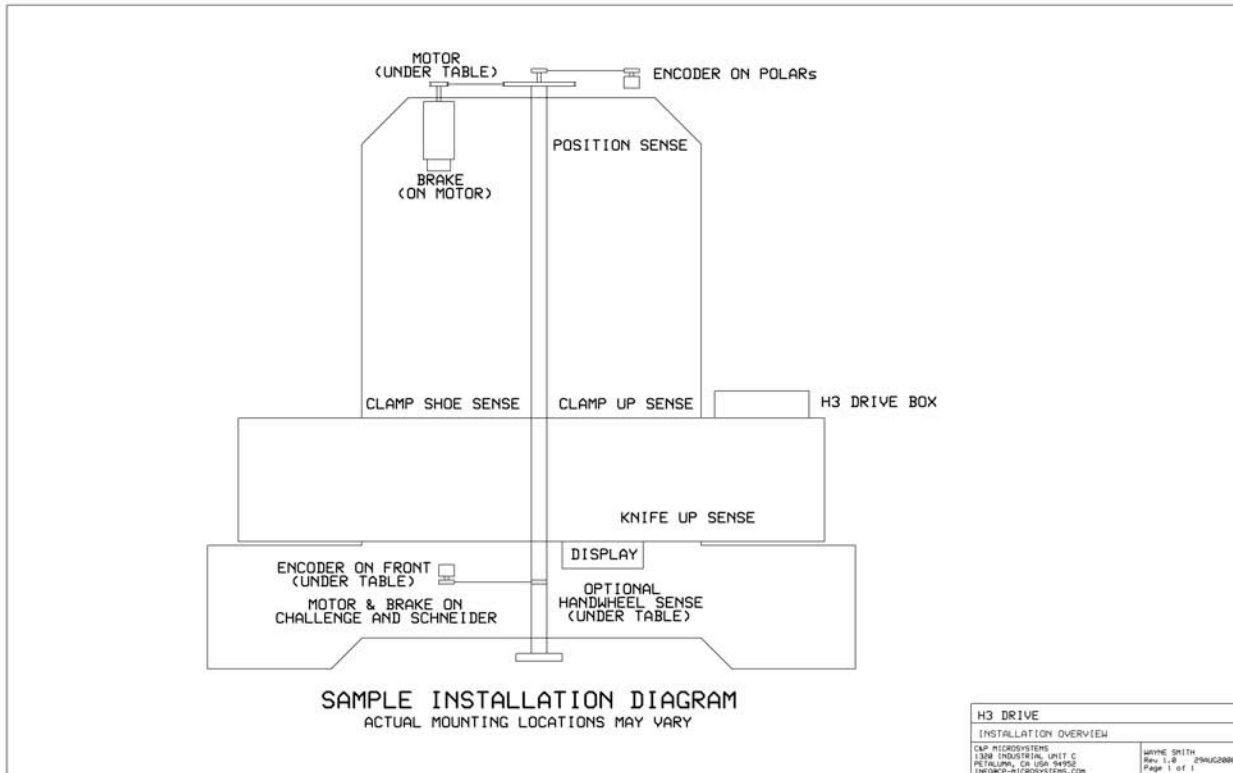


Auxiliary control outputs may be desired dependent upon the machine and the operator's requirements. These may include air table control or cut disable (to prevent knife operation while the gauge is in motion). There are several options for interfacing these controls. Please note:

1. The above control outputs do not conform to and are not intended to be used as safety devices. All outside circuits must have the integrity to operate on their own.
2. A spike suppressor must exist across the added relay coil to prevent damage to the H-Drive console relay drivers. For DC coils a snubber diode should be added (1N4002 or better). The striped end of the diode goes towards the + side of the relay coil. For AC coils an appropriate RC circuit should be added (100 to 150 ohms with a several uF cap). Failure to install or incorrect installation of a spike suppressor will cause failure in the control circuit.
3. Until power on is recognized from the display the power up mode will be forced wherein the air table and cut disable are off. The cut disable is off to allow circuit verification during the start up procedures.

Notes:

SAMPLE INSTALLATION DIAGRAM



Part locations are for reference purposes only. Every installation will be unique. Mount components for function and form, not necessarily to mimic this diagram.

On some paper cutters, it is not always possible to find space to mount a second motor. It may be necessary to remove the original motor and install the **microcut** motor in the original equipment space. If this is the case, completely insulate any bare wires, label all wires, and pack all mounting hardware with the original motor to facilitate reinstallation of the motor in the event **microcut** is moved to another machine at a later date. The installer should document how the original motor should be refitted. Some machines interlock with the drive motor. The knife and clamp will not operate if the motor is removed. In this case mount the motor on a cross leg or other convenient location and make sure if the pulley turns it is properly guarded.

Notes:

RECOMMENDED TOOL LIST

You may want to adapt this list. Substitute metric drills and taps if you wish to supply your own hardware. The procedures are listed in their order of execution, as well as the tools required to proceed. An installation will be faster if all tasks in a given section are completed before starting the next. If possible, lay out all of the components on the table to help visualize the entire installation.

DETERMINE ALL DRILLING LOCATIONS—Mark all holes that will be drilled to complete mounting of ALL components, including holes to secure ty strap brackets, at the same time.

- Slide T square with level
- Pencil
- Punch

DRILL ALL HOLES—Protect the machine from drill shavings, then drill all holes necessary to mount all components. Use the pilot drill for all holes before increasing drill size to save time. Be careful not to drill any hole too large as the drill size is increased.

- Paper and rags to cover machine surfaces
- Pilot, #7, 5/16" high speed drill bits
- Electric hand drill
- Extension cord

TAP ALL HOLES—Complete all threads for all of the components.

- 1/4-20, 3/8-16 taps
- Tap handle (ratchet type is convenient)
- Tapping fluid

CLEAN THE MACHINE—Clean the machine to prevent future damage.

- Brush
- Rags
- Magnet

BOLT AND SECURE ALL PARTS TO THE MACHINE—

- 7/16, 1/2, 9/16 inch wrenches and sockets
- Phillips screw driver
- Hacksaw to saw off excess threaded rod

ROUTE THE CABLES—Wire all components. Use ty straps to secure the wiring.

- Side cut pliers
- Wire strippers
- Screwdrivers

THE MECHANICAL INSTALLATION

Display Console—The display console is the operator's interface with the system.

1. The display console should mount on the front of the cutter near the operator. The display rod can mount to the left or the right. This is secured by the Panavise mounting bracket.
2. Mount this bracket to the machine based upon operator preference.



NOTE: The retrofit display is supplied in a small plastic console to facilitate large variations in the mounting. C&P Microsystems does offer an OEM panel for some cutters at an additional cost. Please feel free to contact your dealer, representative, or C&P Microsystems directly for more information.

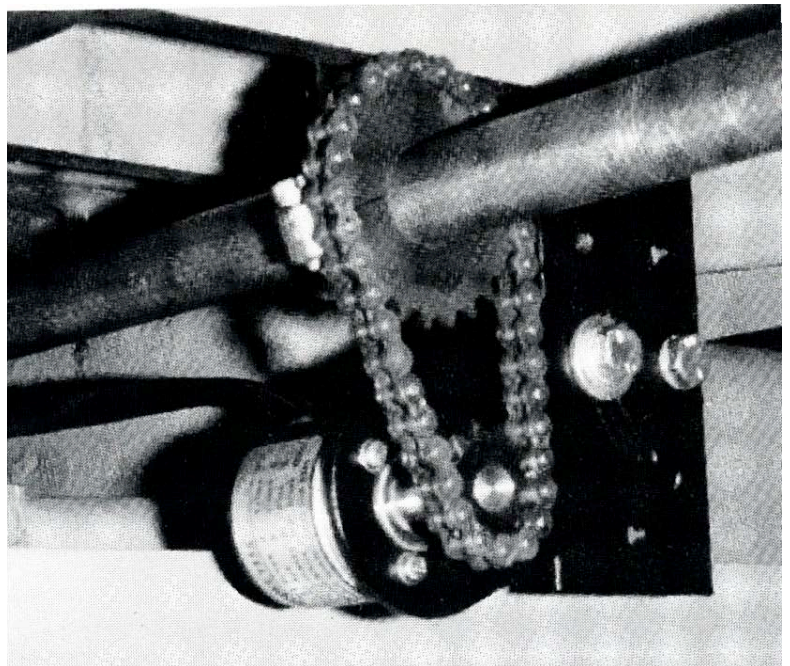


Shaft Encoder—The shaft encoder sends pulses to the drive to indicate back gauge position.

1. Use the shaft encoder mounting brackets supplied to mount the shaft encoder near the lead screw.
2. Install a sprocket on the encoder shaft that will allow it to turn at least two, but not more than four turns for one inch (25 mm) of back gauge movement.
3. Clamp the sprocket to the lead screw with the hose clamp so that it aligns with the encoder sprocket. Depending upon the machine, the sprocket may need to be bored, or cut in half. It is easier to assure that the sprocket faces align if the chain is wrapped around the sprocket while the hose clamp is tightened. Insure the clamp does not interfere with the chain.
4. Install the chain on the sprockets, making sure both sprocket faces are aligned. Adjust the chain tension so that it is snug but not too tight. The chain can be split and snapped back together to allow for any required length.



Rear mounting option



Front mounting option

DC Drive Motor—The motor turns the lead screw.

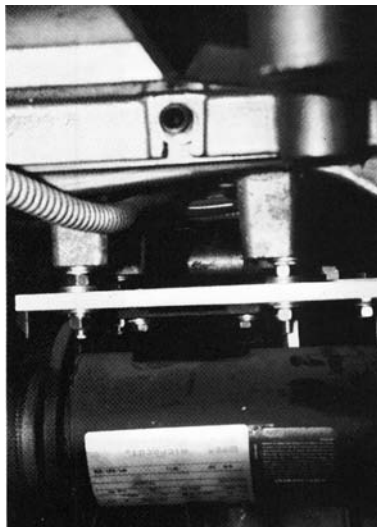
1. Use the brackets and 9 by 12 inch plate as needed to mount the motor so that it lines up with the existing lead screw drive pulley. In many cases the same belt can be used for the new motor as was used for the original equipment drive. The motor mounting method must isolate the original drive system to avoid contention between the two.
2. If **microcut** is ordered for a Schneider cutter a one inch wide cog belt pulley will be included with the kit to drive with the original flat belt. If the original motor is removed make sure wires are labeled and taped.
3. On some cutters the brake will have to be disabled and the drive clutch enabled to allow proper operation.



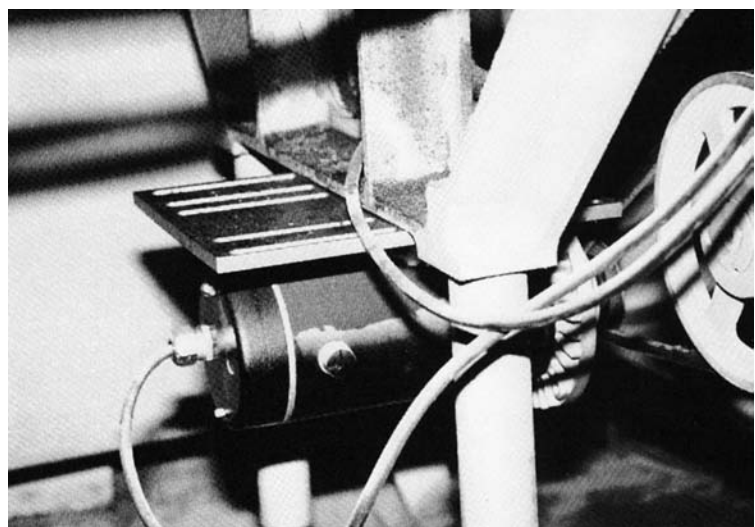
Polar



Harris



Wohlenberg



Lawson

PROXIMITY SENSORS

The sensors allow the system to know what the cutter is doing. Each sensor cable is labeled and must be installed according to its designation. The open collector type sensors are interchangeable, each containing a normally open and a normally closed contact (selected by the wiring method at the PCB connector). Use any combination of brackets and hardware to install each sensor securely to the machine according to the following criteria:

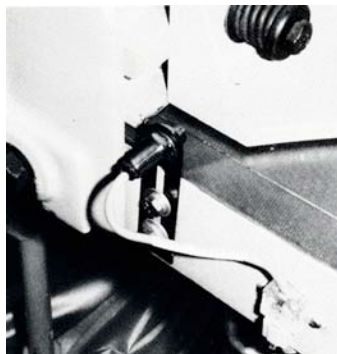
NOTE: The electrical purpose of each sensor is supplied in case the sensor is replaced with a different type of a switch. Refer to the labeling at the drive console for voltages and sensor inputs. Wiring can be cut to length as required. The optional hand wheel sense supplies ground to allow gauge drive. This is jumpered when not used. The cable wiring colors are blue = ground, brown = +, black = normally open, and white = normally closed.

Position Sensor—supplies ground when the gauge is not near the rear of the table.

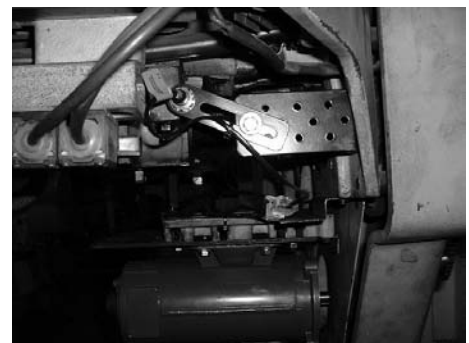
1. Move the back gauge to its rearmost position.
2. Mount the position sense so that it will be tripped by the gauge one or two inches (25 to 50 mm) before the back gauge reaches the maximum mechanical rear position.
3. Do not mount the position sensor so far forward that the back gauge may move behind it and allow the sensor to become "untripped" as the gauge is moved to the extreme rear.
4. Do not mount the rear position sensor more than ten full encoder revolutions from the mechanical rear of the cutter.
5. Use the supplied trip plate if the cutter is heavily painted or if the surface to be sensed is not flat.



Above table

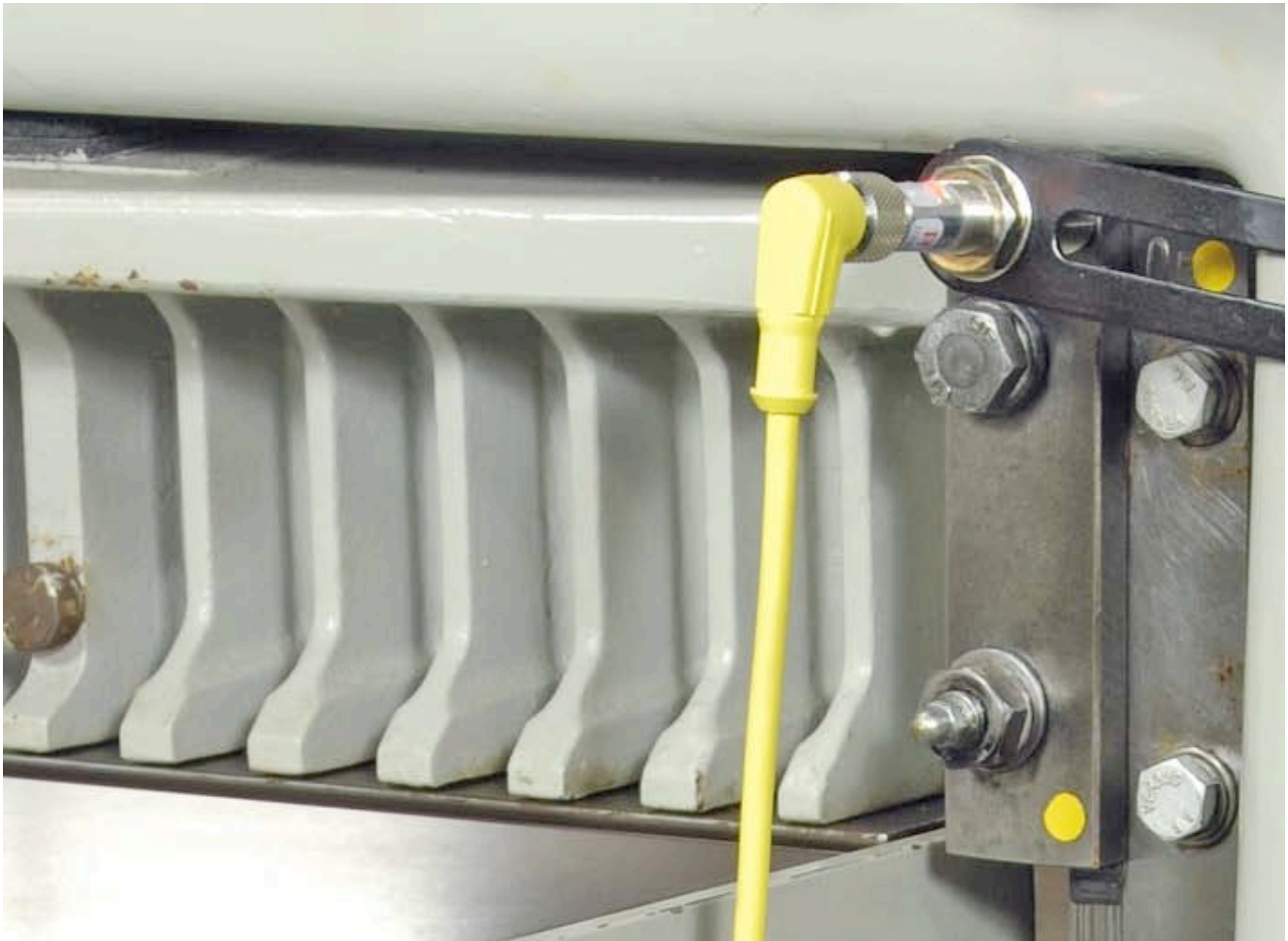


Below table



Clamp Up Sensor—supplies ground when the clamp is full up.

1. Mount this sensor so that it is tripped only when the clamp is in its full up position. Horizontal mounting of the sensor barrel prevents complications that can arise due to hydraulic sag.
2. Use the supplied trip plate if the cutter is heavily painted or if the surface to be sensed is not flat.



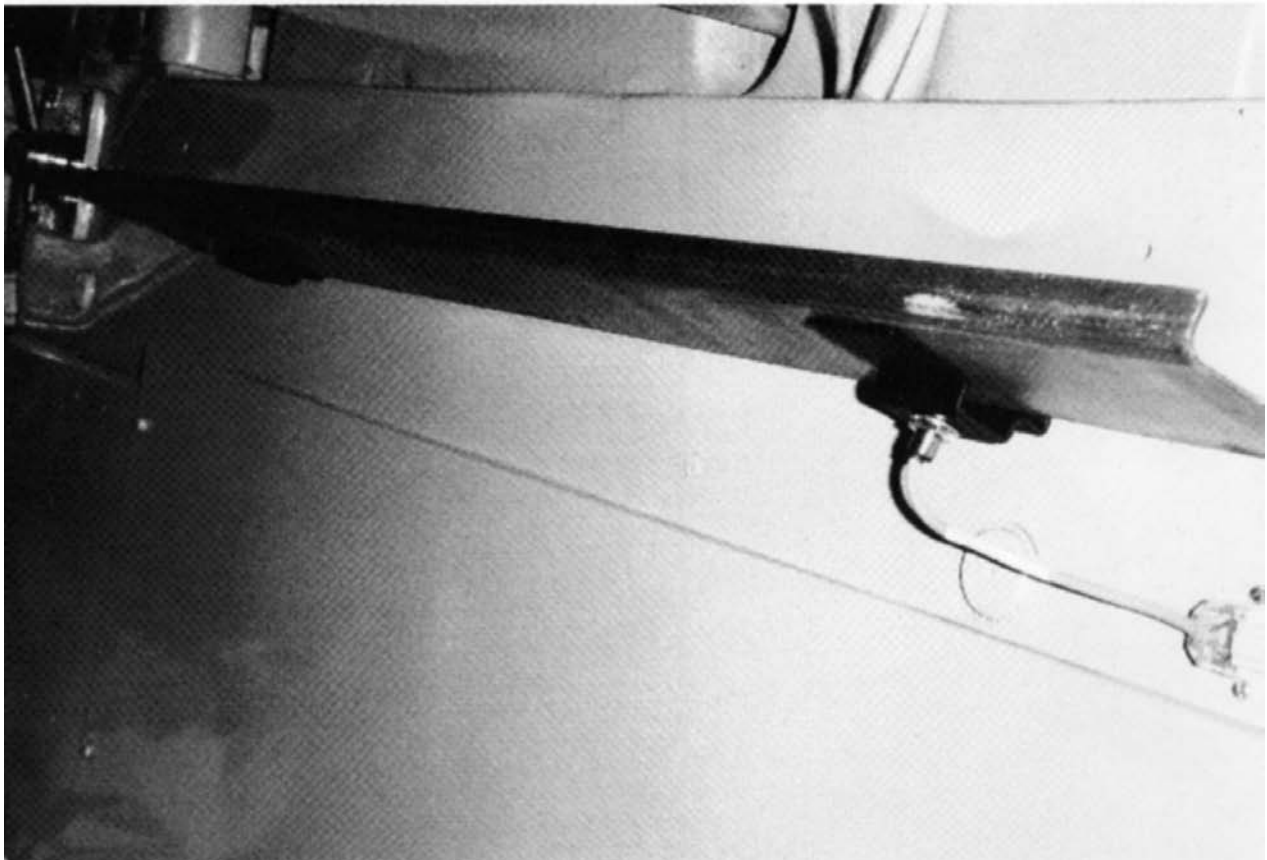
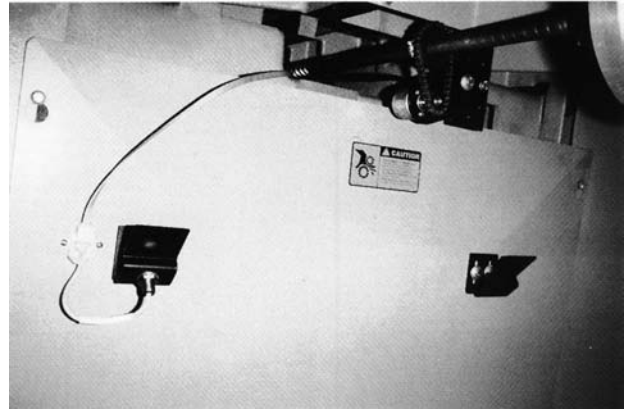
Cut Sensor—supplies ground when the knife is up.

1. Mount this sensor to the side of the opening in front of the knife bar so that it is tripped near the bottom of the knife stroke.
2. This sensor must be tripped for at least 1/4 second during the knife cycle to register a cut.
3. This sensor must only be tripped once per knife stroke. Beware the double-tripping effect that holes, lips, and bolt heads can cause.



Clamp Shoe Sensor—supplies ground when the clamp shoe is in the holder.

1. Mount this sensor so that it is tripped when the clamp shoe (false clamp or sole plate) is resting in its holder. If there is no clamp shoe holder, use the multi-angled brackets supplied to create one.



Drive Box—The H3 drive box drives the gauge motor and acts as a junction box for the wiring.

1. Use four bolts with flat and lock washers to install this in a central location. Make sure the cables will reach all of the components. Do not mount this box on a moving panel. The AC and motor plugs should exit the top. They can be routed down the back of the drive box. It is best to plug them into the box and route them this way as you install the box. If you know what voltage you will be supplying the selector switch in the box can be set at this time.



WIRING AND POWER

Be sure that the original equipment back gauge motor cannot drive the lead screw. Be certain that the original equipment back gauge brake will not energize during motor drive. If a clutch needs to be locked on (electrically or mechanically) to allow the **microcut** motor to drive, do this now. If any modifications are made completely insulate any bare wires, label all wires, and pack all original parts that were removed. To facilitate reinstallation of the original drive system in the event **microcut** is moved to another machine at a later date, the installer should document how the original wiring and motor should be refitted on the NOTES page at the end of this document. Check the machine for operation in case any of the above modifications may have affected operation.

Refer to the “Basic Layout” page earlier in this manual. Choose cable paths that avoid all moving parts for all machine operations. Secure all cables appropriately. The power and main motor cables should be run away from the other cables (the other cables should avoid high power wiring).

Wire the proximity sensors to the plugs according to function on the color dots on the plugs. The cables can be cut to convenient lengths or the excess can be tied out of the way. The proximity sensor cables are split into two groups—one for housing mounted sensors and one for the table mounted sensors. This facilitates easier moving of the machine in the future in case the table must be removed. The table connector contains the option for a hand wheel sense input if the cutter has such a switch. If this is to be connected remove the jumper and wire according to the “Wiring Diagram” near the end of this manual.

Plug the cable supplied with the encoder into the drive box. Route this to the encoder and plug it in. The 7 pin connector for the encoder can be wired for either 5VDC or 12VDC encoder operation. This is done at the factory and should not be changed unless a different encoder is supplied at a later date. Refer to the silkscreen on the PCB as well as the “Basic Layout” page earlier in this manual for details.

The motor connects to two different cables. The 3 prong female line cord plug supplies DC drive power from the drive box to the three pin connector at the motor. The 8 pin connector at the drive box contains a cable that attaches to the motor’s 12VDC brake. The motor’s direction is determined during the set up routine (see the Owner’s Manual). The additional connections on the 8 pin plug for the brake are for additional machine control—see the “Auxiliary Controls” page earlier in this manual.

Connect the display console to the drive box with the supplied cable. Route the cable and plug it into the drive box.

Supplied power is to be 110/220±10% VAC, 50/60 Hz. There may be a voltage selector switch in the drive box (Revision A1.x PCBs). Remove the cover and make sure the switch is set correctly for the voltage you will be supplying. If you are removing the plug to hard wire the cord, the center of the plug (yellow wire with green tracer) is the earth connection. The other two lines are for the power. Check the plug to make sure this is correct. Plug the cable into the drive box.

FINAL CHECK

Insure that—

- The machine is fully cleaned from the installation.
- All parts are securely mounted to the machine.
- The motor pulley is secure.
- The motor drive belt is correctly aligned and fairly tight.
- The encoder chain is aligned and snug.
- The encoder sprocket clamp does not interfere with the chain or machine.
- All cables are secure and clear of all machine operations.
- All machine operations (cutting, clamping, etc.) are functioning properly.
- All hazard points (pinch, crush, etc.) must be fully guarded.

Review the machine for any areas that could create hazards such as pinch points or exposed parts. Guard as appropriate. Remember **microcut is not intended to control the knife or the clamp on the paper cutter**. *Anything* dealing with the clamp or knife is *not* to be tampered with or adjusted during the installation or operation of **microcut**. *Any* alteration to the knife or clamp safeties, circuits, or operation, or *any* installation technique that compromises the safety of anyone working on or around the machine is STRICTLY FORBIDDEN. **Guarding may need to be altered or added** to offer proper protection when **microcut** parts and assemblies are added to the machine. *Never* operate the machine until *all* guarding is complete. *All* moving parts and hazards must be covered in such a way as to prevent accidental contact of *any* sort. Any nip, draw-in, crush, or shearing hazard must be evaluated and eliminated.

Use the NOTES pages throughout this manual to document all changes that were made to the machine during the installation as well as steps to perform to return to the original operation.

Show the operator the installation, making sure he is comfortable with all mounting locations.

microcut is designed for all machines. When shipped the unit has no idea what type of machine it is on. The set up routine allows **microcut** to understand the machine it has been installed on. This **must** be completed to allow correct operation. Until then motor and counting direction may be wrong and the machine sizes may be wrong. Serious damage may be inflicted on the machine while this is the case. Do not operate **microcut** until the set up routine has been completed. It is a good idea to go through this routine with the operator so that he is familiar with the approach and can select the correct machine sizes and operating parameters. Refer to the Owner's Manual for details on the set up routine.

SPECIAL NOTES FOR VARIOUS DISPLAYS AND MOTORS

The **microcut** control system is available with different displays for different needs. The JR and BASIC units require the set up routine only. The PLUS WS has several configurations that can be defined. Refer to the special notes in the set up routine section in the Owner's Manual for details.

The **microcut** control system is available with different motors for different sized machines. These motors may be 90VDC or 180VDC. For Revision A1.x boards the software must be changed to operate with a 180VDC motor. On Revision A2.0 and later boards JP700 can be moved to select the motor voltage. At power on the drive unit will indicate a 90VDC motor by blinking the "ZERO" LED several times. If the unit is set for a 180VDC motor then the LED will remain on solid. NOTE: The "CURRENT OK" LED will blink several times at power on if the VAC supplied is 100 to 130 and will remain on solid if it is 200 to 250.

Revision A2.0 and later boards can have their maximum current set to the power of the motor. Different motors require different current limits to avoid premature failure. The maximum current (or power) is indicated on the motor nameplate. If your motor's nameplate shows the maximum current (measured in amps) then the next step is straightforward. If not, you will need to adjust power to amps. If your motor is rated in horsepower (HP), one HP = 747 watts. If your motor is rated in Kilowatts (KW), then 1 KW = 1000 watts. The maximum current is rated watts / rated voltage.

Locate the potentiometer on the top half of the drive board. The potentiometer is a dark circular device about ½ inch, or 12 mm, in diameter with markings from 0 to 100. Nearby you will see a table of currents and potentiometer settings. Set the potentiometer according to your motor's allowed current. NOTE: The maximum current is the current that can be used for 100% duty cycle operation of the motor without causing excessive heat and premature failure. Generally the **microcut** motor will not operate at 100%. You may be able to turn the current up a bit to improve acceleration on some machines. If you opt to do this please use some common sense and realize you may adversely reduce the expected service life of the motor.

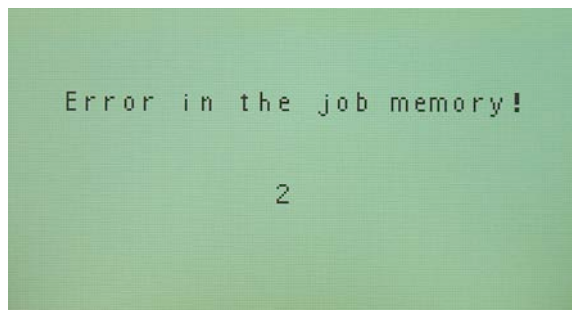
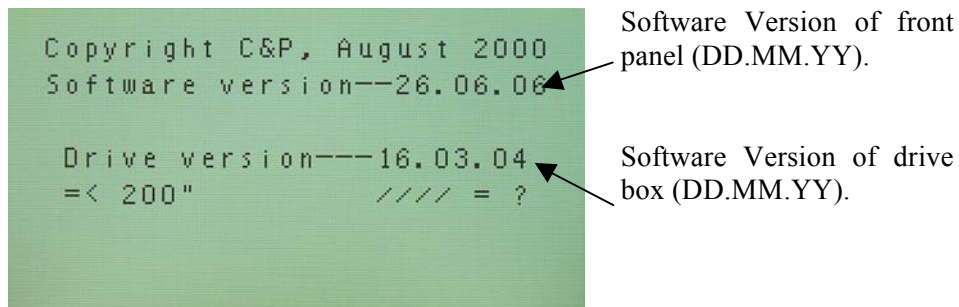
microcut BASIC SET UP ROUTINE

All **microcut** units must be told what type of machine they have been installed on before they can operate properly. This routine only needs to be done once. The information is stored in multiple locations and is verified at any power on. If an error exists the set up routine will be forced. If the shaft encoder or position sensor is changed the routine should be done. Otherwise, you can proceed directly to POWER ON (page 11).

The Set Up Routine can be used to install different languages, erase all of the job memory, enable different units of measurement, enable air table control, set machine sizes, define back gauge speed, and adjust the settling tolerance.

There are two methods of starting the Set Up Routine. The first method is the default with a brand new unit. New units have had a FULL memory erasure that will force the Set Up Routine at power on.

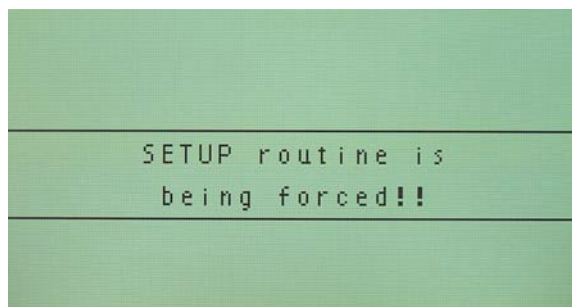
Opening screen



This screen notes that the memory does not have the set-up parameters installed. The 2 designates the error type.

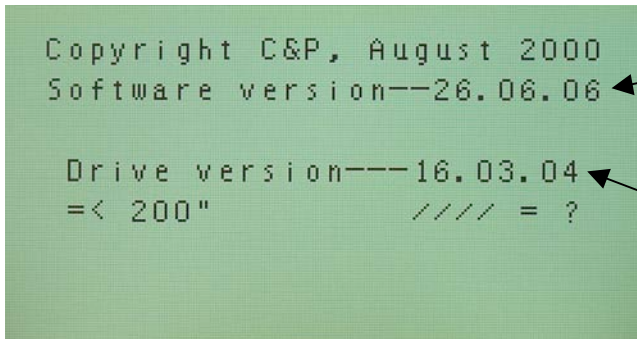
Press to continue.

You can also press any key on the keypad to continue



The next page describes the alternate method of entering the Set Up Routine if the routine has been completed.

If **microcut** has been through the Set Up Routine and you would like to change some aspect of the routine, please turn the system off and then on for the opening screen to appear.



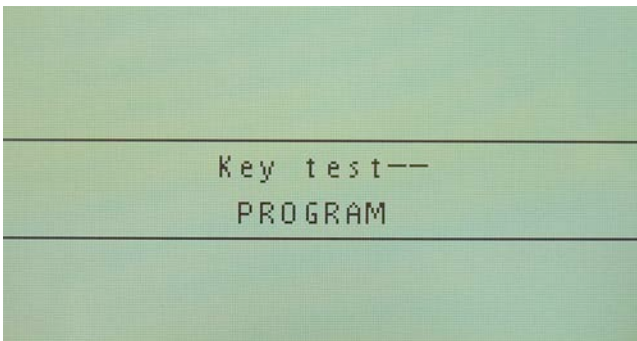
Software Version of front panel (DD.MM.YY).

Software Version of attached drive box (DD.MM.YY).

Hold in the



key at the above screen.

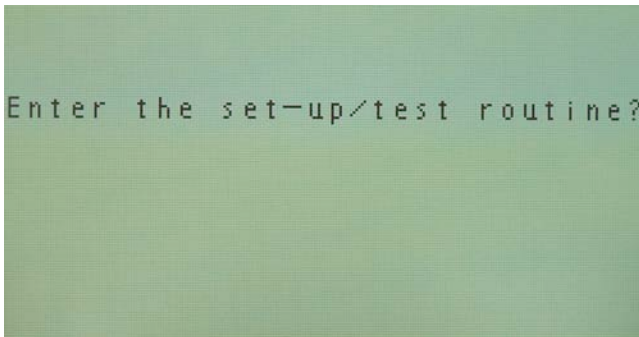


Note: During a normal power on, this screen would denote a stuck key.

When this screen appears release the



key.



Set-up routine entry screen.

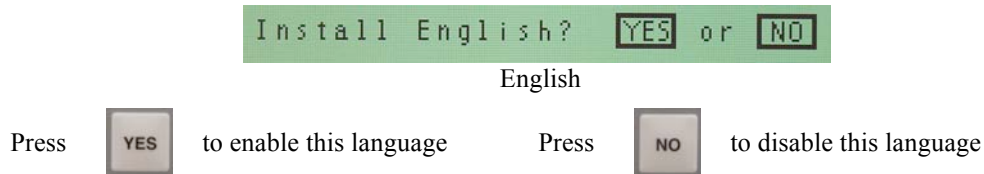
When this screen appears press the



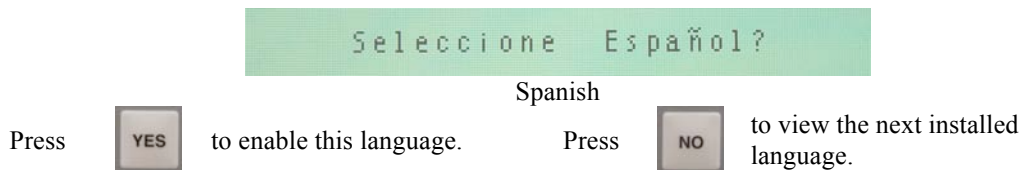
key.

microcut will now continue with the following screens:

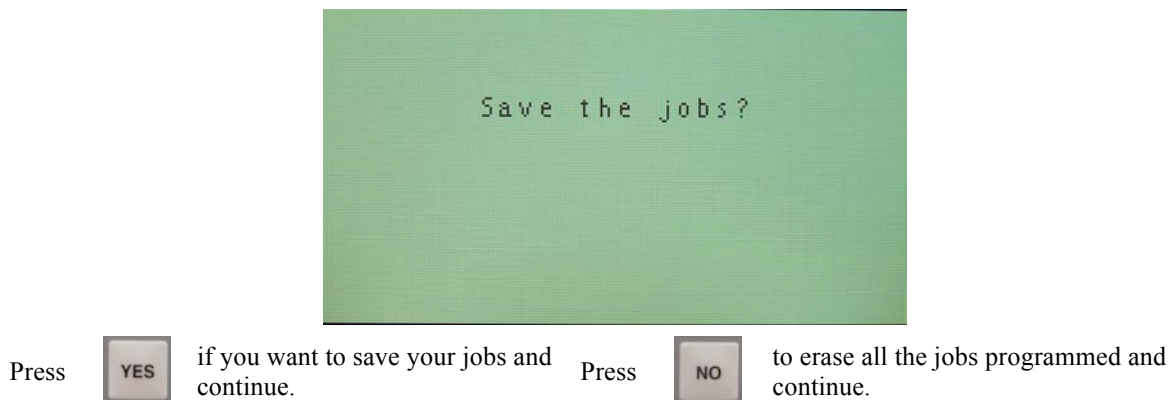
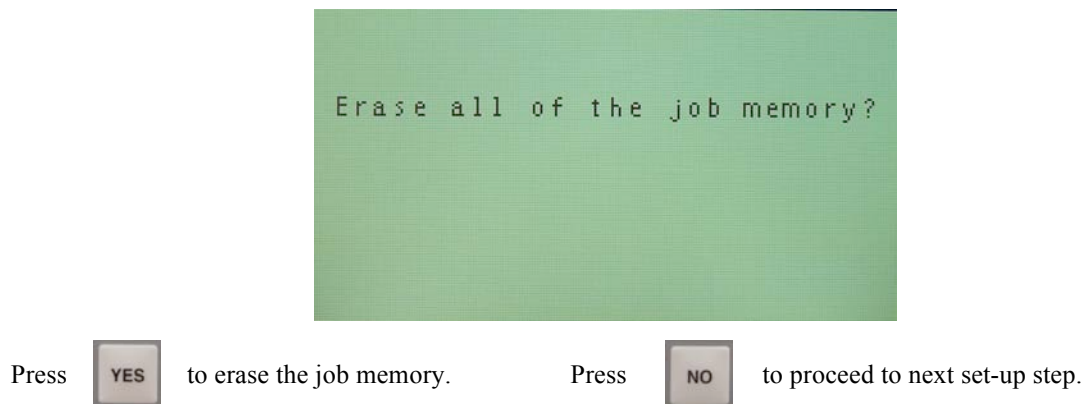
The first part of the set-up routine is language installation. You will be presented with a number of screens asking whether you want to install the named language or not. The current languages available are English, Chinese, Spanish, German, French, Russian, Italian, Netherlands, and Danish. An example of this is shown.



If you press the **YES** key on only one language, the unit will default to that language. If you press the **YES** key to more than one language, you will be presented with a screen that will ask you to select a language whenever the unit is turned on. An example screen follows:

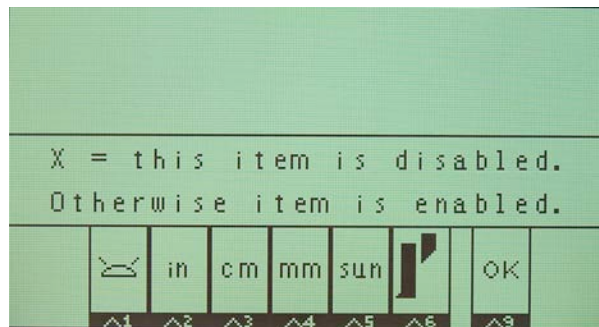


microcut will now continue with the following screens:





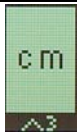



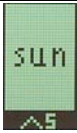
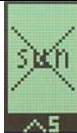








Note: This will only erase your jobs and not any other set-up parameters. The two questions require two different keys to make accidental job erasure less likely.

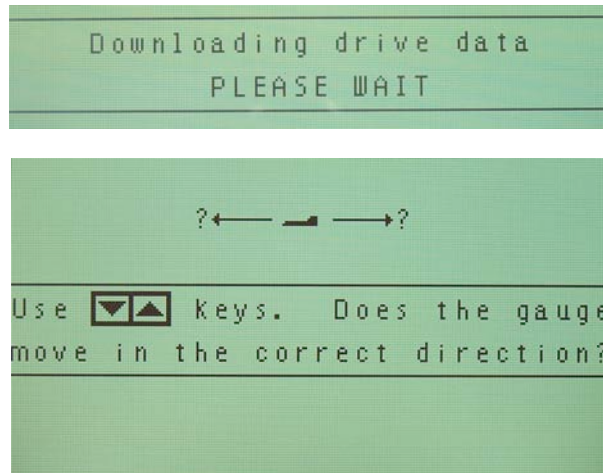
microcut will now continue with the following screen:



This screen allows you to enable/disable the air, inches, centimeters, millimeters, sun and cut optimization features of the unit.

To enable or disable feature	Shown enabled	Shown disabled
Hold in  and then press the  to enable or disable the air control. Disable this unless the air control line is installed.		
Hold in  and then press the  to enable or disable inches.		
Hold in  and then press the  to enable or disable cm.		
Hold in  and then press the  to enable or disable mm.		
Hold in  and then press the  to enable or disable sun.		
Hold in  and then press the  to enable or disable cut optimization. This is for original equipment only. Disable it unless the cut optimization lines are installed.		
Hold in  and then press the  to continue. When the screen shows your desired configuration. You can also press  to continue.		

microcut will now continue with the following screens:




Press the **DOWN ARROW** key. Does the gauge move in the forward direction?



Press the **UP ARROW** key. Does the gauge move in the reverse direction?

Going past this point then requires the full Set Up Routine.


If the direction is wrong, press NO and the computer will flip the operation.

Press  if the motor direction is correct.

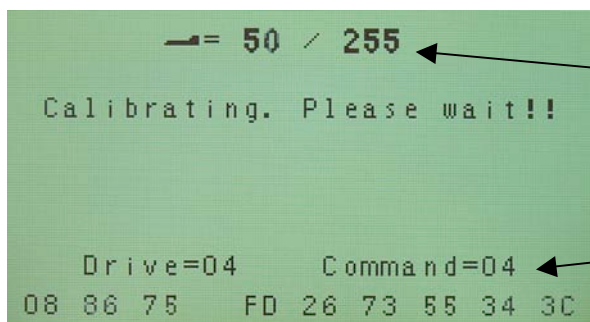
If **microcut** found that the encoder is turning the wrong way, it will correct it automatically and return you to the previous screens.

If everything is okay, the screen will then show:



Press the  key.

The screen will show:



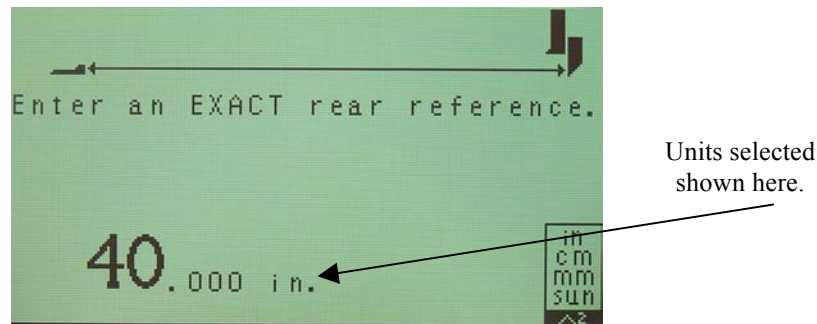
←= 50 / 255 ← Power being used to the motor.

08 86 75 FD 26 73 55 34 3C ← Internal data used for trouble shooting in case an error occurs.




The back gauge will move to the rear of the machine.

microcut will now continue with the following screen:

NOTE: For some OEM applications where the lead screw pitch is already known the reference position steps will be skipped.



Examine the screen and determine if the units of measurement are correct. If not, then do the following:

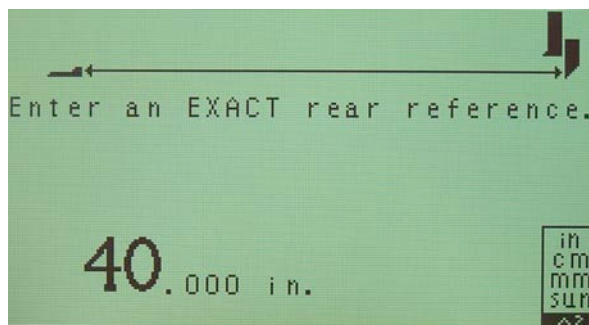
Hold in  and then press the  key to change the displayed units from inch to cm to mm to sun or back to inch. 


NOTE: For machines with the C&P Microsystems clamp/cut control circuit the main motor can now be powered on.

Measure the distance from where the back gauge is currently stopped to the cut line. Use the hand wheel and measuring device to carefully move the back gauge forward to the nearest exact number (avoid back lash). As an example, if the measurement was 40.250 inches, then move the back gauge forward to exactly 40 inches.

Use the **NUMBER** keys on the keypad to show the measured value in the display.

Using the previous example the screen will show:

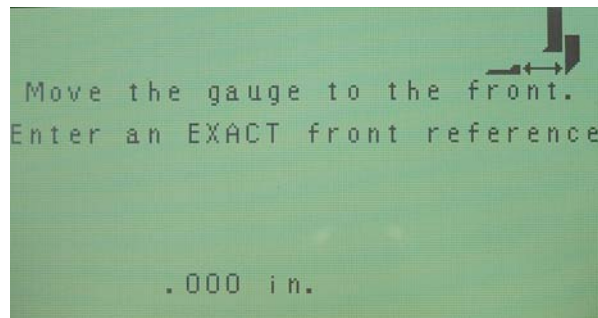


Press  when you are finished to enter your reference value and continue.

Note: The rear and front reference positions are used to calculate the lead screw pitch. If these are not precise then the lead screw pitch will be wrong and it will be impossible to correctly calibrate the gauge. If the lead screw pitch is such that the back gauge moves an exact number of inches (or cm) per one (or 2 or 4 or ...) revolution, then put a mark on the hand wheel or lead screw pulley at the back position and align this mark when entering the front position. If the positions were not absolutely exact, final calibration can be done later (see MANUAL OPERATION) if needed.

It is also a good idea to mark from the center of the encoder shaft across to the lead screw sprocket and onto the lead screw. This gives you timing marks to reference with respect to the mark above. If you ever have accuracy problems you can use these marks to verify what is slipping.

microcut will now continue with the following screen:



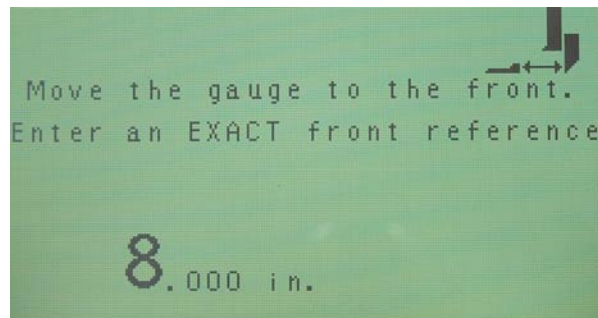
Press the **DOWN ARROW** key to drive in the forward direction. Release the key when the back gauge is less than 10 inches from the cut line.

NOTE: This is the first time that the position of the cut sensor is evaluated. If the cut sensor is not correctly installed the screen will show a series of knives moving downwards. If this appears, check the cut sensor carefully (refer to the installation section of this manual and the diagnostic LEDs contained within the drive box).

Measure the distance from where the back gauge is currently stopped to the cut line. Use the hand wheel to move the back gauge forward to the nearest exact number (avoid back lash). As an example, if the measurement was 8.250 inches, then move the back gauge forward to 8 inches.

Use the **NUMBER** keys on the keypad to show the measured value in the display.

Using the previous example the screen will show:

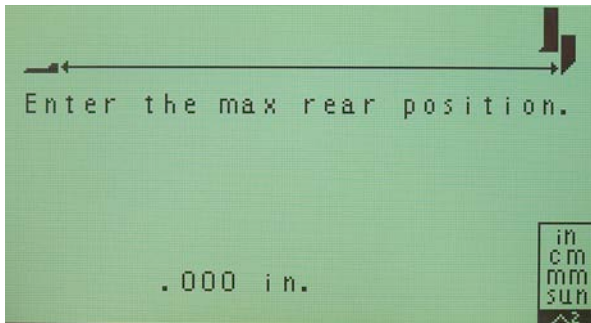


Press




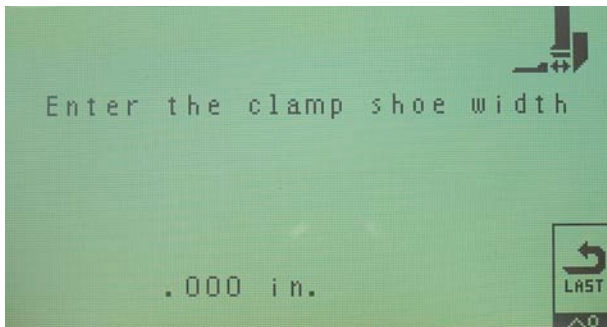
When you are finished to enter your reference value and continue.

microcut will now continue with the following screens:




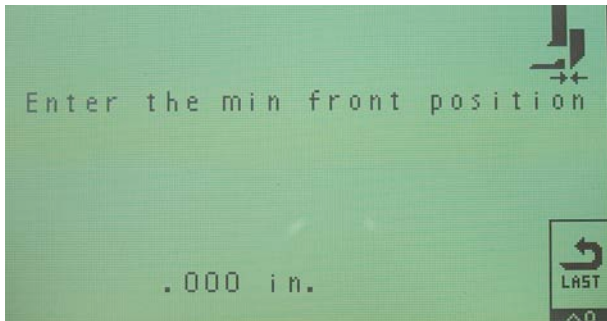
Use the **NUMBER** keypad to display the actual maximum rear of the paper cutter. This value must be greater than where the rear proximity sensor is tripped.

Press  to enter the value and continue.




Use the **NUMBER** keypad to enter the width of the removable plate that mounts to the clamp. If you do not have this plate then enter the minimum cut (how far the back gauge can travel to the front).

Press  to enter the value and continue.



Use the **NUMBER** keypad to enter the minimum cut (how far in the back gauge can travel to the front).

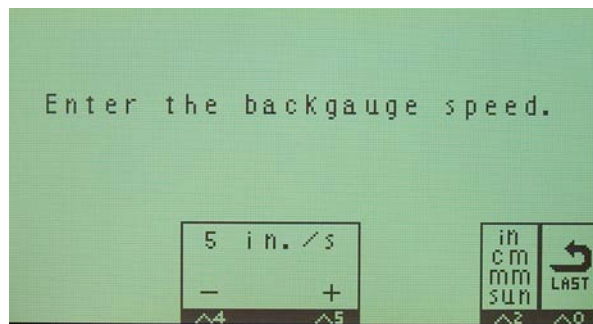
Press  to enter the value and continue.

If you enter a value on the previous screens that you feel may be inaccurate, back up to the entry you would like to redo by:

Holding  and pressing  to back up to a previous screen .



microcut will now continue with the following screen:

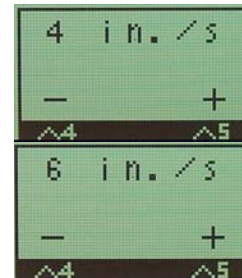



Please note a good starting speed value is size of the paper cutter divide by 6.

To change the listed speed:

Hold in  and tap  to decrease the shown speed.

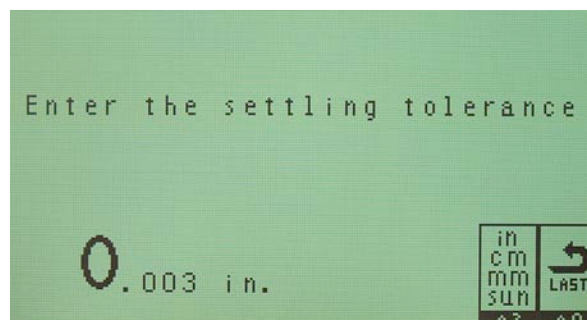
Hold in  and tap  to increase the shown speed.



When you are finished entering the value, press  to continue.


Note: Speed is approximate. Absolute maximum speed is based upon pulley ratios and the mechanical condition of your cutter.

microcut will now continue with the following screen:



Use the **NUMBER** keypad to change the listed tolerance setting.

The tolerance allows the display to settle on a position. All mechanical systems contain a certain amount of flex or vibration. If the tolerance is too small, any flex or vibration will cause the current position display to flutter between numbers. Generally the tolerance is set to .003 inches (.007 cm), although tighter or looser tolerances can be selected. To insure the display is stable, the drive control will re-correct the gauge anytime that the error is more than half of the tolerance setting. A .003 inches setting will yield actual accuracy to .0015 inches (.004 cm). Larger tolerances allow faster positioning and faster cutting.

Press  when you are finished entering the value to continue.

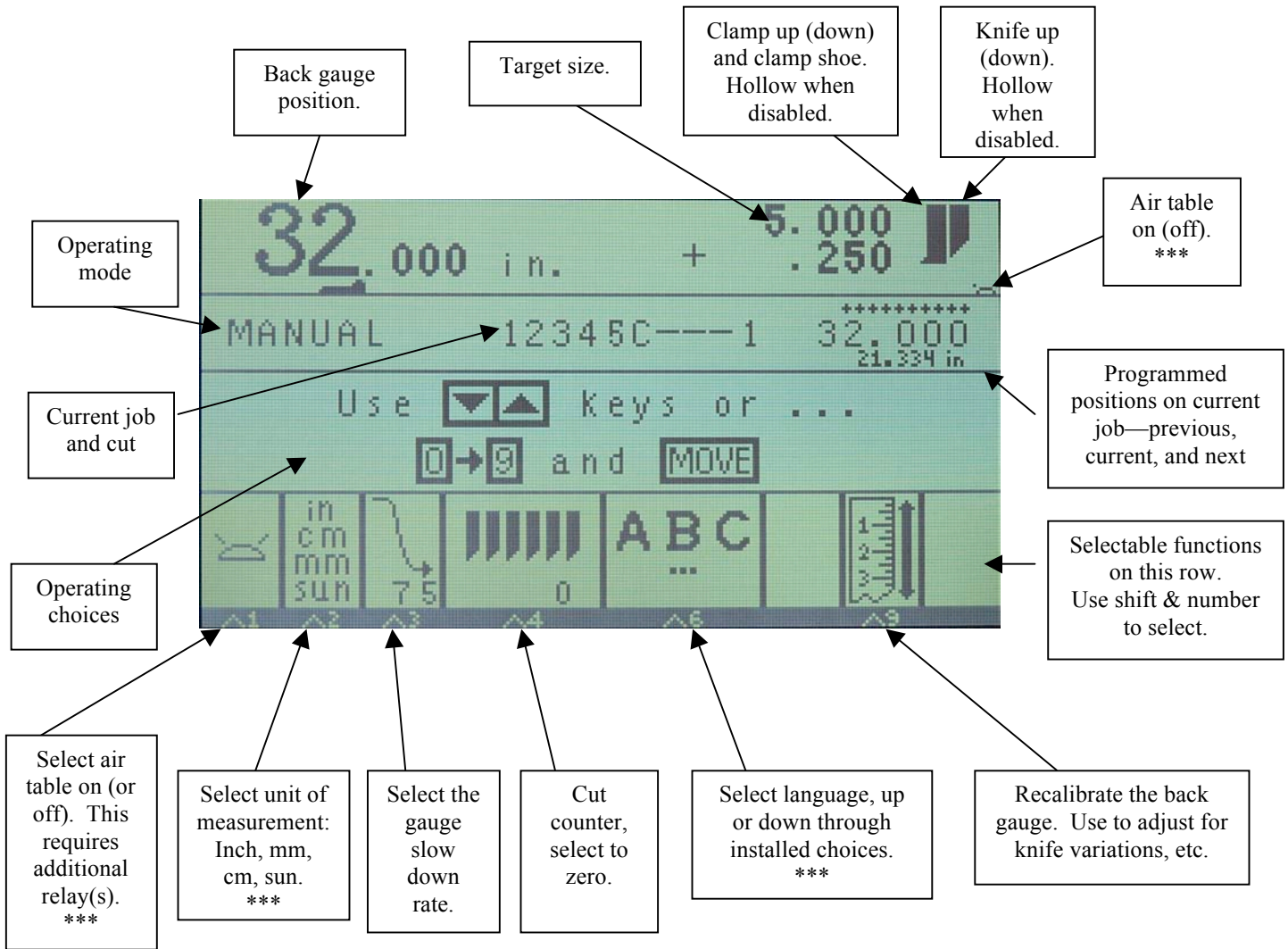
The Set Up Routine is now complete.

The unit will restart automatically. After the unit reaches the rear of the machine and calibrates, move it to a known position and check for accuracy. Use the MANUAL MODE ^9 option (see next page) to make any necessary adjustments.

Note: The deceleration rate is forced to 75% during the set-up routine. This can be adjusted from **MANUAL** mode, after power on and calibration (see next page).

POWER ON AND MANUAL MODE

At power on the computer must calibrate to the machine. Follow the instructions on the screen to select a language and do the calibration. After this the manual mode screen will appear—



Manual mode is used when the operator wants to manually control the position of the back gauge for every cut. The **DRIVE** keys will move the back gauge and turn off auto-correction. A quick tap to the key will move the back gauge .001 (inch or cm, or .01mm) and turn auto correcting back on.

The **MOVE** key will enable auto-correction of the back gauge. For fractions, key in the whole size and then add the fraction: 20.000 + 1 / 4. Press **MOVE** or **YES** to total the value. Auto correcting will be activated.

To select a desired function, hold the ^ (**SHIFT**) key and then press the number required.

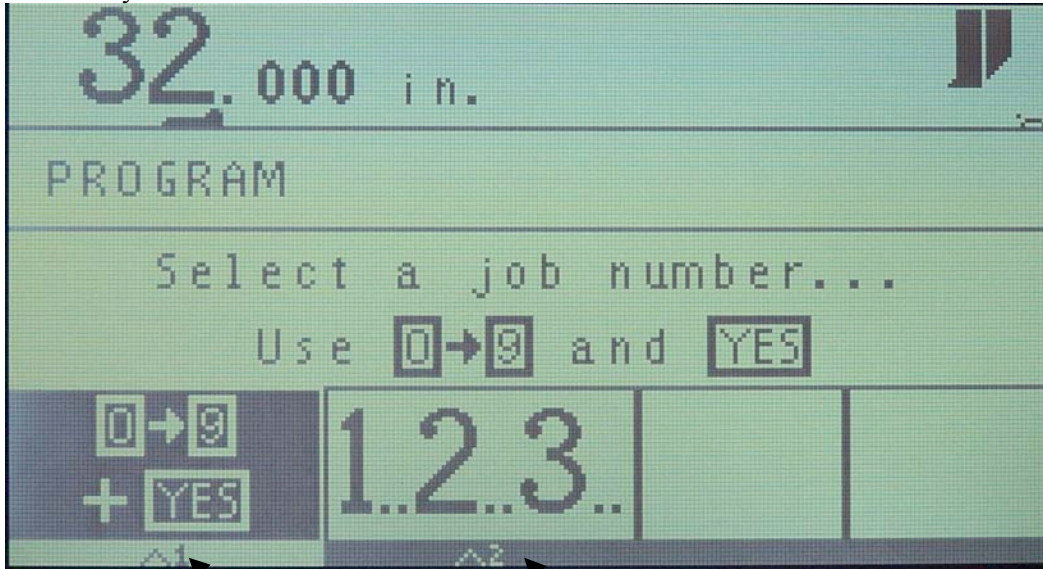
Press the **MANUAL** key from any mode to return to manual mode.

If your cutter has a retractable hand wheel with sensor installed, when you release the hand wheel the current position will become the new target and auto correction will be activated.

*** The ^1 option and air icon will only show if the air control is enabled. The ^2 option will show only the enabled units and will be blank if only one unit is enabled. The ^6 option will be available only if more than one language is installed. In MANUAL mode you can press ^5 and then ^7 to adjust the air, units, speed, and tolerance options. Refer to the SET UP ROUTINE for language selections.

PROGRAM MODE

Program mode allows you to define a set of positions for the backgauge to cycle through. To program a job press the **PROGRAM** key—



Default option. Key in the number you want for new job & press **YES**. Use the **ARROW** keys to scroll into the alphabet.

Select to let computer choose the lowest new job number for you.

A job number must be supplied before programming can begin. Use the **NUMBER** and **YES** keys to select a job or use ^2 for the computer to find the lowest available job number. After a job number is selected the main program mode screen will appear—

Job and cut number. Dashes are *s if target is a cut optimization.

Programmed positions—previous, current, and next

Back to previous cut.

Select air table on (or off).

Select unit of measurement: Inch, mm, cm, sun. ***

Target type--Cut

Start label mode.

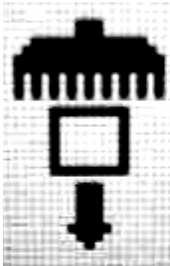
Start sheet divide mode.

Options will appear on the bottom part of the screen only when appropriate. For instance insert will appear only if a cut already exists after the location displayed. Delete will not be shown unless the location is already programmed.

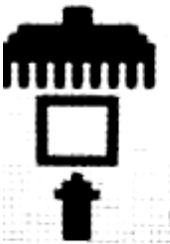
To program positions, move the back gauge and make cuts or key in the positions and press **YES**. Use ^3 to adjust the target type. The side of a knife is for a cut (see previous picture). The side of a clamp is for a clamp



Clamp only location. Some OEM applications have this feature. If your cutter does not, then this can be programmed as a reminder to use the foot treadle only.



Push out shows the arrow away from the gauge. The screen's job/target area will show a vertical bar and an arrow pointing away from it.



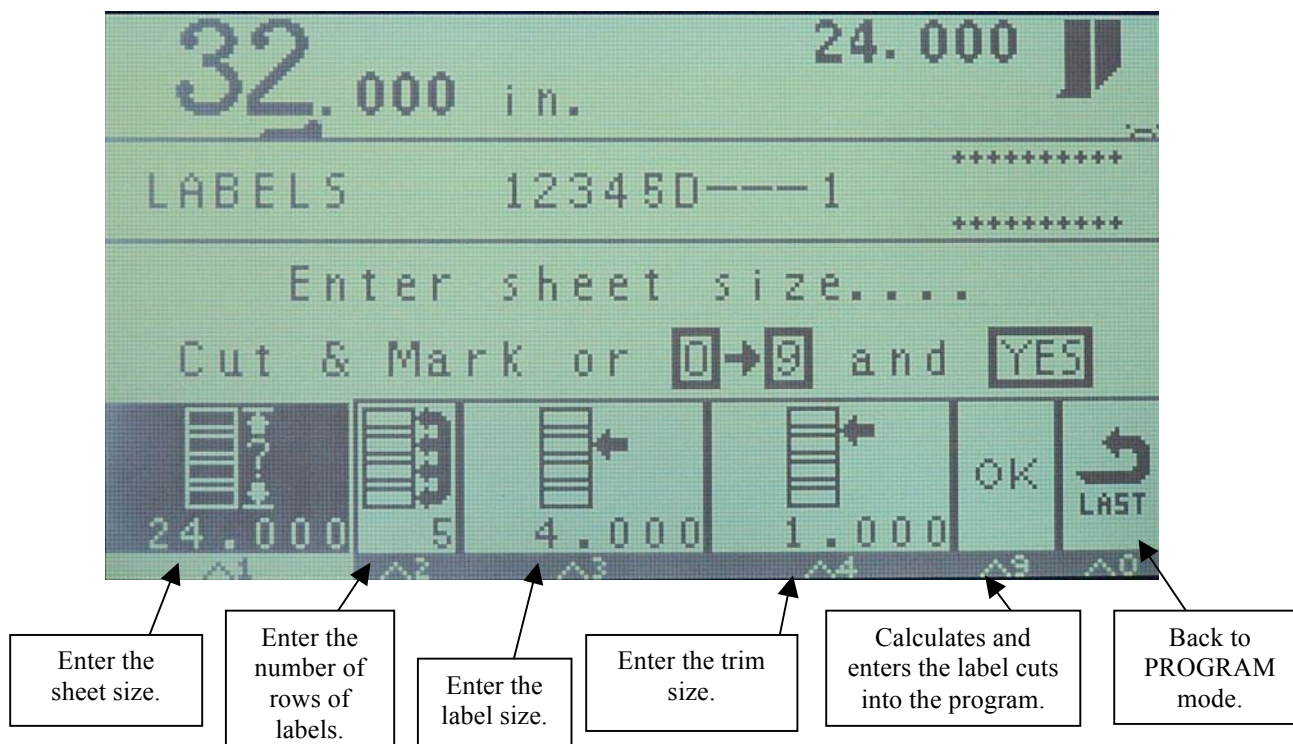
Loading point shows the arrow towards the gauge. The screen's job/target area will show a vertical bar and an arrow pointing toward it.



Cut optimization. This is a feature available on some OEMs only. If your cutter does not have this feature and you would like to disable it, please refer to the Set Up Routine section of this manual.

SEE NEXT PAGE FOR ADDITIONAL PROGRAMMING INFORMATION

This is the screen when the label function is selected—



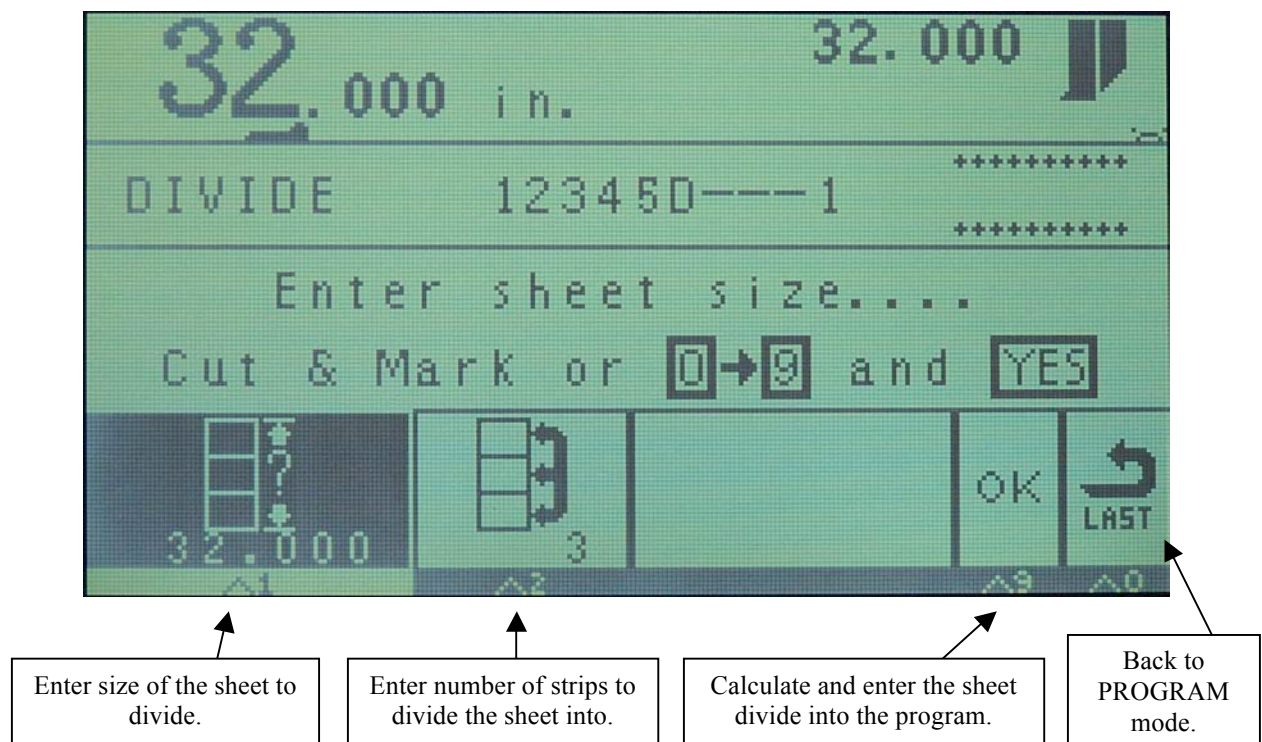
The screen will guide you to enter the values required to automatically calculate all the stop positions required for the label work. The reverse lighted box is the one you are working with—

1. First it will ask for the first cut size. Key this value in and press the **YES** key.
2. Now the second function will be selected, asking for the number of label rows. Key this value in and press the **YES** key.
3. The third function will now ask for the label size. Key this in and press **YES** as before.
4. The fourth function will now suggest what the trim-out size should be in the target size display (top right screen). You can accept it or enter your own value. Press the **YES** key when complete.

Note that as you enter the values, they are recorded at the bottom of each function icon. You can go back and make changes if needed.

Finally select OK (^9) to command the computer to place all the required cuts into the program. Select LAST (^0) to exit without programming.

This is the screen when the sheet divide function is selected—



The screen will guide you to enter the values required to automatically calculate all the stop positions required to divide the sheet equally. The reverse lighted box is the one you are working with —

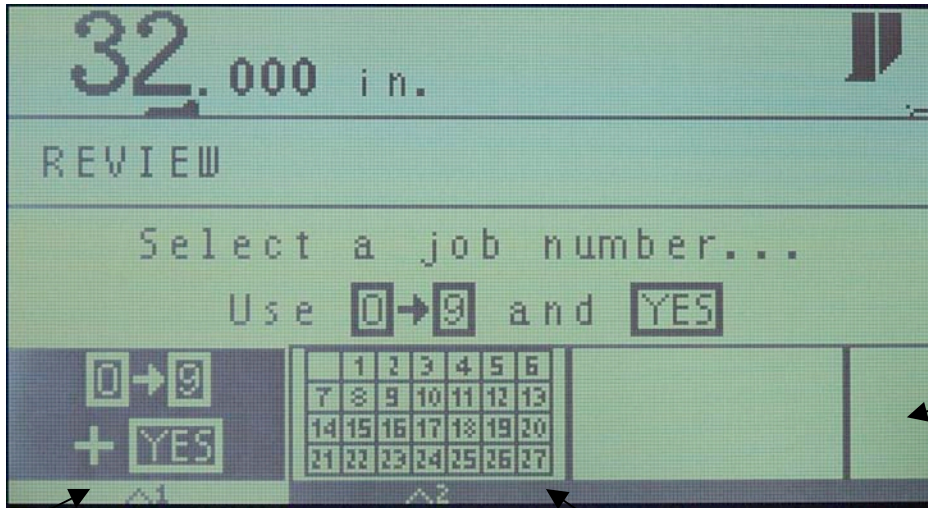
1. First it will ask for the whole sheet size. Key this value in and press the **YES** key.
2. Now the second function will be selected, asking for the number to divide the sheet by. Key this value in and press the **YES** key.

Note that as you enter the values, they are recorded at the bottom of each function icon. You can go back and make changes if needed.

Finally select OK (^9) to command the computer to place all the required cuts into the program. Select LAST (^0) to exit without programming.

REVIEW MODE

Review mode allows you to recall jobs that were programmed previously. To enter this mode, press the **REVIEW** key. The review screen will appear—



Select last job used. ^0 will appear only if there is a last job.

Select the job number you want to use.

See each program chronologically to help you find the job you want.

For a specific job (^1) use the **NUMBER** and **YES** keys. For chronological selection (^2) press **NO** to go to the next job or press **YES** to select the job. Once a job is selected the program mode options will appear on the lower part of the display allowing you to review the job (the same as in PROGRAM MODE) and, if necessary, make adjustments—



Back to previous cut.

Select air table on (or off).

Insert a new target.

Delete this target.

Start label mode.

Start sheet divide mode.

Change this target.

Delete job*

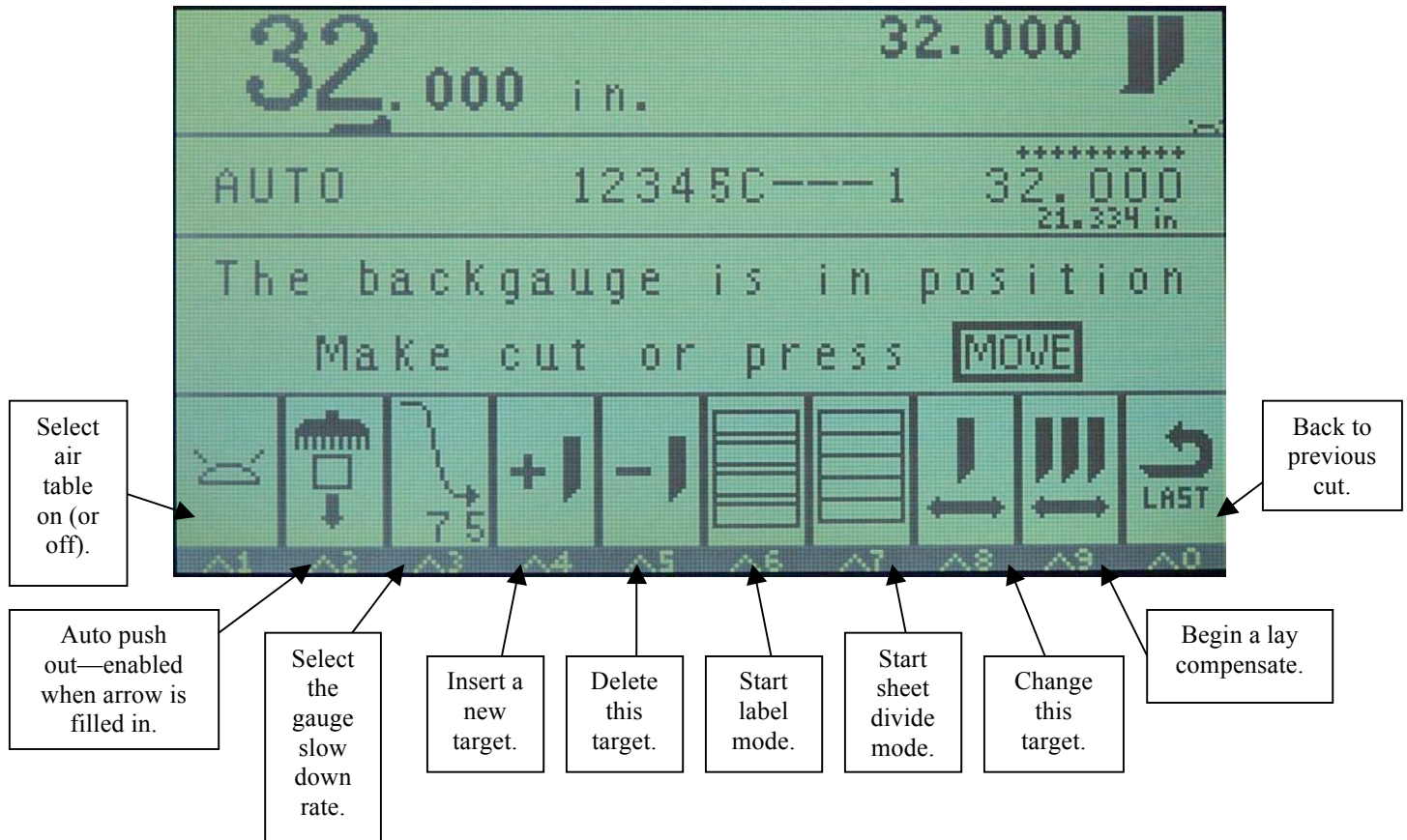
Options will appear on the screen only when appropriate.

Press the **AUTO** key to enter automatic operation at the displayed position.

*Press and hold the **REVIEW** key at power on for a choice to erase ALL jobs—when the screen shows REVIEW KEY IS PRESSED release the key for the option.

AUTOMATIC MODE

Automatic mode is used to allow the computer to position the back gauge correctly throughout a job. Program a job or select an old job (see previous pages). Press the **AUTO** key. The automatic mode screen will appear—



Options will only appear on the screen only when appropriate.

The back gauge will move from one target to the next as the knife cycles or when the **MOVE** key is pressed. The **YES** or **LAST** key is used to move forward or backwards through a job. You can make changes in the same way as when you created the job.

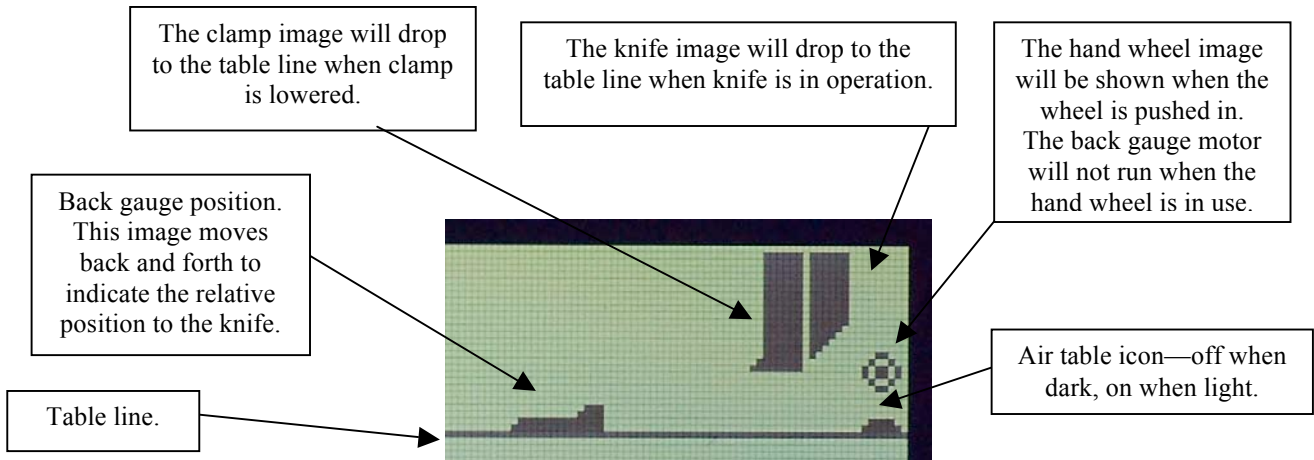
For instance ^2 will convert to change units only when a target is being modified or inserted. ^3 will show change units only under those same circumstances.

Lay compensate allows you to move all forward moving cuts by the same amount (to adjust for movements of the printed image on the sheet). It will not change any cuts after a push, a load, a reverse gauge move, or the end of the job.

The air will turn on for any reverse drive or push out. The air will turn off when the clamp is lowered. It is possible to program the air table after the cut but before the clamp is raised. This is useful for moving work across to the side tables. You can do this by using the air table function after a cut while holding the clamp down. The air after cut feature defaults to the off state during programming.

SENSOR ICONS ON THE SCREEN

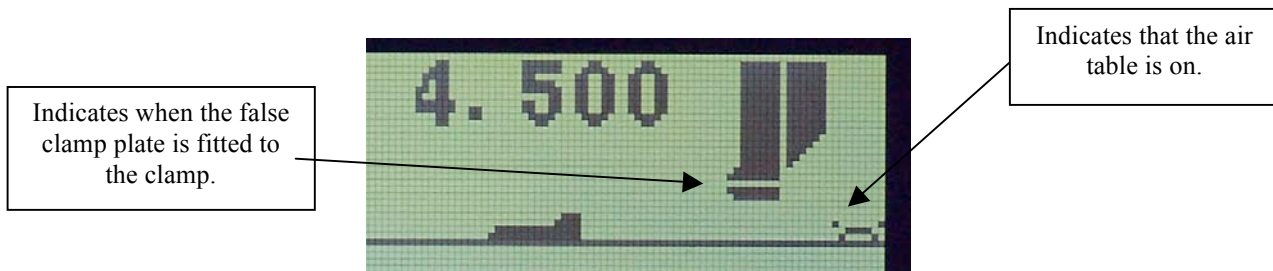
There are several sensors attached to the computer to insure that correct operation can occur. The top section of the screen shows the states of several of these sensors. Refer to the next three diagrams for details—



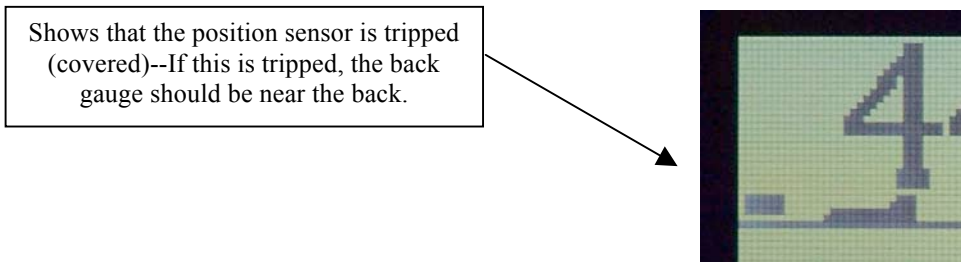
Operation of the clamp and knife in automatic mode will advance the controller to the next position. The back gauge motor will not move if either the clamp and/or knife are down.

If the hand wheel is pressed, upon release the back gauge will auto-correct to the new position.

The air is controlled by the air function as well as programming (when in automatic mode). With the clamp up the air will be on or off based upon the air status (^I). The air will go off when the clamp is down and stay off unless the unit is in AUTOMATIC mode and the air after cut feature is programmed for on. The air will also be forced on for any push out or reverse drive.



When the false clamp (sometimes called the clamp shoe or sole plate) is attached to the clamp the minimum forward drive will be larger. If a program contains positions that are smaller than the false clamp size and the false clamp is installed, an error message will occur when the back gauge is asked to go to that position.



If any icons are different from the machine, then check all cables, connectors, sensors, and mechanical adjustments carefully. There are LEDs in the drive box to indicate the sensor status as well. Each LED is labeled on the PCB and is located above its corresponding cable.

ERROR MESSAGES

The control system is constantly checking to make sure that everything is correct during operation. If anything appears to be wrong, a message will appear on the screen. These can be of three different types—

1. Conditional, just indicating operations as they progress.
2. Minor, where pressing any key will clear the screen and resume normal operation.
3. Major, where the power will have to be turned off and back on again, or repairs may be necessary.

Prompts generated by the display:

Entered value is too small!!!

This value cannot be zero!!

Cut stroke early!!

Job number already used!

Out of job programming memory!

Job number not found!!

There are no more jobs!!

Not enough available memory!

The information is incomplete!

Target is out of table range!!

Error in the job memory!

Error in leadscrew values!

Error in machine sizes!!

Check keyed in value to move to

Cannot divide by 0

Wait longer before cutting

Choose a different number

Memory chip is full, erase some of the jobs

Try another number

First 999 used OR no more jobs to review

Label or divide require too much space

Not enough input to continue

Trying to go too far back or forward

Data in memory is invalid, setup will be forced

Inch, cm mm, sun pitches disagree, setup will be forced

Machine sizes are impossible for machine, setup will be forced

Refer to the following pages for more messages.

STATUS INDICATORS FROM THE H3 DRIVE COMPUTER

The computers track all operations of the machine and send reports to the display constantly. Individual sensors are also monitored and displayed near the top of the screen. LEDs on the H3 Drive PCB allow you to perform additional evaluations.

The following table lists error numbers sent from the H3 to the display and their corresponding messages. The first number is in standard form (Base 10). The number in parenthesis is in hexadecimal form (Base 16—for computer counting). JR and BASIC units display the hexadecimal form of the number as well as the message. The PLUS WS unit shows the message followed by the standard (base 10) number.

Status	Drive computer conditions
00	Steady state, no errors
04	In preset drive routine
06	In factory reverse drive test
10 (0A)	In knife change mode (special software required)
15 (0F)	In calibrate gauge routine (momentary flash only)
96 (60)	Waiting for RAM download at power on
97 (61)	Waiting for preset drive (or factory test drive) at power on
98 (62)	AC power check (unused remnant of H1 drive)
99 (63)	In factory forward drive test
100 (64)	In knife change routine stage 2 (special software required)
128 (80)	Target lost
129 (81)	No motion seen (fatal error forced in preset or set up)
130 (82)	Data download time out error
131 (83)	Data download last byte not equal to #5Ah
132 (84)	Data download RB8 not set on last byte
133 (85)	Data download RB8 set before last byte
134 (86)	Data download version of 83h but with RB8 set
135 (87)	Too many over current errors during drive. The speed has been limited. Oil the screw.
181 (B5)	No motion at preset forward drive
182 (B6)	Position sense error
183 (B7)	No motion at preset reverse drive
184 (B8)	Zero set missing after position sense
185 (B9)	Reverse drive is forward
186 (BA)	No motion at start up reverse test
187 (BB)	Impaired drive at reverse test, lube
188 (BC)	Forward drive is reverse
189 (BD)	No motion at start up forward test
190 (BE)	Impaired drive at forward test, lube
191 (BF)	Duplicated data on last zero set position value lost
192 (C0)	Too many counts without a zero set
193 (C1)	UART time out error—too long without communication from the display

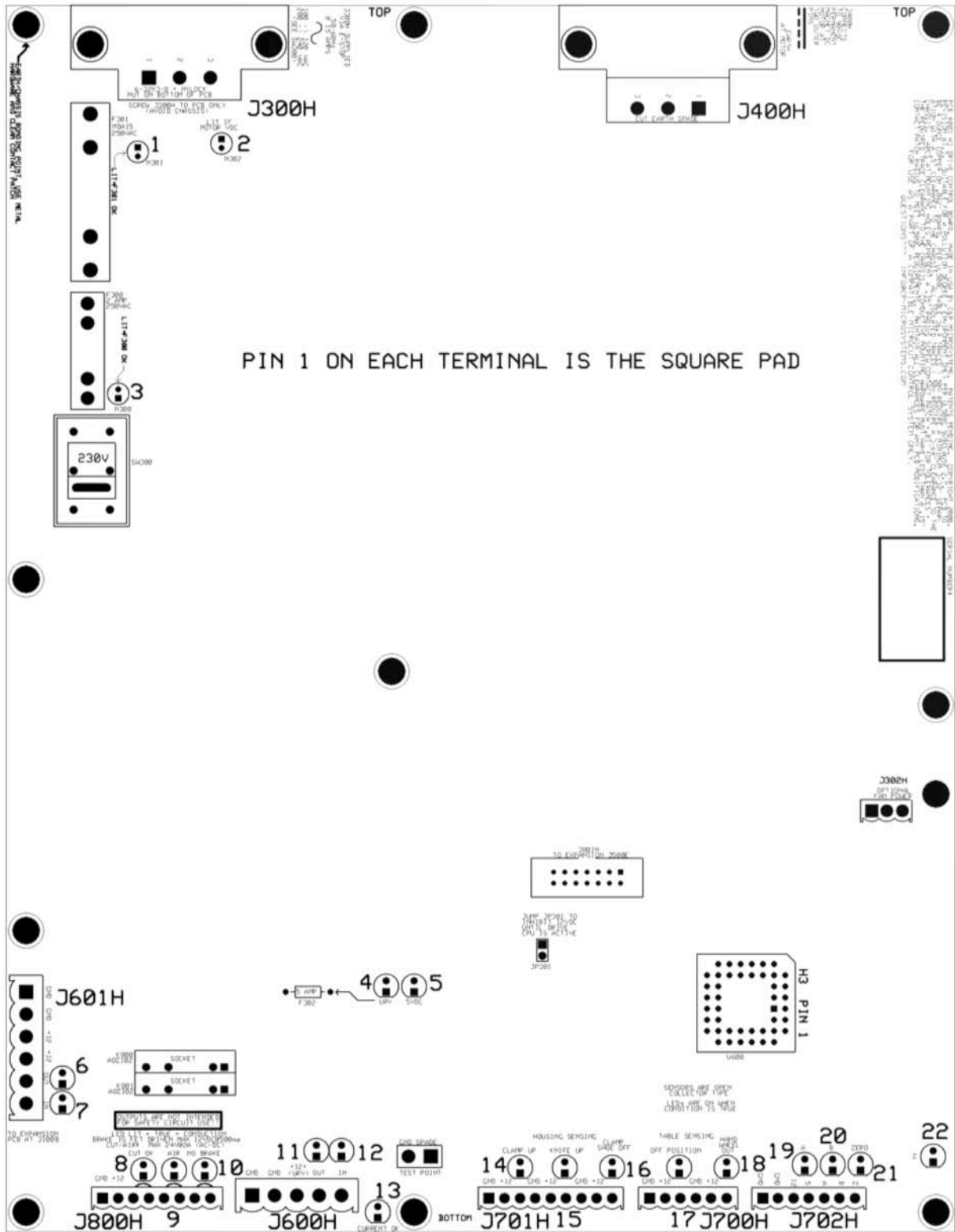
NOTE: A 135 (87) Over Current error will occur if after the back gauge has been given enough time to accelerate, the system continues to see excessive current going through the motor for too many cycles. In this event, the computer will reduce the current speed by 10% and use this as a limit regardless of what the display requests. With each move the H3 Drive will increase the limit by a small amount.

If lubrication is not performed or the speed reduced, another Over Current error is likely to occur.

On European machines with acme screws generally 6 to 8 inches per second (15 to 20 cm per second) is a maximum speed. Anything beyond that will bind the screw and the bearings and result in higher energy use without increased speed.

H3 BOARD

Revision 1 H3 boards:



See next pages for details on the LEDs and connectors.

H3 INDICATOR LIGHT DEFINITION TABLE

The following table defines the purpose of each LED. Refer to the connector table and cabling diagrams as well.

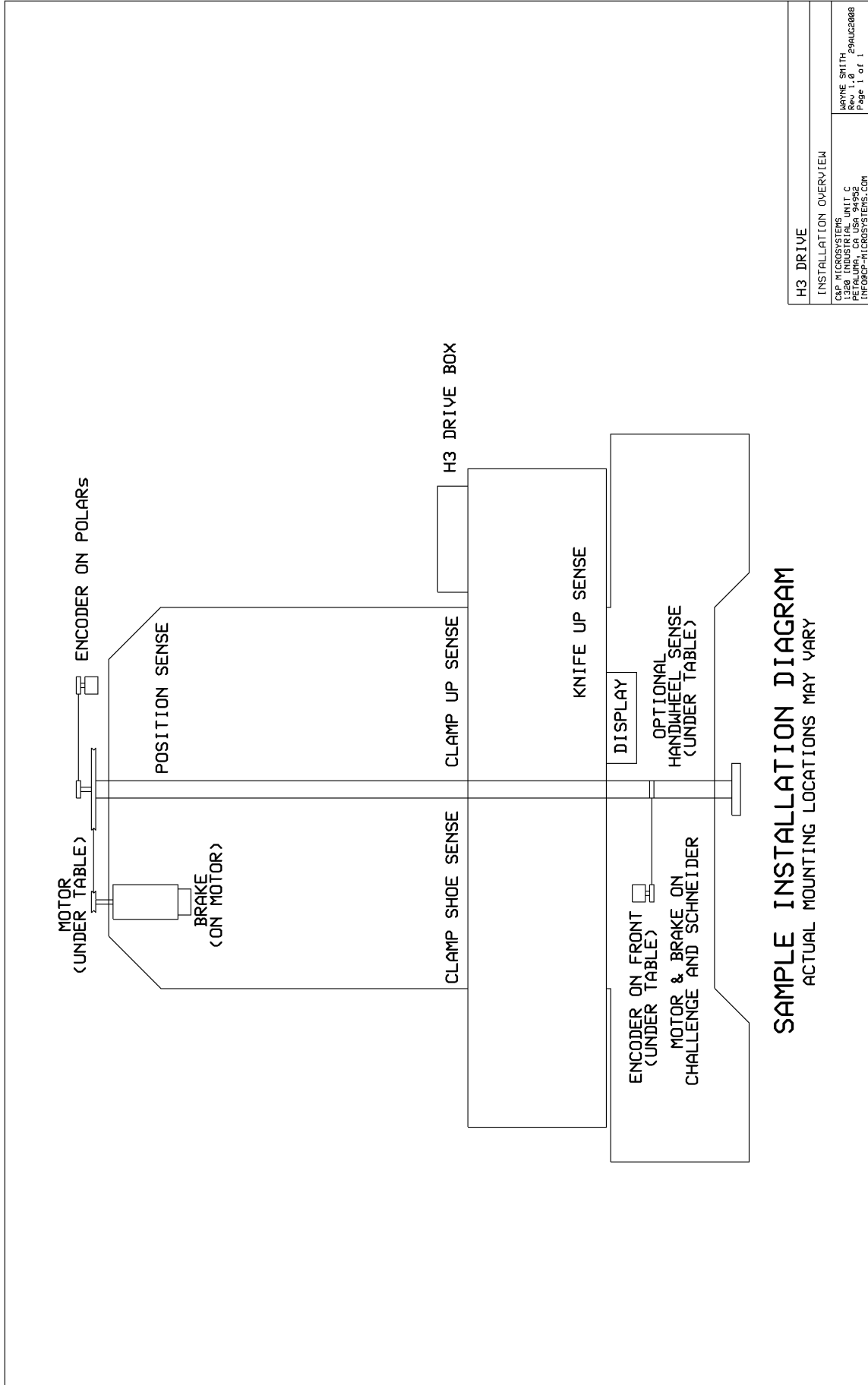
Number	Definition when ON
1	Revision 1: Fuse 301 is OK (20 amp slow blow) Revision 2: Not used
2	Revision 1: Full wave bridge (FWB301) is OK Revision 2: Fuse 300 (20 amp slow blow or circuit breaker) and FWB351 OK (lights slowly at power on)
3	Revision 1: Fuse 300 is OK (2 amp quick blow) Revision 2: Not used
4	Revision 1: Voltage from TRAN302, FWB306, and F302 (5 amp) is OK Revision 2: Fuse 301 (5 amp solder type) and 12VDC switching power supply are OK
5	+5 VDC from U307 is OK
6	UART send from H3 drive computer to Expansion computer is operating
7	UART send from Expansion computer to H3 drive computer is operating
8	The cut operation is being enabled
9	The air table is active
10	The brake is being energized to the not braking state
11	UART send from the H3 drive computer to the display is operating
12	UART send from the display to the H3 drive computer is operating
13	The current through the back gauge drive motor is not excessive
14	The clamp is in the full up position
15	The knife is in the full up position—not active on this PCB, see B65 control PCB
16	The clamp shoe is in its holder rather than attached to the clamp (full forward drive is allowed)
17	The back gauge is in front of the rear position sensor
18	The hand wheel to manually position the back gauge is not pressed in
19	The “A” quadrature signal from the shaft encoder is active
20	The “B” quadrature signal from the shaft encoder is active
21	Flips each time the zero signal is received from the shaft encoder
22	The “ZERO SET” signal from the shaft encoder is active

H3 TERMINAL CONNECTION TABLE

The following table explains the function of the various connectors as well as the individual connections of each. Notes are included as appropriate. The cable diagrams elsewhere may also be beneficial.

Terminal	Pin	Purpose
J300H	1, 2, 3	AC power into the H3 drive—check SW300 for voltage range, center pin is earth (chassis)
J400H	1, 2, 3	Cable for back gauge drive motor, center pin is earth (chassis), also see J800H
J601H	1	Computer ground to connect to B65 control PCB
	2	Spare ground connection
	3	Computer +12 VDC to connect to B65 control PCB
	4	Spare +12 VDC connection
	5	UART signal from H3 drive computer to Expansion computer
	6	UART signal from Expansion computer to H3 drive computer
J800H	1	Ground for external relay coil connections (see Auxiliary Controls later in this manual)
	2	+12 VDC for external relay coil connections (see Auxiliary Controls later in this manual)
	3	Normally open contact for cut enable control—not used
	4	Normally open contact for cut enable control—not used
	5	Normally open contact for air enable control—see B65 connector J400B
	6	Normally open contact for air enable control—see B65 connector J400B
	7	Ground path to energize the back gauge motor brake
	8	+12 VDC to energize the back gauge motor brake
J600H	1	Spare computer ground for the display power (possible shield connection)
	2	Computer ground for the display power
	3	Unregulated voltage (see LED 4 in previous table) for display power
	4	UART signal from H3 drive computer to display computer
	5	UART signal from display computer to H3 drive computer
J701H	1	Computer ground for the sensor power
	2	+12 VDC for the sensor power
	3	Ground connection from clamp sensor when clamp is full up
	4	Computer ground for the sensor power—not used
	5	+12 VDC for the sensor power—not used
	6	Ground connection from knife sensor when knife is full up—not used
	7	Computer ground for the sensor power
	8	+12 VDC for the sensor power
	9	Ground connection from clamp shoe sensor when clamp shoe is in its holder (not on the clamp)
J700H	1	Computer ground for the sensor power
	2	+12 VDC for the sensor power
	3	Ground connection from position sensor when the back gauge is in front of the sensor
	4	Computer ground for the sensor power
	5	+12 VDC for the sensor power
	6	Ground connection from hand wheel sensor when the hand wheel is released
J800H	1	Computer ground for the encoder shield (optional)
	2	Computer ground for the encoder power
	3	+12 VDC for the encoder power
	4	+5 VDC for the encoder power
	5	“A” quadrature signal from the encoder (driven +12, driven +5, or open collector to ground OK)
	6	“B” quadrature signal from the encoder (driven +12, driven +5, or open collector to ground OK)
	7	“ZERO SET” signal from the encoder (driven +12, driven +5, or open collector to ground OK)

SAMPLE INSTALLATION LOCATION DRAWING

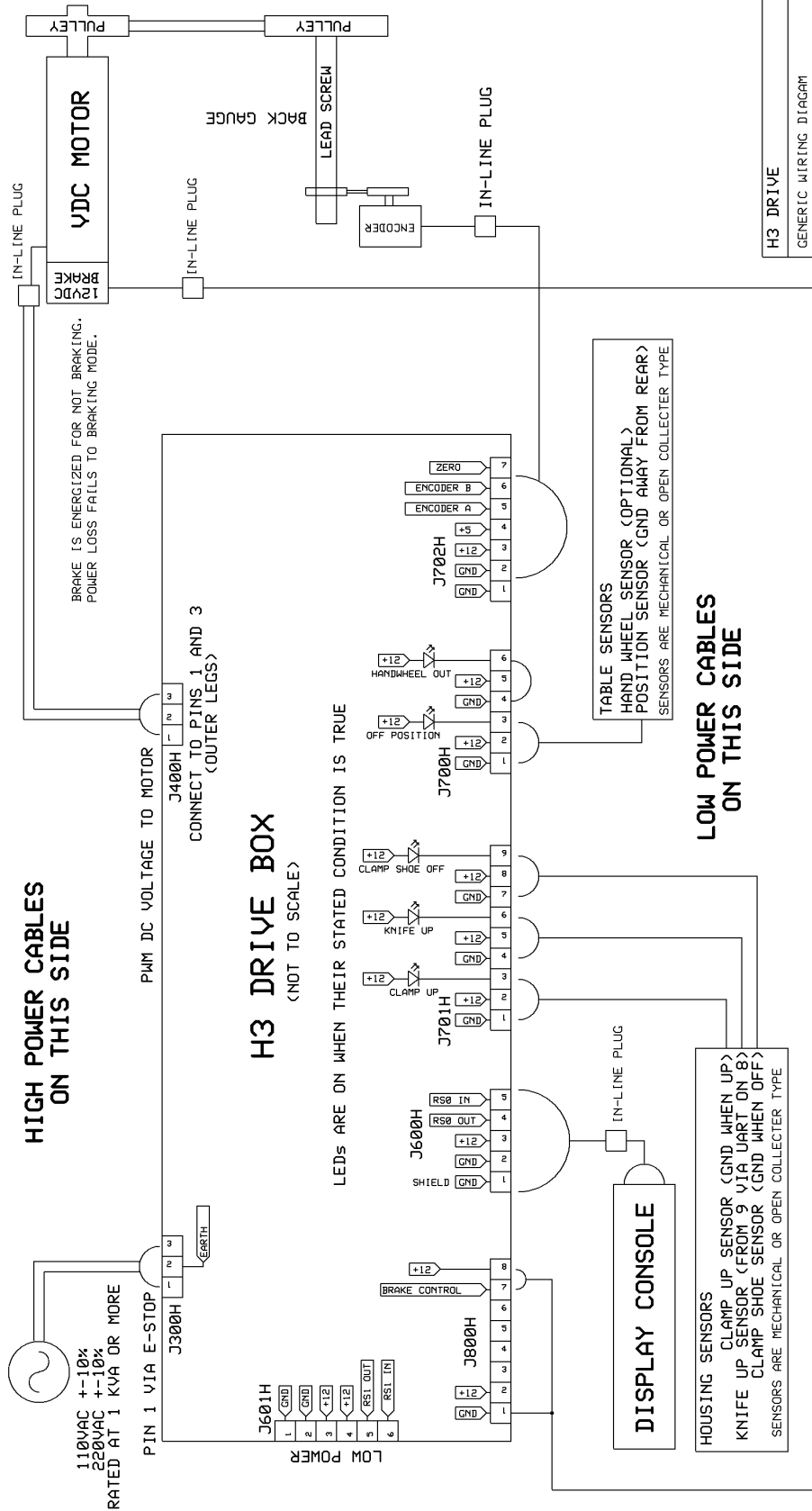


SAMPLE INSTALLATION DIAGRAM
ACTUAL MOUNTING LOCATIONS MAY VARY

H3 DRIVE	INSTALLATION OVERVIEW
CMP MICROSYSTEMS 1320 INDUSTRIAL UNIT C FERRIS, MISSOURI 64502 PHONE: 417-831-1100 FAX: 417-831-1101 WWW.CMP-MICROSYSTEMS.COM	
DRAWN: SMITH REV: 1.0 DATE: 29AUG2008 PAGE: 1 of 1	

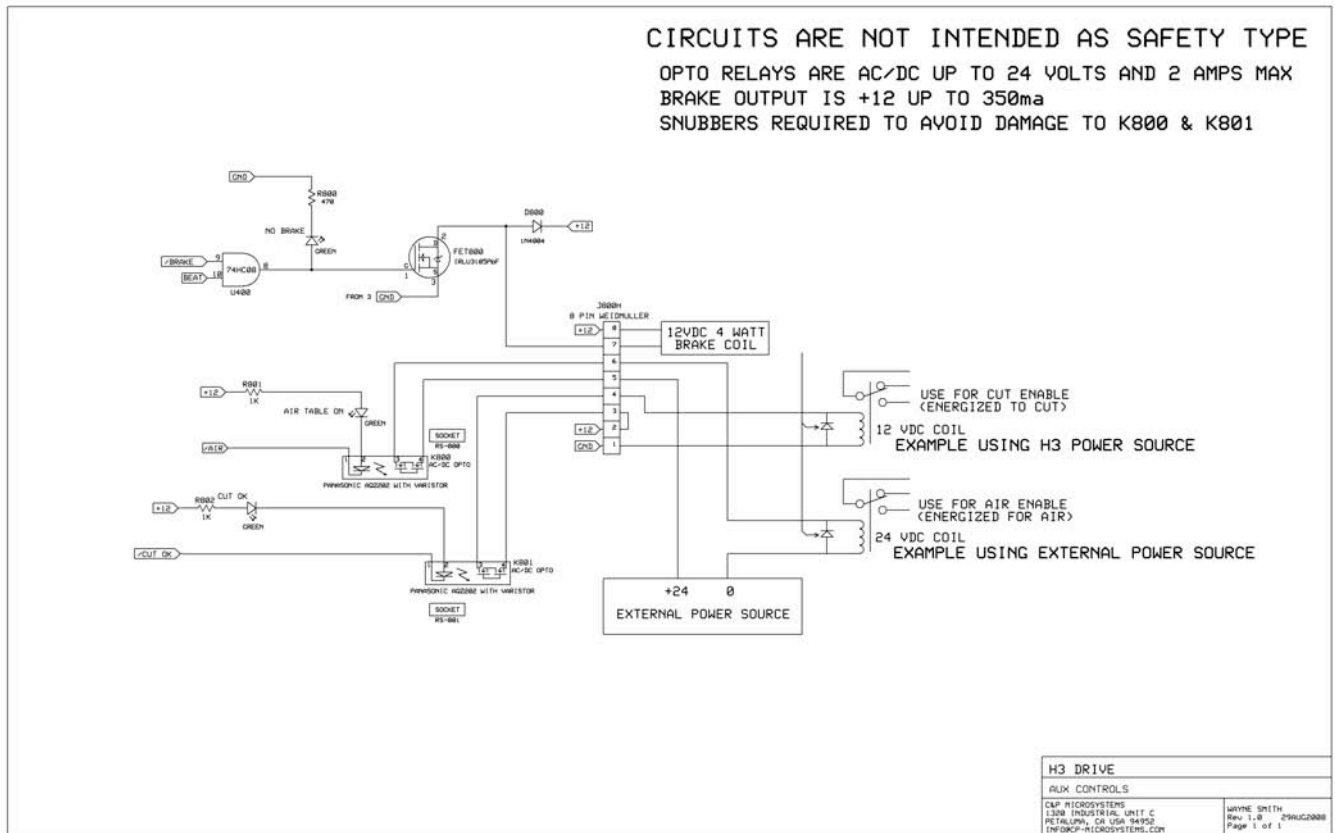
H3 DRIVE BOX CABLING DIAGRAM

**LOW POWER CABLES MUST BE SEPARATED FROM HIGH POWER CABLES:
 LOW POWER CABLES INCLUDE J601H, J800H, J300H, J600H, J701H, J700H, J702H
 HIGH POWER CABLES INCLUDE MACHINE CABLES, YAC TO J300H, AND MOTOR TO J400H**



H3 DRIVE	
GENERIC WIRING DIAGRAM	
CAP MICROSYSTEMS 10000 WILSON ROAD REDFORD, MI 48954 INFO@CAP-MICROSYSTEMS.COM	WAYNE SMITH Rev 1.1 13Jan2008 Page 1 of 1

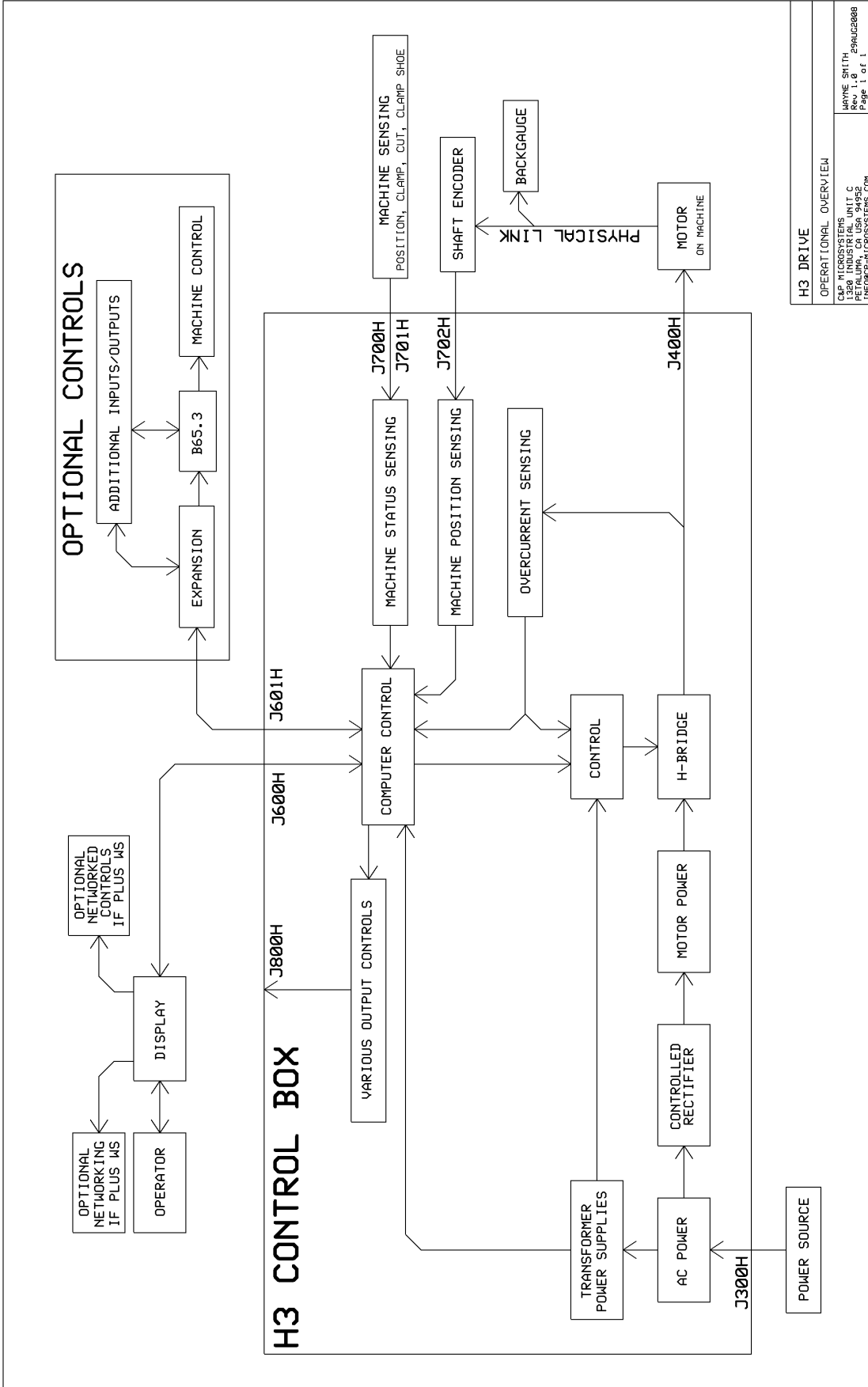
H3 DRIVE AUXILIARY CONTROLS



4. The above control outputs do not conform to and are not intended to be used as safety devices. All outside circuits must have the integrity to operate on their own.
5. A spike suppressor must exist across the added relay coil to prevent damage to the H-Drive console relay drivers. For DC coils a snubber diode should be added (1N4002 or better). The striped end of the diode goes towards the + side of the relay coil. For AC coils an appropriate RC circuit should be added (100 to 150 ohms with a several uF cap). Failure to install or incorrect installation of a spike suppressor will cause failure in the control circuit.

Until power on is recognized from the display the power up mode will be forced wherein the air outputs remain in their off state. Once data is downloaded from the display, the drive will initiate its heartbeat signal and energize the brake (to allow the gauge to be moved) and shut off the cut disable to allow circuit verification during the start up procedures.

H3 DRIVE FUNCTIONAL BLOCK DIAGRAM



H3 DRIVE	
OPERATIONAL OVERVIEW	
CAP MICROSYSTEMS 1320 INDUSTRIAL UNIT C PETALUMA, CA USA 94952 INFO@CAPMICROSYSTEMS.COM	MAYNE SR1TH 299AUC2808 Page 1 of 1

DECLARATION BY THE MANUFACTURER

(Directive 89/392/EEC, Art. 4.2 and Annex II, sub B)

C&P Microsystems LLC herewith declares that the product covered by this instruction manual is intended to be incorporated into machinery or to be assembled with other machinery to constitute machinery covered by Directive 89/392/EEC, as amended and that the following (parts/clauses of) harmonized standards and national technical standards have been applied:

EN 50082-2: 1995 “Electromagnetic Compatibility – Generic Immunity Standard, Part 2: Industrial Environment”

CISPR 22: “Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment”

FCC Part 15 stating: “This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.”

FCC warning stating: “Changes or modification not expressly approved by the party responsible for compliance could void the user’s authority to operate this equipment.”

ISO/IEC Guide 25 in the category of “Electrical (EMC)”, including in its scope the EMC standard AS/NZ 3548 under the authority of the A2LA and NATA laboratory accreditation agreement.

Class A warning requirement that “This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

The Japanese standard for “Voluntary Control Council for Interference (VCCI) by Data Processing Equipment and Electronic Office Machines, Technical Requirements” which is technically equivalent to CISPR 22 (1993).

SPECIFICATIONS/LIMITATIONS

Power input: 110/220±10% VAC, 50/60 Hz, 1KVA. Voltage based on position of SW300 on H3 PCB.

Motor output: 0 to 90 VDC (PWM controlled, peak voltage based upon DC bus created from AC input)

Motor type:

90VDC permanent magnet type up to 1 HP

Frame size can vary based upon mounting requirements

RPM can vary based upon full speed requirements

Power can vary based upon load requirements

Sensors:

Normally open (clamp up, clamp shoe) open collector type at 12VDC

Normally closed (position, cut) open collector type at 12VDC

Encoder:

Incremental type

5VDC or 12VDC input dependent upon termination at H3 drive box

500 windows with A and B outputs

Zero pulse (either normally high or normally low acceptable, gated or not)

Open collector or driven is acceptable.

Auxiliary I/O: Refer to details elsewhere in this manual

Display: Unregulated input from 12 to 28VDC with RS-232 interface from/to drive box

Climatic considerations:

Operation (weather protected control rooms or equipment rooms not fully air conditioned)—

Temperature per Class 3K3—+5C to +40C.

Relative humidity per Class 3K3—5% to 85%, 1g/m³ to 25g/m³.

No condensation or formation of ice.

Air pressure per Class 3K3—86 kPa to 106 kPa.

Storage—

Temperature per Class 1K4—-25C to +55C.

Relative humidity per Class 1K3—5% to 95%, 1g/m³ to 29g/m³.

Air pressure per Class 1K4—86 kPa to 106 kPa.

Transportation—

Temperature per Class 2K3—-25C to +70C.

Relative humidity per Class 2K3—to 95%, to 60g/m³.

Maximum RH based on—

Unit slowly increases temperature by 40C.

Unit moves directly from temperatures between -25C and 30C.

Unit moves directly from temperatures between 70C and 15C.

Brief light condensation is acceptable.

Air pressure per Class 2K3—70 kPa to 106 kPa.

NOTES

Modifications to the machine during the installation and things to do to return the machine to its original state include:

INDEX

Topic	Page
Air	24, 31, 37, 38, 47
Auto correction	31
Auto push	37
Auxiliary controls	47
Block diagram	48
Calibrate gauge	31
Change cut	36, 37
Clamp shoe (false clamp, false paper clamp, sole plate) sensor	38, 46
Clamp up sensor	38, 46
Component locations	45
Cut counter	31
Cut sensor	38, 46
DC drive motor	46
Deceleration	31, 37
Delete job	36
Drive box	45, 46, 48
Erase all memory	23
Error messages	37, 40
Hand wheel sensor	31, 38, 46
Labels	34
Languages	23
Lay compensate	37
Motor voltage and current settings	20
Position sensor	38, 46
Power requirements	67
Proximity sensors	55,63
Sensors	38, 46
Set up routine	21
Shaft encoder	46
Sheet divide	35
Speed	29
Target types	33
Tolerance	29
Units of measurement	23, 31, 32
Wiring and power	46, 47, 50