

Front Cover

Title Page (copy of front cover)

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Welcome

Thank you for purchasing the High Frequency Spindle Option for your Sabre™ router. This spindle, which replaces the standard 3 1/4 hp motor, provides the following important benefits:

- Constant torque 7 hp or 3 hp motor maintains constant rpm while allowing the spindle to cut at greater feed rates and greater depth per pass.
- Variable speed spindle allows you to dial in the exact speed (up to 24,000 rpm) to maximize performance and edge quality.
- High precision collets provide better tool wear resistance and improved edge quality.
- High precision spindle bearings provide rigidity and longer life.
- Induction-type motor eliminates brushes and other wearable components which require replacement and provides quieter operation, even when cutting metals.

About this booklet

This booklet provides information on unpacking and verifying the kit contents, installing the High Frequency Spindle Option, and using the spindle as it differs from the standard router motor. Special information in this manual is presented in notes, cautions, and warnings as follows:

- *Note: A note contains important information which could affect successful completion of a task.*
- **CAUTION: A caution statement contains information which, if not observed, could result in damage to the equipment.**
- **WARNING: A warning statement contains information which, if not observed, could result in personal injury.**

If you have questions regarding the installation or use of the High Frequency Spindle Option, please contact the Gerber Router Support Group at:



860-528-1028 (USA and Canada)

860-290-5568 (fax)

Unpacking the High Frequency Spindle

The High Frequency Spindle motor is attached to a pallet with four screws. Remove the screws and save the screws and pallet for future use.

After unpacking, inspect the following:

1. Verify that the part numbers on the packing slip and invoice match the part numbers on the motor.
2. Verify that the kit contents listed below have been received.
3. Check for shipping damage immediately. If any part of the option is damaged or missing, notify the shipper immediately.

Kit contents

- 1 High Frequency Spindle
- 4 M6 x 1.0 screws, flat washers, and lock washers to attach the spindle to the carriage
- 2 motor lift springs
- 2 spring brackets
- 1 Z hood spindle power cable
- 1 Z hood receptacle
- 15 tie wraps
- 1 speed controller with attached interface cables
- 1 dual serial board to install in the electrical cabinet
- 1 RS232 cable to connect between the dual serial board and the electrical cabinet chassis 1 foot (0.3 meter) long
- 1 RS232 cable to connect between the electrical cabinet and the speed controller 12 feet (3.6 meter) long
- 1 ground braid to connect between the electrical cabinet and the speed controller
- 1 24 mm spindle wrench
- 1 spindle spanner wrench
- 1 M27 x 1.5 spindle collet nut
- 1 .500" diameter collet
- 1 .250" or 6 mm diameter collet
- 1 .125" or 3 mm sleeve for use with the .250" or 3 mm diameter collet

Installing the High Frequency Spindle Option

The sequence for installing the High Frequency Spindle Option is as follows:

- Verifying the electrical requirements
- Removing the standard motor
- Mounting the High Frequency Spindle on the carriage
- Installing the Z hood spindle power cable and receptacle
- Installing the dual serial board and RS232 cables
- Connecting the ground braid
- Connecting the speed controller

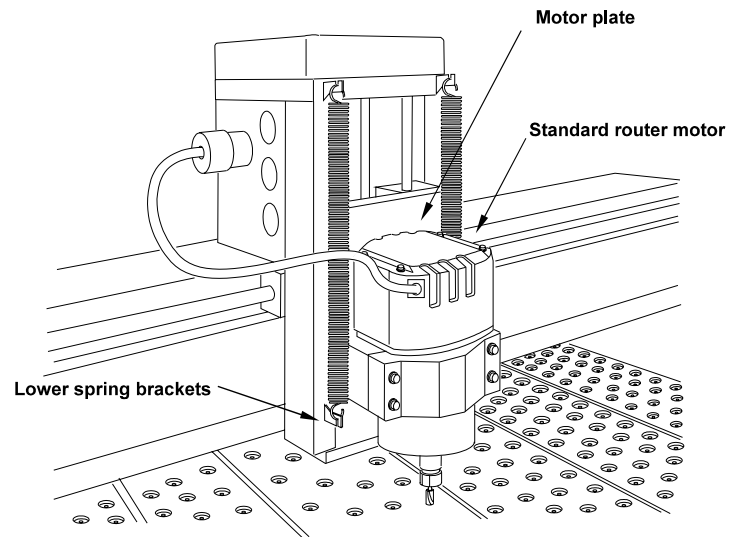
Verifying the electrical requirements

The High Frequency Spindle Option requires a dedicated electrical circuit in addition to the circuit used by the Sabre. It must be wired by a licensed industrial electrician prior to starting the installation procedure. Verify that the correct electrical circuit is installed for the spindle option you purchased. The choices are as follows:

- 230 V (+10%, -15%), single phase, 30 Amp, 47-63 Hz required for 3 hp spindles
- 230 V (+10%, -15%), three phase, 30 Amp, 47-63 Hz required for 7 hp spindles
- 380 - 460 V (+10%, -15%), three phase, 30 Amp, 47-63 Hz required for 7 hp high voltage spindles

Removing the standard motor

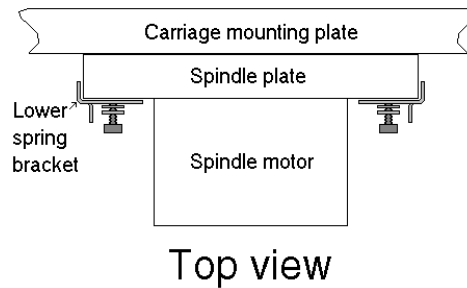
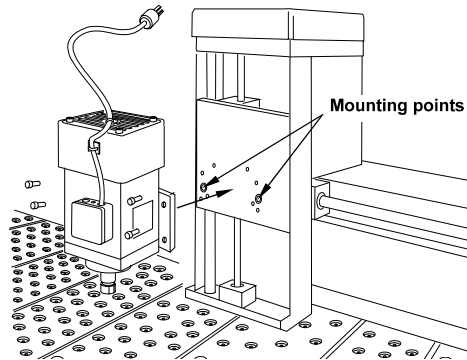
1. Shut off power to the Sabre by turning off the main power breaker on the electrical cabinet.
2. Unplug the router motor power cord from the carriage.
3. Remove any tool or collet in the motor.
4. Unhook and remove the side springs.
5. Remove the two lower screws attaching the lower spring brackets and motor plate to the carriage, then remove the spring brackets.
6. Remove the two upper screws attaching the motor plate and motor to the carriage. The motor and plate remain attached to the carriage by two alignment pins in the plate.



7. Pull the motor plate and motor from the carriage.

Mounting the High Frequency Spindle on the carriage

1. Lower the Z axis to approximately 8" (203 mm) above the router table surface.
2. Slide the motor into position by aligning the pins in the spindle plate to the mounting points on the carriage mounting plate.
3. Attach the spindle plate to the carriage using the 2 M6 x 1.0 screws, flat washers, and lock washers provided in the kit in the upper left and right mounting holes. Hand-tighten.
4. Attach the left and right spring brackets provided in the kit to the lower mounting holes using the remaining screws and washers. Install each bracket as shown in the illustration.
5. Tighten all mounting screws.
6. Manually raise the Z axis all the way up.
7. Install the springs provided in the kit by hooking one eye of each spring to the lower bracket and the other eye to the upper bracket.



Installing the Z hood spindle power cable and receptacle

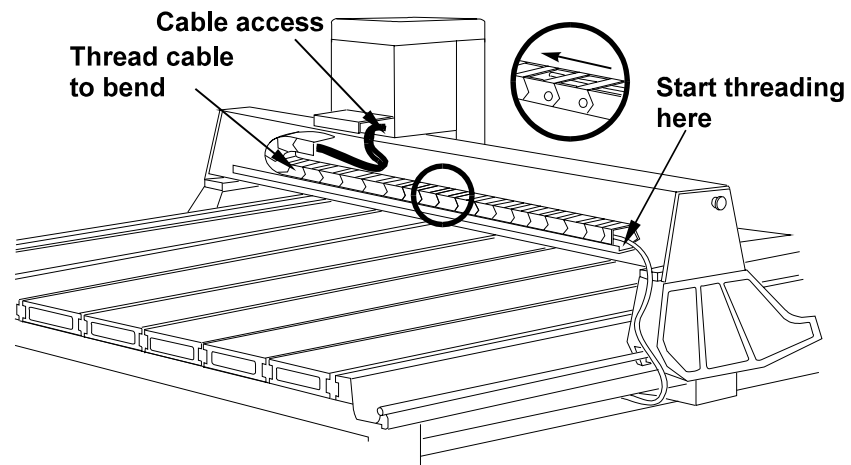
The Z hood spindle power cable is an interface between the speed controller and the receptacle that the High Frequency Spindle plugs into. The cable and receptacle may have already been installed at the factory. If they were not, they are included as part of the kit. To determine if they are installed, look at the Z hood connector panel. If the receptacle position labeled P190 SPINDLE MOTOR ONLY is covered with a plastic plug, you need to install the cable and receptacle. If the receptacle is already installed, plug the spindle power cord into the P190 receptacle on the Z hood connector panel, then go to the paragraph "Installing the dual serial board" in this booklet.

WARNING: To avoid electric shock, perform all maintenance procedures with the Sabre turned off and unplugged from the power source. Gerber recommends that installation of the power cable and receptacle be performed by a licensed industrial electrician.

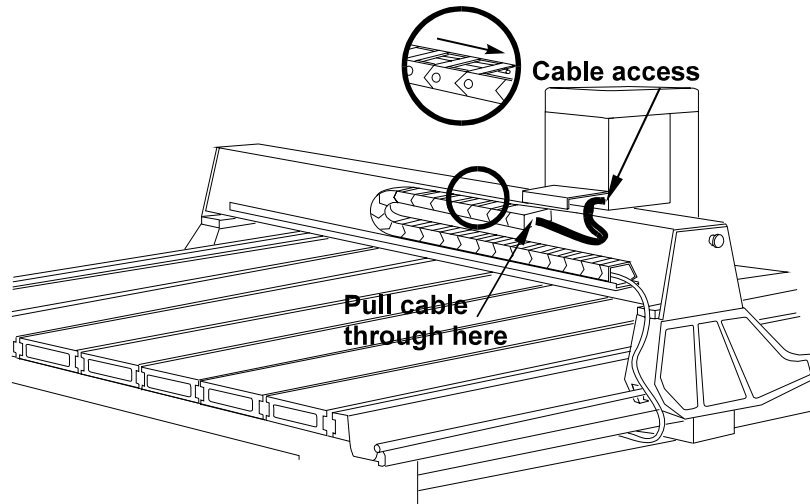
Routing the cable in the cable carrier

The option kit contains a Z hood spindle power cable with a plug on one end and four wires free at the other end.

1. Tape the loose wire ends extending from the cable in several places to make feeding easier.
2. Push the carriage all the way to the left of the table (when viewed from the rear). This straightens the cable carrier and makes cable routing easier.
3. Push the taped wire end of the cable through the carrier from right to left (when viewed from the rear) until the cable reaches the bend in the carrier.

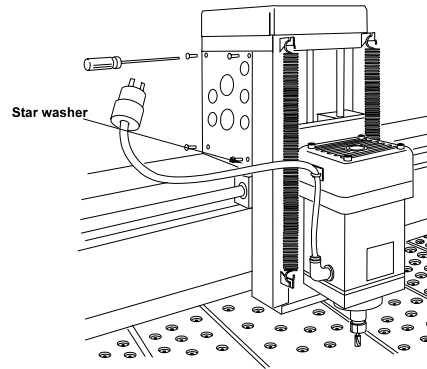


4. Push the carriage to the right (when viewed from the rear) to straighten the remaining section of the cable carrier.
5. Continue to feed the cable through the carrier. You may use long-handled tweezers to grasp the end of the cable.
6. Pull sufficient cable through the carrier to reach into the cable access opening in the Z hood.



Connecting the spindle power receptacle

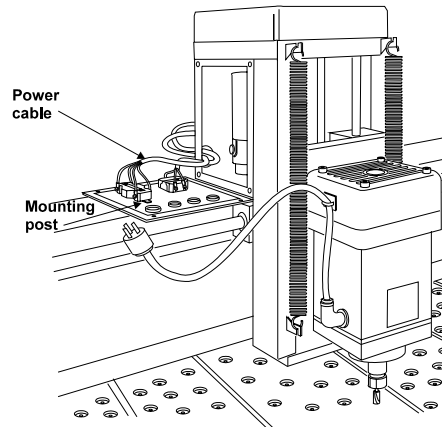
1. Remove the four screws that hold the Z hood connector panel to the side of the Z hood. Be careful not to lose the star washer.
2. Carefully remove the Z hood connector panel and lay it face down on the top of the carriage.
3. Push the P190 plastic plug from the rear of the panel to remove it from the panel.
4. Feed the Z hood spindle power cable through the P190 access opening from the back of the panel.



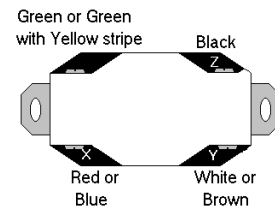
CAUTION: Each wire must be connected to the correct connector terminal in the following step. Failure to connect the wires correctly can result in damage to the Sabre or to the spindle motor. Connecting one of the X, Y, or Z wires to the ground connector will result in a circuit overload.

5. Remove the tape from the wire ends and connect each wire to its matching connector on the plug provided in the kit.

Note: The X, Y, and ground wire colors may be different from those shown in the illustration at the right.



6. Mount the plug on the mounting posts that extend through the panel. Secure the plug with the two M4 star nuts provided.
7. Replace the panel, securing it with the four screws and one star washer.
8. Pull any excess cable extending from the Z hood through the cable carrier.



9. Use tie wraps provided to attach the cable to a free tab located under each end of the cable carrier. If possible, tie-wrap the cable in the same tab at both ends of the cable carrier.
10. Plug the spindle power cord into the P190 receptacle on the Z hood connector panel.

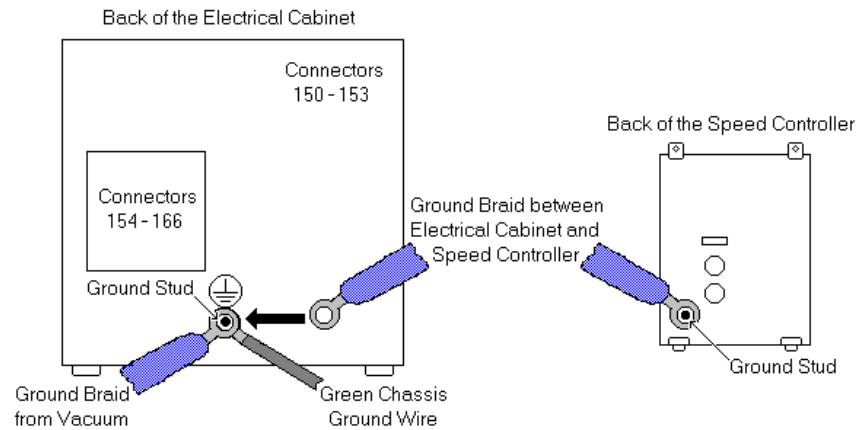
Installing the dual serial board

WARNING: Disconnect the Sabre from AC power before performing this procedure. Dangerous voltages exist in the interior of the electrical cabinet.

1. Turn off power to the Sabre and unplug it from AC power.
2. Loosen the four screws holding the top of the electrical cabinet. It is not necessary to remove them. Lift up and remove the cover from the electrical cabinet.
3. Plug the 1 foot (0.3 meter) RS232 cable provided in the kit into the dual serial board. The 10-pin connector end is labeled "Dual Serial Com J2" and plugs into connector J2 on the dual serial board.
4. Insert the dual serial board into the slot labeled J128 on the electrical cabinet back plane with the component side toward the circuit board already installed.
5. From the outside of the electrical cabinet, remove the vinyl cover from the opening labeled P152 SPINDLE 1.
6. From the inside of the electrical cabinet, push the 9-pin D-connector end of the dual serial cable through the P152 SPINDLE 1 opening. Secure the connector with the two sets of nuts and femlocks provided with the cable. Attach the green ground wire from the cable to the inside of the chassis below the connector labeled "R150 9A." (Remove the nut securing the other ground wires, then use the nut to secure all wires.)
7. Replace the electrical cabinet cover and tighten the screws.
8. Plug one end of the 12 foot (3.6 meter) RS232 cable provided in the kit into the connector labeled P152 SPINDLE 1 (just installed) on the electrical cabinet. Tighten the screws.
9. Plug the other end of the cable into the 9-pin connector on the speed controller. Tighten the screws.

Connecting the ground braid

The illustration below shows typical ground attachments on the back of the electrical cabinet when the grounds for the chip removal system vacuum and the router table are already connected (the ground braid from the chip removal system vacuum and the green chassis ground wire from the router table). When you install the speed controller, you must add an additional ground braid between the electrical cabinet and the speed controller as shown in the illustration.



CAUTION: Failure to install and properly tighten the ground braid can result in erratic router operation.

1. Place the speed controller at the right rear corner of the Sabre near the electrical cabinet.
2. Attach one end of the ground braid to the ground stud on the speed controller using the nut and star washer assembly on the speed controller ground stud. Tighten the nut with a wrench to ensure a reliable connection between the ground braid and the speed controller chassis.
3. Remove the nut and star washer assembly from the ground stud on the back of the electrical cabinet.
4. Add the free end of the speed controller ground braid to the vacuum ground braid and chassis ground wire on the ground stud.
5. Attach the three grounds to the electrical cabinet chassis with the nut and star washer assembly. Tighten the nut with a wrench to ensure a reliable connection between the grounds and the electrical cabinet chassis.

Connecting the speed controller

Connect the three cables on the back of the speed controller as follows:

1. Plug the cable labeled P62740C into the connector labeled R162 SPINDLE 1 on the electrical cabinet.
2. Connect the Remote On/Off cable (quick disconnect) to the Z hood spindle power cable you installed in the paragraph "Installing the Z hood spindle power cable and receptacle" on page 5.
3. Plug the upper power cord into the 230 VAC dedicated outlet described previously.

Using the High Frequency Spindle

This section describes use of the High Frequency Spindle as far as its use differs from the standard router motor. Please refer to the *Sabre Owner's Guide* for routing instructions.

CAUTION: Before turning on the Sabre for the first time, use a volt meter to verify that incoming power is correct for your spindle according to the information on page 3. Power exceeding this range could result in major damage to the system.

CAUTION: Before turning on main power, recheck all connections at the electrical cabinet.

Spindle option selection

Before using the High Frequency Spindle, you must use the control pad to tell the Sabre software that the spindle is installed as follows:

1. Turn on main power. The display reads:

STATUS	
MACHINE:	Idle
JOB:	Not Ready

2. Press the up arrow key until the display reads:

MAIN MENU	2/2
A: Position control	
B: Manual feed	
C: Configuration	

3. Press C. The display reads:

CONFIGURATION	1/4
A: Acceleration	
B: Positioning rate	
C: Table protection	

- Press the up arrow key until the display reads:

CONFIGURATION	1/4
A: Spindle Control	

- Press A. The display reads:

SPINDLE CONTROL
Unavailable
A: Change

- Press A to toggle the display so that it reads:

SPINDLE CONTROL
Available
A: Change

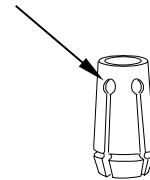
- Press ENTER, then EXIT.

Installing a tool

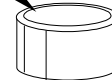
CAUTION: Solid carbide tools such as those provided with the Sabre must be handled very carefully. Do not strike the cutting edge on any hard surface. Be careful when installing the tool not to strike the cutting edge on the collet or nut during installation.

- Unplug the motor from the carriage.
- Select a tool and appropriate collet or sleeve. Use the .500" collet for the pen tool. Use the sleeve when using a .125" or 3 mm tool in a .250" or 6 mm collet.
- Make sure that the tool and collet are clean and undamaged.
- Push the collet into the collet nut until it clicks into place. When using the sleeve, insert the tapered end into the collet and nut so that the tool shank will fit into the slotted end. When properly installed, the collet (and sleeve) will not fall out of the nut when turned upside down.

**High Frequency Spindle
collet**



Collet nut



5. Install the tool into the collet (or sleeve). The bottom of the collet should be approximately even with the top of the tool flutes and should not cover any portion of the flutes. Very little of the tool shank should be exposed below the collet (or sleeve).
6. Move the carriage near the front of the table for better access.
7. Make sure that the inside of the spindle is clean and undamaged.
8. Install the collet and nut loosely into the bottom of the spindle. Hold the tool in the collet to prevent it from falling out and hand-tighten the collet nut.

CAUTION: When installing the tool, do not attempt to gain leverage by jamming one wrench against the carriage while pushing on the other.

9. Tighten the collet nut using two wrenches provided in the kit. Place one wrench on the spindle chuck and the other on the collet nut. Using two hands, push the wrenches in opposite directions to tighten the collet nut.

Removing a tool

CAUTION: Before removing a tool, move the carriage away from any workpiece or other hard surface. If the tool falls out of the collet during removal, the cutting edge could be damaged.

1. Move the spindle near the front of the table for better access.
2. Unplug the spindle.

CAUTION: When removing a tool, do not attempt to gain leverage by jamming one wrench against the carriage while pushing on the other.

3. Using two wrenches, loosen the collet nut. Place one wrench on the spindle chuck and the other on the collet nut. Using two hands, pull the wrenches in opposite directions to loosen the collet nut. The nut will spin free for approximately one revolution, then tighten again. Continue turning the nut until the tool is released.
4. Remove the tool from the collet (or sleeve) and store properly.

Setting the spindle speed

The spindle speed may be set before you start routing or while routing. Tool selection and material type and thickness determine the correct spindle speed. Follow the recommended speeds and feeds on the reference card in the *Sabre Owner's Guide*.

Once you have experience cutting materials, you may want to depart from the speeds and feeds on the reference card. To "fine tune" the speed, you must listen to the sound of the spindle. Vibration, chattering, and excessive squealing are signs that the speed is not exactly correct. Excessive tool wear or damage is also a sign that the speed is not correct. Change the speed up or down slightly until you reduce or eliminate these sounds and also improve tool wear.

Set the spindle speed using the Sabre control pad as follows:

1. Press the RPM key on the control pad. The display reads:

SPINDLE SPEED 06000 rpm A: Increase by 100 B: Decrease by 100
--

2. To toggle the "Increase" and "Decrease" rpm values between 10, 100, and 1000 rpm, press either the up or down function arrow key on the control pad.
3. Press the A key to increase the spindle speed or the B key to decrease the spindle speed. When the display reads the desired rpm, release the key.
4. Press ENTER to record the change and return to MAIN MENU. If you do not press ENTER and turn off the router, the next time you turn the Sabre on, the spindle speed will be set to 6,000, which is the default.

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