Rojek Woodworking Machinery

Interchangeable Shaper Spindle

Installation and User's Guide

Contents

SECTION 1

Introduction

This guide is issued as an addition to the machine's User Instruction Manual. The standard configuration for machines with a vertical spindle shaper is with a single, fixed spindle. This additional guide details more specifically the steps for setup and installation of the shaper spindles for those machines that have the optional Interchangeable Spindle Assembly and the optional Chuck For Router Bits.

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The manufacturer reserves the right to particular changes in its continuous technical development of the machine and these components.

Safety Instructions

Please pay close attention to all "**Warning**" and "**Caution**" notices**.** Warnings refer to personal injury risks, Cautions refer to risks to the machine.

Safety Precautions

- Proceed entirely according to the following instructional guide. Non-performance of these instructions can cause death or serious injury to the machine operator.
- The machine should always be turned off and disconnected from the power source before performing any work on the machine, or changing out cutters. Failure to do so can result in serious injury.
- Proceed according to this guide during assembly, installation and dismantling of the interchangeable spindle.
- Tighten the Differential Screw and Locking Nuts by rated torque without use of levers or beating on the wrench.
- Make sure that fitting surfaces are clean, unbroken and perfectly flat on both sides before clamping Spacing Rings and a shaper tool onto the spindle.
- Never use deformed or cracked tools.
- Never use tools at a higher speed than recommended by competent manufacturer.
- Make sure that all rotating tools are perfectly balanced, properly sharpened, adapted and fixed.

Delivered Components & Tools Required

The “Interchangeable Spindle” and the “Chuck For Router Bits” options for the vertical spindle shaper are generally ordered together. Each option comes with one spindle, so if both are installed on the machine there will be two spindles included. The standard shaper spindle provided is the 3/4” -- 5/4” diameter step spindle, and the spindle provided for the router chuck is a specially designed, “shortened,” 5/4” diameter spindle. With various size spindles available for order, the table below lists the components for all available.

Parts Included With Spindle

Parts / Spindle Diameter	30mm	40mm	50mm	3/4 -- 5/4"	1 -- 5/4"	5/4"	Router 5/4"
Locking Nut	1	1	1	1	1	1	1
Spindle	1	1	1	1	1	1	1
Differential Screw	1	1	1	1	1	1	1
Spacing Ring (h=5mm)	2	2	2	5+2+3	5+4+3	2	2
Spacing Ring (h=10mm)	--	--	--	1+1+2	1+2+2	--	--
Spacing Ring (h=15mm)	1	1	1	3+1	3+1	1	1
Spacing Ring (h=20mm)	2	2	2	2	2	2	2
Spacing Ring (h=30mm)	2	2	2	1	1	2	2
Chip Deflector	1	1	1	1	1	1	1
Plastic Cap	1	1	1	1	1	1	1
Router Collet Nut	--	--	--	--	--	--	1
Router Collet (ø 8mm)	--	--	--	--	--	--	1
Router Collet (ø 1/2")	--	--	--	--	--	--	1

Tools Required to Install and Setup

Tools / Spindle Diameter	30mm	40mm	50mm	3/4 -- 5/4"	1 -- 5/4"	5/4"	Router 5/4"
T-Handle Allen (6mm)	--	--	--	1	--	--	--
T-Handle Allen (10mm)	1	*	*		1	1	1
Open-End Wrench (27mm)	1	*	*	1	1	1	1
Open-End Wrench (36mm)	--	*	*	--	1	--	--
Open-End Wrench (41mm)	1	*	*	--	--	1	1

** Tools not determined as of this printing.*

The Interchangeable Spindle

Description

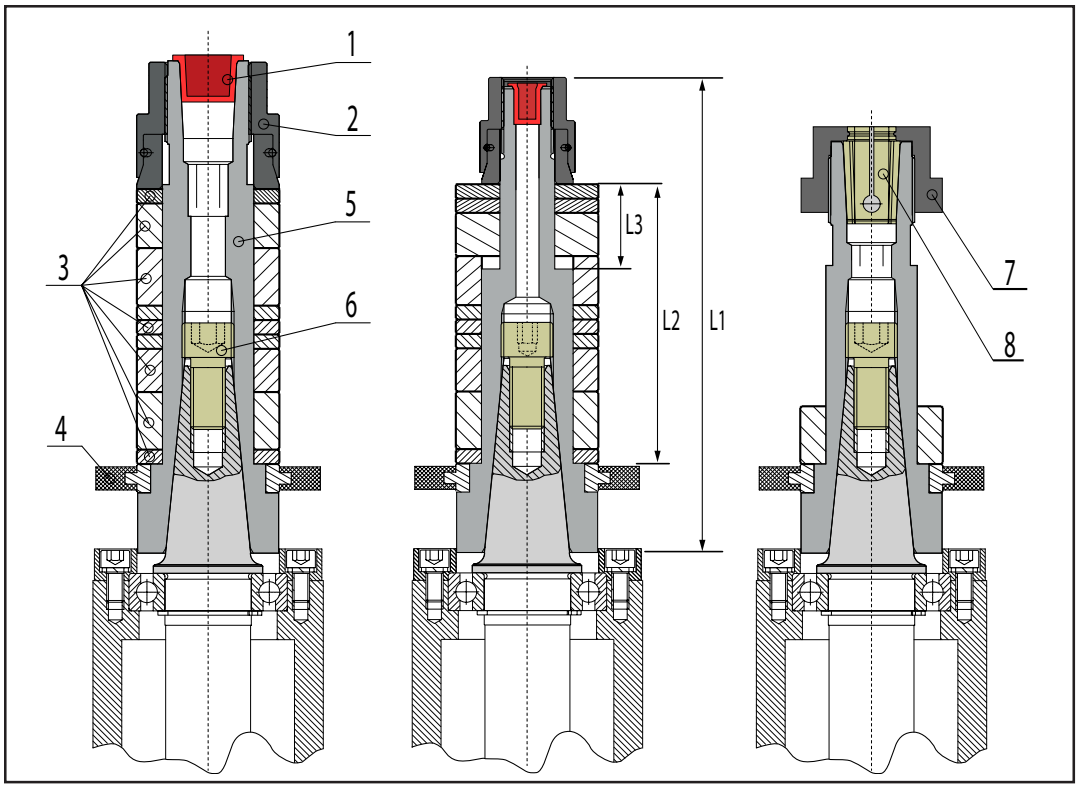
The standard Rojek machine with a vertical spindle shaper is designed and manufactured with a single-piece milling/spindle shaft. When ordered with the optional "Interchangeable Spindle Assembly," the milling/spindle shaft is manufactured with two segments. The upper tool-clamping section is separated and joined to the main milling/spindle shaft with a differential screw. This two-part construction enables the easy exchange and use of various size spindle diameters on a single machine.

This removable upper tool-clamping section of the spindle shaft, referred to as the "Spindle" to simplify discussions, can be in various lengths and configurations, as well as diameters. The Spindle can have a single diameter shaft, or two separate diameters - referred to as a "Step-Spindle." Also available is a collet assembly for shank-type cutters (router bits).

Spindle Component Identification

Components and tools for the 3/4" -- 5/4" diameter step spindle.

Components and tools for the 5/4" diameter router spindle. This is a special spindle with a shorter length for router use.



Shaper Spindle

1 — Plastic Cap
2 — Locking Nut
3 — Spacing Rings
4 — Chip Deflector
5 — Spindle
6 — Differential Screw

Router Spindle

7 — Router Collet Nut
8 — Router Collet

Specifications

Spindle Diameter	Total Spindle Length L1 (mm)	Spindle Clamping Length L2 / L3 (mm)	Router Collet Diameter
30mm	177.04	100	—
40mm	177.04	105	—
50mm	177.04	115	—
3/4 — 5/4"	177.04	100 / 30	—
1 — 5/4"	177.04	100 / 35	—
5/4"	177.04	100	—
Router 5/4"	149.04	70	8mm & 1/2"

Installation and Setup

The following installation and setup steps are not in any critical sequence, unless specifically stated. In fact, the interchangeable shaper spindle will already be assembled and installed onto the machine you have purchased. For the most part, the photos were taken so that the step being illustrated could more easily be seen and understood. For example, in the first sequence of steps, the assembly of the outer components onto the spindle could just as easily be accomplished after the spindle has been installed into the machine. Or, the differential screw could be installed into the spindle prior to assembling the outer components.

Assembly of the Spindle Components

Assembling Outer Components

Begin the assembly of the outer components by first installing the **chip deflector**. This should fit onto the very lower level of the spindle.

The **chip deflector**, as the name implies, acts to throw any dust or chips that fall into the spindle cavity out toward the outer wall of the cavity so that the dust collector can pick it up.

Next, slide the **spacing rings** onto the spindle shaft. These come in various heights, so mix them up to achieve the correct height for the **locking nut**.

For the actual shaping operation setup, the **spacing rings** will be used to establish the location of the shaper cutter on the spindle and provide the **locking nut** with a surface for clamping.

Once the **spacing rings** have been installed to the appropriate height, install the **locking nut**.

Tighten the **locking nut** against the top **spacing ring** or shaper cutting tool, as the case may be.

The **locking nut** has a compression foot on the bottom that exerts torque on the nut. This prevents the nut from coming off when operating in reverse.

A **plastic cap** should be used to plug the hole in th top of the spindle (see #1 in Component Identification diagram on pg. 8) after every mounting of the interchangeable spindle.

Warning: *Failure to sufficiently tighten the locking nut, so that the compression foot engages, may result in the locking nut coming off during operation, causing serious injury.*

Step Spindle to Solid 5/4" Conversion

To convert any of the Step Spindles into a solid 5/4" spindle, simply utilize the 5/4" diameter **spacing rings** on the smaller diameter section of the spindle.

Router Spindle Assembly

Just as with the shaper spindle (on page 9), begin the assembly of the outer components by first installing the **chip deflector**. This should fit onto the very lower level of the spindle.

Next, slide the **spacing rings** onto the spindle shaft. When used with the router spindle, these spacers serve only to weigh down the **chip deflector** so that it will remain at the bottom of the spindle during operation.

As shown in the photo, limit the number of **spacing rings** installed so that the open-end wrench can still be used on the spindle.

Router Collet and Nut

To put together the router collet assembly, place the head of the **router collet** into the **router collet nut**, as shown.

Place both thumbs on the end of the **router collet**, as shown, and press firmly.

The **router collet** should snap into the **router collet nut** so that the end of the collet is flush with the top of the nut.

Insert a 1/2" router bit into the collet and tighten, as shown.

The correct operating rotation for the router spindle, looking from the top down, is counter-clockwise.

The **router collet nut** does not have a compression foot, so it cannot be operated in reverse. Do not operate the machine in a clockwise rotation with the router spindle installed.

Warning: *Use extreme caution when operating the router to ensure that the spindle is set to rotate in a counter-clockwise direction. Operating the router spindle in a clockwise rotation may result in the router collet nut coming off, causing serious injury.*

Installing Differential Screw

Insert the appropriate T-Handle allen wrench through the end of the spindle shaft, as shown.

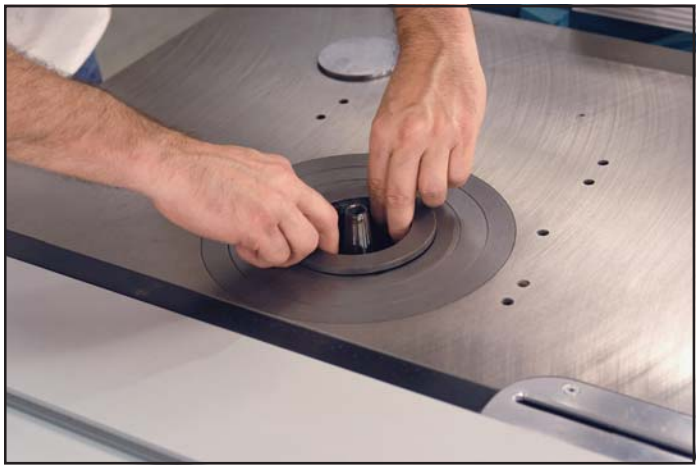
With the T-Handle wrench inside the spindle, insert the **differential screw** onto the allen wrench.

The **differential screw** is threaded on both the shaft and the head. The head and the shaft are counter-threaded so that they thread in opposite directions.

Looking from the top-end of the spindle (the end with the T-Handle inserted into it), rotate the wrench counter-clockwise and thread the **differential screw** into the spindle.

Thread the **differential screw** all the way into the spindle until it bottoms out.

Installing Spindle Into Machine



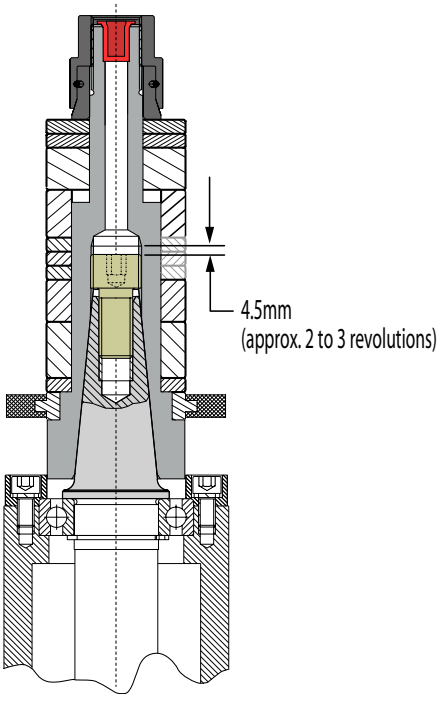
In order to install the spindle, you must first remove at least the first table ring. This is necessary to accomodate the size of the **chip deflector**.

There are multiple removable rings that allow the use of various sized shaper cutter tools.

Adjust Differential Screw

Prior to installing the spindle, re-insert the T-Handle Allen wrench and engage the **differential screw**. Rotate the wrench counter-clockwise to ensure that the **differential screw** is threaded into the spindle as far as it will go. Then back it out, rotating the wrench clockwise, 2 to 3 turns (use the T-Handle on the wrench to judge the rotation).

Leave the T-Handle wrench inside the spindle and engaged with the screw.



The purpose of backing out the **differential screw** is to provide approximately 0.18" (4.5mm) of space above the screw that will be needed to back out the screw later, when removing the spindle (see Section 4 Disassembly and Removal for this discussion).

Next, place the spindle and T-Handle Allen wrench, as a unit, onto the main milling/spindle shaft as shown. The thread of the **differential screw** will be inserted into the thread of the main shaft.

To properly install the spindle, it is important that the **differential screw** and spindle rotate together, synchronously, so that the 4.5mm space that was created earlier does not change.

To accomplish this, rotate the spindle and the T-Handle Allen wrench clockwise together as a single unit. Pay particular attention to the position of the T-Handle to ensure that the relationship of the **differential screw** to the spindle remains the same.

Once the spindle bottoms-out on the main milling/spindle shaft, place the open-end wrench on the spindle (or the **locking nut**, as the case may be) and hand-tighten the spindle only.

Then, after removing the open-end wrench, firmly turn the T-Handle Allen wrench clockwise, tightening the **differential screw** with approximately 7.38 ft-lbs (10 ntn-m) of torque.

Now, the spindle is ready for the outer components and shaper cutter (if not previously installed).

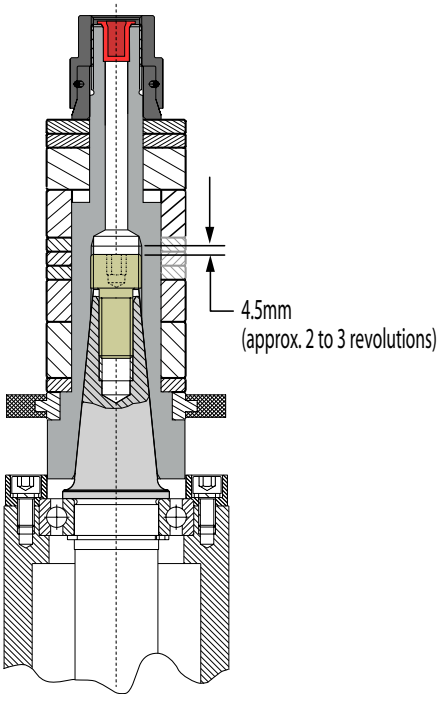
Do not forget to plug the hole with a **plastic cap** after every mounting of the interchangeable spindle to prevent chips and debris from getting inside the spindle.

Disassembly and Removal

The following disassembly and removal instructions are abbreviated. Most of the steps have been discussed earlier during the installation and setup steps. Removal of the **outer components** and the **differential screw** can be accomplished by simply using the installation steps in reverse sequence.

As with the installation steps, disassembly and removal can also be performed in different sequences. The illustration below shows a bare spindle being removed from the machine. This can also be accomplished not only with the **outer components** still installed, but also with the particular shaper cutter tool that is being used still mounted on the spindle. This allows the use of multiple spindles with pre-installed shaper cutters to perform multiple operations, cutting down on changeover and setup time.

Removing Spindle from Machine



To remove the spindle from the shaper, hold the spindle stationary with the open-end wrench while turning the T-Handle Allen wrench counter-clockwise.

This is where the importance of the 0.18" (4.5mm) space referred to in the Installing Spindle Into Machine section on page 14 becomes apparent. The additional space provides the needed room for the **differential screw** to back out from the main shaft/spindle.

Once the spindle has broken free of the main shaft/spindle, the open-end wrench can be removed and the T-Handle wrench rotated counter-clockwise until the **differential screw** and spindle are free.

TROUBLESHOOTING:

If the **differential screw** will not turn counter-clockwise in the previous step, it is probably due to a lack of space above the screw (0.18", 4.5mm). In this case, the only way to break the spindle free will be to hold down the main shaft/spindle at the bottom end where the pully assembly is mounted, rather than with the open-end wrench on the interchangeable spindle.

Removing Router Collet from Nut

Illustrated is a simple method for removing the router collet from the nut.

Place the router collet nut on a surface that will allow space below the router collet for it to fall.

If using a spacing ring, as shown, take care not to damage it during the remaining steps.

Place a round pin, slightly smaller than the outside diameter of the router collet, on top of the router collet.

Ideally, a wooden dowel should be used. Here, the illustration shows a 7/16" socket being used for this purpose.

Take care not to damage the collet.

With the pin placed carefully on just the router collet and not in contact with the nut, strike the pin slightly with a mallet to dislodge the collet from the nut.

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Tech Mark provides a variety of resources to assist in troubleshooting and correcting any problems you may encounter.

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support@tech-mark.com

- Can't resolve the problem using the Technical Guide? Send an email to our support staff and expect a response within 24 business hours (weekends and holidays excluded).

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- If your problem requires phone assistance, please call us to speak directly with a Tech Mark technician. Technicians are available Monday through Friday, 8 a.m. to 5 p.m. CST.

TECH MARK, INC.®

Tech Mark, Inc
7901 Industry Drive
North Little Rock, AR 72117
tel (501) 945-9393 • fax (501) 945-0312
www.rojekusa.com

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Installation and User's Guide

Part #: ROJ-PUB-IS-SPINDLE
Ver #: 0311