

# Tormach® Speeder

Operator's Manual



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Tormach Speeder Manual  
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## Preface

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### 1.1 Safety

This brief manual reviews the installation, use, and maintenance of the Tormach Speeder. The Tormach Speeder is used to mount sharp cutting tools, and caution should always be taken when working with these tools. Eye protection and Ear protection should always be worn when using the Speeder.

### 1.2 Intended Use

The Tormach Speeder is intended to be used as an accessory for Tormach milling machines and other mills, such as Bridgeport® mills, which have compatible spindle geometry. The Tormach Speeder is a speed increasing spindle for light to medium duty applications and can be used for conventional milling operations with or without coolant.

### **1.3 Principles of Operation**

The Speeder works on the principle of pulley ratios. Typically, different sized pulleys are used to slow down the speed and increase the torque between a prime mover such as an electric motor, and an output device, such as a conveyor belt. The motor would have a pulley smaller in diameter than the conveyor roller. For every rotation of the motor, the roller would spin a fraction of that rotation. This results in a mechanical advantage and a speed decrease.

In the case of a speed-up device, like the Tormach Speeder, the opposite principle applies; the drive pulley is larger than the driven pulley. This means that for every rotation of the drive pulley, the driven pulley rotates some multiple of that. This gives a faster output speed but at a lower torque.

### **1.4 Performance Expectations**

The Tormach Speeder is rated for 20,000 RPM output, but can handle speeds of up to 30,000 RPM output for short periods of time. These kinds of speeds likely come at the cost of belt and bearing life and will definitely make more noise during operation. That said, we have not seen much detriment to surface finish at speeds above 20,000 RPM.

When properly mounted, with the belt correctly tensioned, the speeder can deliver 500 to 1000 watts to the tool. In general, it will be able to deliver more power at high speeds. The belts can slip if you do heavy cutting at lower speeds. You can easily overload the speeder transmission, particularly if your primary spindle is a 3 hp (2200 watt) or 5 hp (3700 watt) Bridgeport style mill.

While the Tormach Speeder offers much higher rigidity and robustness over a companion grinder style spindle, damage can still occur with severe tool crashes.

The speeder can be used with coolant, but be aware of certain restrictions. The lower spindle is sealed against coolant using a labyrinth seal which means that spindle rotation is required for sealing action. Turn coolant on only after the spindle is spinning and turn coolant off before the spindle is turned off. This should be a standard procedure with any high speed spindle. The upper sections, where the belt drive transmission exists, should not be exposed to coolant.

## 2 Installation

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### 2.1 Preparing the Spindle

Some Spindles may have a burr on the 3-3/8" diameter housing. Use a flat file to remove. The Tormach Speeder requires the use of the Tormach Tool System® (TTS) R8 collet (sold separately).

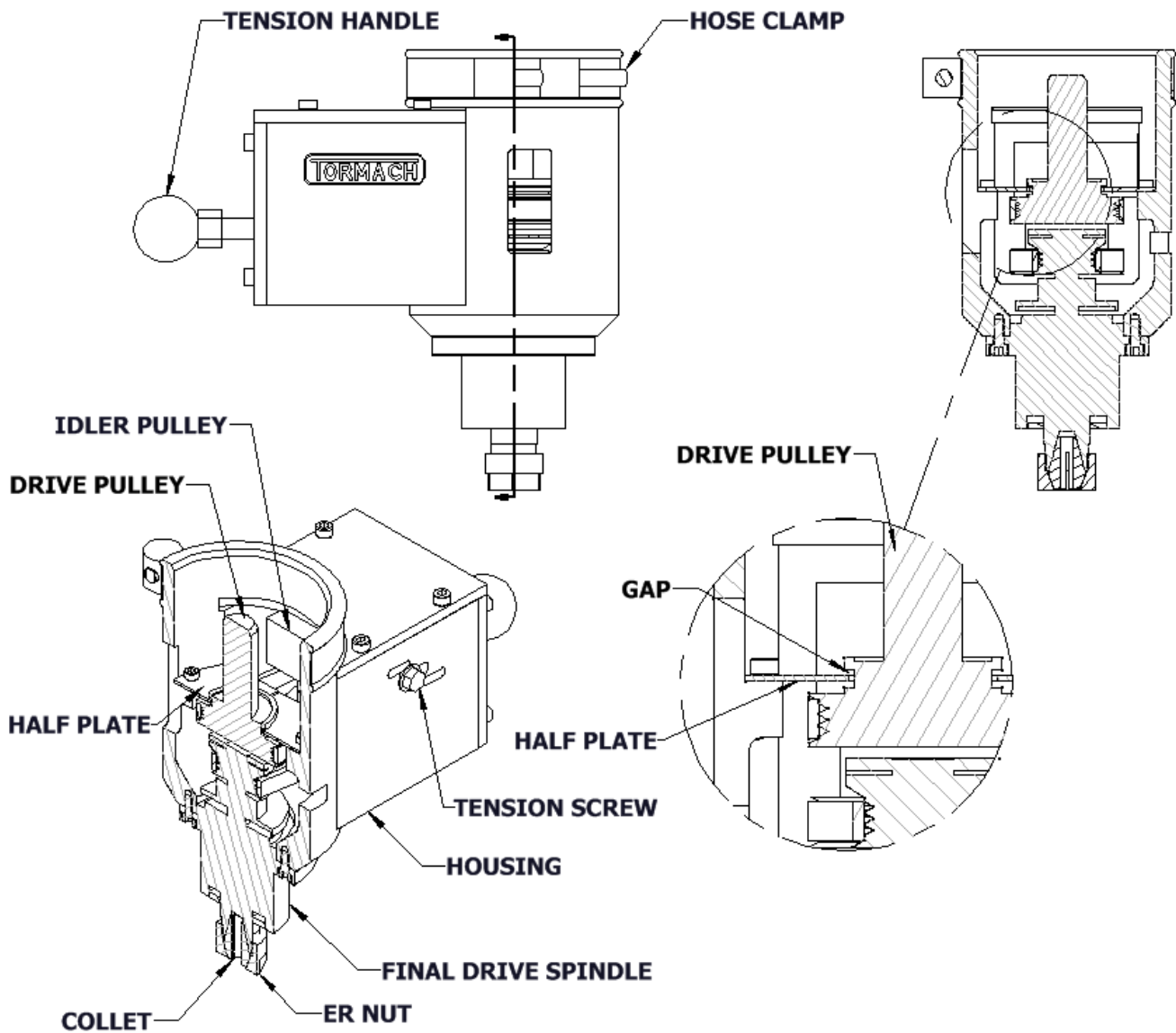
### 2.2 Installing the Speeder on the mill: (See detailed view in the figure below.)

1. Install the TTS R8 collet loose in the mill spindle
2. Loosen the Speeder tension screw with the 10mm wrench (included) to relieve any belt tension.
3. With the hose clamp loose, slide the Speeder over the spindle nose, aligning the drive pulley shaft with the TTS collet.
4. Position the housing as far up on the spindle housing as possible with the tension handle to the left and tighten down the hose clamp.
5. Tighten the spindle draw bar. This will lift the drive pulley a bit, relative to the rest of the speeder.
6. Looking through the speeder housing opening, verify that the drive pulley groove is not in contact with the half plates (see detail view on the figure below). If the drive pulley is sitting a bit high or low (rubbing on the half plate), loosen the draw bar, give it a slight tap, and retighten. If the drive pulley is too high and won't drop when loosening the draw bar, try using a screwdriver inserted from the rear of the housing to gently push the pulley down. Retighten the draw bar. To verify that the drive pulley is not rubbing on the half plates, manually rotate the main mill spindle and listen for any kind of rubbing.
7. Pull on the tension rod to tension the belts. This part can be a little tricky. The goal is to tension both belts evenly. There is a bit of play with the tension rod to allow the user to tweak this a bit. When even tension has been achieved, tighten down the tension screw. Heavy tension is not required, ten pounds or so should be adequate.
8. To test the tension, manually rotate the mill spindle, the final drive spindle should rotate without hesitation.

#### 2.2.1 Belt Tension

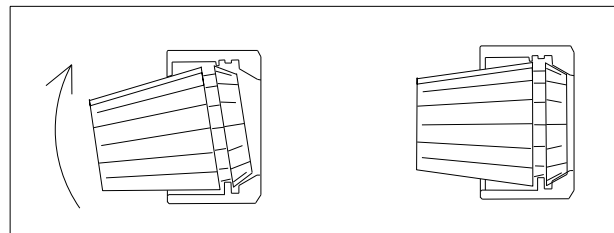
The Tormach Speeder is designed such that significant belt slip will occur at very low speed. When manually spinning the drive pulley, don't be surprised if the final drive spindle is easily stopped by hand. The Speeder develops most of its belt drive force at higher speeds as the centrifugal force of the belt traveling around the pulleys causes a significant increase in overall belt tension.

## Installation



### 2.3 Installing a cutting tool in the speeder

The Tormach Speeder uses an ER-16 collet. Like any ER collet system, first install the collet into the collet nut, then install the combined collet/nut into the speeder spindle, and then install your selected tool. Using the wrenches included, tighten the collet nut snug.



To change a collet, loosen and remove the ER nut. Since the collet is self extracting, it will pop out with the nut. You may notice that while you are loosening the nut, the nut will start tight, then get loose then tight once again before going loose one last time before it comes off the threads. This is normal.

### 3 Initial Start up (Break in)

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1. All speeders will require a short break-in period. We recommend running the speeder at 15,000 RPM (5000 RPM input speed) for 15 minutes before cutting anything with it. For mills not capable of these speeds then the maximum spindle speed should be used. During this time the belt may shed some small particles. This is normal.
2. Speeders may likely have excess grease applied during manufacture. Don't be surprised if oil appears to be dripping out of the spindle. This will decrease after the initial break in period.
3. Shipping oil will most likely be present on the pulley surfaces prior to initial start up and is difficult to remove. . This may cause some belt slipping in the beginning, but should not be a problem after the break-in period once the oil has worn off. This oil will not damage the belts.

### 4 Operation tips

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1. Balance is a key issue with any high speed device. Unbalanced cutters should not be used- for example: single flute cutters, end mills with a Weldon flat.
2. While the Tormach speeder has a concentric design (input and output spindles are in line with each other), it should be noted that re-referencing the speeder tool to the work is recommended after installation if precise positioning is required.
3. Note that Speeder spindle speeds will be 3x the commanded spindle speed. A digital Tachometer will always be handy to verify actual tool speed.
4. Please note, the speeder is not coolant proof. While the location of the housing side openings generally are such that spray on the work piece does not make it inside the housing, care should be taken that coolant does not drip from leaking coolant lines on the top of the speeder.



## 5 Maintenance, Repair and Spare Parts

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### 5.1 Regular Maintenance

The only routine maintenance required for the speeder is regular inspection of the spindles and belts. All bearings are lubricated and sealed for life and require no special attention. It is also advised to clean out any debris inside the housing prior to use.

### 5.2 Belt Replacement

The belts are an obvious wear item. To replace them, the speeder must be partially disassembled.

1. Remove the tension rod and cover plates

2. Remove the tension screw.
3. Slide the idler spindle out of the housing slots, the belts can now be removed from the Idler.
4. Remove the belts from the drive spindle and drive pulley.

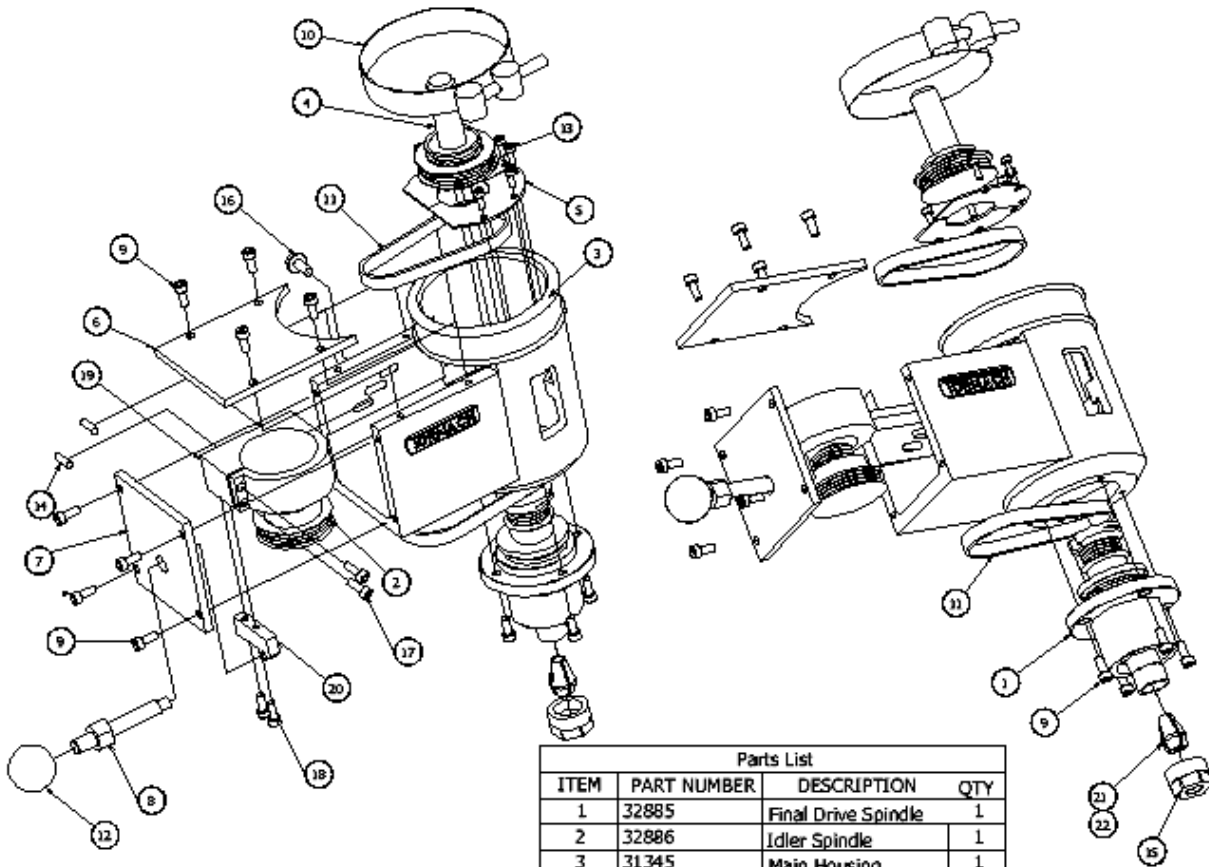
Install is the reverse, just be sure that the belts are seated completely on the spindle pulleys

### **5.3 Spindle Replacement**

Should the Final Drive Spindle require replacement, simply remove the 4 mounting screws.

Neither the Idler nor the Final Drive Spindles are user repairable.

### 5.4 Parts List



\* Belt cross reference: Gates Polyflex® JB®  
Part number: 3/3M280JB

Parts List			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	32885	Final Drive Spindle	1
2	32886	Idler Spindle	1
3	31345	Main Housing	1
4	31346	Drive Pulley	1
5	31347	Half Plate	2
6	31348	Top Cover Plate	1
7	31349	End Cover Plate	1
8	31351	Tension Rod	1
9	31353	Screw, M5x12	12
10	31355	Hose Clamp	1
11	31356	Belt *	2
12	31357	Knob	1
13	31329	Screw, M4x6	6
14	33046	Dowel Pin	2
15	31778	ER Nut (replacemt)	1
16	31779	Screw, Flange	1
17	33045	Screw, M6x18	2
18	31685	Screw, M6x25	2
19	32891	Speeder Idler Mount	1
20	32892	Tension Block	1
21	31690	Collet, ER 16 1/8"	1
22	31691	Collet, ER 16 1/4"	1
	31792	Label, speeder	1
	31837	25mm wrench	1
	31838	17/19 mm wrench	1
	31842	10/11 mm wrench	1
	31896	Owners Manual	1
	31784	Wooden Speeder Box	1