

# Kelton Multi-Axis Scraper

*Designed by Kel McNaughton*

## Guide for Use

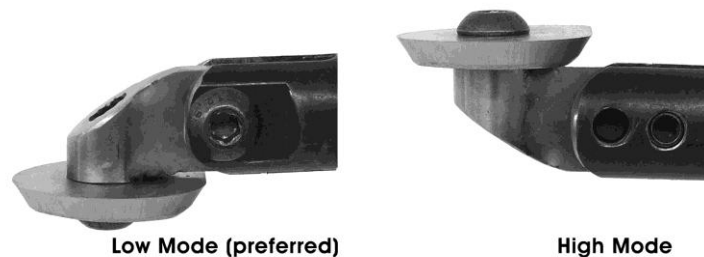


The Kelton Multi-Axis Scraper is a multipurpose scraper that can be used in various modes. It provides wood turners with a tool that will enable them to achieve both super fine finishes and rapid removal of wood. The uniquely designed swivel head assembly, combined with the customizable rake adjustment and a rotatable cutter allows the user almost unlimited configurations to suit their particular needs.

It is one tool that can perform numerous scraping operations without the need for additional accessories. It can also be used in areas where conventional scrapers have difficulty, e.g. negative rake scraping and shear scraping in hollow forms and deep, steep sided bowls.

**CAUTION! Woodturning is a potentially hazardous activity. Observe all normal wood turning safety procedures when using the Kelton Multi-Axis Scraper, along with those procedures specific to this product.**

The Kelton Multi-Axis Scraper can be used in two basic modes and five distinct modes within each basic mode. The two basic modes, “**Low**” and “**High**”, refer to the position of the cutter in relation to the shaft and are achieved by removing the cutter, turning it over on the carrier, then reinserting and tightening the cap head screw that holds the cutter in place. **Figure 1** shows the two basic modes. **For purposes of this guide, the “Low” mode will always be used.** The Low mode puts the cutter below the main shaft, and is the most stable mode. Note that in all modes the scraper is generally used with the shaft of the tool horizontal.



**Figure 1**

## How to Make Adjustments

### Setting the Tool Head Assembly Angle:

The tool head assembly can be rotated in relation to the tool shaft to achieve various scraping modes. To rotate the assembly, slightly loosen the small socket screw (**Figure 2**) on the main tool shaft, rotate the assembly to the desired position and retighten the screw. **If for any reason the assembly is completely removed from the shaft, care must be taken that it is properly re-installed with the set screw seated in the recess on the shaft of the head assembly.**

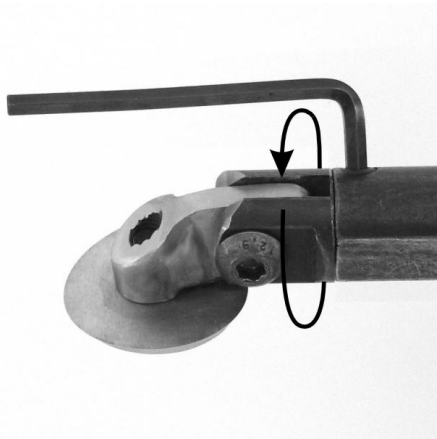


Figure 2

**Caution!!!** While the head assembly can physically be positioned at any angle to the shaft, the tool tip should not be positioned at an angle greater than 45 degrees to the work. Higher angles will greatly increase the risk of a serious catch that might ruin the work and/or cause injury to the turner.

### Setting the Rake Angle:

The rake angle of the cutter is adjusted by loosening both the large cap head screw (**Figure 3**) and the socket screw (located on the opposite side from the cap head screw and not shown) in the Head Assembly, adjusting the cutter to the desired rake, re-tightening the socket screw and then re-tightening the cap head screw. Both screws must be tightened securely! Tightening the small socket set screw in the tool head assembly holds the tool tip at the desired angle while the large main locking screw holds the tip securely in the assembly.

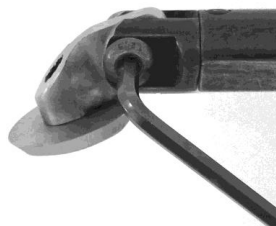


Figure 3

**Rotating the Cutter:**

The teardrop cutter may be rotated to any position to achieve the desired radius or a fresh burr on an unused section of the cutter. Simply loosen the cap head screw (**Figure 4**) that holds the cutter to the carrier, rotate the cutter to the desired position and then retighten the screw.



**Figure 4**

**Please read the following information carefully to take full advantage of the many features of the Kelton Multi-Axis Scraper.**

Note that the main shaft has two machined flats and a round portion along its length. The flats are angled so the tool can be easily swapped from left hand to right hand for shear scraping in either direction., e.g. when working on the outside of a piece. The round portion of the main shaft allows users to angle the tool tip at their own desired angle of work (See “**User Defined Angle**” **Figure 7**).

**In all modes care should be taken to provide enough clearance between the toolrest and the workpiece that neither the tool head assembly nor the main shaft socket screw (when in User Defined Mode) contacts the toolrest when the cutter tip is drawn to the closest edge of the workpiece.**

### **Setting the Kelton Multi-Axis Scraper to Various Modes**

The scraper is almost infinitely configurable when one considers the various degrees of rake and cutter angle available. The most common general modes of use will be discussed below. Customized adjustments within these modes can be made by the user to suit their particular needs.

### **Setting to Conventional Scraper Mode**

The Kelton Multi-Axis Scraper can be used as a conventional (zero rake) scraper. To set the scraper for conventional mode scraping, set the tip to horizontal, then set the head assembly so that one of the flats on the main shaft is pointing downward, e.g. rests on toolrest (**Figure 5**).



**Figure 5**

### **Setting to Normal Shear Scraping Mode**

In normal scraping mode, there is zero rake to the cutting tip, but it is rotated to produce a shearing cut. The tool tip is first adjusted to a horizontal (zero rake) position. The tool head assembly is then rotated within the main shaft to obtain the desired shear angle. The adjustment of the tool head assembly can be in either of two positions:

#### ***SHEAR CUTTING AT A SET ANGLE:***

The tool head assembly is set at an angle to the main shaft, and one of the milled flats of the main shaft is used on the toolrest (**Figure 6**). The cutter angle is typically 45 degrees in both left and right hand positions but may be adjusted according to the user's preference. **It is not recommended that the cutter be set at an angle greater than 45 degrees.** In this mode the machined flats give extra support to the tool and reduce the risk of tool rotating. It also allows the user to quickly switch between the two set angles, e.g. when working the outside of a piece.



**Figure 6**

***SHEAR CUTTING AT A USER DEFINED ANGLE:***

The tool head assembly is set at an angle to the main shaft, such that the **round portion of the main shaft is used on the toolrest (Figure 7)**. A slight change in the tool tip angle is achieved “on the fly” by the user slightly rotating the tool on the round shaft during use.

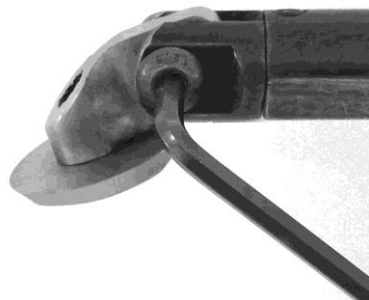


**Figure 7**

It should be noted that the cutter head assembly is located in position on the main shaft with a precision fit. There should be no need to undo the locking screw more than a slight turn to make adjustments. Undoing the locking screw too far may allow the head assembly to come away from the main shaft. If this should happen, care must be exercised to ensure it is replaced correctly and that the set screw is seated in the recess machined into the tang of the cutter head assembly.

**Setting the Tool to Negative Rake Mode**

In negative rake position, the tool tip is angled down in relation to the tool head assembly and shaft during the cut. The tool tip is adjusted from horizontal to this more controlled negative rake by slightly loosening both the cap head screw and the socket screw in the tool head assembly, adjusting the cutter to the desired rake and re-tightening the small socket screw and then the large cap head screw (**Figure 8**).



**Figure 8**

### **Setting the Tool for Combined Shear Scrape/Negative Rake Mode**

This mode is a combination of the two modes listed above. The tool tip is adjusted at a negative rake angle and the head assembly is also adjusted, relative to the main shaft. In this mode the tool tip cuts at a shear scrape angle but with the tip trailing the tool shaft. Combine any of the options listed above to achieve any number of positions to best suit the work and achieve a fine finish.

**Figure 9** shows the scraper set to a negative rake with the head assembly in the set angle mode (main shaft set screw on top) which allows the user to use the machined flats for greater control.

**Figure 10** shows the tool set to negative rake with the head assembly in the User Defined Angle mode (main shaft set screw on the bottom) which allows the user to change the cutter angle on the fly. **Always remember to remove the Allen Wrench before using the tool!**



**Figure 9**



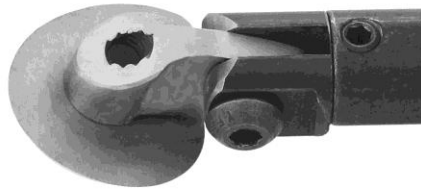
**Figure 10**

### **Setting the Tool to Positive Rake Shearing Mode**

There are instances where a positive rake shearing cut may produce a better surface than other configurations, e.g. a finishing cut on the steep sides of a bowl or vessel. **This configuration can be “catchy” if used incorrectly and should be used with caution, only with the cutter adjusted to a shearing mode, and only for very light cuts.** In the positive rake position (Figure 11), the cutter is angled slightly up in relation to the tool head assembly and shaft during the cut. Adjustment to positive rake is done by loosening both screws in the tool head assembly as described above, setting the desired rake and re-tightening the screws securely. **The cutter head assembly should then be rotated to a shearing angle**, preferably a set angle in which the milled flat of the main shaft rides on the toolrest (Figure 12).



**Figure 11**



**Figure 12**

**CAUTION!!!** Tips will generally be extremely sharp. Use great care when handling, especially when loosening or tightening the head assembly or rotatable cutter, so as to avoid injury. Wearing cut resistant gloves while making these adjustments is strongly recommended.

## **Operation**

The toolrest must be set back sufficiently from the workpiece that the head assembly and the socket screw on the main tool shaft do not contact the toolrest at any point when the tool is in use.

**Caution!!! While the head assembly can physically be positioned at any angle to the shaft, the tool tip should not be positioned at an angle greater than 45 degrees to the work. Higher angles will greatly increase the risk of a serious catch that might ruin the work and/or cause injury to the turner. Under normal finish shear scraping conditions with near zero angle tip position, only light holding forces are required for this tool. For bulk material removal, the larger Kelton handles are recommended for better control of the forces that this usage can generate.**

For optimal results when making finishing cuts, the tip edge should have a fine, even burr. When the scraper is being used for bulk wood removal, such as in the interior of a deep bowl, where gouges are difficult or impossible to use, a more aggressive burr may be desired.

## **Sharpening**

**CAUTION!!! Sharpening inherently entails working with items and edges that can result in injury. All sharpening activity should be done with great care. It is highly recommended that cut resistant gloves be worn. Read and observe all safety instructions for any power sharpening tools used. In particular, approach any power sharpening tool carefully to prevent inadvertent jamming and catching of the scraper cutting edge in the moving surface of the sharpening tool.**

While the tip has extremely good wear resistance, it is nonetheless easily sharpened as necessary. It cuts as a result of a raised-edge burr. As sold, the burr is at a moderate or intermediate level and can be felt by carefully and **lightly** drawing a fingertip from the top flat surface of the scraper tip, **outward** across the top of the cutting edge. **WARNING!!!** This must be done carefully and only in a direction away from the cutting edge, as any movement along or into the cutting edge is likely to result in injury.

Because the cutting action of a scraper, unlike other turning tools such as gouges, is achieved by means of a relatively fragile raised burr, the edge (burr) must be refreshed somewhat more frequently to maintain an effective cutting action. This is especially true when achieving fine finishing cuts or when working with certain woods such as very hard burls.

Maintenance sharpening is achieved by the upward wiping of a good hand held slip stone. To achieve a coarser, more aggressive burr, sharpen with a coarser grade of stone such as is typically found on a bench grinder. Avoid heavy or prolonged contact with a grinding wheel, sanding belt or disk as this may cause the burr to curl over and counteract its effectiveness. Use only clean, well-dressed grinding wheels, sanding disks or belts to obtain a good, uniform burr.

Old burr can be removed by placing the tip face down on a fine, flat sharpening stone and rubbing very gently or with a light rub of a slip stone held against the top surface of the tip. Never use an aggressive abrasive or grinding wheel on the top flat surface of the cutter! The cutter has layer of special cutting alloy on its top surface. Grinding away this layer or using unnecessarily coarse abrasives will damage the cutter. In all cases, make sure never to get an angle between the top surface and the stone or you will not be able to achieve a good burr until



the edge is ground back to the flat surface. When the old burr is removed, you are ready to re-sharpen.

A more durable burr can be obtained by ticketing or burnishing the edge. The size and aggressiveness of the burr (from super fine to very aggressive) can be adjusted by the force and angle used when burnishing. First, the edge needs to be sharpened and the burr from sharpening removed as discussed above. Burnishing can be done with a jig or simply by rolling/sliding an HSS rod, burnisher or similar piece along the sharpened (ground) side of the cutting edge. Greater force and repetition will result in a larger burr. Remember that the objective is to raise a burr that stands out from the surface rather than one that curls over. A properly raised burr is capable of producing extremely fine shavings and an exceptional finish to even the most difficult of woods.

### **Features**

The Kelton Multi-Axis Scraper is manufactured using quality materials. The main shaft and head assembly are coated to resist corrosion, while the replaceable tool tip incorporates a top layer of a specially formulated alloy that holds its edge well and can be easily sharpened. (See **Sharpening** section above). The shank of the Kelton Multi-Axis Scraper is round and can be held in one of the range of Kelton Handles including the Kelton ER25 or ER32 handles with the 16 mm ER collet. Use of the Kelton ER handles with added weight (lead or steel shot) results in even more stability to an already extremely stable tool, especially when working on deep vessels.

### **Acknowledgements**

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