

Axminster SU1 Universal Mill



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Matthew Chapman reviews another product from the Axminster Engineer Series.

The Axminster SU1 Universal Mill is a compact machine with a primary role of horizontal milling but can also be configured to conduct vertical milling (**photo 1**). The design is such that the motor and spindle are a stand-alone assembly that can be moved between the horizontal and vertical axis – more of this shortly.

Build quality

Generally the build quality is good with the machine being based on a substantial casting. There were a few areas where I thought the attention to detail was lacking slightly with one example being the off-centre bored hole for the motor/spindle assembly in the main casting (**photo 2**). Those opting to purchase the stand/cabinet will now be supplied with the new type Axminster design that, as I described in my last review, is of excellent build quality and finish. Note the pictures in this review show the old cabinet.



Spindle/motor assembly hole showing eccentricity with casting.



Axminster SU1 Universal Mill.

Controls

The mill is controlled with a convenient start/stop box with an additional latch down emergency stop. Spindle speed is controlled electronically and has a speed range of 200-2000 rpm. The only measure of what the spindle speed actually is, is a scale sticker behind the speed control knob. Whilst this gives an indication of the speed it does not reflect the drop in rpm experienced under load; a situation that is more prevalent in smaller machines. I think a digital tachometer, as found on other Axminster machines, would have been ideal here.

Table axis controls

Handles for both the cross and longitudinal axes were smooth and easy to operate with all three dials being engraved in a clear and legible manner. Power feed can be purchased

as an optional accessory and fitted to the longitudinal axis if required. The longitudinal axis had no discernable backlash whilst the cross axis had 0.01mm. Whilst I thought this was very good there is no means provided to adjust out any backlash that will inevitably develop over time.

A pleasant surprise was that movement in the Z axis is effected by raising and lowering the knee as opposed to moving the head; a much more rigid and accurate method in my opinion. The control handle to raise and lower the knee is conventional in both its location, on front of the mill, and operation through a 90 degree bevel gear to a leadscrew. This was found to have 0.02 mm of backlash, all of which was located in the bevel gear mesh. Again there is no means of adjustment here.



Horizontal milling.

Slideways were ground, not scrapped, and had suitable gib strip adjustment. All three axes could be locked through sprung handle type clamps on the X and Y axis and hex head screws on the Z axis.

Horizontal milling

For horizontal milling the cutter arbor attaches to the spindle via a No.3 Morse taper. It is 20mm in diameter and so accepts standard cutters. Cutters are held in an entirely conventional manner with spacers and a clamp nut, which enables various cutter combinations and positions along the arbor. The outboard end of the arbor is supported in a bronze bearing held by a substantial casting that is dovetailed to the sliding arm or ram; all in all a solid set-up.

Taking a cut using side and face cutter in the horizontal configuration I found the mill

to perform faultlessly (**photo 3**). The motor was more than powerful enough and was not found wanting at all. My one observation here was that the spindle speed seemed slightly erratic at very low speeds though I suspect this was below

the stated minimum specified speed of 200 rpm. Perhaps my biggest surprise in this review is just how rigid the mill is in the horizontal configuration, with no discernable vibration during substantial cuts; quite an impressive performance for such a small mill.

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Spindle/motor assembly removed.

Vertical milling

Converting to vertical milling was very easy. The horizontal support and arbor are removed and then the spindle/motor assembly removed by means of a simple clamp (**photo 4**).

A substantial casting forms

the vertical head through which the spindle/motor assembly passes. This locates inside a hole bored into the front of the overhead support arm or ram. It is fixed in position by a single M6 clamp screw through cylindrical clamps (**photo 5**). This clamp also allows the vertical head to pivot thus allowing the head to be squared up to the table and also angled cuts to be made; though of course there is no quill feed so angled boring or drilling is not possible. The M6 screw seems a little small for this application and I would worry about over



SU1 set for vertical milling.

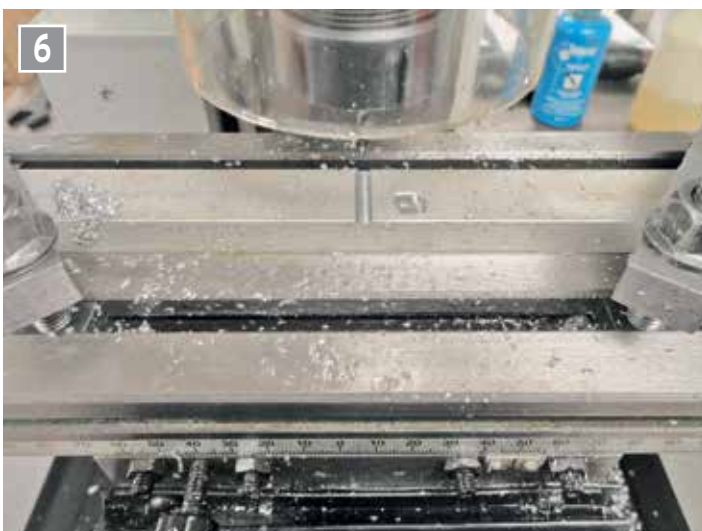
tightening; I think I would look to increase this in size if possible.

Cutting using the vertical head was faultless with no rigidity issues (**photo 6**). The distance between the spindle face and the table is quite limited, certainly care would have to be taken in choosing cutter and work holders etc. as I found the distance was soon used up; standard MT3 collets probably give the most clearance as opposed to collet chucks. Additionally I found the Perspex guard to be slightly restricting as it was fixed to the vertical head with no quick method of moving it out the way for setting up etc.

Conclusion

The SU1 is an enjoyable and easy machine to operate; it is certainly more robust than it initially looks. It offers all the benefits expected of a small horizontal mill with gear/spline cutting and slotting being the obvious examples. The additional capability to carry out vertical milling, albeit slightly limited in capacity compared to exclusively vertical mills, turns the SU1 into a useful multi-role machine that will make the most of space in a small workshop.

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Vertical milling showing fixed guard.

Full detail on the exact specifications of the SU1 can be found at the Axminster website. www.axminster.co.uk

Additionally the Axminster Skills Centre instructor, Mr. Bob Rolph has posted an informative video at www.youtube.com/watch?v=Bmq8uK9JzZQ which is certainly worth a watch.