



## What is an UNIMAT lathe



Fig.: UNIMAT-SL DB 200 lathe.

First of all, I am not a hard core UNIMAT expert, but we have one in the shop for testing our UNIMAT accessories, which we offer in the meanwhile at [www.LatheCity.com](http://www.LatheCity.com) I do also have some UNIMAT manuals at hand. We have a so-called UNIMAL-SL DB 200 which is one of the earlier models. However, a number of UNIMATS have been built and are still available on the second hand market. I am aware of the following models:

**UNIMAT-SL DB 200**

**SL 1000**

**EMCO UNIMAT 3**

**UNIMAT 4**

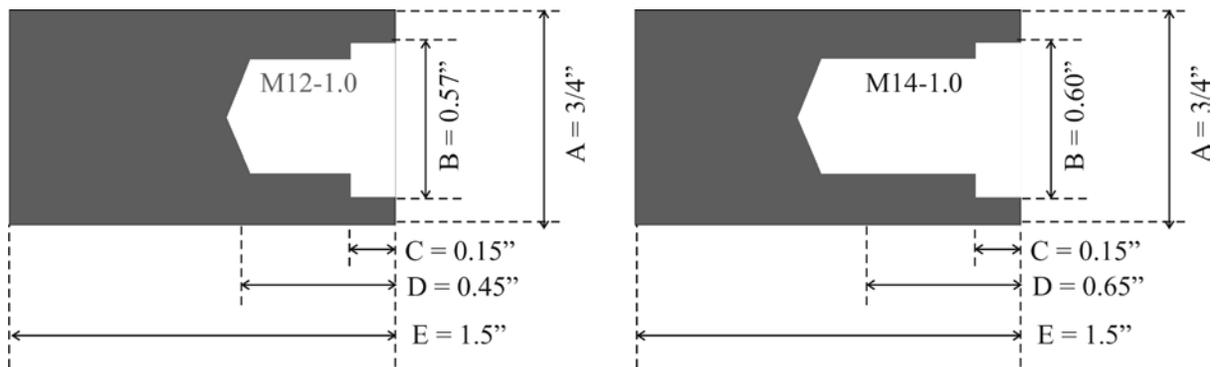
**UNIMAT 1 Basic**

The Unimat DB/SL model was originally made in Austria (Maier & Company, 1953), similarly to Sherline's model origin. It was sold in the US by EMCO in mid 1950s. Apparently some 10,000 were made until 1977 when production stopped. The succeeding model, the Unimat-3, was manufactured between 1976 and 1990. In the 1990s, Emco discontinued also the newer UNIMAT models. Thus, only 2<sup>nd</sup> hand UNIMATs are available today. As far as I know, all parts on the UNIMATs SL, DB, SL, SL 1000 etc. are interchangeable. These are essentially the same machines; the DB is an early model, then the designation was changed to SL and later to UNIMAT 1000. The later models, starting with the UNIMAT 3 are a different design (different spindle and lathe bed). That variety and the fact that only 2<sup>nd</sup> hand versions are available triggered apparently the interest of tool collectors.

UNIMAT is an entirely metric system, the older models (DB, SL) have M12-1.0 head/tail-stock spindles the newer (UNIMAT 3) come with M14-1.0 spindles. I have never seen a DRO for UNIMATs, although CNC upgrades exist. The earlier models didn't have a dovetail lathe bed but just two rods, i.e., the design reminds one to a drill press vise. The stability is inferior to dovetail designs. Newer UNIMAT

versions (EMCO UNIMAT 3) have a dovetail style lathe bed. The latest model (*UNIMAT 1 basic*) looks like made from a structural framing system. It looks like a tool for kids, perhaps a good system for engaging young adults with machining.

The earlier models are very similar to Sherlines lathe. For example, taper are cut by rotating the headstock. The headstock and lathe bed are “aligned” with a pin and not with an alignment key as on Sherline’s lathe. That’s not very precise, i.e., one basically always cuts a taper on the DB 200 lathe, I would guess. (One may use a rod inserted in the tailstock and headstock to align them – the “buddy bar” available at LatheCity.) UNIMAT 3 has a compound slide, however. Thread cutting attachments exist, but on the earlier models, this is an even more tedious procedure than on Sherline’s lathe. I did never cut threads on an UNIMAT.



**Fig.:** For machining spindle accessories or for purchasing the correct size these dimensions need to be known. Tailstock and headstock spindle front ends are identically. Shown on the left are the UNIMAT SL DB dimensions and on the right those for UNIMAT 3. (I never had an UNIMAT 3. Thus, these dimensions are based on customer information we got for machining custom designed adapters.)

The most important UNIMAT-SL DB 200 / EMCO UNIMAT 3 (or 4) specs to the best of my knowledge are given in the following. Some parameters are gathered from old manuals, some are measured.

- M12-1.0 tailstock and headstock spindle threads / UNIMAT 3 have M14-1.0 threads
- Hole through spindle (measured with Starret small diameter gauge on four different spindles) amounts to 7.2 mm (9/32”) at the front (threaded) end / for UNIMAT 3 it’s 10 mm according to manual
- Interestingly, at the end side of the headstock spindle I do measure 6.5 mm for SL DB
- Tailstock spindle bore 12 mm, but diameter of spindle quill amounts to 11.96 mm for my SL DB (Measure yours if you want to machine a new tailstock spindle. LatheCity offers a Morse type tailstock spindle. The tailstock quill can be clamped, i.e., the diameter is less critically as on a Sherline lathe, but over size it rather than under sizing the quill.)
- Center height 1.41” (36 mm) / 1.81” (46 mm)
- Swing over lathe bed 2.36” (60 mm) / 3.62” (92 mm)
- Distance between centers 6.69” (170 mm) / 7.9” (200 mm)
- Lead screw M8-1.0 left hand, tailstock spindle M8-1.0 left hand, and M5-0.8 right hand for the hand wheels. This is metric, fine thread, and left handed. I like metric, but this is somewhat odd.
- Cross-slide has one T-slot that fits 12 mm T-nuts and runs horizontally

- Original motor has apparently 4000 RPM, 13 (!) belt configurations are shown in the original manual for DB 200, ranging from 375 to 9200 RPM which, however, that requires additional wheels which are often missing for 2<sup>nd</sup> hand versions. I only used a configuration with 2000 RPM myself.
- Nuts & bolts (tailstock locking, tool posts) are M6-1.25 which is more or less a metric standard size.

I could have added some drawings here, but I would not like to run into legal issues. Although I guess that any patents were expired decades ago (?)

UNIMATs come with a milling column which makes these systems insanely cheap. For example, we got our UNIMAT lathe and mill for \$350 at Ebay (in 2012) including some accessories. That's significantly cheaper than any Sherline system I have ever seen. As already mentioned, except the very latest models, UNIMATs are not made anymore, i.e., these systems are only available through the 2<sup>nd</sup> hand market. Therefore, also the availability of accessories is limited. LatheCity jumped in this neach – we offer UNIMAT accessories.

Unfortunately, I have to write that metal work on a DB 200 is very limited and the lathe is not very precise. For example, even when working on aluminum the motor stalls all the time (it stops), the cutting depth is close to zero even with aluminum using carbide inserts. Our lathe had the original motor, I think, and new drive belts. One may want to replace this motor with e.g. a Sherline motor which would not be too expensive (\$150+controller). I have also seen variable speed motors for UNIMAT at the 2<sup>nd</sup> hand market for about \$120-\$200. Using extremely small feed rates helps to circumvent the difficulties with the small motor torque to some extent.

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More details about the UNIMAT are given in the 2n Ed. of Vol. 1 which will be available late in 2013.