Michael Brombeiss
Santa Monica, CA 90404
https://brombeiss.com/

Precision Matthews Lathe PM-1030V – Setup and Upgrades

Wall thruput

- 2 ½" diameter trough-hole in wall underneath stairway, aligned with hollow Lathe spindle to allow for long stock

Stand

- Basis: Husky 46" 9 Drawer Toolbox
- Repainted from Dark Grey to White
- Reinforced Bottom and Top
- Bolted against Wall with metal mounting angles
- Four height adjustable rests
- Four retractable casters
- Remounted power outlet (front to back of right side)
- Leveled with precision machinist's level

Power, Air, Light

- 110V Power supply to power outlet in Lathe stand
- High pressure air connector next to Lathe stand
- Air line and Nozzle attached to right side of Lathe Stand
- LED light strip above Lathe

Ways Protector

- Fixed way protector (underneath chuck) made of ½ ich composite material, painted white
- Travelling way protector made of 3/16 MFD, attached to X-Axis Saddle

Chuck Guard Safety Switch

- The chuck guard is originally fixed with 2 screws to the mounting rod. Moving the chuck guard rotates the rod which then activates the chuck guard safety switch, located inside the electrical compartment
- Screws fixing guard to mounting rod removed to allow for free rotating without activating safety switch
- Screw through right side of Chuck Guard into face of mounting rod to prevent Guard slipping off rod
- Tightening set screw prevents mounting rod from rotating (activating safety switch)
- Inserted (long) bolt acts as chuck guard rest and prevents closed chuck guard from hitting chuck
- Mounted rubber rest for chuck guard in open position
- Lathe runs independent from position of chuck guard
- Electrical connectors for safety switch later used for Spindle Stop safety switch

Gear Cover Safety Switch

- The gear cover is originally equipped with a “key” which slides out of a machine mounted safety switch and cuts off power when the gear cover is removed.
- Positioning the key and sliding on the gear box cover smoothly is not easy
- Safety key removed from gear box cover and inserted “permanently in safety switch
- Lathe runs independent from position gear box cover

Carriage Stop

- Custom made carriage stop from 1018 Steel with locking handle (carry over part from PM-25 Mill) and adjustable bolt in Y-Axis

Saddle Lock Screw

- Access to the original saddle lock screw (M8 Socket Head Screw in countersunk hole) is sometimes blocked by the saddle gib screws. The DRO x-Axis ruler gives limited access to the lock screw.
- Socket Head Screw Replaced with Hex Head Screw and steel sleeve to account for depth of countersink hole.
- Low profile, custom made 17mm wrench slides underneath DRO ruler

Cross Slide Lock Screw

- Access to original Cross Slide Lock Screw (M5 Head Screw) is blocked by DRO ruler.
- Replaced original Screw with shorter version
- Custom made, shorter Allen key gives access to Lock Screw

Cross Slide Lead Screw

- The cross slide showed excessive backlash (1 full turn of dial)
- One reason was, that the lead screw nut was not bolted tightly to the cross slide
- Tightened lead screw nut
- Adjusted split lead screw nut
- Replaced (broken) split nut and lead screw with new parts
- Backlash now approx. 0.002 in

Cross Slide Power Feed

- The Power feed for the cross slide did not engage properly (only slightly and only worked when the handle was pushed down manually
- The reason was, that the gear wheel on the lead screw was mounted too far out and engaged only slightly with the drive gear
- Installed two washers (total thickness 2mm) behind the inner bearing of the lead screw to position the gear wheel on the lead screw further inside
- (Did not want to drill new holes in the lead screw to reposition the gear wheel)

Cross Slide Compound mount

- The Compound is mounted approx. 35 mm “inside” the cross slide, limiting the max. cutting diameter.
- Drilled a new 10mm hole in the top of the cross slide, 35mm further out than the existing hole to allow for larger turning diameters

Michael Brombeiss
Santa Monica, CA 90404
https://brombeiss.com/

Cross Slide Protectors

- 1: Round slide ins for compound T-nut slots, made of (blue) air hose, filled with 5/16 round wood tube
- 2; Square slide ins for compound T-nut slots, 3D printed from (blue) PLA
  (Note: The right T-nut slot has slightly different dimensions than the left one, requiring two different parts).

Compound Tool Post Mount (Bushing)

- The Tool Post is mounted to the compound by a 8mm bolt with a flange at the bottom.
- This flange is significantly smaller than the hole in the tool post body (14mm vs 14.5mm), allowing for some play between the tool post and bolt.
- Since the tool post is bolted down to the compound surface and hold in place by friction this probably does not cause any problems, but a; does not support repeatability when turning the tool post and b; is just not right
- Machined a brass bushing which slips over the lower and middle flanges of the bolt and secures the location of the tool post relative to the compound

Compound Tool Post Adapter (Block)

- The Tool Post is originally mounted on to of the compound, which sits on top of the cross slide.
- The compound is the weakest link when it comes to rigidity and since I don't use it very often (in general just for small tapers and threat cutting) I built a replacement block which can be swapped with the Compound in a matter of seconds.
- The adapter consists of the following parts:
  - Base plate attached to the cross slide with two T-Nuts. The base plate has a shallow center groove at the bottom to give clearance to the cross-slide oiler. On the to it has two registration grooves for the adapter block. On groove is on center line, the other one is 17mm left of center which puts the tip of the cutting tool just in front of the cross slide to give maximum clearance between the cross and chuck/workpiece if needed.
    Turning the base plate 180 degrees gives 17mm additional space along the x-axis if needed.
  - Tool Post Block, mounted to the baseplate in registration slot and two 6mm bolts.
    The top of the Block is the resting surface for the cutting tool holder. In order to avoid the need to adjust the height of the cutting tools when switch from Compound to Adapter, the distance between the top of the Block and the cross-slide surface is exactly the same as it is for the compound.
  - Tool Post Center bolt, attached with a (light) press fit to the Block, and secured wit a 8mm Screw from the bottom. The top of the bolt has the same 8mm threat as the original bolt of the compound.

Compound Lead Screw Key

- The key slot and the key in the lead screw for the handle wheel were damaged, allowing the wheel to turn on the lead screw freely
- Milled a new key slot in the lead screw and made a new key

Michael Brombeiss
Santa Monica, CA 90404
https://brombeiss.com/

Compound Lock Screw

- Compound Lock Screw (M4 Head Screw) requires Allen Key
- Original Lock Screw replace with custom made, knurled aluminum Wheel to allow for "tool free" operation

Compound Power Feed Adapter

- Adapter for cordless drill to power feed compound (e.g., for turning tapers)
- Turned mounting disk out of DELRIN which attaches to original compound wheel with two wheels handles
- Cut off tools side of standard (locking) ¼" hex bit and cut 6mm thread (had to "de-harden" hex bit for machining
- Built handle extension for "one-hand" manual turning of compound wheel

Tailstock

- The Y-Axis DRO limits the forward movement of the tailstock and sometimes puts a work piece out of reach of the life center
- Milled the (angled) front bottom part of the tailstock down so it can slip underneath the DRO
- Built a new Aluminum cover for the Y-Axis DRO to safe additional space
- Built new tailstock stop to prevent tailstock from touching DRO

Tailstock Caliper *(replaced by DRO, see below)*

- *The tailstock features an imperial scale for quill travel requiring calculations for metric-projects*
- *Cut-off the inside and outside jaws of a standard 4-inch digital caliper and mounted a "downward" angle at the front end of the slider*
- *Mounted modified caliper on top of tailstock body with a custom-made holding bracket (utilizing the calipers stop screw to secure caliper in bracket)*
- *Built a slotted ring which attaches to the front of the quill and is secured with set screws*
- *The slot captures the downward angle of the caliper and move the slider with the quill without backlash*
- *If the Caliper is not needed, the quill ring can be rotated 90 degrees which released the downward angled connector*

Tailstock DRO

- The tailstock features an imperial scale for quill travel requiring calculations for metric-projects
- Cut-off the length of the DRO slider to fit tailstock
- Built mounting bracket and mounted DRO to side of tailstock (utilizing the threated holes on the bottom of the DRO body)
- Built a connecting ring which attaches to the front of the quill and is secured with a set screw
- Built a slotted connector for the front end of the DRO slider.
- The connector is attached to the DRO slider utilizing the provided end caps.
- The quill-connector rotates into the slot of the DRO connector and the quill and DRO move simultaneously without backlash.
- If the DRO is not needed, the quill ring can be rotated 90 degrees which released DRO connector

Chuck Jaw Sleeves
- Soft material might get damaged by the hardened steel chuck jaws
- Custom made aluminum “slip-on” chuck jaw sleeves provide a softer contact surface

Chuck Spider (EDGE Technologies)
- The EDGE Technologies Chuck Spider is made for Chucks size 6” and up, the center piece is too large in diameter to fit into the chucks center hole.
- Turned the center part of the aluminum spider and the plastic centering piece to a smaller diameter
- To fit into the 5” chuck center hole

5C Collet Chuck
- Ordered BOSTAR 5C Collet Chuck with semi-finished backplate (1 ½” x 8 thread)
- Machined back plate on both sides to fit on chuck and on lathe spindle
  (Lathe spindle mount: DIN 55027 (old DIN 55022) with 50mm center diameter

6 inch 2-piece Chuck
- Ordered SHARS 6-inch two-piece Chuck with semi-finished backplate (1 ½ x 8 thread)
- Machined back plate on both sides to fit on chuck and on lathe spindle
  (Lathe spindle mount: DIN 55027 (old DIN 55022) with 50mm center diameter

4 Jaw Chuck Key
- The original chuck key for the 4-jaw chuck is rather short and prevents dialing in on a horizontal plane when a indicator is attached to the tool post
- Created a longer chuck key which provides clearance between the chuck key handle and the tool post and indicator

Lathe Dog
- Created a lathe dog and dog driver for turning between centers.
  The driver attaches to one of the three holes of the spindle chuck mount.
  In order to eliminate vibrations caused by the imbalanced weight of the driver, two balancing weights are mounted to the other two chuck mounting holes of the spindle.

Spindle Spider
- Created a spindle spider to support long stock, extending out of the end of the spindle

Chip Pan
- Chip pan underneath saddle bed for chip collection

Steady Rest with Ball Bearings
- Replaced original (sliding) brass fingers of steady rest with fingers made of steel and ball bearings
- The fingers also fit the following rest

Michael Brombeiss
Santa Monica, CA 90404
https://brombeiss.com/

Work light

- LED Work light mounted to back of chip pan

Spindle Bearings

- Noticed slightly “grooved” or “fluted” surface finish after about 3 years of use
- First attempts of problem solving included
    - Locking x-axis when turning
    - Replace Compound with solid “block”
    - Using cutting tools with different corner radii
- Tightening spindle bearing pre-load solved the problem