



XP to T-RAX metal workshop crediting
material



Credits

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TL;DR

Main differences between XP and T-RAX workshops

General things

- T-RAX does not have a check-in system and checking in is not needed or possible.
- Fault-logging is done through scanning QR-codes in the FUSE workshops.
- T-RAX does not have a dialed in drill-press vise.

Things allowed at T-RAX

- Water bottles with sealable lids allowed at T-RAX
- Changing speeds at the vertical band saw allowed at T-RAX
- If needed, members are allowed to mix cutting fluid themselves
- If needed, members are allowed to regulate the gas flow for the welding gas
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Things NOT allowed at T-RAX

- Open flames not allowed at T-RAX
- No grinding aluminium in the belt grinder at T-RAX



General workshop rules

It is very important to adhere to the workshop rules while in the metal workshop. As the machines can be very dangerous if used without care, as well as the possibility of damaging the equipment.

In the metal workshop it is mandatory to adhere to the clothing rules. The following is required in the workshop:

- Safety glasses, normal glasses are fine
- Hearing protection, when machines are running
- Correct clothing, this includes
 - Pants that extend past your knees.
 - Short sleeve t-shirt, or rolled up sleeves (Exception to this rule is when welding, when welding, full covering fireproof clothing should be worn. A good alternative is the welding overalls that is available in the workshop).
 - Safety shoes (available in the FUSE-box).
- No hanging jewelry
- Tied up hair if you have long hair

You are never allowed to work alone in the workshop. Anyone else that is joining you must have completed the necessary T-RAX metal course to be allowed into the workshop.

You are not allowed to use gloves when working with any rotating tools or machines in the workshop, which only leaves the plate cutter and welding where gloves are allowed.

You are not allowed to perform any maintenance on the machines, this is done by the daytime personnel, if a machine is broken, scan one of the QR-codes in the workshop and fill in what is wrong.

Open flames are not allowed in the workshop. Meaning that you are not allowed to use burners or similar anywhere in the workshop.

Bringing a water bottle into the workshop is fine as long as it has a sealable lid.

Payment for material can be done in the rapid prototyping workshop next to the laser cutter.



Horizontal Metal Band Saw



Figure 1: Horizontal Metal Band Saw

Use

The horizontal metal band saw is used to cut workpieces from long pieces of stock. It uses cutting fluid to lubricate, cool and extract chips

Differences from XP

The difference between the horizontal metal band saw at XP is mainly that the feed mechanism (dropping of the blade) is fully hydraulic, meaning that the saw does not need to be running for the blade to drop. Due to this it is important to always make sure that the feed is turned to zero whenever you're not cutting.



figure 2: Horizontal metal bandsaw feed rate control

Feed Rate

The feed rate can be turned multiple turns to open the hydraulic valve more, this increases the rate at which the blade drops. When turning the knob to zero it is important that you do NOT tighten it, this will only lead to the plastic cover slipping and making the indicated numbers off. When cutting the knob should be turned to the number 5.



Figure 3: Horizontal metal bandsaw controls

The controls have two different speeds stål (steel) and alu (aluminium). It also has stop, start and emergency stop.



Swivel the bandsaw



Figure 4: Swivel lock

To swivel the band saw the lock needs to be opened, it can then be turned. It is important to remember that the band saw can start cutting into its own base in certain swivel degrees.



Figure 5: Length stop engaged (left) and up while cutting (right)

The length stop has two different modes, it can be flipped up or down, this feature is meant to make sure that you can keep the same measurement between cuts, while still not pinching the blade. The lever is flipped away from the operator when putting in a new piece and then flipped towards the operator during cutting.



Figure 6: Horizontal band saw fast clamp lever (White closest to the camera)

The saw is equipped with a fast clamping mechanism, to use this you turn the clamping wheel until the stock is slightly clamped, you then turn the wheel half a turn back. When this



is done you can simply use the fast clamping lever to clamp the piece securely. This along with the length stop can be used to great advantage when cutting many similar pieces of stock.



Figure 7: Blade support (black square running along blade)

Depending on how wide the stock you're cutting is, the support might need to be changed, the small black lever situated next to the support unlocks the support and allows you to move it back and forth. If this support has been moved back and you're trying to cut a small stock. Then you might have a problem where the back of the support will interfere with the clamping wheel. This will lead to the blade not being able to drop any longer. To fix this simply move the support in longer.



Horizontal metal bandsaw door



Figure 8: Horizontal metal bandsaw door

The door next to the saw is used when cutting long materials, it can also be used to get bigger pieces of material into the workshop. It is allowed to be opened only when cutting long pieces. It must at all other times be both closed and locked, as anyone can open the door if you fail to lock it.

Failing to lock the door leads to termination of access to the workshop.



Vertical band saw



Figure 9: Vertical Band Saw

Use

The vertical band saw in the FUSE metal workshop works pretty much the exact same way as the one at XP.

Controls

The controls you are allowed to use are the red and green off and on buttons to the right, these are used to stop and start the band saw. The buttons to the left are used to weld the saw blades, which members are not allowed to do.

Reversing

When cutting with the band saw it is very important that you do not reverse while the machine is on. If you reverse, the blade will skip off its driving wheels and the machine will be out of service until the daytime personnel has fixed it.

It is also good to remember to not pinch the blade, when turning the machine has a possibility of pinching if the turn is too sharp. A better alternative than turning in the saw is to



simply make a series of small straight cuts and then grinding down the rest of the turn on the belt grinder. This will also lead to a much better result.

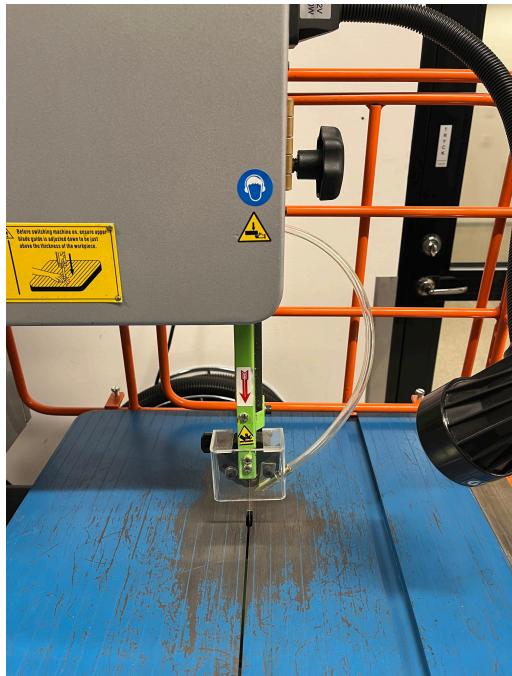


Figure 10: Blade support (Green) blade support wheel (Black above the support)

Blade support

When cutting, the blade support should be as close to the material as possible (without pinching it). To change the height of the support the wheel on the right should be loosened and then the support can be moved up and down with one hand.

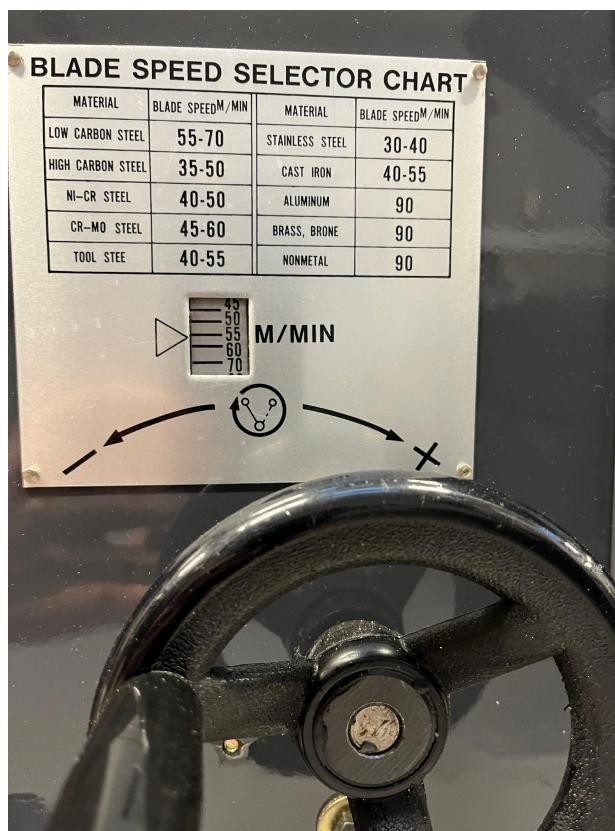


Figure 11: Blade speed chart for the vertical band saw

Blade speed

You are allowed and encouraged to change the blade speed to match the material you are cutting. For reference all the steel (except stainless steel) that is available to buy from T-RAX is low carbon steel, and thus the wheel should be turned until the indicator is somewhere between 55 and 70 when cutting it.



Belt Grinder



Figure 12: The belt grinder in the FUSE metal workshop

Use

The belt grinder can be used to grind steel. The belt grinder at FUSE is basically the same as the one at XP. The biggest difference is that the stop and start buttons are on the back side of the machine, facing the wall (yellow box in the picture). It is not allowed to grind aluminium in the grinder as steel and aluminium dust can create thermite.