

Hardware and Machine Anatomy

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Manufacturer Specifications (Gen 2 Foreman)

- **Cut area:** ~49" × 49⁷/₈" (1245 × 1248 mm)
- **Z travel (Z-20 slider):** ~165 mm (~6.5")
- **Gantry clearance:** up to ~160 mm depending on Z-slider mount height
- **Motion:** closed-loop steppers; 60 mm X rail / 50 mm Y rails
- **Spindle:** [Redline 80mm 1.5kW air-cooled](#) - ER20 collet (up to 1/2" shank); max ~1.5" bit diameter recommended
- **Power:** 110V spindle

Our Setup (Makerspace)

Setting	Value	Implication
Z-20 mount position	Highest position	Maximizes gantry clearance (~160 mm) but reduces effective Z reach to the spoilboard - plan job thickness accordingly
Spoilboard	3/4" (19 mm)	Include in Z-zero and max cut depth calculations; resurfacing removes material over time
Workholding	T-tracks	Use T-track clamps and fixtures (no vacuum table)
Dust collection	Not installed yet	Coming very soon - use shop vac / manual cleanup until installed

Effective max work height also depends on spindle position in the mount and bit stick-out. Tall workpieces may eventually require lowering the Z assembly (trading gantry clearance for more Z reach).

TBD: Exact effective max cut height measurement for our current mount + spoilboard setup.

Bits and Collets

The spindle uses an **ER20 collet system**. Collet size must match your bit’s shank diameter exactly - using the wrong size collet is a safety hazard.

Spec	Value	Notes
Collet type	ER20	Standard ER20 collets; select size to match bit shank diameter exactly
Max shank diameter	1/2" (12.7 mm)	Largest ER20 collet size; do not attempt larger shanks
Max bit diameter	~1.5"	Larger bits have excess rotational mass and can fault the VFD - avoid
Installation	Two wrenches required	One wrench on the spindle flat, one on the collet nut; never run with a loose collet

Install and tighten the bit **before** any spindle power. Always inspect the collet for wear or damage before use; replace if needed.

Component Glossary

Component	What it is	Controlled by
Spindle	Motor that spins the cutting bit	VFD + RTS-X
VFD	Variable Frequency Drive - converts power and sets spindle RPM	RTS-X (must not be in manual/local mode during jobs)
Z-20 slider	Heavy-duty vertical axis assembly	RTS-X motion firmware
RTS-X controller	Real-time motion controller (closed-loop on Elite)	RTS-X firmware
Shop PC	Dedicated CNC computer at the makerspace	RTS-X Windows app (<i>sole interface - no HMI touchscreen</i>)
VCarve Pro	CAM/design software - creates toolpaths, does not run the machine	Separate from RTS-X

Note: This machine does **not** have the optional Redline HMI touchscreen. All homing, zeroing, file import, simulation, and job execution happen through RTS-X on the dedicated shop PC.

TBD: Physical layout diagram - shop photos of spindle, VFD, e-stop, shop PC station, and work area. Link stock Onefinity manual diagram until then.

TBD: Shop-specific power outlet / breaker labeling.

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