

Fadal VMC 4020 for Military & Defense

CNC vertical mill for precision milling, drilling, and contouring on prototypes through medium production runs. This paper covers what the machine does, the military & defense parts we produce with it, the alloys we run, the tolerances and finishes military & defense buyers expect, and the documentation package.

20" W × 48" L × 24" H workpiece envelope
ENVELOPE

±0.0005" routine on critical features
TOLERANCE

1994
SINCE

ISO 9001:2015
QMS

Same-week / rig-down direct
RESPONSE



Pistol Whiskers · 20" W × 48" L × 24" H workpiece envelope · CNC vertical machining center

PUBLISHED
January 15, 2026

LAST UPDATED
2026-01-15

FORMAT
Web + PDF

READ TIME
~6 min

Executive summary

Machine: Fadal VMC 4020-906-1 (shop nickname: *Pistol Whiskers*). CNC vertical machining center at B&R Productions, running from our New Waverly, Texas shop under an ISO 9001:2015 quality system.

Application: CNC vertical mill for precision milling, drilling, and contouring on prototypes through medium production runs for Military & Defense customers — Defense primes, subassembly manufacturers, tactical vehicle component OEMs, munitions component suppliers, weapon-system integrators, sustainment (out-of-production replacement) contractors.

Envelope: 20" W × 48" L × 24" H workpiece envelope. **Tolerance:** ±0.0005" routine on critical features.

Traceability: Material by heat and lot on every job.

The machine, in context

The Fadal 4020 is the workhorse of American medium-envelope CNC milling — rigid, well-understood, and forgiving with the harder alloys. Pistol Whiskers is our go-to for prototype work, repair parts, and small-to-medium production runs where the part fits inside the envelope. It handles complex pocketing, milled features, and multi-face setups without flinching on the alloys that would chatter marginal equipment.

Full specifications

Model	Fadal VMC 4020-906-1 ("Pistol Whiskers")
Type	3-axis CNC vertical machining center
Workpiece envelope	20" W × 48" L × 24" H (B&R working spec)
Axis travels	40" X × 20" Y × 20–28" Z (Fadal 4020 platform)
Table size	48" × 20"
Spindle taper	CAT 40
Spindle speed	75 – 7,500 RPM standard; 10,000 RPM on HT-series builds
Spindle drive	15 HP with 220 ft-lb torque (HT class)
Rapid traverse	900 IPM (per axis)
Automatic tool changer	21-tool ATC

Control	Fadal CNC-88 / Format 2 (some HT and later builds run Fanuc Oi-MC)
Machine weight	~12,500 lb
Tolerance capability	±0.0005" routine on critical features
Materials	Aluminum, stainless, tool steel, 4140/4340, Inconel, Hastelloy, titanium

Values marked "platform" reflect the machine manufacturer's published spec range for this platform family; B&R's working spec is what we quote on this specific unit.

Who this serves in Military & Defense

Typical buyer: Defense primes, subassembly manufacturers, tactical vehicle component OEMs, munitions component suppliers, weapon-system integrators, sustainment (out-of-production replacement) contractors.

What's hard about military & defense work: ITAR compliance, security-sensitive prints, program-specific quality plans, tight-tolerance structural components, exotic-alloy selection driven by service environment, and legacy-part sustainment where the OEM no longer supports the design.

Typical Military & Defense parts we produce on Pistol Whiskers

- Structural brackets, mounting plates, and adapters
- Weapon housings and receivers within 20" envelope
- Vehicle armor bracket hardware and mounts
- Sensor housings and control-system enclosures
- Reverse-engineered legacy parts for sustainment programs

Above list is representative; if your part isn't shown, call and ask — most oilfield / aerospace / defense / industrial turned or milled work fits somewhere in the shop.

Alloys we run for Military & Defense

Standard range: 17-4 PH · 15-5 PH · 13-8 Mo · 4140 pre-hard · 4340 · Titanium Grade 5 · Inconel 718 · Aluminum 7075 · High-strength steels · Customer-specific alloys on request.

Defense parts routinely spec 4140 pre-hard, 4340, and precipitation-hardening stainless — condition-specific machining knowledge matters, same as aerospace. Titanium is common on weight-critical structural components. Legacy sustainment often specifies materials nobody sees anywhere else; we work with the spec sheet you provide and validate machining strategy before we cut.

What "we run these weekly" means: we stock or reliably source the common alloys in the industry's typical spec range. Sharp tooling, proven feeds and speeds, and process control specific to each alloy family. Your part is not the one we're experimenting on.

How we machine it — our 5-step process

This is the process B&R runs on every job, military & defense or otherwise. The specifics of feeds, speeds, and tooling shift by alloy and machine; the discipline is universal.

- 1 Material verification.** Every job starts with material traceability. Heat and lot numbers documented against the mill test report. For customer-supplied material, we verify against the CofC before touching the stock.
- 2 First-article layout.** Stock is measured and laid out before any cutting starts. Concentricity, roundness, and squareness of the starting material established; if the stock is out of tolerance we call the customer before wasting time on a bad blank.
- 3 Roughing with process control for the alloy.** Feeds, speeds, and coolant strategy set for the specific alloy family — sharp coated carbide (or PCD for high-volume Ti Grade 5), positive rake, high-pressure through-tool coolant on 2507 and Inconel to control cutting temperature. Interrupted cuts get extra attention because they cycle heat into the workpiece.
- 4 Finish pass to spec.** Finish pass with a fresh insert, controlled DOC, and measured surface-finish targets. Critical features (bore concentricity, seat grooves, sealing surfaces) are held tighter than most job-shop lathes can offer.

5

CMM verification + documentation. Every critical dimension CMM-verified. First-article report generated. Certificate of conformance issued with delivery. Customer-specific ITPs and PPAP-style packages produced on demand.

Tolerance and finish expectations in Military & Defense

±0.0005" routine on critical features. Tighter with proper setup and fixture. GD&T-driven tolerancing supported. CMM verification on first articles; customer-plan-driven measurement on production runs. Documentation the level a program office expects.

Documentation and quality workflow

ITAR-controlled work under NDA with customer-specific document control — prints stay in-shop. Customer-specific quality plans, PPAP, and first-article documentation standard. Material traceability by heat and lot on every job. Certificates of conformance with delivery.

Response time and emergency work

Program-driven schedules honored. Emergency component replacement supported for sustainment programs with established relationships. Legacy-part reverse-engineering supported for out-of-production sustainment.

How we compare

Compared to a large defense-prime captive shop: we're faster for one-offs, small runs, and legacy sustainment where the prime's supply chain has moved on. Compared to a lowest-bidder commodity shop: we handle ITAR, we document properly, and we understand that a program-office audit is a real thing.

Working with B&R Productions

New customer or existing, the process starts the same way: call (936) 291-7827 or send a print through the quote form. Prints are accepted as PDF, STEP, IGES, DWG, or DXF; if you only have a sample part, we reverse-engineer routinely. NDAs on request. ITAR-controlled prints handled under document control with prints staying in-shop.

Quotes typically come back within 24 hours for standard work, same-day for repeat customers on stocked materials, and near-immediately by phone for emergency and rig-down situations. Lead times are quoted honestly — we don't promise Wednesday and deliver next month.

Frequently asked questions

8 questions covering the Fadal VMC 4020 platform and Military & Defense work. Also indexed as FAQ schema for AI answer engines.

What's the workpiece envelope on the Fadal VMC 4020?

20" W × 48" L × 24" H is B&R's stated working envelope. The Fadal 4020 platform itself has 40" X, 20" Y, 20–28" Z travels — plenty of headroom for the parts we quote on this machine.

What tolerances can the Fadal hold on Inconel or 17-4 PH?

±0.0005" routine on critical features. The 15 HP spindle and 220 ft-lb torque handle roughing without chatter; sharp carbide with the right feed keeps aged-condition alloys behaving.

How many tools can be loaded at once?

21-tool automatic tool changer. Enough for most single-setup jobs — plan the tool list with us in the RFQ and we'll confirm the setup fits.

Do you handle ITAR-controlled defense work?

Yes. ITAR-controlled prints handled under NDA with strict document control. Prints stay in-shop. Program-specific quality plans, PPAP, and first-article documentation supported.

What defense-adjacent parts have you machined?

Weapon subassembly components, defense actuator parts, vehicle armor bracket hardware, sensor housings, hydraulic cylinders for defense platforms, tactical vehicle component reverse-engineering, and legacy-sustainment parts for out-of-production programs.

What alloys are typical for defense work at B&R?

17-4 PH, 15-5 PH, 4140 pre-hard, 4340, Titanium Grade 5, Inconel 718, aluminum 7075, high-strength steels. Customer-specific alloys on request.

Can you reverse-engineer legacy defense parts?

Yes — sustainment work for out-of-production programs is a regular part of our mix. Send a worn sample and any documentation available; we'll produce the replacement with full material traceability.

What tolerances do you hold on defense components?

±0.0005" routine on critical features. Tighter with the right fixture. Every critical dimension CMM-verified. Documentation to customer spec.

Related white papers

[See all machine × industry white papers →](#)

Ready to talk about your Military & Defense work?

Send us a print or a sample photo and specs. Emergencies: call direct and say "rig-down."

Published by B&R Productions — a precision CNC machining shop in New Waverly, Texas, in business since 1994. ISO 9001:2015 certified. Serving oil & gas, aerospace, defense, and industrial customers across Texas and the Gulf Coast.

Written by the B&R Productions team. Machine specs verified against manufacturer data. Alloy and process notes reflect shop practice as of 2026-01-15.