

Fadal VMC 4020 for Industrial & General Manufacturing

CNC vertical mill for precision milling, drilling, and contouring on prototypes through medium production runs. This paper covers what the machine does, the industrial & general manufacturing parts we produce with it, the alloys we run, the tolerances and finishes industrial & general manufacturing 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



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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 Industrial & General Manufacturing customers — Industrial equipment OEMs, custom machinery builders, pump and valve manufacturers outside oilfield, food and pharma equipment suppliers, mining and heavy-equipment operators, reverse-engineering customers, sustainment for out-of-production industrial equipment.

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 0i-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 Industrial & General Manufacturing

Typical buyer: Industrial equipment OEMs, custom machinery builders, pump and valve manufacturers outside oilfield, food and pharma equipment suppliers, mining and heavy-equipment operators, reverse-engineering customers, sustainment for out-of-production industrial equipment.

What's hard about industrial & general manufacturing work: Legacy parts with no OEM support, one-off replacement components, small-lot production runs, materials that don't fit standard shop capabilities, and tight lead times on repair work where a down-machine is losing money by the day.

Typical Industrial & General Manufacturing parts we produce on Pistol Whiskers

- Custom machinery housings, gearboxes, and pump bodies
- Pump body machining (impellers, sleeves, seal areas)
- Manifold blocks and valve bodies for industrial applications
- Fixtures and jigs for industrial customers
- Reverse-engineered legacy parts across sectors

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 Industrial & General Manufacturing

Standard range: Stainless (304, 316, 17-4 PH) · Tool steels · 4140 / 4340 · Brass · Bronze · Aluminum · Cast iron · Specialty alloys per customer requirement.

Industrial work covers the widest alloy range because the applications are the widest. Food and pharma often specify 316L or 17-4 PH; mining and heavy equipment specify tool steels and 4140/4340; pump manufacturers outside oilfield use everything from bronze bushings to stainless impellers. We work with the customer's spec sheet — if you tell us the alloy, we'll tell you honestly whether we can machine it and how quickly.

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, industrial & general manufacturing 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 Industrial & General Manufacturing

±0.0005" routine on critical features. Industrial applications range from precision (pump seal areas, close-fit bushings) to structural (mining and heavy-equipment brackets); we adjust the inspection plan to what the part actually needs. Surface finish measured on parts where finish drives function.

Documentation and quality workflow

Documentation calibrated to customer requirement. Material traceability standard for critical parts. Certificates of conformance issued with delivery. NDAs on request for proprietary designs or reverse-engineered legacy parts.

Response time and emergency work

Down-machine and production-critical work prioritized. Lead times honestly quoted — no false promises. For legacy reverse-engineering, we typically confirm feasibility on the first phone call. Call (936) 291-7827.

How we compare

Compared to sourcing a new OEM part: we're often faster and cheaper for one-offs and small runs, and for legacy parts where the OEM has moved on we're often the only realistic option. Compared to a cheapest-bidder job shop: we hold tolerance, document material, and don't ruin the part.

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 Industrial & General Manufacturing 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.

What kind of industrial customers does B&R work with?

Industrial equipment OEMs, custom machinery builders, non-oilfield pump and valve manufacturers, food and pharma equipment suppliers, mining and heavy-equipment operators, and any customer who needs a legacy or reverse-engineered part made right.

Do you machine one-off replacement parts?

Yes — a lot of our industrial work is exactly this. Send the sample or drawing; if the material is on the shelf, we're often faster than the OEM. Reverse-engineered legacy parts across almost every sector.

What materials do you run for industrial work?

Full range — stainless (304, 316, 17-4 PH), tool steels, 4140/4340, brass, bronze, aluminum, cast iron, and specialty alloys per customer requirement. If you need something unusual, ask.

Do you offer emergency turnaround on down-machine parts?

Yes for repeat customers with material on the shelf. Same-day and next-day realistic when we already have the alloy. Call (936) 291-7827 and describe what's down.

Can you do small-batch production or is B&R just one-offs?

Both. Prototype and small-batch through repeat production. Small production runs where a big shop's minimum order would kill the economics are exactly where we fit.

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Ready to talk about your Industrial & General Manufacturing 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.

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