HLQ INDUCTION EQUIPMENT CO., LTD.

Magnetic Grinding Machine Precision Deburring & Polishing

Original engineering analysis • Process guide • Selection criteria • QA checklist

Document control
Reviewed against the publicly available HLQ product information on 9 October 2026. The HLQ page identifies a magnetic pin finishing process and an indicative 5-20 minute cycle, but provides no model-specific electrical power, working volume or drive frequency. All study calculations are labeled illustrative and require sample validation.

Magnetic Grinding Machine for Precision Deburring and Polishing

Table of Contents

1. What Is the Magnetic Grinding Machine?
2. Key Applications
3. Suitable Materials
4. Working Principle
5. Technical Specifications
6. Recommended Model Selection
7. Process Workflow
8. Coil and Fixture Design
9. Control System and Automation
10. Common Problems and Solutions
11. Engineering Selection Guide
12. Advantages
13. Limitations
14. Why Choose HLQ Induction Equipment?
15. FAQ - Eight Engineering Questions

What Is the Magnetic Grinding Machine?

The **HLQ Magnetic Grinding Machine**, also called a magnetic deburring and polishing machine, is a batch surface-finishing system that drives small magnetically responsive stainless-steel pins through a work bowl using a changing magnetic field. The pins contact accessible part surfaces to remove light burrs, reduce minor machining marks, clean recesses and improve appearance. Its best-fit applications are small, intricate components such as CNC-turned fittings, stamped parts, jewelry findings, precision hardware and parts with accessible slots or holes. It is a finishing process, **not an induction heater or a substitute for heavy stock-removal grinding**. Final results require application trials.

Buyer question	Direct engineering answer
What does it do?	Light deburring, polishing, cleaning and controlled edge conditioning.
How does it work?	A changing magnetic field moves magnetic stainless-steel pins in a liquid-filled bowl.
Best parts?	Small intricate parts with fine burrs and surfaces accessible to pins and liquid.
Typical cycle?	The existing HLQ page describes approximately 5-20 minutes; not a guaranteed result.
What must be tested?	Burr removal, surface finish, dimensions, media entrapment, cleanliness and total cycle cost.

Key Applications

Magnetic pin finishing is useful where rigid brushes, files or buffing wheels cannot consistently reach fine features. Effectiveness is controlled by pin geometry, part accessibility, cycle intensity and the original burr condition.

Application	Typical component	Objective	Acceptance check
CNC machined parts	Turned fittings, collars, connectors	Remove small cross-hole and edge burrs	Burr-height inspection; visual and tactile check
Stamped components	Clips, brackets, small shims	Reduce fine stamping burrs	Edge condition and part distortion
Jewelry and ornaments	Findings, chains, decorative parts	Brighten reachable features	Appearance, scratches and detail retention
Watch and eyewear parts	Small precision hardware	Finish edges and crevices	Dimensional and appearance inspection
Electronic and telecom hardware	Metal terminals, sleeves, housings	Remove fine burrs and residue	Particle and contact-area cleanliness
Medical-device components	Selected instrument parts	Light deburring before cleaning	Validated bioburden/particle and dimensional process
Die castings	Small nonferrous cast parts	Remove fine flash and brighten	Remaining heavy flash; porosity exposure

For an alternative product presentation, compare HLQ's magnetic deburring and polishing machine page.

Suitable Materials

The workpiece itself does not need to be magnetic: the magnetic field primarily drives the finishing pins. Ferromagnetic workpieces, delicate coatings and mixed-material assemblies can behave differently and require trials.

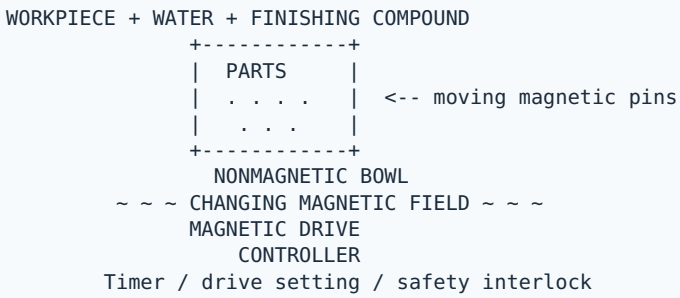
Material	Indicative suitability	Major risk / validation item
Stainless steel	Often suitable for fine burrs	Surface finish, passivation compatibility, pin contamination

Material	Indicative suitability	Major risk / validation item
Copper and brass	Often suitable for gentle finishing	Soft-metal marking, discoloration, compound compatibility
Aluminum alloy	Trial required	Scratch risk, softness and staining
Carbon steel / ferrous parts	Trial required	Magnetic attraction, parts sticking, corrosion control
Silver / gold jewelry alloys	Often considered for fine polishing	Detail retention, plating and gemstone protection
Rigid engineering plastics	Application-specific	Scratches, dimensional or edge damage
Coated / plated parts	Restricted until tested	Coating thinning, micro-scratches, peeling
Assemblies with bearings or seals	Generally require special evaluation	Trapped media, ingress, magnetic exposure

Working Principle

A magnetic drive underneath or around a nonmagnetic processing bowl produces a moving magnetic field. The field exerts forces and torques on magnetically responsive stainless-steel pins, causing them to tumble, rotate and contact part surfaces in water with an appropriate finishing compound. Repeated light impacts and rubbing can remove small burrs and brighten accessible surfaces. The original page does not establish whether this particular HLQ unit uses rotating permanent magnets or electronically driven electromagnets; that implementation must be confirmed.

Figure 1. Magnetic pin finishing - conceptual operating principle



Unlike a cutting wheel, the pins do not remove large amounts of stock. Deep blind holes, undersized openings or geometries that trap pins may remain incompletely finished; access must be demonstrated on samples.

Process variable	Expected influence	Verification
Pin diameter and length	Feature access and contact aggressiveness	Fit through minimum passage; no retained pins
Magnetic drive intensity	Media motion and finishing action	Part damage and burr removal
Batch mass and fill	Part-to-media interaction	No overloading or excessive part collision
Liquid level and compound	Lubrication, cleaning and corrosion control	Supplier-approved concentration and quality

Process variable	Expected influence	Verification
Processing duration	Deburring extent and scratch risk	Stop when acceptance criteria are met

Technical Specifications

The source page describes the process and a reference processing period but does **not** provide a numeric machine datasheet. Unknown ratings are shown as not published instead of inferred from unrelated HLQ induction generators.

Parameter	Specification	Notes
Product	Magnetic Grinding / Deburring / Polishing Machine	HLQ published product name
Finishing medium	Magnetically responsive stainless-steel pins	Pin grade, dimensions and mass not specified
Processing mechanism	Magnetic-field-driven pin motion	Drive architecture not specified
Typical application cycle	Approximately 5-20 minutes	Original page's indicative range; sample-dependent
Target operations	Fine deburring, polishing, cleaning, light edge finishing	Does not guarantee zero dimensional change
Typical workpieces	Small precision parts, jewelry, complex metal components	Suitable batch confirmed by trials
Motor / electrical rated power	Not published	Request certified nameplate kW
Input voltage / phase / frequency	Not published	Confirm for destination country
Magnetic drive speed / frequency	Not published	Distinct from mains frequency or induction heating frequency
Working bowl dimensions / volume	Not published	Request working rather than gross capacity
Maximum batch mass	Not published	Confirm usable load for actual parts
Machine dimensions / net weight	Not published	Confirm footprint and installation
Pin consumption / change interval	Not published	Monitor damage and contamination
Control range / timer resolution	Not published	Original page mentions adjustable operation
Machine guarding / electrical protections	Not detailed	Confirm with current machine documentation
Surface roughness guarantee	Not published	Define baseline and final Ra/Sa by testing

Recommended Model Selection

HLQ's reviewed page does not publish named machine variants or validated wattages. Use the following application matrix to define the *power class to be quoted* and the *magnetic drive settings to be tested*; do not treat it as an existing HLQ model catalog.

Application	Material	Recommended Power	Frequency
Jewelry findings / micro hardware	Gold, silver, brass	Specify after bowl load and trial	Drive-specific; request adjustable setting range
Small CNC turned parts	Stainless steel, brass	Specify after batch-mass trial	Not published; validate drive intensity
Stamped precision components	Stainless, mild steel, copper	Size for fill level and component collision risk	Drive-specific; not a kHz heating rating
Fine die castings	Aluminum, zinc alloy	Sample test required for surface sensitivity	Drive-specific; tune with approved settings
Higher-volume batch finishing	Sorted compatible components	Confirm motor kW and maximum effective batch load	Confirm manufacturer controller specification

Compare the full magnetic grinding machine range before selecting the production system.

Machine Selection: Required Data from Manufacturer

Requirement	Buyer should request	Why it matters
Net usable batch mass	kg of actual parts per cycle	Defines production capacity
Bowl working dimensions	mm / usable liters	Confirms workpiece fit and part mobility
Pin kit	Diameter, length, grade, initial mass	Confirms hole access and contact behavior
Rated electric power	kW, V, phase, Hz, current	Correct electrical design
Magnetic drive	Type and adjustable speed/intensity	Process control
Process fluid	Water / compound recipe and waste handling	Quality and safety
Acceptance	Representative before/after sample report	Technical and commercial proof

Process Workflow

Production should follow an approved finishing recipe with measurable entry and exit criteria.

Figure 2. Magnetic grinding and polishing - production workflow



Stage	Check	Record
Incoming inspection	Material, burr location and condition	Part ID, drawing and initial defect photos
Loading	Batch mass, pin quantity, fluid level	Mass and selected recipe
Processing	Time, speed/intensity, mixing behavior	Actual cycle time and operating setting
Separation	All pins recovered; no trapped media	Media-accountability result
Cleaning/drying	Compound residue and corrosion risk	Rinse and drying method
Quality control	Burrs, surface, dimensions, particles	Measured pass/fail result

Coil and Fixture Design

Terminology note: A magnetic grinding machine does not necessarily use an induction-heating coil or a heated workpiece. For this process, the relevant design is the **magnetic drive, processing bowl, pin media and part-separation fixture**. Coil details apply only if the supplied magnetic drive actually uses electromagnets, which the reviewed HLQ page does not establish.

Magnetic Pins and Feature Accessibility

Design item	Engineering check	Consequence if incorrect
Pin diameter	Smaller than accessible openings with adequate clearance	Cannot enter feature or becomes trapped
Pin length	Compatible with passage depth and intersections	Bridging or jammed media
Pin grade / magnetism	Compatible with magnetic drive and material cleanliness	Weak motion or contamination

Design item	Engineering check	Consequence if incorrect
Bowl geometry	No persistent stagnant or overloaded zones	Nonuniform finishing
Part separation	Prevent part-to-part collision for delicate parts	Scratches and distortion
Media recovery	Magnetic tool / sieve and accountable pin removal	Retained foreign material
Fluid compatibility	Approved chemistry for alloy and coating	Staining and corrosion

See also the magnetic polishing machine application collection for related HLQ product references.

Control System and Automation

The original page mentions adjustable operation, timing and cycle-completion reminders, but it does not publish a controller datasheet. Request verification of available speed/intensity settings, reversal modes, recipes and safety protections for the exact machine supplied.

Control / feature	Recommended function	Documentation status
Cycle timer	Repeatable dwell time and end-of-cycle alarm	Function mentioned; numeric controller range absent
Drive intensity	Adjust pin agitation for part sensitivity	Available range must be confirmed
Drive direction / reversal	Improve coverage if supported	Not confirmed for HLQ model
Lid / bowl guarding	Prevent access during operation	Confirm current safety design
Overload / thermal protection	Protect motor and electronics	Not documented on reviewed page
Recipe management	Store part-specific approved settings	Optional integration, confirm availability
Operator traceability	Batch records, alarms and inspection status	Requires site-specific integration

Process Quality Dashboard: Values to Record

KPI	Unit	Pass criterion
Remaining burr height	mm or µm	Per drawing and validated inspection
Surface roughness	Ra or Sa, µm	Per customer specification
Critical dimensions	mm	Within drawing tolerance
Media retention	Count	Zero retained pins where specified
Batch processing time	min	Qualified process window
Finished acceptable parts	pieces/batch	Verified yield

Common Problems and Solutions

Problem	Possible cause	Practical corrective action
Fine burr remains	Wrong pin size, short time, insufficient access	Review burr type and pin access; test controlled recipe
Blind hole not clean	Pins cannot circulate in deep cavity	Check depth/diameter, part orientation and alternative process
Visible scratches	Excessive intensity, overload, sharp media or collision	Reduce intensity/load; inspect media; use protective separation
Edges rounded too much	Excessive processing or aggressive pin selection	Shorten cycle and specify measurable edge criteria
Part color changes	Unsuitable compound, dirty water or alloy response	Change to approved chemistry; rinse and dry promptly
Pins trapped in features	Pin length matches bore / crevice geometry	Change media dimensions; introduce pin accountability
Parts clump together	Ferromagnetic attraction or high fill	Reduce batch; use separation fixtures; confirm feasibility
Inconsistent finish	Variable batch weight / water level / cycle	Standardize the process recipe and part orientation
Heavy burr is unaffected	Process is for fine finishing, not heavy machining defects	Pre-deburr mechanically then apply magnetic finishing
Water residue / corrosion	Incomplete rinsing/drying or improper chemistry	Validated post-cleaning and drying; corrosion inhibitor if appropriate
Low hourly throughput	Slow unloading, separation and inspection	Measure total cycle, not just machine timer

Engineering Selection Guide

Specify the finishing outcome first and the machine second. A purchase decision should be based on representative production samples, not just machine size or the ability to make a sample look shiny.

Step 1. Define the Acceptance Criteria

Requirement	How to specify it	Recommended measurement
Burr removal	Maximum remaining burr height and location	Optical microscope / profile measurement
Surface finish	Target Ra/Sa and inspection zone	Profilometer / surface imaging
Edge condition	Maximum edge radius or minimum sharpness	Optical measurement
Dimensional stability	Critical features and tolerances	Calipers, CMM or suitable gauge
Cleanliness	Residual media / particles / chemistry	Visual, filtration or customer method

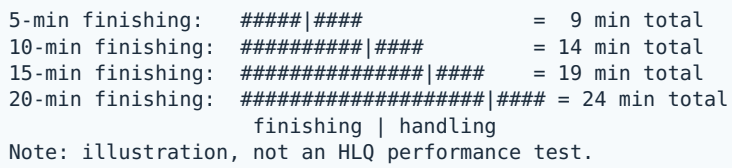
Step 2. Separate Machine Time from Total Production Time

For batch finishing: **Good parts per hour = 60 × accepted parts per batch / total batch cycle (minutes)**. The complete cycle includes loading, finishing, separation, washing, drying and inspection.

Processing time	Other handling time	Total cycle	Theoretical batches/hour
5 min	4 min	9 min	6.7
10 min	4 min	14 min	4.3
15 min	4 min	19 min	3.2
20 min	4 min	24 min	2.5

These are mathematical examples using an assumed four-minute handling allowance; no HLQ machine throughput is claimed.

Figure 3. Illustrative total cycle time, including 4 minutes of handling



Step 3. Run a Controlled Trial Matrix

Trial	Machine dwell	Other conditions	Decision data
A	5 min	Same parts, media, liquid and drive setting	Burr, finish, dimensions, pin trapping
B	10 min	Hold all other variables constant	Incremental change vs. A
C	15 min	Hold all other variables constant	Incremental change vs. B
D	20 min	Use only if shorter trials fail and parts remain safe	Evidence of over-processing

Choose the shortest qualified cycle, then confirm repeatability across multiple batches. For regulated components, apply a documented process validation plan.

Step 4. Supplier RFQ Checklist

Provide to HLQ	Example of required detail
Material	Grade, heat treatment and coating
Part drawing	Overall dimensions, smallest bore and deepest blind hole
Burr specification	Photos, height, location and cause
Surface requirement	Before/after Ra or visual sample standard
Batch requirement	Parts/hour, pieces/batch, current manual cost
Installation requirements	Voltage, frequency, available space and utilities

Provide to HLQ	Example of required detail
Inspection requirement	Measurement method and customer acceptance limits

Advantages

Potential benefit	How it helps	Qualification
Reaches complex geometry	Pin media can enter accessible holes and crevices	Not every blind feature is accessible
Batch processing	Multiple small components can be finished together	Capacity depends on geometry and batch load
Reduced manual contact	Less hand filing and buffing during the timed stage	Loading and inspection remain necessary
Flexible materials	Applicable to several metal alloys	Trials required for soft/coated parts
Combined finishing	Fine deburring, cleaning and brightening in one stage	Does not replace all upstream machining
Repeatable recipe potential	Controlled batch weight, media and time	Prove with repeatable sample results

Limitations

Limitation	Practical implication	Alternative / mitigation
Heavy burrs and thick flash	Slow or ineffective removal	Mechanical pre-deburring or machining
Very deep blind holes	Media may not circulate	Geometry trial or targeted finishing
Small critical holes	Media may become trapped	Pin-size review and 100% media checks
Ferromagnetic workpieces	Part attraction and clustering	Reduced load, fixtures, sample test
Soft or plated components	Scratches or coating damage	Gentle recipe or alternative process
Strict dimensional tolerances	Material removal / edge change possible	Pre/post dimensional measurements
Environmental claims	Wastewater and spent chemistry still need treatment	Document waste and water management
Missing machine ratings	Cannot guarantee batch kg/h or electrical setup	Obtain model datasheet and factory trial report

Why Choose HLQ Induction Equipment?

HLQ offers magnetic grinding and deburring equipment for precision component finishing. For a reliable purchase, ask HLQ to provide a model-specific datasheet, a compatible magnetic-pin kit, clear electrical requirements, sample-processing results and repeatable acceptance criteria. The right machine is the one that meets the drawing requirements with acceptable batch throughput, cleanliness and surface condition; a faster or brighter-looking result is not automatically a better result.

For related topic collections, browse HLQ's magnetic deburring machine applications.

Recommended Factory Acceptance Test

Acceptance element	Evidence to request
Machine identity	Model, serial number, electrical nameplate
Parts	Representative customer samples and quantities
Recipe	Media type/size, mass, compound, liquid, dwell and drive setting
Before / after	Microscope images, surface roughness, dimensional results
Yield	Accepted parts per batch and repeatability
Media recovery	No retained pins under agreed detection method
Safety	Guarding, emergency stop and current compliance documents

FAQ - Eight Engineering Questions

FAQ 1. What is a magnetic grinding machine?

It is a batch deburring and polishing machine that uses a changing magnetic field to drive fine magnetic stainless-steel pins around small workpieces in a liquid-filled bowl. The pins perform gentle surface contact and are most useful for fine burrs and intricate, accessible features.

FAQ 2. Is magnetic grinding the same as induction heating?

No. Magnetic pin finishing uses magnetic forces to move finishing media; it is not designed to raise a workpiece to forging or melting temperature. The word "magnetic" refers to pin movement, not induction heating performance.

FAQ 3. Can magnetic pins finish internal holes and threads?

They can improve reachable holes, cross-drillings and threads when pin size, part geometry and motion permit access. Deep blind holes and narrow features may remain unfinished or trap pins, so representative samples must be inspected.

FAQ 4. What materials can be processed?

Depending on the finishing recipe, suitable candidates include stainless steel, brass, copper, aluminum alloys, some ferrous components, precious-metal jewelry alloys and selected rigid plastics. Ferromagnetic workpieces, coatings and very soft parts need additional testing.

FAQ 5. How long does a magnetic polishing cycle take?

The reviewed HLQ page describes approximately 5-20 minutes. Actual time depends on burr size, part geometry, pin selection, batch mass and target finish. Include loading, pin separation, rinsing, drying and inspection when calculating hourly output.

FAQ 6. Will magnetic polishing change part dimensions or round edges?

Any mechanical finishing process can change surface topography and edge geometry. For tight-tolerance parts, compare critical dimensions, edge radius and surface roughness before and after trials; do not assume zero change.

FAQ 7. What power and magnetic drive frequency does the HLQ machine use?

The current published product page does not supply model-specific rated power, electrical input, motor speed or magnetic drive frequency. Request the exact machine datasheet. Do not confuse the magnetic pin drive frequency with the 1-20 kHz rating of HLQ's separate induction heating generators.

FAQ 8. How should buyers select and validate a magnetic deburring machine?

Submit representative components with dimensions, burr photos, surface-finish targets, throughput needs and inspection limits. Perform controlled trials, document the process recipe, measure the finish and dimensions, confirm complete pin recovery and accept the machine only after the results are repeatable.