

Efficient equipment for Fettling automation

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WHY Efficient FETTLING equipment?

- **HOW TO ACHIEVE PEAK OUTPUT**
- **THIS IS THE ONLY TAKE AWAY**





Brief on points to be covered

My Experiences – Fettling needs

- **Modernisation is needed in Fettling.**
- **Traditionally the most polluted area.**
- **Detailed Information on raw casting.**
- **No one single equipment can satisfy your need.**
- **Can be multipurpose if methoding changes are made.**
- **Machine replicates manual operation - Faster.**
- **What cant be wedged, can be hammered or if not can be cut for sure.**
- **Volume dictates need to automate.**
- **Safety aspects.**



Efficient equipment for fettling automation

WHY AUTOMATE FETTLING

The most messy part of the foundry nowadays is the fettling shop

- **Save manpower. Reduce up to 30%**
- **Save time required for finishing.**
- **Lead to dispatch time reduction.**
- **Eliminate bottle necks.**
- **Save space.**

MACHINES TO BE DISCUSSED

Equipment can handle Non Ferrous, SG iron & Steel castings.

- **Crushers for runners & rejected castings**
- **Hand held Hydraulic De-gating Spreaders, runner bar cutters & shears**
- **Multi axis Floating arm Hydraulic Abrasive Cutters. Reach up to 5metres.**
- **Non Robotic NC 5-6 axis grinders for very small 300 gram castings to 200kg castings.**
- **Riser Knock off Pneumatic Hammers. From 35mm risers to 350mm neck of risers.**

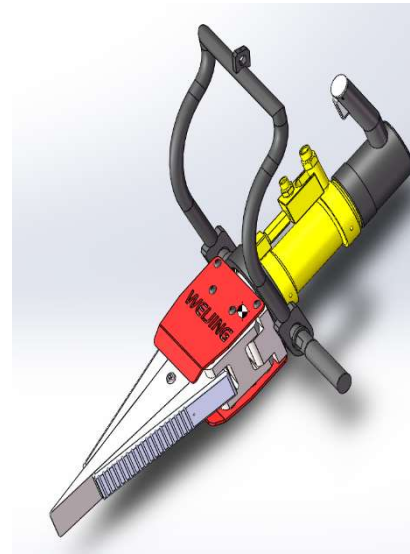
Spreader Wedges Basic types we deal



**Vertical wedge
for waist height
degating**



**Vertical wedge
for ground level
degating**



**Horizontal wedge
waist height/ground
level**



Runner cutter

Vertical wedge for waist height degating



- No central wedge coming out makes it possible to degate parts vertically.
- 30 hits per min breaking speed can meet high efficient degating.
- Short operating handles make it more suitable breaking parts on the conveyor belt at waist height.
- Unique structure design for easier daily lubricating
- Double sealing inside for better quality
- This vertical wedge is quite suitable to degate parts on the conveyor belt at waist height.
- The operator doesn't need to keep extra space for central wedge to come out.

Vertical wedge for ground level Operation



- No central wedge coming out makes it possible to degate parts vertically.
- 30 hits per min breaking speed can meet high efficient producing of VERTICAL Molding lines.
- Long operating handles for better protecting worker's back when degating castings on the ground or on the ground conveyor belt.
- Wider & rough side blades for better supporting and not easy to slide during working;
- Unique structure design for easier daily lubricating; Durability: Double sealing inside for better quality;

Universal Horizontal wedge for waist height/ground level



- The wedge with short suspension frame suits operating at waist height.
- The wedge with long suspension frame suits operating on the ground level.
- No matter which suspension frame (both can rotate nearly $\pm 90^\circ$ at horizontal direction and around 90° at vertical direction), both can enable the operator to position the wedge at any angle freely.
- Side blades have deep anti-skid grooves for better performance.
- Double sealing inside for better quality.
- Side blades fully slide on the surface of central wedge for longer lifetime.

Wedge Application videos

- <https://youtu.be/dPdcBhKJpa8> wedge degating crankshaft parts vertically at waist height
- <https://youtu.be/2XZuLVCaIM8> wedge degating calliper parts vertically on the ground directly
- <https://youtu.be/CF6tDNFHmbI> wedge degating parts on the ground directly
- https://youtu.be/Au37q_TPvEQ wedge degating parts on the ground directly at Indian foundry
- <https://youtu.be/rl0qdS8XAdQ> wedge degating calliper parts vertically at waist height
- https://youtu.be/cOsZI5_bki0 wedge degating flywheel parts vertically at waist height
- <https://youtu.be/quSv3WSVAys> wedge vertically degating on the conveyor at waist height
- <https://youtu.be/spVazowcAi0> wedge degating disc parts vertically at waist height or at ground level
- https://youtu.be/bZ_062irYzQ wedge degating parts vertically at waist height or at ground level
- <https://youtu.be/lGoTqmfO2MM> rotatable wedge degating bucket tooth parts on the ground directly
- <https://youtu.be/bN7HKfygfs4> wedge degating differential parts vertically on the ground conveyor
- <https://youtu.be/Z5Ce6Rz9-t8> wedge horizontally operating at the foundry (inspiring application)
- <https://youtu.be/TUmtJYEGpZM> wedge degating parts vertically on the ground directly
- <https://youtu.be/dEG-Op3bGeQ> wedge degating parts vertically on the ground (demonstration)
- <https://youtu.be/JCIB4MkoqtY> wedge degating differential parts vertically on the ground (extra thick inserting tips)
- <https://youtu.be/Ub3Eh64SBLs> wedge degating bearing housing parts at waist height
- <https://youtu.be/duJWCs8UJfQ> wedge degating big parts on the ground directly



Runner Bar Cutter

Runner Cutter is designed to shear the runner into small pieces easily before putting them into the furnace. Help the foundries to improve the molten efficiency and save the power cost.

Features:

Comparing to normal runner breaker, the cutter is more flexible, more ergonomic, more easy to operate.

Two options available:

Model: RC1660

Cutting force: 16T, (SG Iron) Runner Diameter could be sheared up to 40 mm Cutting Frequency: 12 times/Min, Weight: 52 Kg

Model: RC2580

Cutting Force: 25 T, (SG Iron) Runner Diameter could be sheared up to 60 mm

Cutting Frequency: 8 times/Min, Weight: 65 kg

Runner Cutter Application videos

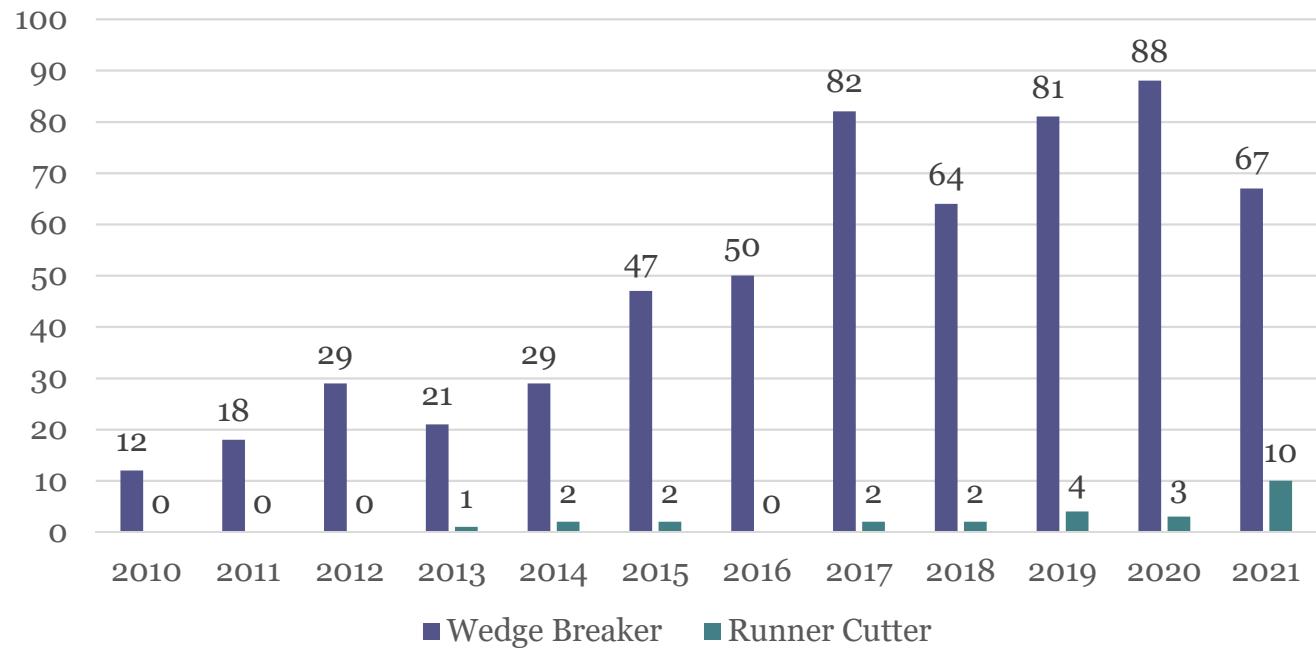
- <https://youtu.be/kouPehO5krs> runner cutter (16T cutting force) operating at waist height (brake disc foundry)
- <https://youtu.be/f-fj6CdPGMU> runner cutter (16T cutting force) operating at waist height
- https://youtu.be/4w3bAZ_59uM runner cutter (25T cutting force) operating on the ground level
- <https://youtu.be/Z5Ce6Rz9-t8> runner cutter (RC1650) with long operating handles works on the ground level
- <https://youtu.be/LIKuf1vuY9o> runner breaker breaks runners on the ground and at waist height.

What features our pump unit has



- **The power pack is equipped with Cycle counter**
- **PLC Controller**
- **180 bar and 450 bar auto pressure switching**
- **3M times guaranteed for low pressure pump, 8M times for Booster Pump based on regular correct maintenance;**
- **Solid-state relays inside for more safer since no sparks in dust; 20M times guaranteed based on stable voltage supplied;**
- **Water Cooling system is an option available for 24*7 operating condition.**
- **Auto switch off after 20 minutes idling.**
- **7.5KW/11KW Power Station are available for foundries to choose for different speed required with air cooling or water cooling.**

How many sets we have supplied



26 sets Runner Cutter and **588** sets Wedge Breaker in total by end of Dec, 2021.





Three Types of NC Grinding machine

- **2 Axis grinding machine**
 - Customized to remove parting lines, flashes, butts at outer round surface of round parts.
- **3 Axis grinding machine**
 - Customized to remove parting lines, flashes, butts at one same horizontal level on the parts.
- **5 Axis grinding machine**
 - Robotic arm structure: more flexible, more options for choosing.
 - Cross sliding table structure: high rigidity for better grinding big in gates, parting lines.

2 Axis Grinding Machine with 2 Grinding Stations





What is a Two Axis Grinding Machine?

Weijing 2 axis grinding machine with 2 grinding stations is customized to remove parting lines, flashes, butts on the outer round surface of circular castings.

- **Grinding fully covered from sparks for more safety.**
- **Diamond wheel improves cycle time and increases life time of wheel.**
- **Repeatable grinding accuracy is controlled by 4 position sensors.**
- **One operator can operate two grinding stations same time for improving the time utilization rate.**

Technical Specification

- **Grinding Accuracy: 1 mm if part is without ovality**
- **Control System: PLC + 11 sensors**
- **Grinding wheel rotating speed: 2803 rpm**
- **Grinding wheel linear velocity: 58.7 m/s**
- **Grinding sparks: covered**
- **Casting holding: air cylinder**
- **Movement Drive: hydraulic driving by Gerator pump**
- **Grinding Wheel: Diamond wheel with 400 mm Diameter**
- **Air pressure required: 4-6 Bar**
- **Air consumption: 9 Litres per cycle time per grinding station**
- **Machine power: 18 KW combined**
- **Machine weight: 2500 KG.**
- **Machine Dimension: 2000*1850*1750 mm**

What Kinds of Circular Castings Suit This Grinder



Casting Requirements

- Casting material: Cast iron/ SG Iron Castings
- Casting Shape: circular castings, Casting Diameter: 120-360 mm
- If casting diameter is down to 80 mm or up to 460 mm, Weijing can customize for you without any extra cost.
- Casting Height < 154 mm
- Casting Weight: < 30 Kg
- Gate areas: up to 200 sqmm each station



Weijing 2 axis grinding machine videos

- <https://youtu.be/erM53BLSnKs> brake disc part fettling video
- <https://youtu.be/k6LaULdpsfl> brake disc part deburring video
- <https://youtu.be/lsBnmfay4l8> round part with 400 mm D fettling video
- <https://youtu.be/0HIZExnzACY> differential part fettling video
- <https://youtu.be/GO4FbAgQlyE> bearing housing part grinding video
- <https://youtu.be/VMEZ5euC2Ek> bearing housing part fettling video
- https://youtu.be/THZpTs_bkfk bearing housing part deburring video
- <https://youtu.be/AkSfE4no3Yw> brake disc part fettling video

Weijing 3 Axis Grinding Machine

If you just need to remove the parting lines, flashes or butts at one same horizontal level on the part, no matter round parts or not round parts, actually 3 axis grinding machine can do the work for you.

WEIJING 3 axis grinding machine can help you save lots of money on unnecessary axis spends.

- <https://youtu.be/prvyo-UlxQ4> railway pad part fettling video
- <https://youtu.be/yQEa9omu3n8> railway pad part grinding video
- https://youtu.be/hA4Q_CaEiW8 railway pad part grinding video
- <https://youtu.be/oE9dNax1Fz4> power steering pump part fettling video



Weijing 3 axis auto grinding machine



Part requirements

Radius of gyration: 250 mm, height: 250 mm, weight: 30 kg

Diamond wheel

Grinding wheel: $\phi 355 \times t 12 \times \phi 80$ mm
Linear speed of wheel: 3900 m/min

Moving velocity

X axis for horizontal movement: 114°
Y axis for longitudinal movement: 125°
C axis for part rotating: $\pm 360^\circ$

Feed speed

X=4462(deg/min) , Y=5142(deg/min)
C=5400(deg/min)

Driving power

Driving motor of big wheel: 7.5 kw.
3+0.85+0.75(KW) for X, Y, C axis.
Total power: 10.4 KW

Air supply requirement: 0.49~0.69 Mpa

Machine weight: 2800 kg

Dimensions: 2300*2280*2700 mm



Weijing 5 Axis Grinding Machine

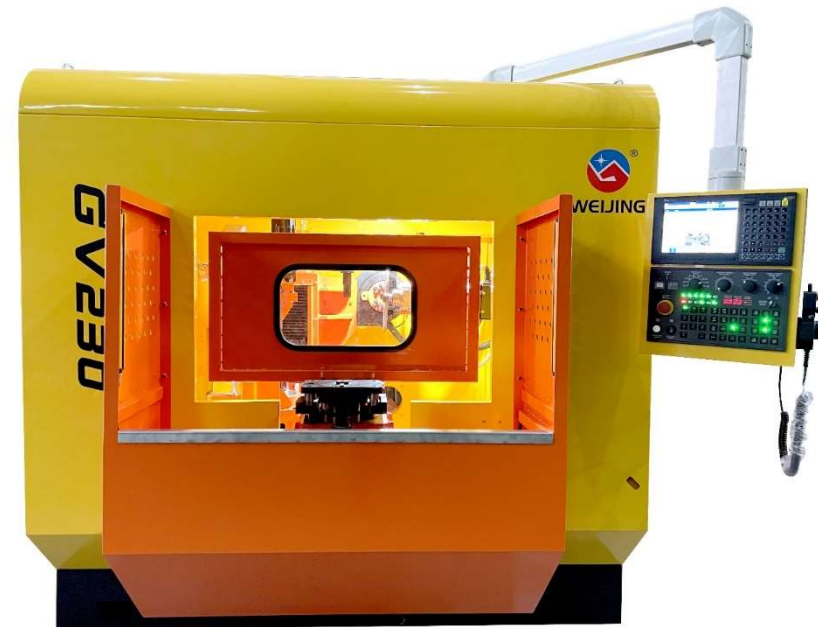
Weijing 5 Axis Grinding Machine is designed for grinding the butts or parting lines of Iron castings.

- 1. Equipped with Chinese TOP 1 NC operating system which can guarantee the excellent quality and perfect user experience.**
- 2. HNC programming format is similar as FANUC and SIEMENS. It will help the operators who is familiar with FANUC or SIEMENS to get used to it smoothly.**
- 3. Diamond wheels can give you a super long life time for saving the grinding cost.**
- 4. Small grinding wheel can reach some areas which big wheel can't reach.**
- 5. The pallet changer can help the users to make full use of grinding time to fix next part outside.**
- 6. Cross sliding table mechanisms is an optional for better rigidity to remove big gate ends.**

Current Models



GV18



GV230

Current Models

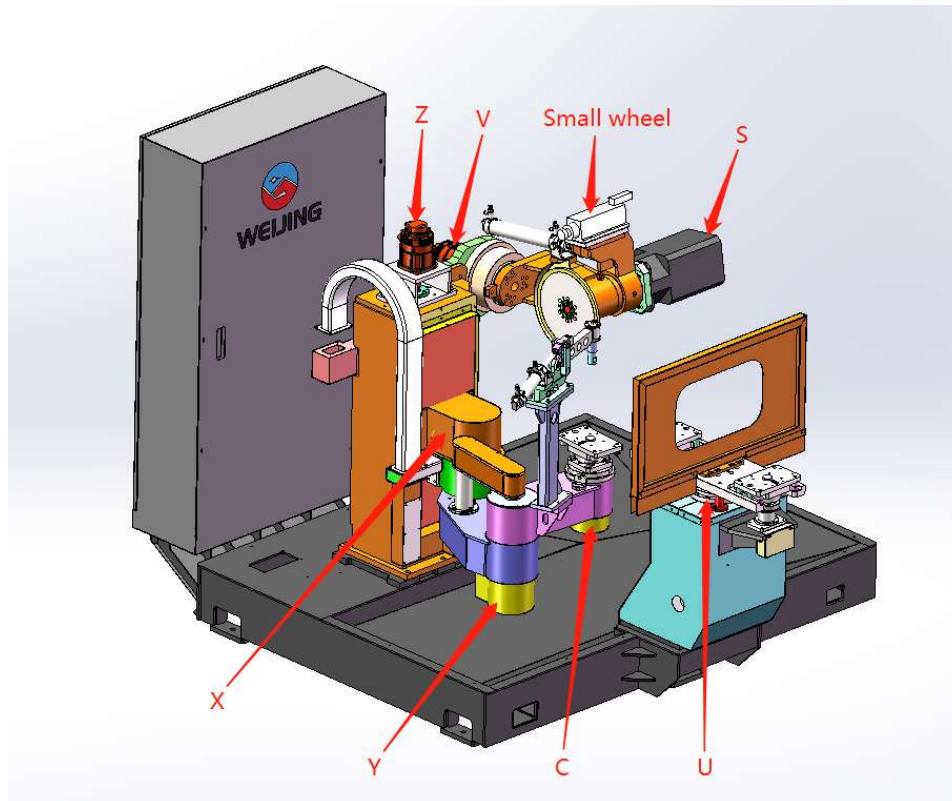


GV270



GV1200

Axis function definition



Based on International Cartesian coordinates, we set below function for each axis of robotic arm mechanisms grinding machine of Weijing.

**X axis: horizontal movement
Y axis: longitudinal movement
Z axis: vertical movement**

**C axis: part horizontal rotating
V axis: big wheel movement
U axis: pallet changer movement**

GV18 Grinder Parameters



Part requirements

Radius of gyration: 150 mm, height: 150 mm, weight: 8 kg

Diamond wheels

Big wheel: $\phi 305 * t12 * \phi 80$ mm

Small wheel: $\phi 16$

Linear speed of big wheel: 2298 m/min

Linear speed of small wheel: 10000 rpm

Moving velocity

X axis for horizontal movement: 65°

Z axis for vertical movement: 155 mm

Y axis for longitudinal movement: 125°

C axis for part rotating: $\pm 360^\circ$

V axis for big wheel to rotate: 105°

Feed speed

X=5400(deg/min)

Y=5400(deg/min)

Z=7500(mm/min)

C=9000(deg/min)

V=5400(deg/min)

Driving power

Driving motor of big wheel: 3.7 Kw

Driving motor of small wheel: 3.5 Kw

1+1.5+0.75+0.4+2.4(KW) for X, Z, Y, C, V axis.

Total power: 13.25 KW

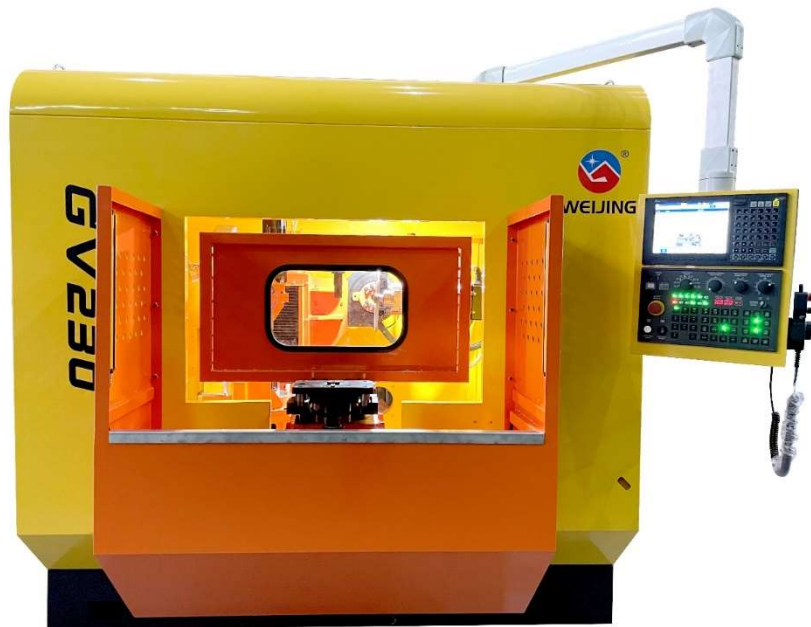
Air supply requirement: 0.49~0.69 Mpa

Machine weight: 1400 kg

Dimensions: 2210*1570*2080 mm

One operator can control 2~3 sets GV18 grinder for super efficiency for you.

GV230 Grinder Parameters



Part requirements

Radius of gyration: 250 mm, height: 200 mm, Weight: 30 Kg

Diamond wheels

Big wheel size: $\phi 355 \times t12 \times \phi 80$

Small wheel size: $\phi 16$

Linear speed of big wheel: 3900 m/min

Linear speed of small wheel: 10000 rpm

Moving velocity

X axis for horizontal movement: 75°

Z axis for vertical movement: 250 mm

Y axis for longitudinal movement: 100°

C axis for part rotating: $\pm 360^\circ$

V axis for big wheel to rotate: 120°

U axis for pallet changer to rotate: $\pm 180^\circ$

Feed speed

X=4462(deg/min)

Z=7500(mm/min)

Y=5142(deg/min)

C=5400(deg/min)

V=4462(deg/min)

U=5142(deg/min)

Driving power

Driving motor of big wheel: 7.5 Kw

Driving motor of small wheel: 3.5 Kw

1.5+2.5+1.3+1+2.4+1(KW) for X, Z, Y, C, V, U axis.

Total power: 20.7 KW

Air supply requirement: 0.49~0.69 Mpa

Machine weight: 2800 kg

Dimensions: 2880*2460*2400 mm

The pallet changer can save time to put part on the outer fixture for you!

GV270 Grinder Parameters



Part requirements

Radius of gyration: 350 mm, height: 400 mm, Weight: 70 Kg

Diamond wheels

Big wheel size: $\phi 405 \times t12 \times \phi 80$

Small wheel size: $\phi 16$

Linear speed of big wheel: 4450 m/min

Linear speed of small wheel: 10000 rpm

Moving velocity

X axis for horizontal movement: 99°

Z axis for vertical movement: 450 mm

Y axis for longitudinal movement: 130°

C axis for part rotating: $\pm 360^\circ$

V axis for big wheel to rotate: 120°

U axis for pallet changer to rotate: $\pm 180^\circ$

Feed speed

X=3157(deg/min)

Y=15000(mm/min)

Z=4462(deg/min)

C=5142(deg/min)

V=4462(deg/min)

U=4462(deg/min)

Driving power

Driving motor of big wheel: 7.5 Kw

Driving motor of small wheel: 3.5 Kw

2.3+1.5+5.5+0.88+2.4+1.5 (KW) for X, Y, Z, C, V, U axis.

Total power: 25.08 KW

Air supply requirement: 0.49~0.69 Mpa

Machine weight: 4000 kg

Dimensions: 3570*2200*2780 mm

The pallet changer can save time to put part on the outer fixture for you!

GV1200 Grinder Parameters



Part requirements

Radius of gyration: 300 mm, height: 270 mm, Weight: 200 Kg

Diamond wheels

Big wheel size: $\phi 355 \times 12 \times \phi 80$

Small wheel size: $\phi 16$

Linear speed of big wheel: 3900 m/min

Linear speed of small wheel: 10000 rpm

Feed speed

X, Y, Z=0~10000 mm/min

C, V=15 rpm

Moving velocity

X axis for horizontal movement: 600 mm

Y axis for longitudinal movement: 550 mm

Z axis for vertical movement: 300 mm

C axis for part rotating: $\pm 360^\circ$

V axis for big wheel to rotate: $\pm 180^\circ$

Driving power

Driving motor of big wheel: 7.5 Kw

Driving motor of small wheel: 3.5 Kw

2.3+2.3+5.5+2.3+2.3(KW) for X, Y, Z, C, V axis.

Total power: 25.7 KW

Air supply requirement: 0.49~0.69 Mpa

Machine weight: 4000 kg

Dimensions: 2258*2460*2081 mm

Cross sliding table mechanisms has excellent rigidity on heavy duty grinding!

These parts have been done by 5 axis grinding machine

- <https://youtu.be/tSwLeRcsiVg> diesel engine block part fettling video
- <https://youtu.be/2GzhLpTx97k> diesel engine block part grinding video
- <https://youtu.be/rIRj4v-j7Cs> oil pump end cap part grinding video
- <https://youtu.be/7KTmaPq2E2A> differential part fettled by GV120
- <https://youtu.be/ZNw1TE0fnKI> differential part deburred by GV230
- <https://youtu.be/XflyX0Zpb8I> steering knuckle part fettling video by GV230
- <https://youtu.be/YcqbRd7ceU4> pipe part fettled by GV230
- <https://youtu.be/bQVmyzDhXZA> differential part fettled by GV230
- <https://youtu.be/8sRz0xUFRHk> oil pump housing fettled by GV230
- <https://youtu.be/35KBVQo9hVI> crankcase part fettled by GV18
- <https://youtu.be/4jdLnp3Jupg> grating part fettled by GV1200
- <https://youtu.be/pgS76HM78QE> engine block part fettled by GV230
- <https://youtu.be/FujqL9JGgDc> round part fettled by GV18

Unique NC operating system



Controller brand: HNC – Top 1 NC Controller Brand In China

System version: HNC-818 CNC Controller

Features:

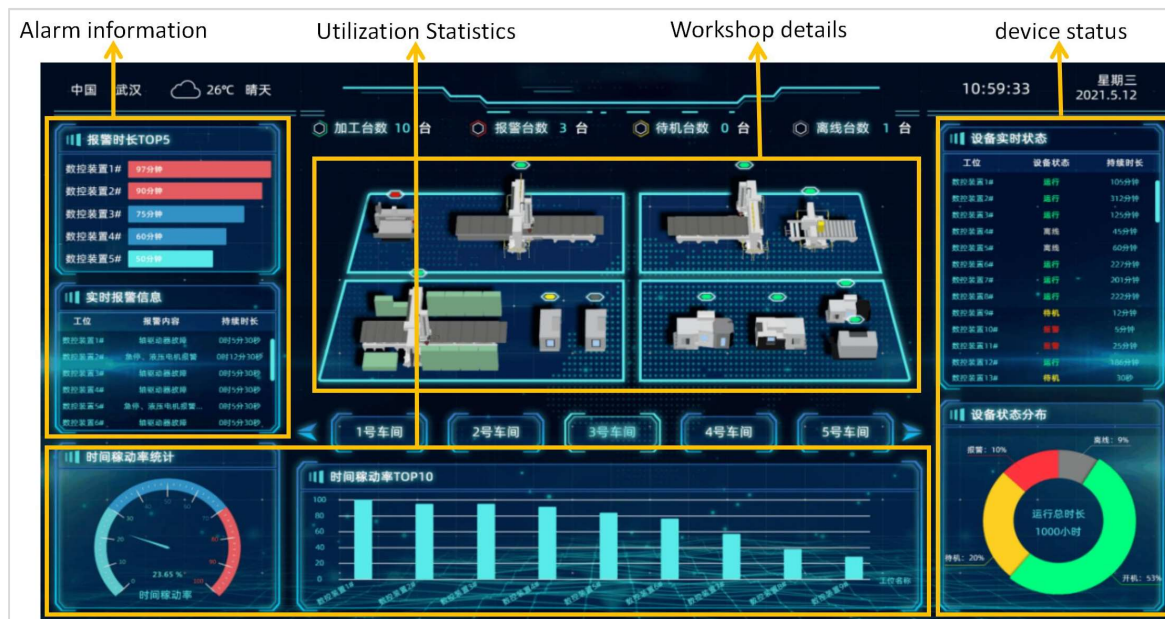
1. HNC programming format is similar as FANUC and SIEMENS.
 - It will help the operators who is familiar with FANUC or SIEMENS to get used to it smoothly.
2. Equipped with 1G memory and 8G solid state hard drive.
 - Excellent hardware is the precondition of high speed and high efficient processing.
3. Equipped with two panels: NC panel and MCP (Master control program) panel.
 - Physical buttons on MCP panel would be easy for the operator to operate, avoiding any misoperations.
4. Equipped with two programming ways: NC programming and hand teaching.
 - Even if the operator has zero NC programming, it will be easy for them to learn.
5. Unique NC cloud can provide remote diagnosis and monitoring.
 - It can help the user to fix the issues quickly and avoid long downtime.
6. Could be programmed on computer first, then upload to the grinder.
 - It will be convenient for the user to program and save time.
7. Has manual shortcut MST function.
 - It can help the operator to flexibly switch the running speed of wheel and easily execute M codes during hand teaching programming. (M codes means pressing the part, clamping the part, rotating small wheel, air blowing for big wheel to cool down)

NC panel & MCP panel



NC panel will be easy for the operators to get used to it.
Physical buttons on MCP panel would be easy for the operator to operate, avoiding any misoperations.

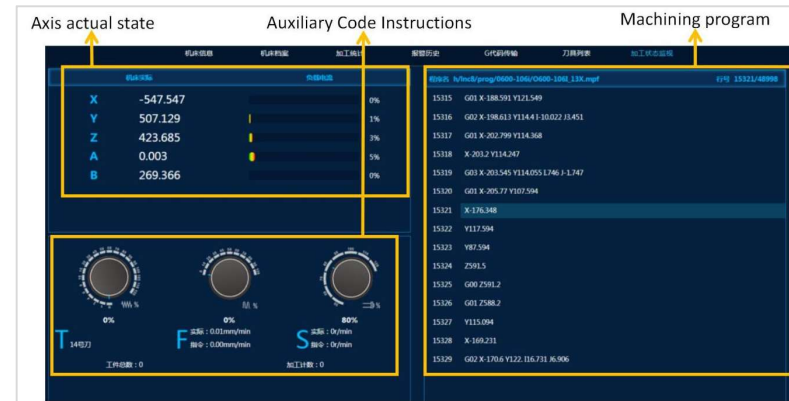
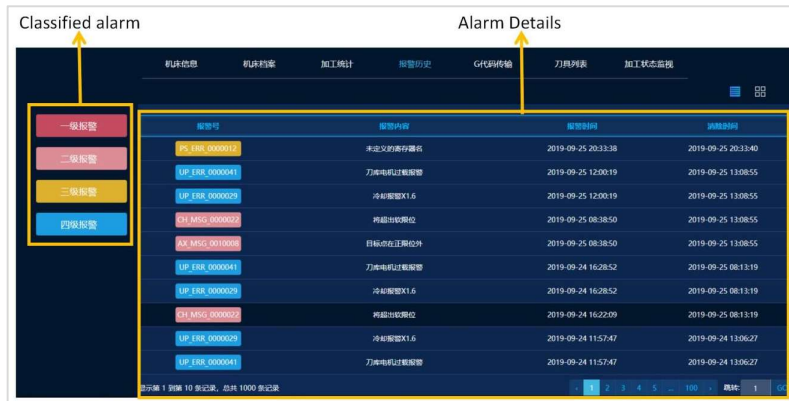
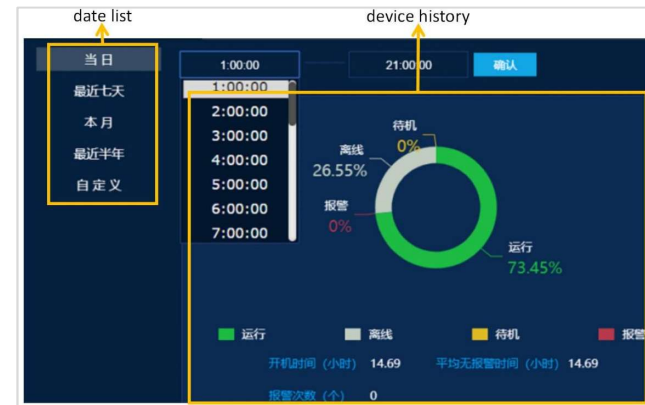
Unique iNC cloud service



iNC cloud service is a set of industrial process visualization inspection tools.

- can realize the real-time monitoring of equipment conditions with the end user's authorization.
- can provide remote diagnosis for saving downtime.
- can manage up to 20 machines and real-time view the operation of each machine.

INC cloud makes data visualization





Who is HNC

Wuhan Huazhong Numerical Control Co., Ltd (Abbreviation: HNC)

- **Founded in 1994 with registered capital of RMB 172.79 million.**
- **HNC is a listed group company with more than 30 branches (subsidiaries).**
- **The leading supplier and manufacturer of CNC systems, servo drive, servo motor in China.**
- **HNC has passed Management Systems Certifications including ISO9001, ISO14001, and OHSAS18001.**
- **Already supplied 12,000 sets system to oversea market, covering Russia, India, Pakistan, Thailand, Vietnam, Malaysia, Indonesia, Belarus, Ukraine.**
- **Already supplied 300,000 sets system only to China market by 2022. Average annual sold quantity is approx. 30,000 sets.**
- **Constant temperature production workshop and 5 strict production test before final product guarantee the controller you receive will has the excellent quality.**



Production Process



Company honors

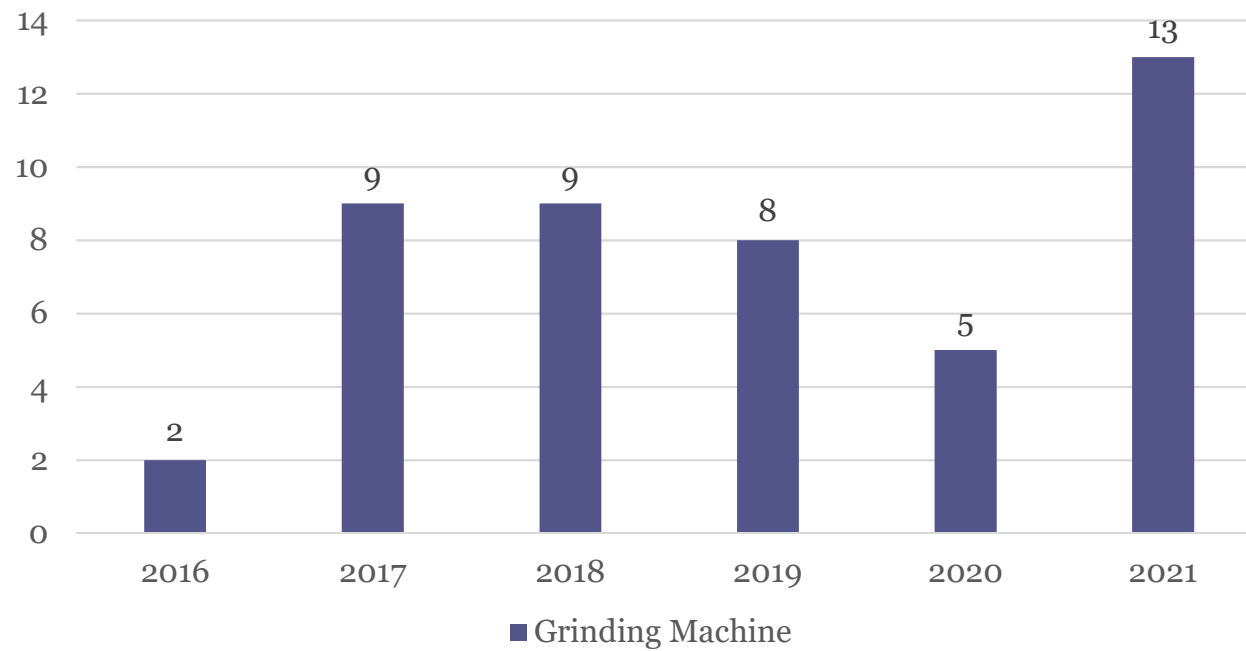
- Second Prize of National Science and Technology Progress Award for High Performance CNC System
- Chinese Good Design
- First Prize of China Machinery Industry Science and Technology Award for High-end CNC System Standar
- Medal of China's Top 100 Intelligent Manufacturing Enterprises
- China Machinery Industry Science and Technology Award
- Third prize of Heavy-Duty High-Efficiency and High-Precision CNC Gantry Mobile Multi-spindle Drillin
- First Prize of Hubei Province Science and Technology Progress Award for Fully Closed Loop High Preci
- First Prize of Hubei Province Science and Technology Progress Award of Huazhong 8 Series High-perfor
- First Prize of Beijing Science and Technology Award
- First Prize of Key Technology and Application of High-performance CNC system



More videos can help you know more about HNC

- <https://youtu.be/-76uP3nDhu0> **Wuhan Huazhong Numerical Control Co., Ltd (HNC) introduction**
- <https://youtu.be/3MPiubHFkd0> **HNC CNC controller introduction**
- <https://youtu.be/w1vfVnZUg8w> **HNC 8 Series Controller introduction**
- <https://youtu.be/6pnh8-I1OPE> **Application of HNC 8 system on lathe**
- <https://youtu.be/Js8Zi0V9A1Q> **Panel functions of HNC CNC system**
- <https://youtu.be/XPTmTSpzx5E> **HNC CNC system operation introduction**
- <https://youtu.be/tbqI-8ADL8M> **iNC Cloud platform of HNC CNC**
- <https://youtu.be/m94sk1nc48o> **HNC 8 system and its high end application**

How many sets have been supplied



46 sets auto grinding machine have been supplied by end of 2021.



Efficient equipment for fettling automation – High speed grinding

AWBell
EQUIPMENT

GRINDERS CUT OFF SAWS WATERBLAST CLEANING MENU

cycle, the RG5360 can be programmed to grind it.


[DOWNLOAD BROCHURE](#)

GRINDERS

- MANUAL HEIGHT ADJUSTABLE GRINDER
RG324
- RGS PLUNGE SERIES
RG340L, RG340K, RG340M
- REVOLVING TABLE GRINDER
RG5231
- RECIPROCATING PROFILE GRINDER
RG5600
- FIVE AXIS GRINDER
RG2000
- SWING FRAME BELT GRINDER
MPG40**

MPG40

SWING FRAME BELT GRINDER



← →

Floating cutter features

- **Can use up to a 6" wide abrasive belt and 40Hp drive motor, effective grinding area of 3' x 3' x 2.5'. Large.**
- **Provided with easy to use controls to adjust height and angle of the grinding head**
- **A hydraulic actuated mechanism to allow the wheel to be tilted 15° either side of vertical**
- **Pivot locking holds the arm stationary between grinds and releases to allow the grinding head to float during grinding operations."**
- **Removing one or both hands instantaneously stops the grinding belt.**



A W Bell machinery

- <https://youtu.be/XPnGWiBZY7I> for floating grinders video
- https://youtu.be/WkPtQY_C3GQ for semi automatic cutting stations video

Efficient equipment for fettling automation – PH hammers

产品型号 Product Model	能量 (焦耳) Energy (Joule)	冒口截断面积 (ϕ mm) Riser Diameter	冒口高度 (mm) Riser Height	产品重量 (KG) Product weight
QC65	500	35	90	95
QC85	900	55	140	160
QC135	1800	85	260	345
QC155	3000	110	300	600
QC195	4000	130	350	815
QC295	6000	160	450	1520
QC295P	8500	180	480	1700
QC355	9000	210	480	2250
QC431	18000	250	610	2740
QC499	28000	350	680	6300

Thank you for your presence

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