Wuhan Huazhong Numerical Control Co., Ltd.

ZIP Code: 430223
ADD: HUST Park, Miaoshan Region, East-lake Development Zone, Wuhan, Hubei, China
TEL: +86-027-87180025
FAX: +86-027-87180308
Http://www.huazhongcnc.com

Sales Department

Contact: Wan Qian
Mobile: 13908624168
E-mail: wanqian@hzncc.com
Contact: Zhang Dengxiang
Mobile: 13307189386
E-mail: zdx@hzncc.com

Service Center

Contact: Zhang Yaohua
Hotline: 800-880-0598, 400-999-0861
TEL: 027-87180095, 87180800
Fax: 027-87180303
E-mail: service@hzncc.com

International business Department

Contact: Masha Huang
TEL: +86-27-87180306
Mobile: +86-19907131374
E-mail: masha.huang@mail.ru

International Service

Contact: Masha Huang
TEL: +86-27-87180306
Mobile: +86-19907131374
E-mail: masha.huang@mail.ru

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WUHAN HUAZHONG NUMERICAL CONTROL CO.,LTD

The information provided in this catalog is a general description of the product. The content in this catalog may differ from the actual application and may change as the product is further developed. HNC is responsible for providing the product characteristics described only when it is clearly stated in the relevant contract terms.

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华中数控

- MORE PRECISE
- MORE RAPID
- MORE INTELLIGENT

HNC8 SMART CONTROLLER

武汉华中数控股份有限公司
WUHAN HUAZHONG NUMERICAL CONTROL CO.,LTD

Wuhan Huazhong Numerical Control Co., Ltd. ("the company") is China's medium and high-end CNC system research and industrial base, the first listed company in China's CNC system industry. The company's technology research and development which is a national high-tech enterprise is supported by National CNC System Engineering Technology Research Center of Huazhong University of Science and Technology.

The company has won two second prizes of national science and technology progress and seven provincial and ministerial level of first prizes. It is the strongest technical enterprise in China's CNC system industry.

The company sells nearly 20,000 sets of CNC systems, 100,000 sets of servo amplifiers and motors, and 2,000 industrial robots every year. The sales of medium and high-end CNC systems rank first in China.

HNC8 CNC system developed by the company has achieved the word advanced level in five-axis, multi-channel, high-speed high-precision, intelligent and other technologies. Its medium and high-end CNC system is mostly used in China. They have been used in aerospace, machine tool, and auto parts enterprises such as Shenyang Aviation Industry Corporation, Bochi Machine Tool Group Co., Ltd and Dongfeng Motor Co., Ltd.

CONTENTS

Table of HNC8 high-performance CNC system functions

Product	Matched machine tool	Basic parameter	Features	Smart function
HNC-808 series 	performance ↑  CNC lathe, machining center	2-4 axis control 10.4" color LCD screen	· Supporting NCUC, EtherCAT bus protocol · Supporting 16,000,000PPR high-precision encoder · Supporting high-speed asynchronous motor\permanent magnet synchronous spindle motor · 8000rpm high-speed rigid tapping (permanent magnet synchronous spindle motor) Supporting bidirectional 20000 points pitch error compensation (optional) · Customization (optional) Supporting TCP\IP, Ethernet communication protocols	
HNC-818 series 	 Turning center, high speed machining center, lathe mill combo, gantry machining center, grinder, horizontal machining center, glass cutting machine, high gloss machine	2-32 axis control (optional) 2-channel (optional) 8.4", 12.1" color LCD screen	· High-speed high-precision control · Max. acceleration rate is 1.8G (3G when linear motor is mounted) · Dual channel control (optional) Dual-axis synchronization control · Full-closed loop control (optical grating, magnetic grating) · Supporting bidirectional 20000 points pitch error compensation · Auto measurement · Supporting a variety of sensor interfaces · Machine assembly quality analysis software (optional) · Customization · Touch screen (optional)	· Big data of CNC machine tool · Broken tool inspection · Machine health protection · Technological process optimization · Mobile terminal NC · Cloud service · Temperature compensation
HNC-848 series 	 Five-axis machine, heavy-duty machine, lathe mill combo	5-32 axis control; 17" color LCD screen	· High-speed high-precision control · 5 simultaneously controlled axes 5-axis auto calibration 5-axis RTCP function Large circular interpolation Hyperbolic interpolation 5-axis orientation machining · Synchronization control · Error compensation · Direct drive · Intelligent control · Lathe-mill combination · Multi-channel control · Seamless integration of CAM software · Touch screen · Backlash elimination for multiple motors	

HNC8 Series CNC System

HNC-808 series

Tailored to popular turning and milling applications

The HNC-808 all-digital bus-type high-grade CNC system is designed for milling and turning processes to meet a wide range of application needs: from standard milling machines, simple machining centers, to cycle-controlled lathes and full-function CNC lathes.

Easy to debug, simple operation

Integrating the debugging functions such as batch debugging, online diagnosis, machining log, HNC-808 all-digital bus-type high-grade CNC system offers powerful facilities for daily operation and program edit, bringing simplicity in the user experience.

HNC-808D

HNC-818 series

Reliable performance, maintenance free

HNC-818 is an all-digital bus-type high-grade CNC system based on operation panel of up to IP65 protection level with fewer interfaces. HNC-818 is applied for the extreme operating conditions. The fan and the hard disk don't apply to the HNC-818, and the memory works without battery, so the control system is completely maintenance free.

Standard turning and milling functions

With the system software based on the technical process, HNC-818 is the best choice of standard lathe and milling machine. HNC-818 can be used on vertical or ordinary horizontal machining center, mould processing, and turning center with subspindle, live tool and Y axis.

Easy to operate

With 8.4" /10.4" high resolution color LCD display, HNC-818 is very convenient to operate. There are USB and RJ45 interfaces on the front operation panel for the rapid and easy data transfer to machine tool.

HNC-818D

HNC-848 series

Stylish, reliable performance

Aiming at the global high-grade CNC control system, the company developed HNC-848 high-grade all-digital bus type system HNC-848 adopts the modular, open architecture, NC and MPC structure of dual CPU module, and 17 " LED LCD.

Interface template switching function

The use of HNC-848 scripting technology allows HNC8 to have many functions that the traditional CNC system does not have, including skin replacement and multi-language. In consideration the user's habits, HNC8 HMI system provides a variety of interface templates, users can click to the familiar interface style, reducing the learning curve.

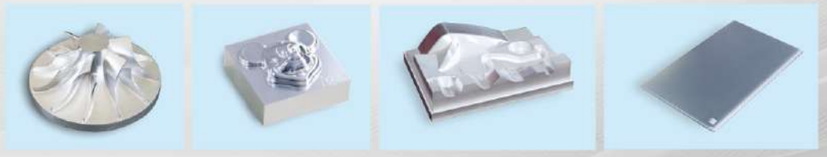
Usability integration technology

The traditional numerical control system is control-based, and HNC-848 is mainly for management. From control to management, the system integration reaches a new height. HMI can integrate local scripts, local dynamic libraries, native applications, and cloud applications with a variety of integration methods and less difficulties.

Highly open

The openness of CNC system is mainly reflected in four aspects: hardware openness, kernel openness, functional openness, and ecological openness. The openness of HNC-848 system hardware is reflected in hardware replaceability; the openness of kernel is reflected in the integration of IEC61131PLC editing tool; the functional openness is reflected in HMI, users can develop custom function modules; the ecological openness is reflected in cloud services. The CNC system can make full use of cloud resources.

HNC-848D



Servo amplifier

HSV-180U all digital bus-type AC servo amplifier unit

HSV-160U all digital bus-type AC servo amplifier unit

HSV-150E all digital bus-type servo amplifier unit

HSV-180U All digital bus-type AC servo amplifier

Series HSV-180U, a new all-digital AC server amplifier unit developed by Wuhan Huazhong Numerical Control Co., Ltd., is applied mainly to the precision/response sensitive area.

With NCUC bus protocol of self-owned intellectual property, HSV-180U exchanges data with NC devices through its high-speed industrial ethernet bus interface. Its high-resolution absolute encoder interface can be connected to various of encoders such as composite incremental encoder, sine cosine encoder, and all digital absolute encoder, with the position feedback resolution up to 23-bit. It supports the dual encoder interface by which full-closed loop control is implemented.

There are eight types for series HSV-180U, with the maximum power output of power circuit reaching 100KW, greatly widening the power output range of servo amplifiers.

HSV-160U All digital bus-type AC servo amplifier

Series HSV-160U, a new all-digital AC server amplifier unit developed by Wuhan Huazhong Numerical Control Co., Ltd., is applied mainly to the precision/response sensitive area.

With NCUC bus protocol of self-owned intellectual property, HSV-160U exchanges data with NC devices through its high-speed industrial ethernet bus interface. Its high-resolution absolute encoder interface can be connected to various of encoders such as composite incremental encoder, sine cosine encoder, and all digital absolute encoder, with the position feedback resolution up to 23-bit. It supports the dual encoder interface by which full-closed loop control is implemented.

There are four specifications for series HSV-160U: HSV-160U-20A, HSV-160U-30A, HSV-160U-50A HSV-160U-75A, with the maximum power output of power circuit reaching 5.5KW.

HSV-150E All digital bus-type servo amplifier

HSV-150E full digital bus servo amplifier is the latest highly functionally servo amplifier with high performance. Its various IO interfaces satisfy any I/O needs, and the advanced vibration suppression function brings a qualitative leap of performance. It supports EtherCAT, CAN and other communication protocols to achieve EtherCAT and CANopen communication functions; with the built-in GUI user-friendly debug software [Huashu servo], user can easily complete parameter settings within a few minutes; almost any feedback types are supported such as rotary or linear AC servo motors, rotary or linear DC servo motors; its power ranges from 200W to 90kW.

Servo motor

LBB motor

LDD motor

GK motor

GM7 spindle motor

Spindle motor

Gz DC motor

DD motor

Linear motor

ST series AC permanent magnetic synchronous servo motor

ST series AC permanent magnet synchronous servo motors are widely used in various industries such as machinery, textile, printing, packaging and automation. They are the first choice for the executive component of CNC systems and automatic control devices.

The motor uses high-resolution encoders, low torque ripple, high installation precision; the highest speed can be reached with perfect maximum ratio of torque to inertia and high acceleration torque based on field weakening; high protection level IP65, encoder shock-absorbing installation and triple overload capability enables the motor highly accurate, highly dynamic, reliable, and maintenance-free.

R-GK9 series AC permanent magnetic servo motor

The AC servo system formed by the R-GK9 series AC servo motor and servo amplifier unit can be widely used in machine tools, textiles, printing, building materials and other fields.

The motor provides: high speed (6000rpm or even 9000rpm); high-precision (torque ripple is as low as 0.3%); high density (torque density is increased by over 20%, smaller size); high density magnetic optimization design with a high volume ferromagnetic material density structure.

Series servo motor

Huada LDD motor >

Highly precise, highly dynamic, reliable and durable, maintenance-free

Highly precise:

- High resolution encoder
- Low torque fluctuation
- High installation precision (flange and axis)

Highly dynamic

- Perfect maximum ratio of torque to inertia
- High acceleration torque based on field weakening, can reach to the maximum speed

Reliable and durable

- High protective level IP65 (amplifier-side flange Ip67)
- Shockproof, have to do with the damping installation of encoder
- Three times overload

Maintenance-free

- There is no battery on the absolute encoder

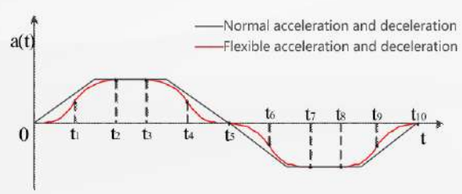
Series LDD motor completely meets the high-precision, high-speed, and high-dynamic requirements for drilling-tapping center.

- Support 24-bit\26-bit high-resolution encoder motors and linear motors. By configuring higher resolution (24-bit and higher) encoder motor, linear motor, grating scale, and DD motor, servo amplifier realizes more accurate interpolation speed and acceleration, which improves the surface quality of the parts and precision.

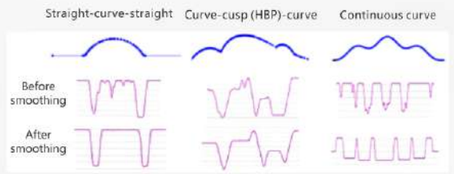
Features of HNC8 Intelligent CNC System

More Precise–Better Machining Precision

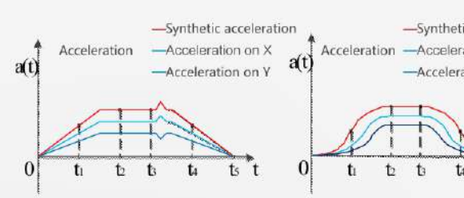
High-speed and high-precision basic control algorithm



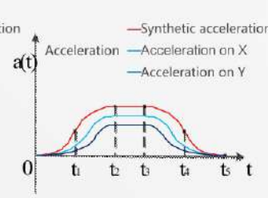
Sine cosine flexible acceleration and deceleration



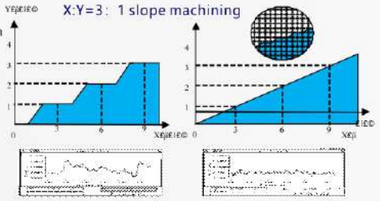
Speed smoothing algorithm



Low-order spline fitting



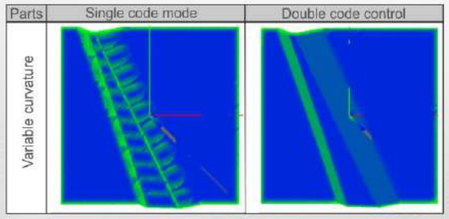
High-order spline fitting



High-speed nano interpolation algorithm

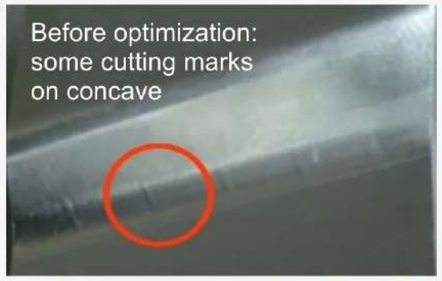
Processing optimization technology based on double code control

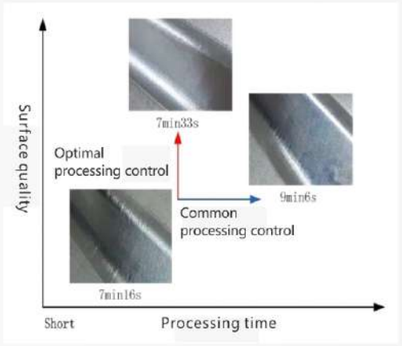
Through the original "double code control" technology, the "G-code" (first code) of traditional CNC machining and the intelligent control "i-code" (second code) of multi-objective optimization processing run simultaneously to achieve the goals for CNC machinining: high quality, high efficiency, reliability, safety and low consumption.



Comparison of chromatograms and processing of typical parts

3D surface processing based on “double code control”

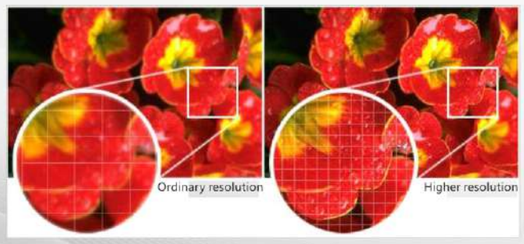


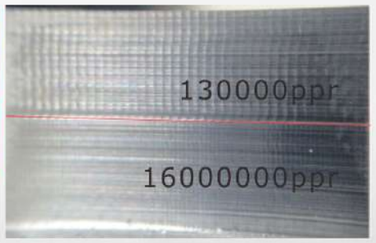


Under the same processing efficiency, the surface finish can be improved effectively; under the same processing surface quality, the processing time can be significantly reduced, and both the processing efficiency and the quality can be increased.

High resolution encoder

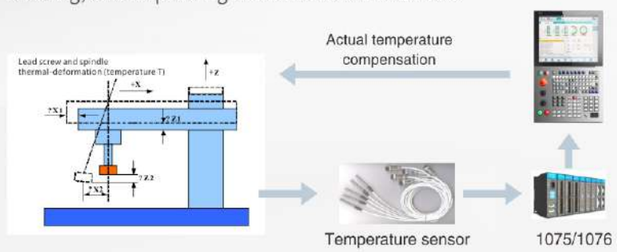
Low voltage LMDD series and high voltage HMDD series motors are equipped with 16,000,000 resolution photoelectric encoders to improve the processing accuracy and finish.





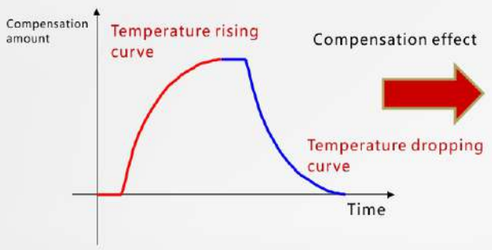
Thermal error compensation based on temperature sensor

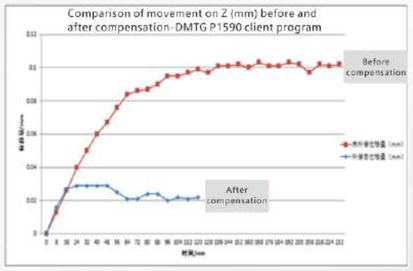
HNC8 intelligent CNC system supports the thermal error compensation technology with sensor, and high-precision temperature sensor is selected to reduce the warm-up time, realizing processing after booting, and improving machine tool utilization.



The actual error data is calculated based on the machine actual temperature and calibrated temperature/error table.

The most commonly used Pt100 and KTY84 temperature sensors are supported. Real-time temperature detection with measurement accuracy of +/-0.5% is realized, temperature measurement ranges from -40°C to 240°C, and system display resolution is 0.1°C. The time for warming up and cooling down is effectively reduced, and the stability of the machining accuracy is ensured.

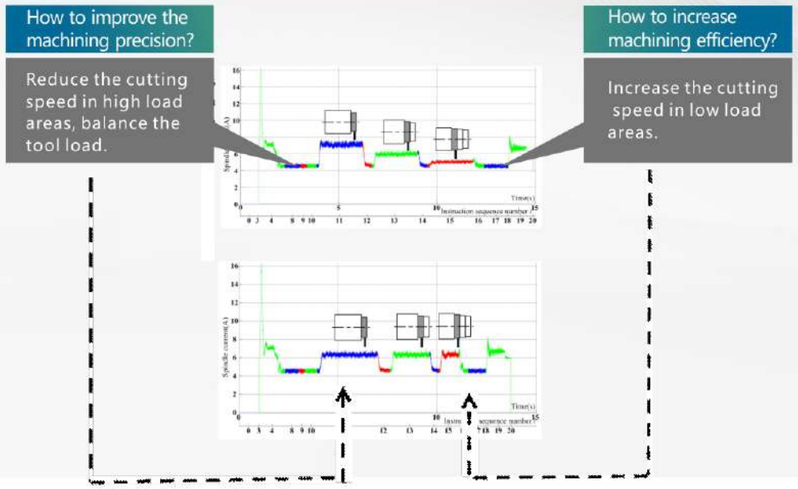




The lead screw deformation curve during warming up is different from that during cooling down, therefore, different compensation data is used for warming and cooling times to increase the compensation precision of machine tool.

Faster-Higher Machining Speed

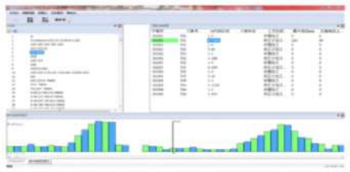
Intelligent optimization of process parameters based on instruction domain big data



V2.0 process evaluation

Evaluation result:
The total optimization efficiency is expected to be 4.4% for this G code
Suggestion:
It is suggested to use process optimization software for optimization.

Evaluate during processing to calculate optimization efficiency

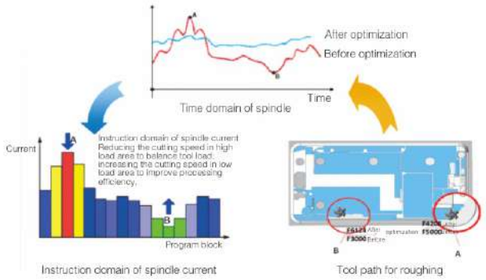


Process parameter optimization

```
N334 R-1000. 0
N372 R-1000. 0
N411 R-1000. 0
N412 R1206634. 0
N441 R9057895. 0
N641 R9057895. 0
N841 R9057895. 0
N975 R1206634. 0
N1004 R0. 0
N1005 R-1000. 0
N1043 R-1000. 0
N1082 R-1000. 0
N1083 R-1000. 0
N1121 R-1000. 0
```

```
N331 G1 X237.871 Y237.871 Z-7.000 F15000
N332 G1 X237.900 Y237.900 Z-6.983 F5000
N333 G1 X238.300 Y238.300 Z-6.752
N334 G1 X238.400 Y238.400 Z-6.694
N335 G1 X238.900 Y238.900 Z-6.406
N336 G1 X239.000 Y239.000 Z-6.348
N337 G1 X239.600 Y239.600 Z-6.002
N338 G1 X239.700 Y239.700 Z-5.944
N339 G1 X240.200 Y240.200 Z-5.655
N340 G1 X240.300 Y240.300 Z-5.597
N341 G1 X240.900 Y240.900 Z-5.251
N342 G1 X241.000 Y241.000 Z-5.193
```

Output 2nd processing code



Instruction domain of spindle current

Tool path for roughing

Matching High-performance Linear Motor

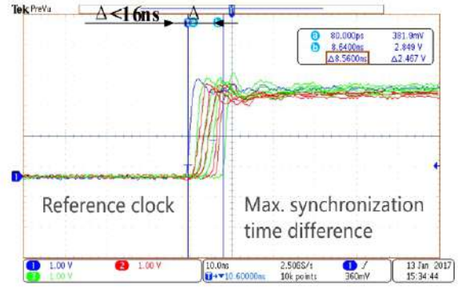
With high-performance linear motor, HNC8 bus system meets the requirements of mirror finishing and high precision mold processing

Mirror finishing

Graphite mold processing, Sum machining precision

Highly synchronous NCUC2.0 fieldbus

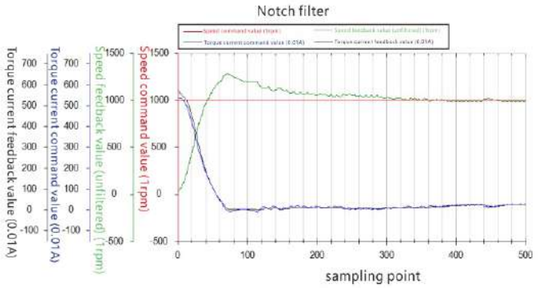
The highly synchronous NCUC2.0 fieldbus realizes real-time data exchange read and write without delay, and ensures strong real-time performance. High synchronization is guaranteed by the crystal calibration based on the intra-frame delay of frame transmission.



Synchronization time difference is 16ns at maximum.

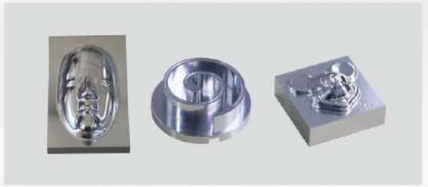
High-speed, high-precision, and high-rigidity drive control technology

Using hardware current loop, notch filter, overmodulation, field weakening, etc., the current loop response characteristics and servo control stiffness and response are significantly improved.



With hardware current loop, the current tracking is better, and the current fluctuation is smaller.

Typical cases for high-speed high-precision application



Mold high-speed high-precision processing

	A famous Japanese controller	HNC8
Configuration	With 2400rpm motorized spindle, and servo magazine.	
Processing time	15min and 22s	14min and 36s
Surface quality	Qualified	Qualified

Comparison test for high-speed mold processing with foreign high-grade system

High precision finishing to achieve a high gloss surface

Phase	HNC controller	Famous Japanese controller	Famous Japanese controller	Famous Japanese controller	Famous Japanese controller	Famous Japanese controller
Finishing	41 M32S	44M29S	48M39S	48M39S	51M10S	48M03S

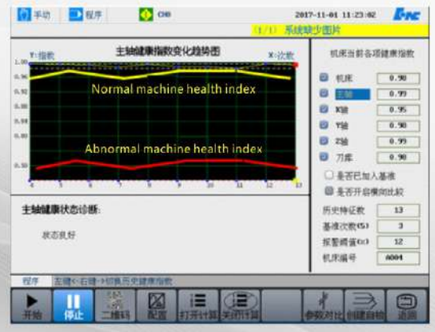
Comparison test for high-speed mold processing with foreign high-grade system

Machine health protection

"Triathlon" health self-test and health assessment

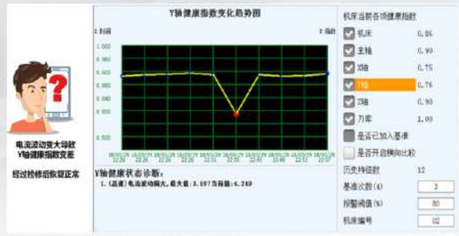
Recently, this machine often makes abnormal noises, and the processing quality does not seem as good as before.

I don't know where the problem lies?

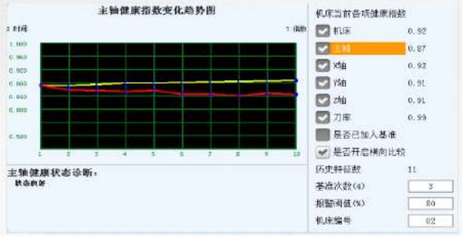


"Triathlon" health self-test and health assessment function

The electrocardiogram of the machine tool is obtained from the self-test of machine tool, the change of the machine health index is checked, and the health condition of the machine tool is evaluated. According to the evaluation, the machine tool is timely maintained for the healthy operation. At the same time, based on the horizontal comparison between health of machine tools with the same amplifier and motor, the consistency of assembly and debugging is guaranteed.

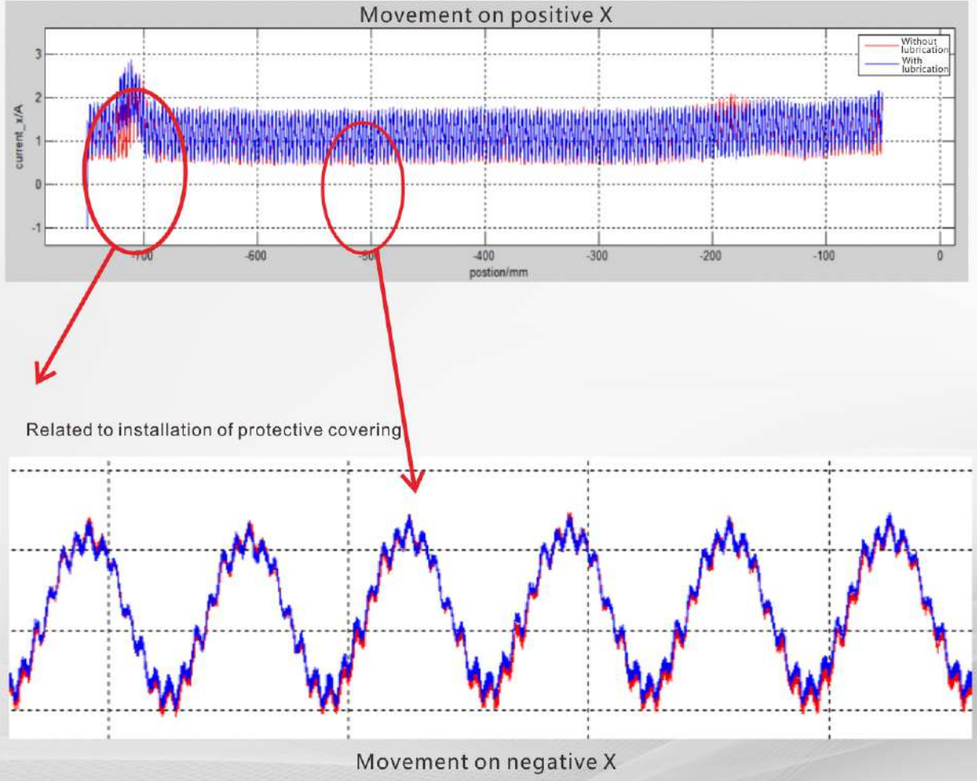


Health assessment: According to the changes in the health index of the machine tool components, the health status of the machine tool is evaluated and the machine tool is repaired in time to effectively ensure the healthy operation.

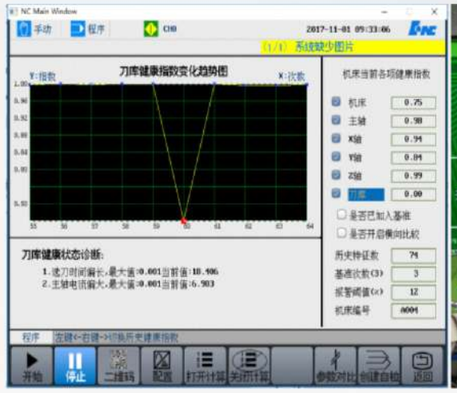


Horizontal comparison: By comparing the health of machines with the same amplifier and motor, you can analyze the difference of the machine tools to ensure the consistency of machine tool assembly and debugging.

Case 1 Current curves of X-axis position and X-axis feed motor



Case 2 Frequently dropping of magazine health index



Magazine health index drops

The maintenance personnel initially determined that it was a relay problem. After replacing the relay, the problem still exists. Change base of Y2.7 to that of Y3.0 and continue to check the cause of the problem. After the Y3.0 and Y2.7 relay bases are exchanged, the magazine can CCW rotate normally. Therefore, the original base of Y2.7 is faulty.

Case 3 Horizontal comparison of machine health indexes

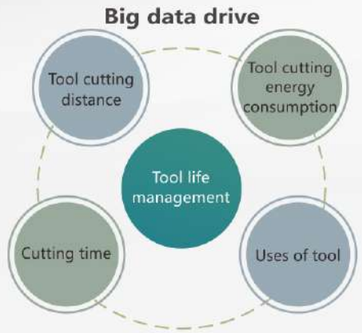
Horizontal comparison of machine health index

Machine No.	X axis	Y axis	Z axis	Spindle	Magazine	Machine
D01	0.953	0.954	0.921	0.976	0.942	0.9492
D02	0.933	0.969	0.963	0.955	0.954	0.9548
D03	0.95	0.934	0.952	0.944	0.96	0.948
D04	0.9	0.929	0.944	0.936	0.955	0.9328
D05	0.979	0.974	0.984	0.954	0.977	0.9736
D06	0.978	0.973	0.978	0.945	0.977	0.9702
D07	0.948	0.958	0.964	0.949	0.962	0.9562
D08	0.977	0.968	0.963	0.89	0.762	**0.912**
D09	0.957	0.968	0.971	0.883	0.96	0.9478
D10	0.972	0.98	0.953	0.987	0.98	0.9744
D11	0.956	0.941	0.956	0.312	0.907	**0.8144**
D12	0.93	0.952	0.953	0.951	0.98	0.9532
D13	0.962	0.9	0.937	0.974	0.971	0.9488
D14	0.96	0.965	0.965	0.94	0.968	0.9596
D15	0.985	0.976	0.976	0.954	0.892	0.9566

More Intelligent–More Intelligent Workshop Dispatch and Management

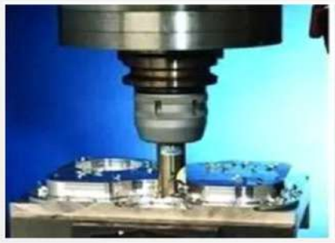
Intelligent tool life management

A variety of tool life management methods improves the rationality and accuracy of intelligent management of tool life, and effectively extends tool life.



Traditional method

Broken tool detection function



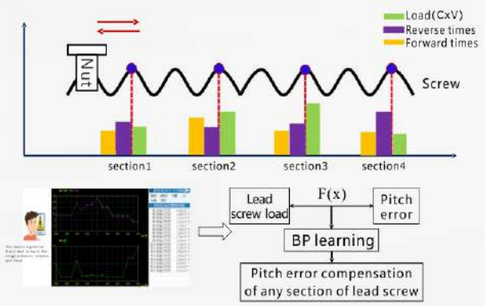
If it is not found in time that the tool is broken during processing, the subsequent processing will be affected, which annoys users for a long time.

Broken tool detection function. When tool is broken, it stops the processing and relevant alarm is issued.

Supporting the broken tool detection for tap and drill.
Tap：ϕ2/ϕ3/ϕ4
Drill：3/4/5mm

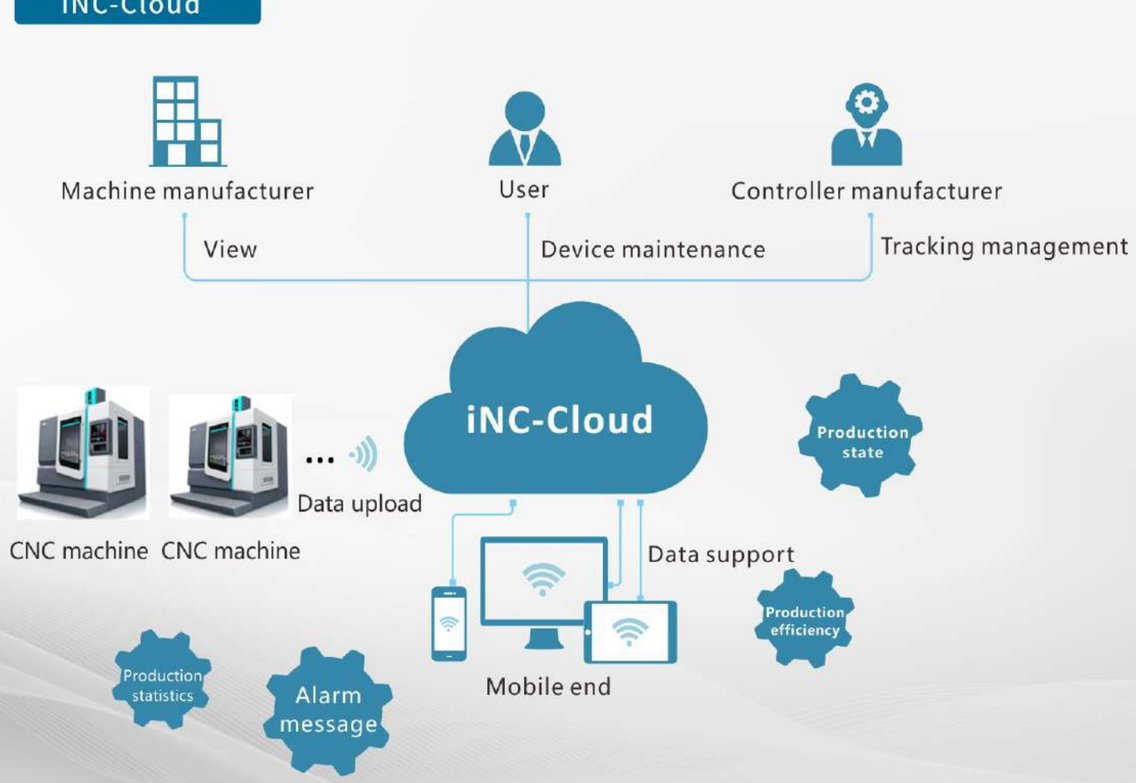
Full life cycle machine load chart

By segmenting the lead screw of each axis according to the actual position of the machine tool, the load of the section where each segment is located is counted. The state of the lead screw can be evaluated based on statistics.



Simulation display and evaluation of the screw status using the CNC system interface and corresponding algorithms.

iNC-Cloud



Remote operation and maintenance of equipment

iNC-Cloud has efficient remote equipment operation and maintenance system

Fault case knowledge base
Provide users with troubleshooting solutions

Trouble shooting
Online fault repair service, timely notify customer service engineers to follow up

Regular maintenance
Provide customized maintenance plans for equipment

Predictive maintenance
Predict potential risks of failure of equipment and components

Multi-QR-code aided management

iNC-Cloud provides multi-QR-code aided management service, supports production data to extract and transmit by scanning QR code, and assists equipment production management and remote operation and maintenance, improving user experience.

Various equipment access

iNC-Cloud supports multi-device access modes, including NB-IoT, 4G, and scanning QR codes. Users can choose the most reasonable implementation plan according to the actual situation to balance application requirements and costs.

Multi-QR-code aided management

iNC-Cloud provides multi-level rights management, which assigns different operation rights to different users in the same user group to ensure the secure management of industrial equipment and the data.

Guideline

Step 1: Download and install APP

Android

IOS

Users can search for "CNC Cloud Manager" in Apple App Store, Huawei App Store, etc. to download and install.

Step 2: Enter the mobile phone number to register and log in to the APP

Visit www.hzncc.cn to enter the web version of iNC-Cloud.

CNC system function list

●: Standard ★: Optional —: Not optional

Item	Specification	HNC-808 M	HNC-808 T	HNC-818 M	HNC-848 M	HNC-848 T
System control						
Maximum number of simultaneously controlled axes in channel		4	3	5	9	9
Maximum number of feed axes		4	3	5	32	32
Maximum number of spindles in channel		2	2	4	4	4
Number of PMC control axes		1	1	3	32	32
Number of channels	Standard	1	1	1	1	1
	Maximum	1	2	2	10	10
Spindle/channel	Standard	1	1	1	1	1
	Maximum	2	2	2	4	4
Feed axis/channel	Standard	3	2	3	5	4
	Maximum	4	3	9	9	9
Maximum number of axes in simultaneous motion		3	3	8	80	20
Maximum number of feed axes		4	3	9	64	64
Maximum number of simultaneously controlled axes/channel		3	3	4	9	3
Number of input/output points at maximum		128/128		2048/2048	4096/4096	
Axis name (single channel)	Three basic axes: X, Y, Z; additional axes: U, V, W, A, B, C	●	—	●	●	—
	Two basic axes: X, Z; additional axes: Y, U, V, W, A, B, C	—	●	—	—	●
Axis name (multi-channel)	One or two characters plus number, the first must be a character, e.g. X1	—	—	●	●	●
Gantry axis synchronization		—	—	★	●	●
Tangent synchronization control		—	—	★	★	★
Basic axis coupling control		—	—	★	★	★
Electronic gear box		—	—	★	★	★
Linear chart		—	—	★	★	★
Inclined axis control		—	—	★	★	★
Minimum input unit	mm deg inch	10^{-3}		10^{-4}	10^{-6}	
Metric/Inch	G20/G21	●	●	●	●	●
Pulse unit input	G22	●	●	●	●	●
Machine lock		●	●	●	●	●
Emergency stop		●	●	●	●	●
Overtravel		●	●	●	●	●
Spatial protection area	Providing protection for workpiece and tool	—	—	★	★	★
Software limit		●	●	●	●	●
Dynamic axis release/capture	G101/G102	—	—	★	●	●
Synchronization between channels	G104.0 ~ G104.7	—	—	★	●	●

●: Standard ★: Optional —: Not optional

Item	Specification	HNC-808 M	HNC-808 T	HNC-818 M	HNC-848 M	HNC-848 T
Operation						
Auto		●	●	●	●	●
Single block		●	●	●	●	●
JOG		●	●	●	●	●
Incremental		●	●	●	●	●
MDI		●	●	●	●	●
Multi-block MDI		—	—	●	●	●
Any line		●	●	●	●	●
Breakpoint		●	●	●	●	●
Rerun		●	●	●	●	●
Tool retraction	G106	—	—	★	●	●
Retraction in tapping		★	—	★	●	—
Dry run		●	●	●	●	●
Reference point return		●	●	●	●	●
Floating zero	Setting reference point manually	●	●	●	●	●
Handwheel feed		●	●	●	●	●
Handwheel feedrate override	×1 ×10 ×100 ×1000	●	●	●	●	●
Manual handwheel interrupt		—	—	●	●	●
Three-dimensional anti-collision		—	—	—	★	★
Interpolation Function						
Nano interpolation		●	●	●	★	★
Rapid traverse positioning	G00 (linear interpolation)	●	●	●	●	●
Unidirectional positioning	G60	●	●	●	●	●
Exact stop mode	G61	●	●	●	●	●
Cutting mode	G64	●	●	●	●	●
Exact stop	G09	●	●	●	●	●
Linear interpolation	G01	●	●	●	●	●
Circular interpolation	G02/G03 (three coordinate planes)	●	●	●	●	●
Three-dimensional circular interpolation	G02.4	—	—	★	●	—
Dwell	G04	●	●	●	●	●
Polar coordinate interpolation	G12/G13	—	—	—	—	●
Cylindrical interpolation	G07.1	—	—	—	—	●
Imaginary axis specifying	G07	●	●	●	●	●
Spiral line interpolation	Circular interpolation of two axes, and linear interpolation of the third axis	●	—	●	●	—
Threading	G32/G33	—	●	—	—	●
Multi-thread cutting	G32/G33	—	●	—	—	●
Unequal-lead thread cutting	G32/G33	—	—	—	—	★

●: Standard ★: Optional —: Not optional

Item	Specification	HNC-808 M	HNC-808 T	HNC-818 M	HNC-848 M	HNC-848 T
Circular thread cutting	G35.2/G35.3	—	—	—	—	★
Tapping	G34	●	●	●	●	●
Semi-following tapping	G34.1	—	—	★	★	★
Skip	G31	●	●	●	●	●
EGB axis skip	G31.8	—	—	—	★	★
Reference point return	G28	●	●	●	●	●
Return from reference point	G29	●	●	●	●	●
Reference point return check	G27	★	★	★	★	★
The second, third, and forth reference point return	G30	★	★	★	★	★
High-speed high-precision mode	G05.1	—	—	★	●	—
Read-ahead control	G08	—	—	★	●	—
NURBS interpolation	G06.3/NURBS	—	—	★	●	—
Feed function						
Rapid traverse feedrate	999999 mm/min at maximum	●	●	●	●	●
Rapid traverse override	0%, 25%, 50%, 100%	●	●	●	●	●
Feed per minute	G94	●	●	●	●	●
Feed per revolution	G95	●	●	●	●	●
Inverse time feed	G93	—	—	★	★	★
Inverse time feed mode 1, 2, 3	G93.1/G93.2/G93.3	—	—	—	★	★
S-curve acceleration deceleration control		●	●	●	●	●
Feedrate limit		●	●	●	●	●
JOG override	0 to 120%	●	●	●	●	●
Circular radius speed clamping		●	★	●	●	★
Automatic deceleration at corner		●	★	●	●	★
Program input						
Block skip		●	●	●	●	●
Maximum programmed size	± nine digits (± 99999.999mm)	●	●	●	●	●
Program number		O plus 7 digits		O plus 31 digits		
Block number	N plus ten digits	●	●	●	●	●
Absolute/Incremental programming	G90/G91	●	●	—	●	●
Diameter/radius programming	G36/G37	—	●	●	—	●
Plane selection	G17/G18/G19	●	●	●	●	●
Rotary axis programming		●	●	●	●	●
Rotary axis cycle function		●	●	●	●	●
Polar coordinate programming input	G15/G16	★	—	●	●	—
Local workpiece coordinate system	G52	●	●	●	●	●
Workpiece coordinate system selection	G54 to G59	●	●	●	●	●
Machine coordinate system	G53	●	●	●	●	●

●: Standard ★: Optional —: Not optional

Item	Specification	HNC-808		HNC-818	HNC-848	
		M	T	M	M	T
Workpiece coordinate system setting	G92	●	●	★	●	●
Extension workpiece coordinate system	From G54.1 to G54.60, in total of 60	—	—	—	●	●
Angular programming input		—	●	—	—	●
Chamfer/fillet input		—	●	●	—	●
Programmable data input	G10/G11	●	●	●	●	●
Subprogram call	Allowing 9 nesting levels	●	●	●	●	●
User macro program		●	●	●	●	●
Local variable of macro program	#0 to #49 (current channel)	●	●	●	●	●
Global variable of macro program	#50 to #199 (current channel)	●	●	●	●	●
Non-modal calling subprogram	G65	—	—	●	●	●
Interrupt-type user subprogram	M96/M97	—	—	★	★	★
Coordinate system rotation	G68/G69	●	●	●	●	●
Zoom	G50/G51	●	●	●	●	●
Mirror image	G24/G25	●	●	●	●	●
Dialog programming input		—	—	★	●	●
Free contour programming		—	—	★	★	★
Process cycle						
Drilling cycle	G73: High-speed deep hole drilling	●	—	●	●	—
	G74: Reverse tapping cycle	●	—	●	●	—
	G76: Fine boring cycle	●	—	●	●	—
	G81: Centre hole drilling cycle	●	—	●	●	—
	G83: Deep hole drilling cycle	●	—	●	●	—
	G84: Tapping cycle	●	—	●	●	—
	G85, G86, G89: Boring cycle	●	—	●	●	—
	G87: Back boring cycle					
	G88: Manual boring cycle	●	—	●	●	—
Drilling style	G70: circumferential hole drilling	●	—	●	●	—
	G71: Circular hole drilling	●	—	●	●	—
	G79: Angular straight hole drilling	●	—	●	●	—
	G181: Chess type hole drilling	●	—	●	●	—
Milling cycle	G181: Grooves located on a circle (type 1)	★	—	●	●	—
	G182: Grooves located on a circle (type 2)	★	—	●	●	—
	G183: Circumferential groove	★	—	●	●	—
	G184: Rectangular pocket	★	—	●	●	—
	G185: Round pocket	★	—	●	●	—
	G186: End face milling	★	—	●	●	—
	G188: Rectangular boss	★	—	●	●	—
	G189: Round boss	★	—	●	●	—

●: Standard ★: Optional —: Not optional

Item	Specification	HNC-808		HNC-818	HNC-848	
		M	T	M	M	T
Simple turning cycle	G80: Inner (outer) diameter cutting	—	●	—	—	●
	G81: End face cutting	—	●	—	—	●
	G82: Threading	—	●	—	—	●
	G74: End face deep hole drilling	—	●	—	—	●
	G75: Outer diameter grooving	—	●	—	—	●
Complex turning cycle	G71: Inner (outer) diameter rough turning multiple repetitive cycle	—	●	—	—	●
	G72: End face rough turning multiple repetitive cycle	—	●	—	—	●
	G73: Closed turning multiple repetitive cycle	—	●	—	—	●
	G76: Threading multiple repetitive cycle	—	●	—	—	●
Workpiece measurement cycle	G160: Workpiece probe Calibration	—	—	★	★	★
	G161: Workpiece contour measurement	—	—	★	★	★
	G162: End face measurement	—	—	★	★	★
	G163: Workpiece alignment in plane	—	—	★	★	★
	G163: Workpiece alignment in three-dimensional space	—	—	★	★	★
	G164: Corner measurement	—	—	★	★	★
Tool measurement cycle	G150: Tool probe calibration	—	—	★	★	★
	G151: Tool length measurement	—	—	★	★	★
	G152: Tool radius measurement	—	—	★	★	★
Manual measurement cycle	Need the support of dialog programming	—	—	★	★	★
User-defined cycle	USERDEF.CYC file modification	●	●	●	●	●
Auxiliary/spindle function						
Auxiliary function	M plus 4 digits	●	●	●	●	●
Grouping of auxiliary function		—	—	★	★	★
The second auxiliary function	B code (It is invalid when B is specified as rotary axis.	★	★	★	★	★
MST lock		●	●	●	●	●
Multiple M codes in a single line	Up to 4 M codes can be specified.	●	●	●	●	●
Spindle speed control	S plus 5 digits	●	●	●	●	●
Constant circumferential speed control	G96/G97	—	●	—	—	●
Spindle speed override	0-120%	●	●	●	●	●
Spindle speed fluctuation detection		—	—	★	●	●
Cutting chatter suppressing		—	—	—	★	★
Spindle synchronization control		—	—	★	★	★
Multi-spindle control		—	—	★	★	★

●: Standard ★: Optional —: Not optional

Item	Specification	HNC-808 M	HNC-808 T	HNC-818 M	HNC-848 M	HNC-848 T
Tool function/Tool compensation function						
Spindle orientation		●	–	●	●	●
Spindle positioning		–	–	●	●	●
C/S switching	CTOS STOC	–	–	★	●	●
Rigid tapping		●	●	●	●	●
Tool function	T plus 4 digits	●	●	●	●	●
Number of tool compensation		100		500	1000	
Tool radius compensation (C type tool compensation)	G40/G41/G42	●	●	●	●	●
Tool wear compensation		●	●	●	●	●
Tool length compensation	G49/G43/G44	●	●	●	●	●
Tool management		●	●	●	●	●
Tool magazine management		–	–	★	●	●
Automatic measurement of tool length		–	–	★	★	★
Automatic compensation of tool radius		–	–	★	★	★
Tool life management		–	–	★	●	●
Automatic tool offset input		–	–	★	★	★
Spatial length compensation		–	–	–	●	●
Feature coordinate system		–	–	–	●	●
Inclined surface machining	G68.1	–	–	–	●	●
Axial control of tool	G53.1	–	–	–	●	●
5-axis machining	RTCP	–	–	–	●	●
Precision compensation						
Backlash compensation		●	●	●	●	●
Pitch error compensation		●	●	●	●	●
Thermal error compensation		★	★	★	●	●
Deflection error compensation		–	–	★	●	●
Spatial error compensation		–	–	★	●	●
Edit						
Storage of part program		400M		400M	400M	
Foreground programming		●	●	●	●	●
Background programming		–	–	●	●	●
Program protection		★	★	●	●	●
Dialogic programming		–	–	★	●	●
Program index		●	●	●	●	●

●: Standard ★: Optional —: Not optional

Item	Specification	HNC-808 M	HNC-808 T	HNC-818 M	HNC-848 M	HNC-848 T
Setting/Display						
CNC state display		●	●	●	●	●
Clock display		●	●	●	●	●
Current position display		●	●	●	●	●
Parameter setting		●	●	●	●	●
Alarm display		●	●	●	●	●
Fault history		–	–	●	●	●
Operation history		–	–	★	★	★
Machining information display	Working time, number of machined parts, etc.	●	●	●	●	●
Feedrate display	F value display	●	●	●	●	●
Spindle speed display	S value display	●	●	●	●	●
T code display		●	●	●	●	●
Current programmed path display		●	●	●	●	●
Ladder editing software		–	–	●	●	●
Online ladder modification		–	–	●	●	●
Online monitoring ladder		–	–	●	●	●
Program preview		–	–	●	●	●
Servo adjustment interface		–	–	★	★	★
Three-dimensional solid dynamic simulation		–	–	–	★	★
Multi-language	Simplified Chinese	●	●	●	●	●
	English	★	★	★	★	★
Multi-level permission of data	Four levels: basic, machine manufacturer, CNC system manufacturer, administrator	●	●	●	●	●
Online help		●	●	●	●	●
Animated navigation		–	–	★	●	●
Monitor picture of oscilloscope	Real-time sampling output	●	●	●	●	●
External input/output monitoring display		●	●	●	●	●
Macro variable monitoring		●	●	●	●	●
Internal data monitoring	Data, such as the internal register of CNC, is displayed	●	●	●	●	●
Multi-channel combination display		–	–	●	●	●
Data import/export	Import or export of files such as parameter and PLC	●	●	●	●	●
Function upgrade registration		●	●	●	●	●
Online upgrade of system version		●	●	●	●	●
Feature coordinate system setting	20	–	–	–	●	●

●: Standard ★: Optional —: Not optional

Item	Specification	HNC-808 M	HNC-808 T	HNC-818 M	HNC-848 M	HNC-848 T
Others (hardware)						
Spindle control and encoder interface	Resolution: 12-bit Output voltage: DA 0 to 10V or -10V to +10V Differential reception of square wave	●	●	●	●	●
User I/O	Can extent 4096/4096 at most	●	●	●	●	●
Dimension of display unit		10.4" color display		8.4" / 12.1"color display	17" color display	
Resolution of display unit		640 × 480		800 × 600	1024 × 768	
Standard PC keyboard interface		●	●	●	●	●
DNC unit		★	★	★	★	★
RS232 interface		●	●	●	●	●
USB interface		●	●	●	●	●
CF card interface		●	●	●	●	●
Ethernet interface	10MB/100MB adaptive speed Supporting NT/NOVELL network Supporting file transfer via network	★	★	★	★	★
Manual pulse generator	Manual pulse generator (TTL level input) Coordinate select, override select Emergency stop button, MPG activation button	★	★	★	★	★
Input terminal board	Support NPN and PNP 20-way switch	★	★	★	★	★
Output terminal board	Support NPN 16-way switch	★	★	★	★	★