

# Hartford Introduction



She Hong Industrial Co., LTD.

Before we start,  
here are two things to think about.

**1. The needs of the new market cannot be met by traditional machines.**

**2. To survive in the global market, if there is no production line improved efficiency, dramatically reduced working hours/cost...etc. can be connected. The processing technology of the dramatic production revolution, then this such investment is meaningless.**

1. What's distinction between core value and price of machines?
2. What's distinction between technique of machine and specifications of machines?
3. What's distinction between software machine and outdated machines?
4. Hartford CNC machining center is defined as software machine (similar as Tesla Level 2)
5. Leading brand with Online Cloud Service
6. Why Hartford machines are defined as **5A core value.**

# 1. What is difference between value and price ?

What does core value of machines refer to ?

This is a machine that hardly needs maintenance. The processing efficiency and accuracy are close to the Japanese level. With the use of intelligent software and networking, Hartford has exhausted made every effort to increase value added for customers (Just the value is not easy converted to price)

What does price of machines refer to ?

## 2. What difference between technology and specifications

### What does technique of machines refer to ?

Mechanical specifications are just the skeleton, and technology is life. Only technology can maximize the effectiveness of the machine. What we are talking about with customers is technology,

we have smart software APP, we have powerful technical functions, smart chip conveyor, smart lubrication feeding, air suspension... etc.

### What does specifications of machines refer to ?



### 3. What is the difference between intelligent machines and traditional machines ?

#### Software machine

Although machines were used for decades, software machines sustain added value by cloud updated with the aid of synch-up functions of Apps.

#### Traditional machines

After the traditional machines are installed, they begin to depreciate according to the year. A machine that can't connect and works on the Internet will be eliminated shortly, just like a traditional functional mobile phone.

# 4. Hartford CNC machining center is Defined as software machine (Similar to Tesla Level 2)



## Software Machine

Software machines help operators continuously raising machining efficiency, energy saving and reducing frequency of on-site monitoring. Hartford software machines, therefore, may learn independently within operations thanks to inclusive function of Hartrol Premium, empowering mechanism of autopilot.

Since hardware is meant to be carrier of machines whereas software AI and IoT are served to utilize AI function. For instance, accuracy performance under fluctuating ambient temperature is seldom affected thanks to benefit of AI whole machine thermo compensation. Accordingly, numerous Apps such as AFC (Auto Feedrate Control), and AI Broken Tools Inspection may add value on tools solution.

Besides, UserConnect, Hartnet, Utilization Management and related functions of auto measurement are designed to raise machining efficiency.

So, is yours associated with Hardware Machine or Software machine ?



# 5. Leading Online Cloud Service

## Online Cloud Service

1. Online FAQ Solution
2. Online Technical Manual Guide
3. Online UserConnect
4. Online Machining Monitoring
5. Online Synch-Up
6. Online Maintenance Management
7. Online Quotation System on Spare Parts
8. Online Real-Time Service Contact

VS

## Traditional Solution





# 6. Why Hartford machines are defined as **5A core value**

**A**utomation

**A**PP

**A**-Grade(MGPS)

**A**ir Suspension

**A**uto Pilot



# Introduction Start



# Hartford Introduction



# CONTENTS

- 01** Hartford Scale and Highlight
- 02** Why Hartford is Unique
- 03** Leading Technique and Innovation
- 04** World-Class Clients



Hartford Plant 1



Hartford Plant 3

# 01 Hartford Spotlight

Established in 1965 / 500 Employee / ISO9001

Plant Area : 20,000 ping ( 6,050 m<sup>2</sup> )

Hartford is crowned with Taiwan's title of exporting volume in CNC machining center and machine tools within 20 consecutive years

Hartford Spirit: Integrity, Kindness, Brilliant, Thoughtful

Self-made Key Components/ 95% Self-made Capability

Professional Manager-Base Management



Ministry of Economic Affairs  
Bureau of Foreign Trade

# Leading Brand as World-Class Frontier

**Rank No. 1**  
Exporting Value  
in Taiwan

**Rank No. 1**  
Global marketing  
covers **65 nations**

Over **300 offices**  
service across  
the countries

More than **52,500**  
machines installed  
globally

**MGPS**  
**μ-grade**  
accuracy  
standard is  
compared to  
Japanese  
brand

1. One of six world  
self-made  
controller  
2. **In Taiwan, the**  
**ONLY one**

Hartford  
machines  
**Autopilot**

Hartford is  
literally  
**iFactory**  
per se



# 02. Why Hartford is unique over competitors

# Hartford has been engaging in CNC machining center industry



**1. Innovative & Developing Technique**



**2. Manufacturing Expertise**



**3. Cloud Service**



# 1. Innovation and Technique

1.1 Hartford self-made controller

**Hartrol Premium**

1.2 Cutting efficiency is enhanced with the aid of accumulated AI tech

**AI Tech**

1.3 Multiple models on C frame, Bridge mill, 5-axis, PBM and Moving cross rail series

**Leading Machines**

1.4 Automatic Universal Head, Automatic Extension Head, built-in Spindle 20K/24K rpm

**Self-made vital components**

## 1.1 Hartrol Premium

### All new interface, new version

2021 All New interface just like your automobile dashboard, provides you intelligent monitor that gives you direct information, in addition to enhance machining efficiency and it's simple as using a smart phone.

The longer you use Hartford machine, vs Devaluation of machines used from other brands, they are increasing day by day.



# Technique

HartrolPremium

Information Display

Finished Workpieces

TIM: ---  
Wc: 0

HD.T 25  
NX.T 0  
H

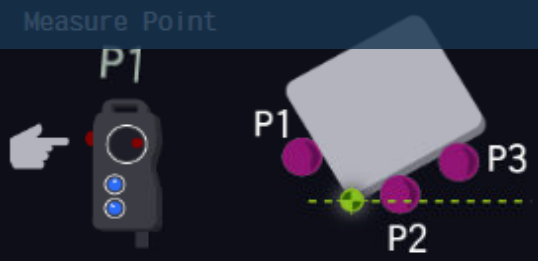
Program Coord.  
X: -0.0100  
Y: 0.0000  
Z: 50.0000

G54.1P11  
X: 0.0000  
Y: 0.0000  
Z: -50.0000

MEM | RDY

## Calibration XY-axis Measure

- Tool Diameter 4.000
- Measure Style Corner + X-Angle
- Corner Position Bottom Left Corner
- Coordinate Position G54.1P 11
- Angle Position #520
- Spindle Rotation S9999



Measure

Previous Point

Smart Operation

2021/04/16 | 11:16:52

App Selection

Monitor

Tool Offset

Calibration

File Trans

Daily Maint.

Macro Var. #500

Tool Life

Expert Mode

Hartford is one 6 companies in the world which implements own self-made CNC controller.

First and only in Taiwan



Technique

# Only 6 in the world & Taiwan only

One of the world  
fastest smart  
controller

No.1

Efficient



Ultra-fast hard Drive  
max. storage 32GB.  
Rapid programming  
access

32 GB



Convenient  
Operation with 19"  
multi-point touch  
screen

19 Inch

2700 look ahead  
blocks maximizes  
machining efficiency

2700

Block

Multiple functions  
enhances up to 20%  
machining efficiency

20 %

More than 60  
value-added APPs

60



# Mobile phone remote operation



Remote to warm up your machine before working to minimize machine standby. Allow you to monitor and operate using remote control , time saving.

# 1.2 AI Technology Functions

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Various AI technology functions, enhance your machining efficiency.

Auto Pilot

2.5D HartCAM

Remote control

HCP Hartrol Conversational Program

Whole Machine Thermal Compensation

Load Setting Navi

Work piece measurement output (Reporter)

# Auto Pilot (Similar to TESLA LEVEL 2)

Before Machining	<ul style="list-style-type: none"><li>Remote warm up / start up ( Time save up to 30 mins)</li><li>Load Setting <u>Navi</u> ( Optimize between speed and accuracy)</li><li>HCP, Automatically generate G code ( Time save up to 80%)</li><li>Tool Calibration ( Time save up to 80%)</li></ul>
During Machining	<ul style="list-style-type: none"><li>AFC Auto <u>Feedrate</u> Control ( Time save up to 23% in heavy cutting.</li><li>AI Lubrication System ( Oil save up to 50%)</li><li>CCD Security mode ( Monitor the machine anytime and anywhere)</li></ul>
After Machining	<ul style="list-style-type: none"><li>Machining countdown ( Material preparing notification)</li><li>Zero Down Time (Maintenance reminder)</li><li>Reporter (Data output by computer)</li><li>Eco function( Power saving, environmental protection)</li></ul>

Goal: We offer machining package for customer.  
Advantage: Enhance customer machining efficiency.



## 2.5D HartCAM



Goal: Operator can efficiently generate machining program and intelligent file transfer.  
Advantage: Convenience, enhance machining efficiency.

# HCP Hartrol Conversation Program

The image displays two screenshots of the Hartrol Premium Canned Cycle software interface, illustrating the conversational programming process.

**Left Screenshot: Cycle Module List**

- Program Edit: HD:\ 1 G40 G49 G80
- Module Example:
  - 範例：一圓形外輪廓銑削
  - Ø20.0mm 端銑刀 D02=10.0
  - 主軸轉速 1500rpm
  - 切削進給率 300 mm/min
  - 圓形外輪廓半徑 50.0 mm
  - Z 軸開始位置 工件上方 50.0 mm
  - 快速接近 R 點 R2.0
  - 最終加工位置 Z-10.0
  - 切削方向 順銑
- GCode Demo:

```
G40 G49 G80
G90 G90 G54 X0 Y0
G43 H01 Z50. M3 S1500
G65 P9980 X100.0 Y100.0 Z-10.0 R2.0 I50.0 D02 F300 C20.0 M02
G80 G91 G28 Z0
M30
```
- Buttons: Insert, Close

**Right Screenshot: Rough machining**

- Parameters:
  - Cutting Direction: 0 (0: CW, 1: CCW)
  - Center position X: [ ]
  - Center position Y: [ ]
  - Arc Radius U: [ ]
  - Tool Radius D: 1 (Tool radius must be greater than 0 (mm))
  - Cutting feedrate F: 0 (The input value must be greater than 0.)
  - Z axis down speed F/2: 0 (The input value must be greater than 0.)
  - Z axis Machining Start Point R: 0
  - End position Z: 0
  - Depth of cut each time Q: 0 (ach depth of cut must be greater than 0 and m)
  - Engage Angle A: 60
  - Feed Angle B: 0
  - Z-axis tool safety height T: 0 (Z axis safety height)
  - Macro device location specification: 1 (Please specify the device location)
- Buttons: Enter, Reset

Goal : Refers to graphics are used during conversational program when configuration or shapes of workpiece for machining.

Advantage: Enhance machining efficiency , minimize the time for writing program.

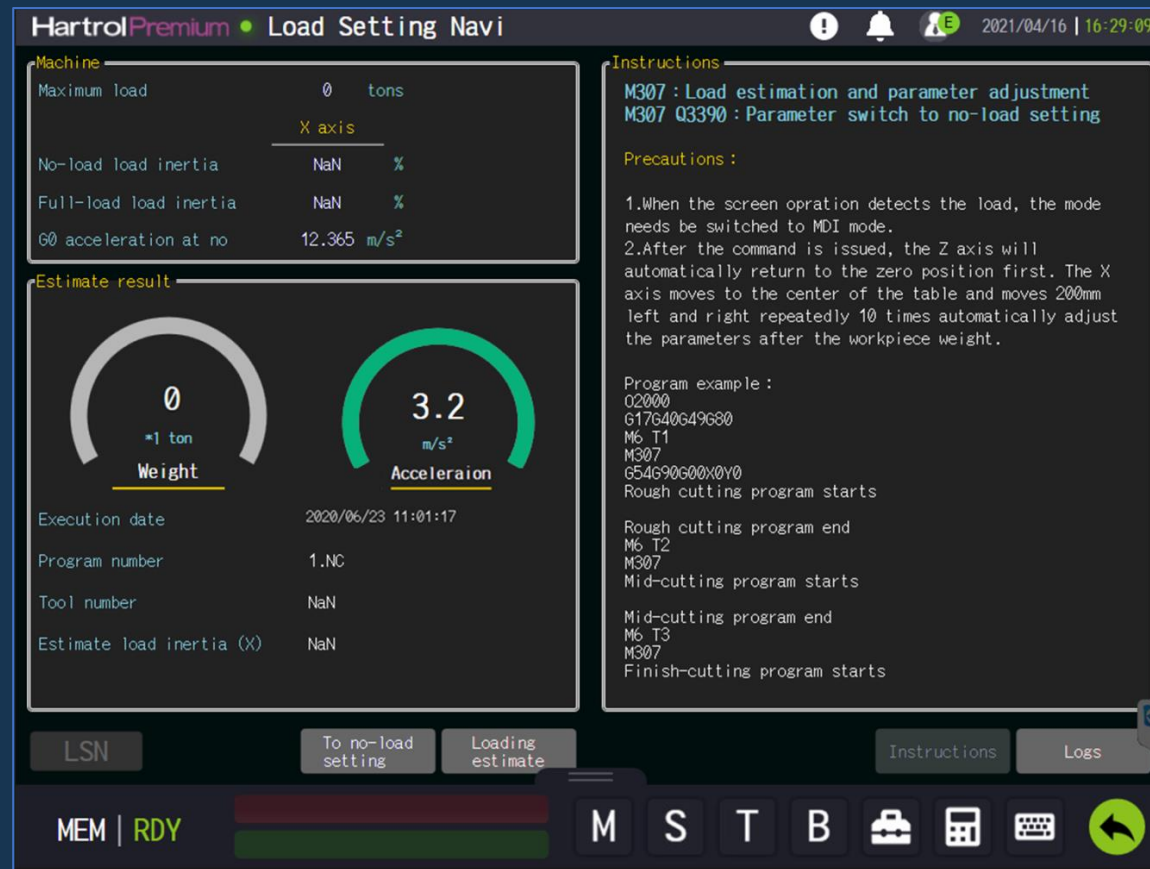
# Whole machine Thermal Compensation



Goal : Accuracy can be satisfied even not in constant temperature room.

Advantage: Accuracy increase up to 66%

# Load Setting Navi



**HartrolPremium • Load Setting Navi** 2021/04/16 | 16:29:09

**Machine**

Maximum load	0 tons
<u>X axis</u>	
No-load load inertia	NaN %
Full-load load inertia	NaN %
G0 acceleration at no	12.365 m/s <sup>2</sup>

**Estimate result**

**Weight**: 0 \*1 ton

**Acceleration**: 3.2 m/s<sup>2</sup>

Execution date: 2020/06/23 11:01:17  
Program number: 1.NC  
Tool number: NaN  
Estimate load inertia (X): NaN

**Instructions**

M307 : Load estimation and parameter adjustment  
M307 Q3390 : Parameter switch to no-load setting

**Precautions :**

1. When the screen operation detects the load, the mode needs to be switched to MDI mode.
2. After the command is issued, the Z axis will automatically return to the zero position first. The X axis moves to the center of the table and moves 200mm left and right repeatedly 10 times automatically adjust the parameters after the workpiece weight.

**Program example :**

```
02000
G17G40G49G80
M6 T1
M307
G54G90G00X0Y0
Rough cutting program starts

Rough cutting program end
M6 T2
M307
Mid-cutting program starts

Mid-cutting program end
M6 T3
M307
Finish-cutting program starts
```

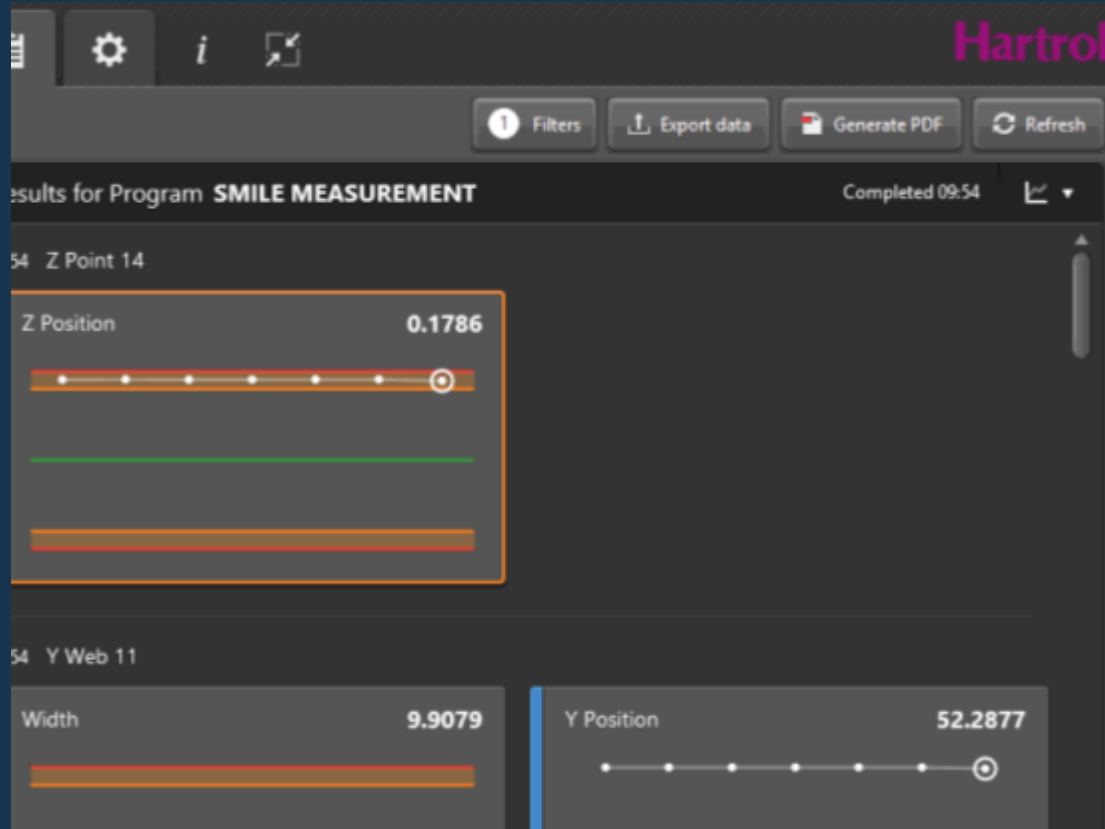
LSN To no-load setting Loading estimate Instructions Logs

MEM | RDY M S T B [printer] [calculator] [keyboard] [green arrow]

Goal: Acceleration ability varies based on different workpiece weight.

Advantage: Eliminate vibration, improve quadrant accuracy, reduce circle quadrant error.

# Work piece measurement data output (Reporter)



	Company: Hartford	Machine ID number: A10-Hartrol Pplus1
	Operator Name: Brian	Program Name: SMILE MEASUREMENT
	Timestamp: 23/03/2021 09:54:30	Units: Millimetres

Feature Name	Measurement Characteristic	Nominal	Actual	Deviation	Lower tol	Upper tol	Measurement Status
Boss 1	X Position	0	0.006	0.006			Not toleranced
	Y Position	0	-0.0062	-0.0062			Not toleranced
	Diameter	20	19.8549	-0.1451	-0.2	0.2	Pass
Bore 2	X Position	25	24.8679	-0.1121			Not toleranced
	Y Position	21	20.9235	-0.0765			Not toleranced
	Diameter	23	22.9922	-0.0078	-0.2	0.2	Pass
Boss 5	X Position	25	24.8769	-0.1231			Not toleranced
	Y Position	21	20.9112	-0.0888			Not toleranced
	Diameter	30	30.4187	0.4187	+0.5	0.5	Warning
Bore 6	X Position	-25	-24.818	0.182			Not toleranced
	Y Position	21	20.948	-0.052			Not toleranced
	Diameter	23	22.9955	-0.0045	-0.2	0.2	Pass

Goal: Measurement data can be output directly, to save the time from handwriting.  
 Advantage: Enhance efficiency, prevent the mistake from handwriting.

## 1.3 Leading models of Industry

**MGPS**

**6 Major  
Machines**

**5-Axis  
Machines**



✓ PLUS Series

✓ S Series

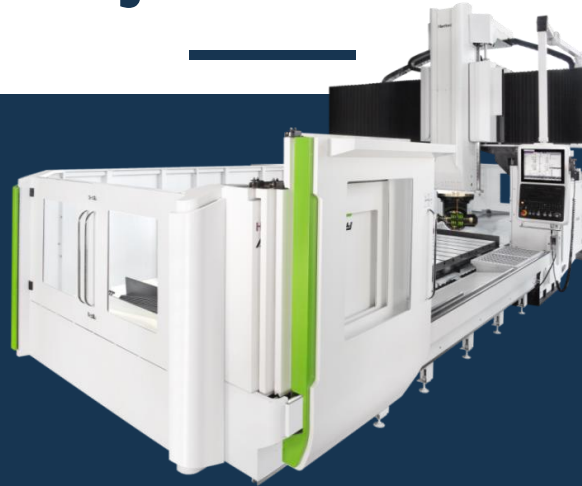
✓ MVP-8/10/11

C1 Standard Ballscrews  
Advantage: Equal to Japanese brand standard

# 6 Major models



a. AERO Gantry Type



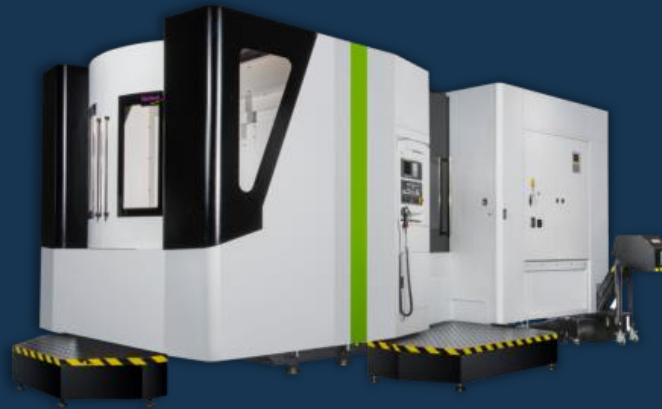
b. EA/EAY 5-Sided Series



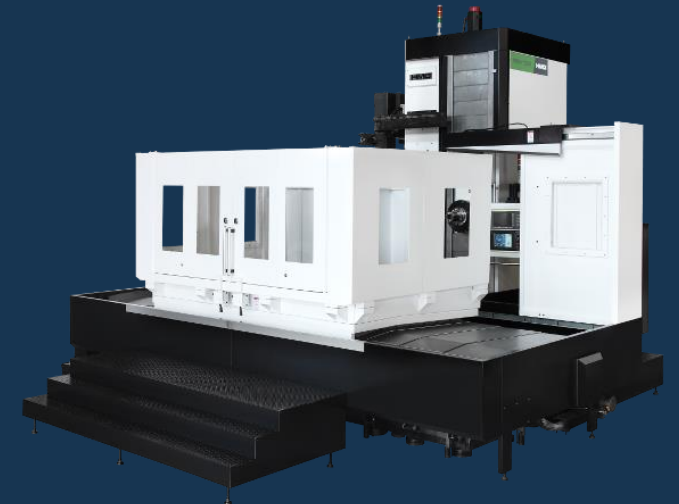
c. TGV Small Double Column



d. MCW Moving crossrail /column Series



e. HMC Horizontal Series



f. PBM Boring mill Series



# 5-Axis Machine



5A-65E

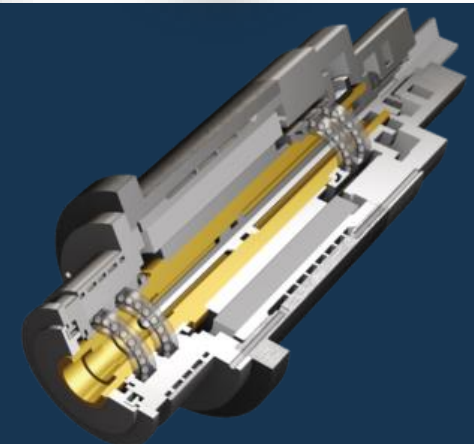
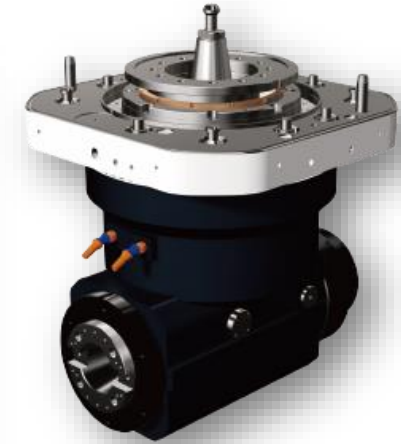
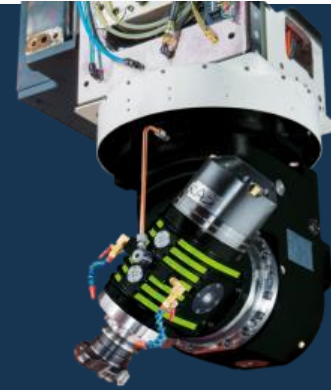
5A-95Q

5BC Series

## 1.4 Self Made Key Components

Key Components are all made by Hartford, including automatic universal head, angular heads, extension head and spindle.

We satisfy customer requirements: From every piece to machine completion, we have fully inspect every steps before shipment to make sure our customer receive the machine under perfection.



# Hartford has been 56 years engaging In CNC machining center industry

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**1. Innovation and  
Technique**



**2. Manufacturing  
Expertise**



**3. Cloud Service**

# 2. Production Technique

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2.1 Taiwan only, 95% in-house production process

**95% In House production**

2.2 World leading brand, One of the start to finish built factory

**Full Production Line**

2.3 Exclusive 5 years guideway warranty

**Guideways 5 years warranty**

2.4 Hartford's quality  
Never compromise

**Spindle run-out: 5um/300mm**

Production

# 2.1-2.2 95% Self- In house production

Only one  
"In house  
production  
process"  
in Taiwan



Casting machine



Heat treatment



Grinding



Boring



Coordinate measuring machine



Casting assembly



Sheet metal painting in oven



Production line assembly



Laser test



Cutting test



Machine assembly



Shipment

Production

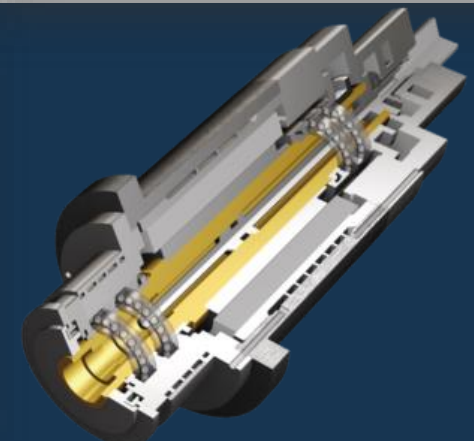
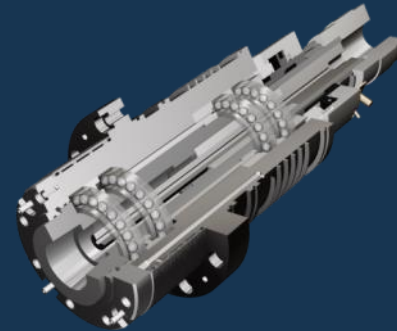
## 2.3 5 years box guide way warranty

Bases on strict scrapping  
standard to make sure  
best stability and durability.



## 2.4 Spindle run-out: 5um/300mm

Full testing for spindle,  
standard guaranteed :  
run-out 5um/300mm



# Hartford has been 56 years engaging in CNC machining center industry



**1. Innovation and Technique**



**2. Manufacturing Expertise**



**3. Cloud Service**



# 3. Global Leading Cloud Service

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3.1 Analyze & solve problem via remote function



3.2 Problem consulting via online customer service report system

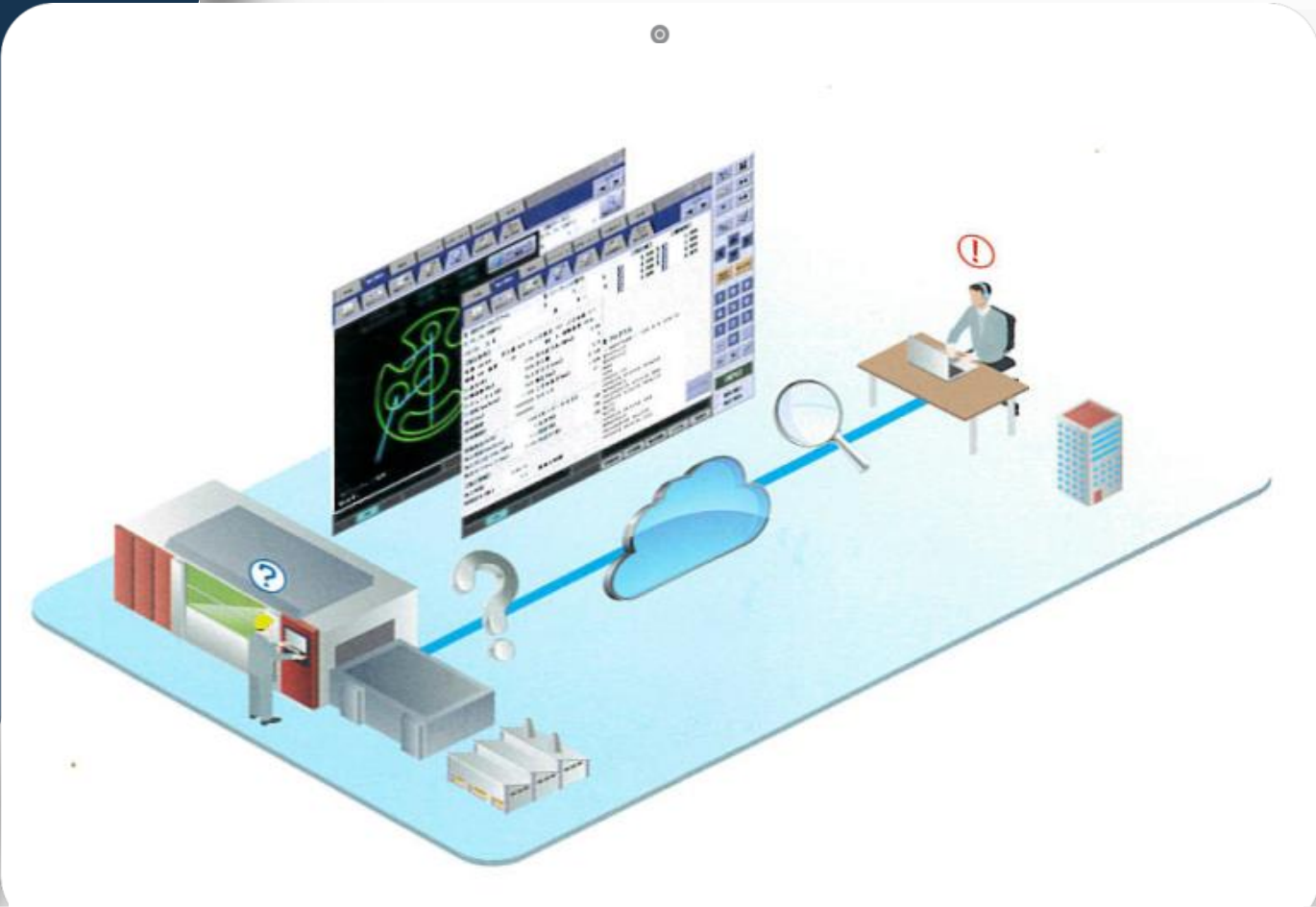


3.3 User can find answer in online FAQ to save time & solving problem quickly



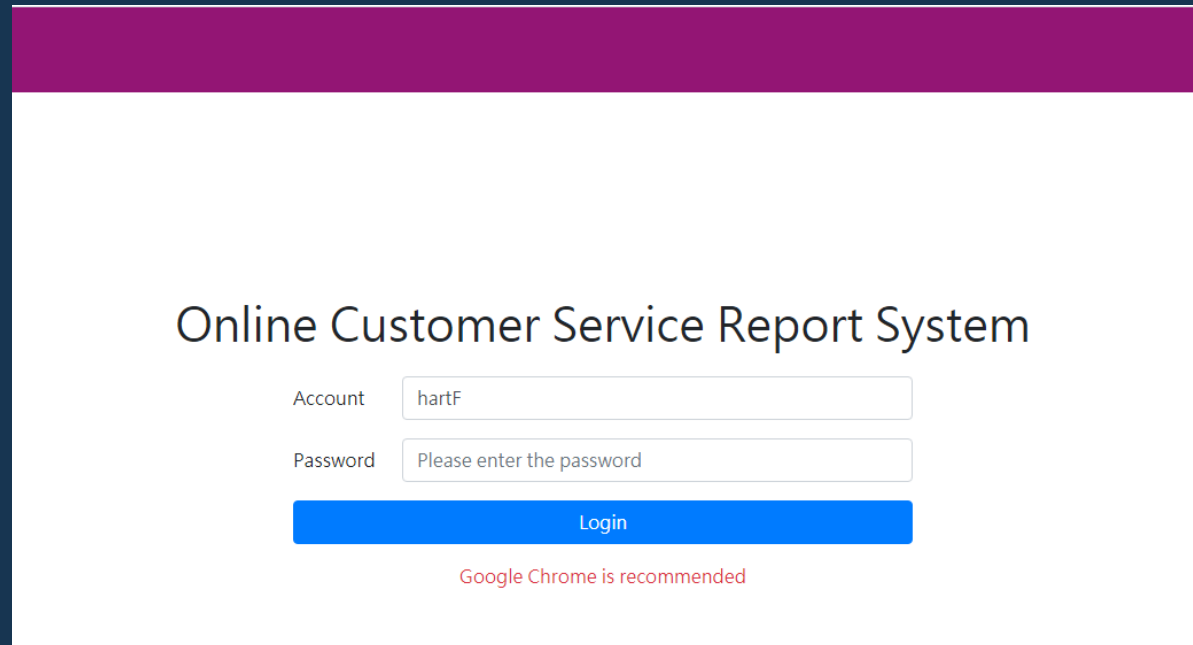
# 3.1 Userconnect

Connecting to user side directly via APP To find root of problem (example: controller system 、 software 、 parameter)



## 3.2 Online customer service report system

Service staff will check system & reply each case daily ,  
and they will offer solution to customer



The screenshot shows a login interface for the 'Online Customer Service Report System'. It features a purple header bar at the top. Below the header, the title 'Online Customer Service Report System' is centered. There are two input fields: 'Account' with the value 'hartF' and 'Password' with the placeholder text 'Please enter the password'. A blue 'Login' button is positioned below the password field. At the bottom of the form, a red text message reads 'Google Chrome is recommended'.

## 3.3 Online FAQ

User can find answer (data & video) in online FAQ to save time & solving problem quickly

Call Center [FAQ](#) [Report History](#) Hello ! hartF ! en 中 Logout

### 1. What problem?

TOP10 Common problems	Hartrol Plus Controller	Mitsubishi Controller
Fanuc Controller	Heidehain Controller	Mechanical problem

# **3 Leading Application technology**

# Aero space



Missile blade  
Material: Titanium  
Features: Long thin blade process  
Model:5BC ~ 5A series



Wing of aircraft  
Material: Aluminum  
Features: Thin blade processing  
Model:5BC series



Turbine blade  
Material: Titanium  
Features: 5-axis simultaneous processing use of blade process method  
Model:5A & 5BC series



# Automotive



Engine



Break disc

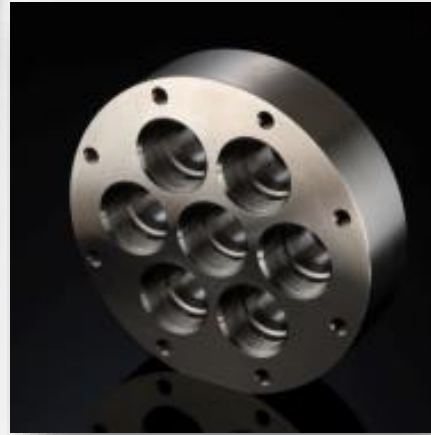


Crankshaft connecting rod system



Wheels

# Mechanical



Mechanical part  
Material: Stainless steel  
Feature: Machining from rough workpiece



Wrench  
Material: P20  
Feature: Mold surface Ra 0.6

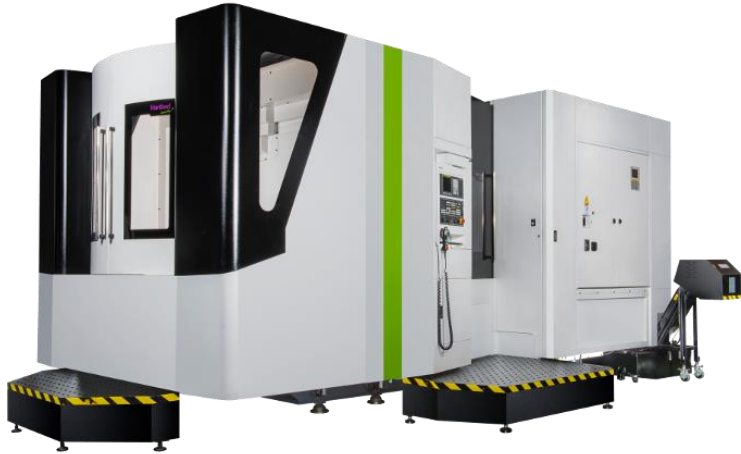


Equipment part  
Material: Aluminum  
Feature: Increasing cutting volume by cycloid machining (with fixture)



# Energy

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Turbine Blades  
Material: Aluminum  
Feature: 3+2 axis machining



Hub of wind driven generator  
Material: Composite material  
Feature: Boring machining



# 04 World-class clients

# Aerospace

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# Automotive

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# Semi-conductor

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SIEMENS

TOSHIBA

FOXCONN



# Engineering

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# Energy

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and more.....<sup>52</sup>

# Conclusion: How to define a good machine

Only intelligent machine can 100% achieve phase 6

Maximum traditional machine can achieve are phase 2

**ZDT**  
Quality stability  
& zero defect

**Average 0.04 times service per year**  
· Self-made core component  
· Full inspection

**Super Fine Machining accuracy & efficiency**

**Top machining accuracy & efficiency**  
· Accuracy level is close to Japan machine

**Cloud Service**  
Service speed

**User service via internet**  
· Online FAQ  
· Online service  
· Online software update

**Hartrol Premium**  
intelligentization

**One of six self-made NC in the world**  
· Only one in Taiwan  
· Easy operation as same sa smart phone  
· More than 60 Apps

**i-Factory**  
IoT

**Intelligent factory**  
· Management via internet  
· Software can be updated at anytime  
· Remote operation & monitor

**Industry 4.0**  
AI

**Intelligent + automation + internet**  
· Software machine are same as Tesla autopilot  
· AI compensation  
AI lubration...etc

Phase 1

Phase 2

Phase 3

Phase 4

Phase 5

Phase 6



THANK YOU !