



Since 1954



The Finest Solution
Internal Solution

FEATURES OF GRINDMASTER 45/80 CNC

三軸複合式內外圓 CNC 磨床機台特色



I/I Type



I/O Type



I/I/O Type

The GRINDMASTER SERIES are 3-axis complex CNC ID/OD grinders. The GRINDMASTER I/I and I/O models use a FANUC CNC to control the workhead (X-axis), ID or OD wheelhead (Y-axis) and ID wheelhead (Z-axis). The GRINDMASTER I/I/O model uses a FANUC CNC to control the workhead (X-axis), ID or OD wheelhead (Y-axis), swivel axis (B-axis) and ID wheelhead (Z-axis).

With just a single chucking action the GRINDMASTER SERIES can perform complex and precision grinding operation such as internal diameter, outside diameter, shoulder grinding taper grinding and end-face grinding. The ID/OD wheelhead (Y-axis) has a programmable automatic swivel function allowing for a smooth transition from one grinding function to another during a single program. It is the perfect solution for grinding complex parts in single piece and small batch production runs. With the incorporation of an automatic loading / unloading system the GRINDMASTER SERIES becomes idea for large batch production, saving valuable time and cutting total cycle times by as much as 60%.

Top-class roller type linear guideways on the X,Y and Z axis ensures superior positioning accuracy of all 3 axes. High-precision concentricity, roundness accuracies and finishes can be achieved easily with the use of the GRINDMASTER SERIES making it the ideal grinder for the automotive, machine tool, aerospace, hydraulic, pneumatic, and electric motor industries.

主新德 GRINDMASTER 系列是三軸獨立控制 CNC 磨床。I/I 以及 I/O Types 使用 CNC 控制器來控制主輪台 (X 軸)、內徑研磨或外徑研磨砂輪頭 (Y 軸) 及內徑研磨砂輪頭 (Z 軸)；I/I/O Types 則是使用 CNC 控制器來控制主輪台 (X 軸)、內徑研磨及外徑研磨砂輪頭 (Y 軸)、旋轉軸 (B 軸) 及內徑研磨砂輪頭 (Z 軸)。

GRINDMASTER 系列磨床能夠在單次夾持設定條件下，完成外徑研磨、外徑錐度研磨、端面 / 肩部研磨以及內徑研磨等複合加工作業；如此可以達成縮短製程生產時間、降低生產成本、確保研磨精度等生產要求。對於具有複雜研磨加工製程之工件而言，GRINDMASTER 系列磨床是最佳的解決方案。

GRINDMASTER 系列機台採用高精密級滾柱線性滑軌，並配置高剛性、低振動、高切削能力之外徑砂輪動壓主軸確保研磨精度表現。適用於汽機車零件、工具機零件、油壓 / 氣壓 / 電子馬達零件等製造業之外徑 / 內徑複合研磨加工作業。手工高精密鏤花以及線性滑軌來確保機台品質與使用壽命。

ID and OD wheel head (Y-axis) of I/I/O TYPE is equipped with auto-rotation B-axis, which can turn from counterclockwise 30 degree to clockwise 210 degree, driven and controlled by servo motor.

The reinforced ribbed box-type machine base is made of high strength Meehanite cast-iron to ensure the high rigidity and stability of the machine. A full enclosure with a large sliding door provides ample space for calibration, set-up, part loading / unloading, and grinding operations. The GRINDMASTER SERIES are made to stringent CE certification standards. The CAD/CAM modularized design of the GRINDMASTER SERIES ensures the high accuracy performance of the machine. A closed loop linear scale feedback system on the X-axis ensures the high precision required for grinding operations. Furthermore automatic sizing devices and a touch probe can be added to improve accuracy even more.

I/I/O TYPE Y 軸內 / 外徑砂輪頭配置全自動旋轉軸 (B 軸)，可旋轉角度範圍從逆時針 30° 到順時針 210°，用伺服馬達驅動與控制。

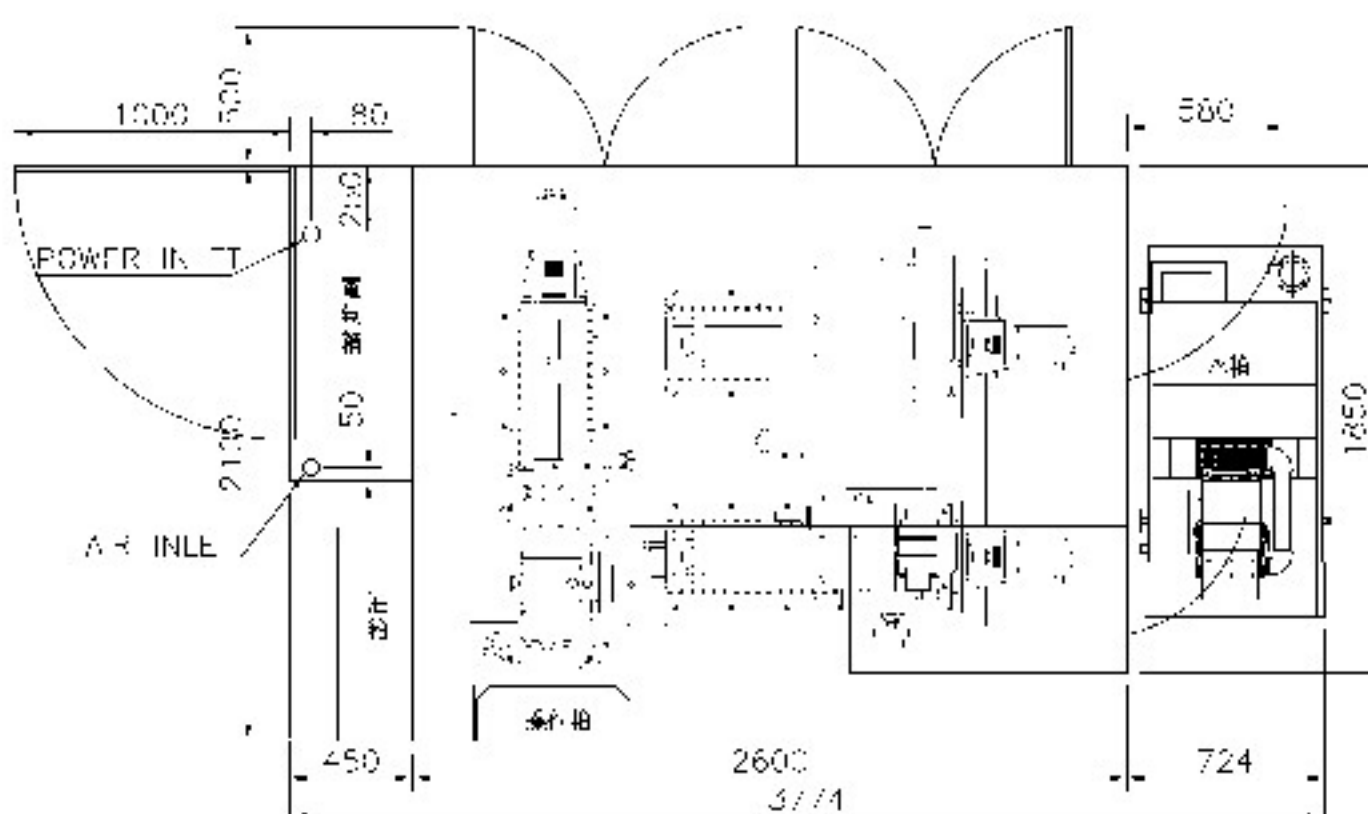
強化肋箱型設計本台以米漢納鑄鐵鑄造確保機台高剛性與穩定性。通過 CE 認證的全密式鋁金與大型工作滑門提供足夠的操作空間以及確保操作安全性。GRINDMASTER 系列磨床採用模組化設計，可縮短機台生產時間、確保組裝品質與精度要求。X 軸密迴路系統 (光學尺回饋) 確保研磨作業之定位精度與研磨精度。三軸獨立控制與全自動旋轉軸等設計讓 GRINDMASTER 系列磨床具備高度之製程彈性與生產彈性，無論大批量或是小批量生產都能夠保持企業生產與成本的競爭力。





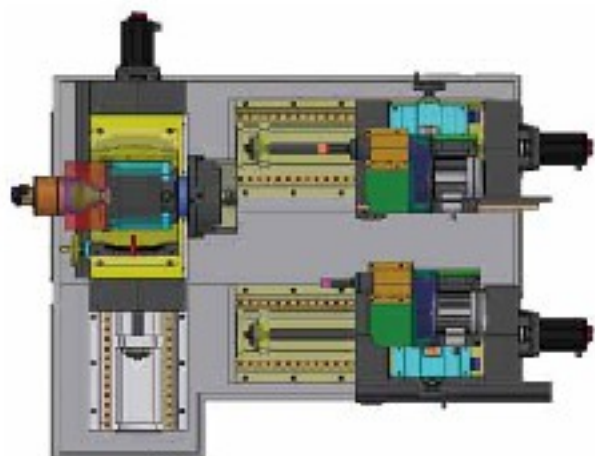
Note: Machine shown with optional accessories and color.

Dimensional Drawing

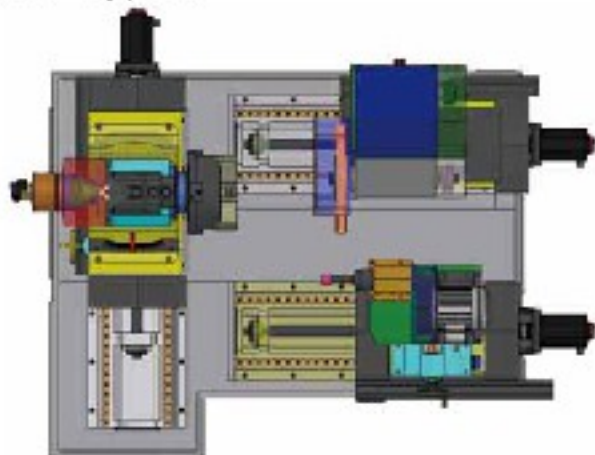


Advantages 機台優勢：

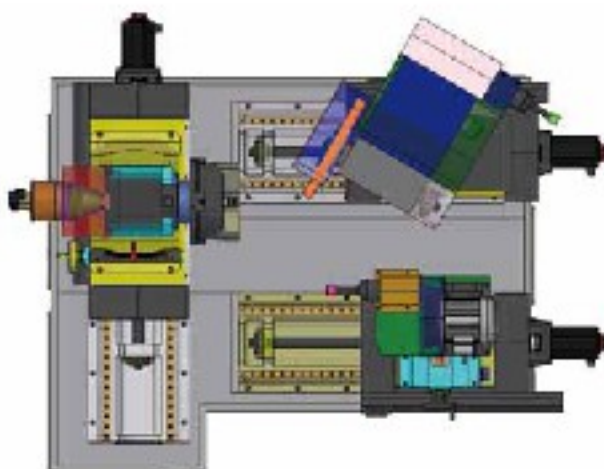
I/I-Type :



I/O-Type :



I/I/O-Type :



Y/Z-axis Dual Independent Wheel Head Design

- ◆ I/I-type : Z-axis equipped ID wheel head;
Y-axis equipped ID wheel head
- ◆ I/O-type : Z-axis equipped ID wheel head;
Y-axis equipped OD wheel head
- ◆ I/I/O-type : Z-axis equipped ID wheel head;
Y-axis equipped ID/OD wheel head
- B-axis automatic swivel by servo motor
- B-axis servo motor output 1.2 kw
- OD spindle motor output 3.7 kw
- ◆ ID Spindle Motor Output 2.2 kw (2P)
- ◆ Grinding wheel (ID) Ø38x38x Ø8.2 mm
- ◆ OD Spindle Motor Output 3.7 kw (4P)
- ◆ Grinding wheel (OD) Ø405x50x Ø127 mm
- ◆ Y/Z-axis Fanuc Servo Motor Output 1.8 kw

Y/Z 軸雙獨立控制砂輪頭設計

- ◆ I/I-type: Z 軸 / Y 軸均配置內研磨砂輪頭
- ◆ I/O-type: Z 軸配置內研磨砂輪頭
Y 軸配置外徑砂輪頭
- ◆ I/I/O-type: Z 軸配置內研磨砂輪頭
Y 軸配置內 / 外徑旋準砂輪頭 (B 軸)
- B 軸伺服馬達控制全自動旋轉
- B 軸伺服馬達輸出功率 1.2 kw
- 外研磨主軸馬達輸出功率 3.7 kw
- ◆ 內研磨主軸馬達輸出功率 2.2 kw (2P)
- ◆ 內研磨標準砂輪尺寸 Ø38x38x Ø8.2 mm
- ◆ 外研磨主軸馬達輸出功率 3.7 kw (4P)
- ◆ 外研磨標準砂輪尺寸 Ø405x50x Ø127 mm
- ◆ Y 軸 / Z 軸伺服馬達輸出功率 1.8 kw





X-axis Work Head

- ◆ Standard Hydraulic Power Chuck
(Please refer P.7 for details.)
- ◆ Manual Swivel
- ◆ Swing Over Diameter :
- Grindmaster 45: Ø450 mm
- Grindmaster 80: Ø800 mm
- ◆ Spindle Motor Output 3 kw (4P)
- ◆ X-axis Fanuc Servo Motor Output 1.8 kw

X 軸主輪台

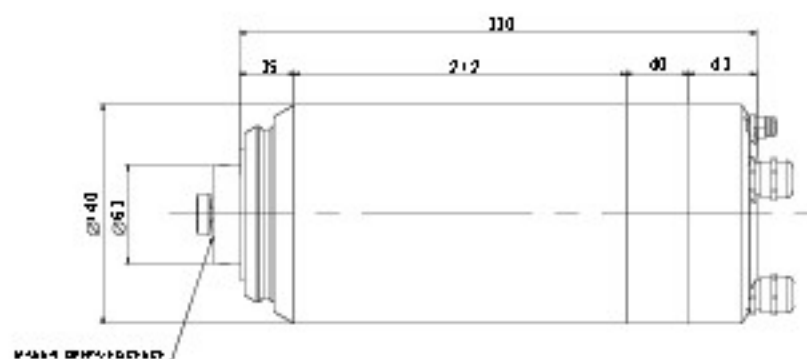
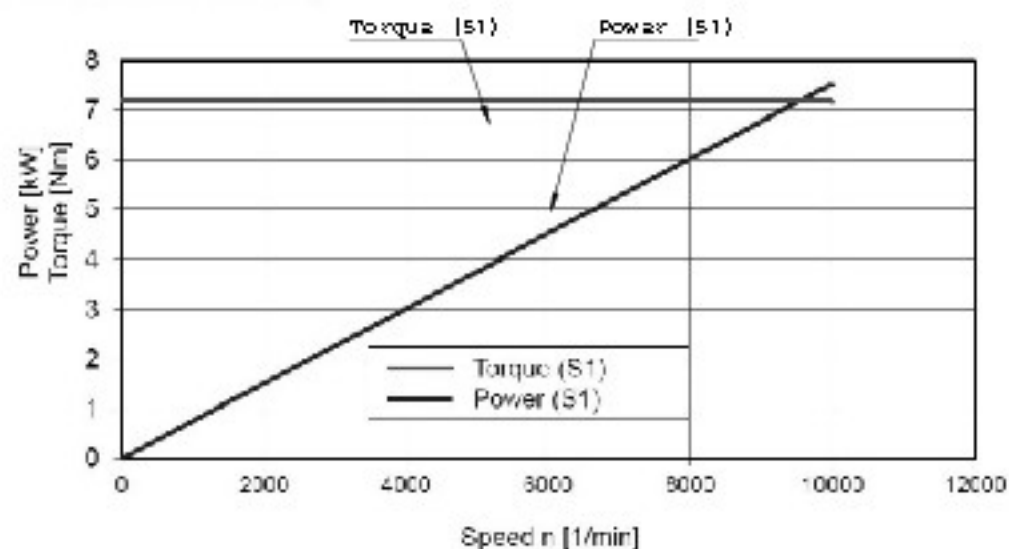
- ◆ 標準油壓夾頭 (詳細請參考 P.7)
- ◆ 手動旋轉
- ◆ 旋徑 :
- Grindmaster 45: Ø450 mm
- Grindmaster 80: Ø800 mm
- ◆ 主輪台主軸輸出功率 3 kw (4P)
- ◆ X 軸伺服馬達輸出功率 1.8 kw

High Frequency ID Spindle 電主軸 (Optional 選配)

Speed - max. rpm	Spindle diameter	Lubrication	Power [kW]	Torque [Nm]
			S1/S6-40%	S1/S6-40%
3000 - max. 5000	140 mm	Grease of Life	7.5 / 9.4	7.2 / 9
6000 - max. 8000	140 mm	Grease of Life	7.5 / 9.4	7.2 / 9
8000 - max. 10000	140 mm	Grease of Life	7.5 / 9.4	7.2 / 9
15000 - max. 18000	150 mm	Grease Replenishment	14 / 17	12.2 / 14.8
20000 - max. 24000	150 mm	Oil Air	14 / 17	12.2 / 14.8
26000 - max. 30000	120 mm	Oil Air	11 / 13	3.5 / 4
35000 - max. 42000	120 mm	Oil Air	11 / 13	3.5 / 4

5000 / 8000 / 10000 rpm

Power (S1), Torque (S1)



Grinding Applications 研磨範例

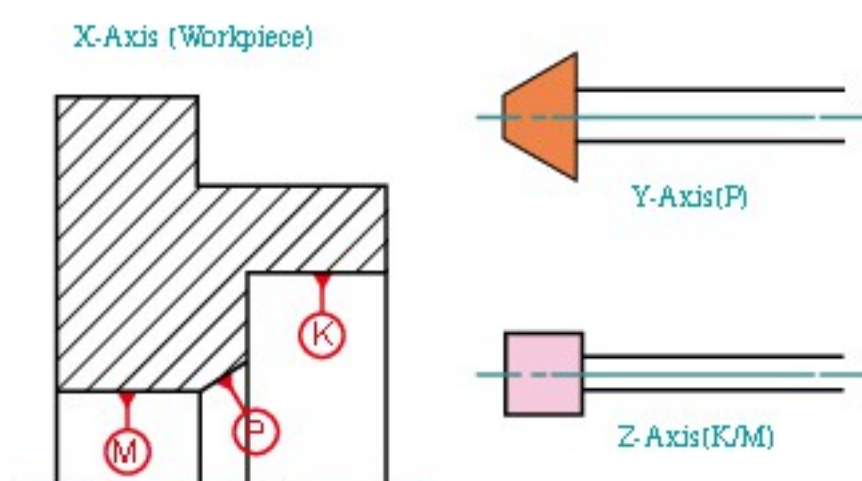
Grinding Operation Examples 加工作業範例：

1. ID straight grinding operation / ID taper grinding operation 內徑直線研磨 / 內徑錐度研磨
2. ID straight grinding operation / OD straight grinding operation 內徑直線研磨 / 外徑直線研磨
3. ID straight grinding operation / ID taper grinding operation / OD straight grinding operation 內徑直線研磨 / 內徑錐度研磨 / 外徑直線研磨

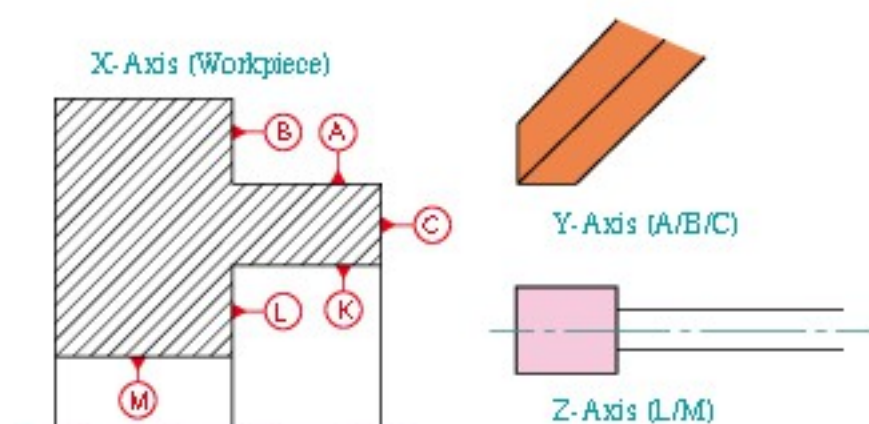
Grinding Position 研磨位置說明

A. OD 外圓 B. OD Face 外圓端面 C. OD Face 外圓端面 K. ID 內圓
L. ID Face 內圓端面 P. ID Taper 內圓錐度 M. ID 內圓

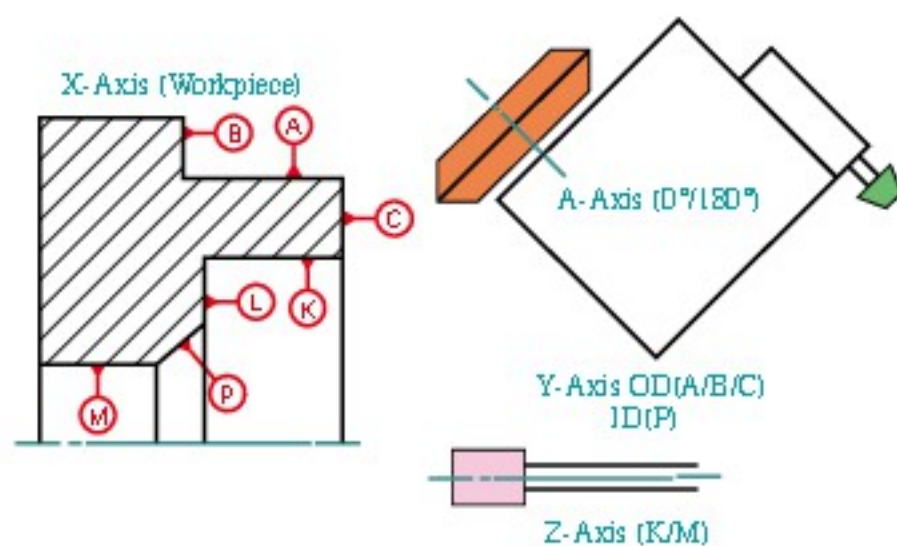
I/I TYPE



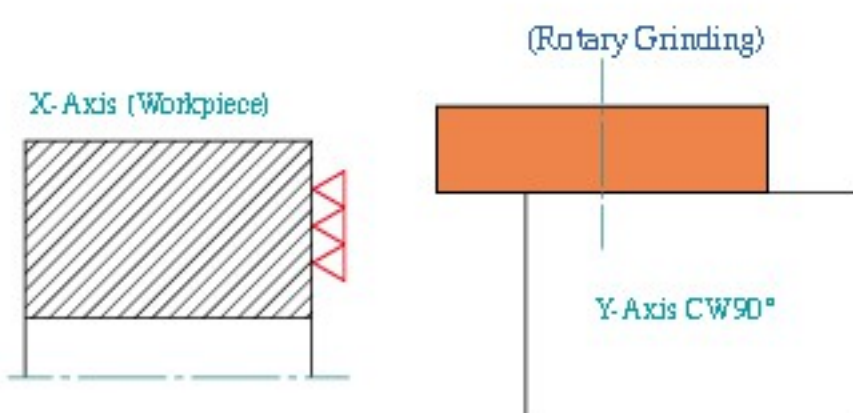
I/O TYPE



I/I/O TYPE



I/O TYPE



FEATURE OF INTERNAL GRINDER

精密內圓 CNC 磨床 GI-150NC/CNC

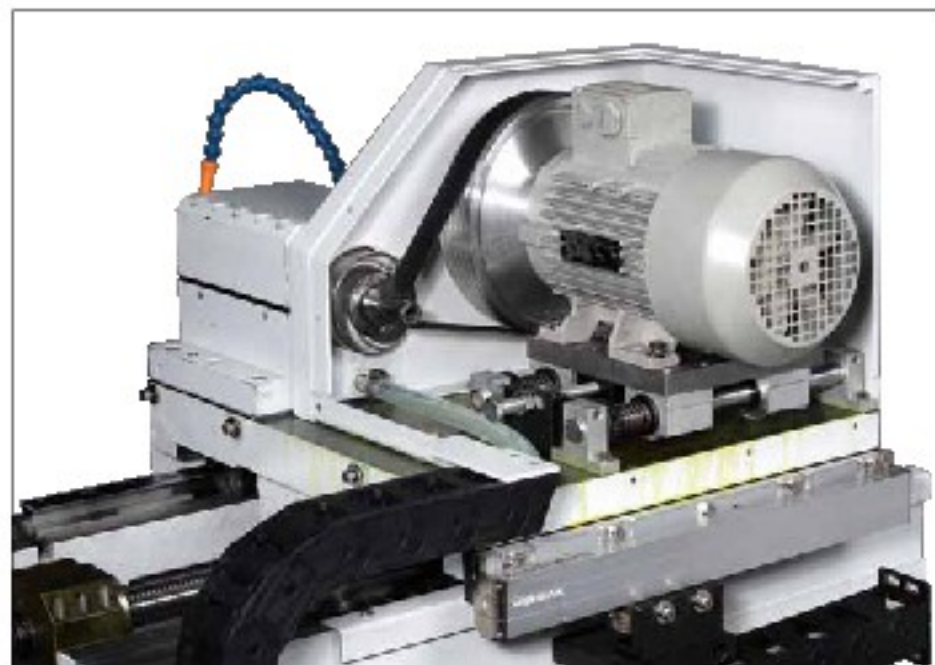


Highly Reliable Design of Machine

- ◆ CNC controlling 2 axes of table left, right feed and grinding wheel federate. X-axis closed-loop design, applying 0.05 μ m resolution linear scale to ensure the positioning and repeatability accuracy of the feeding axis.
- ◆ Apply linear guide that enables fine feed of 0.1 μ m, the minimum setting unit of both table guide face and cut guide face. By improving position definition and repetition accuracy, power on edge face and dead-end grinding is brought out.
- ◆ With certain tension and regardless to grinding resistance, belt of grinding wheel spindle is expanded and without slippage that its rotation accuracy is improved.
- ◆ Chuck core is as low as 1000mm, change such as work disconnection, grinding wheel replacement is easy and without troublesome.

高可靠度的機械設計

- ◆ X/Z 雙軸電腦數控，控制左，右進刀點以及砂輪進給速率等研磨條件。工件移動軸(X軸)閉迴路(Close-Loop)設計，採用解析度 0.05 μ m 之德製光學尺，確保 X 軸(進給軸)之定位精度與重複精度。
- ◆ 採用線性導軌，最小設定單位 0.1 μ m，改善定位精度和重複精度。
- ◆ 內孔研磨砂輪軸馬達皮帶張力保持裝置設計，讓皮帶張力保持、抵消研磨阻抗、確保皮帶不打滑、保證主軸旋轉精度。
- ◆ 工件主軸夾頭中心高只有 1000mm，讓工件更換或砂輪更換作業更加容易。



Grinding Cycle

Automatic Grinding
Compensation Grinding
Short Stroke Compensation Grinding
Manual Grinding
Short Stroke w/ Manual Compensation

加工循環

- ◆自動研磨
- ◆補正研磨
- ◆短行程補正研磨
- ◆手動研磨
- ◆短行程手動補正研磨

Interrupt Function During Auto. Cycle

Dressing Interruption
Feed Retract
Cycle Stop
Return to Start Point

自動循環中斷功能

- ◆修砂中斷功能
- ◆退刀
- ◆自動循環停止
- ◆原點回歸

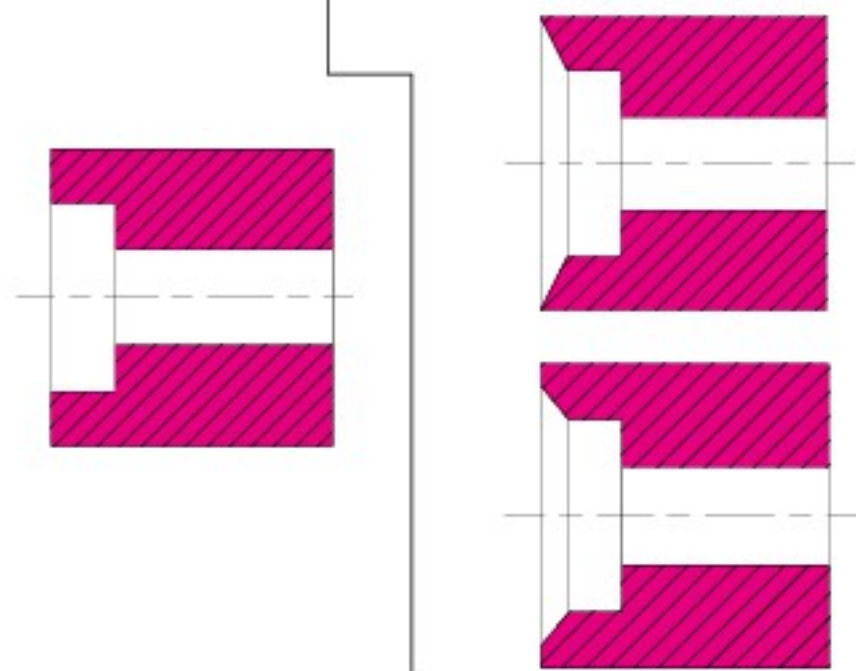
Grinding Wheel Data 砂輪形狀

OD Grinding :
May Be Used
For OD and ID
Grinding

直外圓型：
內圓與外圓研
磨用

Tapered Face :
For Grinding Inner
and Outer End
Faces

端面錐度型：
內圓 / 外部端面研磨用
內圓 / 內圓端面與外圓
/ 外部端面研磨用



ID Spindle Specifications 內研磨砂輪主軸規格

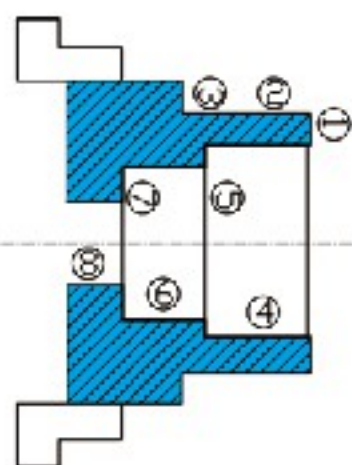
Spindle Speed 內研磨主軸額定轉速	Speed Range 內研磨主軸轉速範圍	Frequency Range 頻率範圍
30,000 rpm	25,000 – 30,000 rpm	50 – 60 Hz
20,000 rpm	15,000 – 20,000 rpm	50 – 60 Hz
15,000 rpm	12,000 – 15,000 rpm	50 – 60 Hz
8,000 rpm	6,000 – 8,000 rpm	50 – 60 Hz

Grinding Applications 研磨範例

Grinding Position 研磨位置說明

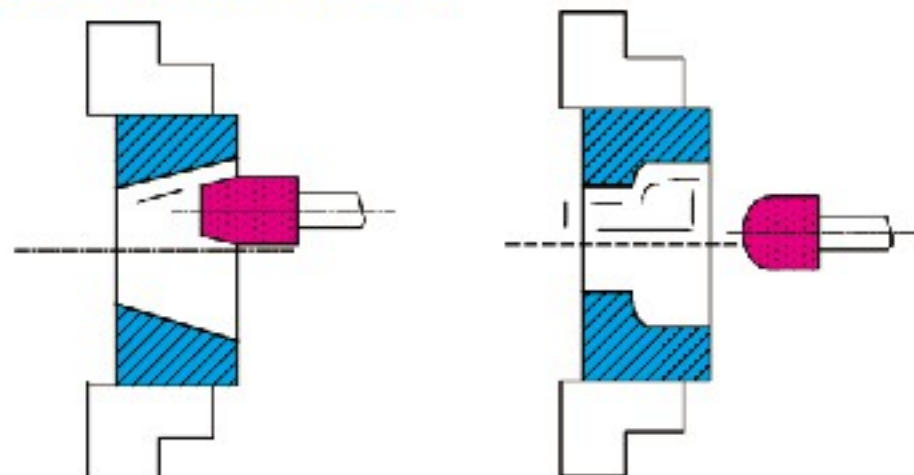
- | | |
|------------|-------|
| 1. OD Face | 2. OD |
| 3. OD Face | 4. ID |
| 5. ID Face | 6. ID |
| 7. ID Face | 8. ID |

- | | |
|--------|-------|
| 1 外部端面 | 2. 外圓 |
| 3 外圓端面 | 4. 內圓 |
| 5 內圓端面 | 6. 內圓 |
| 7 內圓端面 | 8. 內圓 |

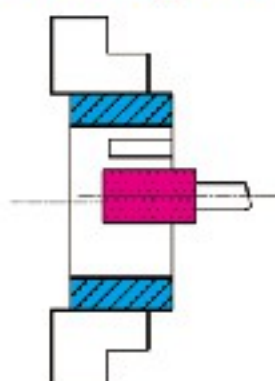


G CODE Form Grinding Examples

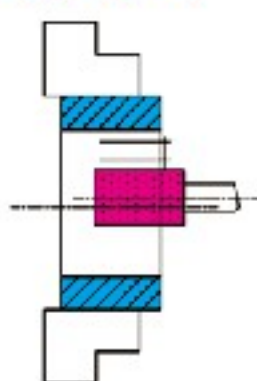
G CODE 砂輪成型研磨範例



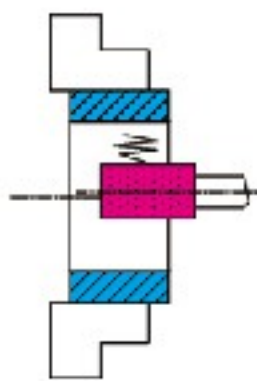
Grinding Methods 研磨方式



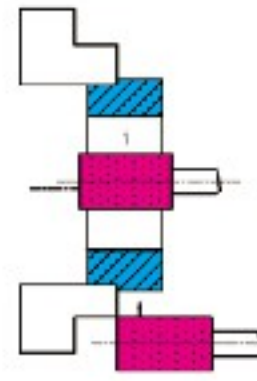
Traverse Grinding
Both Sides Infeed
雙邊進刀內圓研磨



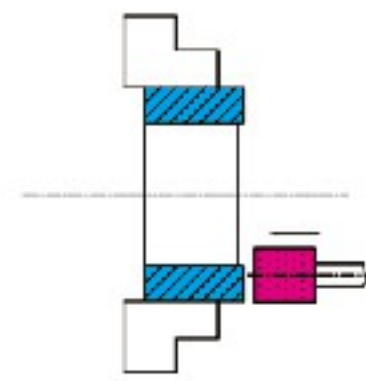
Traverse Grinding
Intermittent Feed
單邊進刀內圓研磨



Oscillation Grinding
w/ Continuous Infeed
連續進刀內圓研磨

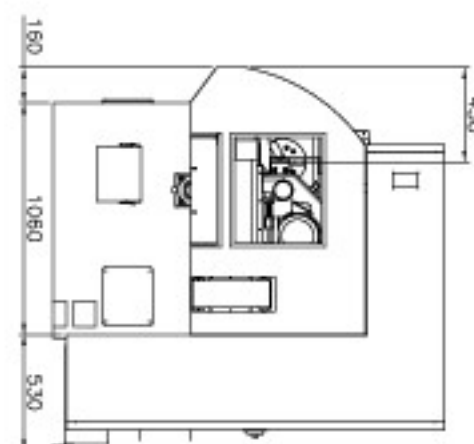
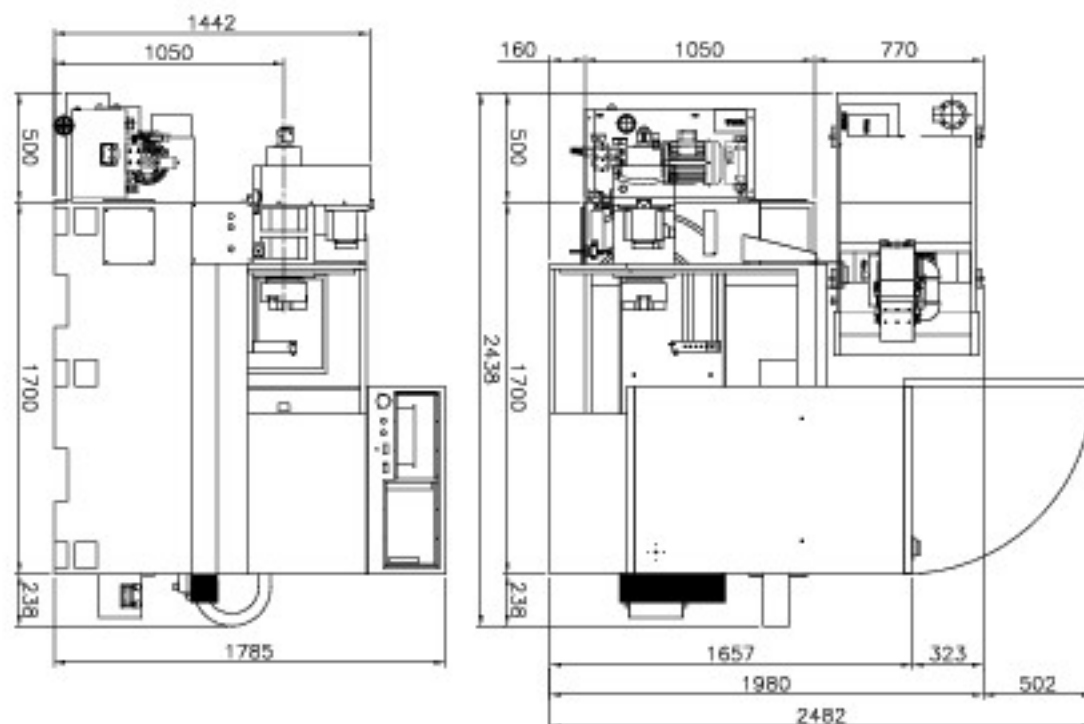


Plunge Grinding
直進刀內圓 / 外圓研磨



Plunge Grinding
(End Face)
外部端面研磨

Dimensional Drawing



Accessories 附件

Item 項次	Part Name 品名	GM-I/I type	GM-I/O type	GM-I/I/O type	GI-CNC
1	Fanuc CNC Controller 控制器	Oi-TD			0iM-TD
2	Coolant System 冷卻系統	Coolant Sys w/ Mag Separator & Paper Filter (260L) 電磁紙帶濾清機			Coolant Sys w/ Mag Separator & Paper Filter (140L) 電磁紙帶濾清機
3	Oil Mist Separator 油霧分離機	Standard 標準			Optional 選配
4	Operation Manual & Parts List 操作手冊 & 零件清單	Standard 標準			
5	Balancing Stand+Arbor 滾輪式平衡台 + 平衡棒	N/A	Standard 標準		Standard 標準
6	Diamond Dresser w/ Stand 鑽石筆 + 鑽石筆座	Single point x4 單點 x4	Single point x2 + Axe style x1 單點 x2+ 斧頭型 x1	Single point x4 + Axe style x1 單點 x4+ 斧頭型 x1	Single point x2 單點 x2
7	Z Axis: 10000rpm D Spindle w/ Shaft Z 軸：內研磨主軸 + 接桿	Standard 標準			Z&X Axis: 30000rpm ID Spindle w/ Shaft 內研磨主軸 + 接桿
8	Y Axis: 20000rpm D Spindle w/ Shaft Y 軸：內研磨主軸 + 接桿	Standard 標準	N/A	Standard 標準	
9	Swivelling Wheelhead (B-axis) w/ Rotary Encoder B 軸環型檢出器	N/A	N/A	Standard 標準	N/A
10	OD Grinding Wheel 外圓砂輪 (405x50x127mm)	N/A	Standard 標準		N/A
11	Wheel Flange 砂輪套 (5")	N/A	Standard 標準		N/A
12	A2-5 Spindle Nose + 6"Hyd Chuck A2-5 工件主軸 + 6" 油壓夾頭	Standard for GM-45 標準		N/A	Standard 標準
13	A2-6 Spindle Nose + 8"Hyd Chuck A2-6 工件主軸 + 8" 油壓夾頭	Optional for GM-45 選配		N/A	N/A
14	A2-6 Spindle Nose + 8"Hyd Chuck A2-6 工件主軸 + 8" 油壓夾頭	Standard for GM-80 標準			N/A
15	A2-8 Spindle Nose + 10"Hyd Chuck A2-8 工件主軸 + 10" 油壓夾頭	Optional for GM-80 選配			N/A
16	Touch Probe 端面量測裝置	Optional 選配	Standard 標準		Optional 選配
17	D : Current Type Gap/ Crash Control 內圓：電流式間隙消除 + 防撞裝置	Standard 標準			N/A
18	OD : Gap/Crash Control 外圓：超音波間隙消除 + 防撞裝置	N/A	Optional 選配		N/A

MACHINE SPECIFICATIONS Grindmaster 系列機台規格

UNIT 單位 : mm(inch)

SPECIFICATIONS 規格項目		GM-45CNC	GM-80CNC
GENERAL CAPACITIES 加工能力	ID Grinding Range 內徑研磨範圍	Ø6~Ø400 (Ø0.2"~ Ø15.7")	Ø6~Ø600 (Ø0.2"~ Ø23.6")
	Max Grinding OD Diameter 最大研磨外徑	Ø450 (17.7")	Ø800 (31.5")
	Swing Over Work Head 主輪台旋徑	Ø500 (19.7")	Ø820 (32.3")
	Max Weight of Workpiece 主輪台最大載重 kgs	50 kg	80 kg
	Type of Wheel Head 砂輪頭型態	Dual Independent Wheel Head Y 軸 / Z 軸 獨立砂輪頭設計	
WORK HEAD CLOSED-LOOP SYSTEM (X-AXIS) 主輪台閉迴路系統 (X 軸)	Type of Chuck 夾爪型態	6" 3-Jaw Chuck 6 英寸三爪夾頭	8" 3-Jaw Chuck 8 英寸三爪夾頭
	Travel X 軸行程	600	600
	Rapid Feedrate 快速移動速率	10m/min	10 m/min
	Min Infeed Increment 最小指令單位	0.0001	0.0001
	X-axis Servo Motor X 軸伺服馬達輸出功率	1.8 kw (FANUC)	1.8 kw (FANUC)
	Spindle Motor 主軸馬達輸出功率	3 kw	3 kw
	Spindle Speed (variable) 主輪台主軸轉速 (可調) rpm	0~1000 rpm	0~1000 rpm
ID / OD WHEEL HEAD (Y-AXIS) ID / OD 砂輪頭 (Y 軸)	Swiveling Angle (Manual) 旋轉角度 (手動)	C W 30° / C C W 30°	C W 30° / C C W 30°
	ID Wheel Size 內研磨砂輪尺寸	Ø38x38x Ø8.2 (Ø1.5"x1.5"x Ø0.3")	
	ID Spindle Motor 內研磨主軸馬達輸出功率	2.2 kw (2P)	2.2 kw (2P)
	ID Spindle Speed 內研磨主軸轉速	8000 / 15000 / 20000 / 30000 rpm (Special Speed by Request 其他價格請洽詢)	
	OD Wheel Size 外徑砂輪尺寸	Opt. Ø405x50x Ø127 (Ø16"x2"x Ø5")	
	OD Spindle Motor 外徑砂輪主軸馬達輸出功率	3.7 kw(4P)	3.7 kw(4P)
	Swiveling Mechanism (I/I/O) B 軸旋轉機構 (I/I/O)	N/A	Automatic Swivel 自動旋轉
	B-axis Swiveling Servo Motor B 軸伺服馬達輸出功率	1.2 kw (FANUC)	1.2 kw (FANUC)
	Angle B 軸旋轉角度範圍 (分割角度 5°)	20° Fix	-30° / +210°
	Travel Y 軸行程	500 (20")	500 (20")
	Y-axis Servo Motor Y 軸伺服馬達輸出功率	1.8 kw (FANUC)	1.8 kw (FANUC)
	Rapid Feedrate 快速移動速率	10 m/min	10m/min
	Min Infeed Increment 最小指令單位	0.0001	0.0001
	ID Wheel Size 內研磨砂輪尺寸	Ø38x38x Ø8.2 (Ø1.5"x1.5"x Ø0.3")	
ID WHEEL HEAD (Z-AXIS) ID 砂輪頭 (Z 軸)	ID Spindle Motor 內研磨主軸馬達輸出功率	2.2 kw (2P)	2.2 kw (2P)
	ID Spindle Speed 內研磨主軸轉速	8000 / 15000 / 20000 / 30000 rpm (Special Speed by Request 其他價格請洽詢)	
	Travel Z 軸行程	500 (20")	500 (20")
	Z-axis Servo Motor Z 軸伺服馬達輸出功率	1.8 kw (FANUC)	1.8 kw (FANUC)
	Rapid feedrate 快速移動速率	10 m/min	10 m/min

MACHINE SPECIFICATIONS GI SERIES 系列機台規格

UNIT 單位 : mm(inch)

SPECIFICATIONS 規格項目		GI-150NC	GI-150CNC
CAPACITY 加工能力	ID Grinding Range 內圓研磨範圍	Ø6~ Ø150 (Ø0.25"~ Ø6")	
	Max Grinding Depth 最大研磨長度	125(5")	
	Max Swing to Dresser 最大距修砂旋徑	Ø220 (8.6")	
	Swing of Chuck Cover 夾頭護罩旋徑	Ø260 (10.2")	
	Spindle Center Height 主軸中心高	1050(41.3")	
	Chuck Type 夾頭型式	6" Hydraulic Chuck (Opt 8") 6 英吋油壓夾頭 (選配 8 英吋)	
	Max Loading 最大工件荷重	50 kg	
WORK HEAD 主輪台	Spindle Speed (Variable) 主軸轉速 (無段變速)	0~1000 rpm	
	Swiveling Angle 旋轉角度	C W 15°~ C C W 5° 順時針 15°~ 逆時針 5°	
	Spindle Motor 主軸馬達輸出功率	1.5 kw	
X-AXIS X 軸	Feedback System 回饋系統	None 無	Closed-Loop System 閉迴路系統
	Stroke 行程	200(7.9")	
	Rapid Traverse Speed 快速移動速率	10 m/min	
	Min Infeed Increment 最小指令單位	0.0001	
	X-axis Servo Motor X 軸伺服馬達輸出功率	1.0 kw	1.2 kw
Z-AXIS 內圓研磨頭 (Z 軸)	ID Spindle Motor 內圓砂輪主軸馬達輸出功率	2.2 kw(2P)	
	ID Spindle Speed 內圓砂輪主軸轉速	8000 / 15000 / 20000 / 30000 rpm (Special Speed by Request 其他價格請洽詢)	
	Stroke 行程	560 (22")	
	Z-axis Driven by Z 軸驅動裝置	Hydraulic Cylinder 油壓缸	Servo Motor 1.8 kw 1.8 kw 伺服馬達
	Rapid Traverse Speed 快速移動速率	500~15,000 mm/min	10 m/min
	Min Infeed Increment 最小指令單位	N/A	0.0001
COOLANT SYSTEM 冷卻系統	Equipments 配置	Electro Magnet Separator + Magzet (Opt Paper Filter) 電磁濾清器 + Magzet (選配：紙帶濾清機)	
	Tank Volume 水箱容量	120 L	
	Capacity 處理量	40 L/min	
	Motor 泵浦馬達	0.1 kw(4P)	
LUBRICATION SYSTEM 潤滑系統	Tank Volume 油箱容量	2 L	
	Motor 泵浦馬達	45 w	
HYDRAULIC SYSTEM 油壓系統	Tank Volume 油箱容量	60 L	26 L
	Motor 泵浦馬達	2 HP	1 HP(4P)
DIMENSION/ WEIGHT 包裝尺寸 / 重量	Machine Cover Type 機台護罩型式	Full Enclosure Splash Guard / Manual Door 全密式鍍金護罩 / 手動拉門	
	Net Weight 淨重	3500 kgs	3500 kgs
	Gross Weight 毛重	4000 kgs	4000 kgs
	Packing (L x W x H) 包裝尺寸 (長 x 寬 x 高)	2980 x 2280 x 2250mm	2980 x 2280 x 2250mm

Note : Factory reserves the rights to change design / specifications / mechanisms to improve machine performance without prior notice.

備註：製造廠保有更改設計規格機構等權利，以改良機器性能而不需預先通知。



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