ACER

OPEARATION MANUAL

Vertical Machine Center

Model: VMC-2240XL

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第一章 安全預防

CHAPTER 1 SAFETY PRECAUTIONS

未經取得資格或未經受訓的人員禁止服務、更換或維修本機器

****THIS MACHINE MUST NOT BE SERVICED, REPAIRED OR MAINTAINED BY UNQUALIFIED AND UNTRAINED PERSONNEL.****

本機器裝置許多安全設施來避免個人或機器遭受傷害或破壞。操作者不應僅僅依賴此等安全設施, 而且應該完全了解以下各章節說明後始能確保操作安全無虞。

This machine is equipped with a number of safety devices to protect personnel and equipment from injury and damage. Operators should not, however, rely solely upon these safety devices but should operate the machine after fully understanding the following paragraphs.

進一步而言, 不正常的操作或維修任何 CNC 機器將增加個人嚴重傷害的可能性, 及大大減少機器的使用壽命。經由您對本手冊的注意及結合您對機器操作的常識及經驗, 將會降低非加工時間、提昇生產效率及提高操作機器之安全性。除非已明顯地載明於本操作手冊上, 本機器可能沒有提供某一些操作/功能。

Moreover, improper operation and maintenance of any CNC machines increases the likelihood of serious personal injury and greatly reduces the service life of this machine. Your attention to this manual, in combination with common sense and good machining practice, can positively affect productivity by reducing downtime and promoting safe operation of this machine unless they are explicitly stated in this instruction manual.

對於您特殊運用的場合, 某些附加的安全考量因素必須加以配合, 請參考有關安全作業等資料或刊物。

Additional safety considerations may be required for your particular application. Please refer to safety information for additional information and reference publications.

重要守則 **RULE OF THUMB:

1. 未經取得資格之人員禁止維護或操作本機器。
   Only qualified personnel are permitted to maintain and operate this machine.

2. 禁止操作或修理本機器,除非你已閱讀並了解所有手冊資料及附於機台上之所有警告及標示標語。
   Do not operate or attempt to repair the machine until you have read and understood all manuals that pertain to the machine, plus all warning and instruction plates /decals mounted on the machine.

3. 請警謹慎工作並隨時注意安全。如您身體已受到藥物或酒精之影響,請勿操作或維修本機器。
   Be mentally alert on the job and keep safety in mind. Never attempt to operate or repair a machine if you are under medication or alcohol influence.

4. 在機器之工作範圍內,請穿戴安全鞋及保護鏡,安全鞋必須具有抗油性,而保護鏡建議採用有邊框型式者。
   Wear safety shoes and eye protection within the work area. Safety shoes should be oil-resistant and safety glasses with side shields are strongly recommended.

5. 請勿攜帶手錶、貴重金屬及其他飾件操作機器,以避免被機器移動件咬入。
   Remove watches, jewelry and other accessories to avoid getting them caught in moving parts.

6. 在機器四周保持乾淨,工件放置有序。
   Maintain a clean and orderly workspace around machine.

7. 適當地儲放刀具及其他附件,請確認機台四周圍無雜物。
   Store tools and miscellaneous parts properly. Be sure there are on articles around the machine.

8. 請勿使用壓縮空氣直接對著主軸、工作台、控制面板、電氣箱或地板噴吹,應使用刷子或刮刷片去除切屑。請勿直接以手除屑或當主軸轉動時除屑,務必於刀具完全停止轉動後再加以清除切屑,並且要經常傾倒切屑。
   Do not use compressed air to blow chips from the machine spindle or table, controls, cabinets, or the floor around the machine. Use a brush or chip scraper to remove chips. Do not remove chips by hand or while the spindle is turning. Make sure that the cutter has completely stopped before attempting to remove chips. Dispose of chips frequently.

9. 當刀具接觸工件表面時,絕對不可啟動機器,注意主軸旋轉方向以確保刀片不致鍛裂。
Never start the machine when the cutter is in contact with the workplace. Make sure the direction of spindle rotation is correct to prevent cutter breakage.

10.必須知道所有”緊急停止鈕”所在位置,機器加工作業中,應關閉所有的門,包括操作面板及電氣箱門。
Know where all the EMERGENCY STOP pushbuttons are located. Keep all machine doors closed while the machine is in operation, including those on the console and the electrical cabinets.

11.如發生停電,應立即關閉電源。
In the event of power failure, turn off the main circuit breaker immediately.

12.除非機器各單元中已有足夠的液壓油及正確的型號或替代品,否則不可啟動機器。
Do not start the machine unless all units contain the proper amount and type of hydraulic oils, lubricant or acceptable equivalents.

13.可拆換式的保險絲須有適當的額定電流值。
Fuses replacement should have the proper current ratings.

14.請勿改變參數、數量及其他電子設定值。如有必要更改,請於修正前先記錄相關更動,以便於之後核對用。
Do not change parameters, volumes and other electrical setting unnecessarily. If such changes are unavoidable, record the values prior to any adjustments for future reference.

15.請勿污染、刮傷或撕下各項警告牌,如已發生無法辨讀或掉落,請向代理商購入並更換。
Do not soil, scratch or remove the caution plate. Should it become illegible to read or missing, order another caution plate from the supplier.

16.當操作堆高機、天車或相似之設備時,請小心以避免撞擊或破壞周圍物品。
Whenever operating a forklift truck, crane or similar equipment, special care should be taken to prevent collisions and damage to surroundings.

17.請勿讓機台在無人照顧下運轉,但當機器運轉作業中,請勿靠近。
Do not leave machine unattended, but stand away while it is running.

18.每日工作結束、離開時,請將主電源關閉。
Turn off the power source before leaving for the day.

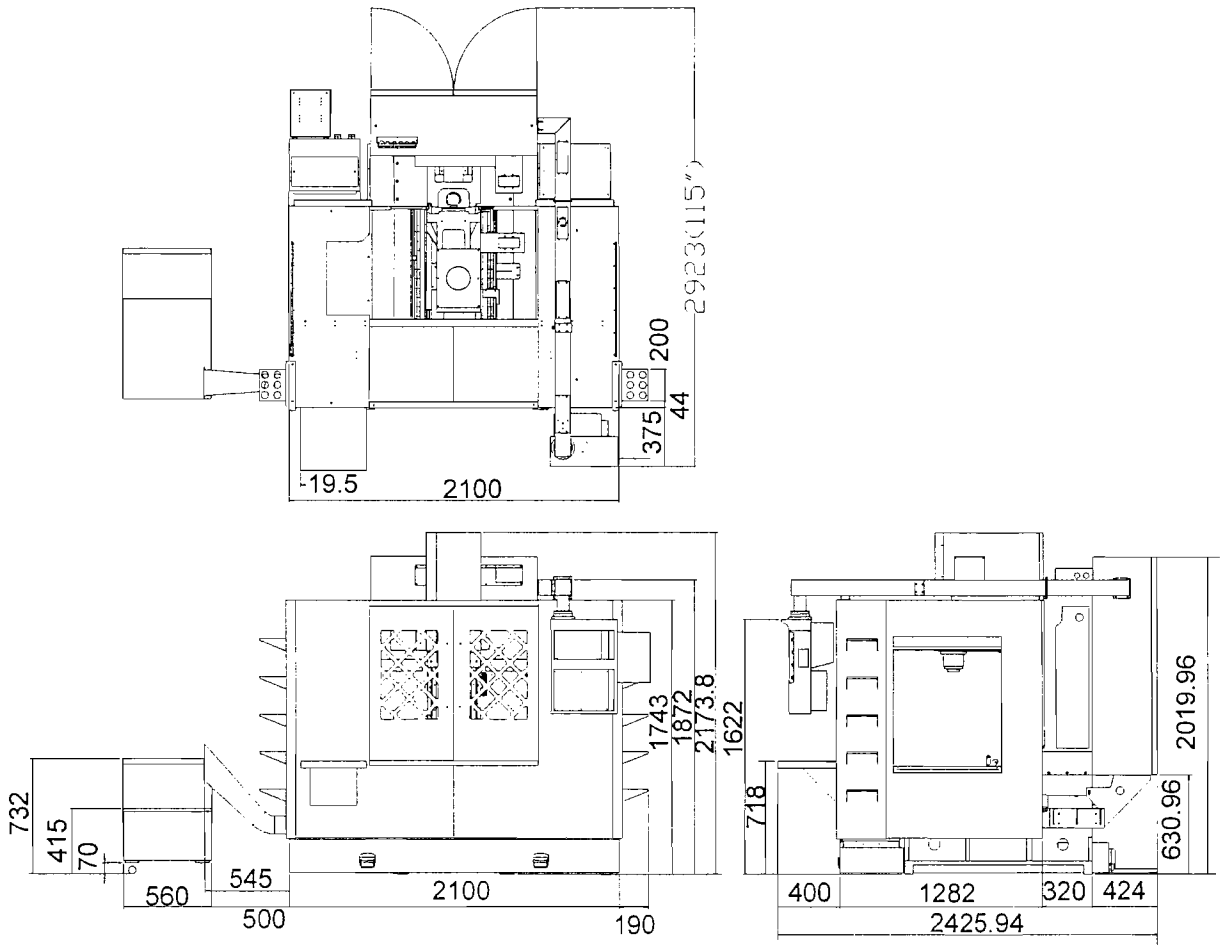
第二章機械規格

CHAPTER 2 MACHINE SPECIFICATION

1.1 機械外觀尺寸圖

OUTLINE DIMENSION DRAWING

EMV600



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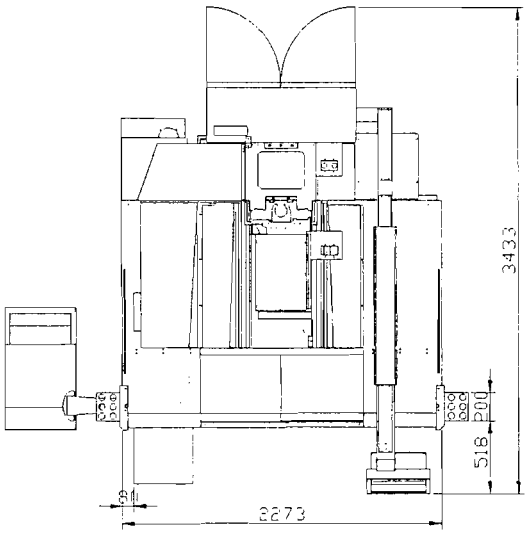
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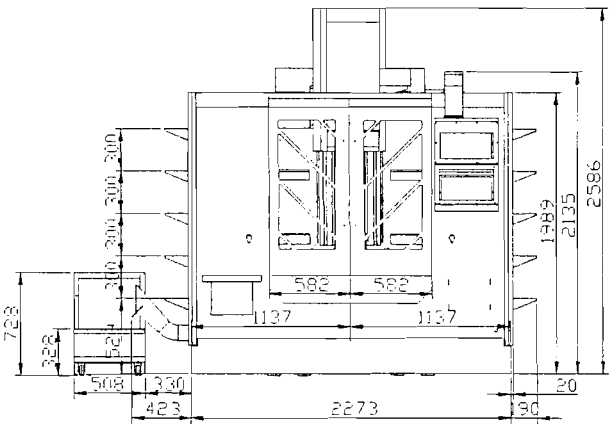
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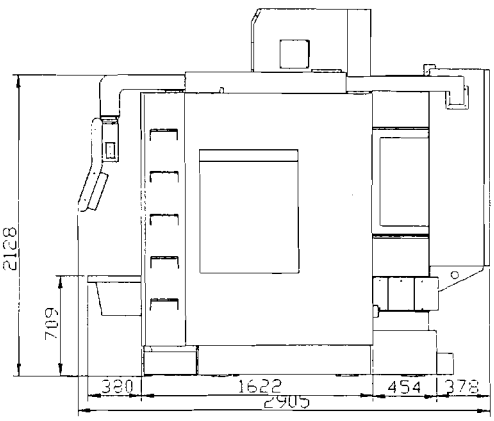
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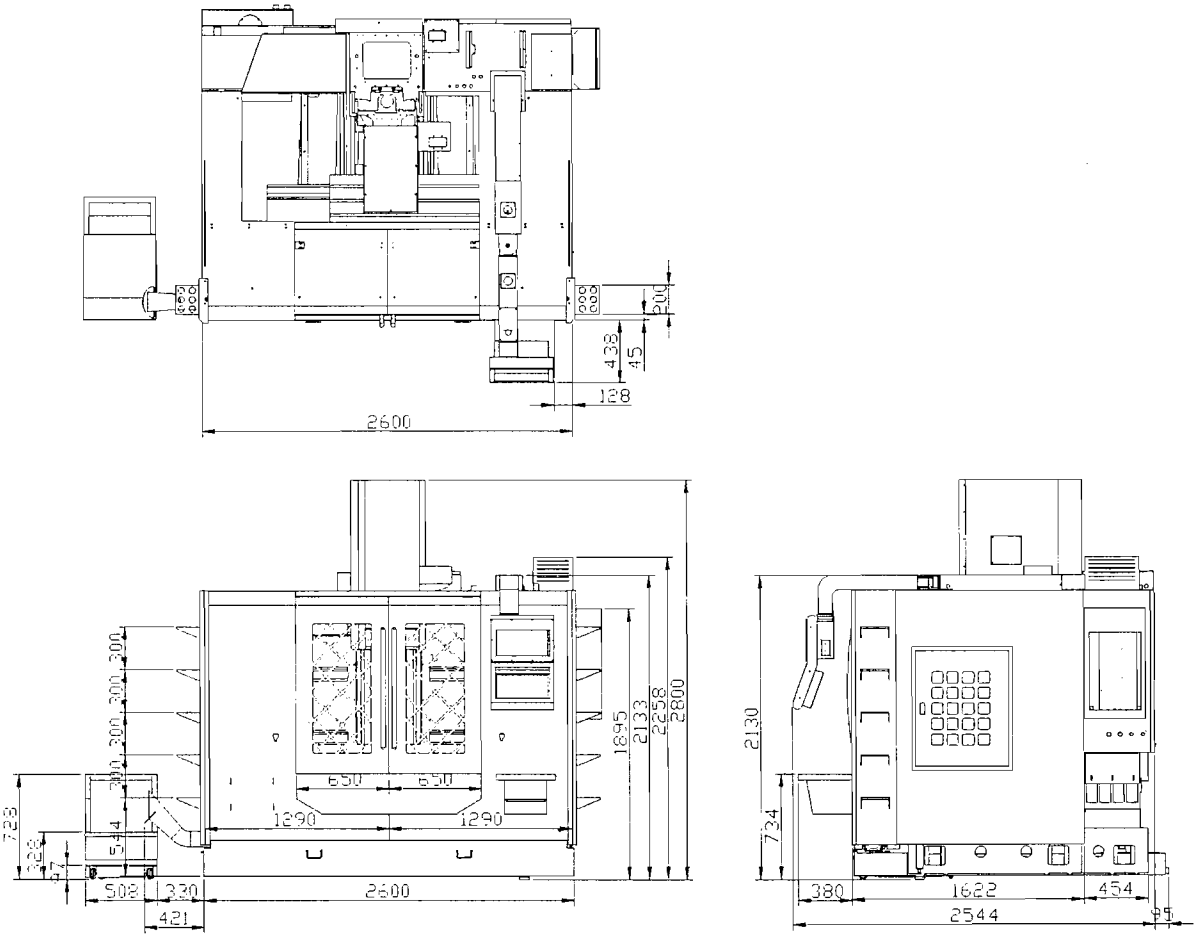
EMV1020/ VMC2240XL



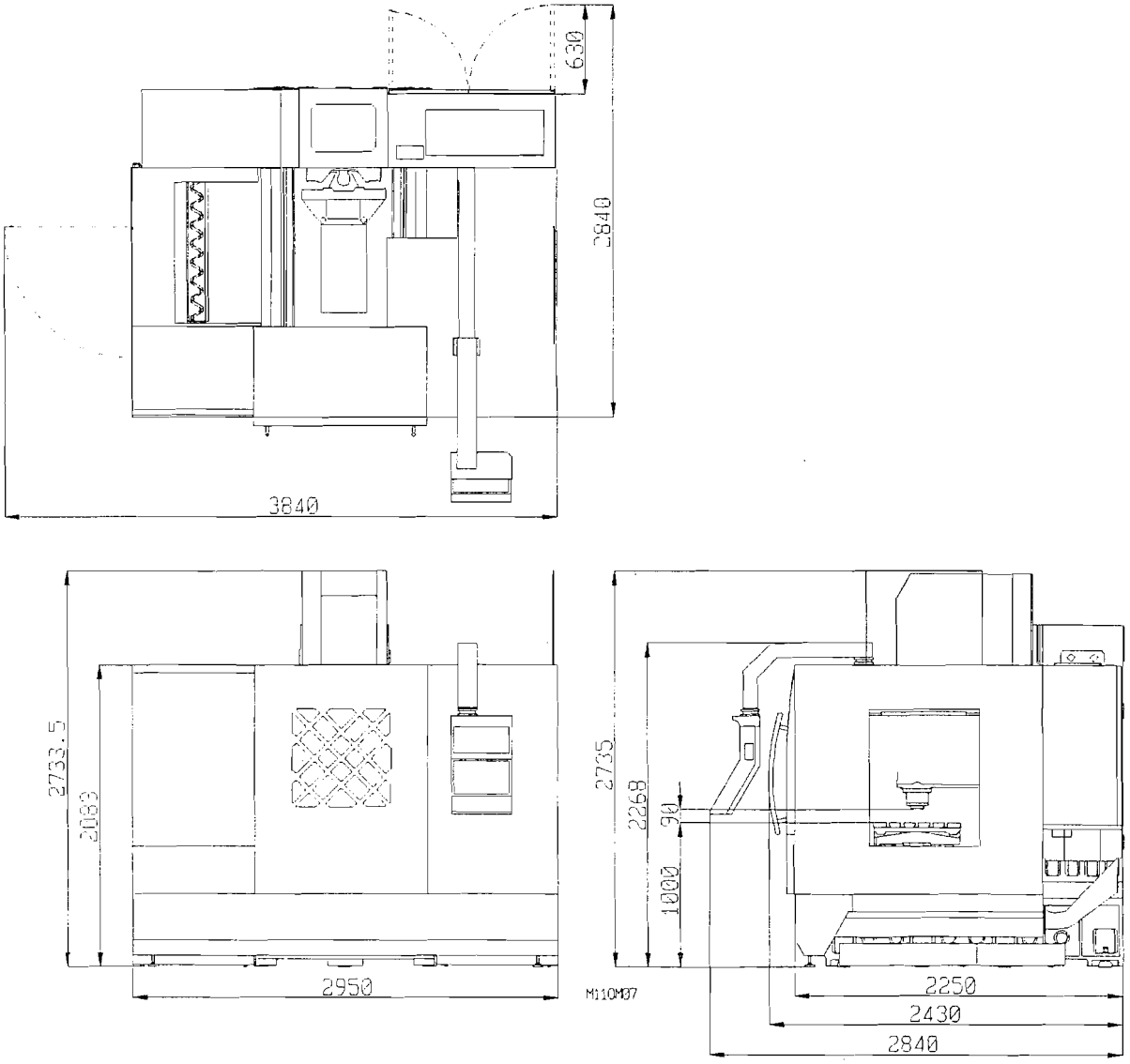


圖 2.1.1 機器外觀尺寸圖

Fig.2.1.1 Outline Dimension Drawing

2.2 機械各部位位置圖

The main parts of machine ,and the position of operator

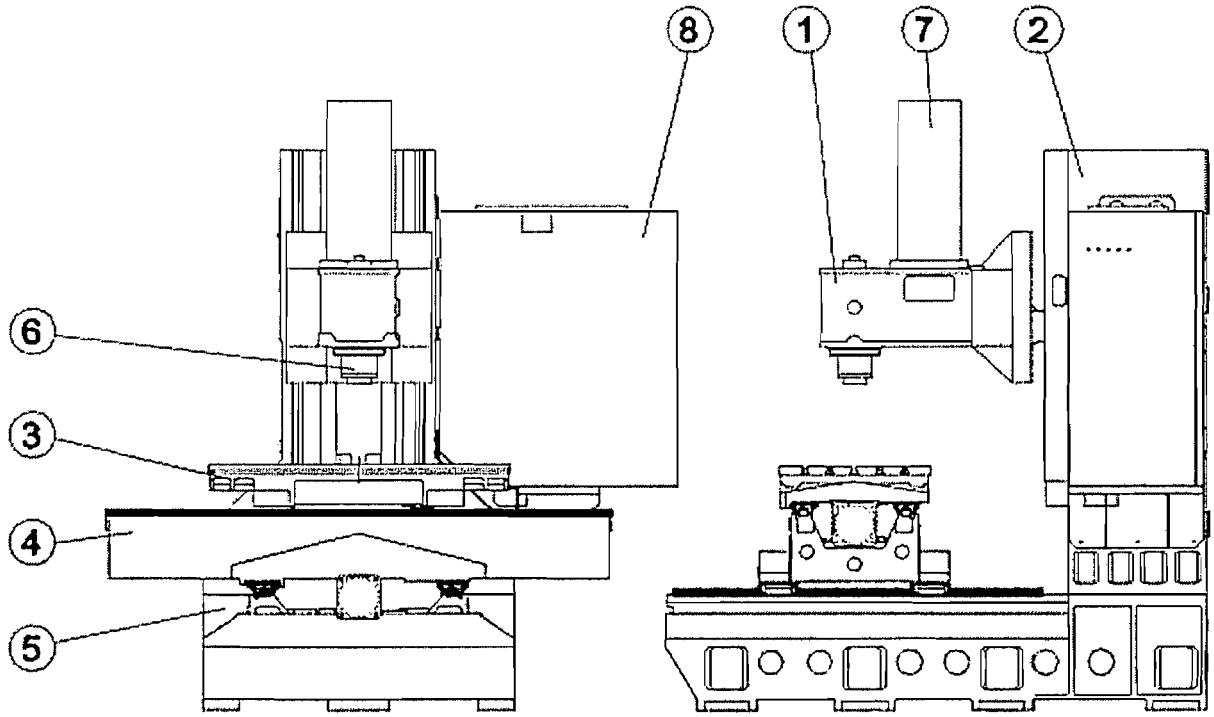


Fig2.2.1

N0.(序號)	名稱 Description	數量 Q'ty
1	主軸座 Spindle	1
2	立柱 Column	1
3	工作台 Table	1
4	鞍座 Saddle	1
5	底座 Base	1
6	主軸 Spindle	1
7	主軸馬達 Spindle motor	1
8	電器箱 Electrical Box	1

EMV600 規格表

	項目	單位	EMV600
三軸行程 T ravel	X 軸行程 Max. travel for X axis	mm	610
	Y 軸行程 Max. travel for Y axis	mm	460
	Z 軸行程 Max. travel for Z axis	mm	480
	主軸鼻端至工作台面 Spindle nose to table	mm	168-648
主軸 Spindle	主軸轉速 Spindle speed	rpm	8000:10000(選配) (Optional) /12000(選配) (Optional)
自動刀具交換系統 ATC	刀具數量/刀庫型式 Tool Q'ty	PCS	斗笠式 Armless16T/ 刀臂式 Arm24T(選配) (Optional)
	可用最大刀具直徑 Max. Tool Diameter	mm	120
	最大刀具長度 Max. Tool Length	mm	300
	最大刀具重量 Max. tool Weight	kg	6
	刀具規格 Tool Shank		BT40
馬達 motor	主軸馬達 Spindle motor (連續/30 分鐘定格)	kw(HP)	5.5kw
	X/Y/Z 軸馬達 X/Y/Z servo motor	kw	1.0/1.0/3.5
工作台 Table	工作台面積 Table size	mm	700x450
	工作台最大荷重 Max. table capacity	kg	600
	T 型槽(槽x寬x中心距) T-slot (Center * width * NO.)	mm	3x18x125(100)
快速位移 Rapid travel	X 軸快速位移 X-rapid traverse	M/mm	24 線軌 Linear way/36 線軌 Linear way (選配) (Optional)
	Y 軸快速位移 Y-rapid traverse	M/mm	24 線軌 Linear way/36 線軌 Linear way (選配) (Optional)
	Z 軸快速位移 Z-rapid traverse (硬軌)	M/mm	20 線軌 Linear way/24 線軌 Linear way (選配) (Optional)
	切削進給速度 Cutting feed rate	mm/mim	1/10000
控制器 Controller	三菱 Mitsubishi		64SM
其他項目 Othet	機器重量 Machine weight	kg	4000
	電源需求 Power Requirement	KVA	15
	空壓源 Air Requirement	Kg/cm^2	6
	水箱容量 Coolan tank	L	180

EMV860 規格表

	項目	單位	EMV860
三軸行程 T ravel	X 軸行程 Max. travel for X axis	mm	860
	Y 軸行程 Max. travel for Y axis	mm	550
	Z 軸行程 Max. travel for Z axis	mm	600
	主軸鼻端至工作台面 Spindle nose to table	mm	185-787
主軸 Spindle	主軸轉速 Spindle speed	rpm	8000:10000(選配) (Optional) /12000(選配) (Optional)
自動刀具交換系統 ATC	刀具數量/刀庫型式 Tool Q'ty	PCS	斗笠式 Armless16T/ 刀臂式 Arm24T(選配) (Optional)
	可用最大刀具直徑 Max. Tool Diameter	mm	120
	最大刀具長度 Max. Tool Length	mm	300
	最大刀具重量 Max. tool Weight	kg	6
	刀具規格 Tool Shank		BT40
馬達 motor	主軸馬達 Spindle motor (連續/30 分鐘定格)	kw(HP)	7.5/11kw
	X/Y/Z 軸馬達 X/Y/Z servo motor	kw	1.5/1.5/2.0
工作台 Table	工作台面積 Table size	mm	910x560
	工作台最大荷重 Max. table capacity	kg	800
	T 型槽(槽x寬x中心距) T-slot (Center * width * NO.)	mm	5x18x100
快速位移 Rapid travel	X 軸快速位移 X-rapid traverse	M/mm	24 線軌 Linear way/36 線軌 Linear way (選配) (Optional)
	Y 軸快速位移 Y-rapid traverse	M/mm	24 線軌 Linear way/36 線軌 Linear way (選配) (Optional)
	Z 軸快速位移 Z-rapid traverse (硬軌)	M/mm	20 線軌 Linear way/24 線軌 Linear way (選配) (Optional)
	切削進給速度 Cutting feed rate	mm/mim	1/10000
控制器 Controller	三菱 Mitsubishi		64SM
其他項目 Othet	機器重量 Machine weight	kg	5800
	電源需求 Power Requirement	KVA	20
	空壓源 Air Requirement	Kg/cm^2	6
	水箱容量 Coolan tank	L	200

EMV1020 規格表

	項目	單位	EMV1020
三軸行程 T ravel	X 軸行程 Max. travel for X axis	mm	1020
	Y 軸行程 Max. travel for Y axis	mm	560
	Z 軸行程 Max. travel for Z axis	mm	600
	主軸鼻端至工作台面 Spindle nose to table	mm	190-790
主軸 Spindle	主軸轉速 Spindle speed	rpm	8000:10000(選配) (Optional) /12000(選配) (Optional)
自動刀具交換系統 ATC	刀具數量/刀庫型式 Tool Q'ty	PCS	斗笠式 Armless16T/ 刀臂式 Arm24T(選配) (Optional)
	可用最大刀具直徑 Max. Tool Diameter	mm	120
	最大刀具長度 Max. Tool Length	mm	300
	最大刀具重量 Max. tool Weight	kg	6
	刀具規格 Tool Shank		BT40
馬達 motor	主軸馬達 Spindle motor (連續/30 分鐘定格)	kw(HP)	7.5/11kw
	X/Y/Z 軸馬達 X/Y/Z servo motor	kw	1.5/1.5/2.0
工作台 Table	工作台面積 Table size	mm	1100x560
	工作台最大荷重 Max. table capacity	kg	1000
	T 型槽(槽x寬x中心距) T-slot (Center * width * NO.)	mm	5x18x100
快速位移 Rapid travel	X 軸快速位移 X-rapid traverse	M/mm	24 線軌 Linear way/36 線軌 Linear way (選配) (Optional)
	Y 軸快速位移 Y-rapid traverse	M/mm	24 線軌 Linear way/36 線軌 Linear way (選配) (Optional)
	Z 軸快速位移 Z-rapid traverse (硬軌)	M/mm	20 線軌 Linear way/24 線軌 Linear way (選配) (Optional)
	切削進給速度 Cutting feed rate	mm/mim	1/10000
控制器 Controller	三菱 Mitsubishi		64SM
其他項目 Othet	機器重量 Machine weight	kg	6300
	電源需求 Power Requirement	KVA	20
	空壓源 Air Requirement	Kg/cm^2	6
	水箱容量 Coolan tank	L	255

EMV1100 規格表

	項目	單位	EMV1100
三軸行程 T ravel	X 軸行程 Max. travel for X axis	mm	1100
	Y 軸行程 Max. travel for Y axis	mm	600
	Z 軸行程 Max. travel for Z axis	mm	600
	主軸鼻端至工作台面 Spindle nose to table	mm	150-750
主軸 Spindle	主軸轉速 Spindle speed	rpm	8000:10000(選配) (Optional) /12000(選配) (Optional)
自動刀具交換系統 ATC	2	PCS	斗笠式 Armless20T/ 刀臂式 Arm24T(選配) (Optional)
	可用最大刀具直徑 Max. Tool Diameter	mm	120
	最大刀具長度 Max. Tool Length	mm	300
	最大刀具重量 Max. tool Weight	kg	6
	刀具規格 Tool Shank		BT40
馬達 motor	主軸馬達 Spindle motor (連續/30 分鐘定格)	kw(HP)	11kw
	X/Y/Z 軸馬達 X/Y/Z servo motor	kw	2.0/2.0/2.0
工作台 Table	工作台面積 Table size	mm	1200x600
	工作台最大荷重 Max. table capacity	kg	1200
	T 型槽(槽x寬x中心距) T-slot (Center * width * NO.)	mm	5x18x100
快速位移 Rapid travel	X 軸快速位移 X-rapid traverse	M/mm	24 線軌 Linear way /18 硬軌 Box way
	Y 軸快速位移 Y-rapid traverse	M/mm	24 線軌 Linear way /18 硬軌 Box way
	Z 軸快速位移 Z-rapid traverse (硬軌)	M/mm	24 線軌 Linear way /18 硬軌 Box way
	切削進給速度 Cutting feed rate	mm/mim	1/10000
控制器 Controller	三菱 Mitsubishi		64SM
其他項目 Othet	機器重量 Machine weight	kg	9200
	電源需求 Power Requirement	KVA	35
	空壓源 Air Requirement	Kg/cm^2	6
	水箱容量 Coolan tank	L	370

第三章 安裝及準備

CHAPTER 3 INSTALLATION AND PREPARATION

3.1 預防處理 PRECAUTION

1. 僅經過訓練合格之作業員,才能操作堆高機、天車或其他相似設施及使用吊鉤等。
   Only trained, qualified, qualified workers should operate forklift trucks, cranes or similar equipment and apply slings.

2. 請參考並使用如手冊中所示之鋼索線尺寸,他們的強度必須足以支撐機台之重量。
   Use only wires of dimensions specified in the manual. They must be strong enough to support machine weights.

3. 拉起機台之前,必須將吊裝零件與機台緊密鎖固。
   Before hoisting the machine, fixed each unit securely.

4. 機台的周圍必須保持乾淨及擺置有序。
   Maintain a clean and orderly surrounding around the machine.

5. 在機台完成安裝程序後,始可按下控制面板上之"POWER ON"鈕。
   "POWER ON" on the control panel can be pressed only after the complete installation.

6. 請確保安裝過程中,電線、電纜線等沒有遭到破壞。
   Be sure electrical cables and wires are not damaged during installation.

7. 安裝後,請確認電源線供應端容量是否足夠後,在接上線。
   After installation, proper capacity should be checked before connection the wire to the power source.

8. 開始使用機台前,請以破布沾煤油或燃料油除去防銹油。請勿使用含甲苯之化合物。
   Removing the anti-rusty oil by rags with paraffin or fuel oil before operating. Toluene compounds must not be used.

9. 在機器開機的狀態下,絕對不可將電氣箱打開。於電氣箱內,有足以導致生命危險及嚴重傷害之高壓電存在。

Never leaver the control boxes open while the power is on. A deadly high voltage is present which can cause serious injury.

3.2 服務須知 SERVICE REQUIREMENTS

3.2.1 電力部份 ELECTRICITY

本機器須在三相 200~240V、50 或 60Hz 電力下運轉,電壓源必須確保變動值在±5%以內。電力需求為 25KVA。如電源供應端距離本機器電氣箱在 5 米範圍內,則可採用 8mm²之電線。每台機台須有單獨的接地裝置。

The machine runs on three-phase, 200-240V, 50 or 60-Hz supply. Power supplied to the machine should not fluctuate more than ±5 %. The power required is 20 KVA. Using a minimum section of 8mm², the input power cable should be within 5 meters between electrical cabinet and power supply end. A separate earth ground is required.

3.2.2 空氣 AIR

本機器必須使用具有連續、乾燥的空氣壓,壓力值在於 85~100 psi(6~8kg/cm²)。(如:圖 3.1)

The air requirement for the machining center is a continuous clean, dry air at 85~100 psi (6~8 kg/cm²). (Ref. Fig 3.1)

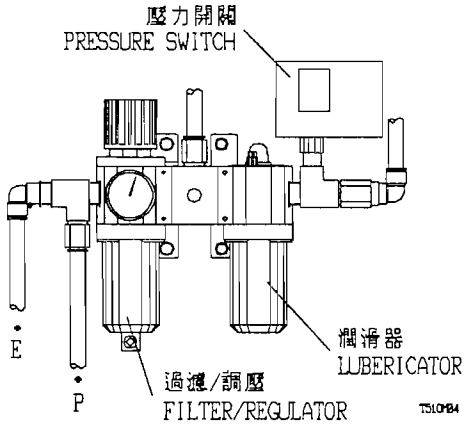


圖 3.1
Fig 3.1

注意:空氣壓中過量的油或水氣會引起機器不正常的作動。三點組合中過濾/調壓單元具有一自動洩放口,啟動機器前須保持水杯中無積水。本項檢查須每日執行,以確保正常的運作。此外,空氣壓管線中過量的污染物可能會阻礙並弄髒閥門,導致空氣或水氣直接流入機器中。

空氣壓力檢知之壓力開關是由製造廠商於場內設定完成，用以確保當作動電磁閥之空氣壓降太大時，此壓力開關會顯示必要的訊息。請切勿自行動手調整此壓力開關。

NOTE: Excessive oil and water in the air supply will cause the machine to malfunction. The air filter/regulator has an automatic drain function that should be empty in the bowl before starting the machine. This must be checked daily for proper operation daily. Also, excessive contaminants in the air line may clog the dump valve and cause air/or water to pass into the machine.

The air pressure-detecting switch installed in the system is factory-set to assure the proper "signal". The drop of air supply to the solenoid control valves will cause improper functioning of the pneumatic actuators. Do not tamper with this switch.

3.3 環境須知 ENVIPONMENTAL REQUIREMENTS

1. 應儘量避免將機器暴露於陽光照射的地點或鄰近熱源等。操作的環境溫度應介於 0~40° C。
   Avoid expose the machines to direct sunlight and/or near to a heat source, etc. Ambient temperature during operation should be 0 through 40°C.

2. 應避免將機器放置於溼度值變化大的地點或是高溼度處。
   Avoid installing machines in a location where the humidity fluctuates considerably and/or highly humid.

3. 應避免將機器放置於多灰塵或潮濕的地點。
   Avoid installing machines in a dusty, misty location.

4. 應避免將機器放置於有振動源附近。
   Install machines where is no vibration sources in surroundings.

5. 應將機器放置於平坦及光滑的地面，不可有灰塵或其他物質。地板的最低耐壓力須達 5000kg/cm²。
   Install machines in a flat and smooth ground without or other particles. The minimum bearing pressure of the floor is 5000 kg/m².

6. 應避免機器遭受電磁波的干擾。例如：電弧焊或放電加工機等。
   The machine must be protected from electrical noise sources, such as electric welders and an electric discharge machine.

7. 必須單獨將機器接地，接地組抗須在 100ohms 以下，且接地線必須越短越好。
   Always ground machine independently. The ground resistance is should be 100 ohms or less and the length of ground cable should be as short as possible.

8. 噪音值在操作者所在位置須在 85dBA 值以下。
The noise level at the operator's position should be under 85 dbA.

9. 機台所在之地基必須為具有足夠厚度及品質一致性的強化或非強化水泥結構, 此等級須能夠符合相對於機器重量之工業用標準。
Foundation should be constructed of either reinforced or non-reinforced concrete with thickness and consistency and should also be compatible to industry standard for its machine weight.

3.4 機器安置 SETTING IN PLACE

3.4.1 機台進出貨櫃注意事項 **While moving machine in/out container**

當搬運機器進出或會時, 請注意並避免使機器碰撞貨櫃頂部, 請特別注意最容易碰損的區域。
Cautiously keep the machine from colliding with the container ceiling when move it in/out container. Pay particular attention to the easy-damage area such as shown Fig2.2

注意：在貨櫃中,機器的高點距離貨櫃頂僅有 140mm,請隨時確認安全的進出。
NOTE: The distance between the container ceiling to machine's highest point is only 140mm. Monitor the movement as carefully as you can.

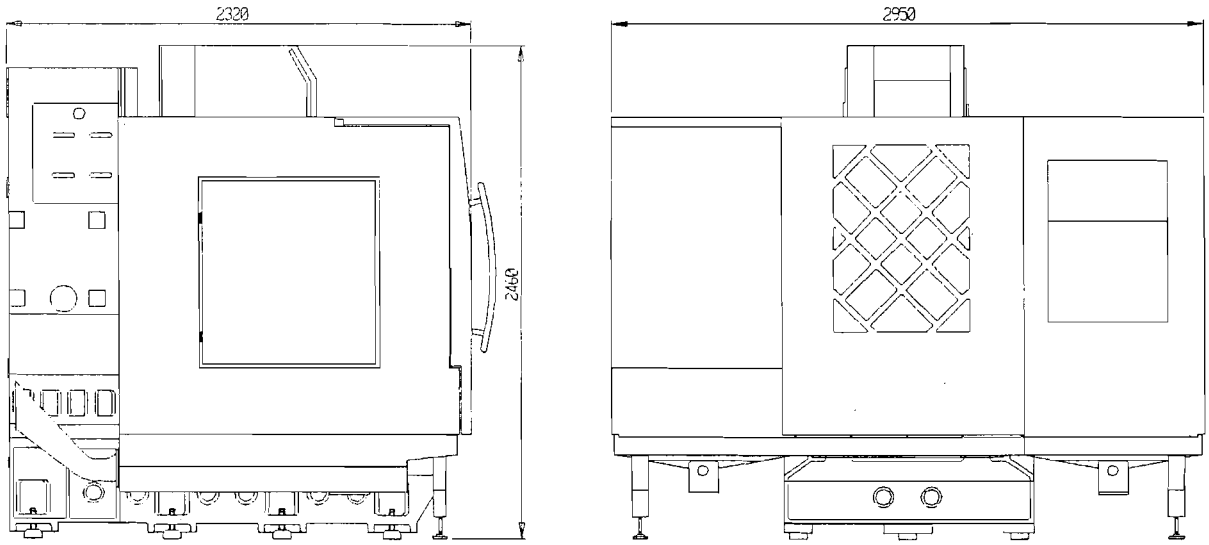


圖 **3.2** 機器進出貨櫃圖
Fig 3.2 Machine IN/OUT container

3.4.2 堆高機 By Forklift

隨時注意機器之重心所在位置:

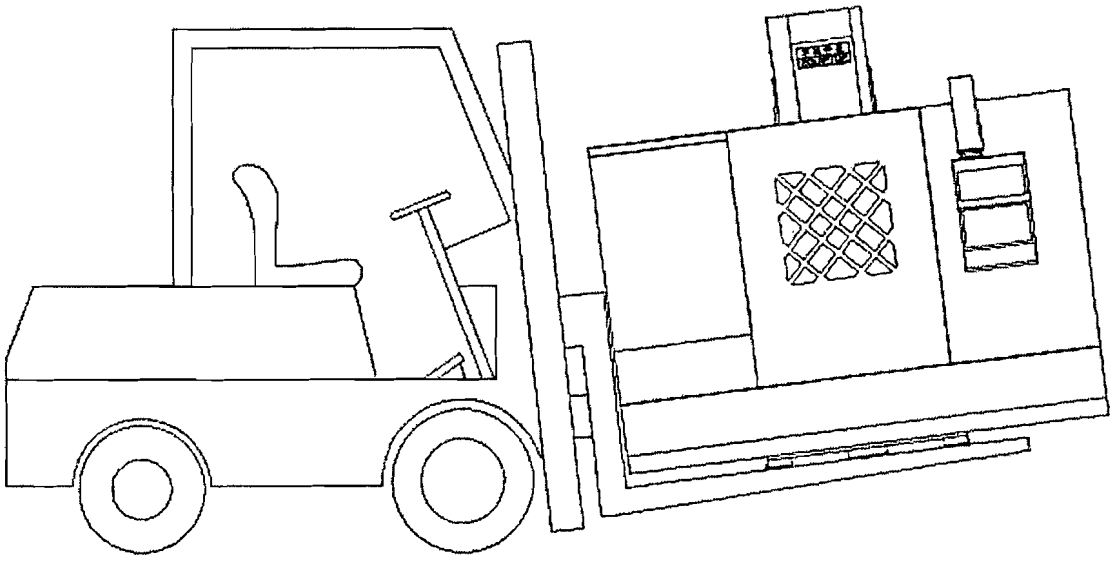
以堆高機刀叉緩慢移致機器重心所在位置後才將機器舉起, 以避免機器傾倒。(如:圖 3.3)

Keep in mind the machine's center of gravity:

Approach the machine with a forklift at the heaviest point of the machine to avoid tipping over of it. (Ref. Fig 3.3)

**搬運時, 僅能從自動換刀機構(ATC)的一側插入, 因為機器的重心偏向 ATC 一側。

**The only acceptable way to move the machine is to lift it from the A.T.C. side.



EMV600 機器重量 = 4000kg
EMV860 機器重量 = 5800kg
EMV1020 機器重量 = 6300kg
EMV1100 機器重量 = 9200kg

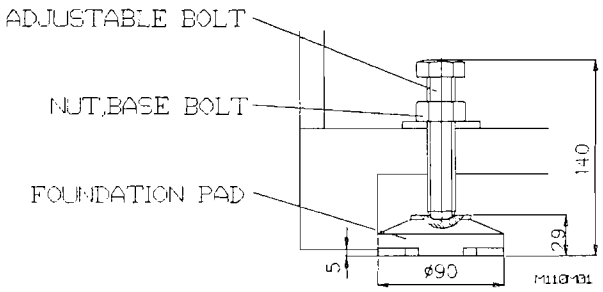
圖 3.3 堆高機搬運方式

Fig. 3.3 Transportation of Forklift

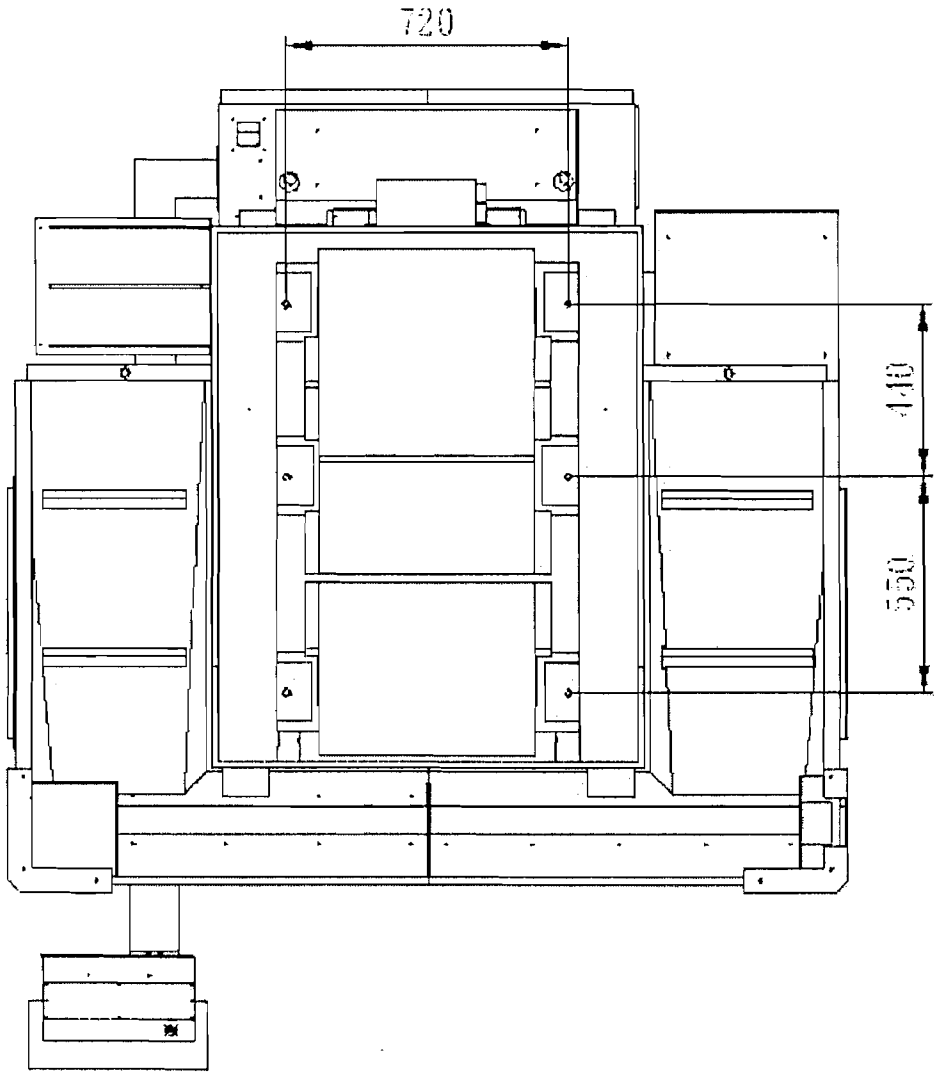
3.5 機器安裝程序

THE PROCEDURE OF MACHINE INSTALLATION

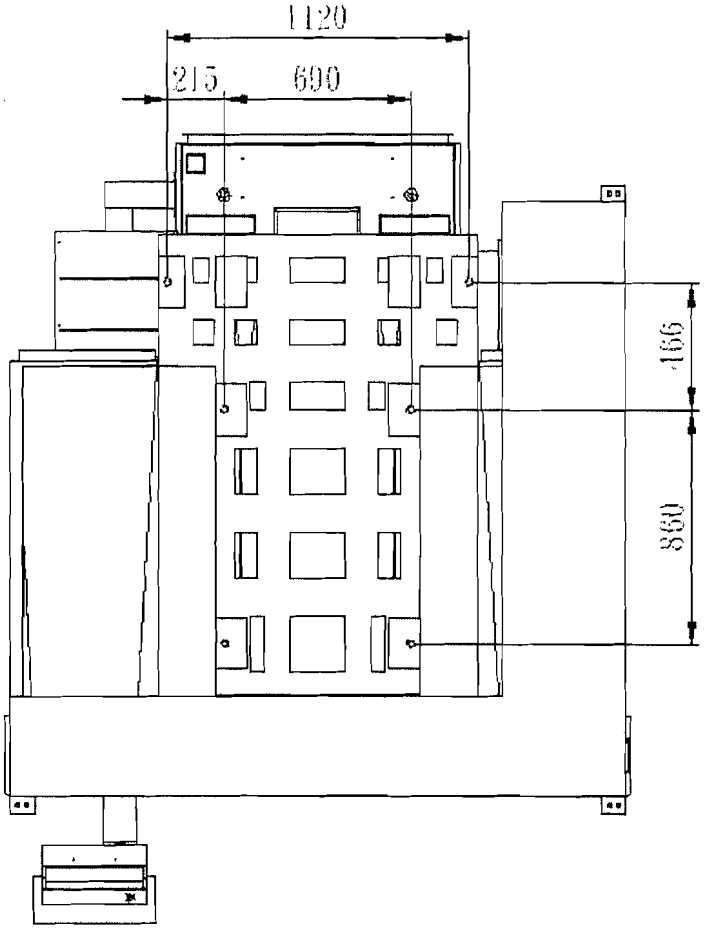
1. 將機器放置於適當位置。
   Position the machine after setting down the machine to the adequate place.
2. 依照機器地基圖所示，放置基礎墊塊於地基螺栓下方。(如：圖 3.4)
   According to the drawing of foundation, put the foundation pas under the foundation bolts to position machine. (Ref. Fig. 3.4)



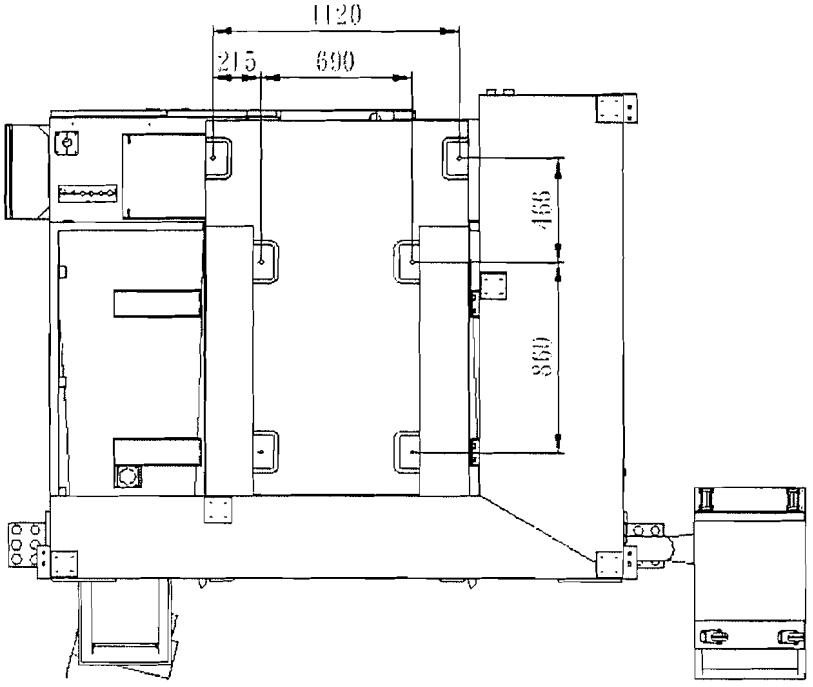
EMV600



EMV860



EMV1020



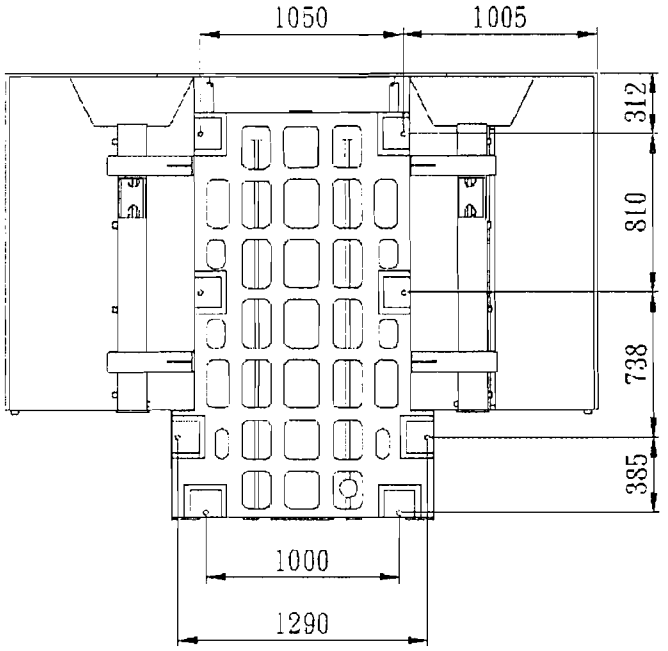


圖 3.4 地基圖

Fig. 3.4 Foundation Drawing

重要須知 **IMPORTANT NOTICES:

以下的檢查及調整必須由服務工程師來執行。

Service engineer must do following check and adjustment.

1. 連接變壓器電源線,務必要確認當地使用的電壓值。
   Must confirm the power voltage supply before connect the wire to transformer.
2. 移除出貨支架(橘色者)及螺栓等。(如:圖 3.5 所示之部位)
   Remove the shipping [Orange color] and screw. (Ref Fig. 2.5)

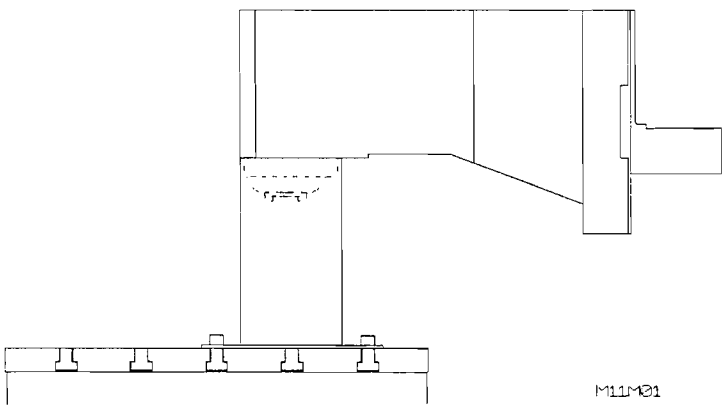


圖 3.5 主軸頭出貨固定架

Fig. 3.5 Shipping Assembly

3. 安裝附件 Installation of accessories:：

a. 裝上油水分離箱，連接管線至水箱及蓄油盤。
Mount the oil-water separation tank, and connect the hoses to coolant tank and to oil reservoir tank.

b. 連接冷卻馬達及水箱之相關管線。
Pipe coolant pump and coolant tank.

**注意：當採用環繞噴水場合，須將球型閥打開。

**NOTE : Open ball valve when using ring spraying.

3.6 水平調整步驟 THE PROCEDURE OF ADJUSTING LEVEL

1. 三軸歸原點。
Let three axes return to the home position.

2. 清潔工作台，並將水平儀如圖方式放置於工作台上。(如：圖 3.6)
Clean the table surface and put the levels gauge on just the drawing shown. (Ref. Fig. 3.6)

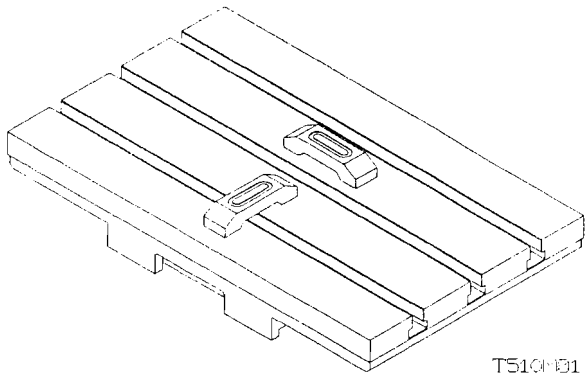


圖 3.6 機器水平調整
Fig. 3.6 Adjusting Level

3. 調整地基螺栓及螺帽，以確保地基螺栓位於基礎墊塊凹槽上。
Adjust the foundation bolt and nuts to make the foundation bolts locate within the indent of pad.

4. 再次執行三軸歸原點動作。
3 axes home operation again.

5. 移動 X 軸至+255mm 且 Y 軸至-200mm 處，調整地基螺栓至水平儀氣泡位於中央位置或偏移量在 0.01mm 範圍內。
Move X axis to +400mm and Y axis to –250mm. Adjust the foundation bolts to ensure the bubbles of level gauges in the middle position and keep the deviation within 0.01 mm.

6. 移動 X 軸由 0 點至+510mm 調整地基螺栓使得此二處位置水平儀偏移量在±0.05mm 範圍內。
Move X axis to the zero position and +800mm. Adjusting the bolts and nuts until the bubbles difference between the two points within 0.05mm.

7. 移動 X 軸至+430mm 位置後,移動 Y 軸由 0 點至-400mm 調整地基螺栓使得此二處位置水平儀偏移量在±0.05mm 範圍內。
   After returning X axis to +400mm, move Y axis to zero and –500mm.Repeat procedure 6 until the bubbles difference value between the two points within 0.05 mm.
8. 鎖緊地基螺栓及螺帽。
   Tighten the foundation bolts with nuts.

3.7 裝機通電注意說明
POWER INSTALLATION DESCRIPTION

3.7.1 裝機通電注意說明 **Power Installation Description**
機台送電前請確認以下幾點:
Check following points before power supply:

1. 所有固定件是否拆除
   Remove all fixed parts.
2. 所有接線(電線)是否接好
   Check all connections are connected.
3. 所有馬達是否裝上
   Check all motor are installed.
4. 確認電壓是否正確
   Make sure the voltage of power supply is correct.

**三菱、發那科通告電壓不穩超過 220±15%易造成控制器異警,裝機人員務必確認客戶電壓是否符合規定,若不符合規定必須要求客戶改善,不得貿然開機。
Mitsubishi and Fanuc notification Controller would be abnormal and alarmed if the supply power voltage over the range of 220±15%. Installation technician has to make sure the power supply is correct before turn on the power. If the power is abnormal, ask customer to improve. Don't turn on the power until the power is correct. Other the customer should take the responsibility of damage.

3.7.2 裝機通電步驟 The step of installation

1. 三菱、發那科控制器使用 220V 3 項電壓需接接地線。

   Mitsubishi and Fanuc controller 220V/3phase, and earth connection needed.

2. 附變壓器一組。

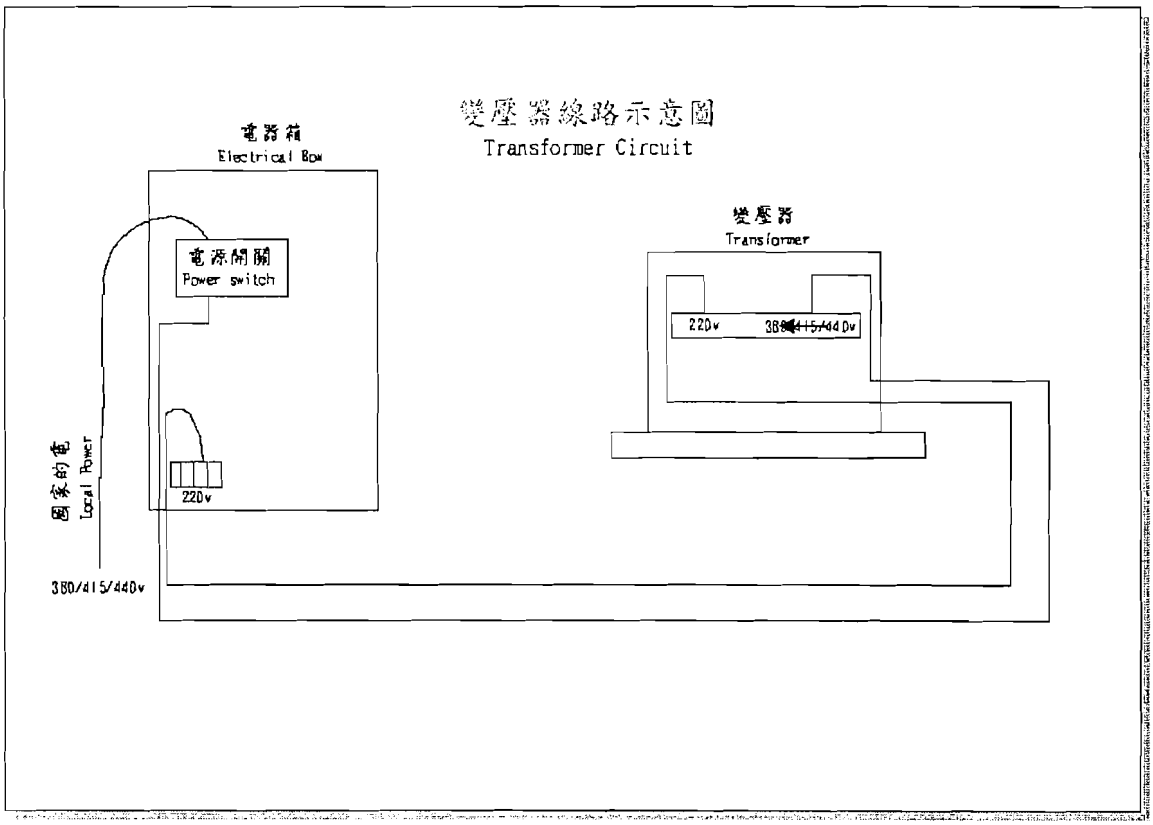
   Transformer attached.

3. 380V(420V&460V)電壓接入變壓器。

   Connect 380V(420V&460V) power to transformer.

4. 變壓器輸出 220V 之電壓，接入機台如下圖所示：

   Transformer output 220V power. Connect to machine as shown below:



5. 請確實確認電壓，再開機。

   Reconfirm the power voltage before turn on the power.

6. 若未確實確認而誤送電壓造成損壞，請自行負責。
   It would be user's own responsibility if connected wrong power voltage and caused damage.

第四章 保養計劃及用油表

CHAPTER 4 MAINTENANCE SCHEDULE & OIL CHART

4.1 保養計劃 MAINTENANCE SCHEDULE

請依照以下的保養計劃實施,以確保機器的可靠運轉。

The following maintenance schedule should be followed to assure continued dependable operation of your machine.

週 期 INTERVAL	保 養 項 目 MAINTENANCE ITEM
每 日 DAILY	▲檢查潤滑油泵浦及三點組合潤滑油箱液面高。(如:圖 3.1) Check lube pump and F.R.L. lubrication tank level. (Ref. Fig. 3.1) ▲檢查三點組合之空氣壓力。(如:圖 3.1) Check air pressure at F.R.L. unit. (Ref. Fig. 3.1) ▲檢查三點組合之自動排洩水杯。(必須完全釋放) Check automatic drain at F.R.L. unit. (The bowl should be empty.) ▲清除摺動護罩、水盤及換刀機構上之鐵屑。 Clean chips from way covers, bottom pan and tool changer. ▲檢查冷卻液液面高。 Check coolant level. ▲已乾淨的絨布清潔主軸內錐面,並且噴上輕質油。 Wipes spindle taper with a clean close tag and apply light oil.
每 週 WEEKLY	▲檢查、清潔熱交換器上之濾網。 Check/clean filters screen on heat exchanger. ▲清潔機台,但請勿使用溶劑。 Perform necessary cleaning of machine. Do not use solvents. ▲再換刀機構之日內瓦輪及軌道處上少許潤滑油脂。(選刀盤式換刀機構時) Lightly grease the Geneva wheel and guide rails of the tool changer and drum through all tools. (for drum type)

週 期 INTERVAL	保 養 項 目 MAINTENANCE ITEM
每 月 MONTHLY	▲檢查摺動護罩是否運動順暢並且以輕質油潤滑之;如有必要清除水箱上之濾網。 Inspect way covers for proper operation and lubricate with light oil, clean the upper screen o the coolant tank if required.. ▲以油脂潤滑夾爪、刀套。 Lightly grease the finger/pocket of tools
每 半 年 SIX MONTHS	▲更換冷卻液及徹底清潔水箱。 Replace coolant and thoroughly clean the coolant tank. ▲以 Mobil vactra#2 油潤滑配重用鏈條,須全長塗敷。 Lubricate counterweight chains with Mobil Vactra #2 over full length of chain. (If counterweight is used) ▲檢查鏈條是否有非正常之磨耗或斷裂情況。 Inspect chain for any abnormal wear or cracks.
每 年 ANNUALLY	▲檢查機台接地阻抗質是否合乎標準。 Check ground impedance level. ▲排放、清理及重新注入主軸油冷機用油。 Drain, flush & refill spindle oil cooler tank (if applicable).

4.2 建議使用油品 OIL USAGE RECOMMENDATION

用 油 建 議 表 OIL USAGE RECOMMENDATION				
品牌 BRAND 項目 ITEM	MOBLE	SHELL	ESSO	CASTROL
氣壓元件潤滑油 LUBRICATOR OF PNEUMATIC	DET LIGHT	TURBO T32	TERESSO 32 NUTO H32	HYSPIN VG32 PERFECTO T32
自動潤滑系統 AUTO LUBRICATOR SYSTEM	VACTRA 2	TONNA T68	FEBIS K68	MAGNA BD68

第五章 技術參考資料

CHAPTER 5 TECHNICAL REFERENCE

5.1 進接開關式主軸定位

PROXIMITY SENAOR SPINDLE ORIENTAION

當執行刀具交換時,機器會自動執行主軸定位。主軸定位亦可以程式 M19 執行之。當主軸馬達齒輪與主軸齒輪齒數比非 1:1 的場合時,計算上係以主軸端的位置檢知裝置(近接開關)之位置當作基準,而非以主軸馬達端的解碼器當作定位基準。

Orientation of the spindle is automatically performed for tool changes and can be programmed with M19. If the gear ratio between spindle pulley and main motor pulley is not 1:1, the spindle orientation is based on the detector (proximity) at spindle, not on the encoder at the main motor side.

5.2 刀臂式自動換刀機構之維護

SERVICE NOTICE OF ARM TYPE A.T.C.

警告!! WARNING!!

*假如沒有充分的了解,維修自動換刀機構會產生高度危險。

*IT IS EXTREMELY DANGEROUS TO OPERATE OR REPAIR A.T.C. WITHOUT SUFFICIENT KNOWLEDGES.

*僅有維修資格的人員才允許執行操作。

*ONLY QUALIFIED PERAONNEL IS PERMITED TO SERVICE THE FOLLOWING OERATION.

*未經授權的人員應遠離自動換刀機構刀臂的迴轉區域。

*UNAUTHOURIZED PERSONNEL SHOULD STAY AWAY FROM A.T.C. OPERATION AREA.

第六章 操作面板說明

CHAPTER 6 OPERATION PANEL

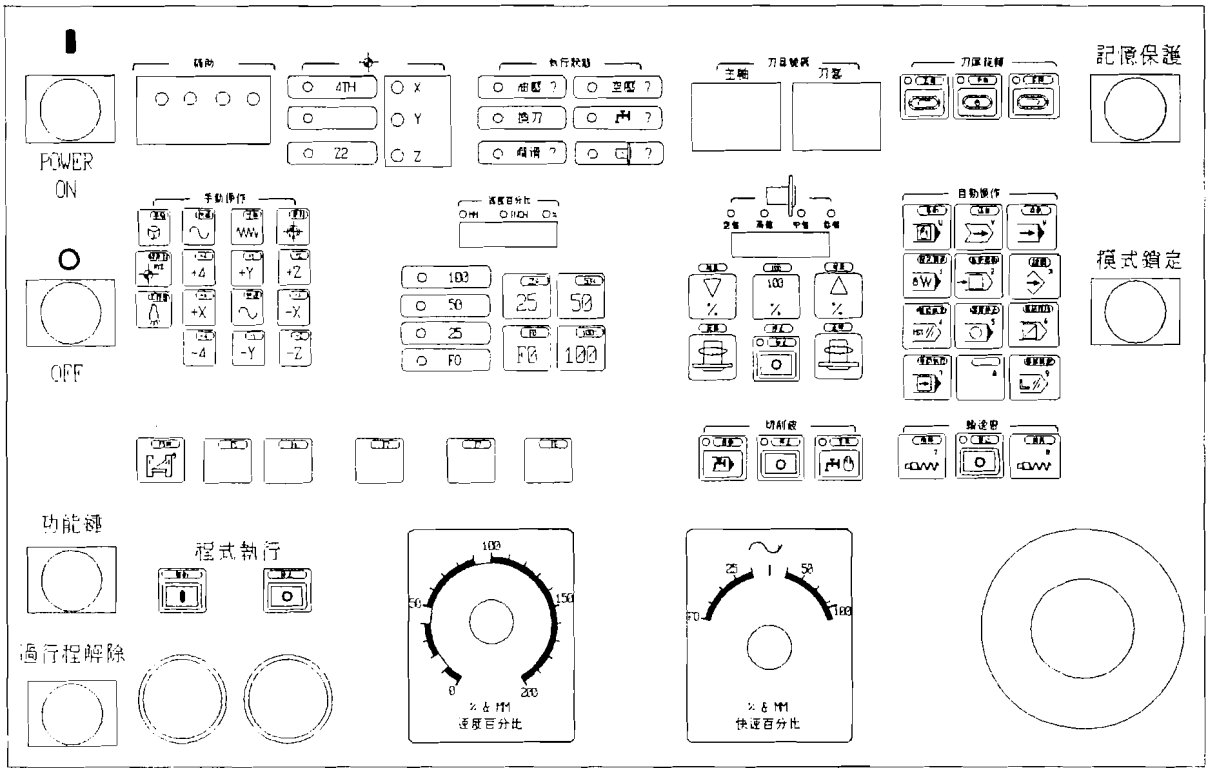
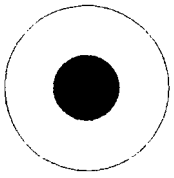
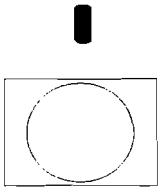
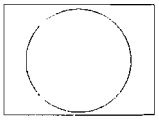
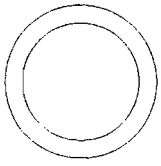


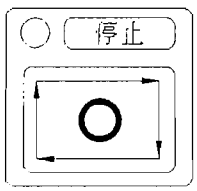
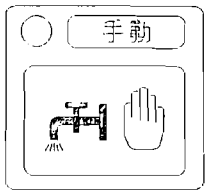
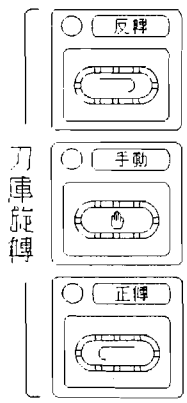
圖 6.2-1(觸控式操作面板)

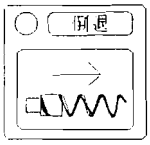
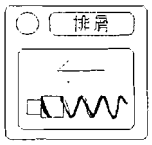
Fig 6.2-1 (Touch Panel)

6.1-1 EMV600 觸控式操作面板說明

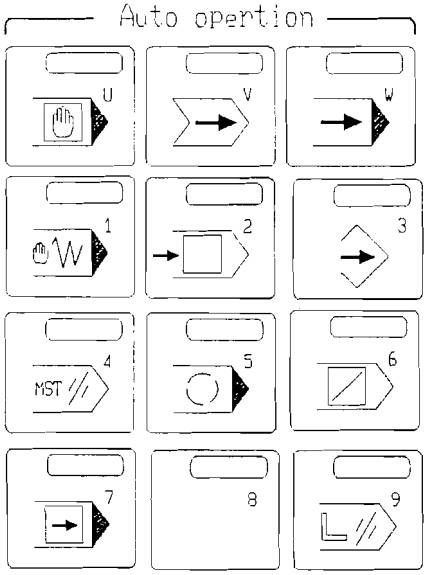
圖示	功能操作說明
EMERGENCY  M110M08	緊急停止開關 A. 用於機械發生緊急狀況,例如機械有發生不正常動作可能危及人員或機械安全時使用。 B. 按下此鍵後,機械所有動作都將立即停止,如:進給、主軸旋轉等。 C. 如欲解除此緊急停止狀態,請將按鈕依順時針方向旋轉即可。 EMERGENCY STOP A. Press this button in emergency situations, i.e. when human life is in danger or there is a risk of damage to the machine or workpiece. B. After pushing down this button, all machine movements, such as feed and spindle rotation will stop immediately.

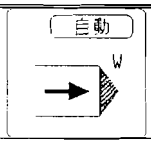
	C. If intend to release this emergency stop status, just turn this button clockwise.
 POWER ON	電源 A. 按下"ON"鍵,NC 電腦、機械面板、伺服馬達…等電源投入。 B. 按下"OFF"鍵, NC 電腦、機械面板、伺服馬達…等電源斷電。 POWER A. Press "ON" button, NC controller、operation panel and servo motor etc will power ON. B. Press "OFF" button, NC controller、operation panel and servo motor etc will power OFF.
過行程解除 	過行程解除 A. 作用:當 CRT 出現"過行程 ALARM"訊息時,可按本鍵。 B. 使用方法:例如 X 軸負方向過行程時,按本件並同時按下 X 軸正方向鍵,即可使 X 軸依正方向正常移動,解除 ALARM 訊息。 OVERTRAVEL CANCEL A. Function: this button can be pressed only when CRT appears "OVERTRAVEL ALARM" message. B. Usage: for example, while –X overtravel, press this button and +X button simultaneously. That can make X axis moves toward positive direction and cancel ALARM message.
TOOL UNCLAMP 	刀具鬆刀與夾刀 A. 位於主軸右下方處。 B. 按下此鍵不放,主軸內爪鬆開,可取下或置入刀具。 C. 放鬆此鍵, 主軸位爪扣縮, 主軸夾住刀具。 D. 刀具置入主軸錐孔前, 請先清潔乾淨。 TOOL UNCLAMP / TOOL CLAMP A. The clamp device is located at the lower right side of the spindle. B. Keep pressing this key, the spindle inner claw will unclamp. It allows to remove or insert tools under this status. C. Release this key, the spindle inner claw will clamp and that makes spindle clamp tools. D. Clean the tools before setting them inside the spindle.

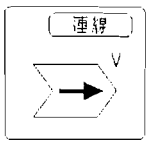
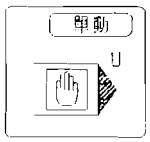
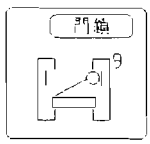
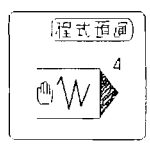
	A. Function: while executing the program which contains M08 or M09 commands, press this key and the coolant motor will run according to command instruction. B. Usage condition: it is active only in "AUTO" mode. C. When this key is active, the built-in lamp will light up.
	切削液停止 A. 功能:不管機械是否動作,切削液無輸出。 B. 使用條件:在自動模式或手動模式中均有效。 C. 本鍵生效後,內藏燈會亮。 COOLANT OFF A. Function: No matter the machine is running or not, no coolant flows out. B. Usage condition: it is active both in "AUTO" mode and "MANUAL" mode. C. When this key is active, the built-in lamp will light up.
	手動切削液 A. 功能:不管機械是否動作,切削液連續輸出。 B. 使用條件:在自動模式或手動模式中均有效。 C. 本鍵生效後,內藏燈會亮。 MANUAL COOLANT ON A. Function: No matter the machine is running or not, the coolant keep flowing out continuously. B. Usage condition: it is active both in "AUTO" mode and "MANUAL" mode. C. When this key is active, the built-in lamp will light up.
	刀庫旋轉 A. 功能:僅在手動操作模式有效。 a. 先按手動(MAN)鍵內藏燈亮時,才有效。 b. 每按一次正轉(CW)或反轉(CCW),刀盤旋轉一把刀。 c. 若持續按住,刀盤旋轉直到鬆手才停止。 B. 刀盤正轉:正時針方向。 刀盤反轉:逆時針方向。 TOOL MAGAZINE ROTATION A. Function: it is only active in "MANUAL" mode. a. Press "MAN" key, as soon as the built-in indicating lamp lights up, this function will be activated. b. Whenever press "CW" or "CCW" once, tool disc will rotate to next tool. c. If keep pressing this key, the tool disc will keep rotating until this key is released.

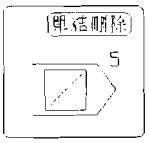
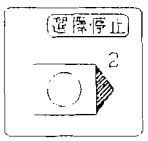
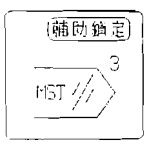
	B. TOOL DISC FORWARD: Clockwise (CW). TOOL DISC REVERSE: Counter clockwise (CCW).
 	輸送帶 功能: A. 按"排屑"(FOR)鍵內藏燈亮,排屑機正轉動作,再按一次排屑機正轉停止,內藏燈息。 B. 按"倒退"(BACK)鍵內藏燈亮,排屑機反轉動作,再按一次排屑機反轉停止,內藏燈不亮。 CHIP CONVEYOR Function: A. Press "FOR" key, the built-in indicating lamp lights up, chip conveyor runs forward. Press this key again, chip conveyer will stop running forward and the built-in indicating lamp extinguishes. B. Press "BACK" key, the built-in indicating lamp lights up, chip conveyor runs backwards. Press this key again, chip conveyer will stop reserve rotation and the built-in indicating lamp will extinguish

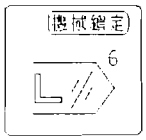
觸控式操作面板說明
Description of Touch Panel



圖示	自動功能操作說明
	自動模式 A. 亦稱程式執行模式。

	B. 本模式下才能執行 CNC 記憶體中之程式。 AUTO MODE A. It is also called Program Execution mode. B. The programs saved inside CNC memory can only be executed under this mode.
	連線 利用讀待機讀取或打製紙帶時使用。 LINK It is used while using paper tape reader to read or using paper tape puncher to punch.
	單動 A. 在本模式下,可當場於螢幕上輸入簡單程式予以執行。 B. 在本模式下輸入之簡單程式: a. FANUC 系列之控制器,僅能存入 1 個單結的程式。 b. 三菱系列之控制器,則能存入較多程式,並可一次全部執行。 SINGLE BLOCK D. It is able to input simple program to execute under this mode. E. The simple program input in this mode: a. In case of FANUC controller, it is able to input single block only. b. In case of MITSUBISHI controller, it is able to input more blocks and to be executed in one time.
	門鎖 A. 按下此鍵燈亮,門鎖開關打開持續 5 秒鐘,5 秒鐘後門所開關自動關閉,燈滅。 B. 此模式在機械運轉中,執行無效。 DOOR INTERLOCK A. As soon as this key is pressed, the indicating lamp will light up and the door interlock will open for 5 seconds meanwhile. After 5 seconds, the door interlock switch will shut off automatically and the indicating lamp will extinguish. B. This mode will be inactive while the machine is running
	程式預演 A. 按此鍵燈亮,程式裡所設定的 F(速度)指令無效,各軸移動速率低 TRAVERSE FEED 所指定之速率位移。 B. 按此鍵燈亮,程式執行攻牙固定循環時,按此鍵無效。 C. 按此鍵燈滅,各軸依程式設定之 F 行進。

	DRY RUN A. As soon as this key is pressed, the indicating lamp will light up and the F command in program will be inactive. Each axis will move at traverse feedrate. B. Press down this key and the indicating lamp lights up. However this key will be inactive when the program executes tapping cycle. C. Press down this key and the indicating lamp extinguishes, each axis will travel at the rate set by F command.
	單結刪除 A. 按此鍵燈亮,程式執行如遇單節前有"/"符號時,此單節略過不執行。 B. 按此鍵燈滅,即使單節前有"/"依舊執行不跳躍。 BLOCK DELETE A. As soon as this key is pressed, the indicating lamp will light up and the blocks which starts with "/" character will be ignored and the program will skip to next block. B. Press down this key and the indicating lamp extinguishes, though the blocks starts with "/", it will not be skipped.
	選擇停止 A. 按此鍵燈亮,執行程式單節中若有"M01"之指令,程式將停止於該單節,若欲繼續時按下"程式啟動"鍵即可。 B. 按此鍵燈滅,若程式有"M01"指令時,程式亦不會停止。 OPTIONAL STOP A. Press down this key and the indicating lamp lights up. If the blocks in the executed program contains "M01" command, the said program will stop at the block contains M01. If intend to go ahead, just press "CYCLE START" key. B. Press down this key and the indicating lamp extinguishes, though program contains "M01" command, "M01" will be ignored and the program will not be stopped.
	輔助鎖定 A. 按此鍵燈亮,執行單節中,若有 M.S.T. CODE 指令不執行,紙執行 G CODE 之指令。 B. 按此鍵燈滅,執行 G.M.S.T CODE 指令正常運作。 M.S.T. CANCEL A. As soon as this key is pressed, the indicating lamp will light up. If the blocks contain M.S.T. commands, M.S.T. code will be ignored, only G code will be executed. B. Press down this key and the indicating lamp extinguishes, the system will execute G code and M.S.T. code and operate normally.



機械鎖定

A. 按此鍵燈亮,程式執行或手動操作時,位置顯示依正常顯示,但機械保持靜止不動。

B. 當執行 G28.G29.G30 時,機械不會移至零點,所以即使執行原點復歸的程式指令,各軸原點的指示燈仍不會亮。

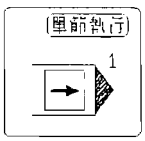
C. M.S.T 和 G 指令會繼續執行,不會因機械鎖定而停止。

MACHINE LOCK

A. Press down this key and the indicating lamp lights up. In case it is under program execution or manual operation mode, the position display will be normal but machine will keep motionless.

B. While executing G28, G29 and G30, machine will not move to zero point. Therefore, even execute zero return commands, the origin indicating lamp of each axis will not light up.

C. M.S.T. and G command will be executing continuously. They will not stop due to machine lock.



單節執行

A. 按此鍵燈亮,程式僅能以"程式啟動"命令執行.再按一次"程式啟動"僅能執行一單節。

B. 按此鍵燈滅,程式可執行到完畢才結束。

C. 按此鍵燈亮,且執行 G28.G29.G30 之程式指令時,三軸會停於中間點。

例:G28 X200.

按此鍵燈滅由 X200. 之點回復至 X 軸之機械原點。

按此鍵燈亮會停在 X200.,需再按" 程式啟動" 。

SINGLE BLOCK OPERATION

A. As soon as this key is pressed the indicating lamp lights up, and the program can be executed only by "CYCLE START" command. Press "CYCLE START" again, the system can execute a single block only.

B. Press down this key and the indicating lamp extinguishes, the program will be executed until end of block and then stop.

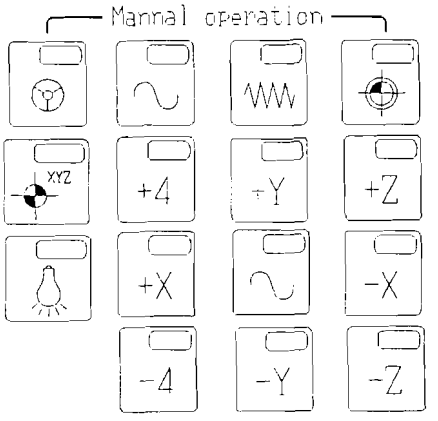
C. While executing G28, G29 & G30 commands, press down this key and the indicating lamp lights up , the 3 axes will stop at center point.

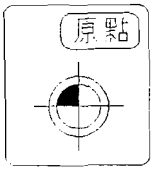
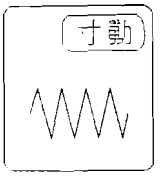
e.g.: G28 X200.

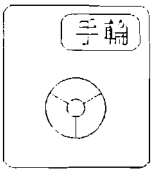
Press down this key and the indicating lamp extinguishes, it will

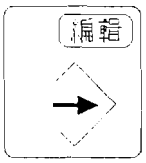
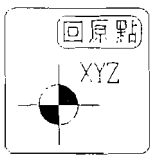
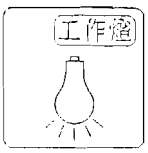
	return from X200 to X machine origin point. Press down this key and the indicating lamp lights up, it will stop at X200. it needs to press "CYCLE START" again.

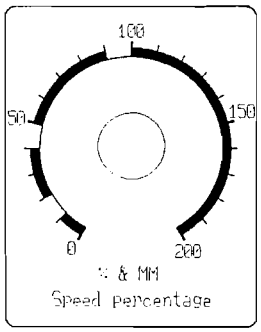
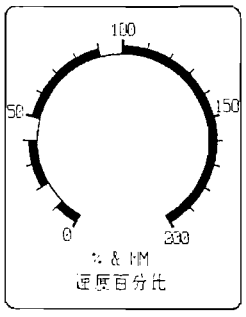
手動功能操作說明
Description of Manual Operation

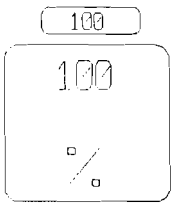
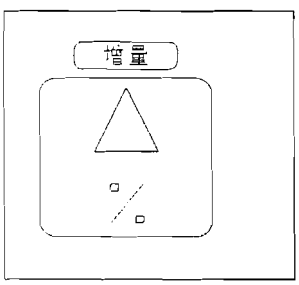


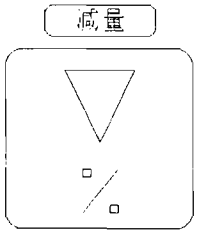
圖示 Figure	手動功能操作說明 Description of Manual Operation
	原點(ZRN) 三軸復歸至"機械原點"時使用 A. 按+X 鍵時,X 軸歸原點 B. 按+Y 鍵時,Y 軸歸原點 C. 按+Z 鍵時,Z 軸歸原點 Zero return (ZRN) This key is used while want to make 3 axes return to "Machine Reference Zero". A. Press +X Key, X-axis returns to its zero point. B. Press +Y Key, Y-axis returns to its zero point. C. Press +Z Key, Z-axis returns to its zero point.
	慢速進給(JOG) A. 本模式下設定軸以"進給率調整"鍵所設定之速度進給,詳細請參閱"進給率調整"鍵說明

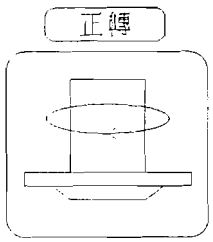
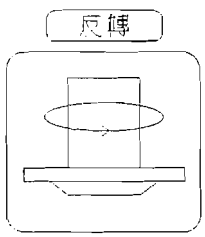
	B. 選擇進給率調整鍵之進給率 C. 選擇欲移動之軸向之(正)鍵或(負)鍵予以控制軸向之行進,手指不要離開(離開後即停止進行) 。 D. 快速進給(~) 直接按軸向(正)鍵或(負)鍵並按下"~"鍵極為快速進給,手指不要離開,若放開"~"鍵,極為慢速進給。 SLOW SPEED FEED (JOG) A. Under JOG mode, the selected axis will feed at the feedrate set by "Feedrate Override". For the details, please refer to the description for "Feedrate override" key. B. Set federate on the "federate override" switch. C. Select the direction key (+) or (—) to control the direction of axis movement. Keep pressing this key (if stop pressing, the movement will stop immediately). D. Rapid Traverse Override (~) Press direction key (+) or (—) and "~"key together, that will become Rapid Traverse. Keep pressing this key. If stop pressing, it will become slow traverse.
	手輪進給(MPG) A. 本模式下,須以手輪控制三軸之移動速率。 B. 執行本模式時須 a. 選擇移動之軸向(請參閱手輪操作說明) 。 b. 選擇進給速度倍率(請參閱手輪操作說明) 。 C. 以上項目選擇完成後,即可以手輪開始控制其行進作業。 D. 手輪操作時請參閱手輪操作使用說明。 MPG HAND WHEELFEEDRATE (MPG) A. Under this mode, it is able to use MPG hand wheel to control axis federate. B. When execute this mode, it is necessary: a. To select movement direction (please refer to the description of hand wheel operation). b. To select federate override in % (please refer to the description of hand wheel operation).

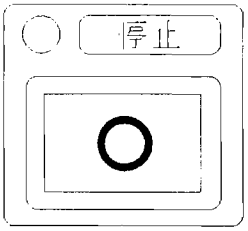
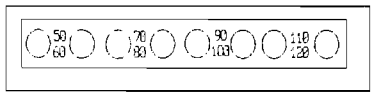
	C. When the above selection is completed, it is able to use hand wheel to control the axis movement. D. For the details, please refer to the description of hand wheel operation.
圖示 Figure	編輯功能操說明 Description of Edit Function
	編輯 A. 對原有程式予以編輯、修改、增加或刪除時,使用本模式。 B. 本模式僅用於編輯,不能用於執行。 C. 如執行新編之程式,必須在”自動模式”下。 D. 程式編輯完成,電腦即自動儲存,不必再執行儲存之動作。 Edit A. It is able to edit, modify, add or delete the original programs under this mode. B. This function is only used for editing program, not for executing program. C. If intend to execute new edited program, the system should be under "AUTO" mode. D. As soon as the program editing is completed, the computer will save program automatically. It is not necessary to execute saving action.
	回原點 選擇在原點模式下,按此鍵,由 Z 軸先回原點,X、Y軸分別回原點。 Home Return Press this key under "Home Return" mode, Z axis will return Home first, then X, Y axis return to Home sequentially.
	工作燈 A. 按此鍵亮燈,工作燈打開。 B. 按此鍵燈滅,工作燈關閉。 Working Lamp A. Press this key and the indicating lamp lights up, the working lamp will turn ON. B. Press this key and the indicating lamp extinguishes, the working lamp will turn OFF.

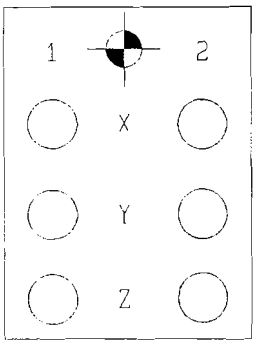
圖示 Figure	進給率操作說明 Description of Feedrate Setting
	A. %燈亮,代表原程式設定速度(F)之百分比。 例如:設定在 120%,F300 表示 其速率為 300*120%=360mm/min B. MM 燈亮,代表每分鐘之進給率。 例如:設定在 6000,表示其速率為 6000mm/min C. 當模式設定為"自動模式"或"手動資料輸入"模式時,執行 G01 之進給率,採用%之數據,代表其進給率(%)。 D. 當模式選擇設定在"慢速進給"模式或"自動模式"之程式預演時,採用 MM 之數據代表其僅給率。 A. When % indicating lamp lights up, that means feedrate % set by original program is active. e.g.: if set 120%, F300, that means the feed rate is 300*120% = 360mm/min B. When MM indicating lamp light up, that stand for the feedrate per Minute. e.g.: if set at 6000, that means the feedrate is 6000mm/min C. When the mode is set at "AUTO" or "MDI" mode, and the feed rate of G01 is in act, it adopts % value to stand for its feed rate. D. When the mode is set at "JOG" or "AUTO" mode and executes Dry Run, it adopts MM value to stand for its feedrate.
	速度百分比 A. 快速進給速率分為 4 段(F0、25%、50%、100%)可供選擇。 B. 可直接旋轉速度百分比來改變進給速率。 a. 調整於自動模式下由 0~200%。 b. 於手動 JOG 模式下或自動模式下的" DRY RUN" 功能,該旋鈕調整 Feedrate Override in % A. *There are 4 rapid traverse federate override*

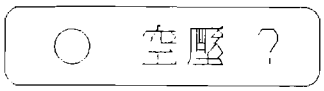
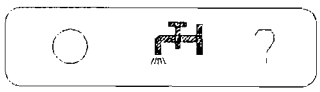
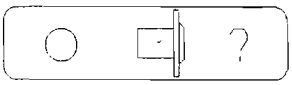
	(F0, 25%, 50% and 100%) available for choice. B. It is able to turn the feedrate override switch to change feed rate. a. The control range is 0 ~ 200% under "AUTO" mode. b. Under "JOG" mode or the "DRY RUN" which is active under "AUTO" mode, this switch can adjust JOG federate from 0~12600 mm/min. JOG 速率 0~12600mm/min
圖示 Figure	主軸功能操作說明 Description of Spindle Function
	主軸 100% A. 程式運轉中使用本鍵,不論是否使用過"主軸增速"或"主軸減速"之操作,主軸都即回復 100%轉速。 B. 使用條件: a. 在自動模式、手動資料輸入模式、慢速進給模式及手輪進給模式均有效。 b. 程式開始時, 主軸均以 100%轉速運轉。 SPINDLE SPEED OVERRIDE 100% A. Use this key while program is running. No matter "SPINDLE DEC" or "SPINDLE INC" is executed previously, the spindle speed will recover to programmed 100% override. B. Usage condition: a. It is active under "AUTO", "MDI", "JOG" and "MPG" mode. b. The spindle rotates at 100% when the program starts.
	主軸增速 A. 功能: a. 當主軸轉動時,本鍵每按一次,其轉速將增加 10%。 b. 最高可達 120%。 B. 使用條件: a. 在自動模式、手動資料輸入模

	式、慢速進給模式及手輪進給模式均有效。 b. 攻牙循環時,本鍵無效,且自動回復程式設定之S轉速100%執行。 SPINDLE INC. A. Function: a. Whenever press this key while spindle is rotating, the rpm will be increased 10%. b. The maximum is up to 120%. B. Usage condition: a. It is active under "AUTO", "MDI", "JOG" and "MPG" mode. b. When it is under TAPPING CYCLE, this key will be inactive and the spindle speed will recover to the programmed 100% to execute tapping cycle
	主軸減速 A. 功能: a. 當主軸轉動時,本鍵每按一次,其轉速將減少10%。 b. 最低可達50%。 B. 使用條件: a. 在自動模式、手動資料輸入模式、慢速進給模式及手輪進給模式均有效。 b. 攻牙循環時,本鍵無效,且無自動回復程式設定之S轉速100%執行。 SPINDLE DEC. A. Function: a. Whenever press this key while spindle is rotating, the rpm will be decreased 10%. b. The minimum is up to 50%. B. Usage condition: a. It is active under "AUTO", "MDI", "JOG" and "MPG" mode. b. When it is under TAPPING CYCLE, this

	key will be inactive and the spindle speed will recover to the programmed 100% to execute tapping cycle
	主軸正轉(CW) A. 功能:讓主軸正轉時,按本鍵。 B. 使用條件: a. 僅在"手動操作模式"中才能使用。 b. 在"自動模式"或"手動資料輸入"模式時無效。 C. 本鍵生效時, 內藏燈會亮, 但如果"主軸停止"或"主軸反轉"生效時, 本鍵內藏燈即熄滅。 SPINDLE CLOCKWISE (CW) A. Function: Press this key to make spindle rotate clockwise. B. Usage condition: a. Only active in "MANUAL OPERATION" mode. b. It is inactive in "AUTO" and "MDI" mode. C. As soon as this key is active, the indicating lamp will light up. However, when "SPINDLE STOP" and "SPINDLE CCW" are active, the indicating lamp will extinguish.
	主軸反轉(CCW) A. 功能:讓主軸反轉時,按本鍵。 B. 使用條件: a. 僅在"手動操作模式"中才能使用。 b. 在"自動模式"或"手動資料輸入"模式時無效。 C. 本鍵生效時, 內藏燈會亮, 但如果"主軸停止"或"主軸正轉"生效時, 本鍵內藏燈即熄滅。 SPINDLE COUNTER CLOCKWISE (CCW) A. Function: Press this key to make spindle rotate counter clockwise. B. Usage condition: a. Only active in "MANUAL OPERATION" mode.

	b. It is inactive in "AUTO" and "MDI" mode. C. As soon as this key is active, the indicating lamp will light up. However, when "SPINDLE STOP" and "SPINDLE CW" are active, the indicating lamp will extinguish.
	主軸停止(STOP) A. 功能:主軸無論為正反轉,按此鍵主軸皆可停止。 B. 使用條件: a. 僅在"手動操作模式"中才能使用。 b. 在"自動模式"或"手動資料輸入"模式時無效。 c. 在正常情況下,主軸停止,本鍵生效。 C. 本鍵生效時,內藏燈會亮,但如果"主軸反轉"或"主軸正轉"生效時,本鍵內藏燈即熄滅。 SPINDLE STOP (STOP) A. Function: No matter the spindle is CW or CCW, whenever press this key, the spindle will stop rotating. B. Usage condition: a. Only active in "MANUAL OPERATION" mode. b. It is inactive in "AUTO" and "MDI" mode. c. Under normal situation, spindle stops and then this key becomes active. C. As soon as this key is active, the indicating lamp will light up. However, when "SPINDLE CW" and "SPINDLE CCW" are active, the indicating lamp will extinguish.
圖示 Figure	指示訊號功能操作說明 Description of Indicating Signal
	主軸轉速百分比 指示訊息:指示當時之主軸轉速百分比。 SPINDLE SPEED OVERRIDE

	Indicating signal: to indicate the current spindle speed override
	原點指示燈 A. 指示訊息:當 X、Y、Z 軸復歸至機械原點。 B. 其他訊息: a. XYZ 軸於機械原點時,XYZ 軸左邊指示燈持續亮著。 b. XYZ 軸於第二原點時,XYZ 軸右邊指示燈持續亮著。 ZERO POINT INDICATING LAMP A. Indicating signal: to indicate X Y Z axes return to machine zero point. B. Other signal: a. When XYZ axes locate at machine zero point, Left Indicating Lamps of XYZ Axis keep lighting up. b. When XYZ axes locate at 2nd reference point, Right Indicating Lamps of XYZ Axis keep lighting up.
	第 4 軸原點 指示訊息: A. 當有裝置第 4 軸時,燈持續亮著,即表示於機械原點處。 B. 指示燈閃爍不停時,即表示於第二原點處。 4TH AXIS REFERENCE POINT Indicating signal: A. In case the system equips with a 4th axis, if the indicating lamp keeps lighting up, that means it locates at machine zero point. B. If the indicating lamp keeps blinking, that means it locates at 2nd reference point.
	ATC ATC 燈亮,表示 ATC 準備完成換刀裝置於正確起點位置。 ATC When ATC indicating lamp lights up, that means ATC is ready and ATC locates at correct start position.

	NC NC 燈亮,表示 CNC 控制器有錯誤異警。 NC When NC indicating lamp lights up, that means CNC controller has error alarm.
	空壓異常 A. 警告訊息:空氣壓力低於標準量。 B. 其他訊息: a. 旋轉警告燈動作 b. 機械正執行程式時本訊息出現,將繼續執行完該單節程式,機械才停止。 AIR PRESSURE ABNORMAL A. Alarm signal: air pressure is lower than standard value. B. Other signal: a. Alarm lamp will activate. b. If this signal appears while machine is executing a program, the machine will not stop until the block is completed.
	切削液異常 A. 警告訊息:水箱內的切削液容量低於浮動開關設定之水位。 B. 其他訊息: a. 旋轉警告燈動作 b. 機械仍能繼續動作。 COOLANT ABNORMAL A. Alarm signal: the coolant level inside the coolant tank is lower than the level set by float switch. B. Other signal: a. Alarm lamp will activate. b. Machine can keep operating.
	主軸異常 A. 警告訊息:主軸馬達異常。 B. 其他訊息: a. 旋轉警告燈動作。 b. 機械在程式執行中會停止而轉換

	至”進給暫停” 。 c. “進給暫停”鍵, 內藏燈會亮。 SPINDLE ABNORMAL A. Alarm signal: spindle motor is abnormal. B. Other signal: a. Alarm lamp will activate. b. Machine will stop while executing program and change to “FEED HOLD” c. The built-in “FEED HOLD” indicating lamp will light up.

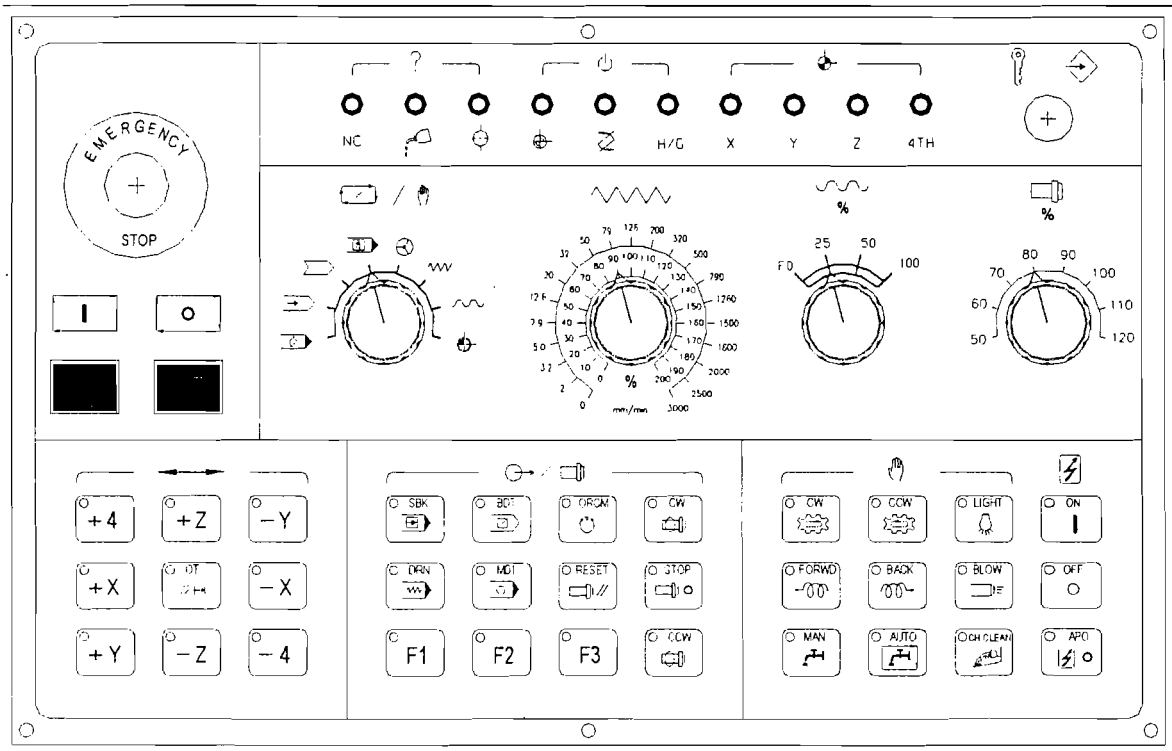
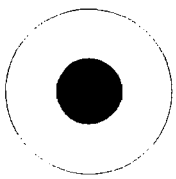
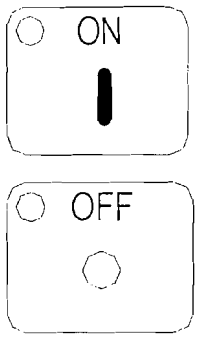


圖 6.2-2(觸控式操作面板)

Fig 6.2-2 (Touch Panel)

6.1-2 EMV860/1020/1100/1400 觸控式操作面板說明

圖示	功能操作說明
EMERGENCY  MI10H08	緊急停止開關 A. 用於機械發生緊急狀況,例如機械有發生不正常動作可能危及人員或機械安全時使用。 B. 按下此鍵後,機械所有動作都將立即停止,如:進給、主軸旋轉等。 C. 如欲解除此緊急停止狀態,請將按鈕依順時針方向旋轉即可。 EMERGENCY STOP A. Press this button in emergency situations, i.e. when human life is in danger or there is a risk of damage to the machine or workpiece. B. After pushing down this button, all machine movements, such as feed and spindle rotation will stop immediately. C. f intend to release this emergency stop status, just turn this button clockwise.



電源

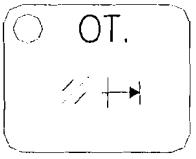
A. 按下"ON"鍵,NC 電腦、機械面板、伺服馬達…等電源投入。

B. 按下"OFF"鍵, NC 電腦、機械面板、伺服馬達…等電源斷電。(在按"OFF"鍵之前必須先按下 EMERGECY POWER OFF 才有效。)

POWER

A. Press "ON" button, NC controller、operation panel and servo motor etc will power ON.

B. Press" OFF" button, NC controller、operation panel and servo motor etc will power OFF. (Please press "EMERGENCY POWER" in advance before pressing "OFF" so "OFF" will be effective)



過行程解除

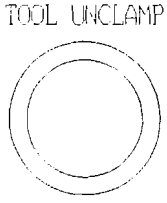
A. 作用:當 CRT 出現"EMERGENCY ALARM"訊息時,可按本鍵。

B. 使用方法:例如 X 軸負方向過行程時,按本件並同時按下 X 軸正方向鍵,即可使 X 軸依正方向正常移動,解除 ALARM 訊息。

OVERTRAVEL CANCEL

A. Function: this button can be pressed only when CRT appears "OVERTRAVEL ALARM" message.

B. Usage: for example, while –X overtravel, press this button and +X button simultaneously. That can make X axis moves toward positive direction and cancel ALARM message.



刀具鬆刀與夾刀

A. 位於主軸右下方處。

B. 按下此鍵不放,主軸內爪鬆開,可取下或置入刀具。

C. 放鬆此鍵, 主軸位爪扣縮, 主軸夾住刀具。

D. 刀具置入主軸錐孔前, 請先清潔乾淨。

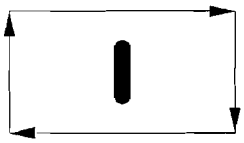
TOOL UNCLAMP / TOOL CLAMP

A. The clamp device is located at the lower right side of the spindle.

B. Keep pressing this key, the spindle inner claw will unclamp. It allows to remove or insert tools under this status.

C. Release this key, the spindle inner claw will clamp and that makes spindle clamp tools.

D. Clean the tools before setting them inside the spindle.



程式啟動

A. 功能:讓程式於"自動模式"下執行。

B. 使用條件:僅在"自動模式"中才有效。

C. 本鍵生效時,指示燈會量。

CYCLE START

A. Function: to make program to be executed under "AUTO" mode.

B. Usage condition: it is effective only in "AUTO MODE".

C. When this key is effective, the indicating lamp will light up.

進給暫停

A. 功能:程式進行中,欲讓三軸停止,可按本鍵。

B. 使用條件:

a. 僅在"自動模式"中才有效。

b. 於固定循環(CANNED CYCLE)執行中,本鍵無效必須等循環結束,三軸才停止。

C. 本鍵生效時:

a. 指示燈會亮。

b. 主軸仍繼續旋轉,如欲停止,可按 NC 控制面板上" RESET" 鍵。

D. 如欲再執行程式時,可按" 程式啟動" 鍵。

FEEDHOLD

A. Function: It is able to press this key to make 3 axes stop while program is running.

B. Usage Condition:

a. It is active only in "AUTO MODE".

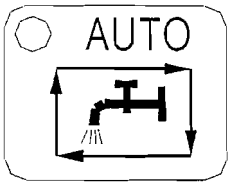
b. This key will be inactive while CANNED CYCLE is under running. All 3 axes will stop only after the canned cycle is completed.

C. When this key is active:

a. The indicating lamp will light up.

b. The spindle keeps rotating continuously. If intend to make it stop, please press the "RESET" key on NC control panel.

D. In case to execute program again, press "CYCLE START" key.



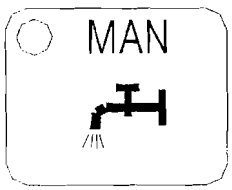
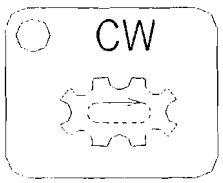
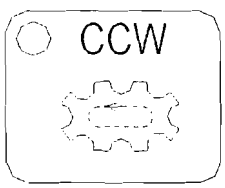
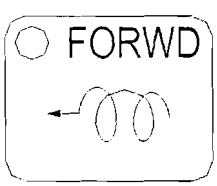
自動切削液

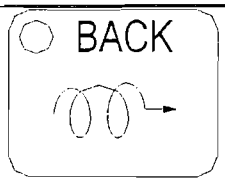
A. 功能:遇程式執行中有 M08、M09 指令,切削液馬達會隨指令動作。

B. 使用條件:僅在自轉模式中才有效。

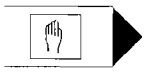
C. 本鍵生效後,內藏燈會亮。

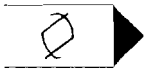
COOLANT ON

	A. Function: while executing the program which contains M08 or M09 commands, press this key and the coolant motor will run according to command instruction. B. Usage condition: it is active only in "AUTO" mode. C. When this key is active, the built-in lamp will light up.
	手動切削液 A. 功能:不管機械是否動作,切削液連續輸出。 B. 使用條件:在自動模式或手動模式中均有效。 C. 本鍵生效後,內藏燈會亮。 MANUAL COOLANT ON A. Function: No matter the machine is running or not, the coolant keep flowing out continuously. B. Usage condition: it is active both in "AUTO" mode and "MANUAL" mode. C. When this key is active, the built-in lamp will light up.
 	刀庫旋轉 A. 功能:僅在手動操作模式有效。 a. 先按手動(MAN)鍵內藏燈亮時,才有效。 b. 每按一次正轉(CW)或反轉(CCW),刀盤旋轉一把刀。 c. 若持續按住,刀盤旋轉直到鬆手才停止。 B. 刀盤正轉:正時針方向。 刀盤反轉:逆時針方向。 TOOL MAGAZINE ROTATION A. Function: it is only active in "MANUAL" mode. a. Press "MAN" key, as soon as the built-in indicating lamp lights up, this function will be activated. b. Whenever press "CW" or "CCW" once, tool disc will rotate to next tool. c. If keep pressing this key, the tool disc will keep rotating until this key is released. B. TOOL DISC FORWARD: Clockwise (CW). TOOL DISC REVERSE: Counter clockwise (CCW).
	輸送帶 功能: A. 按"排屑"(FOR)鍵內藏燈亮,排屑機正轉動作,再按一次排屑機正轉停止,內藏燈息。 B. 按"倒退"(BACK)鍵內藏燈亮,排屑機反轉動作,放開後倒退便停止。 CHIP CONVEYOR Function:

	A. Press "FOR" key, the built-in indicating lamp lights up, chip conveyor runs forward. Press this key again, chip conveyer will stop running forward and the built-in indicating lamp extinguishes. B. Press "BACK", this key light up and chip auger act in reverse; release this key, chip auger stop.

觸控式操作面板說明
Description of Touch Panel

圖示	自動功能操作說明
	自動模式 A. 亦稱程式執行模式。 B. 本模式下才能執行 CNC 記憶體中之程式。 AUTO MODE A. It is also called Program Execution mode. B. The programs saved inside CNC memory can only be executed under this mode.
	連線 利用讀待機讀取或打製紙帶時使用。 LINK It is used while using paper tape reader to read or using paper tape puncher to punch.
MDI 	手動資料輸入 A. 在本模式下,可當場於螢幕上輸入簡單程式予以執行。 B. 在本模式下輸入之簡單程式: c. FANUC 系列之控制器,僅能存入 1 個單結的程式。 d. 三菱系列之控制器,則能存入較多程式,並可一次全部執行。 A. It is able to input simple program to execute under this mode. B. The simple program input in this mode: a. In case of FANUC controller, it is able to input single block only. b. In case of MITSUBISHI controller, it is able to input more blocks and to be executed in one time.

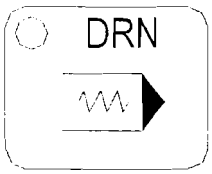


編輯

A. 對原有程式予以編輯、修改、增加或刪除時,使用本模式。
B. 本模式僅用於編輯,不能用於執行。
C. 如執行新編之程式,必須在”自動模式”下。
D. 程式編輯完成,電腦即自動儲存,不必再執行儲存之動作。

Edit

A. It is able to edit, modify, add or delete the original programs under this mode.
B. This function is only used for editing program, not for executing program.
C. If intend to execute new edited program, the system should be under "AUTO" mode.
D. As soon as the program editing is completed, the computer will save program automatically. It is not necessary to execute saving action.

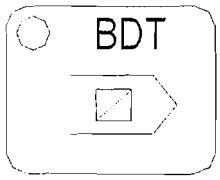


程式預演

A. 按此鍵燈亮,程式裡所設定的 G00,G01 指令無效,各軸移動速率低 JOG TRAVERSE FEED 所指定之速率位移。
B. 按此鍵燈亮,程式執行攻牙固定循環時,按此鍵無效。
C. 按此鍵燈滅,各軸依程式設定之 F 行進。

DRY RUN

A. As soon as this key is pressed, the indicating lamp will light up and the F command in program will be inactive. Each axis will move at traverse feedrate.
B. Press down this key and the indicating lamp lights up. However this key will be inactive when the program executes tapping cycle.
C. Press down this key and the indicating lamp extinguishes, each axis will travel at the rate set by F command.

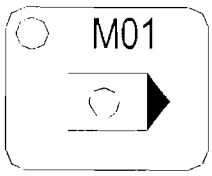


單結刪除

A. 按此鍵燈亮,程式執行如遇單節前有”/”符號時,此單節略過不執行。
B. 按此鍵燈滅,即使單節前有”/”依舊執行不跳躍。

BLOCK DELETE

A. As soon as this key is pressed, the indicating lamp will light up and the blocks which starts with "/" character will be ignored and the program will skip to next block.
B. Press down this key and the indicating lamp extinguishes, though the blocks starts with "/", it will not be skipped.



選擇停止

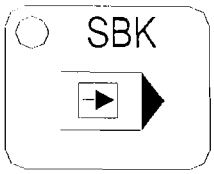
A. 按此鍵燈亮,執行程式單節中若有"M01"之指令,程式將停止於該單節,若欲繼續時按下"程式啟動"鍵即可。

B. 按此鍵燈滅,若程式有"M01"指令時,程式亦不會停止。

OPTIONAL STOP

A. Press down this key and the indicating lamp lights up. If the blocks in the executed program contains "M01" command, the said program will stop at the block contains M01. If intend to go ahead, just press "CYCLE START" key.

B. Press down this key and the indicating lamp extinguishes, though program contains "M01" command, "M01" will be ignored and the program will not be stopped.



單節執行

A. 按此鍵燈亮,程式僅能以"程式啟動"命令執行.再按一次"程式啟動"僅能執行一單節。

B. 按此鍵燈滅,程式可執行到完畢才結束。

C. 按此鍵燈亮,且執行 G28.G29.G30 之程式指令時,三軸會停於中間點。

例:G28 X200.

按此鍵燈滅由 X200. 之點回復至 X 軸之機械原點。

按此鍵燈亮會停在 X200.,需再按" 程式啟動" 。

SINGLE BLOCK OPERATION

A. As soon as this key is pressed the indicating lamp lights up, and the program can be executed only by "CYCLE START" command. Press "CYCLE START" again, the system can execute a single block only.

B. Press down this key and the indicating lamp extinguishes, the program will be executed until end of block and then stop.

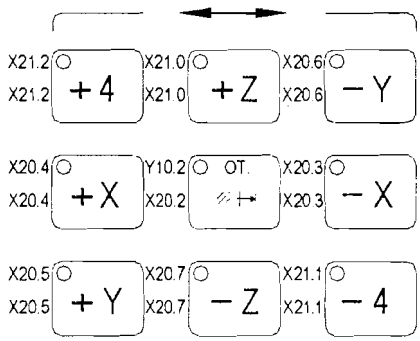
C. While executing G28, G29 & G30 commands, press down this key and the indicating lamp lights up , the 3 axes will stop at center point.

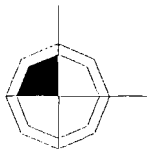
e.g.: G28 X200.

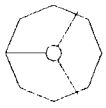
Press down this key and the indicating lamp extinguishes, it will return from X200 to X machine origin point.

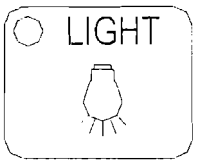
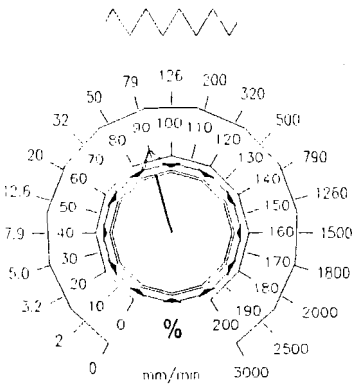
Press down this key and the indicating lamp lights up, it will stop at X200. it needs to press "CYCLE START" again.

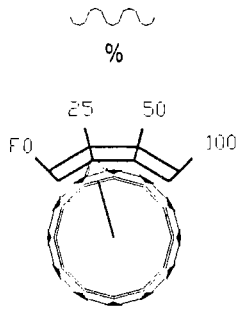
手動功能操作說明
Description of Manual Operation



圖示 Figure	手動功能操作說明 Description of Manual Operation
	原點(ZRN) 三軸復歸至"機械原點"時使用 A. 按+X 鍵時,X 軸歸原點 B. 按+Y 鍵時,Y 軸歸原點 C. 按+Z 鍵時,Z 軸歸原點 Zero return (ZRN) This key is used while want to make 3 axes return to "Machine Reference Zero". A. Press +X Key, X-axis returns to its zero point. B. Press +Y Key, Y-axis returns to its zero point. C. Press +Z Key, Z-axis returns to its zero point.
	慢速進給(JOG) A. 本模式下設定軸以"進給率調整"鍵所設定之速度進給,詳細請參閱"進給率調整"鍵說明 B. 選擇進給率調整鍵之進給率 C. 選擇欲移動之軸向之(正)鍵或(負)鍵予以控制軸向之行進,手指不要離開(離開後即停止進行) 。 D. 快速進給(~) 直接按軸向(正)鍵或(負)鍵並按下"~"鍵極為快速進給,手指不要離開,若放開"~"鍵,極為慢速進給。

	SLOW SPEED FEED (JOG) A. Under JOG mode, the selected axis will feed at the feedrate set by "Feedrate Override". For the details, please refer to the description for "Feedrate override" key. B. Set federate on the "federate override" switch. C. Select the direction key (+) or (—) to control the direction of axis movement. Keep pressing this key (if stop pressing, the movement will stop immediately). D. Rapid Traverse Override (~) Press direction key (+) or (—) and "~"key together, that will become Rapid Traverse. Keep pressing this key. If stop pressing, it will become slow traverse.
MPG 	手輪進給(MPG) A. 本模式下,須以手輪控制三軸之移動速率。 B. 執行本模式時須 a. 選擇移動之軸向(請參閱手輪操作說明)。 b. 選擇進給速度倍率(請參閱手輪操作說明)。 C. 以上項目選擇完成後,即可以手輪開始控制其行進作業。 D. 手輪操作時請參閱手輪操作使用說明。 MPG HAND WHEELFEEDRATE (MPG) A. Under this mode, it is able to use MPG hand wheel to control axis federate. B. When execute this mode, it is necessary: a. To select movement direction (please refer to the description of hand wheel operation). b. To select federate override in % (please refer to the description of hand wheel operation). C. When the above selection is completed, it is able to use hand wheel to control the axis movement. D. For the details, please refer to the description of hand wheel operation.

圖示 Figure	編輯功能操說明 Description of Edit Function
	工作燈 A. 按此鍵亮燈,工作燈打開。 B. 按此鍵燈滅,工作燈關閉。 Working Lamp A. Press this key and the indicating lamp lights up, the working lamp will turn ON. B. Press this key and the indicating lamp extinguishes, the working lamp will turn OFF.
	A. 外圈表示 JOG 的速度,內圈代表原程式設定速度(F)之百分比。 例如:設定在 120%,F300 表示 其速率為 300*120%=360mm/min B. MM 燈亮,代表每分鐘之進給率。 例如:設定在 6000,表示其速率為 6000mm/min C. 當模式設定為"自動模式"或"手動資料輸入"模式時,執行 G01 之進給率,採用%之數據,代表其進給率(%)。 D. 當模式選擇設定在"慢速進給"模式或"自動模式"之程式預演時,採用 MM 之數據代表其僅給率。 A. When % indicating lamp lights up, that means feedrate % set by original program is active. e.g.: if set 120%, F300, that means the feed rate is 300*120% = 360mm/min B. When MM indicating lamp light up, that stand for the feedrate per Minute. e.g.: if set at 6000, that means the feedrate is 6000mm/min C. When the mode is set at "AUTO" or "MDI" mode, and the feed rate of G01 is in act, it adopts % value to stand for its feed rate. D. When the mode is set at "JOG" or "AUTO" mode and executes Dry Run, it adopts MM value to stand for its feedrate.



速度百分比

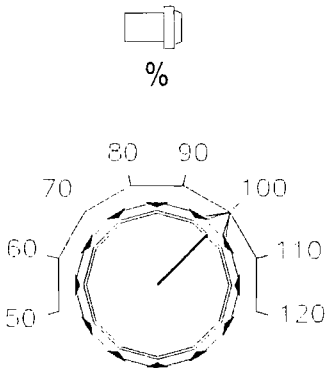
A. 快速進給速率分為 4 段(F0 、25%、50%、100%)可供選擇。

B. 可直接旋轉速度百分比來改變進給速率。

於手動 JOG 模式下或自動模式下的”DRY RUN”功能,該旋鈕調整無效

A. There are 4 rapid traverse federate override (F0, 25%, 50% and 100%) available for choice.

B. It is able to turn the feedrate override switch to change feed rate.



主軸 100%

A. 程式運轉中使用本鍵,不論是否使用過”主軸增速”或”主軸減速”之操作,主軸都即回復 100%轉速。

B. 使用條件:

a. 在自動模式、手動資料輸入模式、慢速進給模式及手輪進給模式均有效。

b. 程式開始時,主軸均以 100%轉速運轉。

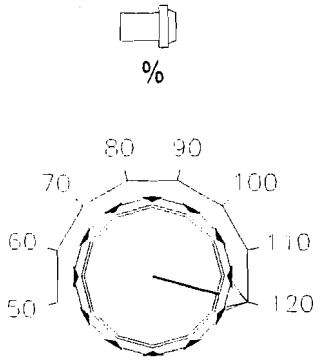
SPINDLE SPEED OVERRIDE 100%

A. Use this key while program is running. No matter “SPINDLE DEC” or “SPINDLE INC” is executed previously, the spindle speed will recover to programmed 100% override.

B. Usage condition:

a. It is active under “AUTO”, “MDI”, “JOG” and “MPG” mode.

b. The spindle rotates at 100% when the program starts.



主軸增速

A. 功能:

a. 當主軸轉動時,本鍵每按一次,其轉速將增加 10%。

b. 最高可達 120%。

B. 使用條件:

a. 在自動模式、手動資料輸入模式、慢速進給模式及手輪進給模式均有效。

b. 攻牙循環時,本鍵無效,且自動回復程式設定之 S 轉速 100%執行。

SPINDLE INC.

A. Function:

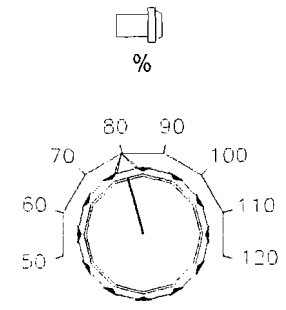
a. Whenever press this key while spindle is rotating, the rpm will be increased 10%.

b. The maximum is up to 120%.

B. Usage condition:

a. It is active under "AUTO", "MDI", "JOG" and "MPG" mode.

b. When it is under TAPPING CYCLE, this key will be inactive and the spindle speed will recover to the programmed 100% to execute tapping cycle



主軸減速

A. 功能:

a. 當主軸轉動時,本鍵每按一次,其轉速將減少 10%。

b. 最低可達 50%。

B. 使用條件:

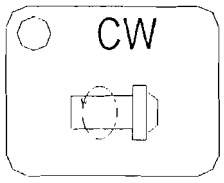
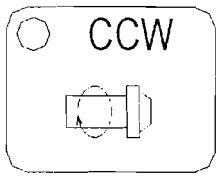
a. 在自動模式、手動資料輸入模式、慢速進給模式及手輪進給模式均有效。

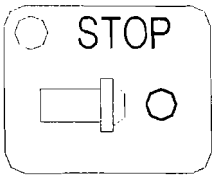
b. 攻牙循環時,本鍵無效,且無自動回復程式設定之 S 轉速 100%執行。

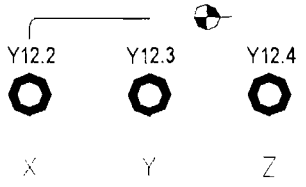
SPINDLE DEC.

A. Function:

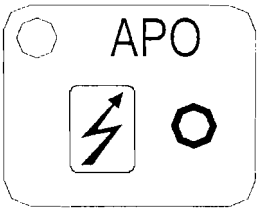
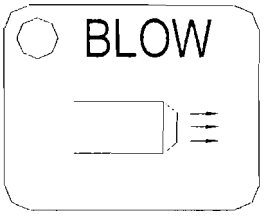
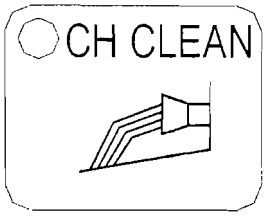
a. Whenever press this key while spindle is rotating, the rpm will be decreased 10%.

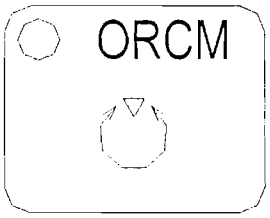
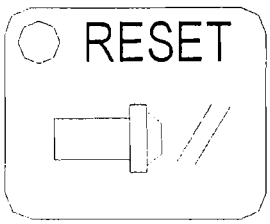
	b. The minimum is up to 50%. B. Usage condition: a. It is active under "AUTO", "MDI", "JOG" and "MPG" mode. b. When it is under TAPPING CYCLE, this key will be inactive and the spindle speed will recover to the programmed 100% to execute tapping cycle
	主軸正轉(CW) A. 功能:讓主軸正轉時,按本鍵。 B. 使用條件: a. 僅在"手動操作模式"中才能使用。 b. 在"自動模式"或"手動資料輸入"模式時無效。 C. 本鍵生效時, 內藏燈會亮, 但如果"主軸停止"或"主軸反轉"生效時, 本鍵內藏燈即熄滅。 SPINDLE CLOCKWISE (CW) A. Function: Press this key to make spindle rotate clockwise. B. Usage condition: a. Only active in "MANUAL OPERATION" mode. b. It is inactive in "AUTO" and "MDI" mode. C. As soon as this key is active, the indicating lamp will light up. However, when "SPINDLE STOP" and "SPINDLE CCW" are active, the indicating lamp will extinguish.
	主軸反轉(CCW) A. 功能:讓主軸反轉時,按本鍵。 B. 使用條件: a. 僅在"手動操作模式"中才能使用。 b. 在"自動模式"或"手動資料輸入"模式時無效。 C. 本鍵生效時, 內藏燈會亮, 但如果"主軸停止"或"主軸正轉"生效時, 本鍵內藏燈即熄滅。 SPINDLE COUNTER CLOCKWISE (CCW)

	A. Function: Press this key to make spindle rotate counter clockwise. B. Usage condition: a. Only active in "MANUAL OPERATION" mode. b. It is inactive in "AUTO" and "MDI" mode. C. As soon as this key is active, the indicating lamp will light up. However, when "SPINDLE STOP" and "SPINDLE CW" are active, the indicating lamp will extinguish.
	主軸停止(STOP) A. 功能:主軸無論為正反轉,按此鍵主軸皆可停止。 B. 使用條件: a. 僅在"手動操作模式"中才能使用。 b. 在"自動模式"或"手動資料輸入"模式時無效。 c. 在正常情況下,主軸停止,本鍵生效。 C. 本鍵生效時,內藏燈會亮,但如果"主軸反轉"或"主軸正轉"生效時,本鍵內藏燈即熄滅。 SPINDLE STOP (STOP) A. Function: No matter the spindle is CW or CCW, whenever press this key, the spindle will stop rotating. B. Usage condition: a. Only active in "MANUAL OPERATION" mode. b. It is inactive in "AUTO" and "MDI" mode. c. Under normal situation, spindle stops and then this key becomes active. C. As soon as this key is active, the indicating lamp will light up. However, when "SPINDLE CW" and "SPINDLE CCW" are active, the indicating lamp will extinguish.

	主軸轉速百分比 指示訊息:指示當時之主軸轉速百分比。 SPINDLE SPEED OVERRIDE Indicating signal: to indicate the current spindle speed override
	原點指示燈 A. 指示訊息:當 X、Y、Z 軸復歸至機械原點。 B. 其他訊息: a. XYZ 軸於機械原點時,XYZ 軸左邊指示燈持續亮著。 b. XYZ 軸於第二原點時,XYZ 軸右邊指示燈持續亮著。 ZERO POINT INDICATING LAMP A. Indicating signal: to indicate X Y Z axes return to machine zero point. B. Other signal: a. When XYZ axes locate at machine zero point, Left Indicating Lamps of XYZ Axis keep lighting up. b. When XYZ axes locate at 2nd reference point, Right Indicating Lamps of XYZ Axis keep lighting up.
	第 4 軸原點 指示訊息: A. 當有裝置第 4 軸時,燈持續亮著,即表示於機械原點處。 B. 指示燈閃爍不停時,即表示於第二原點處。 4TH AXIS REFERENCE POINT Indicating signal: A. In case the system equips with a 4th axis, if the indicating lamp keeps lighting up, that means it locates at machine zero point. B. If the indicating lamp keeps blinking, that means it locates at 2nd reference point.

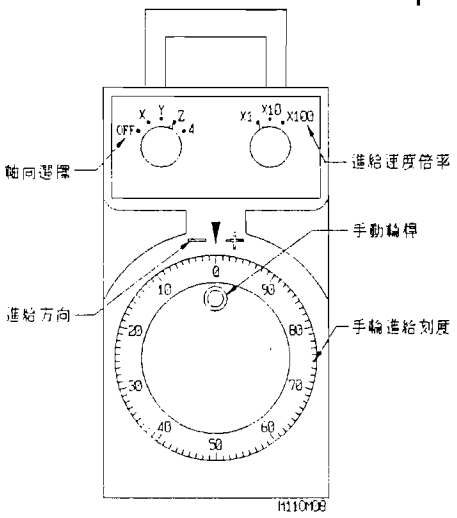
	ATC ATC 燈亮,表示 ATC 準備完成換刀裝置於正確起點位置。 ATC When ATC indicating lamp lights up, that means ATC is ready and ATC locates at correct start position.
	NC NC 燈亮,表示 CNC 控制器有錯誤異警。 NC When NC indicating lamp lights up, that means CNC controller has error alarm.
	空壓異常 •A. 警告訊息:空氣壓力低於標準量。 B. 其他訊息: a. 旋轉警告燈動作 b. 機械正執行程式時本訊息出現,將繼續執行完該單節程式,機械才停止。 AIR PRESSURE ABNORMAL A. Alarm signal: air pressure is lower than standard value. B. Other signal: a. Alarm lamp will activate. b. If this signal appears while machine is executing a program, the machine will not stop until the block is completed.

圖示 Figure	主軸功能操作說明 Description of Spindle Function
Y6.5 	滑道油異常 A. 警告訊息:潤滑機內的潤滑液容量低於浮動開關設定之油位。 B. 其他訊息: a. 旋轉警告燈動作 b. 機械仍能繼續動作。 COOLANT ABNORMAL A. Alarm signal: the coolant level inside the coolant tank is lower than the level set by float switch. B. Other signal: a. Alarm lamp will activate. b. Machine can keep operating.
	M30 自動斷電 按此鍵燈亮時當程式執行至 M30 時,機械的總電源開關會自動跳脫、斷電,此鍵燈不亮時則無效。 M30 Automatic Disconnection When this key light up and program is executed to "M30", the machine power supply will be cut off. If this key doesn't light up, this function will not be effective.
	切削吹氣 按此鍵燈亮時,切削吹氣開,再按一次燈滅,切削吹氣關 Cutting Blow Off When this key light up, Cutting Blow off is switched on; press this key one more time, the key light put out and Cutting Blow off is switched off.
	側沖 PUMP 按此鍵燈亮時,側沖 PUMP 開,再按一次燈滅,側沖 PUMP 關 Side Flush Pump When this key light up, Side Flush Pump is switch on; press one more time, the key light put out and Side Flush Pump is switch off.

	手動主軸定位 按此鍵燈亮時,主軸做定位動作,按 RESET 鍵可解除主軸定位。 Manual Spindle Position Press this key, spindle act in position; press "RESET", spindle position function is closed.
	主軸暫停鍵 當程式 FEED HOLD 時,按此鍵主軸會暫停,再按主軸正轉鍵或按程式 CYCLE START 鍵時,主軸會自動旋轉再移動三軸。 Spindle Pause When program is on "FEED HOLD", press this key so the spindle pause. Keep pressing spindle positive turning key or pressing "CYCLE START", spindle will automatically rotate, then 3 axes move.

6.3 手輪操作說明

Description for Hand Wheel Operation



1. 手動轉輪共有 100 個刻度。

每轉一刻度代表的意義會因為進給速度倍率所設之不同而有所差異。

1. There are 100 graduations on the hand wheel dial.
The meaning of each graduation will be different due to different feedrate multiple setting.

進給速度倍率之刻度 The graduation of federate multiple	手輪轉輪每刻度之意義 The meaning of each graduation on hand wheel
X1	0.001mm
X10	0.01mm
X100	0.1mm

例如:選擇 X10,向右旋轉 50 刻度表示向正方向移動 0.5mm

For example: Feedrate multiple is set at X10, turn hand wheel to right for 50 graduations. That means the selected axis will move toward positive direction (+) for 0.5mm.

2. 手動手輪生效時,手動手輪燈會亮。

2. As soon as the hand wheel is active, the hand wheel indicating lamp will light up.

3. "軸向選擇" 鈕:

A. 轉動旋鈕予以選擇欲移動之軸向

B. 軸向可分為 X 軸, Y 軸, Z 軸即 4 軸(第 4 軸)

3. Regarding "AXIS SELECTION" switch:
   A. Turn this selection switch to select the axis to be moved.
   B. There are X-axis, Y-axis, Z-axis and 4th Axis for choice.

第七章 指令介紹

CHAPTER 7 COMMAND INTRPDUCTION

7.1 M指令清單 M Code List

NOTE : 1. F1→FANUC , M→MITSUBISHI , SI→SIEMENS , F2→FAGOR

2.◎→STAMDARD , ※→OPTION , NA→NONE

3.Format:

M指令 M CODE	功能 FUNCTION		F1	M	S	F2
0	程式停止	Program stop	◎	◎	◎	◎
1	程式停止(選配)	Optional program stop	◎	◎	◎	◎
2	程式結束	Program end	◎	◎	◎	◎
3	主軸 CW	Spindle CW	◎	◎	◎	◎
4	主軸 CCW	Spindle CCW	◎	◎	◎	◎
5	主軸停止	Spindle stop	◎	◎	◎	◎
6	ATC	Automatic tool change	◎	◎	◎	◎
7	油霧式	Mist	◎	◎	◎	◎
8	切削液(開)	Coolant on	◎	◎	◎	◎
9	切削液(關)油霧(關)	Coolant off *mist OFF	◎	◎	◎	◎
10	刀具或主軸噴水(開)	Tool kit ON or water though spindle ON	※	※	※	※
11	刀具或主軸噴水(關)	Tool kit OFF or water though spindle OFF	※	※	※	※
12	油霧(關)	Mist OFF	◎	◎	◎	◎
13	主軸 CW 與切削液(開)	Spindle cw & coolant ON	◎	◎	NA	NA
14	主軸 CCW 與切削液(開)	Spindle ccw & coolant ON	◎	◎	NA	NA
15	清除鐵屑(開)	Chip clean ON	※	※	※	※
16	清除鐵屑(關)	Chip clean OFF	※	※	※	※
17	副程式結束	End of subprogram	NA	NA	◎	NA
19	主軸定位	Spindle orientation	◎	◎	◎	◎
21	刀盤 右	Magazine right	◎	◎	◎	NA
22	刀盤 左	Magazine left	◎	◎	◎	NA
23	刀套上	Pot up	◎	◎	◎	NA

M 指令 M CODE	功能 FUNCTION		F1	M	S	F2
24	刀套下	Pot down	◎	◎	◎	NA
25	刀具夾住	Tool clamp	◎	◎	◎	NA
26	刀具從夾具卸下	Tool unclamp	◎	◎	◎	NA
27	動態循圓(開)	Renishaw interface power ON	※	NA	NA	NA
28	動態循圓(關)	Renishaw interface power OFF	※	NA	NA	NA
29	剛性攻牙	Right tapping	◎	NA	NA	NA
30	程式結束重置	Program end & rewind	◎	◎	◎	◎
40	第四軸夾具夾住	4 th –axis clamp	※	※	※	※
41	第四軸夾具釋放	4 th –axis unclamp	※	※	※	※
42	分度軸循環開始	Axis index cycle start (CW)	※	◎	※	※
45	鐵屑輸送機(開)	Chip conveyor ON	※	※	※	※
46	鐵屑輸送機(關)	Chip conveyor OFF	※	※	※	※
47	螺旋排屑器 CW	Screw auger CW	※	※	※	※
48	螺旋排屑器(關)	Screw auger OFF	※	※	※	※
49	沖屑裝置(開)	Wash down/Chip clean ON	※	※	※	※
50	沖屑裝置(關)	Wash down/Chip clean OFF	※	※	※	※
51	開門	Door open	※	※	※	※
52	關門	Door close	※	※	※	※
56	治具退料					
57	治具吹氣					
61	鏡子映像 X(關)	Mirror image X OFF	※	※	※	※
62	鏡子映像 Y(關)	Mirror image Y OFF	※	※	※	※
64	鏡子映像第 4 軸(關)	Mirror image 4 th OFF	※	※	※	※
67	ATC 附屬程式開始	Begin of ATC. Subroutine				
68	ATC 附屬程式結束	End of ATC. Subroutine				
69	尋找主軸刀具號碼	Search spindle tool no.				
70	尋找下一碼刀具號碼	Search T-code tool no.				
71	鏡子映像 X(開)	Mirror image X ON	※	※	※	※
72	鏡子映像 Y(開)	Mirror image Y ON	※	※	※	※

M 指令 M CODE	功能 FUNCTION		F1	M	S	F2
74	鏡子映像第 4 軸(開)	Mirror image 4 th ON	※	※	※	※
90	MAG 計數 MAG 重設	MAG.count/MAG. Ref.Search & t-table	※	※	※	◎
94	刀具重整	MAG: count/ MAG. Ref. search & t-table				
95	零件櫃 尋找參考值與 T 型桌	Parts counter	◎	NA	NA	NA
98	呼叫副程式	Call sub-program	◎	◎	NA	◎
99	返回副程式	Sub program	◎	◎	NA	◎
100	刀具量測動作	ATC arm 0°~60°	NA	NA	NA	◎
110	設定基準刀	ATC arm 180°	NA	NA	NA	◎

7.2 G 指令 G Code List

G 指令 G CODE	功能 FUNCTION	指令格式 COMMAND FORMAT
G00	快速移動指令 Rapid move command.	G00 X Y Z ;
G01	直線切削指令 Straight cutting command.	G01 X Y Z F ;
G02	順時針方向圓弧切削 Clockwise round cutting.	G17 G02 X Y R(I,J) F ; G18 G02 X Z R(I,K) F ; G19 G02 Y Z R(J,K) F ;
G03	反時針方向圓弧切削 Counterclockwise round cutting.	G17 G03 X Y R(I,J) F ; G18 G03 X Z R(I,K) F ; G19 G03 Y Z R(J,K) F ;
G04	停留時間 Time of stay.	G04 X(P) ;
G5.1	AI 輪廓控制 AI shape control.	G5.1 Q ___: Q1:AI 輪廓控制模式 ON AI shape control mode ON Q0:AI 輪廓控制模式 OFF AI shape control mode OFF

G 指令 G CODE	功能 FUNCTION	指令格式 COMMAND FORMAT
G05	64BIT RISC 高精度輪廓控制 64BIT RISC High precision shape control.	G05P ___: P10000:高精度輪廓控制 ON High precision shape control ON. P0:高精度輪廓控制器 OFF High precision shape control OFF.
G6.2	補間 NURBS	G6.2[P]K_X_Z_[R][F] P:UNRBS 補間的階數 UNRBS stage. X.Y.Z:控制點 Control point. R:比重 Ratio K:終點向量 Terminal vector. F:進給速度 Feed speed.
G6.2	補間 NURBS	
G10	補正量設定 Mend value setting.	G10 P R ; P:補正號碼 Mend number. R:補正量 Mend amount.
G17	X.Y 平面選擇 Surface choose.	
G18	Z.X 平面選擇 Surface choose.	
G19	Y.Z 平面選擇 Surface choose.	
G20	英制輸入 Inch input.	
G21	公制輸入 Metric input.	
G27	參考原點復歸核對 Original home point check reference.	G27 X Y Z ;
G28	自動參考原點復歸 Auto refer to original home point.	G28 X Y Z ;
G29	由參考點經中間點至指定點 From reference point through middle point to stop point.	G29 X Y Z ;
G30	第 2,3,4 原點復歸 # 2,3,4Go home.	G30 P(1,2,3) X Y Z ;
G40	刀具半徑補正消除 Tool radius mend dismiss.	
G41	刀具半徑左補正 Tool radius left mend.	
G42	刀具半徑右補正 Tool radius right mend.	

G 指令 G CODE	功能 FUNCTION	指令格式 COMMAND FORMAT
G43	刀具半徑正方向補正 Tool radius positive mend.	
G44	刀具長度負方向補正 Tool length negative mend.	
G49	刀具長度補正消除 Tool length mend dismiss.	
G54	加工座標系 1. Work coordinate 1.	
G55	加工座標系 2. Work coordinate 2.	
G56	加工座標系 3. Work coordinate 3.	
G57	加工座標系 4. Work coordinate 4.	
G58	加工座標系 5. Work coordinate 5.	
G59	加工座標系 6. Work coordinate 6.	
G73	啄進鑽孔循環 Peck feed drilling circle.	G73 X Y Z R Q F ; R:R 點 R Point Q:每次進刀量 Feeding volume. F:進給速率 Feeding rate.
G74	反方向攻牙循環 Reverse tapping circle.	G74 X Y Z R F;
G76	精搪孔切削循環 Precision boring circle.	G76 X Y Z Q F ; R:R 點 R Point Q:刀具偏移量 Tool deviating volume. F:進給速率 Feeding rate.
G80	固定循環消除 Circle dismiss.	
G81	鑽孔循環 Drilling circle.	
G82	鑽孔循環(Z 點暫停) Drilling circle.(Point Z pause)	G82 X Y Z R P F ; R:R 點 R Point P:孔位到達停留時間 Hole position reached stay time. F:進給速率 Feeding rate.

G 指令 G CODE	功能 FUNCTION	指令格式 COMMAND FORMAT
G83	啄進鑽孔循環 Peck feed drilling circle.	G83 X Y Z Q R F ; R:R 點 R Point Q:每次進刀量 Feed volume. F:進給速率 Feeding rate.
G84	攻牙循環 Tapping circle.	G84 X Y Z R F;
G85	搪孔循環 Boring circle.	G85 X Y Z R F ; (動作方式與 G84 相同,但是主軸至穴底時不變,程式反轉) (Same motion as G84, but spindle reached hole button is not change, and program reverse.)
G86	搪孔循環(Z 軸主軸停止) Boring circle.(Z Axis spindle stop)	G86 X Y Z R F ; R:R 點 R Point Q:刀具偏移量 Tool deviating volume. F:進給速率 Feeding rate.
G87	搪孔.倒搪孔切削循環 Boring and reverse cutting circle.	G87 X Y Z R Q F ; R:R 點 R Point Q:刀具偏移量 Tool deviating volume. F:進給速率 Feeding rate.
G88	搪孔循環(手動退刀) Boring circle. (Manual tool withdrawal)	G88 X Y Z R P F ; R:R 點 R Point P:孔位到達停留時間 Hole position reached stay time. F:進給速率 Feeding rate.
G89	搪孔循環(Z 點暫停) Boring circle. (Point 2 pause)	G89 X Y Z R P F ; R:R 點 R Point P:孔位到達停留時間 Hole position reached stay time. F:進給速率 Feeding rate.
G90	絕對值指令 Absolute value command.	
G91	增量值指令 Increase value command.	
G92	絕對零點設定 Absolute zero point setting.	G92 X Y Z ;
G98	起始點復歸固定循環 Back to start point fixed circle.	

G 指令 G CODE	功能 FUNCTION	指令格式 COMMAND FORMAT
G99	R 點復歸固定循環 Back to R point fixed circle.	

第八章 異警說明與排除

CHEAPER 8 ALARM DESCRIPTION AND SOLUTION

介紹

Preface

此故障排除說明內容,適用於眾程科技機械安裝三菱控制器機台所使用,希望此故障排除之說明能協助您加速修復機械之故障,使機台恢復正常運作。

This chapter--Alarm Description and Solution--can be applied to all EQUIPTOP machines which are equipped with Mitsubishi controller. We do hope that this explanation of trouble shooting can be helpful for you to repair the mechanical trouble so as to make machine resume normal operation.

警告

Caution!

當在有通電狀態下座檢查或測試電路時,必須非常小心且應根據已建立之安全設施實行,試圖作任何修改矯正之前,必須先確定已切斷電源總開關。

When check or test the electrical circuit under power ON status, it is necessary to be very careful. Implement check and test after the safety appliances have already been set up. Before attempting to do any modification and correction, please make sure that the master power switch has already been switched OFF.

主電源總開關切斷後,電源供應器仍有殘留電壓應特別注意,至少等待 3 分鐘後才可執行修改矯正。

After the master switch is cut off, please be careful that there still has remaining voltage left in the power supply. Please wait at least 3 minutes and then it is able to start modification and correction operation.

故障排除內容

Content of Trouble Shooting

此一章節重要的是協助您確認問題的起因，以及如何使用本手冊提供的資訊，協助您快速修復機械故障，恢復正常生產，引言部份提供一些您有可能需要知道的資料，且告訴您當您要從眾程需求技術服務時，您應該提供哪些資料，正確的資料能讓我們快速調閱該機器履歷，且易於判斷對策，以及與我們的服務人員討論時能更迅速的解決問題。

The main purpose of this chapter is to help you to confirm the cause of problem, and teach you how to use the information provided by this manual, so as to assist you to repair the mechanical trouble and make machine restore normal operation condition. There are some useful information you may need to know in foreword. Furthermore, it tells you that when you request EQUIPTOP technical services, what information you should provide to our service department. The correct information can help us to know the machine historical records fast and help us to decide the trouble shooting solution easily and quickly. Moreover, the exact information will be much helpful for our service engineers to find out the solutions earlier.

操作狀態表，您可以參照了解及注意，狀態表這部份包括：造成問題訊息原因的討論及矯正的步驟建議。

The operator may refer to the Operation Status Table to understand and notice the operation status. This table contains the discussion on the causes of problems, and the suggestion on the rectification procedures.

“錯誤判斷/程序確認”流程圖為解決問題首要指標，依圖檢查測試，過程呈現出的訊息與圖示相符與否，通常是修復機器最好的依據，有時候在測試過程中就可以解決問題，有時候可以證實某部品需求更換或者您需要我們技術支援時更方便於電話中洽談，已解決問題。

The flow chart "Error Judgment / Procedure Confirmation" is the primary guidance for problem solution. Execute test and inspection according to the flow chart. To make sure if the messages which appear during the procedure are the same as the graphic figures on this flow chart is always the best basis for machine repair. Sometimes the problems can be solved in the course of test procedure. Sometimes this flow chart can be helpful to find out some parts need to be replaced. Sometimes you request us for technical supports and the problems can be solved through telephone conversation.

“錯誤訊息”操作過程中電腦螢幕上出現的錯誤訊息，最好將他記錄下來，他將可以協助快速解決問題或者您需要我們的技術支援時更容易與技術服務人員溝通。

You'd better record the "Error Message" appears on the screen during operation process. That will be much helpful to solve the problems fast, and on the other hand, it will help you to communicate with our service engineer easily and to solve the problem quickly.

建議

Suggestion:

1. 確認來自於操作者所提供的資料,關於機器如何動作和電腦顯示的訊息,執行測試後如果這些不是造成傷害的主因,您必須重新探討造成問題的真正原因。

   Check the information provided by operator, such as the machine motions and the messages displayed on the screen. After executing test and inspection, if these are not the principal factor to cause the problem, it is necessary to research the exact cause again.

2. 通常您因該藉由執行操上的檢查和測試,開始作故障排除,絕不可依開始就要求拆卸機械零件。

   Usually, you should start trouble shooting by checking and testing operation procedure. Do not request to disassemble machine parts just in the beginning.

3. 每一次處理一個問題,執行故障排除時必須同時考慮問題的起因與結果。

   Deal with the problem one by one. While executing trouble shooting, it is necessary to take cause and result under consideration simultaneously.

注意

Attention

發現故障時確定正確的原因則相同的錯誤重複發生,任何故障發生時絕對有因,即使是簡單的件磨損,機械故時影響系統停機時,或許已經有幾的損壞已經發生

Determine the correct cause while breakdown occ otherwise the same error will occur repeatedly. olutely, every akdown has its

own cause. Even a small simple part is worn-out, that may cause some other parts broken and lead the system malfunction and stop.

一般警示

Caution

這部機器是電腦電子學和電子機械複雜的結合，電氣箱有高壓電不要試圖去做故障排除，除非你已受過正規電控服務技術之訓練，否則請通知我們的服務人員。

This machine is the complex combination of computer electronic engineering and mechanical engineering. Please contact with our service department for service, unless you are a well-trained and qualified electronic control engineer.

從操作者本身取得所有問題真相：

The operator itself is to collect the truth of problem:

寫下所有事情，這是為了不讓後來取得的資訊搞混，以及您可以確認他們所知道的差異。

Write down all matters. That can help you to avoid confusing the information collected and help you to make sure their difference as well.

*確切的知道這部機器在做什麼。

Be sure that you know what the machine is doing well.

*機器出現的訊息是什麼。

What message appears on the display?

*除了現有故障有沒有其他狀況發生。

Besides present problem, is there any other situation happens?

*故障發生以前機械是否有其他奇怪的動作。

Before the breakdown occurs, is there any other strange motion?

*問題發生之前一刻機器的動作為何。

What is the motion right before the breakdown happened?

調查完整

Complete Investigation

在打電話給我們之前，可藉由更好的偵測合依所有指示更深入的檢查，就可避免重複的作業及電話聯絡工作。例如：螢幕顯示的錯誤訊息何操作者的解釋，兩者都必須列入研究考慮，可縮小問題偵測範圍，使問題更容易解決。

Before calling us, you can execute detection and fulfill thorough inspection according to all instructions. That may avoid repeated work and avoid wasting time for telephone communication. For example: take the error message appears on the screen and user's explanation under consideration. That can narrow the detection range and make the problem to be settled easily.

故障發生情況之確認：

Confirm the breakdown situation

1. 記錄故障發生的情況

Record the situation while breakdown occurs

NC 運轉模式為何?

Under which NC operation mode?

自動運轉模式時：確認故障發生時之程式編號程式序號及程式內容為何?

In the case of AUTO mode: confirm the program name, program number and program content while the breakdown occurs.

手動運轉模式時：手動運轉模式為何?操作順序?

In the case of MANUAL mode: remember the system is under which manual operation mode and remember the operation procedure.

2. 利用螢幕之異警診斷畫面，將顯示畫面之內容詳細記錄。

Write down detailed information showed on alarm diagnosis screen.

進入異警診斷畫面之步驟：

The procedure to enter into alarm diagnosis screen:

(1) 按下機能選擇鍵之”DIAGN”。

Press function selection key “DIAGN”.

(2) 按下螢幕下方菜單選擇之”異警”,異警診斷畫面會顯示出異警訊號。

There is a menu selection in the bottom of screen. Press “ALARM” and the alarm screen will show alarm message.

3. 確實記錄異警訊號及內容再重新開機,確認同樣的故障是否再現,若是請聯絡我們的技術人員。

Be sure to record alarm signal and content and startup the system again. Please pay attention whether the same breakdown occurs again or not. If yes, please contact with our service department.

文書資料

Written data

確定目前你所使用機器的文書資料,例如:

Verify the written data for the machine you operated currently, such as:

*MODEL:機械型號

MODEL No.

*SERIAL NO:機械序號

Serial No.

這些資料可以在電氣箱的機號銘牌或出貨精度表上查詢。

You can see the above information on name plate or accuracy table.JW

執行調查

Execute Inspection

如果您是受過歷程訓練的工程師,當您進行調查時要牢記使用正確的安全方法來保護自己,並且避免破壞機械電路及電子元件。

In case you are a well-trained engineer, please remember to take correct safety appliances to protect yourself while you are checking. Please remember not to destroy circuit and electronic parts.

如果您沒有受過訓練，請電洽我們的維修人員，並告知機械型號、序號及問題發生的徵兆。

In case you were not well-trained, please call our service department and tell us model number, serial number and the sign of the problem.

核對結果

Check up the results

請電洽我們的維修人員討論您檢查的發現，我們的維修人員會檢查及驗證您的程序，他們會進一步調查並指出其他不明顯但該注意的事項。

Please call our service engineer to discuss what you found out. Our service engineer will check and verify your procedure again. They will carry out a further check and point out some matters which are not evident but you need to know.

*再次提醒在您來電之前需取得正確的訊息，除了機型及機械序號等，另外電子手冊及參數表一並備齊，如此一來我們的服務人員才能在最短時間內提供最大協助。

We would remind you again that it is necessary to provide detailed information to our service engineer. Besides machine model number and machine serial number, please also prepare electrical manual and parameter table, so our service engineer can provide the most assistance to you in short time.

*確實知道您的錯誤訊息，再三菱的軟體控制中有上百種的訊息，有些看起來相當類似，但可能是指機器不同的零件，如果有一個或多個訊息，請正確的寫下螢幕所示的訊息。

Be sure that you know the error message. There are over one hundred error messages saved in Mitsubishi controller software. Some messages are quite similar, but possibly refer to different machine parts. In order not to make any mistake, please write down the messages showed in the screen exactly.

*了解問題的徵兆，您越了解機械的問題所在將可更快解決問題，您與我們的服務人員可以找到更好的答案。

To understand the sign of problem. The more you understand machine problems, the quicker to solve the problems. You and our service engineer can find out the better solutions easily.

*了解問題何時發生,例如:此種徵兆是否指出現在程式的特定地方,或使用特定的工具,或在某個特別操作後,或在一天當中的特定時間,這些問題有助於找出問題為何發生。

To understand when did the problems occur. For example: whether this sign refers to a specific block in the program or refers to the specific tools used? Whether the problem occurred after a specific operation or occurred in the specific period of a day? Such information is useful for us to discover why the problem occurred.

*從電路板了解 LED 的模式,有些電路板的 LED 顯示提供故障排除訊息,當機器處於故障狀態,注意 LED 的正確訊息,以縮短故障排除的過程。

Check the LED on circuit board and understand the meaning of LED sign. Some LED on circuit board can provide useful messages for trouble shooting. When the machine is out of order, please pay attention to LED sign in order to shorten the trouble shooting process.

機器操作

Machine Operation

在故障排除過程中,您可能遇到需要緊急停止狀況,或機器診斷通知,操作者將可以處理這些項目,但您可能需要一些介紹,方便您親自與他們解決問題。

In the process of trouble shooting, you may probably meet urgent status and you need to execute emergency stop, or maybe you get the machine diagnosis notice that helps operator to solve these matters. However, you may need some more introductions in order to facilitate you to solve the problem with our service engineer.

緊急停止

Emergency Stop

緊急時可以靠按下緊急停止鈕(紅色蕈狀大按鈕),可以停止所有伺服電源,銀幕上會出現緊急停止之訊息。

In the case of emergency situation, it is able to press down the EMERGENCY STOP BUTTON (the red mushroom button) to turn off all servo power supply. The screen will show emergency stop message.

排除緊急停止功能:

The function to release emergency stop:

如果有按下緊急停止鈕,旋轉並抬起按鈕,伺服電源隨及自動恢復待機,供執行下一步驟。

If the emergency stop button is pressed down, just turn and pull the emergency stop button, the servo power supply will recover automatically and become standby status in order to execute next process.

機械診斷

Machine Diagnosis

很多錯誤訊息,指向機械診斷,機械操作系統此部份顯示些感應及測出的狀況,如此您就可以分辨問題是否存在或者已被修復。

There are many error messages refer to machine diagnosis. This part of machine operation system will display the sensed and detected situations, so you can distinguish whether the problem still exist or has already been solved.

重要元件的位置及重置鍵

The position of key components and the RESET button

您可以從零件明細圖表、接線圖及電子手冊尋找相關問題其中之相對位置,有助於問題之發現與追蹤。

You may find out the position of the components, which are involved in the related problems, from the parts list, wiring diagram and manual. That will be helpful to solve problems.

重置鈕可以協助快速消除錯誤及錯誤訊息,一般操作之錯誤訊息可藉重置鈕(RESET)消除。

RESET BUTTON can be used to eliminate error and error message quickly. The error message from general operation can be eliminated by RESET button.

故障分析及排除(環境因素)

Malfunction Analysis and Trouble-Shooting (environmental factor)

狀況及訊息 Status and Message	原因分析 Cause Analysis	矯正步驟 Rectification Procedure
機械水平易變 Machine level is variable	地基螺絲調整不當 The ground bolt is not set properly	重新調整, 完成後固定螺帽 Adjust the ground bolt again and fix the nut after the adjustment.
	墊塊超過 2 片 Leveling block is more than 2 pieces.	更換墊塊, 最多不可超過 2 塊 Replace leveling block and do not exceed 2 pieces.
	機械佔地之地基不穩 The floor ground is not strong enough.	更換地基或重新整地 Rebuild ground or execute soil preparation again.
三點組合水杯排水頻繁 The water cup of F.R.L combination unit drains water frequently.	風壓源水器太重 There is too much steam from the source of compressed air.	1. 風壓源加裝過濾器 Install a compressed air filter. 2. 風壓源加裝乾燥機 Install a compressed air dryer.
風壓不足常常造成停機 Air pressure is not enough and that cause machine stops frequently	空氣壓縮機源頭風壓低於 6KG/CM 平方 Air pressure of compressed air source is lower than 6KG/CM².	加大空氣壓機 Replace a air compressor with larger capability.
	過濾器組或乾燥機阻塞或排水不良 Filter unit or dryer is blocked or the drainage is not well.	1. 檢查過濾器組 Check up the filter unit 2. 乾燥機修理或換新 Repair or replace the dryer.

	風壓管路太長，造成管損太大 Air pipe is too long and that causes too much pipe loss.	1. 加大外部風壓管徑或縮短管路長 Enlarge the diameter of external compressed air pipe or shorten the pipe length. 2. 加裝儲氣筒 Add an air-reserve tank.
電子零件損壞頻繁 The electronic components damaged frequently	環境溼度太大 There is too much humidity.	保持電氣箱門常閉 Always keep the electrical control box close.
	環境漂浮微粒太多，黏貼於電子元件及接點造成 There are too much floating dusts particles adhere onto the electronic components and contact points that cause malfunction.	保持電氣箱門常閉 Always keep the electrical control box close.
	外部電源電壓不穩定，上下波動太大 Main power is not stable and the surge wave is too large.	加裝穩壓器 Install a voltage stabilizer.
ARM TYPE 刀庫換刀臂原點定位不良 The origin point positioning of ARM TYPE tool changer arm is not accurate.	ATC 馬達煞車來令片受潮，切削水器上揚備電風扇下壓造成水器滯留於來令片 The brake lining of ATC motor is dampened. The coolant splashes up but to be blown down by the fan. That makes the damp to be left on brake lining.	ATC 馬達上方不可安裝電風扇 Do not install fan over ATC motor.

加工後零件精度不穩定 Part accuracy is not stable after machining	加工材料儲存區溫度與工區溫度差異較大，材料熱脹冷縮造成加工前後變異 The temperature difference between storage area and working area is larger. Material expands when heated and contracts when cooled, that cause size variety.	材料加工前最好移至加工區放置 4 小時以上 It better to move the material to machining area for over 4 hours.

故障分析及排除(控制器)

Malfunction Analysis and Trouble Shooting (CNC controller)

狀況及訊息 Status and Message	原因分析 Cause Analysis	矯正步驟 Rectification Procedure
三菱控制器傳輸時造成當機問題(使用網路卡的狀況下) The system is down (crashed) while Mitsubishi controller transferring data (use LAN card).	確定控制器為 65M+網路卡的機台 Make sure the machine is equipped with 65M+ LAN card.	於電氣箱內多增加一條接地線，65MNC 使用規格:1C*2^2 黃/綠線即可改善
加工表面紋路不佳 The machined surface of workpiece is not good.	確定控制器為 64M，其 NC 版別為何?若是 C4 版，而 SERVO 版別為 C3 版，即可修正參數 Make sure the controller is MELDAS 64M, and confirm what is the NC version? If NC is C4 version but SERVO is C3, it is able to revise parameter.	修正基本參數 Revise base parameter BASE :1148 為 1 :1148 is 1
		修正軸參數 Revise axis parameter AXIS :2010 X 軸為 40, Y 軸為 40, Z 軸為 40 X-axis is 40,Y-axis is 40, Z-axis is 40.

		修正伺服器參數 Revise servo parameter SERVO :2203 X 軸為 33, Y 軸為 33, Z 軸為 33 X-axis is 33,Y-axis is 33, Z-axis is 33 SERVO :2204 X 軸為 86, Y 軸為 86, Z 軸為 86 X-axis is 86,Y-axis is 86, Z-axis is 86 SERVO :2219 X 軸為 25, Y 軸為 25, Z 軸為 25 X-axis is 25,Y-axis is 25, Z-axis is 25 SERVO :2220 X 軸為 25, Y 軸為 25, Z 軸為 25 X-axis is 25,Y-axis is 25, Z-axis is 25 SERVO :2232 Z 軸原為-22 改為-10 Change Z-axis from –22 to be –10. SERVO :2257 X, Y, Z 軸原為 60 改為 187 Change X,Y,Z 3 axes from 60 to be 187.

		加工參數: PROCESS Process parameter: PROCESS 8004:SPEED 為 100 8004: SPEED is 100 8005:ZONE r 為 0 8005: ZONE r is 0 8006:ZONE d 為 0 8006: ZONE d is 0 8007:OVERRIDE 為 25 8007: OVERRIDE is 25 8008:MAX ANGLE 為 135 8008: MAX ANGLE is 135 8009:DCC ZOON 為 10 8009: DCC ZOON is 10 8012:G73 n 為 0.1 8012: G73 n is 0.1 8013:G83 n 為 1 8013: G83 n is 1 8019:R COMP 原為 99 改為 60 8019: R COMP, change it from 99 to be 60. 8020:DCC.ANDLE 原為 0 改為 10 8020: DCC.ANGLE, change it from 0 to be 10.
導致功能失效 Wrong parameter causes malfunction.	確認參數是否錯誤 Mae sure if the parameter setting is wrong or not.	修正基本參數 Revise basic parameter BASE :1139 原為 4 改為 1 Change it from 4 to 1

刀臂式 ATC 於換刀過程中突然卡刀，無法完成換刀動作 Arm type ATC got stuck in the process of tool changing, so that it can not fulfill tool change motion completely.	不用搖柄機械方式排除 Does not take mechanical method, such as rock handle for trouble shooting.	A. 再 MPG 模式操作將機械診斷三數設定 6403.0 設 1 Set machine diagnosis parameter 6403.0 to be 1 under MPG operation mode. B. 利用面板上的按鈕　　程式啟動(綠色可手動寸動使刀臂做 CW 正轉動作) Use Cycle Start Button , which is located on control panel (green) to execute manual jog to make tool arm rotate CW(clockwise) C.　　程式停止(紅色)可手動寸動使刀臂做 CCW 反轉動作(線換刀開始至鬆刀完成期間) Program stop (red) can execute manual jog to make tool arm rotate CCW (It is active during the period tool change start to tool unclamp complete). D. 主軸會自動判斷鬆夾刀 Spindle will determine tool clamp/unclamp automatically. E. 刀庫不會出現亂刀情況不須重整刀庫 F. Tool magazine will not disorder. It needs not to reorganize the tool magazine. G. 若中途斷電，在通電後不須歸 HOME 點，即可操作 If power OFF halfway, it is not necessary to execute Home return and able to continue operation H. 新板 PLC 才有此功能 Only new version PLC is furnished with this function.

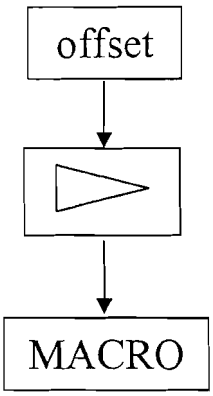
選項

Option

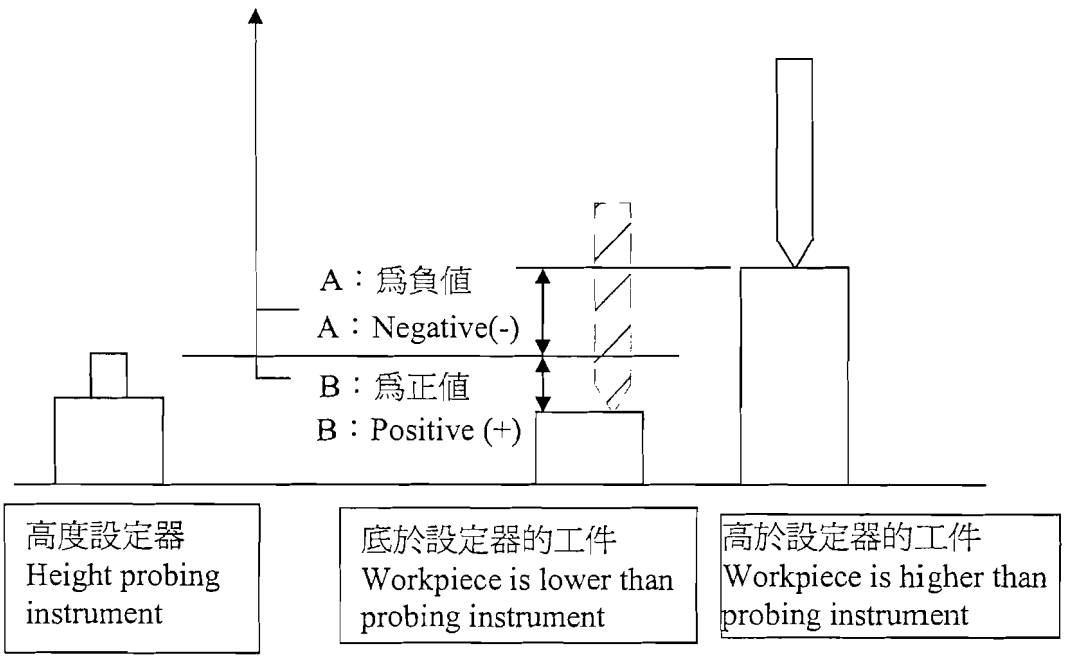
刀長自動量測

Automatic tool measurement

1. 先設定工件基準面與量測器距離 NO：500
   Set the distance betwen workpiece and probing instrument NO：500
   路徑 Path



NO：500：XXX，XXX



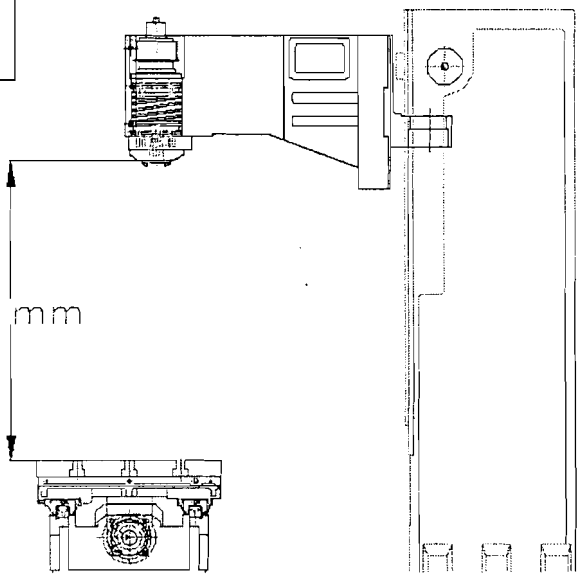
2.若要設定 T1 只要執行 T1M6：M76：即自動設進 H1
Only execute T1M6：M76：T1 can be set and automatically set H1

T1M6；M76；
T2M6；M76；
T3M6；M76；

Drawings of re-setup for each axis retuming to origin point.
Please re-operate controller according to the position shown on the drawings.

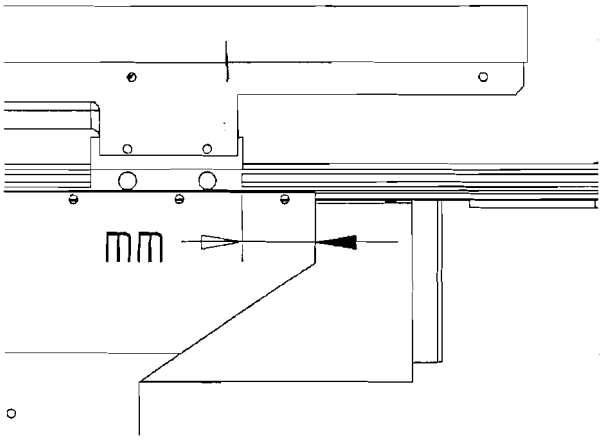
Z-AXIS ZRN

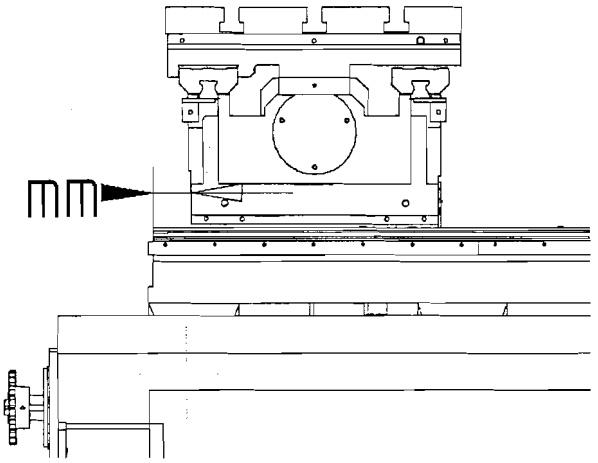
T510	M600	M860	M1020
660mm	648mm	790mm	790mm



X-AXIS

T510	M600	M860	M1020
40mm	38mm	60mm	5mm



Y-AXIS

T510	M600	M860	M1020
0mm	5mm	70mm	70mm