



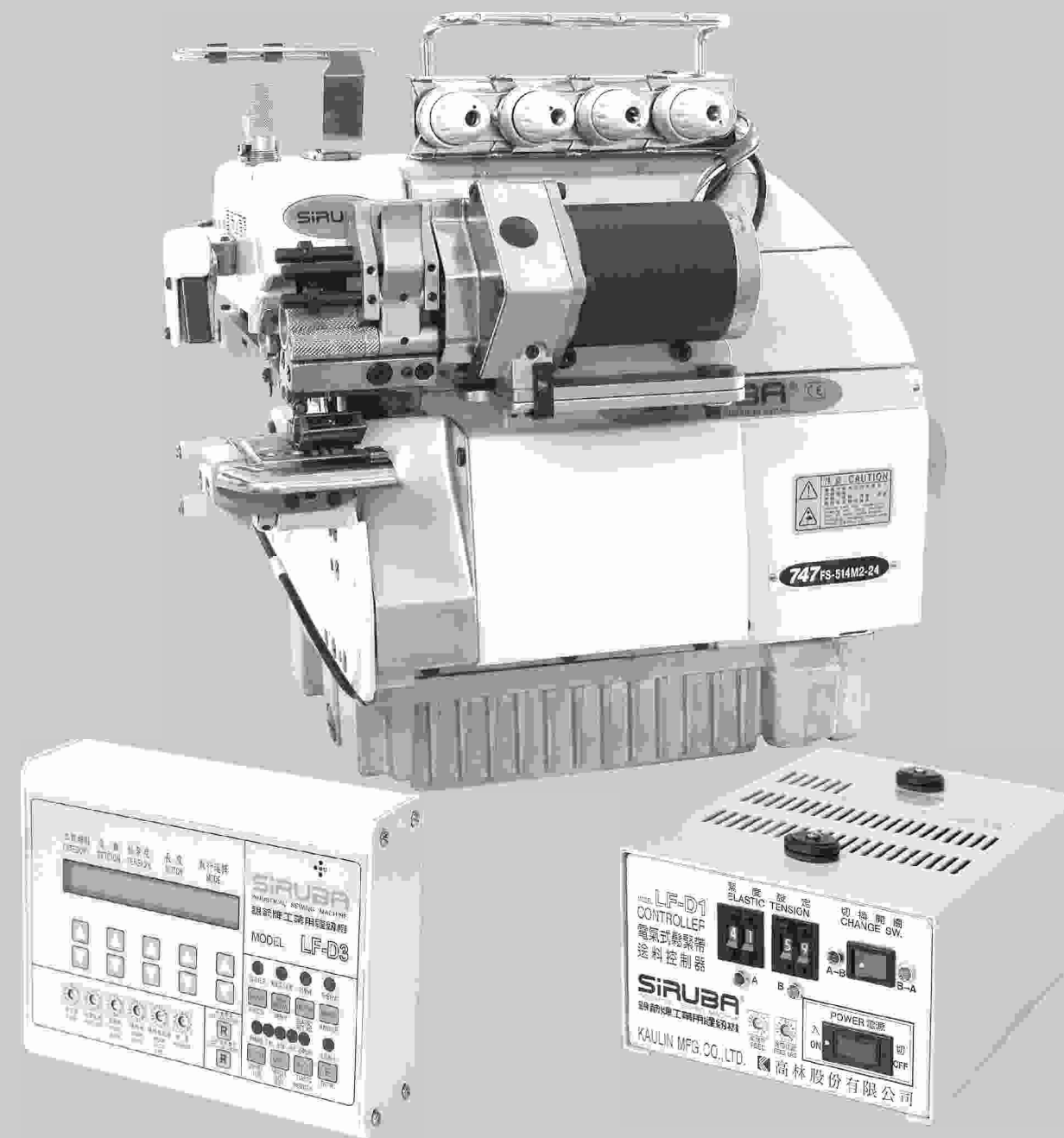
LF-D3

SIRUBA®
銀箭牌工業用縫紉機
INDUSTRIAL SEWING MACHINE

LF-D3

高林股份有限公司 KAULIN MFG. CO., LTD.

使用說明書 INSTRUCTION BOOK



危險水準的說明
Explanation of Dangerous Level

 危險 Dangerous	如果忽視此標記而運行了錯誤的機械操作, 保養時肯定會引起當事者或第三者人員重傷或死亡 Don't ignore the warning sign and don't proceed incorrect operation. Or it will cause the person or the third party seriously injured or dead during maintenance.
 注意 Caution	如果忽視此標記而運行了錯誤的機械操作, 保養時有可能會引起當事者或第三者人員受傷及造成設備損壞 Ignoring this warning sign and proceed incorrect operation will cause the person involved or the third party wounded and equipment damaged during maintenance.

警告圖案表示及表示標誌的說明
Explanation of Warning Signs and Labels

警告圖案表示 Warning Sign		運動部位, 謹防工傷事故 Moving part, beware of industrial accident
		高壓部位, 謹防觸電事故 High voltage, beware of electric shock
		高溫部位, 謹防燙傷事故 High temperature, beware of burns
指示標幟 Instruction Label		禁止 Prohibited
		地線的接線表示 Indication of ground wiring

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一般安全事項說明

GENERAL SAFETY INSTRUCTIONS

警告！

當使用這台機器，基本安全預防應恆被遵守，以減輕火災、電擊、或是個人傷害的風險。包含以下注意事項。
在操作這台機器之前，請閱讀所有說明並且謹記於心。

1. 保持工作場所清潔

雜亂的環境與椅子會招引危害。

2. 考量工作場所環境

勿暴露電源於雨水之中、勿在濕氣重的地方或潮濕的場所使用機械器具。保持工作場所良好整齊。當有引發火災或爆炸危險時，勿使用電源工具。

3. 免於電擊危害

避免身體接觸地線或是接地表面。(即：管線，發熱物體，以及冷凍庫)

4. 勿使孩童接近

不要讓訪客碰觸工具或是延伸管線

5. 適當的穿著

不要穿著寬鬆衣物或穿戴珠寶，這可能被活動零件拉扯而導致危險。穿戴護髮套以包含住長髮。

6. 不要任意拉扯電線

絕不要用電線端拉扯機器，或是從插座猛拉電線來拔掉電線。使電線遠離熱源、油類或是尖銳邊緣。

7. 謹慎保養機器

遵從指示來添加潤滑油或是更換附件。定期檢測工具用線，如果有所損害，請使用合格的維修器具來修復。

Warning!

When using this machine, basic safety precautions should always be followed to reduce the risk of fire, electric shock and personal injury, including the followings. Read all these instructions before operating this product and save these instructions.

1. **Keep work area clean**

Cluttered areas and benches invite injuries.

2. **Consider work area environment**

Do not expose power to rain. Do not use machine tools in damp or wet locations. Keep work area well lit. Do not use power tools where there is risk to cause any fire or explosion.

3. **Guard against electric shock**

Avoid body contact with earthed or grounded surfaces (e.g. Pipes, radiators, ranges refrigerators.)

4. **Keep children away**

Do not let visitors touch the tool or extension code.

5. **Dress properly**

Do not wear loose clothing or jewelry, they can be caught in moving parts. Wear protecting hair covering to contain long hair.

6. **Do not abuse the cord**

Never carry the machine by cord or yank it to disconnect it from the socket. Keep the cord away from heat, oil, and sharp edges.

7. **Maintain machine with care**

Follow instructions for lubrication and changing accessories. Inspect tool cord periodically. If damaged, have it repaired by an authorized service facility.

8. 分開機器

當不使用機器時、維修前、以及更換配件時。
9. 避免誤啟動

不要以手指置於啟動開關上之後，搬運一個已插入電源的工具。確定在插電之前，電源開關是關閉的。
10. 檢查損害零件

在進一步使用器具之前，應該小心檢查並確認損傷的零件或是穿戴保護器具來確認零件會正確運轉並且呈現應有功能。
11. 警告

除了在這本使用說明手冊中建議的功能之外，任何附件或是配件的使用，都可能會導致個人傷害的危險。
12. 由合格人員來修理工具

所以的修理工作應該由合格的人員使用原始個別零件來作修理。

連接電源的特別警示

1. 只可與有"CE"認證的按壓啟動裝置連接這台機器。

2. 遵守此使用說明手冊來安裝控制裝置。
3. 在操作過程中，永遠保持機器適當的接地。

4. 在調整、更換零件、或是維修保養之前，必須確定將插頭由插座拔出，以預防任何機器意料之外的啟動而造成危害。

8. Disconnect machine

When not in use, before servicing and when changing accessories.
9. Avoid unintentional starting

Do not carry a plug-in tool with a finger on the switch. Ensure the power switch is off when plugging in.
10. Check damaged parts

Before further use of the tool, a guard or other part that is damaged should be carefully checked to determine that it will operate properly and perform its intended function.
11. Warning

The use of any accessory or attachment, otherthan those recommended in this instruction manual, may present a risk of personal injury.
12. Have your tool repaired by a qualified person

Repairs should only be carried out by qualified persons using original spare parts.

SPECIAL WARNING FOR ELECTRIC CONNECTION!

1. Incorporate this machine only with “CE” certificate hold-to-run control device.

2. Follow the instruction manual device to install control device.

3. Always earth machine appropriately during operation.

4. Before adjustment, parts change or servicing must be sure to pull out the plug from socket to prevent the hazard of unintentionally start of machine.

重要安全事項說明

恭喜您購買本機器, 為了使這台機器能獲得最佳功能以及安全的操作，務必請正確的使用這台機器，使用前請仔細閱讀使用說明書，希望您能長期使用它。請記得將此說明書放在容易取得的地方。

- 

1. 當您使用機器時，除了以下事項外，請注意其他基本安全措施。
- 

2. 使用機器前，除了這本使用說明書外，請詳細閱讀其他有關說明書。此外，請妥為保存這本使用說明書，以便需要時可以隨時取閱。
- 

3. 先確認機器是符合貴國安全規定及標準後，再使用機器。
- 

4. 當機器完成操作準備時，所有安全配備必需安裝就緒，在缺少所述安全配備下操作是不被允許的，以免導致人員受傷。
- 

5. 此機器應由受過適當訓練之操作員操作。
- 

6. 為了安全，我們建議您配戴安全眼鏡。
- 

7. 以下情形，請先關閉電源或拔掉插頭：

- (1) 穿針線、線導片、 天平等以及更換梭子時，

(2) 更換針、押具、針板、送具、頂針片、喇叭、車布導板，以及其他附屬配件時。

IMPORTANT SAFETY INSTRUCTIONS

For operating safely and getting the best functions of this machine, you must operate it correctly. Please read and follow the instructions of this manual, and keep it at hand for future references. We are confident that you will enjoy this machine as much as we enjoy manufacturing it.

- 

1. Instead of the following instructions, when you use this machine, please pay attention to the basic safety measures.
- 

2. Before using this machine, please read this manual and all related instructions. In addition, please keep this manual for future needs.
- 

3. Before using this machine, please ascertain that it conforms with safety standards and regulations of your country.
- 

4. When the machine is ready for operation, all the safety equipments must be ready. Operate this machine without the specified safety devices is not allowed.
- 

5. This machine must be operated by a properly trained operator.
- 

6. For your own safety, we suggest you wearing goggles.
- 

7. Please turn off the power switch or disconnect it for any one of the circumstances of the followings :
- (1) When threading needle(s), adjusting thread Take-up(s), thread guide(s), and / or replacing bobbin(s),

(2) When replacing needles, presser feet, needle plates, feed dogs, needle guards, horns, cloth guides and other parts or accessories,

- (3) 維修工作時。
- (4) 離開工作場所或工作場所無人看顧時。
- (5) 若使用離合器馬達而無煞車片裝置時，必需待馬達完全停止。



8. 假如不慎讓機器及配件使用之油或油脂, 接觸到眼睛、皮膚或誤食時, 請立刻以水清洗接觸部位及就診。



9. 請勿擅自碰觸運轉中之零件或配件及注意機器電源是否已開啟, 以免導致人員受傷。



10. 維修、修改及調整等工作, 需由受過適當訓練的技師或熟手為之。維修時只許使用指定之零件。



11. 一般維修及檢查工作必須由受過適當訓練的人員為之。



12. 電子零件維修及保養工作必須由資深的電子技師為之, 或由非常熟練的人員檢查及指導, 當發現零件損壞時, 請立刻停止機器運轉。



13. 在做裝有氣動式零件(例如氣缸)機器的維修及保養工作前, 機器連接空壓機及高壓空氣必須予以關閉及卸除, 機器中殘存高壓氣體必需予以消除, 此外調整及性能檢查只能由受過適當訓練的技師或熟手為之。



14. 機器使用一段時間, 必需定期清理。

- (3) When repairing,
- (4) When the operator leaves the working place or leaves the machine unattended.
- (5) If clutch motors without brake pads are used, must wait until the motor stops completely.



8. If grease, oil, or any fluid contacts your skin or eyes by any chance, please wash the contacted area completely with clean water and consult a doctor. Or, swallow any fluid mistakenly, consult a doctor immediately.



9. Do not touch any functioning parts and devices. Always attend to whether power switch is on or off before operating in order to prevent anyone from getting hurts.



10. Qualified technicians are required for adjustment, modification, and repair. Only use assigned parts for replacement.



11. Routine maintenance and service must be performed by well trained persons, or qualified technicians.



12. Maintain and check the electronic parts must be done by qualified electrician or well-trained persons. If any electronic part damaged or malfunctioned, stop the machine immediately.



13. The air hose has to be detached from the machine and the compressor or air supply has to be cut off before repairing and servicing the machine equipped with pneumatic parts such as an air cylinder. Qualified technicians or well-trained persons are required for adjustment and repairs.



14. To ensure the best performance, periodically clean the machine is necessary.



15. 為使機器能正常操作及減少噪音, 機台務必平放地上, 機器避免在強烈噪音的環境下操作。



16. 選用適當的電源插頭, 並由電子技師將其按裝在機器上, 且插頭必需插在接地線之插座上。



17. 機器只允許被使用於指定用途上, 其他用途是不允許的。



18. 修改或變更機器必需依照安全規定及標準, 同時採取有效的安全措施, 本公司不承擔任何私自因修改或變更機器所引起損壞之責。

19. 警告提示以兩種符號標示:



(1) 對操作員或服務人員之傷害危險, 也為了避免觸電之危險, 請勿打開馬達電器箱之外蓋, 也不要觸摸電器箱裡面之零件。



(2) 必需特別注意事項

a. 絕對不可在移開皮帶蓋, 手指保護蓋或安全配件後, 進行機器操作, 以免導致人員受傷。



b. 為了避免被機器纏住, 當機器運轉中, 您的手、頭髮及衣服, 需遠離手輪, 皮帶及馬達; 此外這些部位周圍不可放置任何物品, 以免導致人員受傷。



15. In order to operate properly and to reduce the noise, please place the machine flat and level on the ground. Avoid operating the sewing machine at a noisy surrounding.



16. Select a proper power plug and install it by an electrician. Please connect the power plug to a grounded receptacle.



17. This machine can only be used for the designed purpose. Other uses of this machine are not allowed.



18. Any modification or conversion made on this machine must be conformed with the safety standards and regulations. Precaution is necessary. No responsibility will our company take for damages caused by any modification or conversion of this machine without permission.

19. Two safety warning signs are applied as warning signs:



(1) For the safety of operators and service persons, please don't open the cover of any electronic control boxes of motor or other devices and don't touch any components inside to avoid electrical shock hazards.



(2) Always keep in mind:

a. Please never operate this machine without belt cover, finger guard or any safety device to avoid physical injury.



b. Please keep your hair, fingers and cloths away from the hand wheel, V belt and motor while the machine is in operation, as well as never put anything near these parts, to prevent the risk of injuries by tangled into them.



c. 當您打開電源開關後或機器已在運轉中，絕不可將您的手放在針的下方或針線控線桿外蓋中，以免導致人員受傷。



d. 當機器運轉中，梭頭高速轉動，為了避免對手可能引起之傷害，必需確定您的手保持遠離梭頭附近。此外，當更換梭子時，確定電源開關已關閉，以免導致人員受傷。



e. 當放置或抬起機頭時，小心勿將手置於機器中，以免導致人員受傷。



f. 為了避免機器突然啟動而引起可能意外，當機頭傾斜或移開皮帶蓋及皮帶時，請關掉機器電源，以免導致人員受傷。



g. 如果您的機器是配置伺服馬達，機器於靜止狀態時，馬達是不會產生噪音的，為了避免機器突然啟動而引起可能意外，故請關掉機器電源。



h. 為了避免觸電之危險，請絕不要在移開電源接地線後操作機器。



c. Please never put your fingers under the needle(s) or in the thread take-up cover to prevent physical injuries when you turn on the power switch or operate the machine.



d. While the machine is in operation, the hook rotates at a high speed. Please keep your hands away from the area of hook to prevent any potential injury to your hands. In addition, please make sure to turn off the power of the machine while changing bobbins.



e. Be careful and do not place your fingers inside the machine when placing or lifting the machine head to avoid possible physical injuries.



f. Please turn off the power before tilting the machine head or removing the belt cover and the V belt to avoid possible accidents due to abrupt start of this machine.



g. For machines equipped servo motors, the motors do not produce noise while the machines are at rest. Therefore, please turn off the power of this machine to avoid possible accidents due to abrupt start of the machine.



h. Never operate the sewing machine after the ground wire is removed to avoid electrical shock hazards.



i. 為了避免觸電或電子零件損壞而引起之可能意外，請先切斷電源，再插上或拔掉插頭。



i. Please turn the power switch off before connecting or disconnecting the power plug to prevent possible accidents due to electric shock or damaged electronic components.

特別事項

WARNING

為了避免機器故障及損壞，請先確定以下事項：



1. 當您安裝好機器後，做第一次機器操作前，請徹底清潔機器。



2. 清除運送途中累積之灰塵及溢出之油脂。



3. 確定電壓及馬達相數(單相或三相)安裝正確。



4. 確定電源插頭正確地接上電源。



5. 當使用電壓與標示電壓不同時，請勿使用機器。



6. 確定機器轉動方向是否正確。



警告：
在操作或調整本書中所提到之各步驟前，請先將電源關掉，以免因為機器突然啟動造成之意外。



Please confirm the followings to avoid malfunction or damage to this machine.



1. After installing the machine, and before the first operation, please clean it completely.



2. Clean all dust and overflowed oil during transportation.



3. Confirm that the voltage and the phase (single or 3 phase) of motor are set correctly.



4. Confirm that the power plug is correctly connected to the power supply.



5. Never use the machine when the local voltage type is different from the marked voltage on the nametag attached on the machine.



6. Confirm that the rotating direction of the machine pulley is correct.



Warning :
Before doing any operation or any adjustment described later in this manual, please turn the power off to prevent accidents caused by abrupt start of the sewing machine.

功能基本架構

THE FUNDAMENTAL FUNCTION STRUCTURE

1. 共有26組工程(Catagory)可供記憶，以A~Z來編號。(圖1)

2. 每組工程提供26個段數(Section)以供執行，以01~26來編號。

3. 每個段數則紀錄有送帶鬆緊度(Tension)，送帶鬆緊度以00~90表示；送帶長度(Stitch)，送帶長度以000~999表示；以及五種執行模式(Mode)：
- (1) 手動跳段(H)

(2) 手動切帶或膝動切帶，擇一使用(HC)

(3) 自動跳段(A)

(4) 自動控制長度及切帶(AC)

(5) 段數回歸起點(R)
1. There are 26 categories of built-in memory available for this machine, which are coded from A to Z.

2. Each category has 26 sections for executing. The sections are coded from 01 to 26.

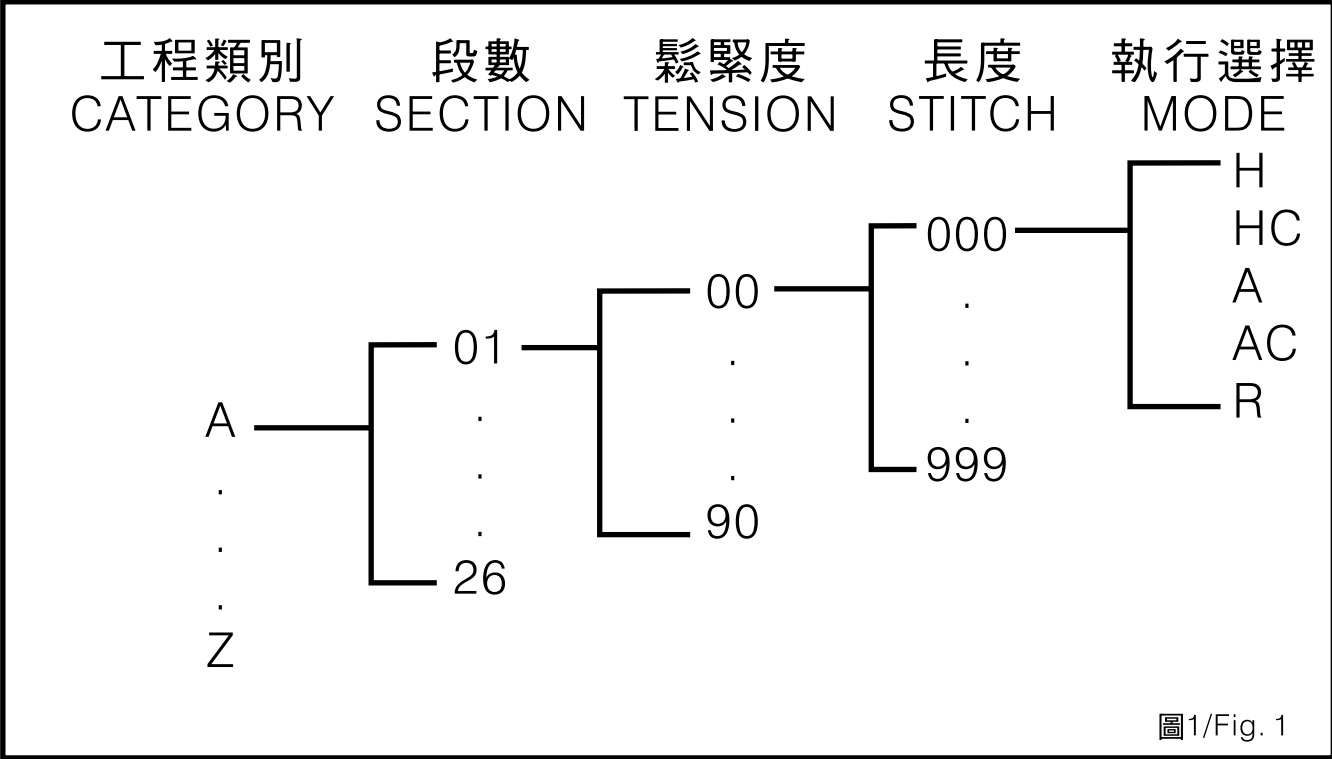
3. Each section records tensions, from 00~90, stitches, from 000~999, and 5 modes:
- (1) Changing section manually. (H)

(2) Two selections: trimming tapes manually or knee-controlled. (HC)

(3) Changing section automatically. (A)

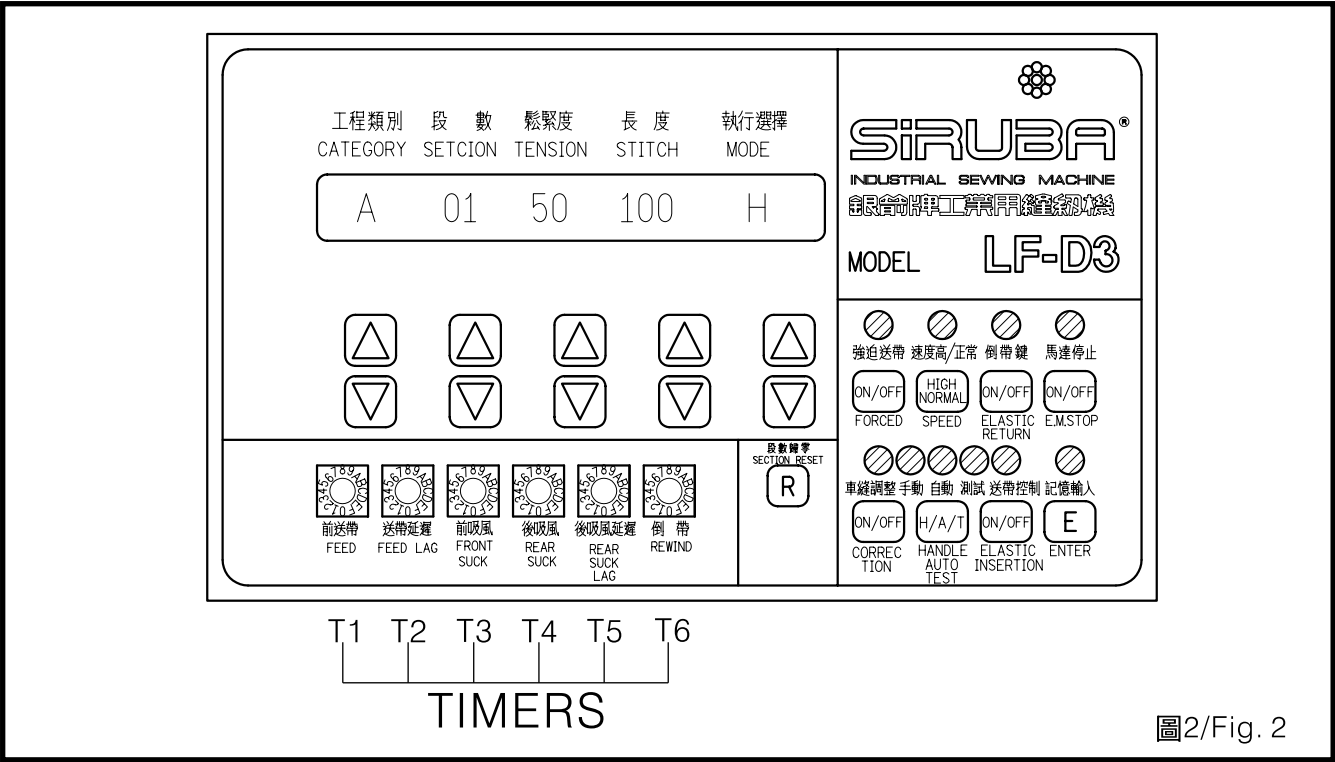
(4) Controlling the tape length and trimming the tapes automatically. (AC)

(5) Resetting the section. (R)



控制箱之功能說明

HOW TO SET THE CONTROL BOX



T1

T2

T3

T4

T5

T6

TIMERS

圖2/Fig. 2

1. 螢光液晶顯示字幕功能：(圖2)

(1) 工程類別設定
工程類別由A至Z共26組可供選擇，可依車縫類需要設定使用。如不同之款式、大小等變化皆可設定。

(2) 段數設定
段數設定由1至26段，可依車縫需要設定不同段數使用，也就是說在同一工程類別中有26段之變化可供選擇。

(3) 鬆緊度設定
設定1至26之任何一段之供給量，即送帶滾輪轉動之快慢控制，數字愈小時所供給之量愈小，亦即縫合後鬆緊度變繃，反之所供給量愈多則縫合後變寬鬆，其數字之多寡請依實際縫合所需之鬆緊度選擇適之數字。(縫合前先行測試)。
1. The descriptions of LCD screen functions: (Fig. 2)

(1) Category setting
26 categories, from A to Z, can be set depending on the sewing types, such as types or sizes.

(2) Section setting
The section can be set from 1 to 26. It can be set depending on the sewing types, which means that each category has 26 different sections.

(3) Tension setting
This function is to set the feeding volume of any one of the 26 sections, which controls the rolling speed of the feeding roller. The smaller the number is, the less the feeding volume is. That means the elastic tension will become tense. On the contrary, the more the feeding volume, the looser the tension. Please choose the the proper number according to the requirments. (A trial before use is strongly recommended.)

- (4) 長度針數設定

各段所設定之數字為鬆緊帶之長，即送帶滾輪轉動之時間長短。設定之數字愈小鬆緊帶愈短，反之則愈長。但長度針數之設定會因各段鬆緊度之設定大小有所變化，所以二者需配合使用調整至最理想程度。(當縫紉機器粗細針距有調整時，亦會影響長度之變化，因此粗細針距有重新調整時，應在重新設定鬆緊度及長度之針數)。
- (5) 模式選擇

有5種不同模式，可依需要作不同之設定。

a. 手動跳段(H)

車縫時，視所需之長度，以手動按鈕開關變換段數。

b. 手動切帶或膝動切帶(HC)

當車縫完成所需之長度時，用手動按鈕開關控制切帶或膝動控制切帶。

c. 自動控制跳段(A)

依設定之長度數據及執行模式之自動跳段車縫。

d. 自動控制長度與切帶(AC)

當車縫完成全部設定好之段數長度及執行模式後，即自動切斷鬆緊帶。

- (4) Stitch length setting

The set number is the length of the elastic, which also means the length of time of the roller feeding. The smaller the set number, the shorter the elastic. On the contrary, the elastic tape will be longer. However, the settings of the stitch length will vary because of the setting volumes of each section. Therefore, the elastic tension and stitch length need to be adjusted cooperatively to the best condition. (When the stitch length is adjusted because of the needle width, it will also effect the sewed stitch length. Therefore, when doing readjustments of the stitch length, please reset the tension and the stitch numbers.)
- (5) Mode selecting

There are five different modes, and please adjust according to requirements.

a. Changing section manually (H)

Change to next section by pressing the button manually according to the required length when sewing.

b. Trimming tape manually or knee-controlled (HC)

When finishing the required length, trim the elastic by pressing the button manually or by knee-control.

c. Changing section automatically (A)

It will change to the next section automatically along the set number of length and the mode.

d. Controlling the tape length and trimming tapes automatically (AC)

When finishing all the set length in sections and modes, it will trim the elastic automatically.

- e. 段數回歸起點(R)

設定自動功能(自動燈亮)操作後，在一件衣服(褲)結束車縫之段數後面設定"R"，則切帶及後吸風動作完成時，段數自動回歸(01段)起點。
2. 註：

(1) 設定手動狀態(手動燈亮)車縫時，執行選擇功能一律H顯示, 若設定其它執行模式時, 則自動跳為H，手動之按鈕開關只執行跳段功能, 且切帶時一律以膝動開關控制切帶。

(2) 設定自動狀態(自動燈亮)車縫時，執行選擇功能即可設定自動或手動，按鈕開關則可執行跳段(模式為H時)或切帶(模式為HC時)功能。

3. 設定如圖3。

- e. Resetting the section (R)

After setting the auto operations (the auto lamp is on,) set "R" after the setting sequence of sewing. The result is the sewing operations will return to the beginning (section 01) after tape trimming and waste suction.
2. NOTE:

(1) In setting the operation of manual function (the manual lamp is on,) the code will all show as the letter H. Even if setting other operation mode, the code will automatically change to H. The manual button only executes section switching, as well as the tape trimming function is limited to knee-control trimming.

(2) In setting the operatino of automatic function (the auto lamp is on,) there will have two choices to make, auto or manual. When the mode is set to H, the button can execute section changing. When the mode is set to HC, the button can execute tape trimming.
3. The settings are as shown in figure 3.

工程類別 CATEGORY	段數 SECTION	鬆緊度 TENSION	長度 STITCH	執行選擇 MODE	
—	—	—	—	H	← 表達手動控制跳段 Changing Section Manually
—	—	—	—	HC	← 表達手動切帶或膝動切帶 Trimming Tapes Manually or Knee-Control
—	—	—	—	A	← 表達自動控制跳段 Changing Section Automatically
—	—	—	—	AC	← 表達自動控制長度及切帶 Controlling Length and Trimming Automatically
—	—	—	—	R	← 表達段數回歸起點 Resetting the Section

圖3/Fig. 3

操作設定功能說明

HOW TO OPERATE THE SETTING FUNCTION

1. 數字之調整

- (1) 由△▽之觸控鍵來操作，△則數字增加，▽則數字減少，按一次則跳一個數字，按著不放則數字自動增加或減少。
- (2) 選擇五種模式代號，按△則依順序H→HC→A→AC→R顯示，按▽則反順序顯示。

2. 車縫調整鍵

- (1) 當設定於自動車縫，在某段數車縫失敗時，則可按車縫調整鍵來改變車縫段數及功能，回到需要之起點。
- (2) 操作順序：
按下車縫調整鍵(ON)LED燈亮，調整需要之段數後按下記憶輸入鍵(閃爍三下及有三響聲)，完成時再切換至(OFF)LED燈滅，即可開始車縫。

3. 手動/自動/測試鍵

- (1) 手動燈(H)亮，表示車縫模式為手動控制方式。
- (2) 手動控制操作說明：
 - a. 手動操作時，1~26之段數各段鬆緊度設定數字在(10~90)之間，針距設定在999或不設定亦可。
 - b. 模式執行皆顯示"H"。

1. Adjust the digital figure

- (1) Controlled by the △ and ▽ buttons. When pressing △, it will increase the number, whereas pressing ▽ will decrease the number. Each press will add or minus one from the preceding number. If the button is kept pressed, the number will increase or decrease continuously and automatically.
- (2) The five codes of the modes will appear in the order of H→HC→A→AC→R by pressing △. The codes will appear contrarily if pressing ▽.

2. Sewing adjusting button

- (1) When one section of sewing fails in auto sewing, the section and its functions can be changed simply by pressing sewing adjusting button, and return to the beginning.
- (2) Operation procedure:
Press the sewing adjusting button (ON) to make it function. At this time, the LED lamp is on. After adjusting to the required section, please press the enter key, which will flash and beep 3 times. Finally, press the OFF key. The LED lamp will be off, and then the sewing is available.

3. Manual/Auto/Test key

- (1) When the manual light is on, it means the sewing mode is manual control.
- (2) Manual control operation:
 - a. When operating manually, the set number of the tension of each section from 1~26 is between 10~90. Set the stitch length to 999 or don't set.
 - b. The mode is shown in letter H.

- c. 車縫操作時的鬆緊帶長度，由膝動開關控制切刀之動作來控制。
- d. 當切刀動作及後吸風動作完成時，段數則自動回歸至此段開頭(即01段)。
- e. 選擇1~26段之作業方式，是以觸控手動按鈕開關來控制跳段。
- f. 手動控制操作車縫時，手動LED燈會亮。(圖4，圖5)

- c. The length of the elastic while sewing is controlled by knee-controlled trimmer.
- d. When finishing trimming and waste sucking, the section number will automatically return to the beginning of this section (ie section 01).
- e. To select the section from 1~26 is to press the manual button to control.
- f. When controlling the sewing operation manually, the LED lamp indicating manual controlling will be on. (Fig. 4, Fig. 5)

工程類別	段數	鬆緊度	長度	執行選擇
CATEGORY	SECTION	TENSION	STITCH	MODE
A	01	80	60	H
A	02	60	70	H

手動跳段到02段
Change to section 02 manually

膝控切帶結束車縫
Knee-control trimming to finish sewing

02段 Section 02 01段 Section 01

手動操作車縫時，當膝控切帶後，段數自動回歸到01段
After the knee-control tape trimming in the operation of sewing, it will return to section 01 automatically.

圖4/Fig. 4

工程類別	段數	鬆緊度	長度	執行選擇
CATEGORY	SECTION	TENSION	STITCH	MODE
A	01	80	100	HC
A	02	80	50	H
A	03	60	40	HC
A	04	60	40	H
A	05	80	50	HC
A	06	—	—	R

手動切帶 Trimming tapes manually

手動跳段 Changing section manually

手動切帶 Trimming tapes manually

手動跳段 Changing section manually

手動切帶 Trimming tapes manually

回歸01段 Return to section 01

段數06之執行模式為"R"時，段數05完成後即回歸段數01的起始位置
When the mode of section 06 is "R", it will return to section 01 after finishing section 05.

HC 01段 HC section 01

05段 Section 05 02段 Section 02

04段 Section 04 03段 Section 03

圖5/Fig. 5

- (3) 自動燈(A)亮時，表示車縫模式為自動控制方式。

(4) 自動控制操作說明：

a. 在自動操作時，可自由選擇欲執行之工程類別。

b. 每類工程之段數內容執行選擇(自動或手動)，亦可自由設定使用。

c. "R"前之段數選擇必為"HC"或"AC"，否則該段數不可設定"R"指令之自動連續式車縫。此時自動燈會亮。(圖6)
- (3) When the auto lamp (A) is on, it means that the sewing mode is auto control mode.

(4) Operation descriptions:

a. In auto operation, you can choose any category you want to execute.

b. You can also select the sections and modes in every category freely (auto or manual).

c. The section before the section including mode R can only be HC or AC. Otherwise, that section should not set R for auto continuous sewing. At this time, the lamp indicates auto is on. (Fig. 6)

段數11之執行模式為"R"時，在完成段數10的車縫後，即回歸段數01的起始位置。
When the mode of section 11 is R, the process will return to section 01, the beginning, after finishing the sewing of section 10.

工程類別 CATEGORY	段數 SECTION	鬆緊度 TENSION	長度 STITCH	執行選擇 MODE	
A	01	50	30	A	自動跳段 Change section automatically
A	02	70	20	AC	自動切帶 Trimming tape automatically
A	03	50	45	H	手動跳段 Change section manually
A	04	70	35	HC	手動切帶 Trimming tape manually
A	05	70	35	H	手動跳段 Change section manually
A	06	50	45	HC	手動切帶 Trimming tape manually
A	07	50	60	A	自動跳段 Change section automatically
A	08	70	50	AC	自動切帶 Trimming tape automatically
A	09	70	50	A	自動跳段 Change section automatically
A	10	50	60	AC	自動切帶 Trimming tape automatically
A	11	—	—	R	回歸01段 Return to section 01

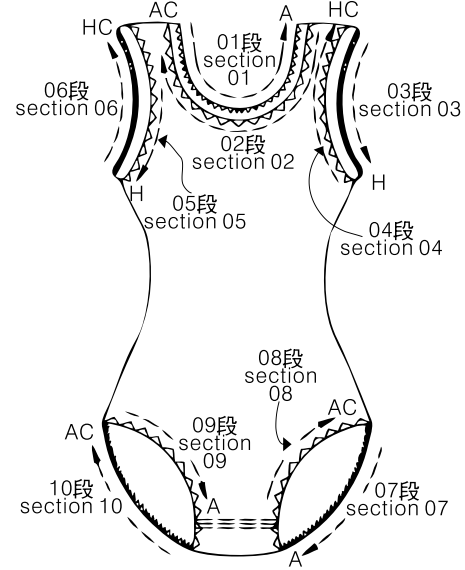


圖6/Fig. 6

- (5) 測試燈 (T) 亮時，表示能將每段測試車縫之緊度，長度記錄在電腦螢幕中，方便模式設定之參考。

4. 送帶控制鍵

(1) 觸控一次送帶控制開關，由ON→OFF或OFF→ON。

(2) 如果開關是OFF時，鬆緊帶送料滾輪才能動作，並且控制箱才能接受各段設定之輸入指令。

(3) 如果開關按成ON時，則面板上之LED燈之數位數字會改成顯示下方下列計時器所設定好之數字。此時控制箱將不接受任何段數設定之數字大、小變化之指令。(圖7)
- (5) When the test light is on, it means that every tension and length of test sewing will be recorded into the computer for reference of mode setting.

4. Feeding control button

(1) Press the feeding control button once, it will switch the status from ON→OFF, or OFF→ON.

(2) Only when the status is OFF, the elastic feeding roller will function, as well as the control box will accept the order of each section.

(3) If the status is ON, the digital number of LED lamp on the panel will change and show the set number timers. At this moment, the control box will not accept any changes about section settings. (Fig. 7)

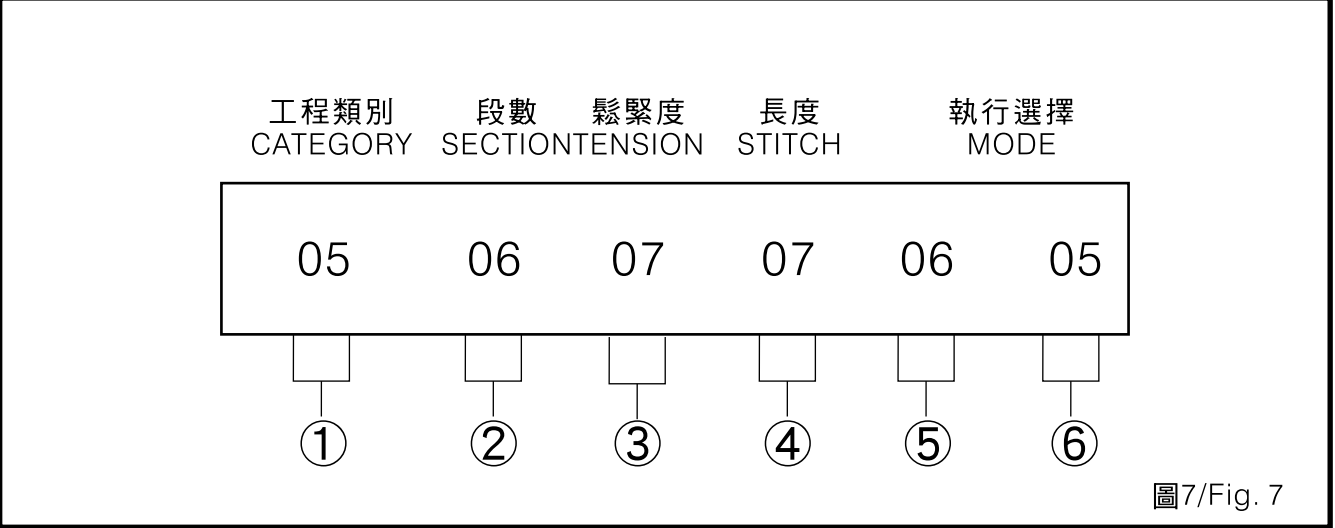


圖7/Fig. 7

- ①：為前送帶時間，由T1來調整。

②：為送帶延遲時間，由T2來調整。

③：為前吸風時間，由T3來調整。

④：為後吸風時間，由T4來調整。

⑤：為後吸風延遲時間，由T5來調整。

⑥：為倒帶時間，由T6來調整。
- ①：Forehand feeding time. Adjusted through T1 timer.

②：Feeding lagged time. Adjusted through T2 timer.

③：Front air suction. Adjusted through T3 timer.

④：Rear air suction. Adjusted through T4 timer.

⑤：Rear air suction lagged time. Adjusted through T5 timer.

⑥：Rewound feeding time. Adjusted through T6 timer.

- (4) 調整任何觸控鍵之前，注意車縫動作要執行完成至後吸風動作才可調整。（即執行指令完成一個循環動作。）

5. 記憶輸入鍵
當車縫功能完成設定時，按下記憶輸入鍵(E)LED燈會閃爍三次及發出三響聲，表示已經記憶輸入完成。

6. 強迫送帶鍵
此鍵為手控觸摸裝置，可在更換鬆緊帶時，按此強迫送帶鍵使鬆緊帶能自行進入送帶輪進行下一次車。

7. 高速鍵/常速鍵
(1) 正常鍵功能(燈未亮)以鬆緊度設定數據為基準，正常運轉送帶。

(2) 高速鍵功能(燈亮)，如常速鍵功能所設定之鬆緊度因布料或鬆緊帶之質料較特殊，無法達到所要求標準時，按下高速功能鍵可加快送帶輪之速度，使送出的鬆緊帶量增加。

8. 倒帶鍵
當按下倒帶鍵(燈亮)，機器開始車縫三針，之後送帶輪則反方向轉動把鬆緊帶前端拉緊，使車縫物之前段亦能有皺摺之效果，倒轉時間長短可從T6(0～15)微調。

(4) Before doing any adjustment, please be noted that the adjustment can only be done after the sewing has been completed up to the rear air suction. (It means that the execution has completed one cycle.)

5. Memory setting button
After completing setting the sewing functions, press the memory setting button (E) until the LED lamp flashes and beeps three times. This means the memory setting is completed.

6. Feeding forcing button
This button is only for manual control. The function is when replacing the elastic, the elastic tape will be inserted into the feeding roller for next sewing by simply pressing this button.

7. High/normal speed button
(1) Normal (the LED lamp is off)- Follow the setting of elastic tension as standard to feed the elastic tape normally.

(2) High speed (the LED lamp is on)-If the sewing cannot process because of the material of the fabrics or the elastic tapes, the speed of the feeding roller can be accelerated by pressing this button, as well as the feeding amount will be increased.

8. Backward feeding button (Elastic Return)
The feeding roller will revolve reversely to pull the forehand part of the elastic tightly when pressing the backward feeding button and the machine has finished 3 stitches. This function can give the forehand part of the elastic tape an effect of puckering. The length of backward time can be micro adjusted through T6 (0~15).

9. 馬達停止鍵
當按下馬達停止鍵，則送帶滾輪無送帶動作，另外如緊度設定00時，送帶輪同樣無送帶動作，此時馬達停止燈會亮。

10. 段數歸零鍵
當車縫物需從起頭01段開始重新車縫時，可先按車縫調整鍵(燈亮)再按段數歸零鍵，段數則回歸01 段。

11. 工程類別歸零鍵
當按下工程類別歸零鍵，則在調整時所有選定之模式均回歸至原先輸入記憶時所選定之模式。

9. Emergency motor stop button (E.M. Stop)
When pressing this button, the feeding roller will not function. Besides, if the tension is set to be 00, the feeding roller will not function as well. At this time, the E.M. Stop light will be on.

10. Section reset button
If the sewing fabric needs to restart from the section 01, please press the sewing adjusting button, which the LED will be on. Then, press  button, and the movement will return to section 01.

11. Category reset button
If this button  is pressed, the all set modes will return to the original modes before inputting into the memory.

腳踏板之控制功能

FUNCTION OF THE PEDAL

1. 腳踏板往後踏時，押具提升並運轉控帶馬達。操作者將鬆緊帶插入押具內後，上下吹風閥吹氣使鬆緊帶平貼於底面。

2. 吹氣量之大小可由FD150節流閥上之旋鈕來調整。

3. 腳踏板往前踩時押具隨即放下，並開始作鬆緊帶與布料之縫合。

1. When pressing the pedal backward, the presser foot will be lifted and the motor will start operating. After placing the elastic tape under the presser foot, the up and under air blowing valves will blow and make the tape to be under the presser foot evenly.

2. The volume of air blowing can be adjusted by turning the knob of the controlling valve, FD150.

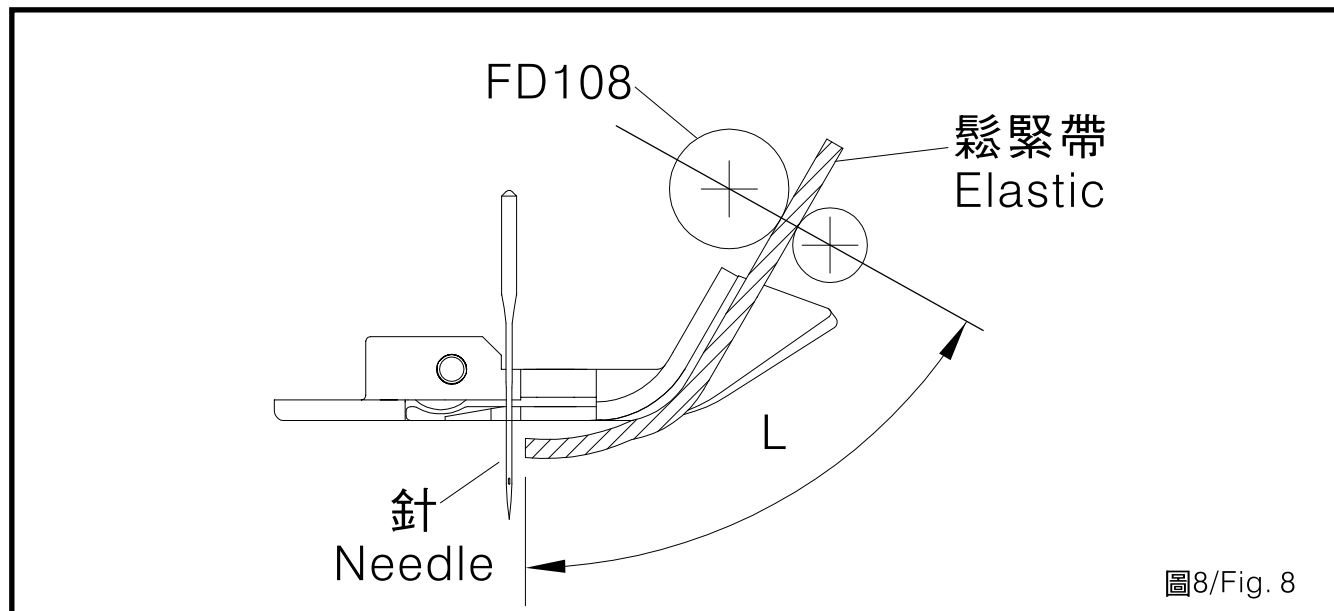
3. When pressing the pedal forward, the presser foot will be lowered down immediately. Also, it starts to sew the elastic tape and the fabrics.

計時器之功能

FUNCTION OF THE TIMER

1. 前送帶時間（T1）
可調整從送帶滾輪(FD108)至押具底下鬆緊帶長度。有 0~15 階段之調整，如圖所示之L長。（圖8）

1. Forehand feeding time. (T1)
This is to adjust the length of the elastic tape from the feeding roller (FD108) to the bottom of the presser foot. The section can be adjusted from 0 to 15. (Fig. 8)



1. 前送帶時間 (T1)
可調整從送帶滾輪(FD108)至押具底下鬆緊帶長度。有 0~15 階段之調整，如圖所示之L長。(圖8)
2. 送帶延遲時間(T2)
此為調整機器開始車縫與送帶滾輪開始送帶之時間延遲差，即車縫數針後延遲一段時間才送帶，以使車縫物之前段亦能皺摺，共延遲時間之長短有1~15段調整。
3. 前吸風時間(T3)
即押具放下開始車縫時，將車縫物前之線頭部份吸入切斷，此段修線時間之調整有 0~15階段調整，數字愈大時間愈長。
4. 後吸風時間(T4)
此為車縫終了切刀將鬆緊帶切斷，開始吸風修線頭之時間，其時間之長短有0~15階段調整。
5. 後吸風延遲時間(T5)
此為後吸風時間(T4)與切刀切斷後，時間的延遲差；亦即FD131之放線時間 (FD131之放線時間與後吸風時間同步)與切刀切斷鬆緊帶後之時間差。放線是指將針線與勾針線之控線組放鬆，以利吸入切線溝及避免斷線。
6. 倒帶時間(T6)
此倒帶功能與送帶延遲功能類似，當機器開始車縫三針後，送帶輪往反方向倒轉，把鬆緊帶拉緊以使車縫物之前段亦能有皺摺效果，倒帶時間長短有0~15長度調整。

1. 前送帶時間 (T1)
可調整從送帶滾輪(FD108)至押具底下鬆緊帶長度。有 0~15 階段之調整，如圖所示之L長。(圖8)
2. 送帶延遲時間(T2)
此為調整機器開始車縫與送帶滾輪開始送帶之時間延遲差，即車縫數針後延遲一段時間才送帶，以使車縫物之前段亦能皺摺，共延遲時間之長短有1~15段調整。
3. 前吸風時間(T3)
即押具放下開始車縫時，將車縫物前之線頭部份吸入切斷，此段修線時間之調整有 0~15階段調整，數字愈大時間愈長。
4. 後吸風時間(T4)
此為車縫終了切刀將鬆緊帶切斷，開始吸風修線頭之時間，其時間之長短有0~15階段調整。
5. 後吸風延遲時間(T5)
此為後吸風時間(T4)與切刀切斷後，時間的延遲差；亦即FD131之放線時間 (FD131之放線時間與後吸風時間同步)與切刀切斷鬆緊帶後之時間差。放線是指將針線與勾針線之控線組放鬆，以利吸入切線溝及避免斷線。
6. 倒帶時間(T6)
此倒帶功能與送帶延遲功能類似，當機器開始車縫三針後，送帶輪往反方向倒轉，把鬆緊帶拉緊以使車縫物之前段亦能有皺摺效果，倒帶時間長短有0~15長度調整。

1. 前送帶時間 (T1)
可調整從送帶滾輪(FD108)至押具底下鬆緊帶長度。有 0~15 階段之調整，如圖所示之L長。(圖8)
2. 送帶延遲時間(T2)
此為調整機器開始車縫與送帶滾輪開始送帶之時間延遲差，即車縫數針後延遲一段時間才送帶，以使車縫物之前段亦能皺摺，共延遲時間之長短有1~15段調整。
3. 前吸風時間(T3)
即押具放下開始車縫時，將車縫物前之線頭部份吸入切斷，此段修線時間之調整有 0~15階段調整，數字愈大時間愈長。
4. 後吸風時間(T4)
此為車縫終了切刀將鬆緊帶切斷，開始吸風修線頭之時間，其時間之長短有0~15階段調整。
5. 後吸風延遲時間(T5)
此為後吸風時間(T4)與切刀切斷後，時間的延遲差；亦即FD131之放線時間 (FD131之放線時間與後吸風時間同步)與切刀切斷鬆緊帶後之時間差。放線是指將針線與勾針線之控線組放鬆，以利吸入切線溝及避免斷線。
6. 倒帶時間(T6)
此倒帶功能與送帶延遲功能類似，當機器開始車縫三針後，送帶輪往反方向倒轉，把鬆緊帶拉緊以使車縫物之前段亦能有皺摺效果，倒帶時間長短有0~15長度調整。

正確的操作步驟

THE CORRECT OPERATION PROCEDURE

1. 空氣管線與高壓空氣壓縮機之空壓過濾器接頭連接，並將調壓過濾器之旋轉鈕調至 3.5~4kg/cm。
2. 檢查電源之伏特數與大控制箱所示伏特數是否相同，然後插上插頭。
3. 打開機台電源開關。
4. 打開控制箱電源開關(在大控制箱，電源開關之LED燈會亮)。

1. Connect the air pipe with the air pressure filter connector of the high pressure air compressor. Adjust the pressure controlling knob to 3.5~4.0 kg/cm.
2. Check the voltage of power supply to confirm if it is the same as the voltage shown on the main control box. Then, plug the power cord in.
3. Turn on the main power switch of the machine.
4. Turn on the power switch of the control box. (Inside the main control box, the LED light of the power switch is on.)

1. 空氣管線與高壓空氣壓縮機之空壓過濾器接頭連接，並將調壓過濾器之旋轉鈕調至

1. Connect the air pipe with the air pressure filter connector of the high pressure air compressor. Adjust the pressure

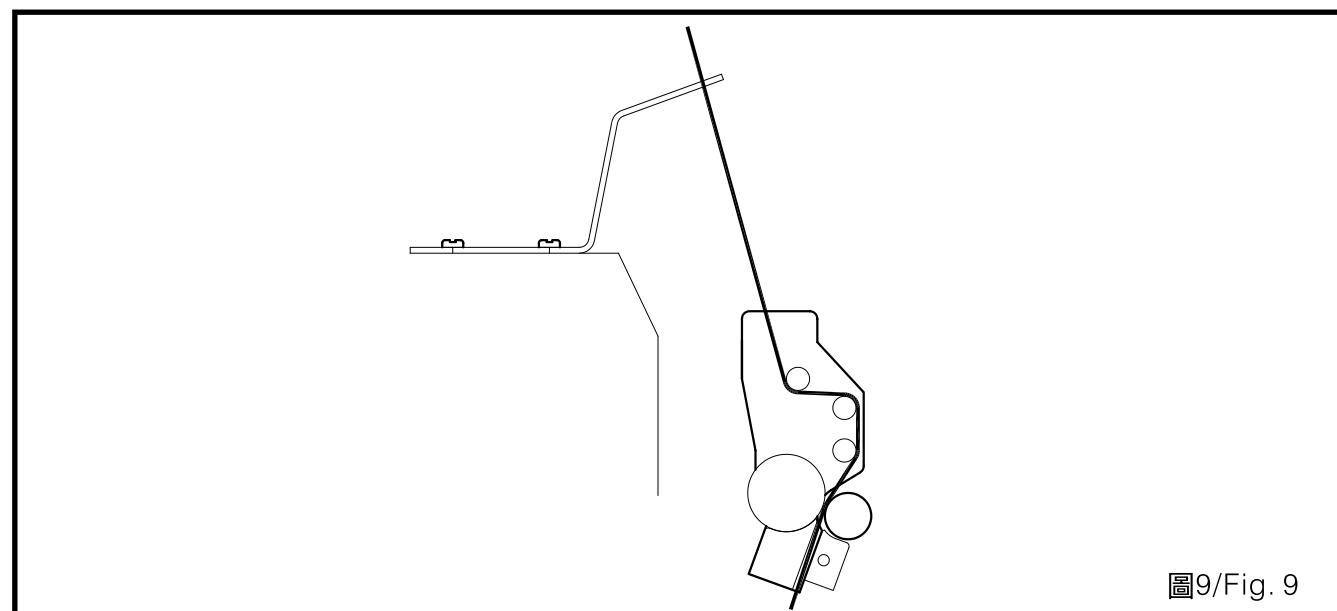


圖9/Fig. 9

3.5~4kg/cm。

controlling knob to 3.5~4.0 kg/cm.

2. Check the voltage of power supply to

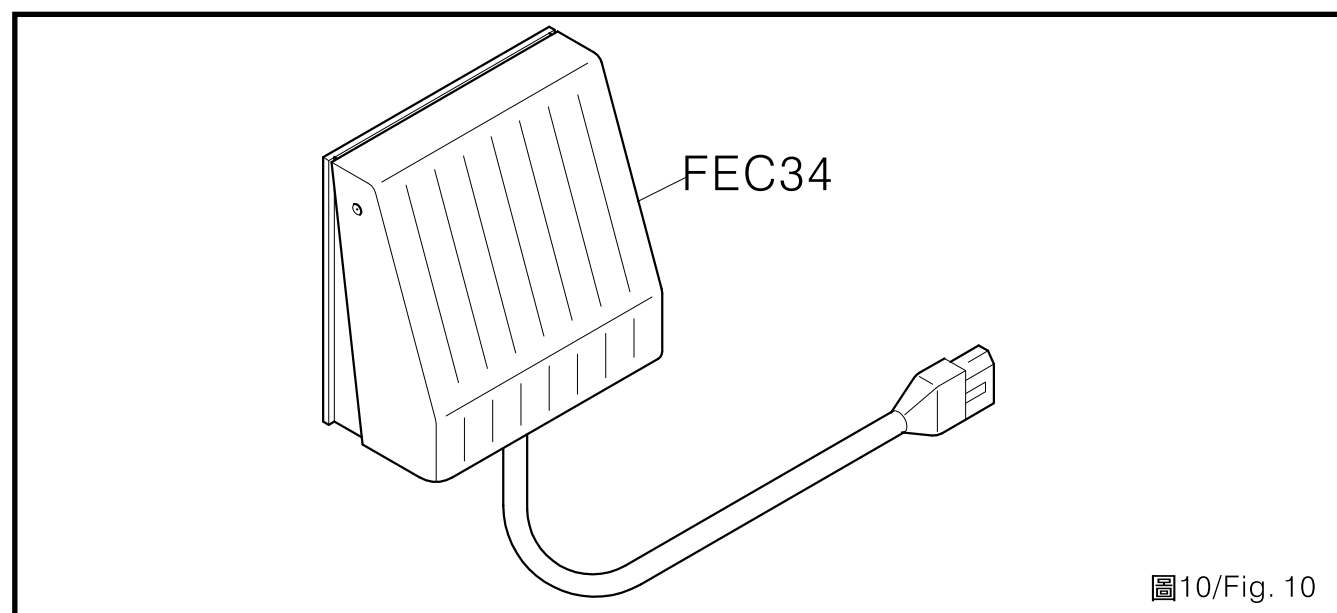


圖10/Fig. 10

2. 檢查電源之伏特數與大控制箱所示伏特數是否相同，然後插上插頭。

confirm if it is the same as the voltage shown on the main control box. Then, plug the power cord in.

3. 打開機台電源開關。

3. Turn on the main power switch of the machine.

4. Turn on the power switch of the control box. (Inside the main control box, the LED light of the power switch is on.)

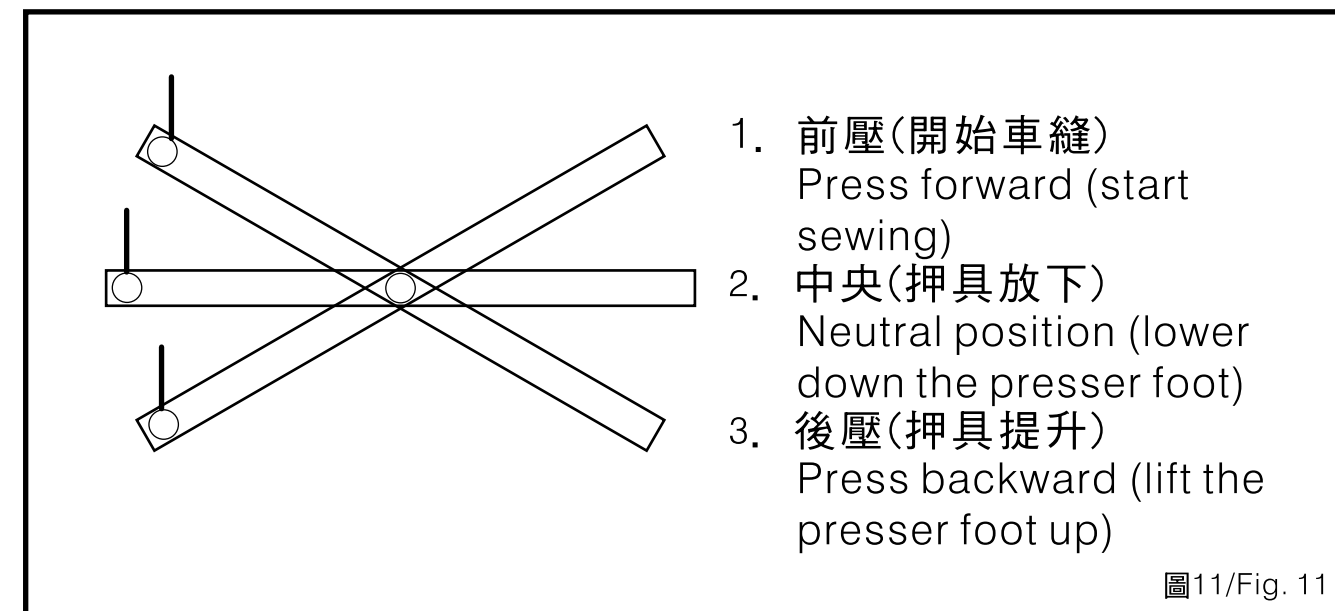


圖11/Fig. 11

8. 放置車縫物於押具下。

8. Put the sewing fabric under the presser foot.

9. 腳踏板踩至中央位置時，押具會下降。

9. When treading the pedal to the neutral position, the presser foot will be lowered down.

10. 腳踏板往前踩，機器開始運轉車縫，(T3)前吸風時間也同時開始動作。操作時間之長短由(T3)所設定之數字來控制。

10. When treading the pedal forward, the machine starts sewing. Meanwhile, the T3 timer starts working on air operation. The operation time can be controlled by the number set on T3 timer.

送帶裝置調整

ADJUST THE ELASTIC FEEDING DEVICE

1. 鬆緊帶寬度調整

- (1) 調整時，先放鬆螺絲①使固定環②左右移動，並穿入鬆緊帶，使其能穩定順暢通過。(圖12)

1. Adjust the width of the elastic guide

- (1) Loosen the screw ① to enable the collar ② moving left or right. Then, insert the elastic so that the elastic can pass smoothly. (Fig. 12)

- (2) 將押具上之螺絲③放鬆調整押具導片④。

- (2) Loosen the screw ③ of the presser foot to loosen and adjust the presser foot guide plate ④.

2. 送帶裝置緊度調整

送帶裝置之固定及穩定度之調整，可先由放鬆螺絲⑤及調整彈簧片⑥後再鎖緊螺絲⑤及盤形彈簧⑦，使其不會鬆動，增加送帶穩定性。

2. Adjust the tension of the elastic feeding device

To adjust the steadiness and the stability of the feeding device, please loosen the screw ⑤ first, and adjust the spring plate ⑥ before tightening the screw ⑤ and the disc shape spring ⑦. Make sure that the device is not loose or movable in order to strength the feeding stability.

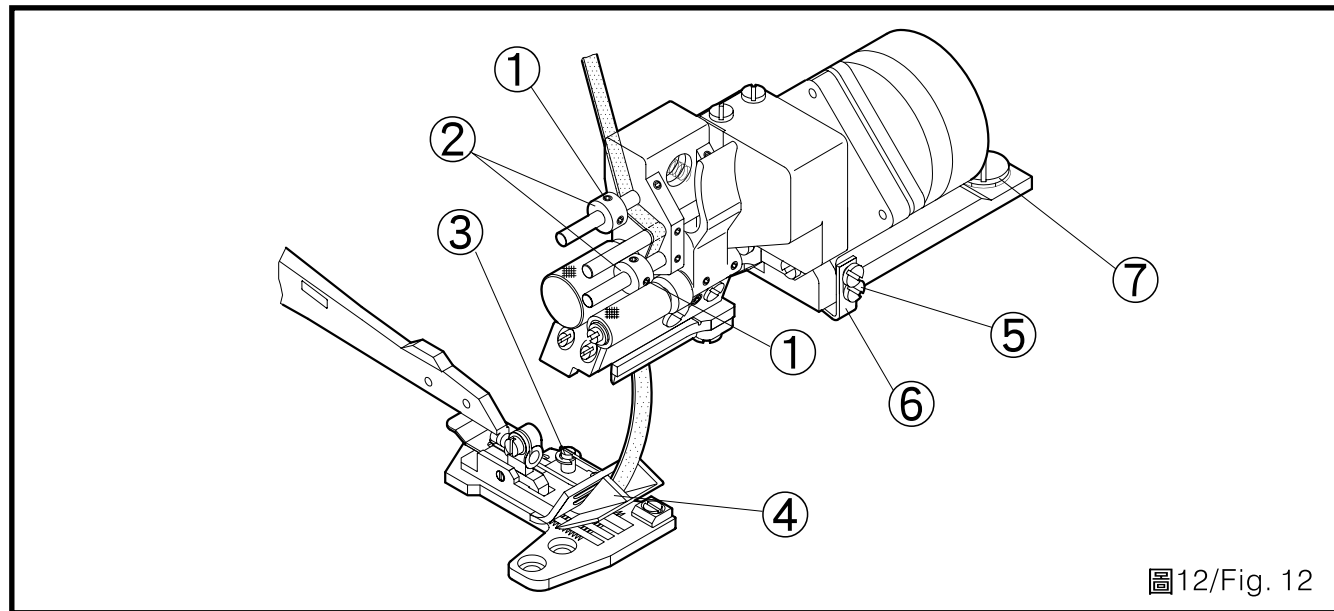


圖12/Fig. 12

1. 鬆緊帶寬度調整

(1) 調整時，先放鬆螺絲①使固定環②左右移動，並穿入鬆緊帶，使其能穩定順暢通過。(圖12)

1. Adjust the width of the elastic guide

(1) Loosen the screw ① to enable the collar ② moving left or right. Then, insert the elastic so that the elastic can pass smoothly. (Fig. 12)

(2) Loosen the screw ③ of the presser foot to loosen and adjust the presser foot guide plate ④.

2. Adjust the tension of the elastic feeding device

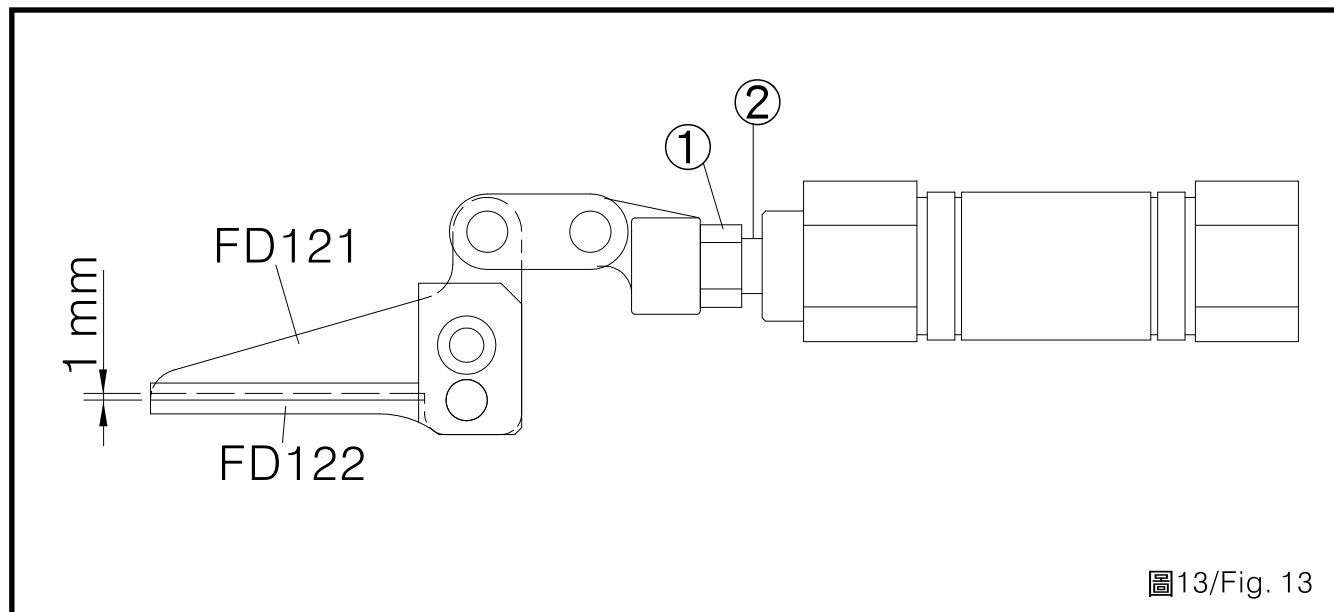


圖13/Fig. 13

(2) 將押具上之螺絲③放鬆調整押具導片④。

To adjust the steadiness and the stability of the feeding device, please loosen the screw ⑤ first, and adjust the spring plate ⑥ before tightening the screw ⑤ and the disc shape spring ⑦. Make sure that the

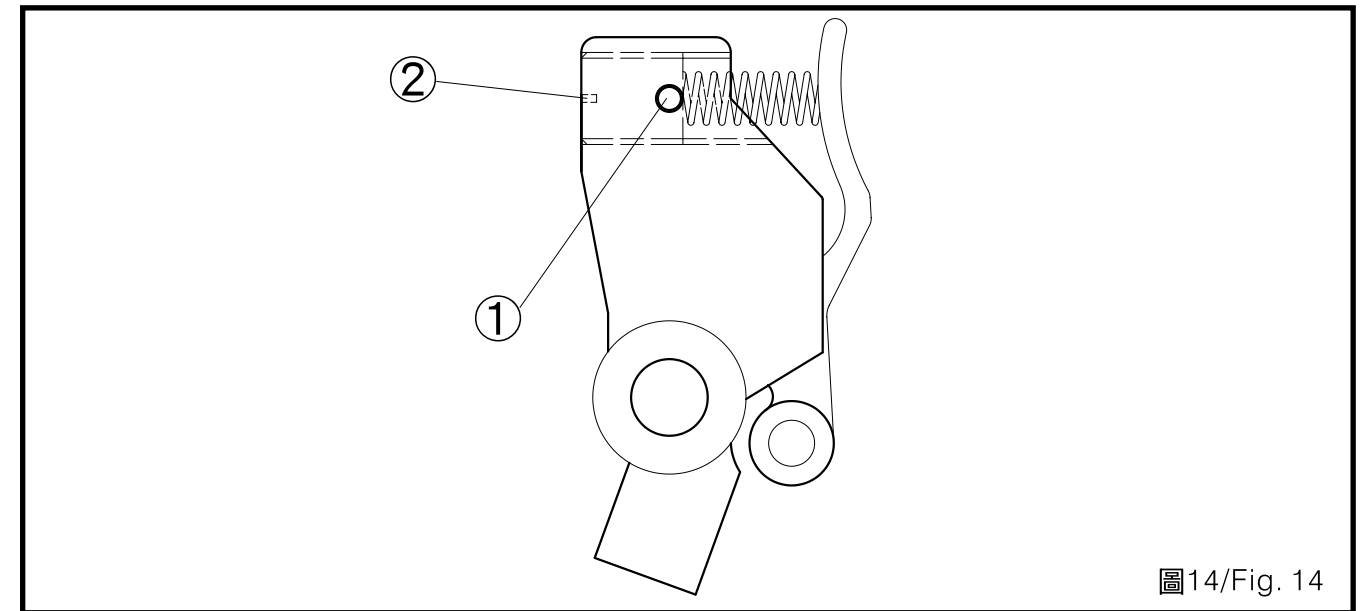


圖14/Fig. 14

2. 送帶裝置緊度調整

送帶裝置之固定及穩定度之調整，可先由放鬆螺絲⑤及調整彈簧片⑥後再鎖緊螺絲⑤及盤形彈簧⑦，使其不會鬆動，增加送帶穩定性。

3. 切刀調整(圖13)

當空氣唧筒動作使上固定刀FD121與下活

device is not loose or movable in order to strength the feeding stability.

3. Adjust the trimmer (Fig. 13)

When the air cylinder moves and make the upper fixed trimmer, FD121, and the lower movable trimmer, FD 122, engaging and performing scissoring effect, the overlap should be 1 mm. When adjusting, loosen

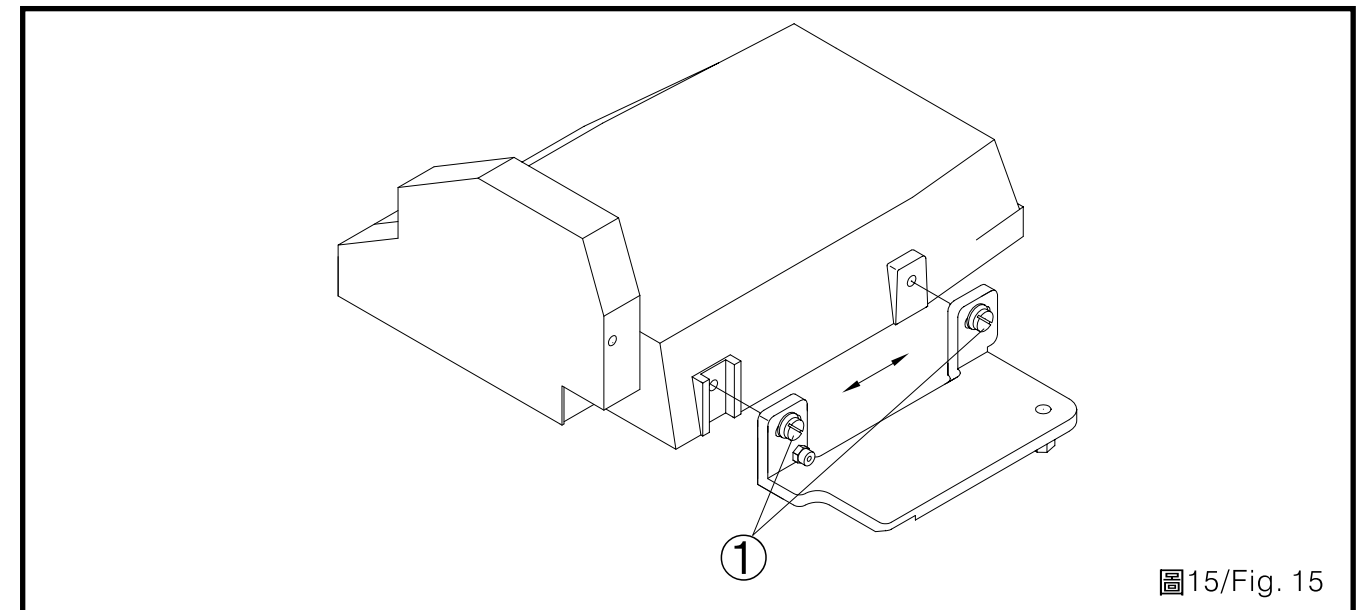


圖15/Fig. 15

動刀FD122剪合，剪合時應重疊1mm。調整時，將固定螺帽①放鬆；轉動空氣唧筒心軸②，使上下刀交疊1mm後再鎖緊螺帽①。

4. 滾輪壓力調整(圖14)

the fixed nut ①, and turn the main shaft ② of the air cylinder. Tighten the nut ① after the overlap is 1 mm.

4. Adjust the roller pressure (Fig. 14)

Loosen the fixed screw, and adjust the screw back and forth to change the

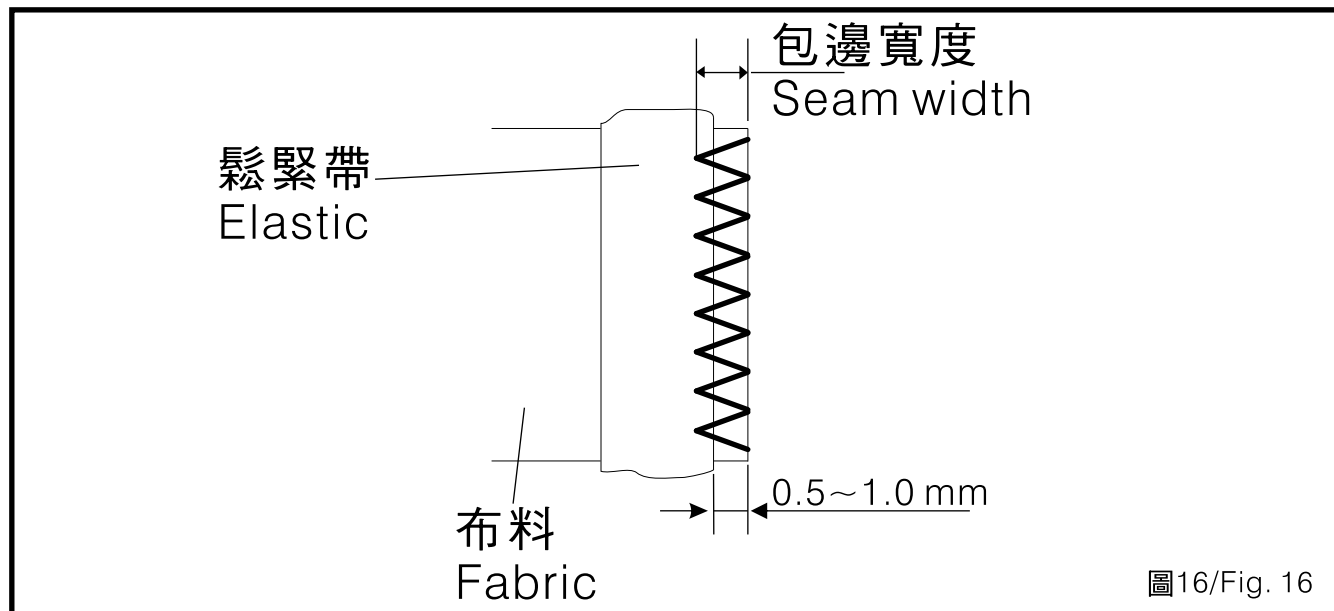


圖16/Fig. 16

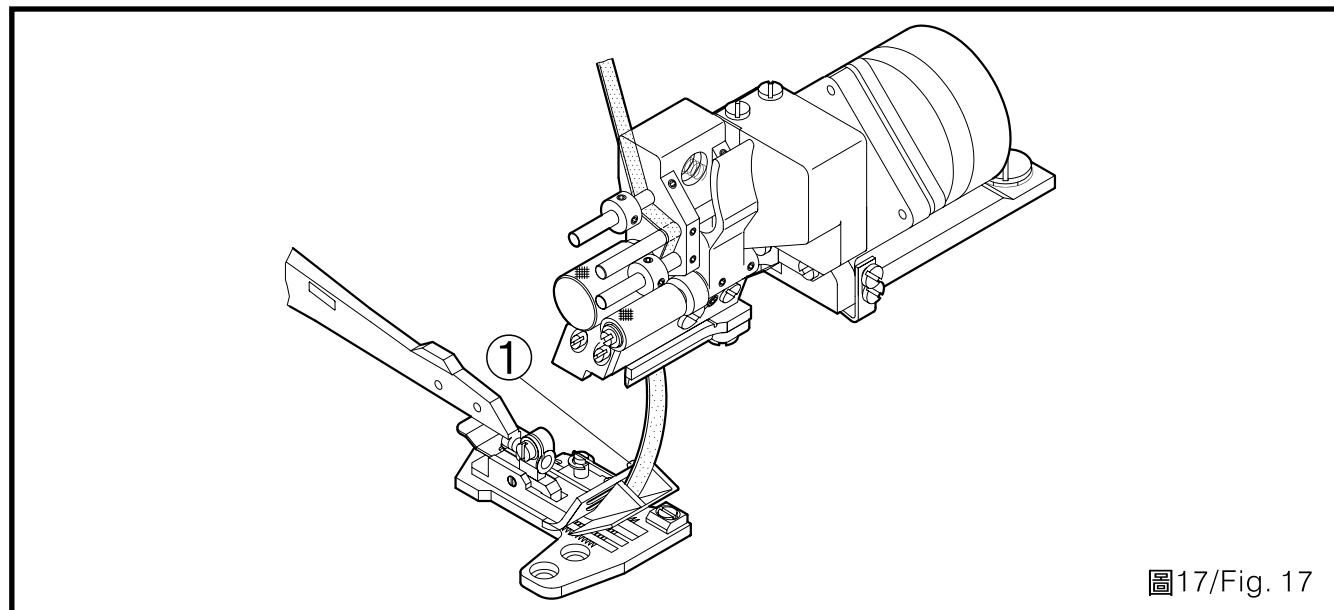


圖17/Fig. 17

1. 鬆緊帶寬度調整

(1) 調整時，先放鬆螺絲①使固定環②左右移動，並穿入鬆緊帶，使其能穩定順暢通過。(圖12)

(2) 將押具上之螺絲③放鬆調整押具導片④。

2. 送帶裝置緊度調整

送帶裝置之固定及穩定度之調整，可先由放鬆螺絲⑤及調整彈簧片⑥後再鎖緊螺絲

1. Adjust the width of the elastic guide

(1) Loosen the screw ① to enable the collar ② moving left or right. Then, insert the elastic so that the elastic can pass smoothly. (Fig. 12)

(2) Loosen the screw ③ of the presser foot to loosen and adjust the presser foot guide plate ④.

2. Adjust the tension of the elastic feeding device

To adjust the steadiness and the stability of the feeding device, please loosen the screw ⑤ first, and adjust the spring plate

(8) 當布料車縫完成，後吸風時間尚在進行時，即可後壓腳踏板提升押具將鬆緊帶送入，作下一車縫作業之準備。押具提升後，後吸風時間自然停止。

(9) 押具已提升，但尚未踩腳踏板車縫，如鬆緊帶未正確送入押具槽內、送入時歪偏、送入量太多、或量不足時，可碰觸膝動開關將鬆緊帶剪除，重新再來。但倘若車縫已進行一半時，布料車縫有不理想，將無法後壓腳踏板將布料修正或取出。此時可踩與押具連結鏈連結之踏板KY20D 將押具提升，作為修正或取出，而後再繼續進行車縫。

(10) 在大量車縫生產前應先試車。先設定鬆緊度和針距，在完成縫紉與切斷鬆緊帶之後，LED燈會亮起，並且顯示針距。然後，重覆試車到滿意為止，其所得資料可接著輸入以供車縫生產所用。縐褶效果會因為布料之種類，紋路，厚薄而有所差異。所以雖然所要的結果相同，但在使用不同布料時，均應先行試車。

(8) When finishing the sewing and the rear air suction still processes, please tread the pedal backward to lift the presser foot and insert the elastic for the next sewing. The rear air suction will stop automatically after lifting the presser foot.

(9) If the elastic is not inserted into the presser foot groove correctly, missed the groove, or the feeding amount is too much or too less when the presser foot is lifted but the pedal is not trod for sewing, please press the knee-control switch to trim the elastic and start over again. However, if the sewing is not perfect while it is in the half of the sewing, there will not be able to correct or take out the fabric by treading the pedal backward. At this moment, please tread the pedal, KY20D, which connects to the presser foot, to lift the presser foot for correction or taking out. Then, please continue sewing.

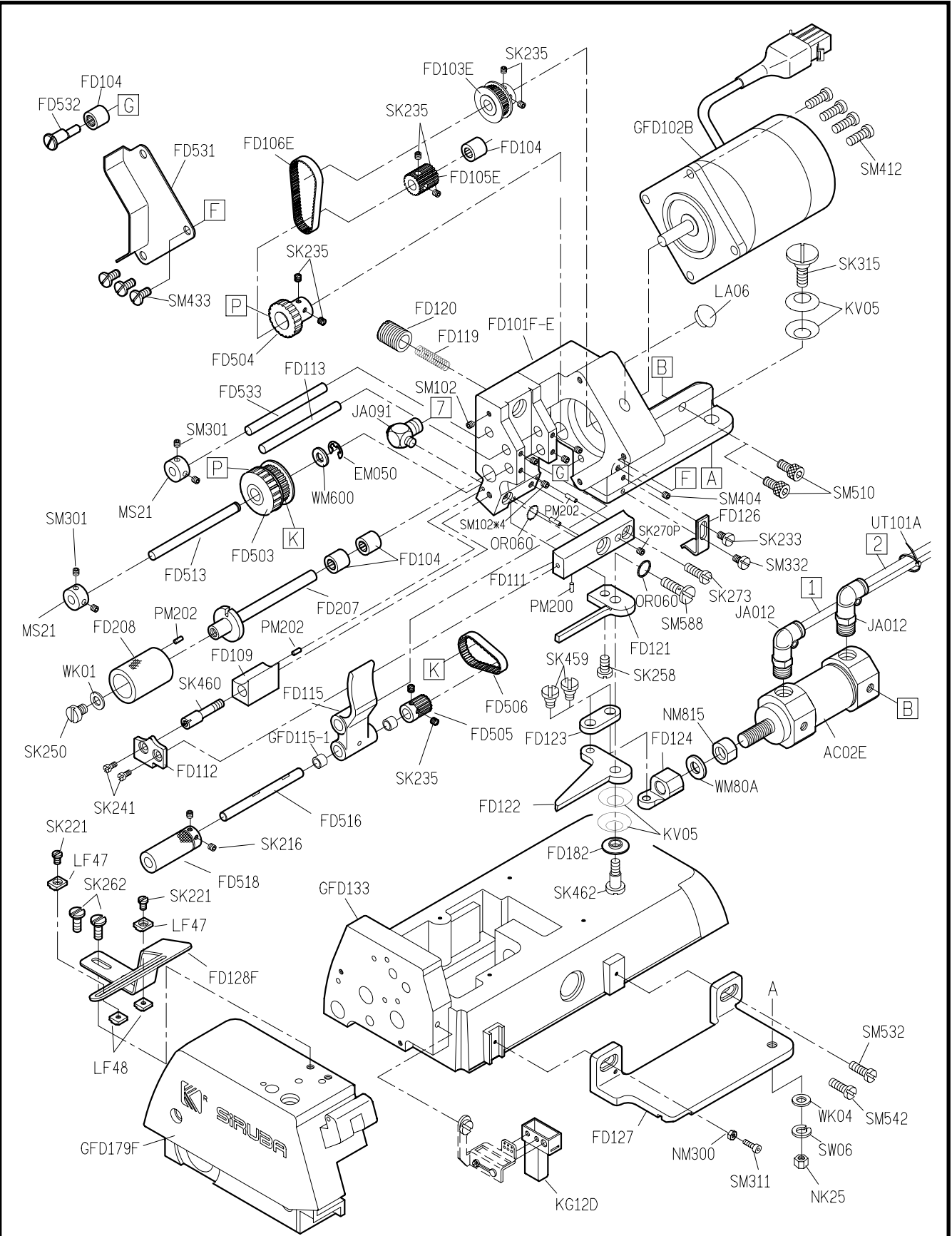
(10) Before starting mass production, please process test sewings. First, set the elastic tension and stitch length. Then, the LED light will be on and show the stitch length after finishing each sewing and trimming. After that, please test sewing repeatedly until a desired result can be accomplished. All the data can then be input to the memory for the mass sewing. The effects of gathering will differ because of the types of the materials, the grains, or the thickness. Therefore, even the desired result is the same, the test sewing should be process when using different materials.

- (11) 送料具之差動比如有變動時，雖控制面板上所設定的數值不變，但所車縫出的布料緊度或長度也會變動。所以差動比有變動時，設定也隨之變更。一般而言，送料具之差動比均調整在1:1。
- (12) 如果使用單獨小型而偽裝有空壓冷凍之高壓空氣壓縮機時，調壓過濾器內的積水應經常排除，且過濾棉網亦應訂時更換，以維持延長機器之壽命，減少故障的發生。

- (11) Even if the set values are the same, the tension and the length will also change if the differential ratio of the feed dog changes. Therefore, when the differential ratio changes, the values should change as well. Generally, the differential ratio is set to 1: 1.
- (12) If using a regular small compressor without the oppressed frozen air, drain the water from the air filter inside the regulator. Also, the filter mesh needs to be replaced periodically to maintain/extend the machine life, and reduce the breakdown or mis-operation.

零件圖(SHORT WHEEL)

PARTS LIST (SHORT WHEEL)



*UNDER 5/8"

圖18/Fig. 18

零件圖(LONG WHEEL)

PARTS LIST (LONG WHEEL)

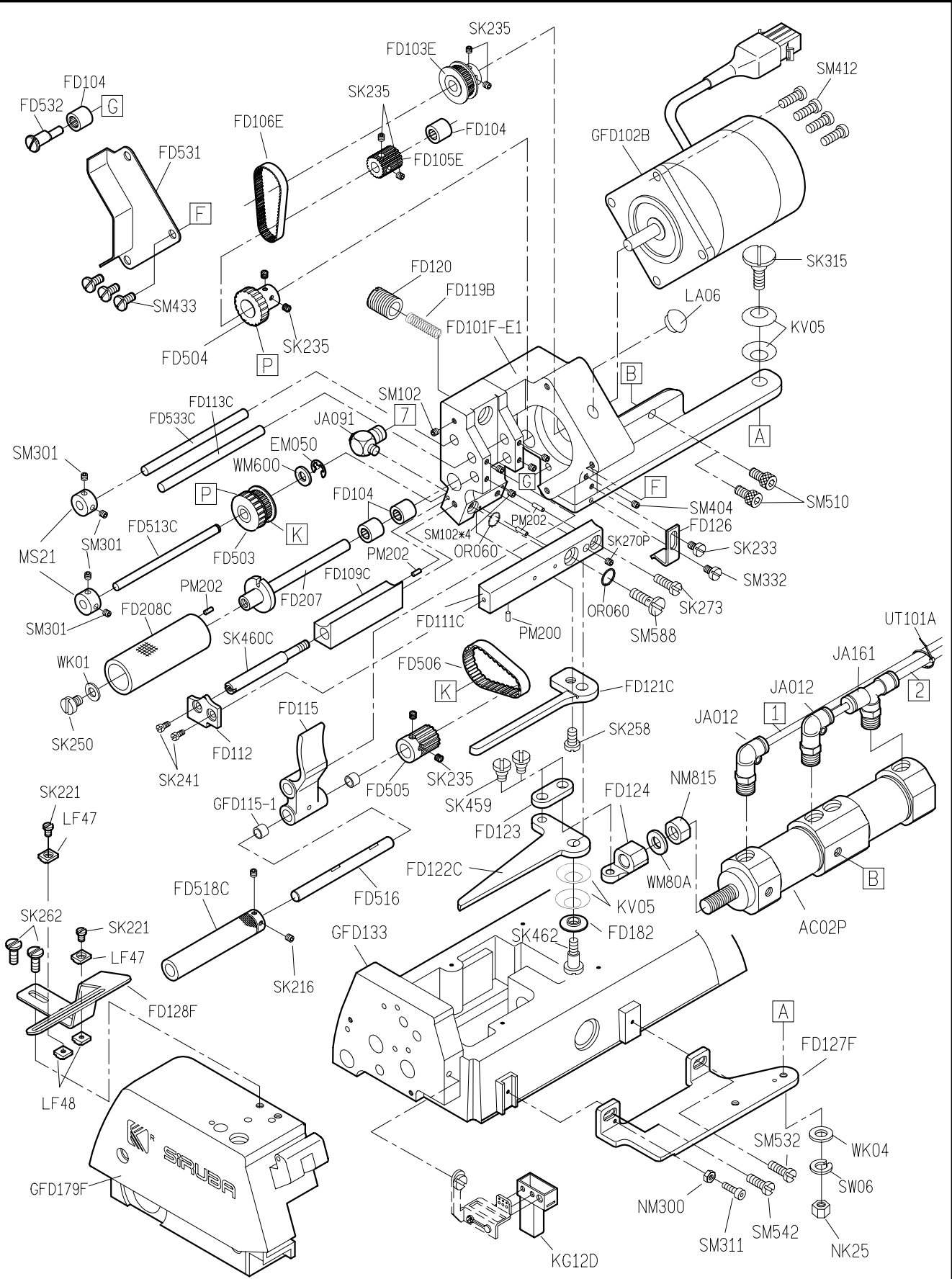


圖19/Fig. 19

零件圖

PARTS LIST

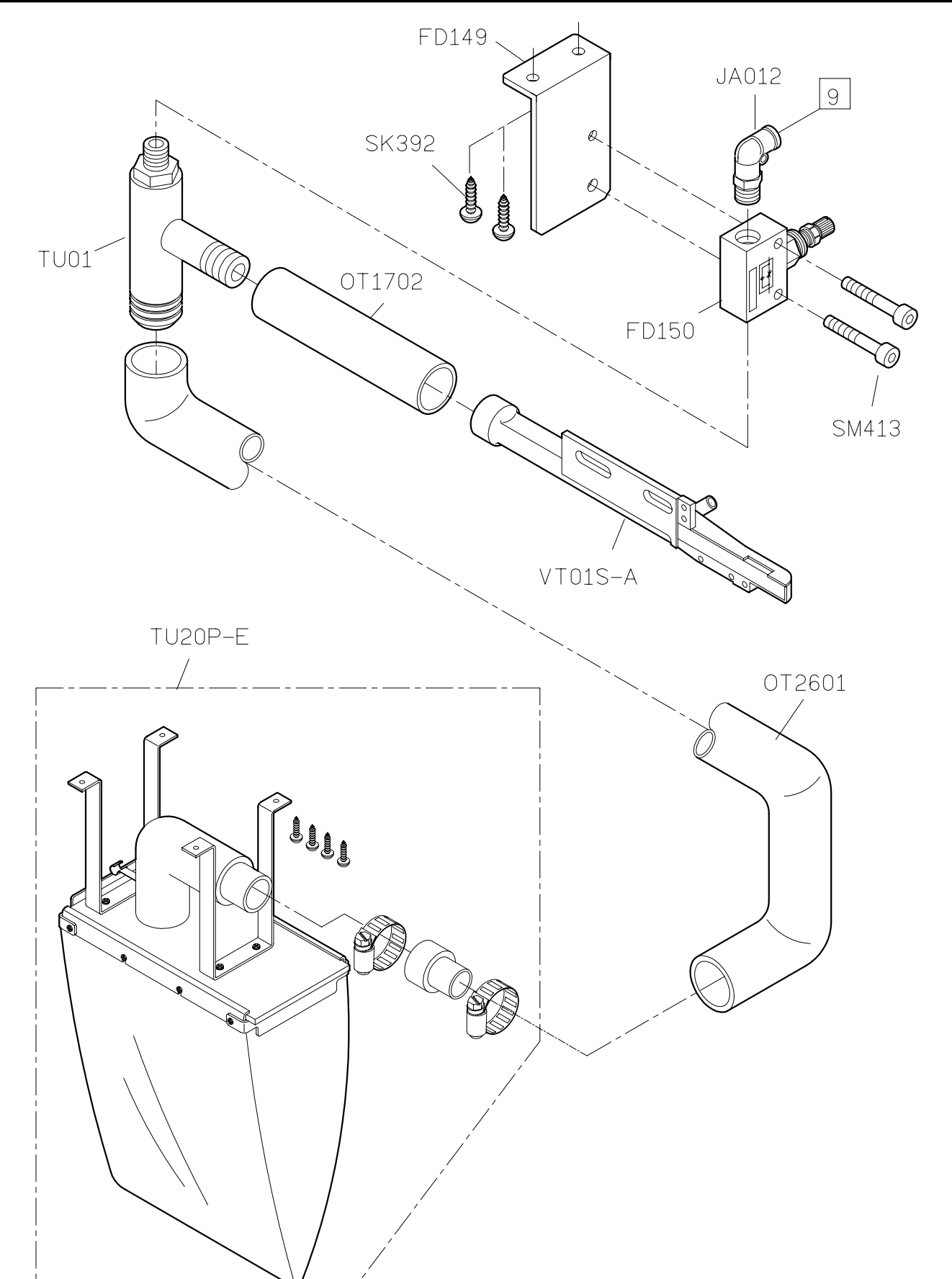
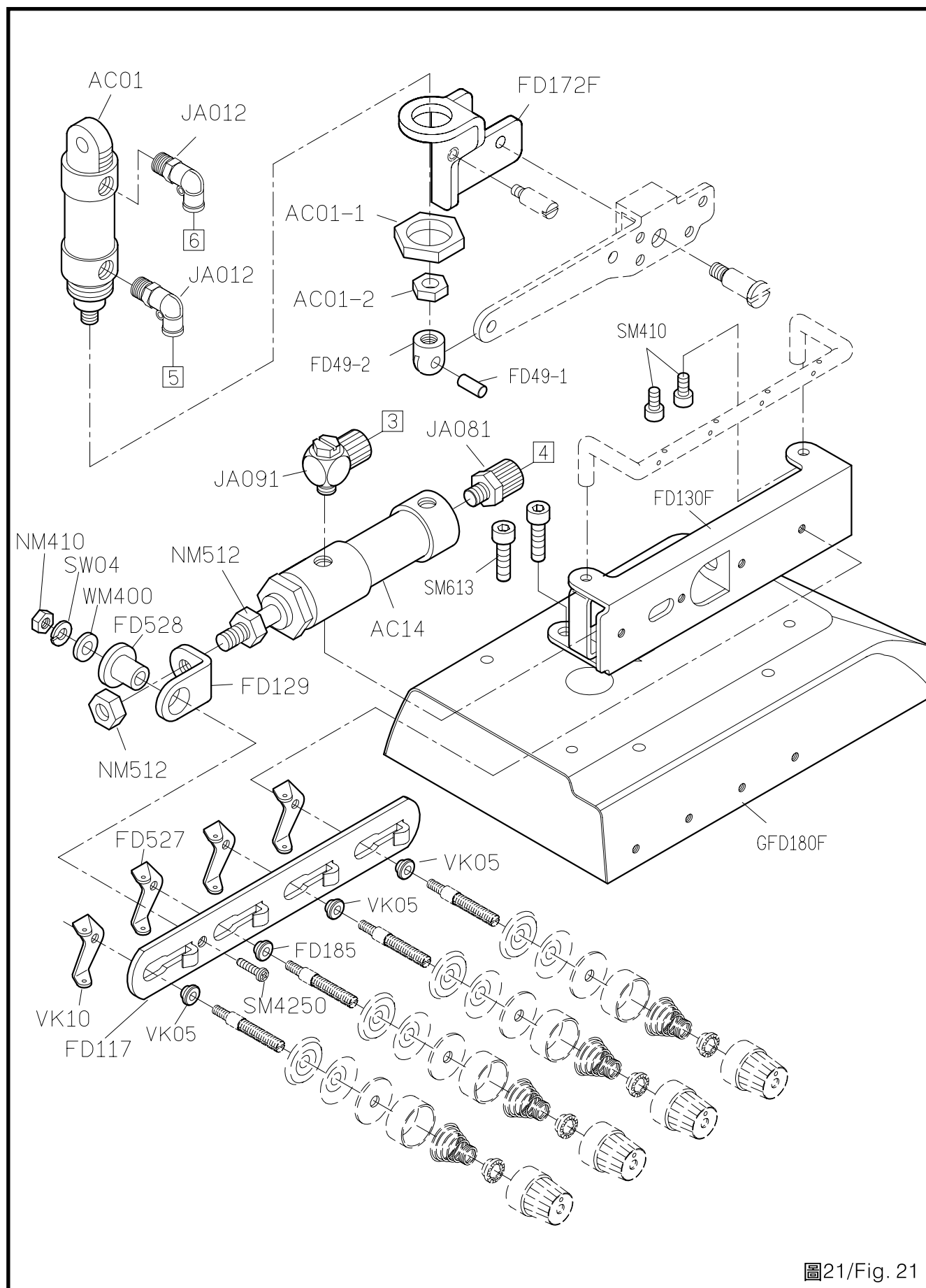


圖20/Fig. 20

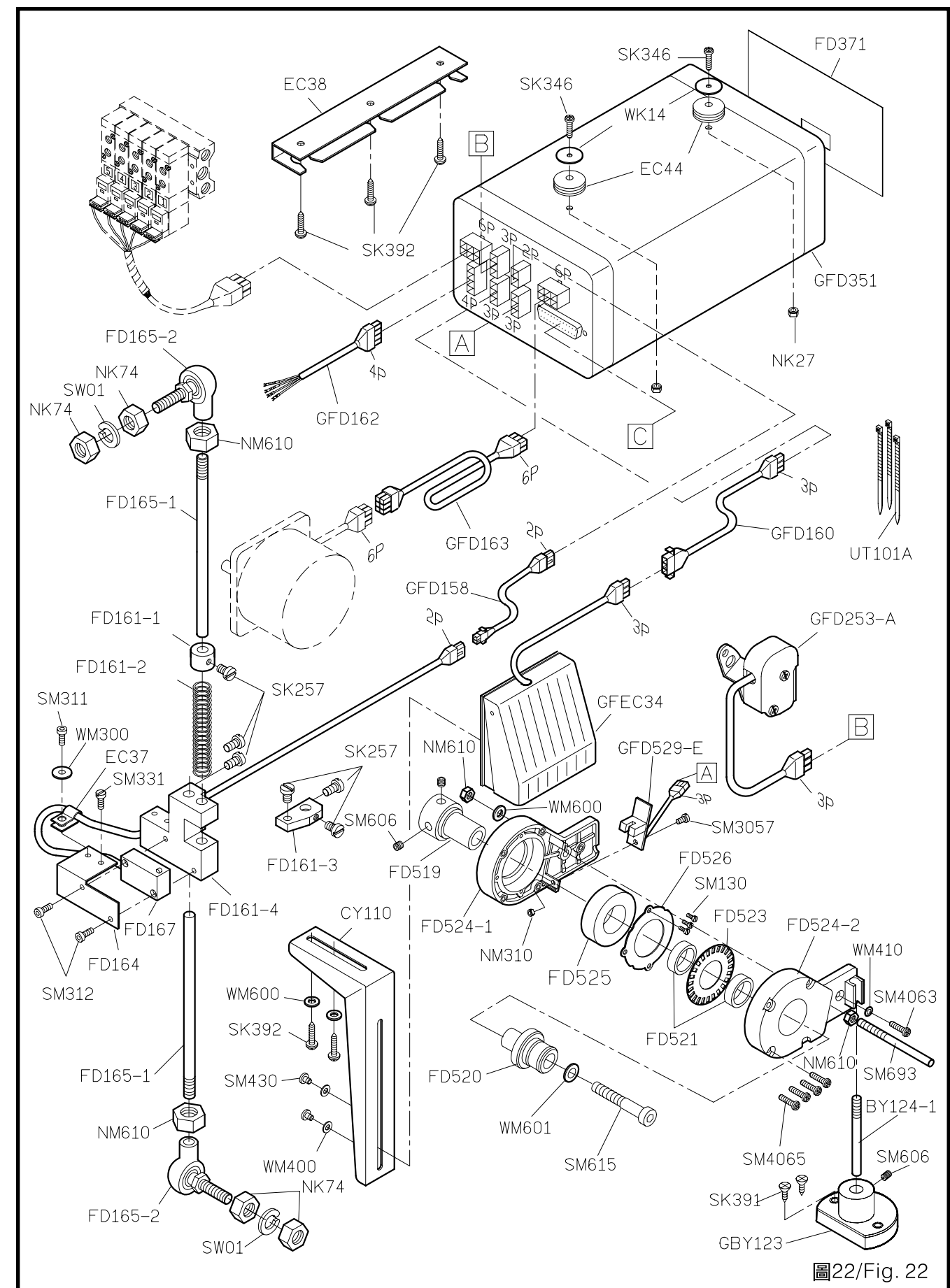
零件圖

PARTS LIST



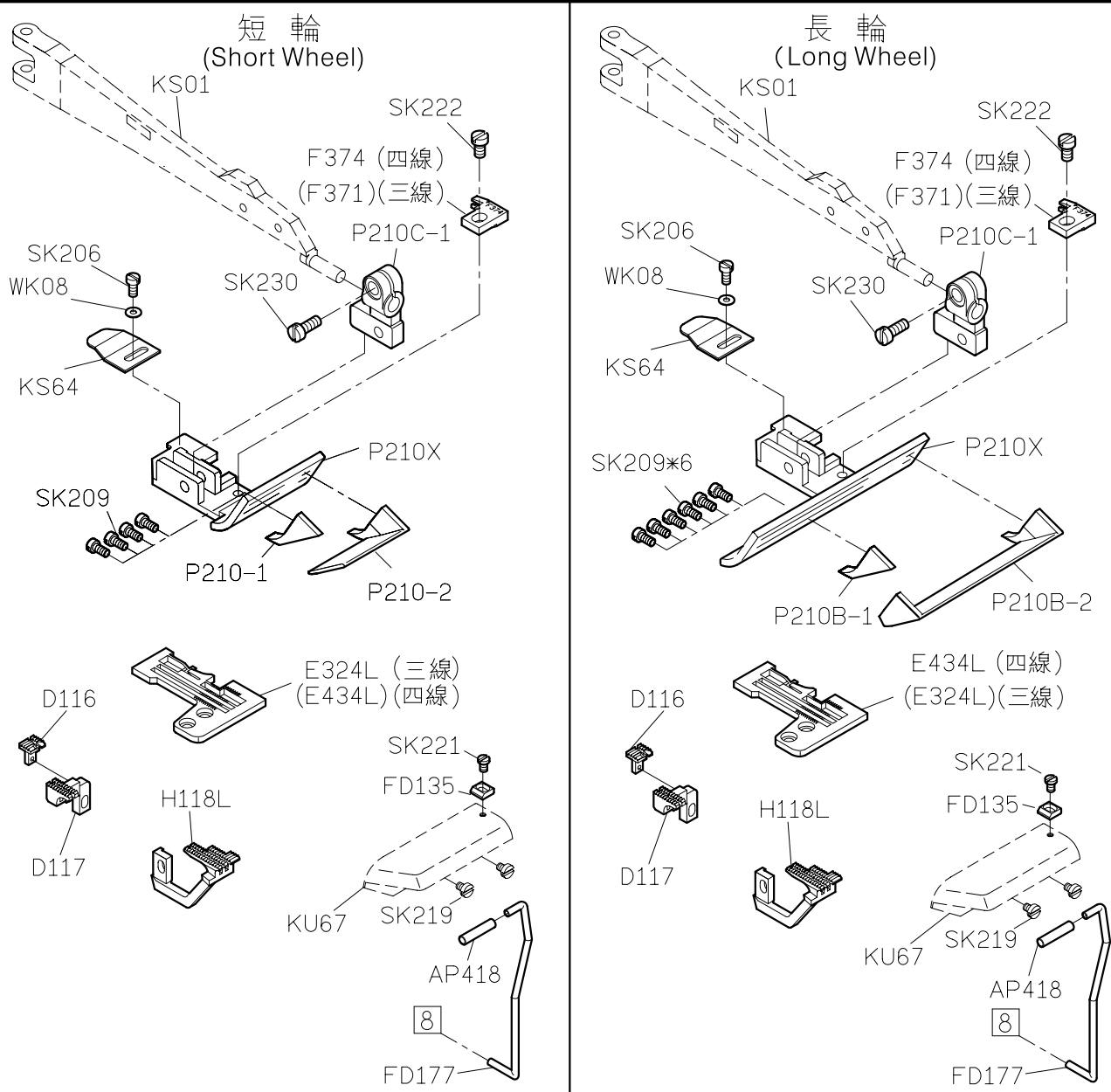
零件圖

PARTS LIST



零件圖

PARTS LIST



滾輪種類		針板	固定式押具	活動式押具	送料具	適用範圍 (鬆緊帶寬)
737	長輪	E324L	P210F	P210A	D116 / H118L	5/8" ~ 2"
	短輪		P210C	P210	D116 / H118L	5/8" 以下
747	長輪	E434L	P210D	P210B	D116 / H118L	5/8" ~ 2"
	短輪		P210E	P210BA	D116 / H118L	5/8" 以下

＊ 活動式押具, 客戶指定時更換, 未註明則用固定式押具

圖23/Fig. 23

零件圖

PARTS LIST

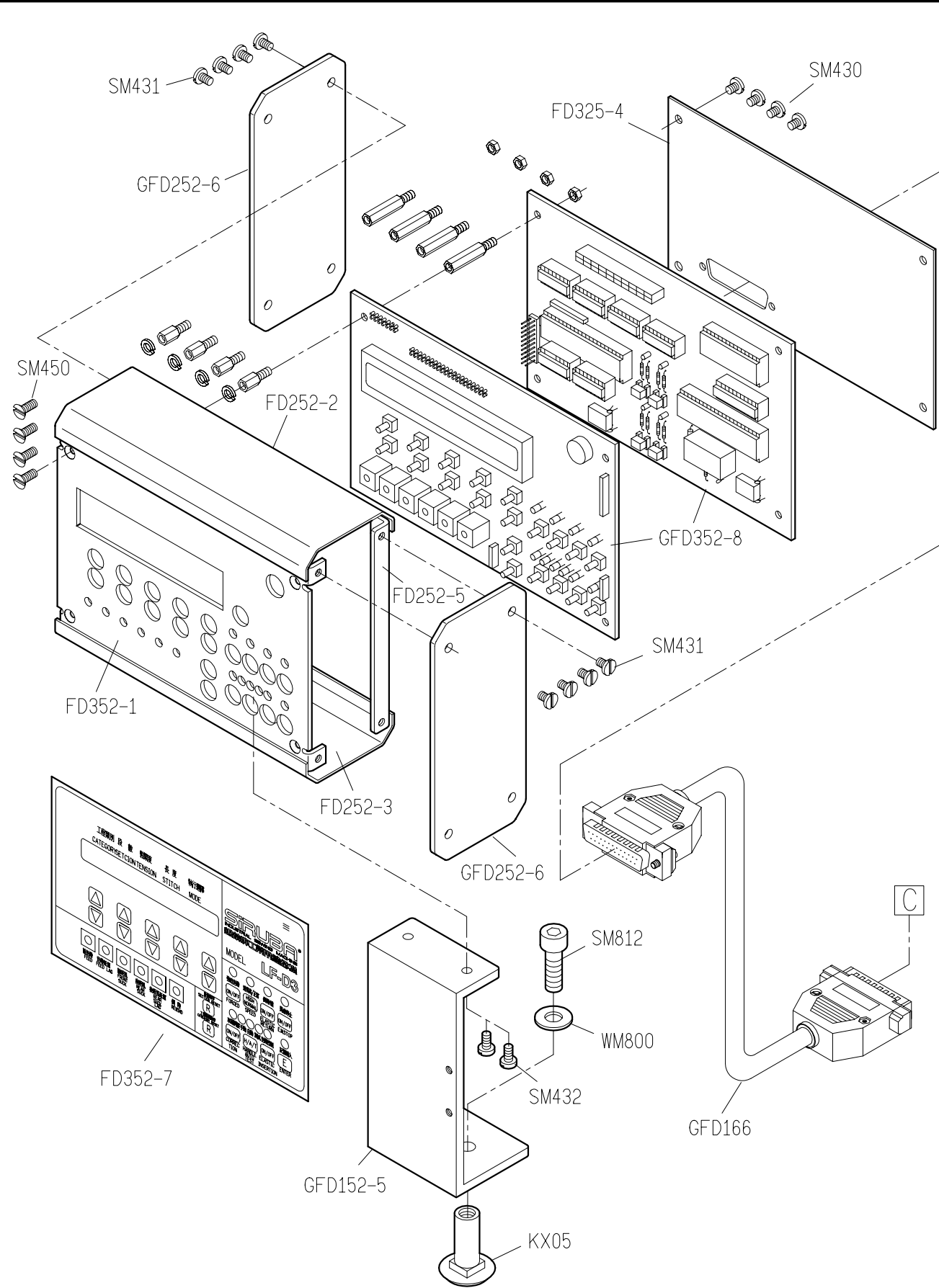


圖24/Fig. 24

零件圖

PARTS LIST

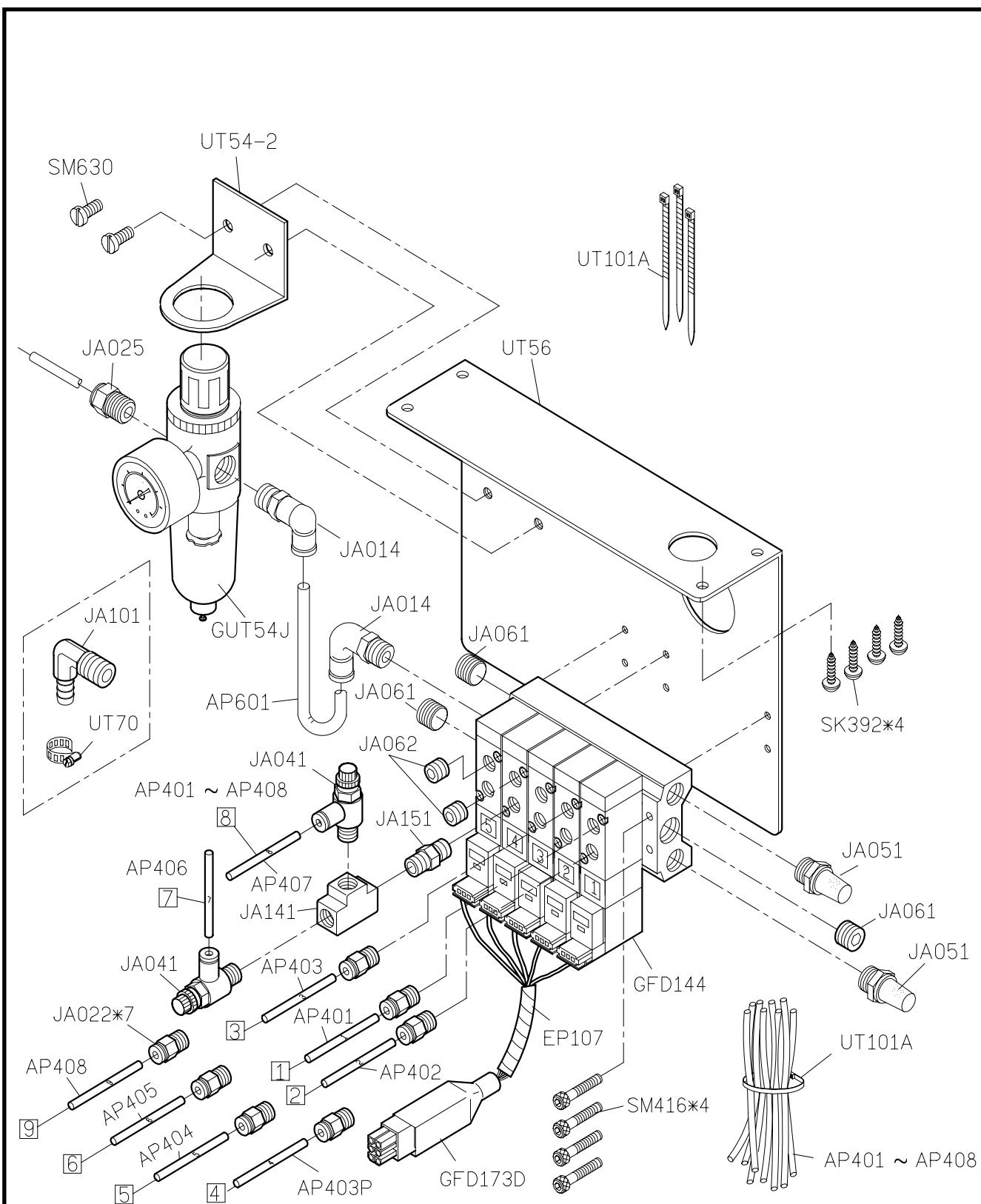


圖25/Fig. 25

桌板圖(平車)

TABLE CUT-OUT (FLAT BED)

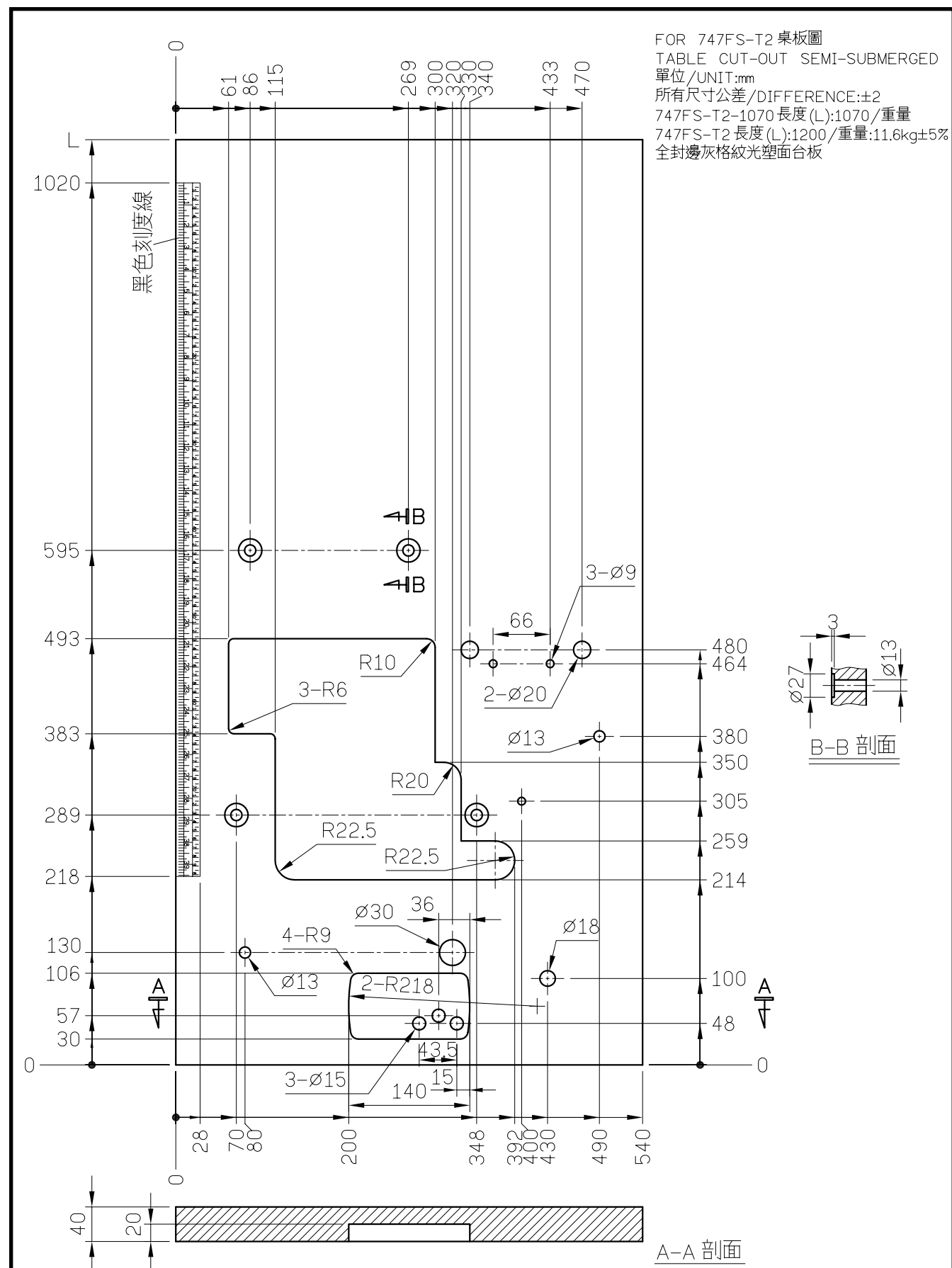


圖26/Fig. 26

桌板圖(筒車)

TABLE CUT-OUT (CYLINDER BED)

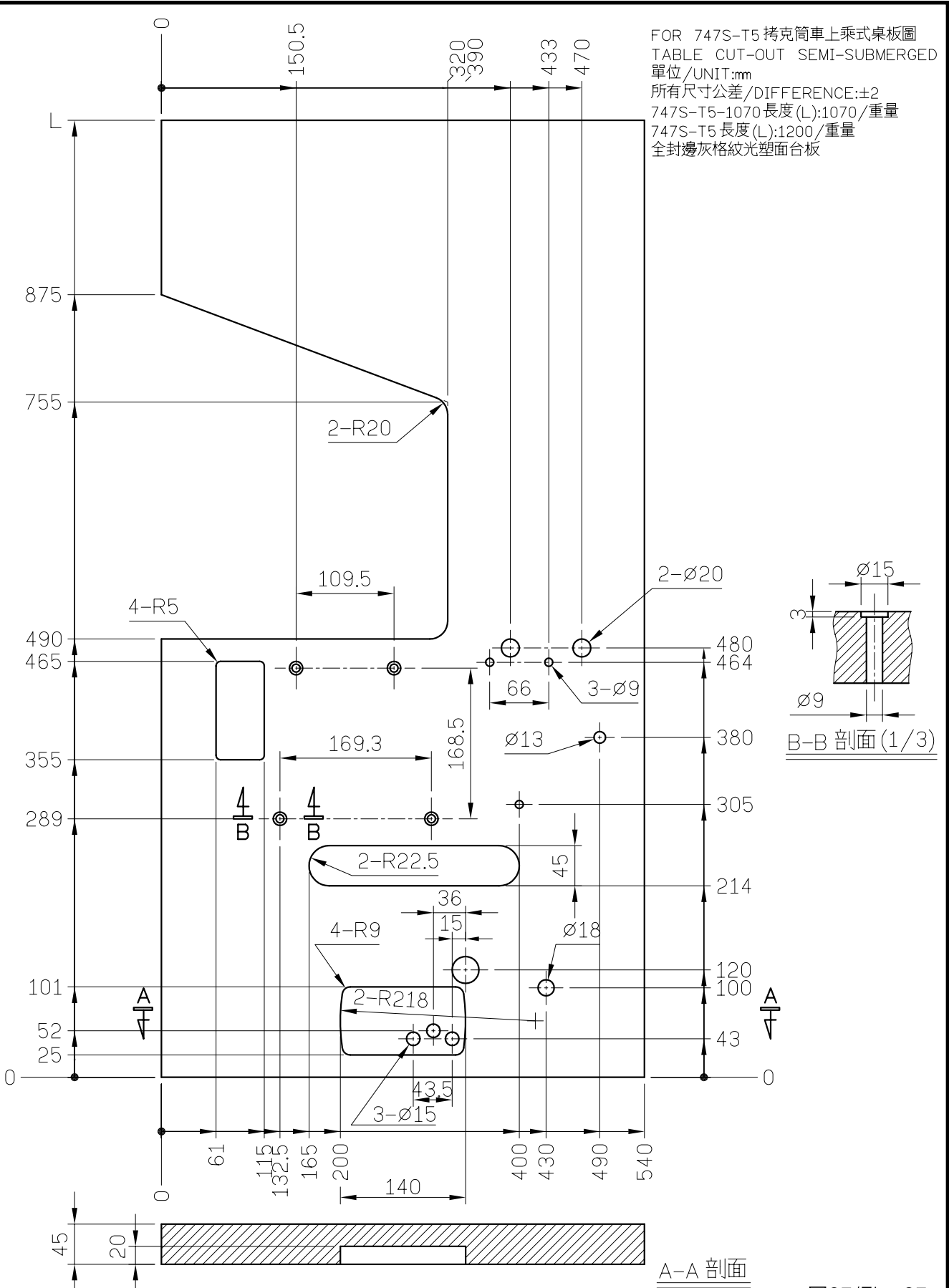


圖27/Fig. 27

報廢流程

DEMOLITION PROCEDURE

1. 當機器需要被淘汰與報廢時，有一些基本規則必須採納、遵守以保護環境及公眾健康。
 2. 所有的機器零組件必須依照下列分類來區分開：
 3. 以此方法，所有材質可以正確的淘汰，回收再利用或鎔解為可再使用或再處理而不至於危害環境。
1. When the machine needs to be eliminated and demolished, certain basic rules must be observed to protect the environment and public health.
 2. ALL machine componenets must be divided according to categories as the followings:
 - (1) All sheathes, flexible hosing and plastic or non-metal components.
 - (2) Electricity components: switches, or lighting components.
 - (3) Insulation materials: rock wool, and flexible rubber strips.
 - (4) Metals: ferrous metals, copper, bronze and brass, various.
 3. In this way, all materials can be eliminated correctly, recycled, or melted down for re-use or disposed of so that they do not harm the environment.