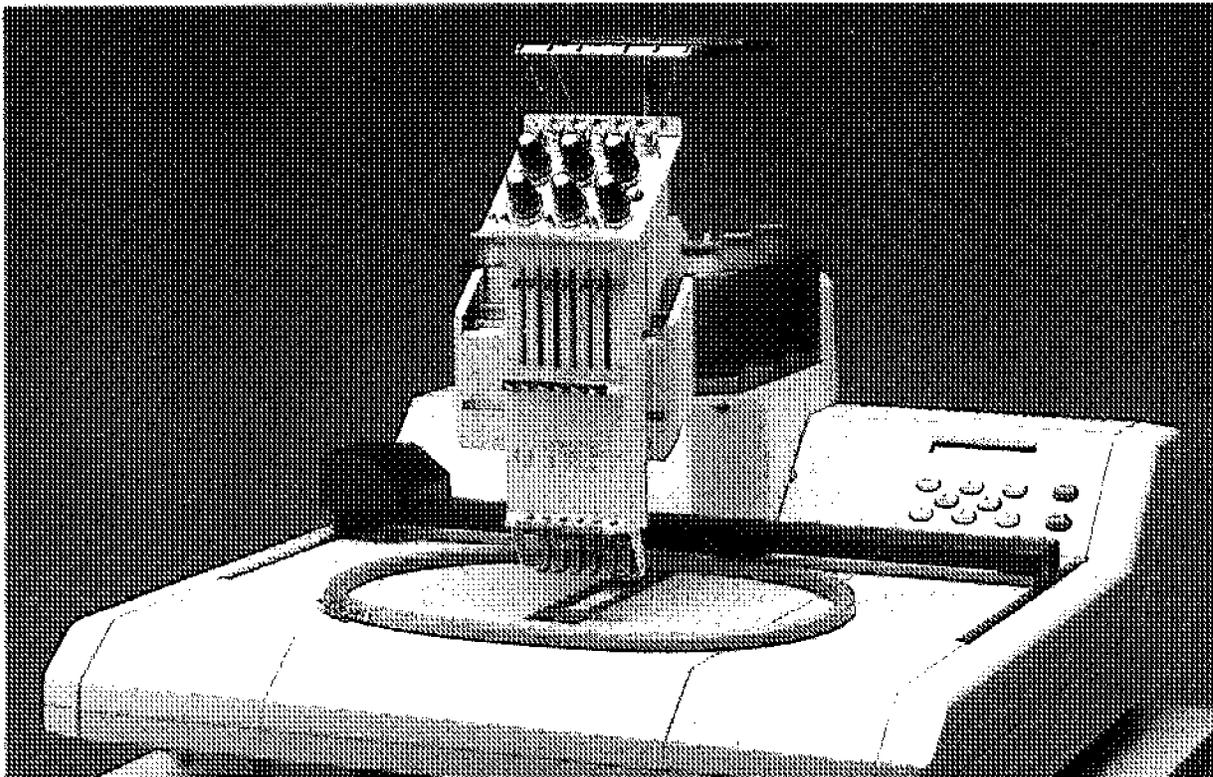




EMC6 (With Melco Head) Embroidery Peripheral Technical Manual

Part Number: 110041-01

**A Technical Guide To Performing Service
Maintenance And Repairs On The 6 Needle,
Single Head Embroidery Peripheral With The
Melco Head. Various Options Included Are,
Trimmer, Large Bobbin, And Bobbin Detect.**



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1. Introduction

Scope of Manual

The EMC6 Embroidery Peripheral Technical Manual is designed to provide the user with information necessary to perform repairs beyond routine operator maintenance.

The Melco EMC6 (with Melco head) Embroidery Peripheral is one of several embroidery peripherals in Melco's Epicor family of products. The EMC6 is a single head embroidery machine, which contains six needles and automatic color change. It is designed to allow for flat goods and cap frame embroidery, and can be equipped with several optional choices, such as, the Trimmer, Large Bobbin, and Bobbin Detect, giving this product functional versatility.

The Letter combination that appears after "EMC6" in the name of your unit, indicates which options are on the machine. An EMC6 M machine is a Melco Head unit without any additional options. An EMC6 ML machine is a Melco head unit with a Large Bobbin. An EMC6 MTL is a Melco head machine with Trimmer and Large Bobbin. When we refer to the product as an EMC6 only (without any options letter designators), the information will equally apply to those units with the various options. However, certain sections of the manual may apply to an option only. In this situation, if the EMC6 that you purchased does not have the particular option that is being discussed, simply disregard that information.

This technical manual is presented in three basic sections: 1) an overview of general information, such as, the proper configuration of the peripheral, in this introductory section, 2) service adjustments, and 3) mechanical disassembly/replacement of the major components of the embroidery peripheral.

Warranty Registration

Please complete the Warranty Registration Form upon installation of the system; and return it to Melco to validate and register the machine warranty. If no Warranty Registration is on file at Melco when warranty service is requested, it will be assumed that your warranty began on the 7th day after the ship date from Melco.

General

Throughout this manual several abbreviations and specific terms may be used. The following explains some of this terminology:

The terms "Embroidery Peripheral" and "Sewing Peripheral" may both be used to identify the same item. The meaning of the two terms is identical.

When referring to the Embroidery Peripheral or peripherals, the initials "EP" or "EPs" may occasionally be used. When speaking of a "printed circuit board," the item may quite often be referred to as a "PCB."

Standard Conventions Used In Manual

Certain procedures in the manual require actions such as pressing a certain key, or typing some letters at the computer keyboard. The following is a list of some of the more commonly used conventions found in this manual.

- To indicate a key on the computer keyboard, it is referred to as simply the key in question - for example: Press the Enter key to initiate the application.
- Square brackets around an all-caps word indicates a key on a peripheral device. The same word without the brackets means a function or description is intended. An example is: **[ENTER]** indicates the ENTER key on the peripheral; and **ENTER** means to perform the function meaning "to go into."
- To indicate typing on the computer keyboard, it is referred to in **BOLD** letters - for example: Type: **run** and press Enter to start the program.
- To indicate that two keys must be pressed simultaneously the following conventions are used: with the computer keyboard, the first key to be pressed and held down is simply referred to, then the second key which needs to be pressed while the first key is held down is referred to after a comma - for example: Press Shift,8 to type an asterisk (*).
- To indicate two keys with the peripheral keyboard, the above holds true except there is no comma between the keys - for example: Press **[ALT][⇒]** to move the needle case one position to the right.

Occasionally in the manual, special attention by the user is required. In this situation, "attention getters" are used to indicate the need for the user to be aware of a situation that is above and beyond the normal or routine. Three standard attention getters are explained below:

WARNING!

This term is used to call to the users attention that the procedure following must be performed with care and accuracy to avoid possible danger or harm to the operator or other persons in the area.

This term is also used to announce important regulatory information.

CAUTION!

This term is used when the procedure following it may cause damage to the equipment if not properly performed by the user.

NOTE:

This term is used when additional information is required beyond the normal steps for communicating the information. It may be used to clarify certain portions of text or to call attention to other items previously mentioned or mentioned later in the procedure.

Glossary Of Terms

Several words or terms are used in this manual that are unique or specialized in use with the embroidery industry or Melco embroidery equipment. The following list of terms and definitions is by no means all inclusive, but provides a base knowledge of these terms. Understanding them will greatly enhance your understanding of the contents of the manual.

Hoop

A mechanical device that holds material to be sewn. "HOOP" is generic term and can used to describe any material holding device.

Job Queue

Machine memory location (found in the RUN MENU) where the design name, and Color Sequence information is stored while the machine is powered up. This memory location is cleared when power is lost or the machine is turned off.

Needle Bar

The device that holds the needle in position to travel vertically in proper coordination with the rest of the sewing head movements.

Thread Tension

A generic term for tensions of thread or yarn used in any style of embroidery.

X Axis

The right to left movement of the Beam and Carriage.

Y Axis

The "front" to "back" movement of the Beam and Carriage.

Z Axis

The rotational movement of the horizontal drive shaft in the sewing head.

Maintenance Philosophy

The maintenance philosophy used in this manual, and practiced at Melco, is to isolate potential problems with the system to a "practical" replacement assembly. Therefore, components are not replaced, but rather, the circuit board "assembly" is replaced.

In the process of isolating problems in the machine, the person performing the troubleshooting must also practice good troubleshooting techniques. Good troubleshooting techniques include, but are not limited to , guarding against static electricity damaging machine components.

CAUTION! The EMC6 Embroidery Peripheral electronics are quite sensitive to static electricity. To avoid probable damage to the equipment, Melco insists that steps be taken to prevent static charges coming from personnel working on these machines. Therefore, Melco requires that personnel utilize a static grounding strap when performing maintenance on the EMC6.

Warranty Considerations

Some areas of maintenance require factory trained personnel to assure proper service. If unauthorized personnel attempt to service these areas, the **FACTORY WARRANTY MAY BE VOIDED.**

Therefore, it is recommended that Melco factory trained personnel be consulted whenever the "Factory Service Advised" statement is noted with a procedure.

For general information, most maintenance in the Z Encoder/Motor area includes steps that may void the factory warranty if not performed properly.

Although the above area is specifically subject to voiding the warranty, any service that is improperly performed may cause the warranty to be voided.

Configuring the EMC6 (With Melco Head)

There are two things that must be set in each sewing peripheral of any Melco system before it is used for the first time.

First you must set the Peripheral Program. The CPU Printed Circuit Board used on the EMC6 Embroidery Peripheral (With Melco Head) may also be used for other Embroidery Peripherals produced at Melco. Therefore, you must tell the CPU board what peripheral it is being used in. This is usually set correctly at the factory, but if for some reason the CPU is replaced it must be done before using the machine for the first time.

CAUTION! If the EMC6 (With Melco Head) is not configured with the correct Peripheral Program, it will not run properly, and may become damaged.

If for any reason the Peripheral Program is not set properly, or if you have replaced the CPU board, you should know how to set the Peripheral Program to avoid problems and possible damage to the unit.

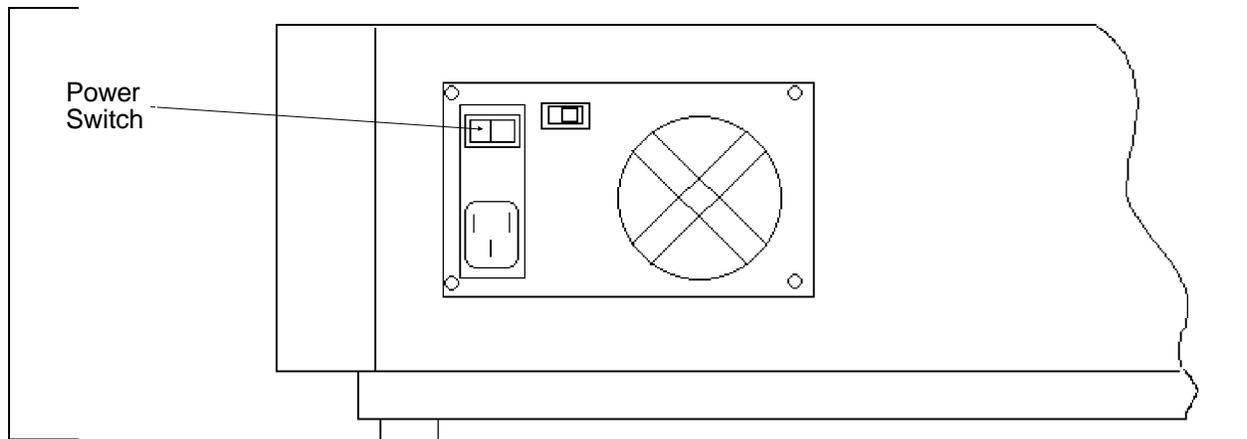
The second configuration item is the network address (or Unit Number). The Unit Number must be set and be different for each peripheral attached to an Epicor computer or network. There may be up to 16 total embroidery peripherals attached to any one computer, and each must have its own Unit Number. The number is selected from the peripheral Keyboard and is between 1 and 16.

The "configuration mode" in the EMC6 is accessible by pressing a certain keystroke combination while switching on the power.

Alternate Configuration Mode

Additionally, the "configuration mode" can be initiated any time the power has been turned on, but the unit has not yet been "down-loaded" by the EDS operating software. Until the unit is "down-loaded," the Display will alternately show the 2 present configuration items (Program Number and Unit Number) continuously until the unit becomes "down-loaded." When the EMC6 is initially turned on, and any time you wish to change the configuration status of the machine, refer to the following steps:

1. Before you turn on the EMC6 (or if the unit has not yet been "down-loaded" by the EDS operating software), locate the 10-key Keyboard (Peripheral Keyboard) and LCD (Liquid Crystal Display) in the upper right area of the peripheral unit.



Also locate the power switch at the right rear of the unit. It is the rocker switch mounted in the Power Input Module, as the figure below shows.

2. Go to the Keyboard. The display will be flashing on and off, find the 3 keys on the Peripheral Keyboard marked: [ALT], [↑], and [↓]. Depress and hold all three keys down at the same time.

NOTE: With the situation where the unit is already ON, but has not been "down-loaded," you need only to depress and hold the 3 Peripheral Keyboard keys until the unit beeps to get into the configuration mode. Then proceed. You do not need to turn off the EMC6.

Hold these keys depressed until the unit "beeps" and the Display shows a message depicting the Peripheral Program currently selected. The EMC6 will now be in the "configuration mode," and you can release the 3 keys.

When the EMC6 is in the "configuration mode," you can set (or change) the Peripheral Program and then the Unit Number for the machine.

Peripheral Program

3. To set the Peripheral Program, simply depress the [↑] or [↓] keys on the Peripheral Keyboard until the correct program shows on the Display (refer to the User Manual for your specific peripheral program). After the desired program is showing on the Display, depress the [ENTER] key on the Peripheral Keyboard to "set" the program.

Unit Number

4. After the [ENTER] key is depressed the configuration item will go to the Unit Number selection. To select a Unit Number, again simply depress the [↑] or [↓] keys on the Peripheral Keyboard until the desired Unit Number shows on the Display. (Remember, you cannot have two peripherals with the same Unit Number. If you do choose 2 peripherals with the same number, the controller will be confused and data transfer errors will occur.) After the desired number is showing on the Display, depress the [ENTER] key on the Peripheral Keyboard.

The EMC6 (With Melco Head) configuration is now complete and the Display will alternately show the Peripheral Program and then the Unit Number selected. Turn the peripheral off, and at the Epicor System Controller enter the EDS program, select the Peripheral Menu F10 and record the Unit Number following the instructions in the EDS/Epicor Operating Manual, page 10-3.

2. Service Adjustments

GENERAL

This section of the manual provides detailed information for performing machine adjustments that may be required during the life of the product. The procedures are guidelines for performing service maintenance; and must be used by personnel practicing good maintenance technique.

With certain areas in this section it is recommended that the procedure be performed by a factory trained technician. This reference is indicated by stating "FACTORY SERVICE ADVISED" at the start of the procedure.

ADJUSTMENT PROCEDURES

The EMC6 is functionally arranged into four sections (five sections with Trimmer Option): the Keyboard section, the Controller section, the Sewing Head section (with optional Trimmer), and the Carriage section .

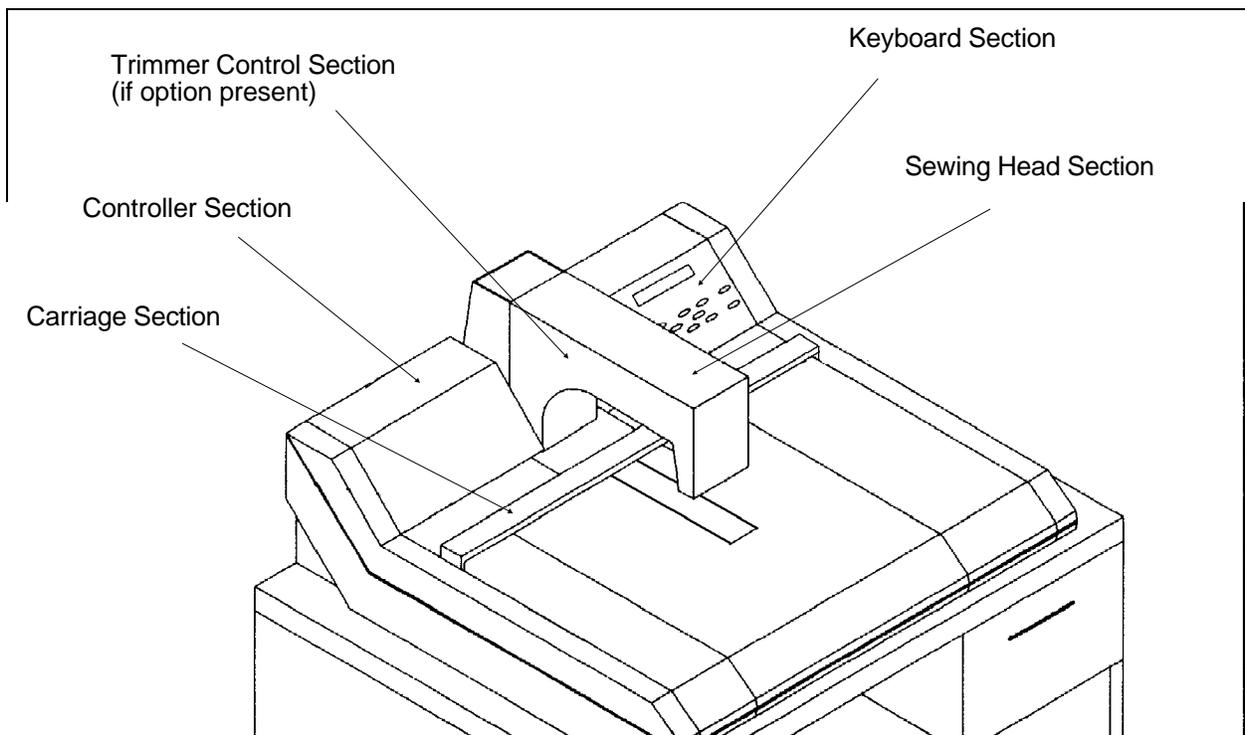


Figure 2 - 1

CONTROLLER SECTION

No adjustments are performed inside the controller section of the EMC6.

MOTOR AND DRIVE BELT TENSIONS

"FACTORY SERVICE ADVISED"

CAUTION! Damage to the machine may result if belt tensions are improperly performed.

All motor and drive belts require special procedures for setting the proper tensions. If the tension settings are attempted without using the proper procedures and without proper training assistance, the machine chassis and some components may be damaged.

If adjustment of a belt tension is thought to be needed, it will be necessary to contact Melco Service .

OPERATOR INTERFACE (KEYBOARD SECTION)

Display Screen Intensity

To adjust the intensity of the display in the keyboard/display assembly it will require the removal of the operator interface (Keyboard) cover to gain access to the adjusting potentiometer on the side of the keyboard printed circuit board. During the adjustment of the display intensity the EMC6 must be on so the result of the adjustment may be observed.

1. Remove the Keyboard Cover, using care not to allow the keyboard/display to come in contact with any portion of the machine that will short circuit any voltages. Also, do not touch the components on the printed circuit board. (Refer to specific instructions Removing Covers in Section 3.) Set the cover on the peripheral table top.
2. Install the static strap as explained in the specific instructions in Section 3.
3. Turn on the power switch to the EMC6.

4. Locate the intensity adjustment pot on the right side of the printed circuit board as shown in the figure below.
5. Rotate the adjustment potentiometer clockwise to increase intensity on the display screen, or counterclockwise to decrease the intensity on the display screen.
6. After the proper intensity is obtained, reinstall the operator interface cover using the same precautions as before.

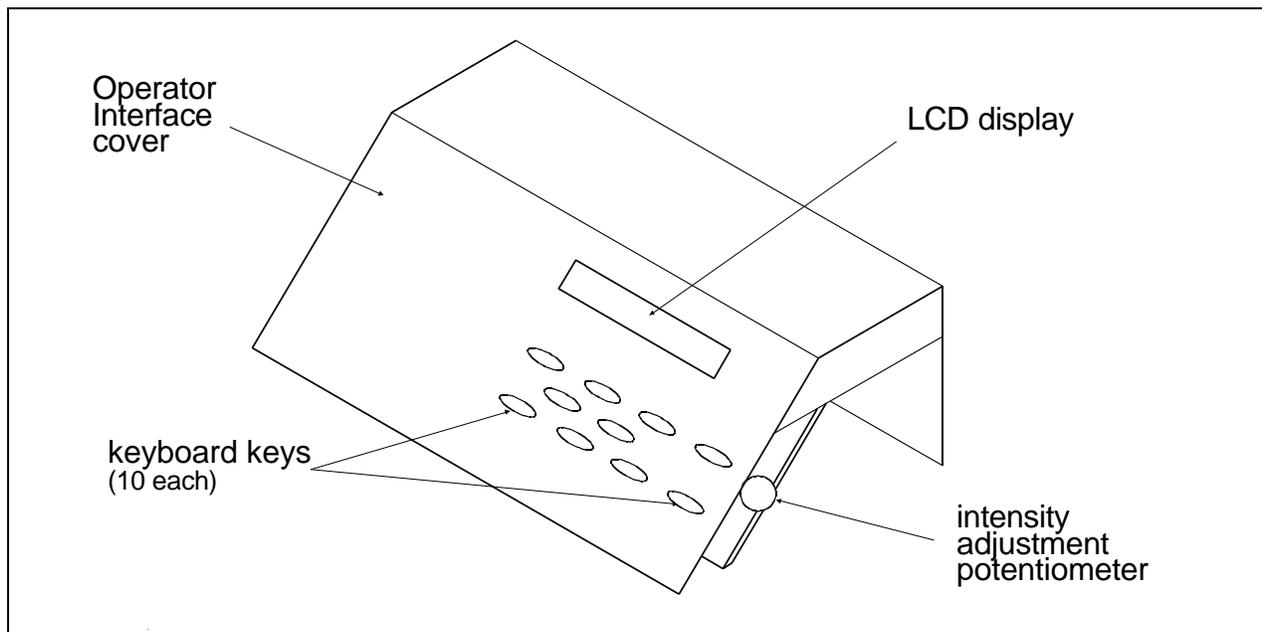


Figure 2 - 2

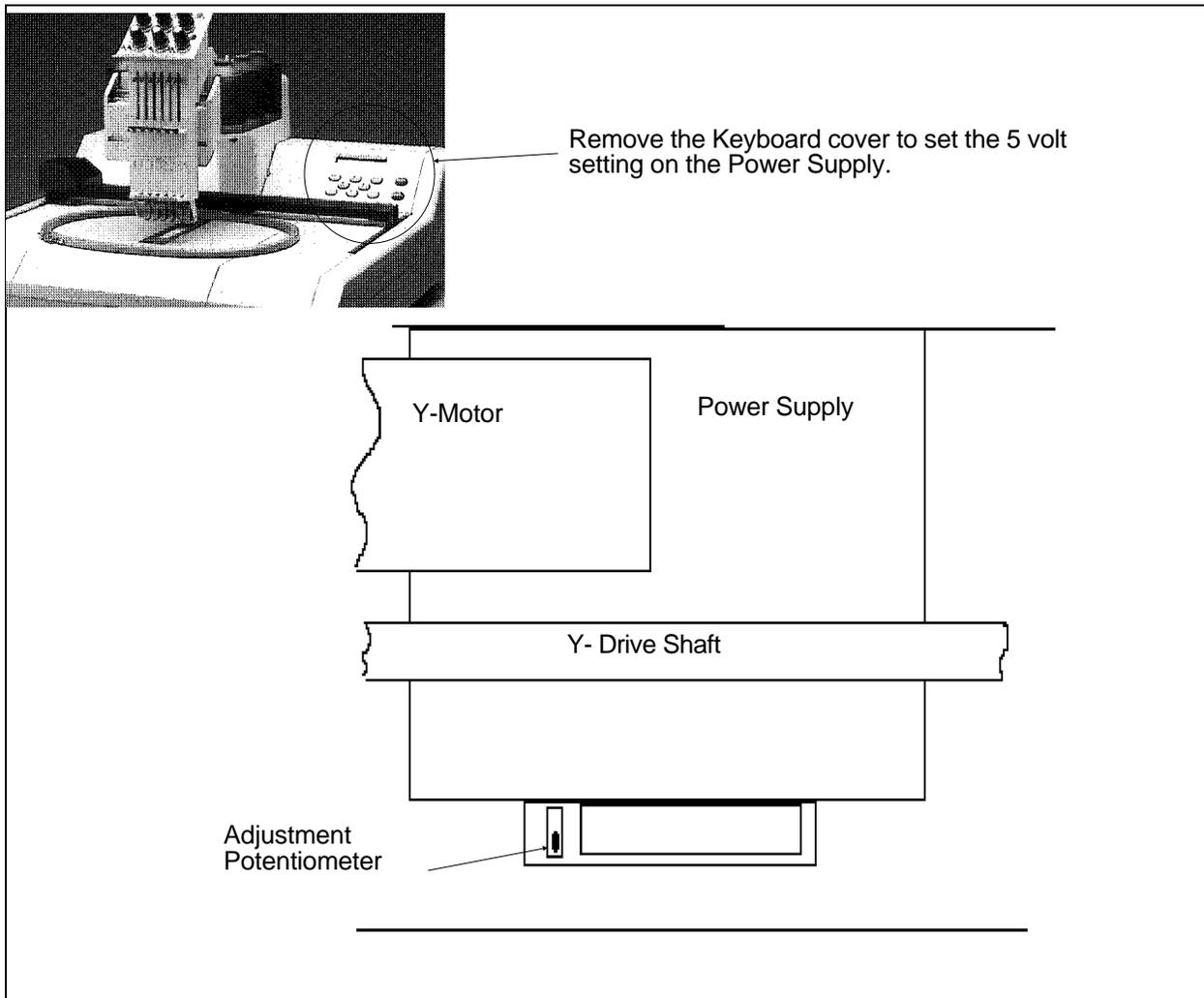
Power Supply (5 Volt Setting)

The power supply for the EMC6 is located under the Keyboard Cover. This also serves as the power input. It is a sealed unit. If the power supply fails it must be replaced, see section 3 for removal and replacement. If a new Power Supply is installed the five volt setting must be set before using the machine.

"FACTORY SERVICE ADVISED"

Tools: Digital voltmeter, insulated alignment tool.

1. Remove the Keyboard Cover, being careful not to damage the Keyboard ribbon cable.
2. Remove the Electronics Cover. Locate the XYZ Interface Board directly in front of the machine CPU PCB. This board has a row of test points across the top. Choose TP4 (GND) and TP5 (+ 5v).
3. Locate the adjustment potentiometer directly next the connector block of the power supply. See Fig. 2-3.
4. Turn the machine ON and using the alignment tool adjust the potentiometer to 5 volts (+ 4.95 - + 5.05 volts).

**Fig. 2-3**

SEWING HEAD

Z Encoder System Introduction

The ability to place stitches precisely at high speed is dependent on the accurate operation of the electronics and electro-mechanical assemblies. The "key" to this is the Z Encoder. The information provided to the CPU by the Z Encoder is the basis for all other actions of the Head, regardless of the style sewing peripheral you are using.

The Z Encoder is a two channel quadrature output with index pulse. If you send the output to an oscilloscope you will see two square wave signals, one slightly ahead of the other. You will also see a third signal, the index pulse. The CPU interprets these signals to determine position, speed and head up.

The CPU then uses this information to determine when to move the X-Carriage, when to move the Y-Axis, when a color change is allowed, when setting home position is allowed, how fast the sewing head is running, how many stitches have been sewn.

It is important for the technician to understand that the peripherals' operational software treats the motor control circuitry differently when the Z-Axis is running than it does when the Z-axis is stopped. When running, the motor control circuitry allows the X,Y, and Z-axis motors only minimal errors in rotation. Any error greater than the allowed error and the motor is driven to eliminate the error. When the peripheral is stopped, however, the software that controls the Z motor allows what is called a "window"; in other words, the peripheral will have between 1.5 and 5 degrees (rotational) error that the software allows. The purpose of this window is to keep the motors from oscillating about the null (hunting for absolute position), and making a grinding noise while stopped. The green LED on the CPU, can be used by the Technician to see if the CPU is in fact receiving a mark pulse from the encoder (indicating that the encoder and associated cables are functional). It should also be stated that "The head-up LED does NOT have to be lit when the peripheral is stopped, and the LED CANNOT be used to make a determination of the Z-encoder alignment status". If used in conjunction with the proper head-up tool, the LED can be used to see if the mark pulse is triggering early or late as compared to absolute mechanical head-up.

The use of the procedures described in the following pages will result in the most proper, accurate alignment and repair of the Z-Encoder System that is possible and or feasible for use in the field by a Technician.

It can be seen, then, that the proper alignment of the Z encoder can result in improved sewing quality and proper machine operation. Slight misalignment can cause many kinds of erratic operation and/or intermittent thread breaks. A larger misalignment can be the cause of equipment damage and subsequent electronic/mechanical failure. The careful application of the Z Encoder Procedures by a technician will result in a machine that will operate correctly and reliably.

Z Encoder Inspection

"FACTORY SERVICE ADVISED"

This procedure is a guide for the technician in determining the condition of the three channel optical encoder. If unauthorized personnel attempt to service this area, the **FACTORY WARRANTY MAY BE VOIDED** if the work is improperly performed.

Inspect the Z shaft encoder following the steps below. If the requirements of this process are not met, replace the encoder by following the Shaft Encoder Installation procedure in Section 3 of this manual.

1. Remove the Electronics Cover.
2. It is important that the computer not download a design to the peripheral. You may disable the peripheral from the computer or, locating the [ALT], the [UP ARROW], and the [DOWN ARROW] keys on the Keyboard of the EMC6 Embroidery Peripheral, press and hold these three keys while you then turn ON the EMC6 Embroidery Peripheral.
3. Hold the keys until the "configuration mode" is initiated and the peripheral program name will appear on the display.

Do not perform any other keystrokes while in the configuration mode at this time.

4. Locate the 4 Red LEDs and 1 Green LED on the outside end at the top of the CPU PCB.
5. Rotate the sewing head manually in a clockwise direction from the rear of the machine. This rotation can be performed by rotating the shaft pulley that is driven by the motor belt.
6. While rotating the sewing head, check that the Green LED blinks once each revolution (this is the "index" or "head-up" mark).

7. Inspect the electrical connectors (encoder cable plug and encoder body) for damage. Clean connections/replace components as necessary.

If the "test" above fails or is in question, replace the component(s) in question with new ones. Refer to Section 3 of this manual for the installation procedure.

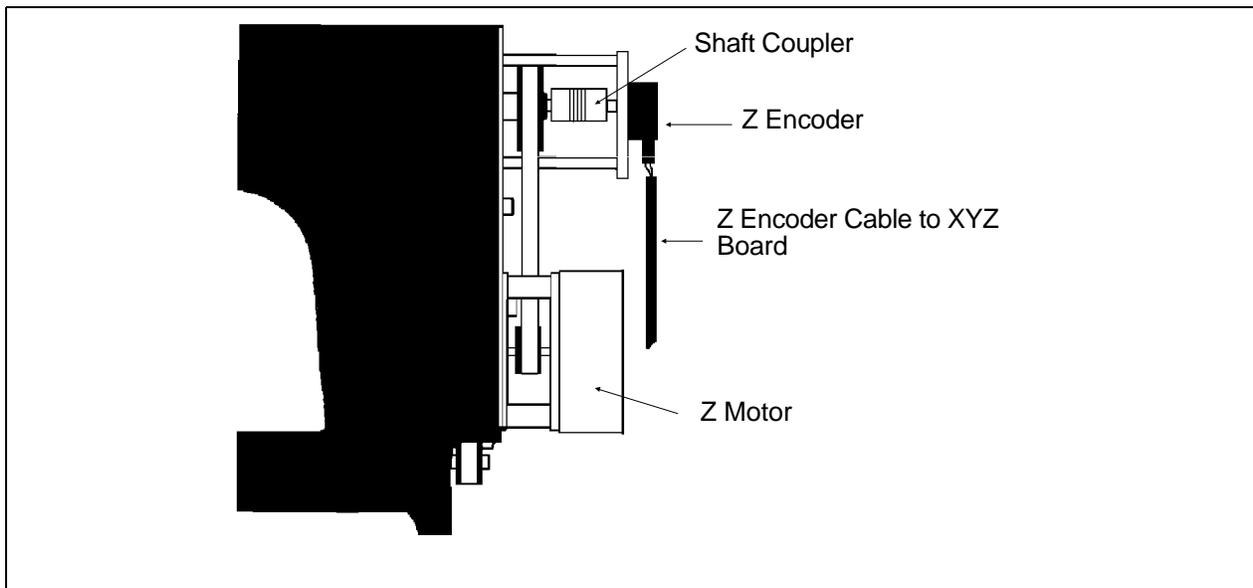


Fig. 2-4

Jump Stitch Solenoid

Jump Stitch Solenoid Adjustment

If a Jump Stitch Solenoid has been replaced, perform the adjustment procedure below.

NOTE: The Needle Case must be removed to make this adjustment, see Section 3 for Needle Case Removal. The Jump Stitch Solenoid must be positioned so that the plunger is close enough to actuate the Needle Bar Driver Jump Lever when the solenoid is engaged (energized).

The plunger also must be located away from contacting the jump lever during normal sewing, when the solenoid is relaxed or not energized.

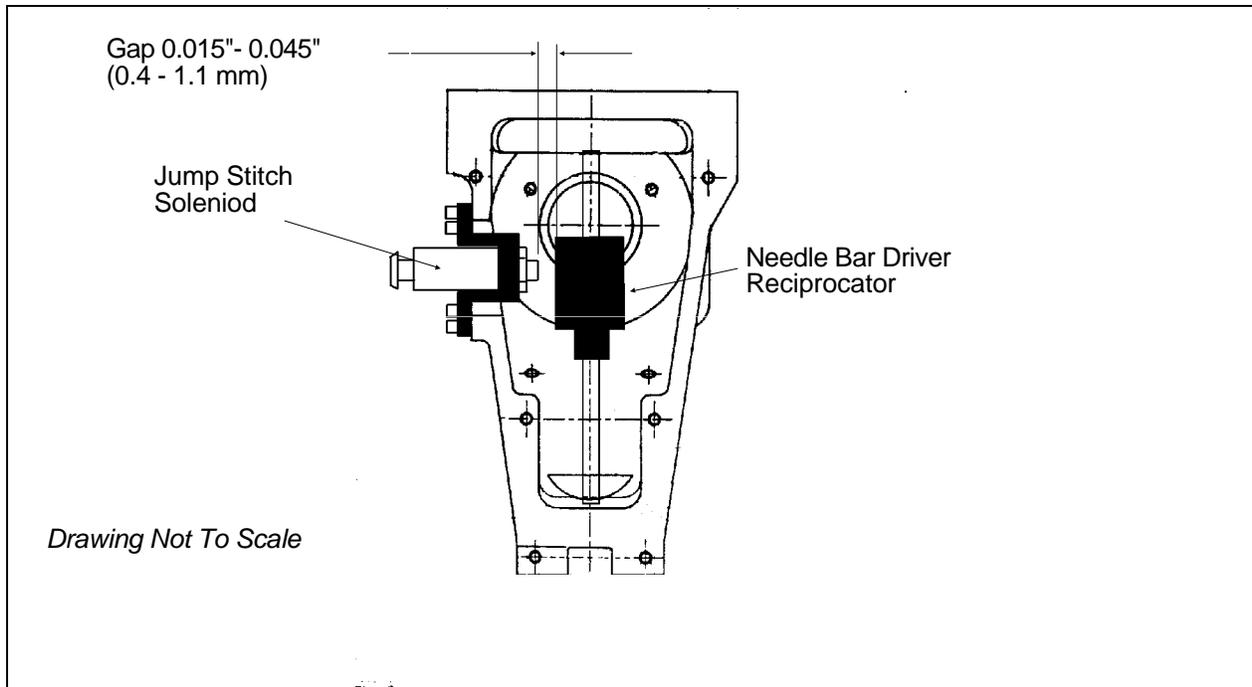


Fig. 2-5

A typical dimension for the gap between the relaxed solenoid plunger and Needle Bar Driver Reciprocator is approximately 0.015 to 0.045 inches (0.4 to 1.1mm).

Attach the solenoid and bracket assembly to the sewing head, and check the alignment. Be sure that the plunger contacts the reciprocator mechanism; and that the reciprocator mechanism does not contact other internal head parts when the solenoid is energized. The two wires coming from the solenoid body and connecting at the small black plastic connector, can be damaged if they are twisted together. Twisting the wires together will reduce their length and can put undue stress at the connections at both ends. We therefore do not recommend twisting these wires together. If you must group these wires together, use "cable ties" (plastic straps) these are available at most electronic supply stores.

TRIMMER SET UP AND ADJUSTMENTS

**Trim
Info
Only**

The Melco Trimmer Option for the EMC6 was assembled and thoroughly tested before the machine was shipped. Although the set up of the Trimmer should not change during normal use, there are a few things to be aware of to prevent problems.

1. Dirt and dust from thread can build up and prevent the Moveable Knife (in the Rotary Hook Assembly) from actuating correctly. Keep the area clean of dust and thread debris and you shouldn't have a problem here. If for some reason you find that the Knives are out of adjustment a procedure for adjusting them is presented in this section.
2. Birdnesting of thread around the Rotary Hook and Picker could cause the knives to become misadjusted, as well as the Picker.

The following procedures provide a guide for adjusting various portions of the Trimmer System.

"FACTORY SERVICE RECOMMENDED"

NOTE: Some of the following procedures require fixtures. See your Melco Service Representative before attempting any of these procedures.

The Movable Knife has no specific adjustment, it is necessary to adjust attitude of the Fixed Blade so that the thread is cut square in the center of the Movable Knife. Proper adjustment of the Fixed Blade is a crucial step in Trimmer operation.

Follow the steps listed below carefully and in ORDER. Performing these steps out of order can require a service call to correct.

Tools needed: Black Marking Pen,(use a non water base ink ie; Sanford Sharpie Permanent Marker or Eberhard Faber Markette All Purpose Marker),a Medium Screw Driver, a Small Screw Driver, a 2 mm Allen Wrench, a 2.5 mm Allen Wrench, and a 1.5 mm Allen Wrench.

Adjusting the Fixed Blade

TURN THE MACHINE POWER OFF

1. Fig. 2-6 and 6a identifies those components that comprise the Trimmer; the Fixed Blade, Movable Knife and the Under Thread Presser. These components are covered by the Front Bed Cover and the Needle Plate, see inset in Fig. 2-6, remove the screws holding these covers. Unplug the Bobbin Detect Sensor located under the Trim Link Arm (see Fig. 2-6). You may test the Trimmer adjustments without the covers in place, but they must be installed to embroider.
2. Carefully lift the Trim Link Arm from the movable knife's Drive Pin. See Fig. 2-6. The Trim Connecting Link should come off easily. Be careful not to bend the Link Arm using too much pressure when you raise it up.

- 3 . With the Movable Knife free of the Link Arm, pull the knife towards the front of the Needle Plate Bracket with a small allen wrench hooked behind the Movable Knife. See Fig. 2-7.
- 4 . With the Black Marking Pen mark in the area of the movable knife, shown in Fig. 2-7. Then push the movable knife back to the rear of the Needle

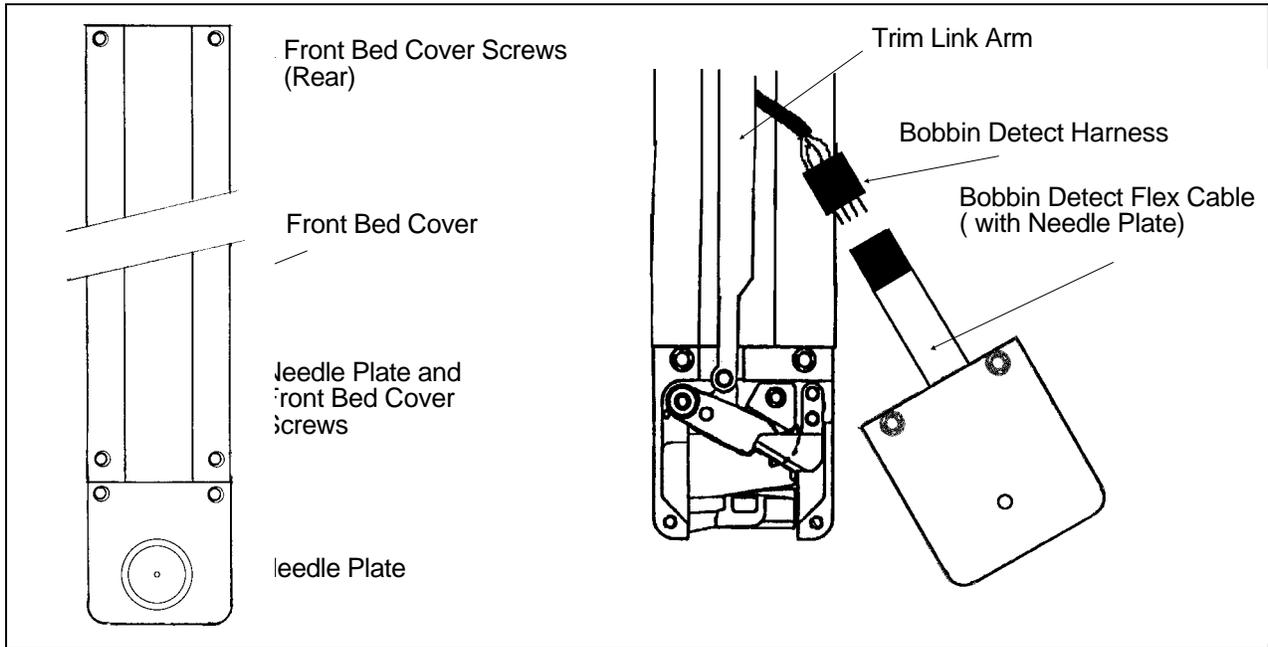


Fig. 2-6

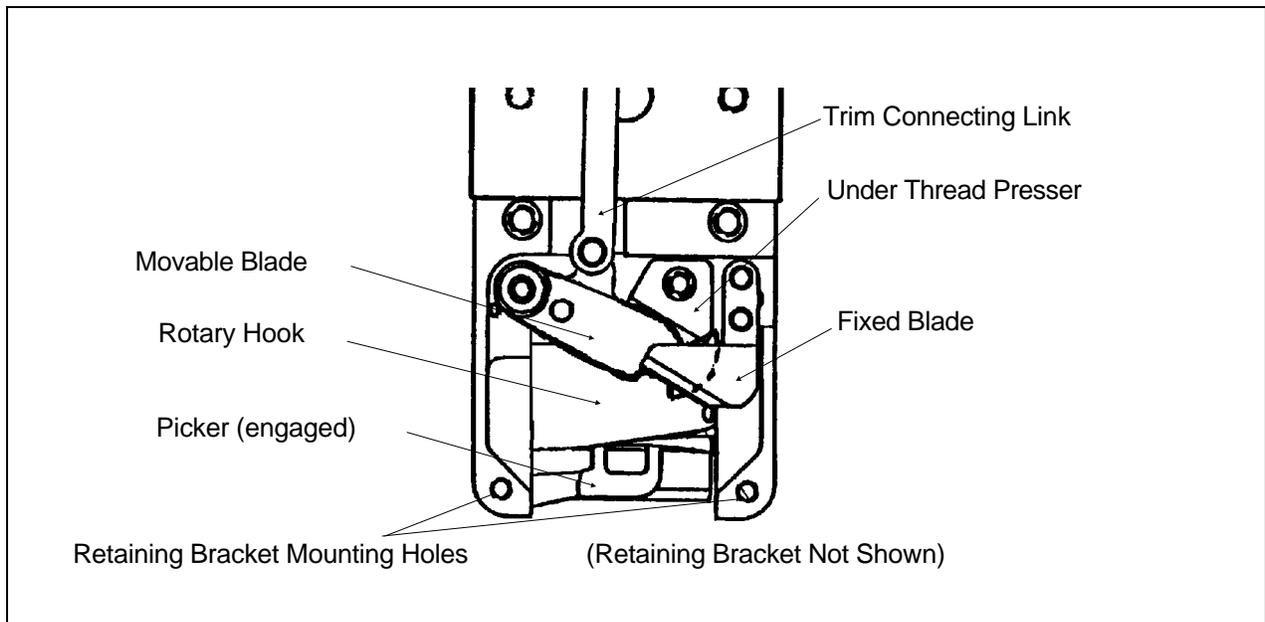


Fig. 2-6a

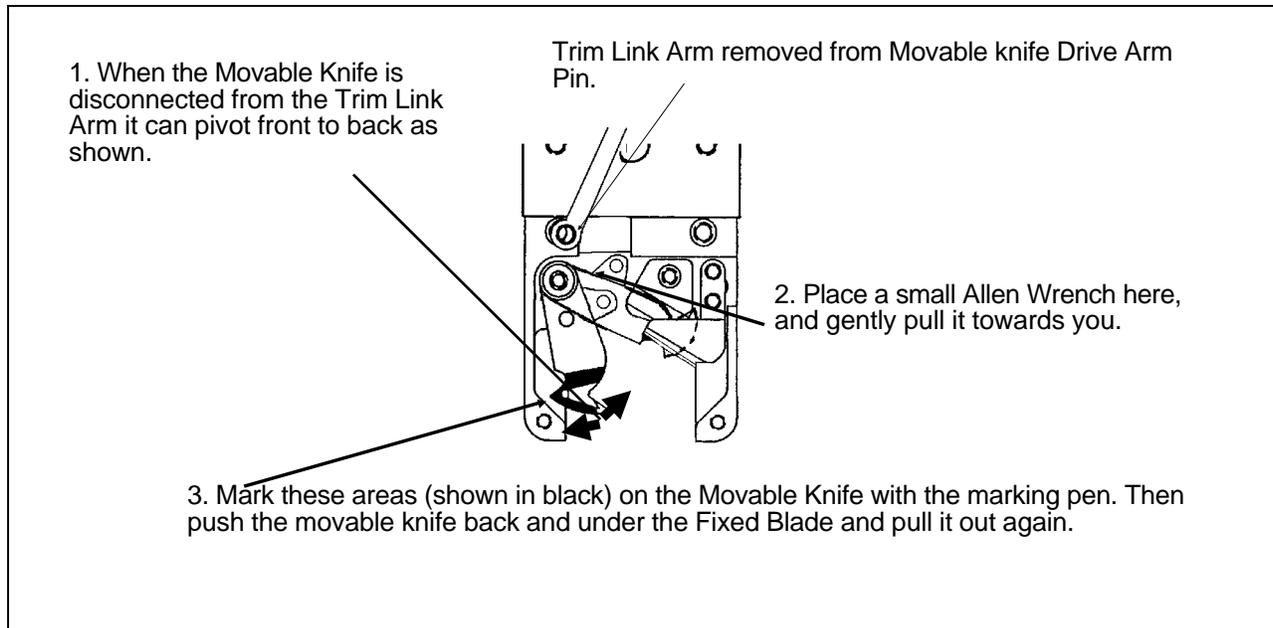


Fig 2-7

Plate Bracket with your thumb or forefinger until it passes UNDER the Fixed Blade. It should take a little force to push the Movable Knife under the Fixed Blade, be careful not to press down on the knife, but use a steady horizontal movement to push the knife.

- 5 . Using an allen wrench pull the Movable Knife out from under the Fixed Blade and look at the "wipe off" of the marking pen ink. See step 6, to determine how the Fixed Blade needs to be adjusted.
- 6 . Use Fig. 2-8 and Fig. 2-9 on the next pages, as guides to making the Fixed Blade adjustments. Adjust the Fixed Blade with the two (2) screws, labeled A and B shown in Fig.4-8.

NOTE: You should never have to change the height of the Fixed Blade Set Screw, shown in Fig. 2-8 , the only time you will need to adjust the height of the Set Screw is if it is replaced. At which time this screw should be set 1 1/2 turns above flush on the needle plate bracket. This is indicated in Fig.2-8.

- Tighten screw A until the ink wiped off looks like # 2 in Fig. 2-9.
- Then tighten screw B until it looks like # 3 in Fig. 2-9.
- If the wipe off looks like # 1, screw A is too tight. Back screw A off just a little bit and try screw B again.

If you look directly at the Fixed Blade from the front you will see that it "tilts" a little as you adjust the blade. It is this "tilt" that you are really adjusting. If the Fixed Blade is adjusted too far to the left, as you look directly head on at

the blade, the ink wiped off the top of the blade will look like Fig. 2-9, # 1. Tighten screw A little bit and then pass the Movable Knife under the Fixed Blade again and look at the knife if it does not look like Fig. 2-9, # 3, tighten screw B a little bit more. The object here is to get the ink wiped off the Movable Knife, by the Fixed Blade, so that the wipe off looks like Fig. 2-9, # 3. There should be some resistance as the Movable Knife passes under the Fixed Blade, but be careful, you can get a good wipe off and still have the Fixed Blade too tight, this can cause Z Timeout Errors. Make no mistake here, this is a difficult adjustment. The first few times you attempt it you will get frustrated. But keep going, once you get the "feel" for adjusting the Fixed Blade you will be able to accomplish it in a few minutes. All it takes is a little practice and some patience.

Checking The Under Thread Presser

The Under Thread Presser, shown in Fig. 2-10, holds the bobbin thread after a trim. This permits a loop of bobbin thread ready for the next stitch. While the Under Thread Presser holds the bobbin thread there should only be enough pressure applied to hold the thread in place under the Movable Knife. If the Under Thread Presser is damaged it can cause problems that look like tension troubles. For example; if the pressure of the Under Thread Presser against the Movable Knife is too much, it may hold the bobbin thread

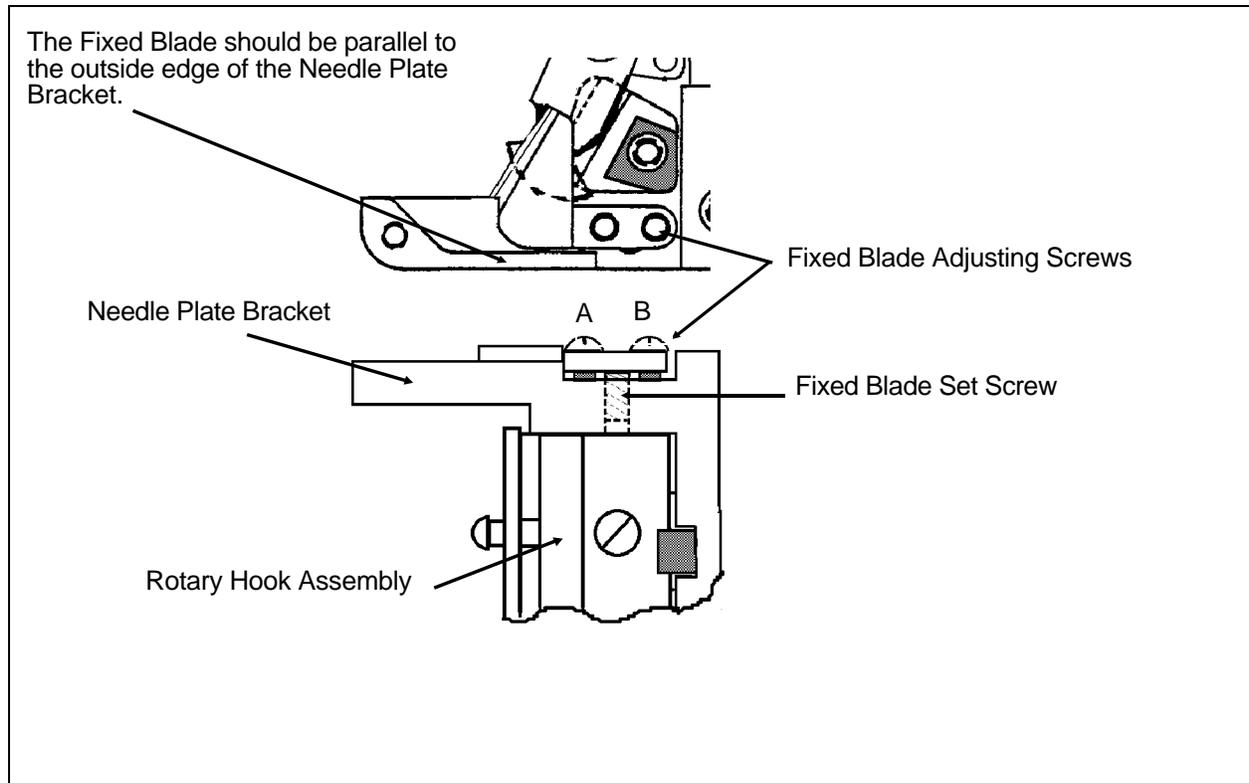


Fig. 2-8 Adjusting The Fixed Blade

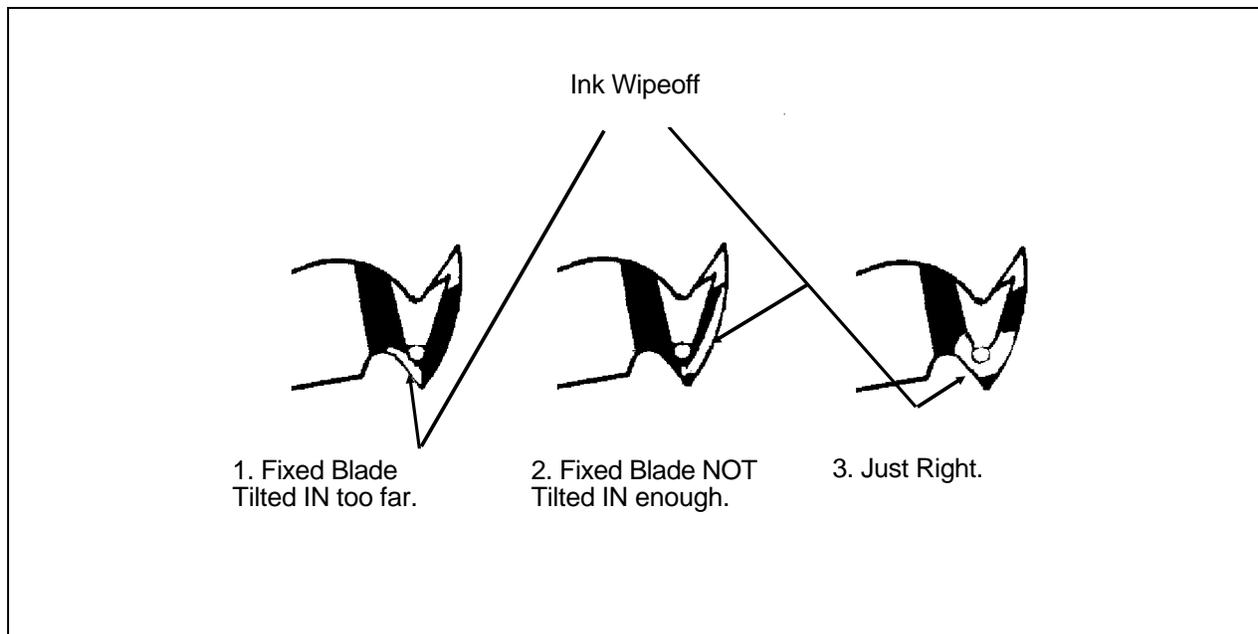


Fig. 2-9

and not allow a loop to be formed, or it may nick or fray the thread, again making it look like the bobbin tension is incorrect. Another example, would be if the Under Thread Presser is "crumpled" (see insert Fig. 2-10), it does not allow the Movable Knife to pass under the Fixed Blade completely to cut the thread, causing a "no cut" condition. If the under thread presser is damaged it can cause intermittent long tails of the upper thread.

Checking the Under Thread Presser is done in two parts. First by looking at the part itself to see if there has been any "crumpling", this is damage caused by the Movable Knife hitting the Under Thread Presser. (See Fig. 2-10) If you see visual evidence of any damage, replace the Under Thread Presser. Second by checking if the Bobbin Thread is in fact being held in place.

While the machine is still turned off, and the Trim Link Arm is disconnected:

1. Pull the Movable Knife "out."
2. Leaving the Bobbin Case in the Rotary Hook, pull off some Bobbin Thread, and drape it over the center of the Movable Knife.
3. With the bobbin thread draped over the Movable Knife from back to front, gently hold the thread so there is some slack and then push the cutter "back" until the thread is cut. This cut should be clean, it should not be frayed. If the thread is frayed readjust the cutter once again. The "top" thread should be loose and fall away, because it has no support. The "bottom" thread should be held in place under the Movable Knife by

the Under Thread Presser. Again look closely at the cut, it should not be frayed, it should be CLEAN CUT.

Remember: *These adjustments may take a few times to accomplish before you become satisfied with the cut.*

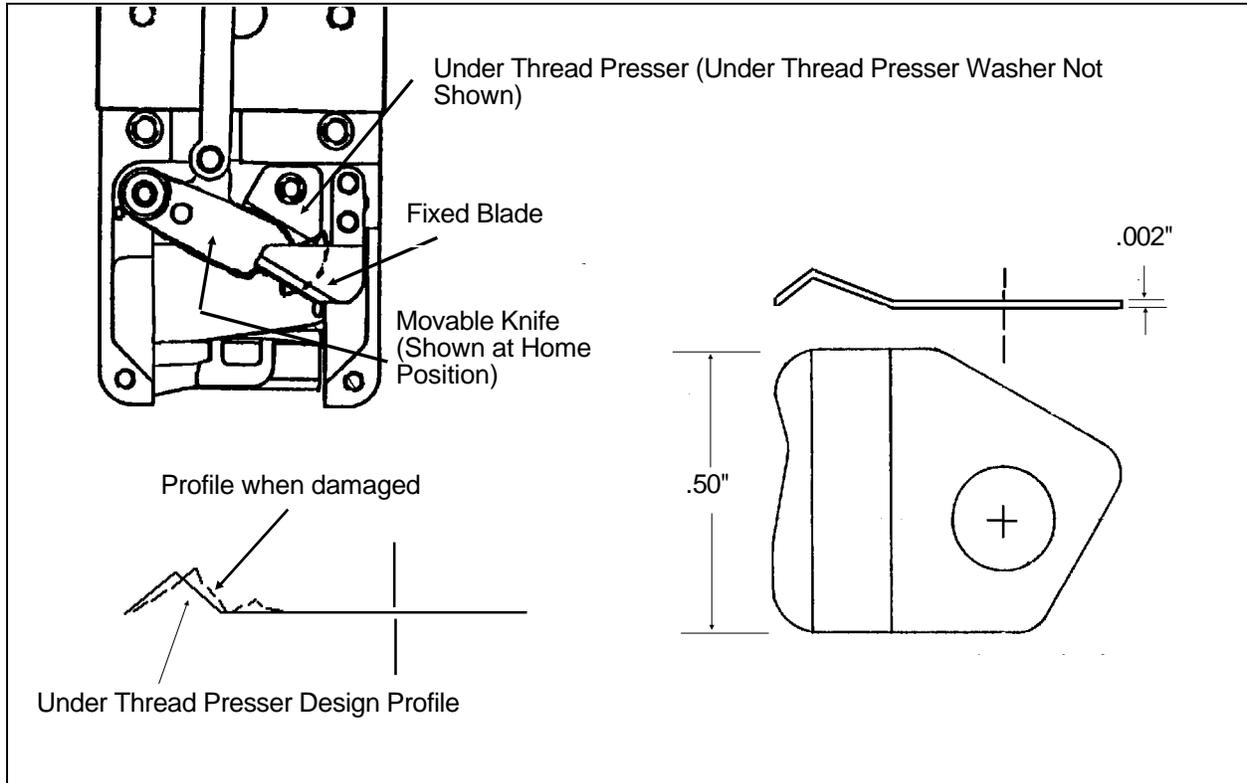


Fig. 2-10

4. After you are satisfied with the movable knife's cut, reattach the Trim Link Arm.
5. Reinstall the Needle Plate first, connecting the Bobbin Detect harness and sensor connector together, before placing the Needle Plate in position.
6. Reinstall the Front Bed Cover watching that the screw heads are snug, but not over-tight.

Setting The Movable Blade Home Position.

It should not be a common thing to have to set the Trim Cutter. Check the Movable Blade's Home Position by removing the Needle Plate (and disconnecting the Bobbin Detect harness).

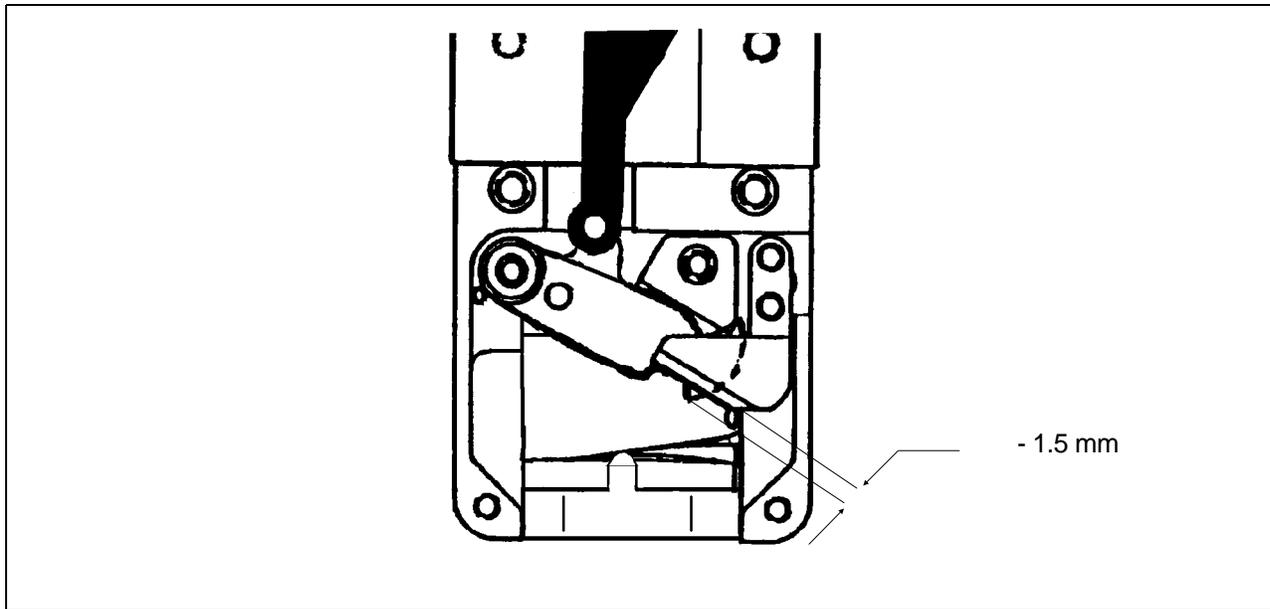


Fig. 2-11

After the trim the cutter (movable blade) returns to its home position. At home the blade rests under the Fixed Blade, a small portion of the movable blades tip,(selector edge), is visible from under the Fixed Blade. See Fig. 2-11. There should be not more than 1.5mm of tip showing. With less than 1.0 mm showing the cutter can not select the proper thread to trim. With more than 1.5 mm showing you may not cut thread at all.

This procedure when done at the factory uses a fixture to insure constant set ups. Off site a fixture may not be available, so the use of a small diameter allen wrench is recommended in place of the fixture.

Prepping The Machine

1. Turn the machine ON.
2. Enter the Home Menu and Set Home.
3. Latch the Jump Stitch Solenoid.
4. Remove the Rear Bed Cover.
5. Remove the two locking screws on the rear of the Trim Connecting Link. Place a small drop of Loctite # 222 (Red) on both threaded tips. Reinstall the screws but do not tighten.

6. Enter the Head Timing Menu, press the [ENTER] key. Press the [UP ARROW]+ [RIGHT ARROW] key combination. Display now reads: Z Position= 111.4 deg. (This is Head Up, which can be between 109.3 and 111.7 degrees.)
7. Manually rotate the Z-Axis until display reads between 280 and 300 degrees.
8. Insert the Pin Fixture lengthwise as shown in Fig. 2-12.

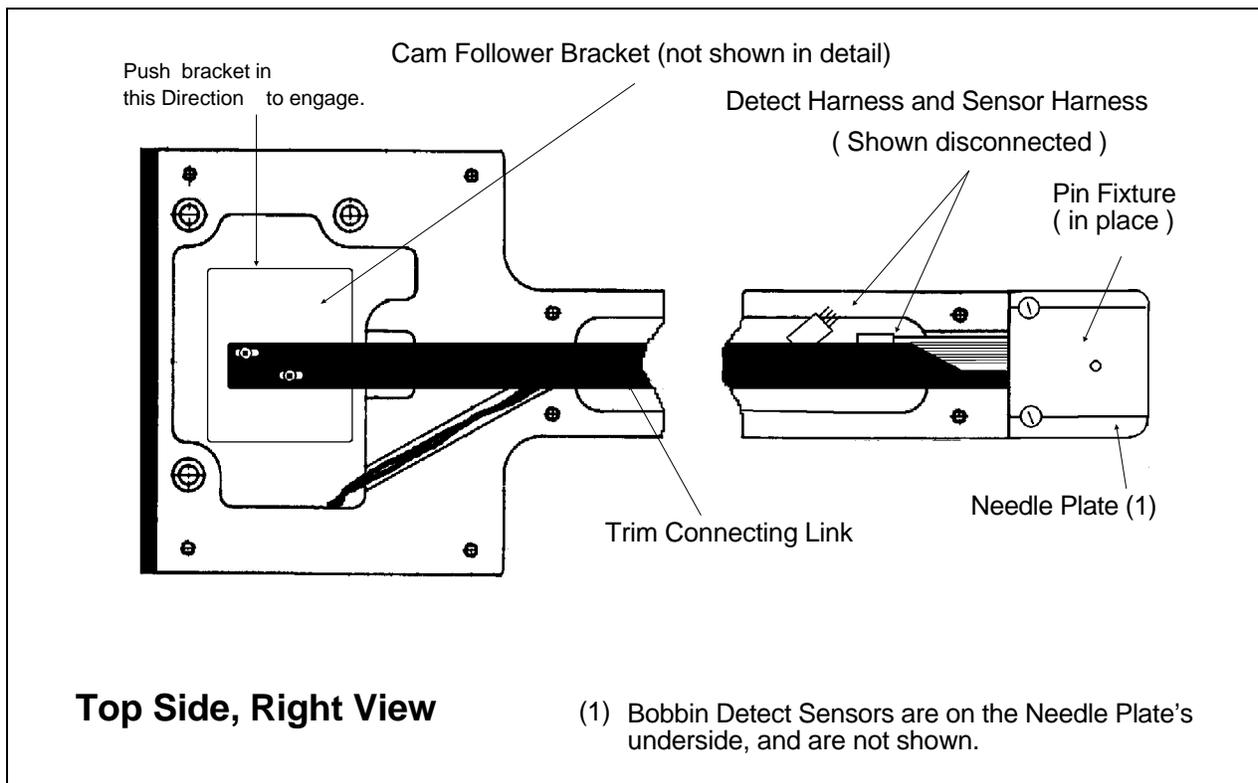


Fig. 2-12

Setting The Movable Blade

1. With the Pin Fixture in place, engage the Cam Follower with your finger, and rotate the Z-axis with the other hand, until the display reads 312 degrees. You can do this while facing the machine.
2. Press the [STOP] Key to lock the z-axis position.

3. Slide the Trim Connecting Link forward to rotate the movable blade until it just touches the pin of the Pin Fixture. **DO NOT PRELOAD THE CUTTER.**
4. Lock the connecting link with the two locking screws.
5. Press the [UP and RIGHT ARROW] keys (Z position). Rotate Z axis until the display reads between 105 and 115 degrees. The Cam Follower should move freely out of the Cam at this time. If it does not, carefully loosen the two locking screws just enough to allow the Cam Follower to move out of the Cam. Then retighten the screws. Check to see that the cam follower moves freely in and out of the cam.

Check the Home Position

1. Press [STOP], then press [ALT and UP ARROW] keys. Press the [MENU] key.
2. Enter the Trim Menu and run a Trim Immediate.
3. A small portion of the selector edge of the Movable blade should be seen protruding from under the Fixed Knife. This should be less than 1.5 mm of protrusion. If the movable blade protrudes more than 1.5 mm or less than 1.0 mm set the Home Position again.

Picker Adjustments

This procedure requires the use of a Picker Fixture. The fixture used will depend on which Bobbin you have, Large or Small. The procedure is the same regardless of the fixture used.

1. Be sure that Hook Timing and Needle Depth are correct before checking or adjusting the Picker.
2. Check that the Picker Solenoid is not binding.
3. Remove the Bobbin Case from the Hook Assembly.
4. Insert the Picker Fixture "fat end" first with the flats facing up into the Hook Assembly where the Bobbin would go. See Fig.2-13.
5. Push the Picker forward until the tangs touch the Fixture in the area shown as "PICKER HEIGHT" also shown in Fig. 2-13.

6. With the Picker at Home Position the rear surface of the Picker should touch the area of the fixture marked "PICKER HOME POSITION" shown in Fig.2-13. Before making any adjustments go to step 6 and check the "PICKER HEIGHT" first.
7. Look at the picker headon when its at HOME POSITION, the tangs should be centered on the Bobbin Shaft. See Fig.2-13. If the tangs are not centered on the Bobbin Shaft loosening the two Pan Head screws on the Picker Bracket will allow side to side movement to adjust. Once the tangs are again centered on the Bobbin Shaft tighten the two Picker Bracket Screws.

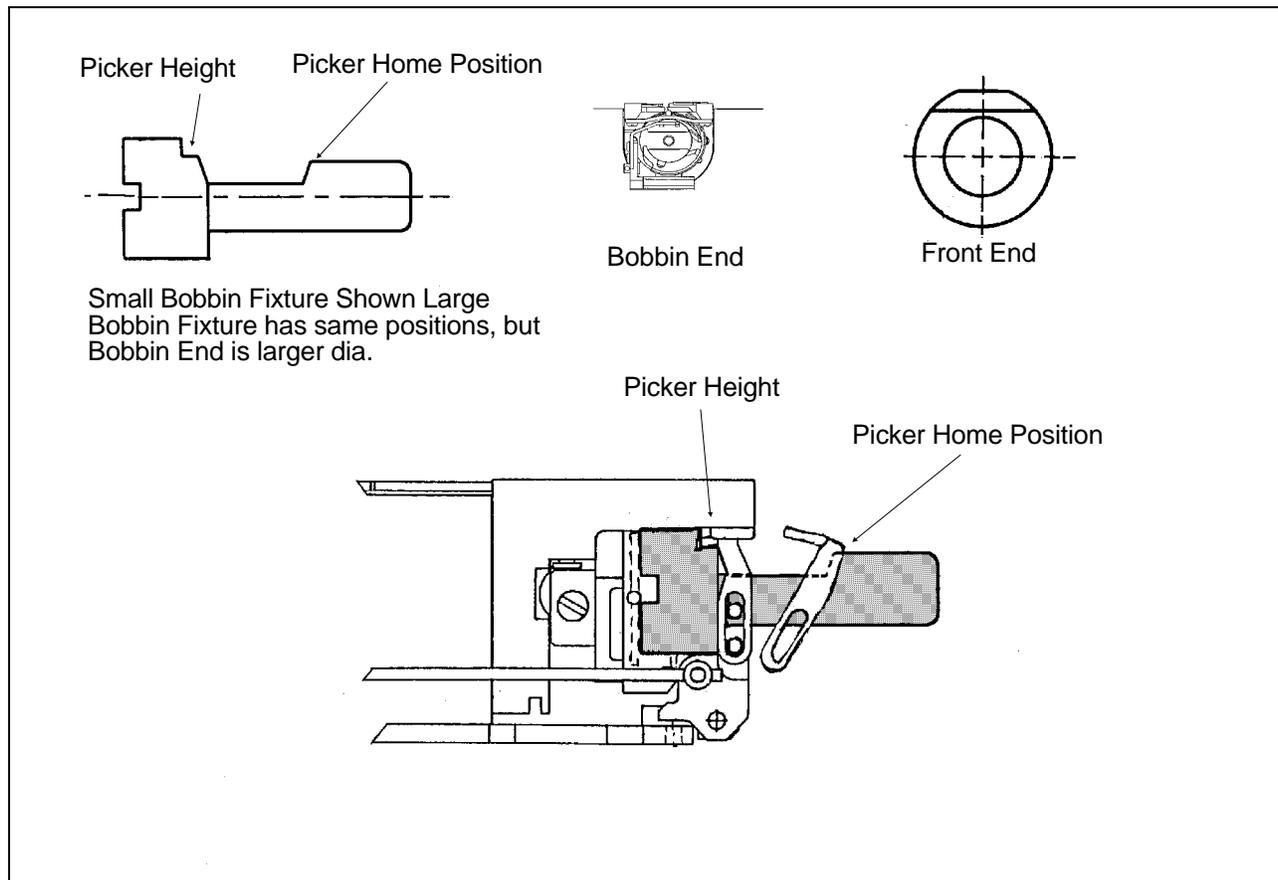


Fig. 2-13

8. Home Position is adjusted at the wire pivot interface, shown in Fig. 2-14. The wire should protrude a little, between .010 and .060 inches through the interface. Be careful, more than .060 inches of wire protrusion and you run the risk of binding on the wire on the Picker Height adjustment screws when the Picker tries to go to Home.

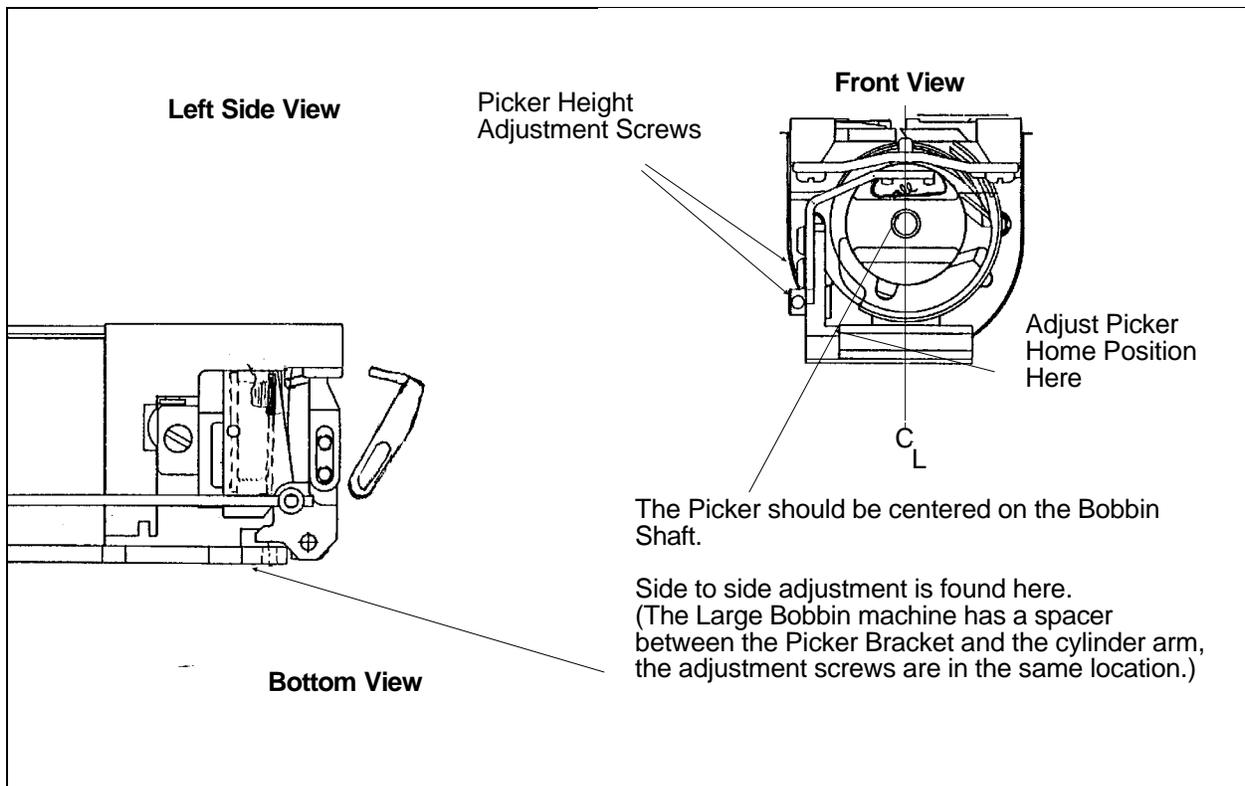


Fig. 2-14

Grabber Adjustments

The grabber blade travel is adjusted at the Transition Brackett in the rear of the head near the Grabber Motor. See Fig. 2-15. The motor is attached to the Actuator Arm, then to a swivel and rod. The rod is inserted into the Transition Brackett and held in place with two set screws. To Adjust the blade travel, follow these steps:

1. Turn the machine off, and unplug the power cord from the power source.
2. Remove the Rear Blade Cover. This cover is held in place by the last two screws of the Blade Top Cover.
3. Remove the Grabber Motor Cover. Manually rock the Motor limit stop lever to move the blade all the forward and all the way back one time. This insures that the blade is not binding somewhere in its path.
4. Look at the right side of the Transition Bracket, you will find two small set screws in the mount.

5. Loosen the set screws, but do not remove them. The mount and blade can now move over the rod. Rock the switch lever toward the front of the machine, the blade retacks into the Transition Bracket and Delron Guide. Leave 1/2 inch of the blade showing. Adjust the blade if necessary and tighten the set screws in the mount.
6. Replace all covers removed to make the adjustment.

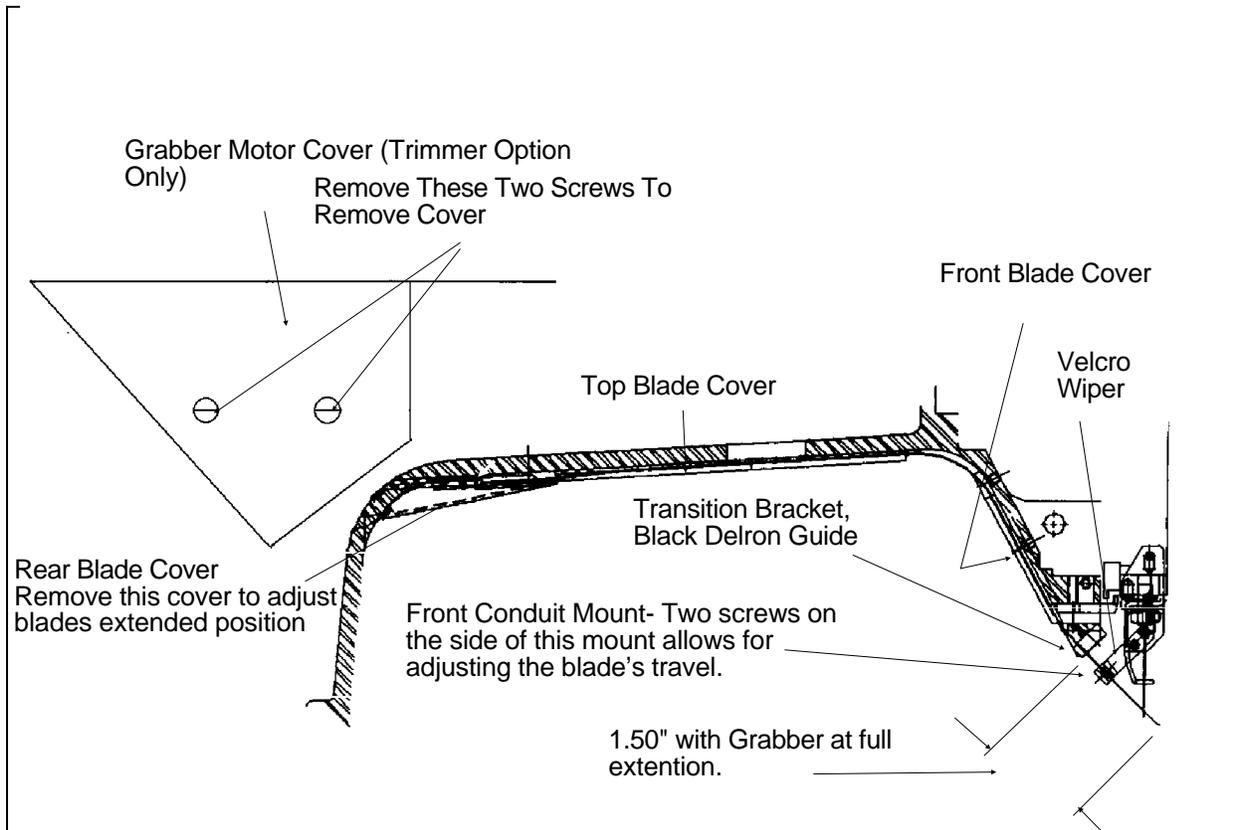


Fig. 2-15

3. MECHANICAL DISASSEMBLY

GENERAL

This section of the manual provides detailed information for performing parts replacements that may be required during the life of the product. The procedures are guidelines for performing repair maintenance; and must be used by personnel practicing good maintenance and repair technique.

With certain areas in this section it is recommended that the procedure be performed by a factory trained technician. This reference is indicated by stating "FACTORY SERVICE ADVISED" at the start of the procedure.

WARNING! Failure to practice good maintenance and repair technique may result in injury to personnel performing the work, and damage to the equipment!

NOTE: The Epicor System Warranty is exclusive of, and may be VOID if, poor maintenance practices have caused damage to the equipment.

Static Electricity / Grounding Strap Use

As with all computerized equipment, the EMC6 Embroidery Peripheral is extremely sensitive to static electricity. Therefore it is essential that the following warnings and cautions be understood and followed. If there is any contents in these statements that is not understood, please contact the Melco technical representative in your local service area for assistance.

WARNING! It is very important that the EMC6 power cord be plugged into a properly wired electrical outlet. Failure to have a properly wired outlet may result in damage to the equipment and injury to personnel. It is recommended that a licensed electrician be consulted to assure that the electrical outlet is properly wired and grounded.

CAUTION! If a properly wired electrical outlet is not used for the source supply voltage to the Epicor System, electrical failures may be the result.

Any time work is performed inside the covered areas of the Sewing Peripheral, the person performing the work MUST be using a static

grounding strap.

The grounding strap must be connected in the proper manner to insure the static charge on the persons body is neutralized to the chassis ground level of the Sewing Peripheral when working in the electronic areas under the covers.

WARNING! The static grounding strap in the Spare Parts Option, has the proper resistance incorporated into the wire for operator protection from electrical shock. DO NOT attempt to use any grounding strap that is not specifically designed for static use. A "straight-wire" grounding device (one without built-in resistance) will place the operator in extreme danger of exposure to lethal voltages. It is ALSO RECOMMENDED that the static strap be checked during daily use for proper resistance protection.

Failure to use a grounding strap, or failure to practice other good maintenance/repair techniques can cause damage to the machine and possible harm to personnel.

Figure 3-1, below, shows the recommended location for attaching the grounding strap when working inside the Controller area of the EMC6.

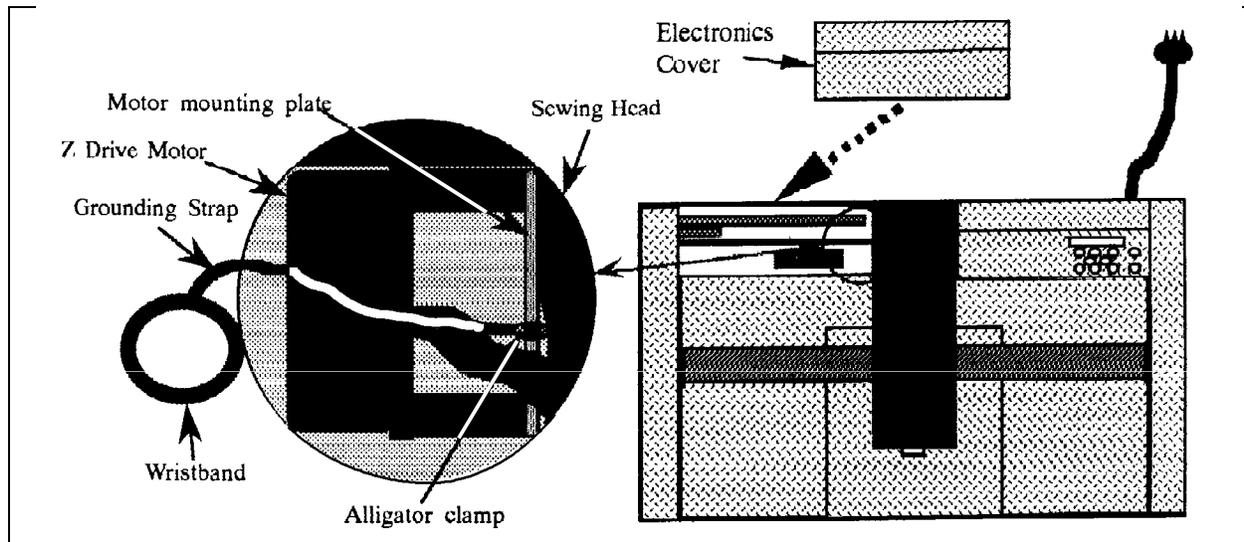


Figure 3 - 1

After removing the Electronics Cover (as described below), locate the ground wire stud on the Z Drive Motor mounting bracket. This bracket is located directly behind the rear of the sewing head. The ground stud protrudes enough to allow the alligator clamp to attached effectively. After placing the wristband over your wrist, attach the alligator clamp of the grounding strap to this ground wire stud (or any other metal which is proven to have chassis electrical ground level).

If working inside the Operator Interface (under the Keyboard and Display), attach the grounding strap to any metal which is proven to have chassis electrical ground level, but on that side of the machine.

Removing The Covers

There are two covers at the rear of the machine, the Electronics Cover and the Keyboard/Operator Interface Cover. These are attached to the machine with Cover Catches in the rear and angled tabs in front. The front angle tabs slip into slots at the rear edge of the sewing area. The rear Cover Catches lock the covers in place.

To remove either cover, place a small bladed screw driver under the center of the locking tab at the rear and pry up. The cover comes off in one motion toward the front.

Caution: When the Electronics Cover is removed two printed circuit boards are exposed. These are the CPU and XYZ Controller boards. DO NOT TOUCH EITHER BOARD WITHOUT USING ANTI-STATIC PRECAUTIONS.

Caution: After removing the Keyboard Cover disconnect the keyboard ribbon cable from the Keyboard PCB. NEVER PICKUP OR MOVE THE KEYBOARD PCB WITH THE KEYBOARD CABLE.

Caution: Never run the sewing peripheral without the electronics cover in place. The cover forms the top of the EMI shield around the Boards to reduce RF interference. Running the equipment without the shield (cover) can be a violation of FCC regulations.

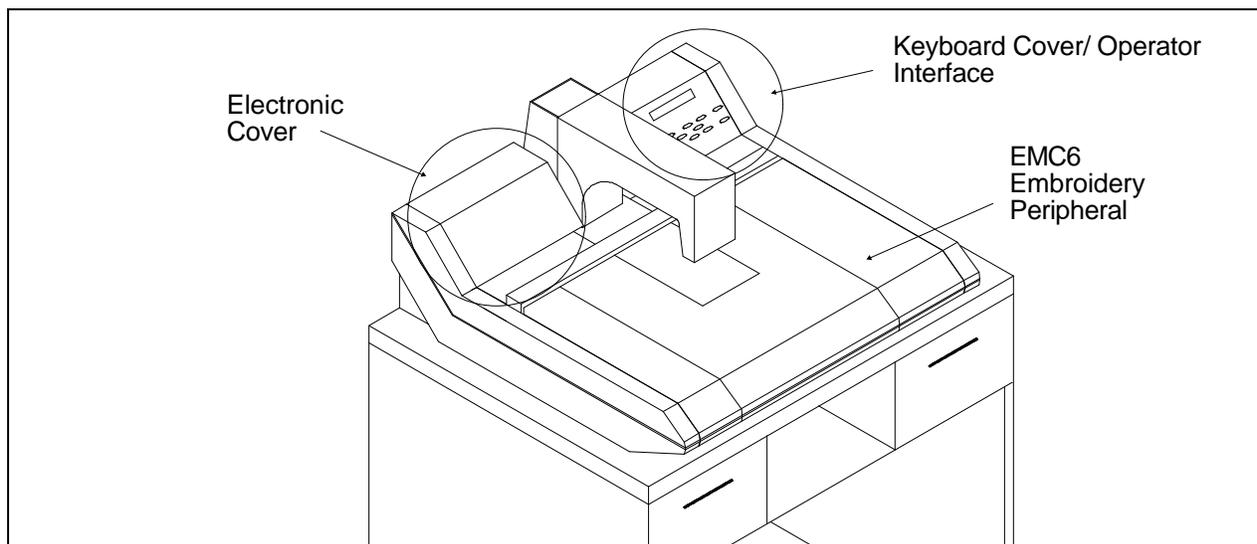


Figure 3 - 2

SEWING PERIPHERAL

End Cap Removal

The 2 end caps (or side panels) of the EMC6 are removable to gain access to the areas covered by each. The Y Drive belts and adjustments for each are

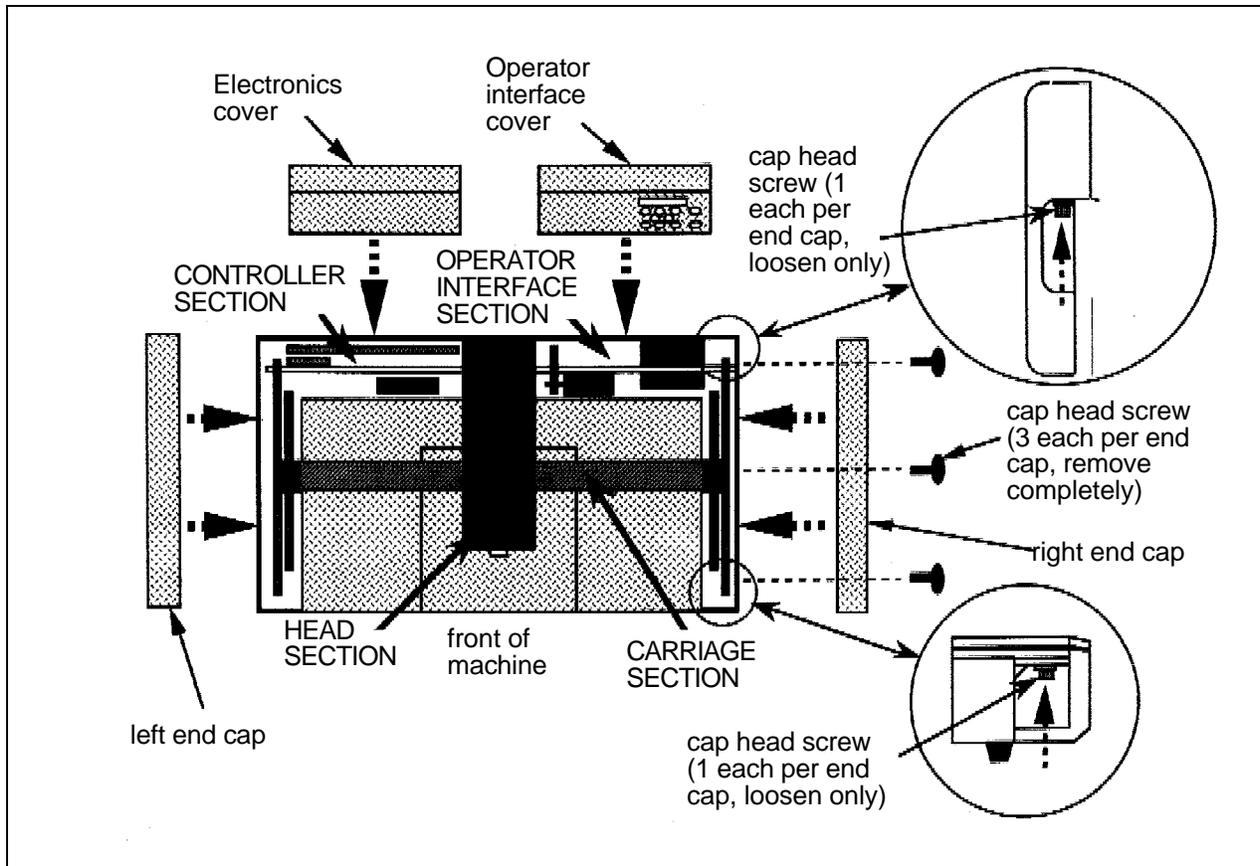


Figure 3 - 3

accessible only with the end caps removed.

There are 3 cap head screws that must be removed, and 2 cap head screws that must be loosened in able to remove each end cap. (Refer to Figure 3-3 above.)

Remove the 3 horizontal cap head screws first, then loosen the 2 outer cap head screws.

CONTROLLER SECTION

CPU PCB Replacement

There are three possible CPUs in your machine:

- The 000493-01 CPU for the EMC6 M with no options.
- The 004862-01 CPU for the first 50 EMC6 MTLs and MLs produced.
- The 004973-01 CPU for all EMC6 MTL and ML machines) after the first 50 machines.

NOTE: The 000493-01 CPU is not "upward" compatible, it does not support the trimmer option. The 004862-01 and the 004793-01 are not "downward" compatible, but are interchangeable, see below.

The only difference between the 004862-01 and the 004793-01 boards is the location of the Z Encoder input connector. If your machine has the 004862-01 CPU, the Z Encoder is connected to the XYZ Controller Board (at J366003), and then to the CPU Board using a ribbon cable. If your machine has the 004793-01 CPU the Z Encoder connector is located directly on the CPU (J3). The functional aspects of the two boards are identical. Both the 004862-01 and the 004793-01 CPUs support all options currently available for the EMC6 MTL and ML machines.

Replacing the 000493-01 CPU EMC6 M

1. Turn off the power switch to the EMC6 and remove the power cord from the power source electrical outlet and the rear of the machine.
2. Remove the interface cable connected to the CPU PCB at the rear of the EMC6. Also remove the "terminator" cable if one is installed. (The last SP in a series of units will have this "terminator" installed.)
3. Remove the Electronic Cover. (Refer to specific instructions for removal.)

<p>CAUTION! Failure to use a properly installed static grounding strap may cause damage to the electronics in the EMC6.</p>
--

4. Install a static grounding strap between the EMC6 and the personnel performing this procedure.

5. Remove the screw and washer attaching the CPU PCB bracket to the chassis near the sewing head (see figure below).

CAUTION! Use care not to drop any hardware into the base of the Controller area.

6. Remove the Z axis encoder ribbon cable from the connector J3709 of the CPU PCB Assembly before the CPU PCB is removed. Refer to the figure below for location reference.
7. Grasp the CPU PCB at the top corners of the board and carefully pull the board up and out of the harness connectors mounted in the base of the chassis. (Use a gentle rocking motion to make it slightly easier to release the board from the connectors.)

CAUTION! Once the CPU PCB is removed from the EMC6, use extreme care in handling the assembly. Portions of this board are very sensitive to static charges. Any further handling of the CPU PCB must be done with the continued use of the static grounding strap still installed as instructed in specific procedures in this manual.

8. To replace the CPU PCB, perform the previous steps in reverse order.

X - Y Motor Control PCB Replacement (000493-01 CPU)

The X-Y Motor Control PCB is "piggy-backed" onto the CPU PCB. Refer to the figure below and identify the location of the X-Y Motor Control PCB.

1. Remove the CPU PCB. (Refer to specific instructions for removal.)

Follow all the precautions associated with the section, such as utilizing the static grounding strap as described.

2. Place the CPU PCB (and attached X-Y Motor Control PCB) on a clean, static-free working surface.
3. Remove the button head screw which secures the X-Y Motor Control PCB to the CPU PCB. Refer to Figure 5-10 below.
4. Carefully hold the CPU PCB at the left 2 corners.
5. Grasp the X-Y Control PCB at the left and right card edges, approximately 1 inch (3 cm) from the bottom.
6. Pull upward on the X-Y Control PCB to disconnect it from the CPU PCB at the connector (see figure below).
7. To replace the X-Y Control PCB, perform the previous steps in reverse order.

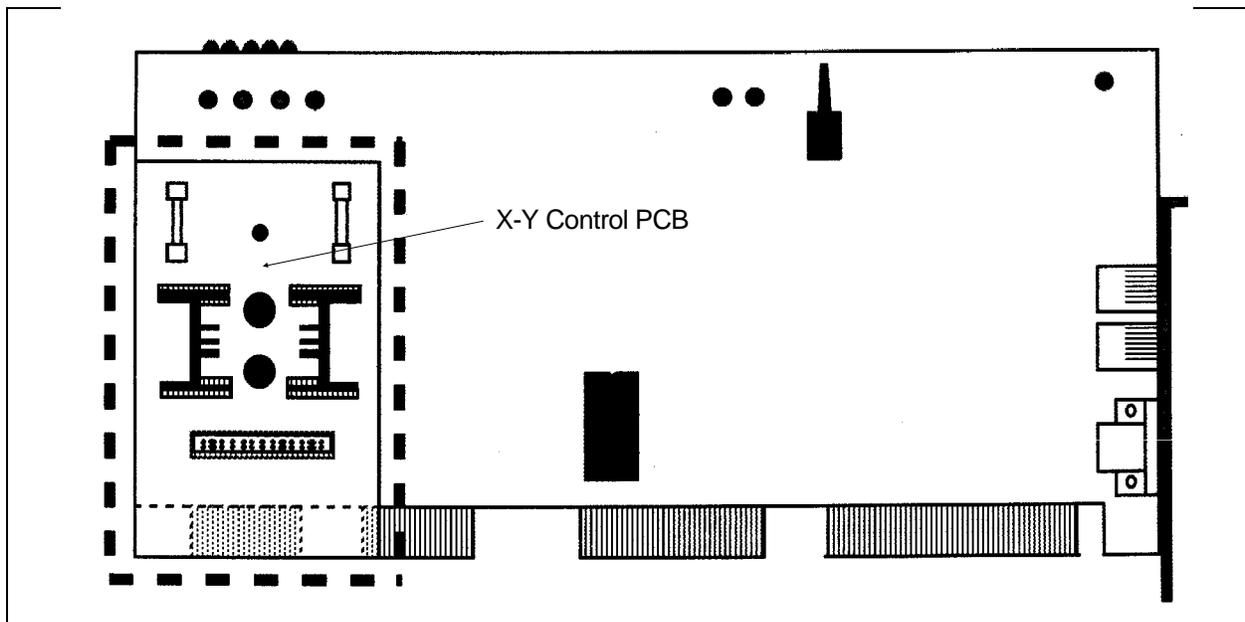


Fig.3-4

Z Motor Controller (000493-01 CPU only)

Z Motor Controller Removal

"FACTORY SERVICE ADVISED"

If unauthorized personnel attempt to service this area, the FACTORY WARRANTY MAY BE VOIDED if the work is improperly performed. It is recommended that prior to removing the Z motor controller the individual wires be tagged with masking tape and numbered to match the motor controller terminal board markings. After marking the individual wires, perform the following steps to remove the motor controller:

1. Use a straight-edged razor blade (or other suitable knife) and cut the stand-off foam rubber from the Controller - NOT from the chassis. See figure on next page.
2. Remove the four screws securing the controller to the chassis.
3. Grasp the multicolored ribbon cable plug and squeeze to unlock the locking finger.
4. Rock the plug in its socket and gently pull to remove.
5. Gently pry the clear insulation strip from the terminal board.

CAUTION! It is advised to label the wires with appropriate means so you will understand exactly where the wires are to be replaced during reinstallation.

6. Number six pieces of masking tape to match the terminal board numbers on the motor controller that have wires connected and place the tape on the wires for identification when reinstalling the motor controller.
7. Remove the terminal screws and disconnect the wire lugs. (You may have to pull the controller partially out of the chassis to gain access the terminal screws.)
8. Remove the controller.

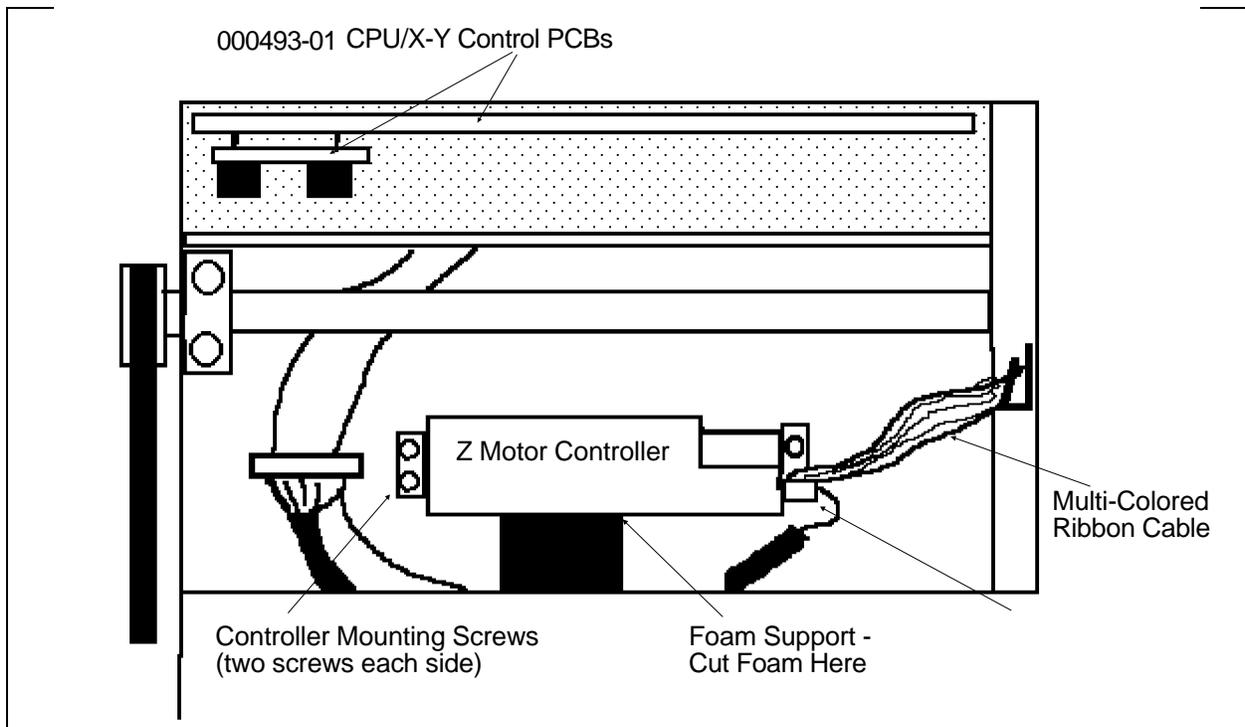


Fig.3-5

Z Motor Controller Installation

"FACTORY SERVICE ADVISED"

There are two different ways to install the Z motor controller: with the wires and multicolored ribbon cable connected, and with the wires connected after installation of the controller proper. It is probably more conservative to perform the wire hookup and then install the controller, in order to test the controller prior to fastening the "box" into the machine (installing the four screws and gluing the standoff onto the controller). The following procedure is listed for performing the installation as "recommended":

1. Gently pry the controller terminal insulating plastic strip from the terminal block.
2. Remove the terminal screws from terminals 1,2,3,5,8,and 10.
3. Ensure a terminal screw has a split lock washer on it, and insert the screw into the terminal lug T-1 (or as identified in the Z Motor Controller Removal Procedure as the terminal lug connected to terminal # 10), and install the terminal lug to terminal 10 on the motor controller terminal block.

4. Perform step (3) for the remaining terminal lugs as listed below:
 - a) Terminal lug T-2 to terminal 8 on the terminal block.
 - b) Terminal lug T-3 to terminal 5 on the terminal block.
 - c) Terminal lug T-4 to terminal 3 on the terminal block.
 - d) Terminal lug T-5 to terminal 2 on the terminal block.
 - e) Terminal lug T-11 to terminal 1 on the terminal block.
5. Plug the multicolored ribbon cable into the motor controller receptacle, ensuring the locking fingers engage.
6. Place the motor controller "temporarily" into position in the "Controller Section" cavity, ensuring the wires/cables are not touching any rotating metal parts.
7. Plug the machine into the power source and turn the unit on.
8. "Download" the machine, and send a small design (Melco Logo).
9. Select the reset menu, and press [Enter].
10. Press [ALT] and [Left Arrow] to select "Test Mode On".
11. Press [Enter] to enable the test mode.

NOTE: The "Test Mode" will allow the unit to ignore the thread break function; and, if the design does not have any "Needle-Up" stitches at the end, it will run continuously until you press [STOP]. This is a maintenance function, and can cause the customer to believe the machine is "broken" if the technician does not disable the function. Enter the "Reset Menu" as before, and press [ALT] and [Right Arrow] keys to turn "test mode" off after completing the testing.

12. Perform the necessary steps per the operators' manual to ready the machine for sewing.
13. "Unthread" the machine.
14. Start the machine and check that all the speeds are operational.

NOTE: If this test of the new motor controller is successful, then continue this procedure. Otherwise, replace the motor controller.

15. Route the motor controller cable (with wires) 9B1 between the plastic chassis mounting bosses.
16. Place a small quantity of "Super Glue" (or other suitable type of adhesive) on the motor controller standoff.
17. Place the motor controller into position, and insert the screws.
18. Tighten the mounting screws to 8 inch-pounds.
19. Press the controller against the standoff until adhesive sets.
20. Route the multicolored ribbon cable through the cable clamps.

Replacing The 004862-01 And 004973-01 CPUs

TURN THE MACHINE POWER OFF AND DISCONNECT FROM THE POWER SOURCE

1. Remove the Electronics Cover.
2. Disconnect the Network Cable, and Terminator if present.
3. Disconnect the Z Motor Harness and Z Encoder Cable from the XYZ PCB.
4. Grasp the XYZ PCB at the top corners and gently rock the PCB up and out of its card edge connectors of the bottom interface board. Disconnect the Ribbon Cable from the center of the XYZ board.
5. Grasp the CPU board at the top corners and gently rock it out of its connectors of the interface board.

If you are replacing the CPU with a new board of the same type reverse the steps above to replace.

If you are replacing the 004862-01 CPU with a 004793-01 CPU board, follow the steps below:

1. Carefully insert the CPU into the interface board. Making sure that the CPU is pushed into the card edge connectors of the interface board securely.

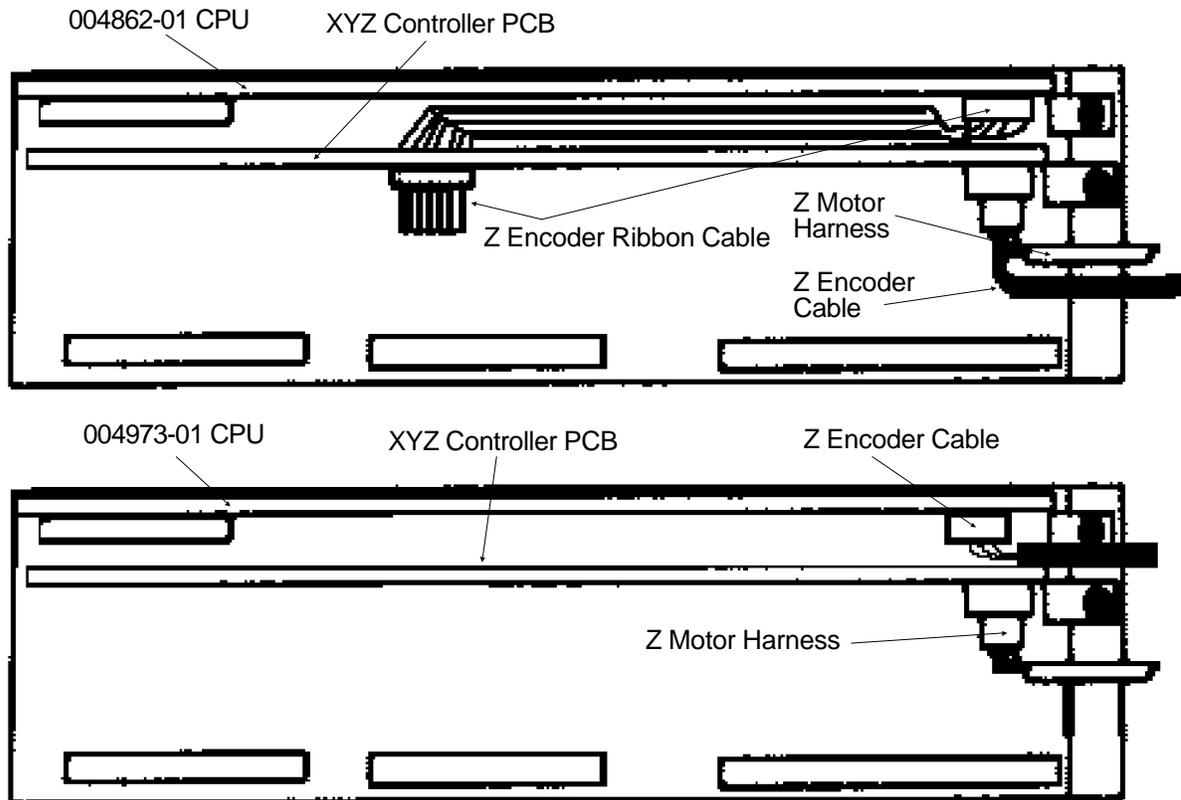


Fig.3-6

2. Connect the Z Encoder Cable into connector J3 of the 004973-01 CPU.
3. Insert the XYZ Board into the card edge connectors of the interface board.
4. Connect the Z Motor Harness to the XYZ board at connector J366002.
5. Replace the Electronics Cover.

XYZ Controller PCB Replacement

The XYZ Controller PCB controls the X axis motor, the Y axis motor and the Z axis motor, all from one printed circuit board. This board and the CPU comprise all the electronic control required. The XYZ Controller sits in front of the CPU in the EMI box.

1. Remove the electronics cover.

Follow all the precautions associated with the section, such as utilizing the static grounding strap as described.

2. Disconnect the Z Motor cable (connector J366002, top right hand corner of board) and the Z Encoder cable (J366003).
3. Remove the screw and washer attaching the PCB to the chassis.
4. Grasp the board at the top corners and gently rock to board up. Disconnect the small blue ribbon cable at the center of the board.
5. Now carefully pull the board the rest of the way out of the EMI box.
6. Replace the board using these steps in reverse.

OPERATOR INTERFACE SECTION

Keyboard/Display Replacement

To remove the Keyboard/Display Assembly from the Operator Interface Cover, refer to the following procedure:

1. Turn off the power switch to the EMC6 and remove the power cord from the power source electrical outlet and the rear of the machine.
2. Remove the Operator Interface Cover. (Refer to specific instructions .)
3. Place the Operator Interface Cover (with Keyboard/Display Assembly) onto a surface which is free of static electricity.
4. Install a static grounding strap between the working surface and the personnel performing this procedure. Refer to the following figure to perform the next steps.
5. Locate and loosen the two screws (indicated in the figure) that secure the PCB at the top.
6. Locate and remove the two screws that secure the PCB near the bottom as indicated in the figure.

NOTE: Locate the nylon insulating washer under the head of the left screw as shown in the figure. This washer must be reinstalled with a new PCB to avoid the possibility of causing electrical circuit damage.

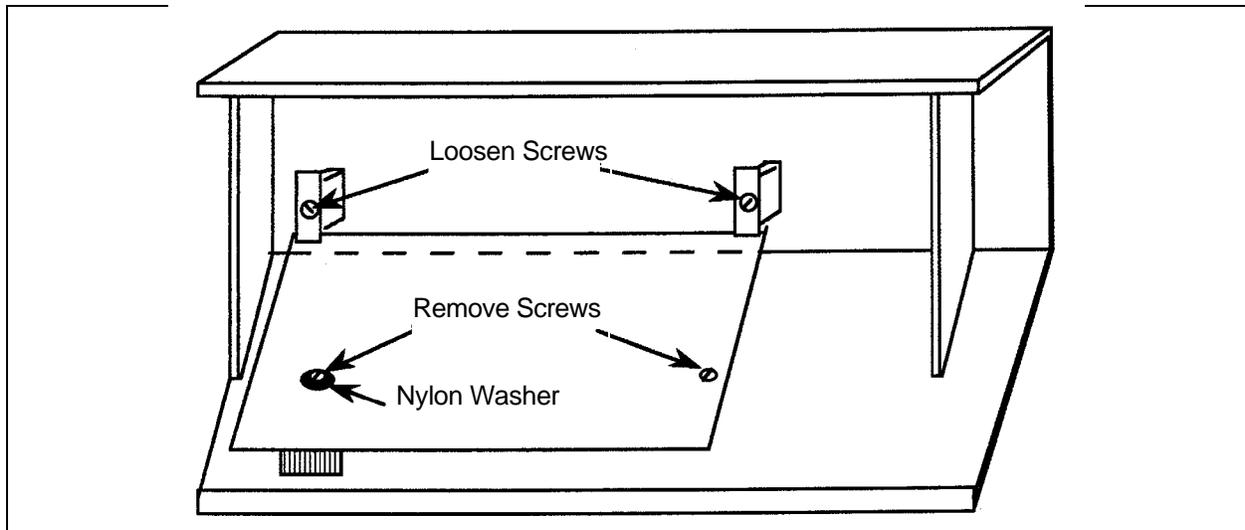


Fig.3-7

7. Remove the PCB from the Operator Interface Cover. Lift at the bottom and the top will follow.
8. Transfer the key caps Stop, Start, Alt, Menu, Enter, Fast/Slow, Arrow Horiz, Arrow Vert) from the old PCB to the new PCB by simply lifting them off of the keys by using finger pressure only. It is recommended that this be done one key at a time to avoid errors in key cap arrangement on the new PCB.
9. When the key caps are transferred, reinstall the Keyboard/Display Assembly by reversing the preceding steps. Insure that the nylon insulating washer is installed under the left screw on the PCB.

Refer to the Adjustment Section of this manual for information in adjusting the intensity of the Display, if required.

Power Supply Replacement

1. Turn Off the peripheral, and unplug the power cord from the source.
2. Remove the Keyboard Cover. Disconnect the Keyboard ribbon cable, and set the cover aside.
3. Disconnect the power distribution cable from the connector on the power supply.
4. Disconnect the ground wires from the ground post on the top of the power supply.

5. Unscrew the two cap head screws (one on either side of the power supply at the rear).
6. Grasp the power supply and slide it out of the rear cutout in the chassis.
7. Remove the four screws attaching the power supply bezel to the power supply.
8. Install the new power supply by reversing these steps.

Y Drive Motor Replacement

"FACTORY SERVICE ADVISED"

When replacing the Y drive motor, the drive belt tension adjustment is very critical. Therefore, before attempting to replace and adjust the belt tension of the Y drive motor, it suggested that you contact the Melco service representative in your area for recommendations before proceeding

CAUTION! DO NOT attempt to adjust the tension of the Y drive motor belt before first contacting a factory trained Melco service representative. Over tightening the attaching/adjustment screw will result in damage to the chassis.

To replace the Y drive motor, refer to the following procedure:

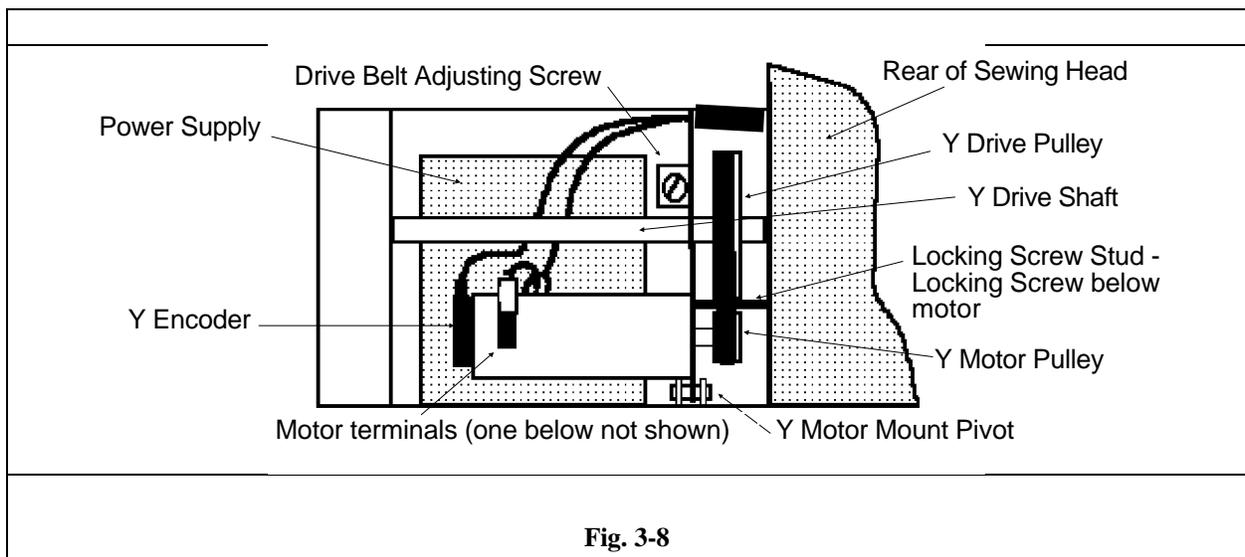


Fig. 3-8

1. Turn off the power switch to the EMC6 and remove the power cord from the power source electrical outlet and the rear of the machine.
2. Remove the Operator Interface Cover. (Refer to specific instructions for removal.)
3. Refer to the procedure for removing the Power Supply, if you must the Y Motor Mounting Bracket..
4. Refer to the figure on the previous page, and disconnect the encoder harness (the harness with the 4 small green, red, white, and black wires) from the Y drive motor encoder.
5. Locate and remove the attaching/adjustment screw and the Y Motor Support Bracket Locking Screw, under the Motor(see Figure 3-8).
6. The motor mounting bracket rotates upward, pivoting on the pin. Carefully maneuver the motor (with bracket still attached) upward and out of the chassis slot in the front; and the block at the rear.

NOTE: The bracket is slotted in the rear to allow it to detach from the pin in the block without the need to remove the pin.

CAUTION! It is advised to label the wires with appropriate means so you will understand exactly where the wires are to be replaced during reinstallation. Identify which of wires goes to which motor terminal before removing the wires in the next step.

7. Before the assembly can be completely removed, identify and disconnect the two motor power harness connections (one connector wire is red and the other one is black).

WARNING! If the two motor power harness connectors are reversed from the original connections, the motor will drive the beam to the mechanical stops

of the sewing field with no regard to speed control when machine is first operated.

CAUTION! DO NOT attempt to adjust the tension of the Y drive motor belt before first contacting a factory trained Melco service representative. Over tightening the attaching/adjustment screw will result in damage to the chassis.

8. Reverse the previous steps to reinstall a new motor. Contact the Melco factory trained service representative in your area regarding the installation of the attaching/adjustment screw and before attempting to adjust the tension of the Y drive motor belt.

CARRIAGE SECTION

Carriage Assembly/Beam Replacement

X Beam Removal

The purpose of this procedure is to remove the X Beam as an Assembly for field replacement and factory rebuild (or bench top repair/adjustment). Refer to the X Motor Replacement Procedure for replacement of the motor only.

1. Remove the following:
 - a) the Electronics Cover
 - b) the Operator Interface Cover
 - c) the left and right End Caps
 - d) the X Motor Cover
2. Disconnect the X Motor and Encoder electrical leads from the X Motor and X Interface PCB.
3. Loosen the ground strap nut under the right side of the Beam.
4. Remove the two # 8-32 x 3/8" button head screws that fasten the RIGHT SIDE Y Drive Belts to the Y Carriage.

CAUTION! The Y Drive Belt clamps have four button-head screws: two fasten the Y Belt Clamps, and two fasten the Clamp to the carriage. LOOSEN ONLY THE SCREWS THAT HOLD THE CLAMP TO THE CARRIAGE!

5. Remove the two # 8-32 x 3/8" button-head screws that fasten the LEFT SIDE Y Drive Belts to the Y Carriage.
6. CAREFULLY push the drive belt clamps to the front or rear of the machine to clear the Y Carriages and the X Motor/Encoder wires.
7. Remove the four # 8-32 x 3/8" cap head screws that fasten the LEFT SIDE Y Carriage to the Y Bearing Housing.
8. Repeat step 7 for the RIGHT SIDE Y Bearing Housing.

9. Carefully slide the beam to the front while lifting the Beam free of the machine.

The X Beam Assembly can now be returned to the factory, or placed on the bench top.

X Motor Replacement

1. Turn off the power switch to the EMC6 and remove the power cord from the power source electrical outlet and the rear of the machine.
2. Remove the Electronic Cover and the Left End Cap. (Refer to specific instructions for removal.)
3. Remove the black plastic X-Motor Cover, by removing the two (2) hex button head screws attaching the cover to the beam.

CAUTION! The Y drive belt clamp has four button head screws - 2 fasten the belt clamp, and 2 fasten the clamp to the Y carriage. LOOSEN ONLY THE SCREWS THAT HOLD THE CLAMP TO THE CARRIAGE!

4. Remove the 2 screws that secure the Y drive belt clamp to the Y carriage.

NOTE: These screws, lock washers, and flat washers **MUST NOT BE MIXED WITH** or **SUBSTITUTED BY** other hardware. The exact dimensions are very critical in the smooth operation of the carriage.

5. Identify and label the X Motor positive, negative, and ground wires; and the terminal on the X Interface PCB to which they are connected.
6. Remove each of the 3 wires, identified above, from the X interface PCB terminals. Carefully grasp the lugs and pull them at the 45 degree angle that they are mounted.
7. Identify the X Motor Encoder harness and carefully disconnect it from the Encoder Body on the "rear" of the X-Motor.
8. Remove the 4 phillips screws attaching the motor to mounting bracket. Tilt the motor to slip the belt off the pulley, then remove the motor.

9. Replace the old motor in the bracket with a new motor. Install, but do not tighten, the four phillips mounting screws.
10. With a hex driver loosen the X-Motor Drive Pulley set screw and remove the pulley from the old motor.
11. Remove the set screw from the pulley and apply "red" LocTite (or equivalent) screw adhesive to the set screw. Reinstall the set screw.
12. Slip the drive belt over the pulley as you install the drive pulley onto the new motor shaft .
13. Tighten the pulley set screw leaving a gap of at least .0020" between the back of the pulley and the motor bracket to ensure there is no bind.
14. Refer to the motor belt tensioning procedure in the Service Adjustments section of this manual for information in tightening the mounting screws.
15. Replace the covers removed at the beginning of this procedure.

X Motor Belt Replacement

1. Turn OFF the machine power at the rear power switch, then unplug the power cord from its outlet.
2. Remove the X-Motor cover from the beam.
3. Loosen the Drive Pulley set screw using a Hex driver or Allen Wrench.
4. Loosen the four phillips head motor mounting screws attaching the motor to the motor bracket. Now try slipping the drive belt over the loosened pulley. If the belt does not slip over the pulley, remove the motor mounting screws and tilt the motor to allow the drive belt to slip off.
5. Replace the Drive Belt in the same manner that you removed the old belt, just reverse the steps. Keeping in mind that the Motor must be flush with the motor bracket, and that you must have at least .0020" gap between the pulley's rear surface and the motor bracket. It is important that the assembly does not bind.

X Drive Belt Replacement

"FACTORY SERVICE ADVISED"

If the need arises for the X drive belt to be replaced, it is suggested that the entire X beam be overhauled at the factory. The other components in the beam must be evaluated during X drive belt replacement, and factory trained technicians are equipped to perform this procedure properly.

Refer to the X beam removal procedure.

Y Drive Belt Replacement

To replace the Y drive belt, refer to the following procedure:

1. Turn off the power switch to the EMC6 and remove the power cord from the power source electrical outlet and the rear of the machine.
2. Remove the EMC6 end caps. (Refer to specific instructions for removal.)

CAUTION! The Y Drive Belt clamps have four button-head screws: two fasten the Y Belt Clamps, and two fasten the Clamp to the carriage. Remove Only The Screws That Fasten The Y Belt Clamps! DO NOT REMOVE THE SCREWS THAT HOLD THE CLAMPS TO THE X BEAM

3. Loosen the belt tension adjustment screw.
4. Remove the screws that hold the Y drive belt within the belt clamp on the end of the X beam.

SEWING HEAD SECTION

General

The MELCO sewing head is made up of several physical sections.

This section of the manual describes the removal and replacement of most of the major components of the sewing head.

Arm and Bed Assembly

The Arm and Bed Assembly provides the stable platform for the multi-needle color change embroidery system. All the other components of the sewing head are attached to this assembly.

In the Arm and Bed Assembly are the shafts, belts, and pulleys that drive the Needle, Color Change, Rotary Hook, and Trimmer (if present EMC6 MTL).

Z Motor Installation (EMC6 M)

"FACTORY SERVICE ADVISED"

There are two purposes that are addressed in this procedure. The first purpose is to install the motor and pulley only. This situation can be found when the motor replacement is the only consideration. The second purpose is for when the technician has determined that the motor failure was caused by improper belt tension or binding of the belt due to improperly aligned pulleys. To install the motor and pulley only, skip to step (4). For the purpose of replacing the Z motor, the pulley, and the bracket, perform the following steps:

1. Ensure the motor mount bracket stand-offs are tight.
2. Place the motor mount bracket into place on the sewing head.
3. Install the motor mount mounting/adjustment screws (two places)
4. Check the motor for operation as follows:
 - a) Plug the Z Motor Harness connector into receptacle of the motor controller .
 - b) Unplug the Z Encoder from the CPU.

WARNING! Ensure that the motor case is at chassis ground potential. A motor windings failure during this test could allow dangerous voltages to be present on the motor case.

- c) Jumper a machine chassis ground to the motor case.
- d) Turn machine power on: the motor will drive (as the CPU looks for

a feedback signal) if it is functional.

e) Turn power off and remove the power cord from the source.

f) Plug the Z Encoder back into it's proper receptacle.

g) Unplug the motor connector from the motor controller.

5. Inspect the motor shaft for any burrs and remove any found.
6. Inspect the motor drive pulley (new or from the old motor) for uneven wear, bent flanges, stripped set screw threads, etc. Replace if necessary.
7. Remove the set screw from the pulley and apply "red" Loctite (or equivalent) screw adhesive to the set screw. Reinstall the set screw.
8. Orient the pulley on the motor shaft with hub containing the set screws towards the sewing head (away from the motor). Align the end of the hub flush with the end of the motor shaft.

NOTE: Replace the Z Motor Drive Belt at this time (if required)

9. Place the motor into position, being careful to engage the belt.
10. Insert the motor mount screws (four places) and tighten.
11. Hold the motor shaft and rotate the sewing head to align the set screws on the pulley with the flat(s) on the motor shaft. Tighten the set screws.
12. Check the pulley alignment by rotating the sewing head clockwise (from the rear) and reposition the motor pulley until the drive belt rides in the center of the motor pulley and the head drive pulley/shaft assembly.
13. Route the multicolored ribbon cable through the cable clamps to the motor controller.
14. Plug the motor connector into the motor controller receptacle.
15. The Z Drive Belt tension should be set at 6 pounds.

Z Motor Replacement (EMC6 MTL, ML)

1. Turn the main power Off, and remove from power source.

2. Remove the Rear Head Cover and the Electronics Cover.
3. Disconnect the Z Motor harness from the XYZ Board.
4. Using a 6mm bent allen wrench loosen the two motor tensioning screws. See figure below.
5. Remove the four cap head screws attaching the motor to the standoffs.
6. Lift the motor away from the standoffs and allow the drive belt to slip off the motor drive pulley.
7. Loosen the pulley set screws and remove the pulley from the motor shaft.
8. Place the pulley on the new motor shaft and slightly tighten one of the pulley set screws.
9. Slide the motor mount bracket up and tighten one of the motor tensioning screws to hold it in place.
10. Place the motor in position. Be sure that the bottom loop of the drive belt is below the motor drive pulley, then reattach the motor to the standoffs with the four cap head screws.
11. Loosen the motor tensioning screw and slide the motor mounting bracket down, making sure that the bottom loop of the drive belt is in the center of the drive pulley.
12. Loosen the drive pulley set screw and adjust the pulley so that the pulley is directly below the main Z drive pulley.
13. Tighten both Z drive pulley set screws.
14. Adjust the belt tension to 6 pounds and tighten the motor tensioning screws.
15. Connect the Z Motor harness to the XYZ board. And replace both the Electronics Cover and the Rear Head Cover.

Z Shaft Encoder Installation (EMC6 M)

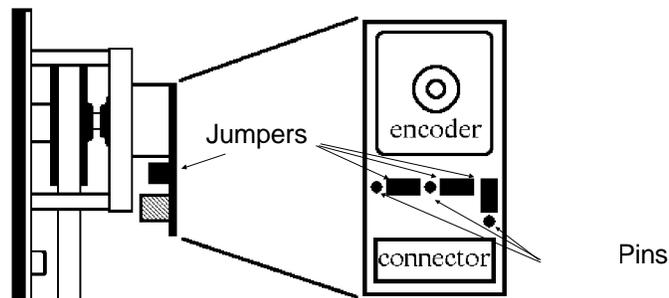
The Melco Sewing Head uses a "shaft" type encoder, rather than the "disk" type used on previous Melco Embroidery Peripherals. This style of encoder provides the same information required by the CPU, while at the same time is easier to install, replace and to calibrate. •

If you think that you may have a problem with the Z Encoder, first contact your Melco Representative for advice, it may be that the encoder is not the problem. If, however, your representative agrees, you can replace the encoder following these steps:

1. Turn the machine OFF. Then disconnect the power from the power source.
2. Remove the Electronics Cover and the Operator Interface Cover.
3. Remove the Z Drive Cover from the top, rear of the sewing head.
4. Using proper anti-static precautions, disconnect the Encoder Ribbon Cable at connector J3709 on the CPU.
5. Loosen the two set screws on the universal coupling that joins the encoder shaft to the head Z shaft.
6. Loosen and remove the Jam Nut attaching the encoder to the mounting plate, pull the encoder off the mounting plate, and discard the defective encoder.
7. Before you install the new encoder, check the position of the 3 "jumpers" on the Encoder PCB against the figure below. If they are not set the same as shown in the figure, set them accordingly.
8. Install the "new" encoder by reversing steps 9 through 6. Then follow the calibration procedure found in Section 2.

Z Encoder Installation (EMC6 MTL,ML)

The MTL and ML machines use a different style shaft type encoder than the

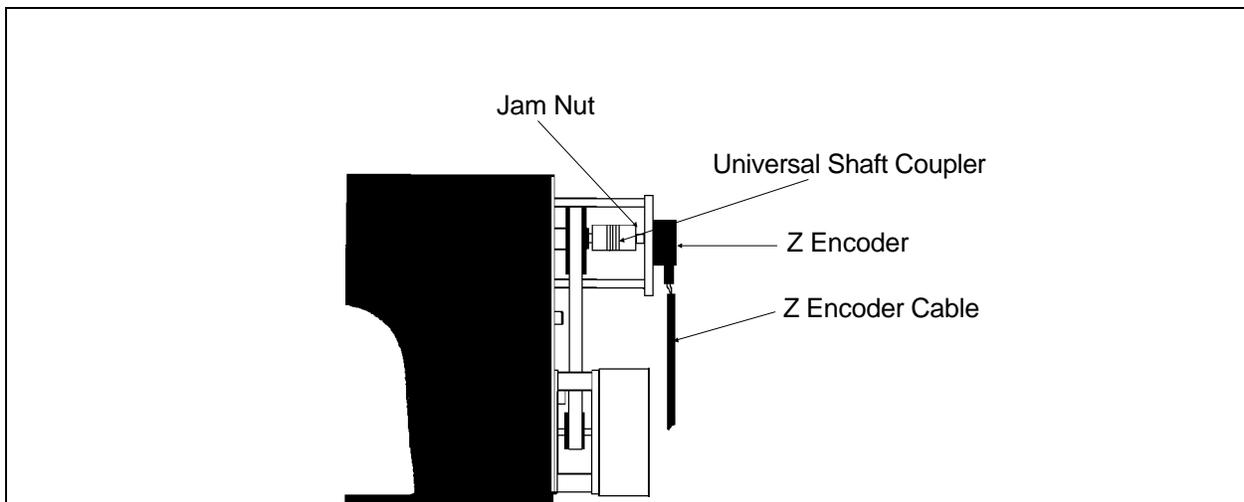


EMC6 M. The PCB and jumpers are not present. As a result installing and calibrating the encoder is "simpler" than previous methods.

1. Turn the machine off.
2. Remove the Rear Head Cover and Electronics Cover.
3. Disconnect the Encoder Cable from the XYZ or CPU board.
4. Loosen the two universal coupling set screws that joins the Z shaft to the Encoder shaft.
5. Loosen and unthread the jam nut on the Encoder shaft.
6. Pull the encoder out of the shaft coupling and encoder mount. Capture the jam nut and washer as the encoder shaft is removed.
7. Insert the new encoder/shaft into the hole of the encoder mount, place the washer and then the jam nut onto the encoder shaft as you insert the shaft through the mounting plate.
8. Insert the encoder shaft into the coupling.
9. Tighten the jam nut, and then the coupling set screws.
10. Connect the Encoder Cable to the XYZ or CPU board.
11. Calibrate the Z Encoder per section 2 of this manual.

Needle Case Removal

It may never be necessary to remove the needle case from the head. However, to replace the Needle Bar Driver, Take Up Lever Gear, or Needle Bar Reciprocator, you must remove the needle case. Refer to the following



steps to remove the Needle Case from sewing head.

1. Turn ON the EMC6 and bring the sewing head to the HEAD UP position.
2. Turn OFF the EMC6 and disconnect the power cord from its power source.
3. Remove the Thread Saddle from the top of the sewing head.
4. Disconnect the Thread Break Harness from the Color Change PCB, at connector J360201.
5. Remove the Right Slide Support (cap at the right end of the Needle Case Cross Slide Shaft) by loosening the 2 screws that secure it to the Front Facia at the top. Loosen the screws almost all the way.

CAUTION! When you remove the Needle Case, you must be very careful not to damage the photo sensors on the Color Change PCB with the metal Color Position Indicator. This indicator is attached to the Needle Case and lies within photo sensors.

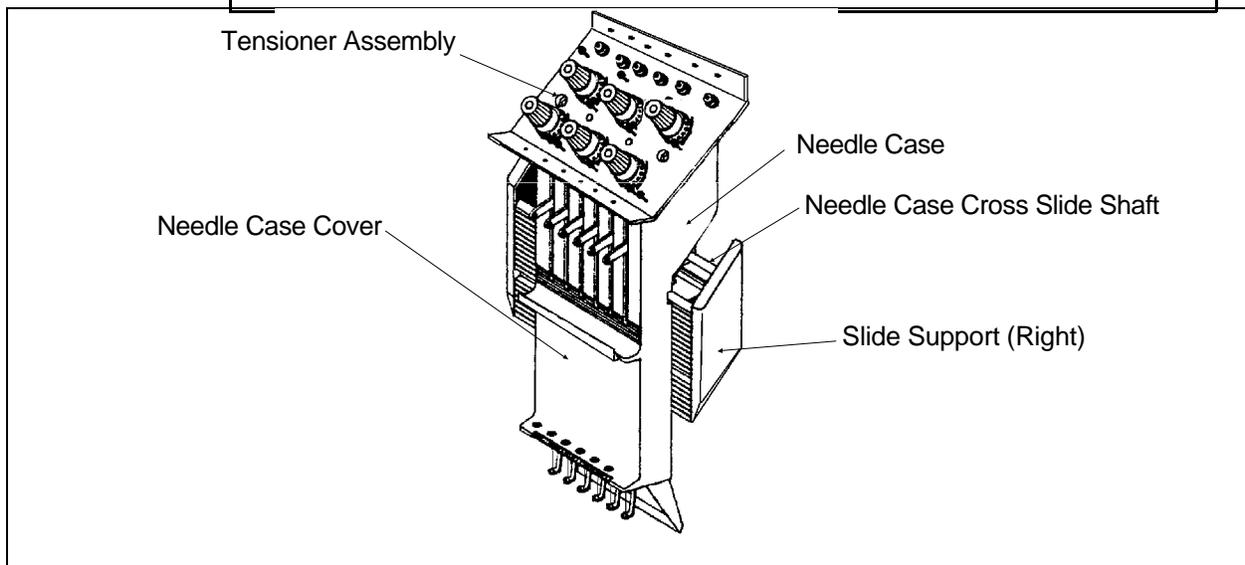
The Needle Case must be moved far enough to the right for the indicator to clear the photo sensors before the Needle Case is pulled away at the top.

6. You must rotate the Color Change Cam to move the needle case to the right. The Color Change Cam has a slot in the end of the cam shaft for this purpose. Rotate the cam shaft with a single blade screw driver. Grasp the needle case to hold it in position as you rotate the cam.
7. When the Color Position Indicator is out of the last photo sensor on the Color Change PCB, pull the left end of the Needle Case Cross Slide Shaft out of the Left Slide Support and simply pull the top of the Needle Case carefully toward you. As the top rotates outward, pick the Needle Case upward slightly to disengage the Lower Needle Case Guide Rail from the front of the sewing head arm. As the Needle Case is pull out and away from the sewing head arm, the needle bar driver studs and take up lever gears easily disengage. The Needle Case should now be free.

To Install the Needle Case

1. Ensure that the Front Facia is installed if it had been removed.

CAUTION! The Head must be at Head Up. If you removed the needle case and have not altered the



Head Up position manually, the head should still be at Head Up. If not, then you must bring the Head to that position.

2. If the sewing head is not at Head Up, you must position it to Head Up.

CAUTION! Keep hands, fingers, and other items away from the printed circuit boards and mechanical areas of the sewing head as you turn ON the EMC6.

3. Turn ON the EMC6. If the Color Change Index LED at the Color Change PCB is ON, rotate the Color Change Cam so the light goes OFF.

CAUTION! In the next steps, keep the Needle Case positioned far enough to the right so the Color Change Indicator will clear the photo sensors as the Needle Case is pushed in at the top.

4. Grasp the Needle Case and set the Lower Guide Rail into position at the bottom of the sewing head arm.
5. Insure the Take Up Levers are aligned so that the slots at the bottom of the Take Up Lever Gears engage into the "rails" at the top of the Front Facia. This is required to place the Take Up Lever Gears in the correct position to engage the Take Up Lever Drive Gear.

6. Insure all six needle bars are at the full needle up position.
7. Pivot the Needle Case from the bottom, into position, with the Take Up Lever Gears onto the rails and the needle bar driver studs into the channel in the front of the Front Facia.
8. Position the left end of the Needle Case Cross Slide Shaft into the Left Slide Support as you hold the Needle Case solidly in place.
9. Now, as you continue to hold the Needle Case solidly in place, rotate the Color Change Cam to move the Needle Case to the left. Stop rotating the cam when the Needle Case is approximately centered on the Needle Case Cross Slide Shaft.
10. Reattach the Right Slide Support by inserting the shaft into place as you slide the screw slots under the 2 loosened screws.

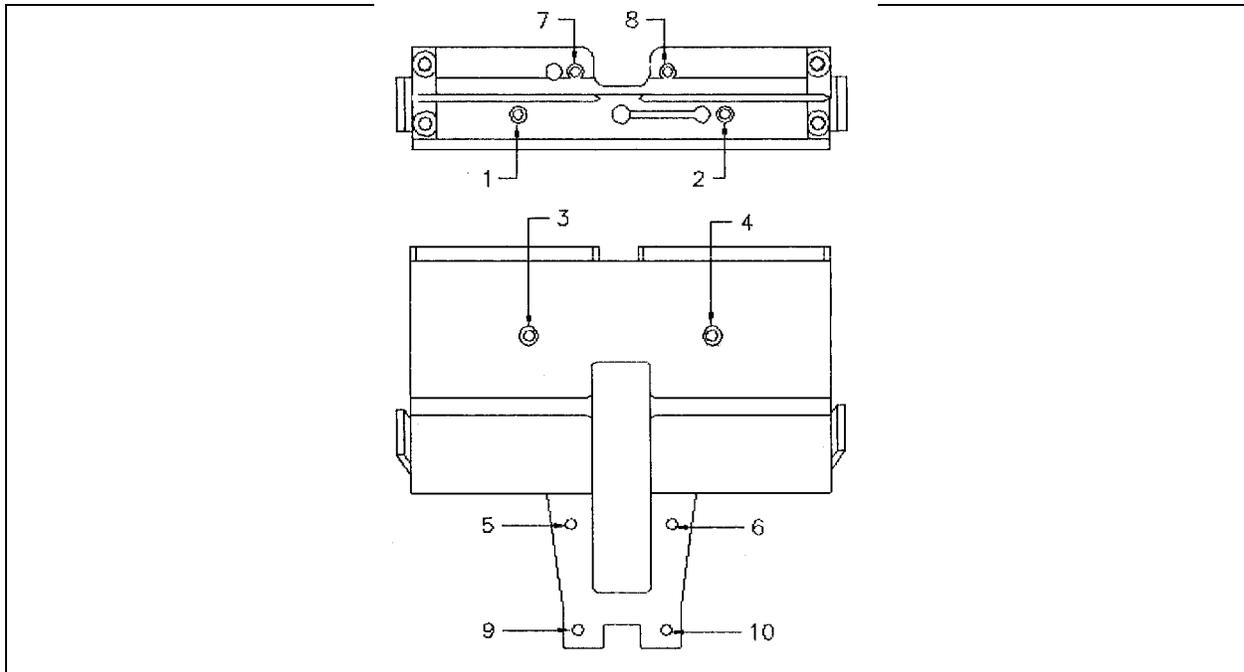
CAUTION! Do not over tighten the screws in the top of the Facia.

11. Snug the 2 screws to secure the Right Side Support to the Facia.
12. Reconnect the Thread Break Harness from the Color Change PCB, at connector J360201.
13. Reinstall the Thread Saddle to the top of the sewing head.

To Remove The Front Facia

If it becomes necessary to remove the Front Facia (to replace the reciprocator assembly, for example), refer to the following procedure.

1. First remove the Needle Case as described in a previous procedure.
2. Remove the four 3mm screws from the top of the Facia. (Refer to the figure on the next page.)
3. Remove the six 4mm screws from the front of the Facia. (Refer to the figure above.)
4. Lift off the Facia. If replacing the Facia, transfer any Slide Support that is attached to the old Facia to the new Facia before installing the new Facia as described on the next page.



Installing The Front Facia

CAUTION! The following procedure **MUST BE FOLLOWED PRECISELY** to avoid possible damage to the Front Facia during installation.
DO NOT OVERTIGHTEN THE SCREWS!

1. Put the Front Facia in position on the front of the sewing head arm and "start" all 10 screws (four 3mm screws on top and six 4mm screws on the bottom). Refer to the figure above for screw locations.
2. After all the screws are started, continue to rotate each of them until just before they begin to snug.
3. When all the screws are positioned to "just before snug," refer to the figure above and "snug" the forward 2 screws (screw # s 1 & 2) on the top surface.
4. Next, "snug" the top 2 screws (screw # s 3 & 4 in the above figure) of the front surface.
5. Now finish snugging the screws in the numbered order as shown in the figure. Snug # s 5 & 7 on the front, then go to the top to snug # s 7 & 8, and then to the bottom two screws numbered 9 and 10.
6. Reinstall the Needle Case and associated covers as described in previous

procedures.

Jump Stitch Solenoid Replacement

If a Jump Stitch Solenoid must be replaced, follow these steps:

1. Remove the Thread Saddle from the top of the sewing head.
2. Disconnect the Jump Stitch Solenoid Harness at the connector location J360204 on the top of the Color Change PCB.
3. Remove the Left Slide Support (cap at the left end of the Needle Case Cross Slide Shaft) by loosening the 2 screws that secure it to the Front Facia at the top. Loosen the screws almost all the way.

By removing the Left Slide Support, you gain access to the top screw of the Jump Stitch Solenoid Bracket through the hole in the side of the Front Facia.

4. Remove the top and bottom screws of the Jump Stitch Solenoid Bracket and then remove the solenoid and the solenoid bracket as one piece.

NOTICE: Before you remove the solenoid from the bracket, record the number of threads of the solenoid that are showing beyond the solenoid bracket (or measure the distance that the end of the solenoid protrudes from the solenoid bracket). When the new solenoid is installed into the bracket, position the solenoid with the same number of threads (or distance) that you recorded in this step.

5. Loosen the locking nut on the solenoid, then rotate the bracket off the solenoid.
6. Replace with new solenoid by reversing the procedure above. Adjust the position of the solenoid into the solenoid bracket using the "thread counts" or measurement you obtained above (see NOTICE above).

NOTE: During installation the solenoid must be adjusted properly. If you did not adhere to the NOTICE above, or if for some other reason, the adjustment for the solenoid is not correct, Refer to the Jump Stitch Adjustment procedure in Section 4 for the proper adjustments.

Color Change

The color change function of the EMC6 (With Melco Head) is much like the color change of other Melco embroidery peripherals offering this feature. The Color Change PCB controls color change commands from the design and from the keyboard, thread break information, the jump stitch solenoid, and the color change motor. The color change PCB, motor, cam, and wire harnesses are located under the Thread Saddle at the front of the sewing head.

Color Change Cam Replacement

The replacement of the Color Change Cam will seldom be required. Contact your Melco representative for advice and instructions before removing this part.

Color Change PCB Replacement

1. Remove the Thread Saddle.

CAUTION! The Color Change PCB is snapped into place on top of the Plastic Motor Mount Box. Be careful not to damage the LED sensors with the Color Position Indicator when removing the PCB.

2. You must rotate the Color Change Cam to move the needle case to the right so the LED sensors on the Color Change PCB are clear of the Color Position Indicator. The Color Change Cam has a slot in the end of the cam shaft for the purpose of rotating cam. Rotate the cam shaft with a single blade screw driver.
3. Disconnect the Jump Stitch Solenoid Harness, the Thread Break Harness, and the Color Change harness from the Color Change PCB.
4. When the Color Position Indicator is out of the last photo sensor on the Color Change PCB, and all the harnesses are disconnected, it is safe to remove the Color Change PCB.
5. To remove the Color Change PCB, pry the rear catch that holds the Color Change PCB, and lift the Color Change PCB off of the Color Change Housing.

Color Change Motor Replacement

To remove the color change motor refer to the following steps:

1. First remove the Thread Saddle and the Color Change PCB as described in previous procedures.
2. Loosen and remove the motor mounting screws.
3. When the motor is loose, pull off the Drive Belt.
4. Loosen the pulley set screw and remove the Motor Drive Pulley.
5. The motor is now loose and can be removed.
6. Replace the Motor and reverse the preceding steps.

Replacing A Needle Bar

To replace a Needle Bar, refer to the steps below, then turn to the Needle Bar height adjustment procedure in the EMC6 Operation Manual.

1. Hold the Tensioner Assembly in place while you remove the 2 screws that secure it to the top of the Needle Case.
2. Lift the Tensioner Assembly up a few inches, then disconnect the Thread Break harness from the bottom of the Tensioner Assembly and set the Tensioner Assembly aside.
NOTE that there is a 180 degree twist counter-clockwise on the cable before it is installed into the Tensioner Assembly.
3. Snap off the Needle Case Front Cover from the Needle Case and identify which Needle Bar is to be replaced.
4. Loosen the Needle Clamp set screw and remove the needle and Needle Clamp from the bottom of the Needle Bar.
5. Next, loosen the Needle Bar Stop Clamp (black clamp).

CAUTION! After the next step, the Needle Bar is free to be moved out the top of the Needle Case. Use care so the springs and other parts do not fly out of position.

6. Loosen the Needle Bar Clamp.
7. Use care as you remove the Needle Bar upward and out the top of the Needle Case.
8. Transfer the screw from the top of the old Needle Bar to the top of the new Needle Bar.

9. Install a new Needle Bar by inserting it from the top, through the various pieces as listed below:

The parts that the Needle Bar engage, from top to bottom are:

- Needle Bar Holding Spring
- washer under spring
- felt pad
- upper casting piece
- rubber bumper just under the upper casting piece
- Needle Bar Stop Clamp (black)
- Needle Bar Clamp (silver)
- Presser Foot Spring
- Presser Foot (top through hole)
- rubber pad
- nylon piece
- felt pad
- lower casting piece
- o-ring
- Presser Foot (lower through hole)
- o-ring
- Needle Clamp and needle

10. Insert the needle and tighten the Needle Clamp screw to secure the needle and capture the Needle Bar.
11. Reinstall the covers and assemblies that were removed during this procedure. Please refer to the "NOTE" in step 2 when reinstalling the Tensioner Assembly.

After installing a new needle bar, you must adjust the needle bar height properly. Refer to the EMC6 User Manual for the adjustment procedure for needle bar height.