



UNICON MICRO

ENGINEER'S MANUAL FOR SWIMWEAR APPLICATIONS

DOCUMENT: MICRO SWIMWEAR REV A
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R & D

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1. GENERAL

The Unicon Micro is primarily designed to control elastic tape feeding applications. Its universal design allows time savings, accuracy, and quality when attaching elastic tape to garments. The system has been designed to meet new EMC specifications that ensure proper operation under harsh industrial conditions such as ESD (electro static discharge), RFI (radio frequency induction), EMI (electro magnetic induction), and various conducted and radiated noises associated with the main power connection.

This device allows the operator to easily specify the feeding amount (ruffling) of elastic tape as desired by means of the control panel. Although the Micro can be programmed for very detailed operations, it can also be programmed for very easy operation. For example, the amount of ruffling can be controlled by programming different tension values while never changing from the sewing mode screen. The ruffling can be changed at a desired position during sewing by operating the knee or cut switch. Ruffling can also change automatically at a specified position by setting the number of stitches in advance.

When the ruffling amount is changed during sewing, the elastic tape is likely to be excessively tensed or slackened. The Unicon Micro prevents this from happening because of the full control feedback loop between the elastic stepping motor and the electronics. The Unicon Micro also automatically compensates the elastic insertion when material feeding inconsistencies occur due to stitch length changes at high and low speeds.

2. FEATURES

1. The Unicon Micro enables the operator to finish high-quality products with consistency regardless of his/her skill.
2. The 8 x 40 line display allows the menus to be displayed in an easier to understand environment for the operator and plant technician.
3. Thanks to a new method of controlling the elastic stepping motor, up to 4 times the ruffling control can be obtained compared to current methods.
4. A new method of controlling the current in the stepping motor allows it to run with maximum torque which will enable it to operate without stalling at faster sewing speeds. In between cycles or after a 15 second stop time in cycle, the motor current drops to a holding torque allowing the motor to not overheat.
5. Self contained software allows the addition of options to be used with the Micro without having to order special PROMS. The options programmed in the standard PROM are; water spot, two-tape, safety sensor, and RAM card.
6. A new elastic control method allows the Micro to track the different rates in material feeding at high and low speeds and compensate the elastic accordingly to maintain consistent ruffling results.

3. **HARDWARE SPECIFICATION**

a. **Inputs/Outputs**

- i. Eight 500mA solenoid outputs
- ii. Has capability to control sew motor speed
 - (1) Requires additional RM6557 treadle interface assy.
- iii. Eight inputs (four can be used to read speed from treadle)
- iv. Seven LED outputs (four can be used to write sew speed to motor)
- v. One 2 amp stepping motor output with 3 programmable torque settings
- vi. encoder input connector with logic signal inputs from motors
- vii. encoder multiplier can digitally multiply High resolution pulses by 1, 2, or 4 times

b. **Memory**

- i. 64K program storage
- ii. 32K battery backed-up RAM
- iii. 64K SRAM memory card (optional)

c. **Power Supply**

- i. Below table 65wtt. or 110wtt. power supplies independantly available
- ii. 65wtt supply specs
 - (a) Input Voltage 100 to 240 VAC (no strapping required)
 - (b) Outputs 24VDC at 2 amps
 - (c) and 5VDC at 5amps
- iii. 110wtt. supply specs
 - (a) Input Voltage 100 to 240 VAC (no strapping required)
 - (b) Outputs 24VDC at 3.5 amps
 - (c) and 5VDC at 5 amps
 - (d) Has special power down memory backup output

d. **EMC Specification**

- i. EMI filters on all I/O
- ii. (4) layer PCB design for EMI protection
- iii. Features 0V to chassis ground design
- iv. ESD tested up to 20kV
- v. Designed for EMI containment
- vi. Complies with:
 - (1) CISPR 22 uP
 - (2) IEC 801-2 ESD
 - (3) IEC 801-3 Rad
 - (4) IEC 801-4 FET
 - (5) IEC 555-2 Power Harmonics

e. **Dimensions**

- i. 8.00 inches wide
- ii. 5.50 inches high
- iii. 2.625 inches deep

f. **General Features**

- i. 8 line x 40 character LCD with EL backlight
- ii. 29 key keyboard
- iii. + and - keys for easy data adjustment
- iv. Arrow keys for free movement of cursor for easy editing
- v. 9 total banks of 24 styles per bank of total styles when the memory card is used

g. **Backpanel features**

- i. Conforms to existing Union Special swimwear I/O connectors for easy upgrade
- ii. Back I/O PCB is upgradable to other I/O panel configurations

h. **Optional Assemblies**

- i. Water spot automatic elastic cutting system
- ii. Two-tape metering device
- iii. Safety sensor assy. for cutter
- iv. RAM card
- v. Sewing motor speed control interface
- vi. LED assy.
- vii. (7) additional solenoid output assy.

4. NAME AND FUNCTION OF CONTROL PANEL SWITCHES

Figure 1 shows the front of the Unicon Micro control panel. There is an 8 x 40 character/graphic display with backlighting. This is the viewing area for all of the menus and messages displayed by the Micro. There are 29 keys whose functions are listed in Table 1.

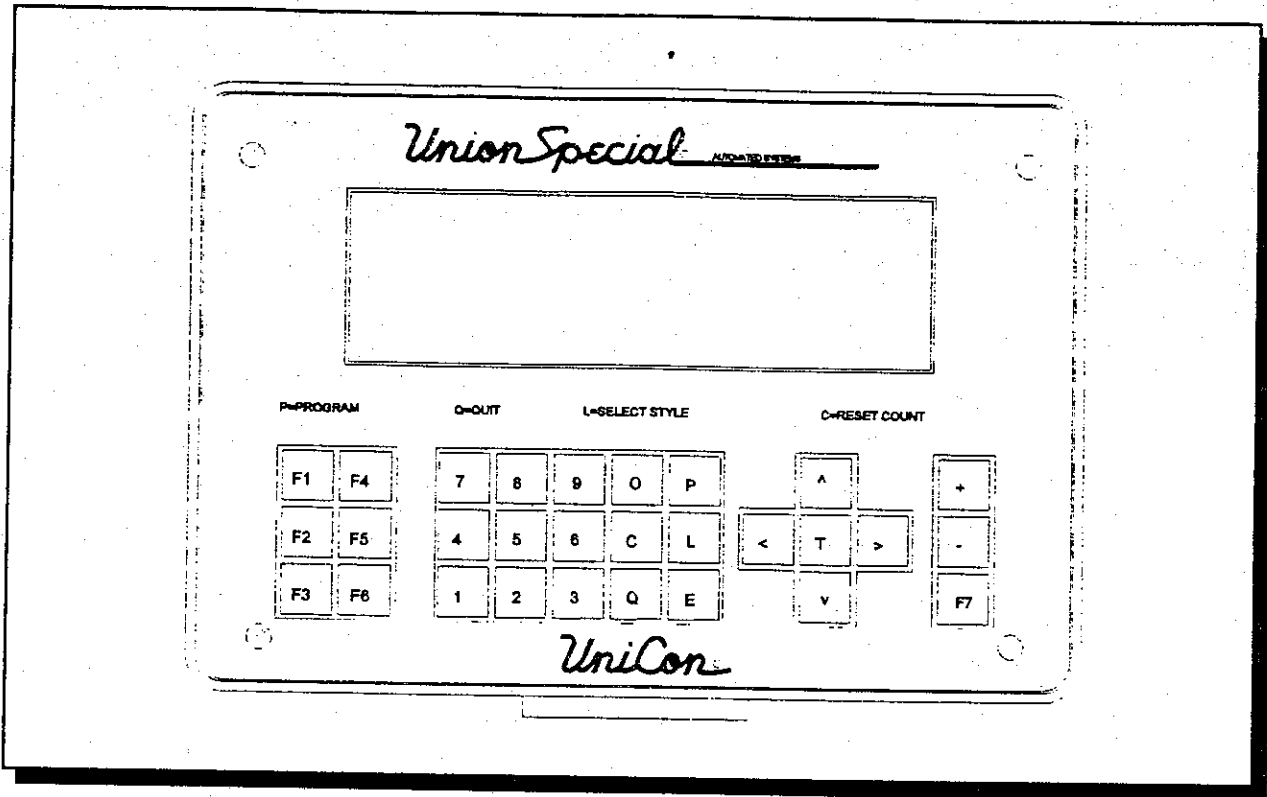
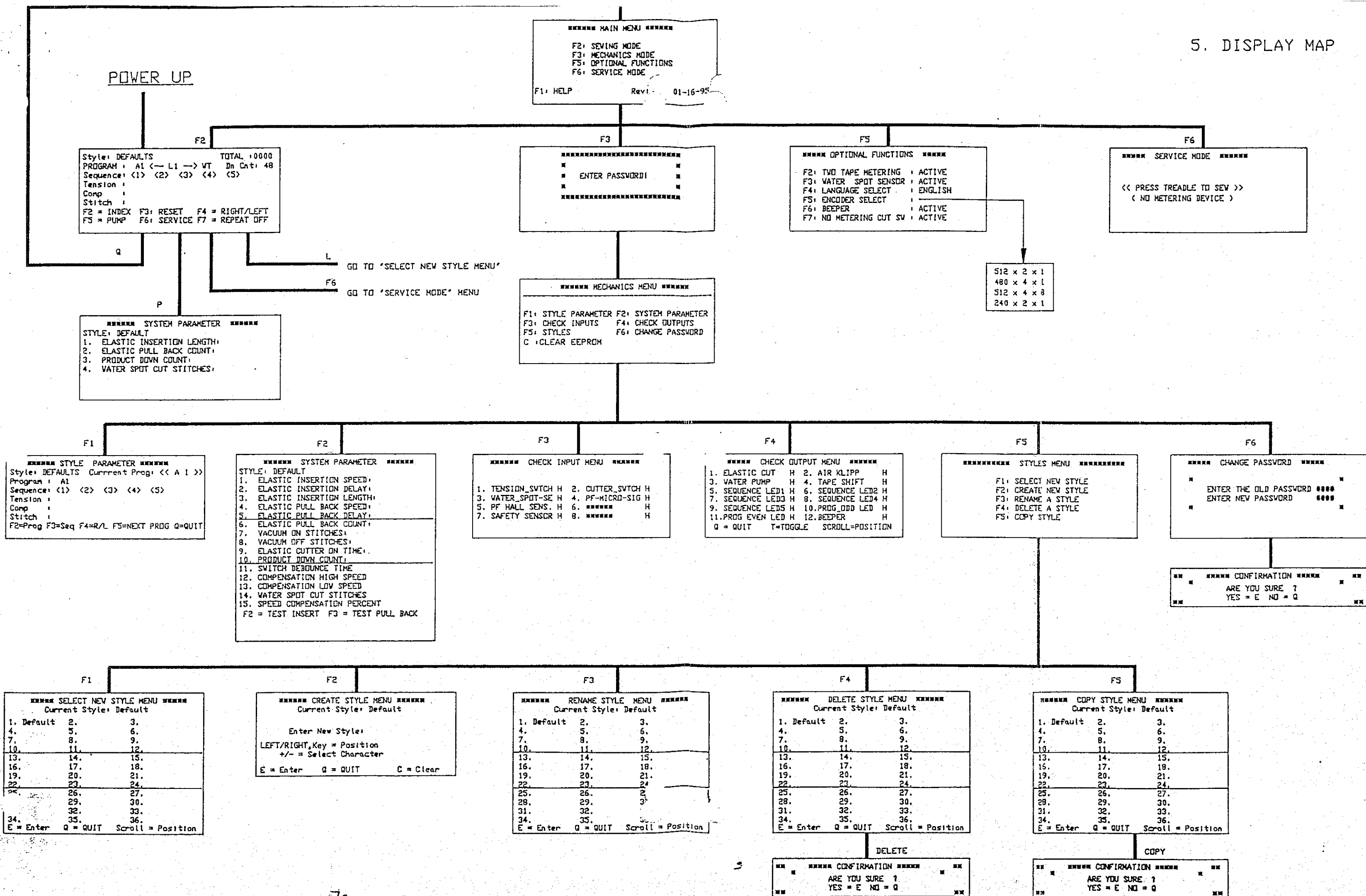


Figure 1

Name of Switch	Function
F1 - F6	These function switches perform different operations depending on which screen is currently displayed. Each screen will describe the operation of these keys.
0 - 9	These number keys are used to enter numeric data.
P	This key is used in the sewing mode to quickly access the operator parameters.
L	This key is used to access the Styles
C	This key is used to clear the total count.
E	This key is used to enter data.
^	This key is used to quit and leave a current menu.
1	This key is used for teach-in mode and to toggle the outputs.
<, >, ^, v	These keys are used to move the cursor.
+, -	These keys are used to increment or decrement data values & scroll program names.
F7	This key is used to repeat a program.

Table 1

5. DISPLAY MAP



6. EXPLANATION OF DISPLAY MAP

The following is an outline of the display map shown in section 5.

- a. MAIN MENU
 - i. F2: SEWING MODE (operator level)
 - (1) P: Operator system parameter
 - (2) L: Select new style menu
 - (3) F6: Service mode
 - ii. F3: MECHANICS MENU (mechanics level)
 - (1) F1: Style parameter
 - (2) F2: System parameter
 - (3) F3: Check input menu
 - (4) F4: Check output menu
 - (5) F5: STYLES MENU
 - (a) F1: Select new style
 - (b) F2: Create style menu
 - (c) F3: Rename style menu
 - (d) F4: Delete style menu
 - (e) F5: Copy style menu
 - (6) F6: Change password
 - iii. F5: OPTIONAL FUNCTIONS (operators level)
 - iv. F6: SERVICE MODE (operators level)

The Unicon Micro software as shown in the outline above has two levels of access, operator and mechanic. From the main menu, the operator can only access the "Sewing mode", "Optional functions" and "Service mode". From the "Sewing mode" the operator can access the "Operator system parameters", "Select new styles" and "Service mode". The "Sewing mode" has been structured to give the operator quick and easy access to what he/she may need and instantly returns to the sewing mode display. The more critical system parameters need access by entering a four digit password. This is the mechanics level.

The software allows up to 36 styles to be created and stored. The contents of these styles are memorized even after the power is turned off. Each of these styles can have up to 10 programs. A style represents the name of a particular garment. A program represents an opening (or seam) of a garment. Each program can have up to 5 sequences. A sequence represents a ruffling amount or can be programmed for no metering. Any combination of sequences can be programmed between ruffling amounts and no metering.

6. EXPLANATION OF DISPLAY MAP

The previous outline in section 6 will be used as a guideline to take a detailed tour of each display screen. Each display is examined to get familiar with the operations and features that can be performed in each screen.

a. MAIN MENU

The Main Menu is the center point from which all other displays can be accessed. From this menu, the operator only has access to the Sewing Mode, Optional Functions, and Service Mode. When the F3 key is pressed, the user is prompted to enter a password to access the Mechanics Mode.

```
***** MAIN MENU *****  
  
F2: SEWING MODE  
F3: MECHANICS MODE  
F5: OPTIONAL FUNCTIONS  
F6: SERVICE MODE  
  
F1: HELP                      Revised: 01-16-95
```

i. SEWING MODE

Depressing the F2 key from the Main Menu will bring up the sewing mode display. This display is also shown after the power has been turned on. The style that will be loaded after the power has been turned on will be the last style used when the power was turned off. In this display the operator can bring up new sewing styles as well as edit the tension, comp, and stitch values in the current style. Changes made to the program are automatically updated. The operator may not, however, add or delete any of the programs in the current style.

```
Style: DEFAULTS                      TOTAL : 0000  
PROGRAM : A1 <-- L1 --> WT      Dn Cnt: 48  
Sequence: <1> <2> <3> <4> <5>  
Tension :  
Comp :  
Stitch :  
F2 = INDEX  F3: RESET  F4 = RIGHT/LEFT  
F5 = PUMP    F6: SERVICE F7 = REPEAT OFF
```

The first sequence of the program is executed as soon as the operator heels back on the pedal. The elastic is inserted under the presser foot and then waits for the sewing to begin. The elastic is then fed according to the tension setting during the sewing cycle. The next sequence of tension can be executed during the sew cycle by hitting the knee switch or the cut switch, or by programming a number of stitches for the tension to change automatically. The knee switch and cut switch have the same type connector so that they are reversible with each other. So the knee switch can control the cutting of elastic at the end of cycle and the cut switch can change the tension or vice versa.

All keys are locked in the middle of the sewing cycle except for the F2, F3, F6, and F7 keys. For more details, see "Sewing Mode" section 7a.

(1) Operator system parameter

From the sewing mode display the operator can access the operator system parameters by depressing the "P" key. We allow the operator to access (4) of the overall system parameters that may need adjustment by the operator. These (4) parameters are:

Elastic Insertion Length - determines the length of elastic initially inserted under the

```
***** SYSTEM PARAMETER *****  
STYLE: DEFAULT  
1. ELASTIC INSERTION LENGTH:  
2. ELASTIC PULL BACK COUNT:  
3. PRODUCT DOWN COUNT:  
4. WATER SPOT CUT STITCHES:  
  
F2 = TEST INSERT  F3 = TEST PULL BACK
```

presser foot. The units of measurement is step. A value of 200 steps is equal to one revolution of the elastic stepping motor.

Elastic Pull Back Count - determines the number of steps that the stepping motor reverses to pre-tension the elastic at the beginning of sewing. Usually the time that the elastic pull back count parameter executes is after (1) stitch has been sewn, but this is determined by the "Elastic Pull Back Delay" parameter. This is discussed in the Mechanics System Parameter section.

Product Down Count - we allow the operator to program a counter which is located in the upper right hand corner of the sewing mode display. Instead of incrementing the counter like the total counter, the product down counter counts backward. At just a glance, the counter displays the number left to complete the bundle. After every cycle, the product down counter subtracts (1) from the remaining number.

Water Spot Cut Stitches - this is used when the water spot automatic cutting system is used. The units of measurement is stitches. This value is the number of stitches that the cutter will count before cutting after a water spot has been detected.

(2) Select new style menu

From the sewing mode, the operator can change to a new style by depressing the "L" key. This will display the "Select New Style" screen on the right. To select a new style is very simple. It can be done one of two ways. One way is to use the arrow keys to move the flashing cursor (the solid square dot) to a number which has the style desired and then depress the "E" key for enter. The program automatically loads the new style and goes back to the sewing mode display. The second way is to enter the number where the style resides and the program automatically loads the new style and goes back to the sewing mode display. When selecting styles 1-9, remember to place a 0 in front of the number.

***** SELECT NEW STYLE MENU *****		
Current Style: Default		
1. Default	2.	3.
4.	5.	6.
7.	8.	9.
10.	11.	12.
13.	14.	15.
16.	17.	18.
19.	20.	21.
22.	23.	24.
25.	26.	27.
28.	29.	30.
31.	32.	33.
34.	35.	36.
E = Enter Q = QUIT Scroll = Position		

There can be up to 36 styles to choose from. When first entering the "Select New Style Menu", the display is only big enough to show the first 12 styles. To access the remaining styles, just use the arrow keys to move the cursor all the way down to the bottom of the screen. Pressing the down arrow key will "scroll" down to the next screen of styles 13 - 24. Use the same method to access styles 25 - 36.

(3) Service mode

If the operator ever needs to operate the sewing machine without the use of elastic, depressing the "F6" key will execute the "Service Mode". In this mode, there is no operation of the elastic stepping motor. This mode is also used by the mechanics to check the sewing machine or to change needles. Depress the "Q" key to exit.

***** SERVICE MODE *****
<< PRESS TREADLE TO SEW >>
(NO METERING DEVICE)

ii. MECHANICS MENU

The mechanics menu is only accessible from the Main Menu. By depressing "F3" from the Main Menu, the user is asked to enter a password. The default password is 0000. After the password has been entered correctly, the Mechanics menu is displayed as shown on the right. This menu is the central point from which all programming is done and the central point from which all inputs and outputs can be tested.

```

***** MECHANICS MENU *****
-----
F1: STYLE PARAMETER  F2: SYSTEM PARAMETER
F3: CHECK INPUTS    F4: CHECK OUTPUTS
F5: STYLES           F6: CHANGE PASSWORD
-----

```

(1) Style parameter

Depressing the "F1" key from the Mechanics Menu will display the Style Parameter screen. This is where the current style programs and sequences are programmed. This display, shown to the right, looks just like the sewing mode display with the exception of the program line. The program line shows the number of programs and the order to which they will be executed. The order is from left to right, looking at the program line.

```

***** STYLE PARAMETER *****
Style: DEFAULTS  Current Prog: << A 1 >>
Program : A1
Sequence: <1> <2> <3> <4> <5>
Tension :
Comp :
Stitch :
F2=Prog F3=Seq F4=R/L F5=NEXT PRG Q=QUIT

```

The program names have already been determined, all that has to be done is to select the names of the programs that best describes the openings or seams and the order to which they are to be sewn. The list of names to choose from are; A1 = arm 1, A2 = arm 2, L1 = leg 1, L2 = leg 2, WT = waist, NK = neck, S1 = seam 1, S2 = seam 2, S3 = seam 3, S4 = seam 4. A program can be repeated as many times as required. As discussed previously, an opening or a seam of a garment represents a program.

For example, the garment in figure 1 has three openings and three seams. In order to sew the 3 seams, a sequence must be programmed as a "no meter". Since any sequence of a program can be made a no meter, we will choose S1 to be the name of the no meter program. This no meter program will be used to sew the three seams without elastic. These seams are marked in Figure 1 as S1. Next to be sewn would be the first leg opening with program L1, then the second leg opening with program L2. The last opening to be sewn would be the waist with program WT.

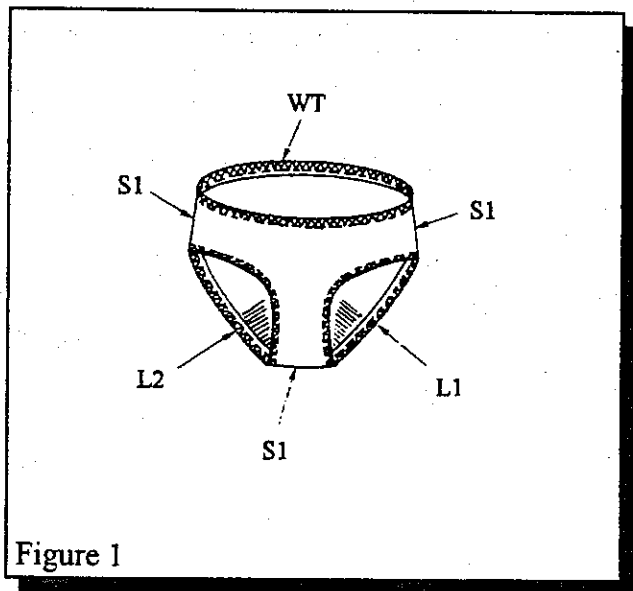


Figure 1

To enter the names of the programs in their order to be executed for this style is very easy. Depressing the F2 key will move the cursor to the program line and allow program names to be entered. While the cursor is flashing in the first column, depress the "+" and "-" keys to scroll through the names of the programs in the first column. When the name "S1" appears, stop

and use the arrow keys to move the cursor to the right for the next column. Continue to do this until the following appears across the program line: S1 L1 L2 WT. To erase the name of a program, just move the cursor to the name and press "0". Now all that is left to do is program the sequences for each program. These can also be programmed from the sewing mode display or from here.

Depressing the F3 key will move the cursor to the sequence section which is where the tension, comp and stitch values are programmed. After programming the sequences for a particular program, depressing the F5 key will move to the next program so that the sequences for it may be programmed. If the two-tape option is being used, depressing the F4 key will determine if a program is to use the left or right tapes. After the programming is complete, depressing the Q key will automatically store the program and return to the Mechanics Menu. For more details, see "No Meter" example in section 7d.

(2) System parameter

Depressing the F2 key from the Mechanics Menu will display the mechanics System Parameter screen. This is where the timing for all of the inputs and outputs are programmed. We only allow the operator access to (4) of these parameters through direct access from the sewing mode, the mechanic can access them all. The following is an explanation of each parameter and its function.

(1) Insertion Speed - This parameter controls the speed of the elastic as it is inserted under the presser foot at the beginning of the cycle. The units of measurement is steps per second (steps/sec). The value entered here is divided into 1Meg to get a result which is the actual elastic stepping motor speed. This parameter can be tested by depressing the F2 key while in the Mechanics Menu. A value of 1000 is a good value.

SYSTEM PARAMETER	
STYLE:	DEFAULT
1.	ELASTIC INSERTION SPEED:
2.	ELASTIC INSERTION DELAY:
3.	ELASTIC INSERTION LENGTH:
4.	ELASTIC PULL BACK SPEED:
5.	ELASTIC PULL BACK DELAY:
6.	ELASTIC PULL BACK COUNT:
7.	VACUUM ON STITCHES:
8.	VACUUM OFF STITCHES:
9.	ELASTIC CUTTER ON TIME:
10.	PRODUCT DOWN COUNT:
11.	SWITCH DEBOUNCE TIME
12.	COMPENSATION HIGH SPEED
13.	COMPENSATION LOW SPEED
14.	WATER SPOT CUT STITCHES
15.	SPEED COMPENSATION PERCENT
F2 = TEST INSERT F3 = TEST PULL BACK	

(2) Elastic Insertion Delay - This parameter sets an amount of time that the elastic stepping motor will wait after sensing a pedal heel back before it inserts the elastic under the presser foot. This is to allow the presser foot time to reach its maximum upward position before the elastic is inserted so the elastic will not hit the foot while its still moving upward. The units of measurement is milliseconds (ms). A normal value is 25ms.

(3) Elastic Insertion Length - This parameter sets the length of elastic inserted under the presser foot at the beginning of a cycle. The units of measurement is steps. The stepping motor is a 100 step/revolution motor, but since we are half stepping a value of 200 is equal to one complete revolution of the motor shaft. Each program number (1) is equal to .194mm or .00764in. So programming a value of 200 steps should insert close to 1.53 inches of elastic. The reason that it may not insert the exact length is because of the compression factor of the elastic is not taken into account. The compression factor is more noticeable with thicker elastics. This parameter can be tested by depressing the F2 key while in the Mechanics Menu. A value of 250 is a good place to start.

(4) Elastic Pull Back Speed - This parameter controls the speed of the elastic stepper when it pre-tensions the elastic. The units of measurement is in steps per second (steps/sec) just like the Elastic Insertion Speed. This parameter can be tested by depressing the F3 key while in the Mechanics Menu. A value of 1000 is a safe speed.

(5) Elastic Pull Back Delay - This parameter determines when the elastic stepping motor pre-tensions the elastic at the beginning of the cycle. The units of measurement is in stitches. The stepping motor will wait this number of stitches before pre-tensioning the elastic. Normally this value is set to (1) stitch. If there are problems with the elastic pulling out of the foot during pre-tensioning, increase the stitch delay. If you need to gather the garment from the sewing start, the elastic tape may be likely to slip out from the presser foot. In this case, increase the stitch delay before pre-tensioning.

(6) Elastic Pull Back Count - This parameter determines how many steps the elastic stepping motor will go backwards when pre-tensioning the elastic at the beginning of the cycle. The unit of measurement is steps and the same distance of travel applies as in the Elastic Insertion Length. This parameter can be tested by depressing the F3 key while in the Mechanics Menu. A good value to start is 100. If you need to gather the garment from the sewing start, the elastic tape may be likely to slip out from the presser foot. In this case, increase the stitch delay for pre-tensioning.

(7) Vacuum On Stitches - This parameter determines how long the air saver stays on at the beginning of the cycle. The unit of measurement is stitches. The air saver will remain on at the beginning of the cycle for the number of stitches entered for this parameter. A good value to start is 15 stitches.

(8) Vacuum Off Stitches - This parameter determines how long the air saver will remain off at the end of cycle. The unit of measurement is stitches. After an elastic cut at the end of cycle, the air saver will remain off for the number of stitches programmed for this parameter. A good value to start is 20 stitches. When the two-tape option is used, this will delay the number of stitches before shifting to the other tape.

(9) Elastic Cutter On time - This parameter determines how long the elastic cutter output will remain on when being fired. The unit of measurement is milliseconds (ms). A value of 50ms results in a quick cut action.

(10) Product Down Count - This is a counter that is provided for the operator. Instead of counting up, it counts backward. This is so the operator can enter the number that has to be sewn of a certain style for example, and after each cycle the counter decrements the current count value. The down counter will always show the number of pieces left to sew to complete a bundle. The down count value is always displayed in the upper right hand corner of the sewing mode display.

(11) Switch Debouce Time - This parameter prevents the knee switch and the cut switch from double firing when pressed. The unit of measurement is milliseconds (ms). A good value to use is 25 - 50 ms.

(12) Compensation High Speed

(13) Compensation Low Speed - These parameters are very important to understand. They work in conjunction with the comp value which is a programmable value for each sequence. Basically the Compensation High Speed, Compensation Low Speed, and the comp value control the ruffling or gathering during a tension change. Since the elastic is being applied in a forward motion, when

the tension changes from a low value (stepping motor is turning faster) to a high value (stepping motor is turning slower), as shown in Figure 2, the Compensation Low Speed acts as an intermediate tension value while the comp value tells the motor how long to maintain this intermediate speed. This is also shown in Figure 3.

There are two ways in which the Tension A to Tension B transition of Figure 2 can be programmed. There can be a gradual change or an immediate change. Of course, there can actually be any combination in between. Figure 3 shows the actual ruffling appearance of a gradual and instant transition between a low tension to a high tension. Once the Compensation high speed has been programmed, the comp value can control the gradual or instant tension change. By programming a high comp value, the tension change will occur gradually. The smaller the comp value, the faster the tension transition. To program the Compensation Low Speed, take the highest and lowest tension values from all five sequences and find the middle tension value. This is an easy way to program the Compensation Low Speed parameter.

When the tension changes from a high value (stepping motor is turning slower) to a low value (stepping motor is turning faster) the Compensation High Speed acts as an intermediate tension value while the comp value tells the motor how long to maintain this intermediate speed. This is shown in the second half of Figure 2 when the gathering moves from tension B to tension C.

There can also be a gradual or instant tension transition when moving from a high tension to a low tension. The second part of Figure 2 can be programmed for a gradual or instant tension

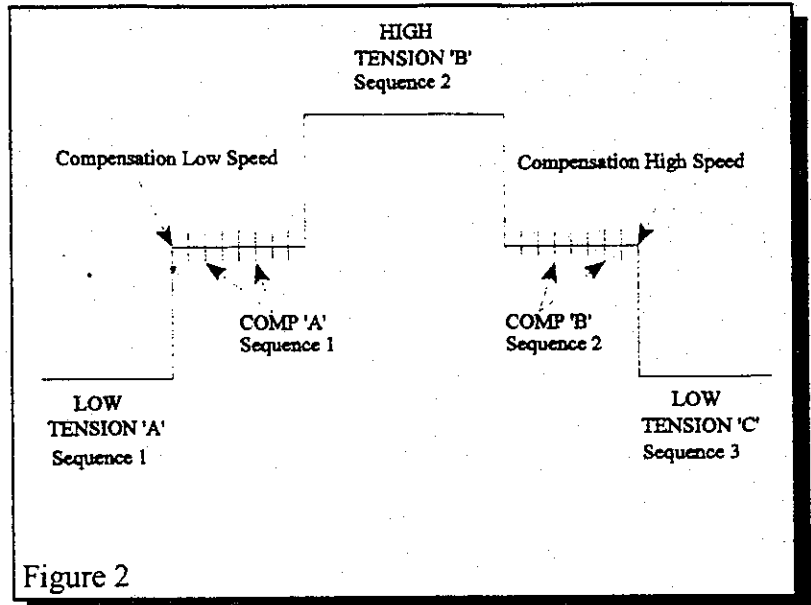


Figure 2

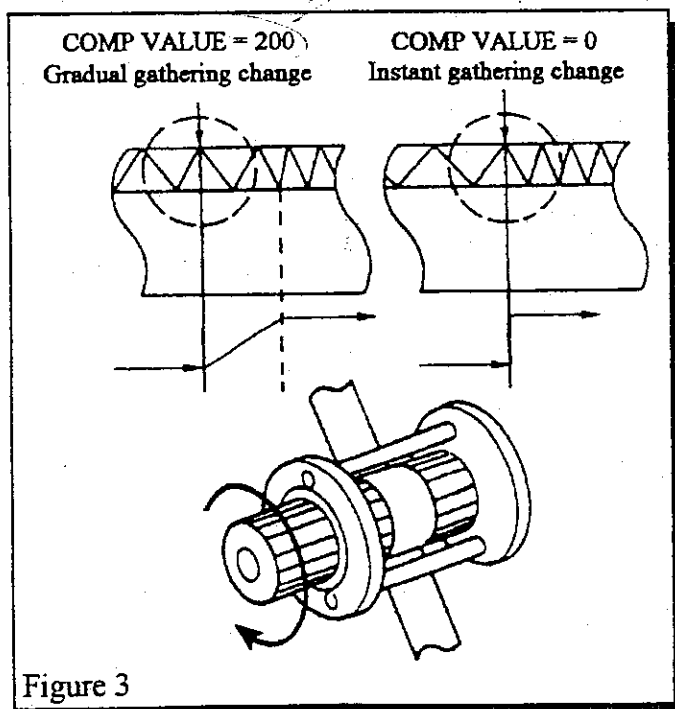


Figure 3

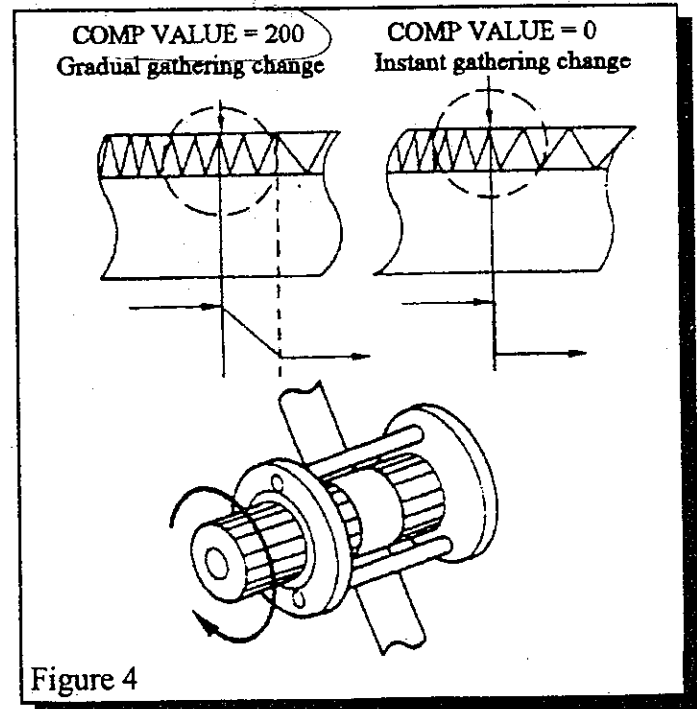


Figure 4

transition shown in Figure 4. Here again, after the Compensation High Speed value has been determined, the comp value of each sequence can determine if the tension transition will be gradual or instant.

For maximum instant tension changes, the Compensation High Speed, Compensation Low Speed and comp values in Table 1 should be used. Make sure the proper machine type is determined.

(14) Water Spot Cut Stitches - When the Water Spot option is used, this parameter determines the stitch count delay that the system will wait to fire the cutter after it senses a water spot. This option is used for automatic cutting without using the stitch counting method.

(15) Speed Compensation Percent - When using this feature, the irregular stitches due to change in sewing speed is corrected. When the sewing speed is above 3500 RPM, the tension is reduced by the % of this value. In the case of the EFKA - 8B31X Variostop motor, the value programmed here is subtracted from the tension value. By using this feature, the feeding amount of the elastic tape is optimized in accordance with the sewing speed and the the feeding amount of the material. An easy way to program this value is to sew the material at slow speed and then at high speed. Count the stitches per inch for each speed and determine the percent change. Program that value here.

(3) Check input menu

Depressing the F3 key from the Mechanics Menu will display the Check Input Menu. This is created so that the mechanic can check all of the functional sensors, switches, or any input that may be connected to the Unicon Micro. Activating a switch or sensor should change the "H" displayed to the right of the input to an "L". When deactivated the "L" should change back to a "H". This would indicate that the particular input tested good.

***** CHECK INPUT MENU *****

1. TENSION_SWITCH H	2. CUTTER_SWITCH H
3. WATER_SPOT-SE H	4. PF-MICRO-SIG H
5. PF HALL SENS. H	6. ***** H
7. SAFETY SENSOR H	8. ***** H

(4) Check output menu

Depressing the F4 key from the Mechanics menu will display the Check Output Menu. This is a screen that provides a test for the outputs. To test an output, simply use the arrow keys to move to the cursor to an output number which needs to be tested. By depressing the "T" key the output value to the right of the output name should change from "H" to "L". Depressing the T key should change the output back to a "H". If the output in question activates then de-activates, then the output tested good. To leave this mode, depress the "Q" key. Doing this will automatically reset all of the outputs to their original status.

***** CHECK OUTPUT MENU *****

1. ELASTIC CUT H	2. AIR KLIPP H
3. WATER PUMP H	4. TAPE SHIFT H
5. SEQUENCE LED1 H	6. SEQUENCE LED2 H
7. SEQUENCE LED3 H	8. SEQUENCE LED4 H
9. SEQUENCE LED5 H	10. PROG_ODD LED H
11. PROG EVEN LED H	12. BEEPER H
Q = QUIT T=TOGGLE SCROLL=POSITION	

(5) STYLES MENU

Depressing the F5 key from the Mechanics Menu will display the Styles Menu. The Styles Menu is a center point from which to select, create, rename, delete or copy a style.

***** STYLES MENU *****	
F1:	SELECT NEW STYLE
F2:	CREATE NEW STYLE
F3:	RENAME A STYLE
F4:	DELETE A STYLE
F5:	COPY STYLE

(a) Select new style

Depressing the F1 key from the Styles Menu will display the Select New Style Menu. This is the same menu that is accessible from the sewing mode by the operator. To see how to select a new style, see the Select new style menu under the Sewing Mode section earlier in section 6. An easy way is to just enter the style number, then "E" to enter. Remember to place a "0" before the numbers 1-9.

***** SELECT NEW STYLE MENU *****		
Current Style: Default		
1. Default	2.	3.
4.	5.	6.
7.	8.	9.
10.	11.	12.
13.	14.	15.
16.	17.	18.
19.	20.	21.
22.	23.	24.
25.	26.	27.
28.	29.	30.
31.	32.	33.
34.	35.	36.
E = Enter Q = QUIT Scroll = Position		

(b) Create style menu

Depressing the F2 key from the Styles Menu will display the Create Style Menu. This is the menu used to first create a new style. The fact must be understood that every style has its own set of individual parameters. When a new style is created, a set of default parameter values are automatically loaded into the styles system parameters. These values will have to be customized for optimum operation.

***** CREATE STYLE MENU *****	
Current Style: Default	
Enter New Style:	
LEFT/RIGHT Key = Position	
+/- = Select Character	
E = Enter	Q = QUIT C = Clear

To create a new style is very simple. A new style name can have up to (8) characters. Use the right and left arrow keys to move the cursor to the second space to the right of the name "Enter New Style:" (it should automatically be at this position). Next use the "+" and "-" keys to scroll through the character selection. The characters should be displayed where the cursor is sitting. When a character is chosen, simply use the right arrow key to move the cursor to the right of the chosen character. The character that was displayed prior to moving the cursor will still be displayed. Repeat the process until the entire name is displayed. Next depress the "E" key to enter the new style.

(c) Rename style menu

Depressing the F3 key from the Styles Menu will display the Rename Style Menu. This screen allows the name of a style to be edited to a different name. Although the name is changed, the system parameter settings remain unchanged. First, the Rename Style Menu is shown. Use the arrow keys to move the cursor to a style number, then depress the "E" key to enter the style. You may also enter the style number, the "E" to enter. Next the Create New Style Menu will display and the new style name should be entered at this time. Depressing the "E" key will update the new style name.

***** RENAME STYLE MENU *****		
Current Style: Default		
1. Default	2.	3.
4.	5.	6.
7.	8.	9.
10.	11.	12.
13.	14.	15.
16.	17.	18.
19.	20.	21.
22.	23.	24.
25.	26.	27.
28.	29.	30.
31.	32.	33.
34.	35.	36.
E = Enter Q = QUIT Scroll = Position		

(d) Delete style menu

Depressing the F4 key from the Styles Menu will display the Delete Style Menu. This screen will enable the user to remove any unwanted styles from memory. To delete a style, use the arrow keys to move the cursor to the style number which needs to be deleted. To access styles 13 - 36 just use the down arrow key to move the cursor into the next screen. The style number may also be entered instead. Depressing the "E" key will enter the style to be deleted. A confirmation screen will then appear asking you to depress the "E" key to complete the deletion or "Q" key to stop.

***** DELETE STYLE MENU *****		
Current Style: Default		
1. Default	2.	3.
4.	5.	6.
7.	8.	9.
10.	11.	12.
13.	14.	15.
16.	17.	18.
19.	20.	21.
22.	23.	24.
25.	26.	27.
28.	29.	30.
31.	32.	33.
34.	35.	36.
E = Enter Q = QUIT Scroll = Position		

(e) Copy style menu

Depressing the F5 key from the Styles Menu will display the Copy Style Menu. In order to copy a styles contents to another, the destination style must be created first. There will be the name "SOURCE:" and "DESTINATION:" displayed at the bottom of the screen. The source is selected first by using the arrow keys to move to a style number then depressing the "E" key to enter the style. Use the same procedure to select the destination style. You may also enter the style number and depress the "E" key for each the source and destination names.

***** COPY STYLE MENU *****		
Current Style: Default		
1. Default	2.	3.
4.	5.	6.
7.	8.	9.
10.	11.	12.
13.	14.	15.
16.	17.	18.
19.	20.	21.
22.	23.	24.
25.	26.	27.
28.	29.	30.
31.	32.	33.
34.	35.	36.
E = Enter Q = QUIT Scroll = Position		

(6) Change password

Depressing the F6 key from the Mechanics Menu will display the Change Password screen. This allows the mechanic to enter a password of choice. The default value is 0000. It prompts the user to enter the current password, then the new password. If the password is ever forgotten, there is a backdoor into the Mechanics Menu. It is

```
***** CHANGE PASSWORD *****
*
*   ENTER THE OLD PASSWORD ####
*   ENTER NEW PASSWORD      ####
*
```

iii. OPTIONAL FUNCTIONS

Depressing the F5 key from the Main Menu will display the Optional Function screen. This display is accessible by the operator or mechanic. The following explains the features in this menu:

F2: TWO TAPE METERING - When using the two-tape metering device, this should be active. Toggle between active and inactive by depressing the F2 key.

F3: WATER SPOT SENSOR - This should be set to "active" if the water spot automatic cut system is being used. Toggle between active and inactive by depressing the F3 key.

F4: LANGUAGE SELECT - Depress the F4 key to select between the English, German or Japanese language.

F5: ENCODER SELECT - This should be set to the proper machine type encoder and never changed. See Table 1 in section 7 - Programming the Unicon Micro to determine the proper setting.

F6: BEEPER - Depressing the F6 key will make the beeper active or inactive. If the beeper is active, there will be a short beep when there is a transition from one sequence to another.

F7: NO METERING CUT SWITCH - Depress the F7 key to activate or de-activate this feature. If this feature is active, after a no meter sequence the operator must hit the cut switch to move to the next sequence, no matter how many heel backs she performs. If this feature is inactive, then she must program the number of heel backs before the program automatically moves to the next sequence.

```
***** OPTIONAL FUNCTIONS *****
F2: TWO TAPE METERING : ACTIVE
F3: WATER SPOT SENSOR : ACTIVE
F4: LANGUAGE SELECT   : ENGLISH
F5: ENCODER SELECT    :
F6: BEEPER            : ACTIVE
F7: NO METERING CUT SV : ACTIVE
```

512 x 2 x 1
480 x 4 x 1
512 x 4 x 8
240 x 2 x 1

iv. SERVICE MODE

Depressing the F6 key from the Main Menu will display the Service Mode screen. This mode allows no metering operation for servicing on the workstation. This is accessible by the operator or mechanic.

***** SERVICE MODE *****

<< PRESS TREADLE TO SEW >>
< NO METERING DEVICE >

7. PROGRAMMING THE UNICON MICRO

a. options

c. ~~Ruffling~~

As earlier explained, ruffling is the amount of material gathering as a result of how much tension is applied to the elastic during sewing. The ruffling is controlled on the Unicon Micro by changing the amount of tension on the elastic. Each sequence has a tension value that can be programmed.

The Unicon Micro uses feedback from the system encoder in a unique way to increase the amount of tension control for ruffling. Internally the electronics multiplies the high resolution pulses from the encoder by four (x 4) and some machines only by two (x2). Currently, the Unicon Micro has been programmed to work with clutch, Efka US80A, Efka 8B31X Variostop, and Quick motors. Each motor presents a different high resolution pulse train from their system encoders. This is the significance of the "Encoder Select" feature in the "Optional Functions" menu (see section 5 - Display Map).

The "Encoder Select" display is shown in Figure 1. The correct encoder type must be selected. Table 1 shows encoder select values for the different encoder types. The first number in the encoder select column is the high resolution, the second number is the multiplier and the third number is the number of pulses per revolution on the the stitch count line. For the calculation purposes the stitch count will always be one pulse per revolution, but we have to list this third value so we can determine if we have to derive the stitch count pulse and not get ecoder types confused.

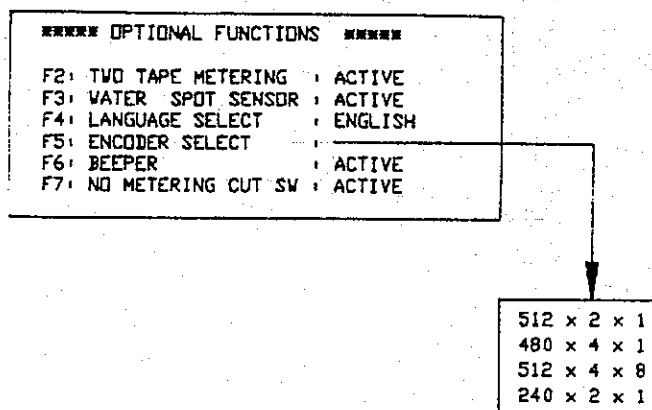


Figure 1

ENCODER SELECT	MOTOR TYPE
512 x 4 x 8	clutch (using Efka P6.1 encoder)
512 x 2 x 1	Efka US80A
480 x 4 x 1	Quick
240 x 2 x 1	Efka 8B31X Variostop

Table 1

The relationship between the high resolution pulses, the tension setting, and the amount of ruffling is expressed in the following equation:

$$\frac{(\text{high resolution} \times \text{multiplier})}{(\text{tension value})} \times (\text{revolutions}) \times (.194\text{mm}) = (\text{elastic length per stitch})$$

Equation 1

where;

- high resolution* = first numeric value in the "encoder select" column of table 1
- multiplier* = second numeric value in the "encoder select" column of table 1
- tension value* = numeric tension value programmed in a sequence

revolutions = (1) for one stitch

.194mm = linear metric distance traveled for one step of the elastic stepping motor

elastic length per stitch = amount of elastic inserted over the period of one stitch

To make this easier to understand, Charts 1 through 5 are graphs which show the feeding amount of the elastic tape per stitch (mm) vs. the input tension value using Equation 1. There is a plotted curve for each of the encoders listed in Table 1. The curves were plotted to demonstrate how important the resolution multiplier is for having a wider range of control over the elastic while being sewn.

This can be seen by comparing Chart 1 (512 x 4) to Chart 2 (512 x 2). All of the graphs have been marked at 2 and 3mm of feeding elastic in order to compare the tension range differences. Chart 1 shows 2mm at a tension value of 199 and 3mm at 127, a difference of 67. Chart 2 shows 2mm at a tension value of 100 and 3mm at 66, a difference of 34. This means that Chart 1 shows twice the tension adjustments between 2 and 3mm than Chart 2! This means that you will have twice the ruffling adjustment. Chart 5 shows the curves from charts 1, 2, and 3 superimposed on the same graph for easy comparison.

Being able to predict the amount of elastic inserted during sewing will allow a predictable amount of ruffling and allow to easily locate a value at which you can sew flat. This is when the elastic and the material are being fed at the same rate and the result is no ruffling. This is important for certain applications.

The same graphed data Charts 1 - 4 is shown numerically in Table 1 - 4 respectively. These tables can be used to determine a tension value that will allow the system to attach the elastic to the garment at a 1:1 ratio. When the ratio is 1:1, the finished seam will be flat. The method of determining this value is very simple. First, sew a garment without any metering and count the stitches per inch. Then look at the "Equivalent number of stitches per inch" column and match up the number. Look directly across the table row to the "Input value of ruffling amount (tension)" column to find the corresponding flat tension value.

For example, a clutch motor using a 512 x 4 type encoder the feeding amount ratio of the cloth and the elastic tape will be 1:1 by inputting a tension value of "200" if the feeding amount of the sewing machine is set to 2.0 mm per stitch (which is 12.8 stitches per inch). Note that the values given on the table should be used as reference, since the values will change in accordance with the thickness and type of elastic (a variable known as elastic compression). So specify a proper value and then check that the cloth and tape feed correctly.

Here again it can be seen that the larger the input value becomes, the less the elastic tape will be fed and the more the finished seam will shrink or "gather". This is the purpose of putting the "Ruffling amount column all of the tables so you can see which way to go after checking a seam.

■ ■ ■ ■ ■ IMPORTANT ■ ■ ■ ■ ■

In closing, it is important to understand how to use the charts and tables in this section. An easy way to understand the charts is to look at the 2 - 3 mm sections marked on each chart. This region of tension values will adjust to flat or little ruffling. Any tension values above will increase the gathering and any values below will produce little to no gathering.

The tables should be used to determine a starting value of tension to sew the elastic flat onto the garment. The procedure is very simple. Sew a piece of material on the machine without any elastic and then determine the stitch length per inch. Look this value up in the "stitches per inch" column, look directly across the row to the tension value column, and that should be the starting value for sewing the elastic flat to the garment. Treat these tables as "look-up tables", they will be helpful because of the tension range differences for the various motor types.

■ ■ ■ ■ ■ IMPORTANT ■ ■ ■ ■ ■

7. PROGRAMMING THE UNICON MICRO

b. Sewing Mode

When the Unicon Micro is first turned on, it wakes up in the sewing mode. This is shown on the "Display Map" located in section 5. Figure 2 shows what will be displayed on the control panel in the sewing mode. The unit is ready to sew. When the operator heels back on the foot pedal, the elastic tape is inserted under the foot and waits for the sewing to start. This is shown in Figure 1. To adjust the elastic insert and pull-back parameters, see the "System Parameter" menu in the Mechanics Menu.

The operator can make editing changes to the programs while out of the sewing cycle. During the sewing cycle most of the keys are locked and will not allow any editing. When out of cycle, use the arrow keys to move the cursor to edit tension, compensation, or stitch values of any sequence. This is one of the nice features that allow on screen editing by the operator without changing from the sewing mode. Any values edited in this mode will be automatically saved. A short description of each feature is listed below. Some of the features will be discussed in more detail later.

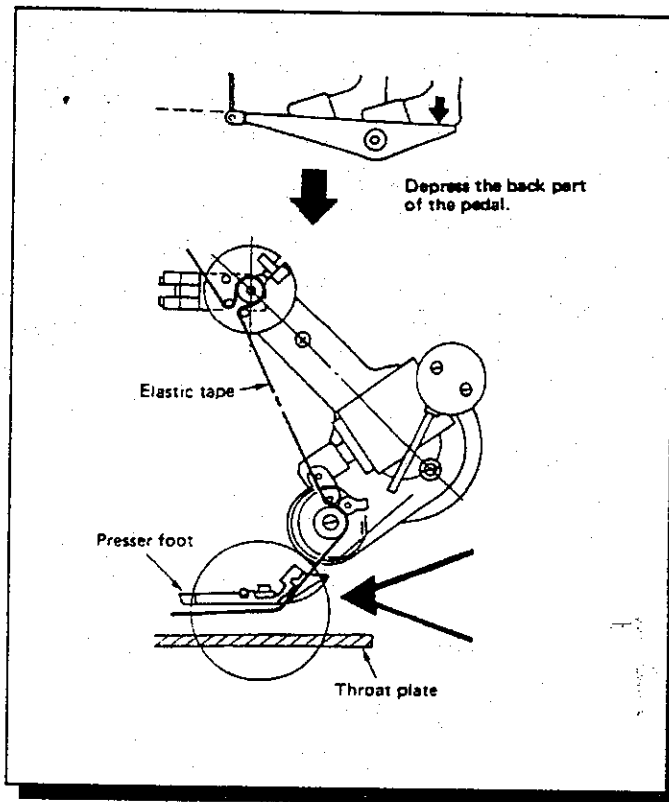


Figure 1

Style: This is where the current style name is shown. A new style may be selected by depressing the "L" key. This will display a list of programmed styles that can be selected.

Total: The total number of garments sewn is displayed here. The total is retained in memory even after the power is turned off. To reset this counter to 0, depress the "C" key.

Style:	Total :####
Program : A1 <-- L1--> WT	Dn Cnt: ##
Sequence: <1> <2> <3> <4> <5>	
Tension :	
Comp :	
Stitch :	
F2 = INDEX	F3 = RESET
F5 = PUMP	F6 = SERVICE
	F4 = RIGHT/LEFT
	F7 = REPEAT(OFF)

Figure 2

Dn Cnt: This stands for down count. This is a unique counter that tells the operator how many garments are left to be sewn in a stack. The stack number is programmed in the Mechanics Menu.

Depressing the "C" key also resets this counter to 0.

Program: # <#> # This line shows the previous, current and next programs for sewing. The name of the program to the left side of the < sign is the program previously sewn. The name of the program in the middle of the <> signs is the current program and the program to the right of the > sign is the next program. Remember that there can be a total of ten programs for one style. The program names can be any of the following: A1, A2, L1, L2, WT, NK, S1, S2, S3, S4.

Sequence: <1> <2> <3> <4> <5> This line shows the programmed sequences for the current program. There can be up to five sequences programmed for each program. During sewing, the cursor moves to the sequence being sewn and flashes. Each sequence has ruffling (tension), compensation (comp), and stitch values that can be programmed from the sewing mode screen.

tension: Another name for this is "ruffling". This value controls the amount of elastic inserted onto the garment during sewing. As the tension value increases the amount of ruffling increases also.

comp: This name is short for compensation. This value relates to the length of material it takes during a tension change. A small value would mean that the ruffling would immediately change from one tension to the next. A large value would mean a gradual change from one tension to another.

stitch: This value is programmed when automatic tension changing and cutting is wanted. Each sequence will be sewn for the number of stitches programmed in that sequence. In the case of the last sequence, after the number of stitches have been sewn the elastic will automatically be cut.

F2 = INDEX Depressing the F2 key will allow the operator to index or scroll from one program to the next.

F3 = RESET Depressing the F3 key sends the cursor to its home position in the upper left hand corner of the display.

F4 = RIGHT/LEFT When the two-tape option has been selected from the OPTIONS menu, the F4 key allows each program to either use the left or right tape. This can be programmed or changed in the sewing mode. Will not be displayed if the two-tape option is not selected from the options menu.

F5 = PUMP When the water spot option has been selected from the OPTIONS menu, the F5 key allows a test of the water spot applicator. Will not be displayed if the water spot option is not selected from the options menu.

F6 = SERVICE Depressing F6 allows the metering device to become inoperational. This is for servicing reasons.

F7 = REPEAT(OFF)(ON) Depressing the F7 key allows the current program to be continually repeated. When the repeat is "on", no other program will be ran.

"P" Key - Depressing the P key will take the operator to the operator parameter menu. This is where the operator can make some adjustments to the machine functions.

"L" Key - Depressing the L key will take the operator to the select styles menu. This is where the operator can select a new style.

"C" Key - Depressing the C key will clear the total and down count values located in the upper right hand corner of the display.

"Q" Key - Depressing the "Q" key will exit from the sewing mode and display the Main Menu.

7. PROGRAMMING THE UNICON MICRO

c. Ruffling

i. Ruffling/Flat Program Example

As explained in the software specification section, each style can have a maximum of ten programs with each program having a maximum of five sequences. A sequence can be programmed to apply tension on the elastic, have no tension on the elastic (flat), have no metering (elastic insertion), or activate a water spot sensor (this will be explained later). First, let's explain how to program openings with tension. Each program represents an opening in which the tension can possibly change up to five times while sewing around the opening.

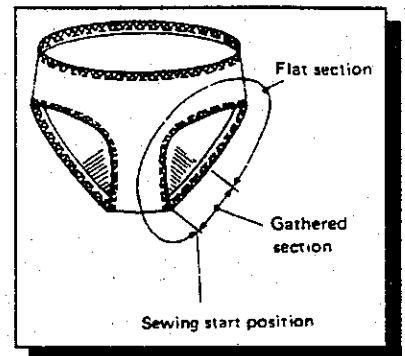


Figure 1

Let's take a look at the garment in Figure 1. We will assume that the garment has already been seamed so there will not have to be a no meter program in this example. Basically, there are 3 openings which will represent 3 programs. We can select L1 for the first leg, L2 for the second leg, and WT for the waist. As Figure 1 shows, we will program L1 and L2 for applying the elastic for flat results around the top of the leg and front, and gathering around the bottom and rear. The gathered sections are shown in Figure 2.

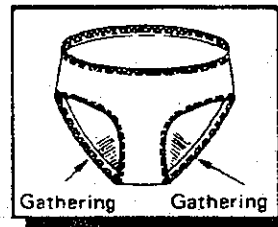


Figure 2

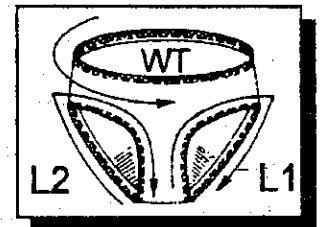


Figure 3

Since we will be changing tensions between flat and gathering around the legs, we must first determine the direction we will sew the openings. The direction of sewing for this example is shown in Figure 3. First, we must create a style name for this garment. This is accomplished from the styles menu which is explained in section 6. After the style name has been created, we can go to the style parameter menu to enter the programs. Following the style parameter guidelines in section 6, the style parameter display will look like that in Figure 4.

```

Style:
Program : L1 L2 WT
Sequence: <1> <2> <3> <4> <5>
Tension : 200 250
Comp : 50
Stitch :
F2 = Prog F3 = Seq F4 = R/L F5 = Next Q = Quit
    
```

Figure 4

```

Style:
Program : <-- L1--> L2
Sequence: <1> <2> <3> <4> <5>
Tension : 175 350
Comp : 50
Stitch :
F2 = INDEX F3 = RESET F4 = RIGHT/LEFT
F5 = PUMP F6 = SERVICE F7 = REPEAT(OFF)
Total :####
Dn Cnt: ##
    
```

Figure 5

Now that the program names have been selected, the tension, comp, and stitch values can be fine-tuned from the sewing mode. Suppose this system has a clutch motor with an Efka P6-1 encoder. Using Chart 1 and Table 1 of section 7c, we can start with estimate values for the tension value for the flat sections of the first leg opening. To determine the flat value, sew a piece of material and determine the # of

stitches per inch. Look at the "stitches per inch column" in Table 1 and match up the number. Next look directly over to the "ruffling" column and get the tension value. If, for example, there were 11 stitches per inch and I wanted the elastic to be inserted at the same rate so I could sew flat, I would insert a tension value of 175 in the first sequence of the L1 program. After sewing with this value, use the ruffling amount "arrows" in Table 1 to help you adjust the tension value to fine tune the flat section.

Looking at Chart 1 we can see that the tension values between 125 and 200 will produce flat to slight ruffling results. As the tension values increase above 200, the ruffling increases. As the tension values decrease below 125, there is little to no ruffling at all.

Next, I want a medium change between tensions so I would program 50 for the comp value for the L1 sequence. The next sequence will have the tension or ruffling value. This is determined basically by the user. I will start with a value of 350. The program for the first leg program L1 is shown in Figure 5. Since sequence 2 is the last sequence of the program, there is no need to enter a comp value for the sequence.

After the flat section of the first leg has been sewn, the operator can use the knee switch or cut switch to move to the gathering sequence. This is shown in Figure 6. You can also enter a value of stitches in the first sequence which will automatically switch to the next sequence. The program for the second leg opening, L2, should look like the program of the first but the sequences will be reversed. To program the waist opening WT, use the same technique for determining which value to program the tension for flat results. For this example, that value was 175.

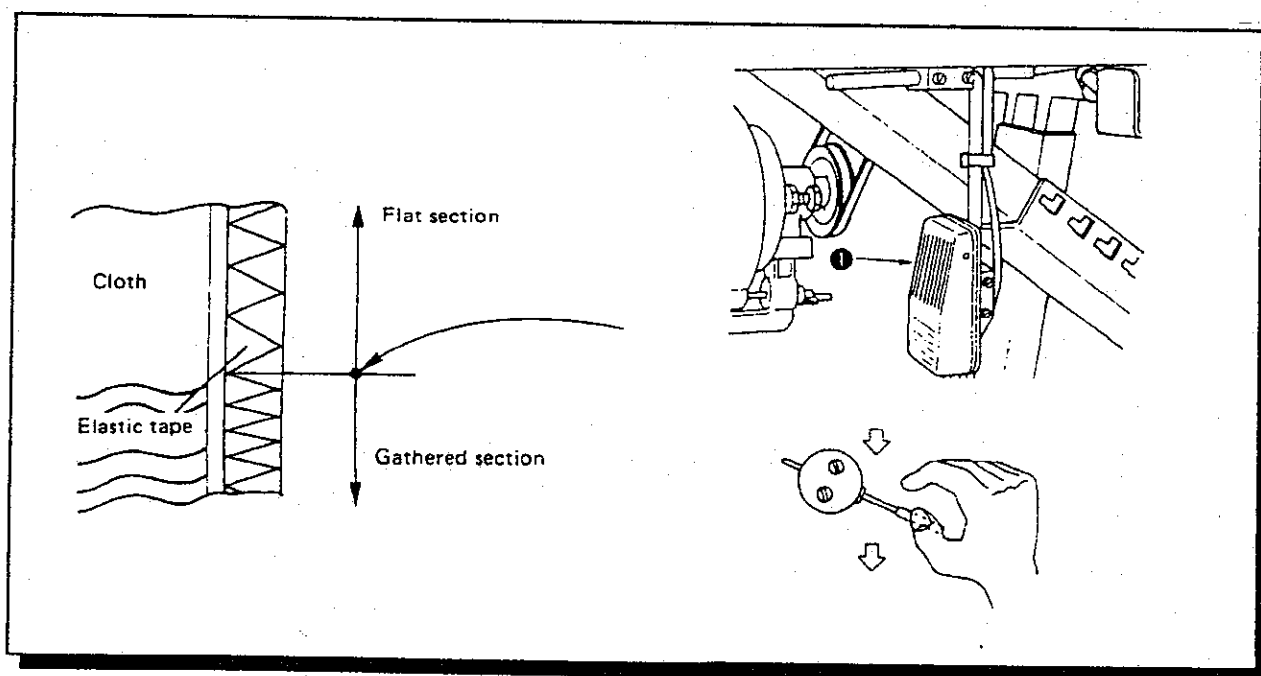


Figure 6

7. PROGRAMMING THE UNICON MICRO

d. NO METER

No meter is a term used to describe closing the seams of the garment without using elastic. These seams are marked in Figure 1 with "S1". This is a continuation of the example in section 6a. Normally these seams are closed at the beginning of the operation. The Unicon Micro allows the seaming and gathering elastic sequences to be entered into the same program of a style. The electronics automatically executes the sequences which allows a continuation of sewing for the garment without stopping for adjustment. The ruffling example in section 7b showed how to program the L1, L2, and WT openings. The same programs can be used here but with the addition of a no meter program which will be added as the first program.

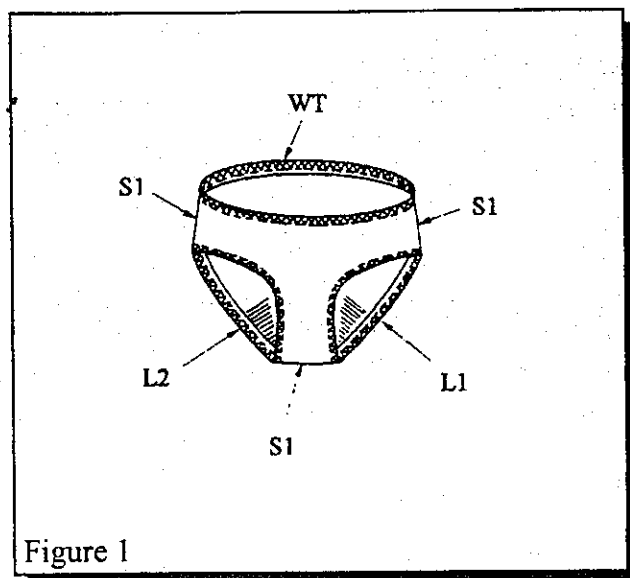


Figure 1

The new program S1 is added to the style shown in Figure 2. There are two ways to program a no meter. The first way is to enter a comp value number in the no meter sequence. Notice that there are no other values in the tension or stitches area. This is how the electronics recognizes a no meter sequence. The no meter sequence can be placed anywhere and assume any program name. The number entered should represent the number of heel backs that will occur while seaming the three seams. The electronics will count each heel back as a completion of a seam. After the last heel back, the electronics will automatically move to the L1 program for the first leg or the next program to be executed. This requires that the operator makes no mistakes and doesn't accidentally hit the pedal.

Style:

Program : S1 L1 L2 WT

Sequence: <1> <2> <3> <4> <5>

Tension :

Comp : 3

Stitch :

F2 = Prog F3 = Seq F4 = R/L F5 = Next Q = Quit

Figure 2

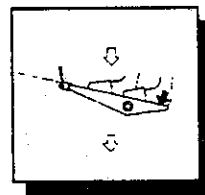


Figure 3



Figure 4

Another way is to allow as many heel backs as necessary and when finished seaming, just hit the cut switch to move to the gathering programs. First, enter the "Options Menu" to activate the "No metering Cut Switch" function. This is accomplished by depressing the F7 key and the word "active" will appear. Then program any number for the comp value in the no meter sequence again without entering values for tension or stitches. Now the operator can heel back as many times as necessary and when the seaming is done, just hit the cut switch and the L1 program will automatically be executed. Figures 3 and 4 show the actions for ending the no meter sequence. Figure 2 shows how the no meter sequence should be programmed for the heel back method. The same sequence can also be used for the cut switch method, but any number can be entered for the comp value.

7. PROGRAMMING THE UNICON MICRO

e. TWO - TAPE

The two-tape feature of the Unicon Micro allows two operations to be performed at one workstation. With the two-tape device, a thinner elastic can be applied to the leg openings and a wider elastic can be applied to the waist opening. Figure 1 shows how the program names may be selected for a swimwear garment. The program for the L1 and L2 openings has been explained in the ruffling section. The same programs can be used for two-tape as well. The only difference is adding LEFT or RIGHT to each of the programs.

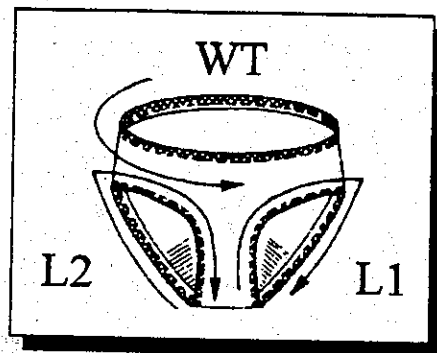


Figure 1

Programming two-tape applications is very easy. Enter the Options Menu and turn the "Two-Tape Metering" option to "active" by depressing the F2 key. When entering back to the sewing mode display, you will notice the word LEFT or RIGHT on the right center side of the display for each program. Use the F2-Index key to index through the L1, L2, and WT programs. Each sequence have to be programmed to use the left or right tape by depressing the F4 key for each program. A sample display is shown in Figure 2 for the L1 program. For this example, the L1 and L2 programs will use the LEFT tape and the WT program will use the RIGHT. This means that the thinner tape is located on the left of the two-tape device and the wide tape on the right.

Style:		Total :####
Program :	<-- L1--> L2	Dn Cnt: ##
Sequence:	<1> <2> <3> <4> <5>	
Tension :	175 350	LEFT
Comp :	50	
Stitch :		
F2 = INDEX	F3 = RESET	F4 = RIGHT/LEFT
F5 = PUMP	F6 = SERVICE	F7 = REPEAT(OFF)

Figure 2

You will notice that when the two-tape option is active, the F4 = RIGHT/LEFT line is displayed on the sewing mode display. The tape selection can be programmed from the style parameter menu or the sewing mode menu. A sample display for the WT program is shown in Figure 3.

Style:		Total :####
Program :	L2 <-- WT-->	Dn Cnt: ##
Sequence:	<1> <2> <3> <4> <5>	
Tension :	160	RIGHT
Comp :		
Stitch :		
F2 = INDEX	F3 = RESET	F4 = RIGHT/LEFT
F5 = PUMP	F6 = SERVICE	F7 = REPEAT(OFF)

Figure 3

Here the tape will be applied flat. As explained in the "Ruffling" section, the Tables in section 6 can be used to determine the flat value for the tension. Figure 3 shows the tension value of 160 selected from Table 1 if a clutch motor with an EFKA P6.1 encoder is used and the stitch length is 10 stitches per inch.

If a stitch count delay is needed before the two-tape device shifts to the other tape after a cut, use the "Vacuum Off Stitches" parameter in the System parameter menu for this.

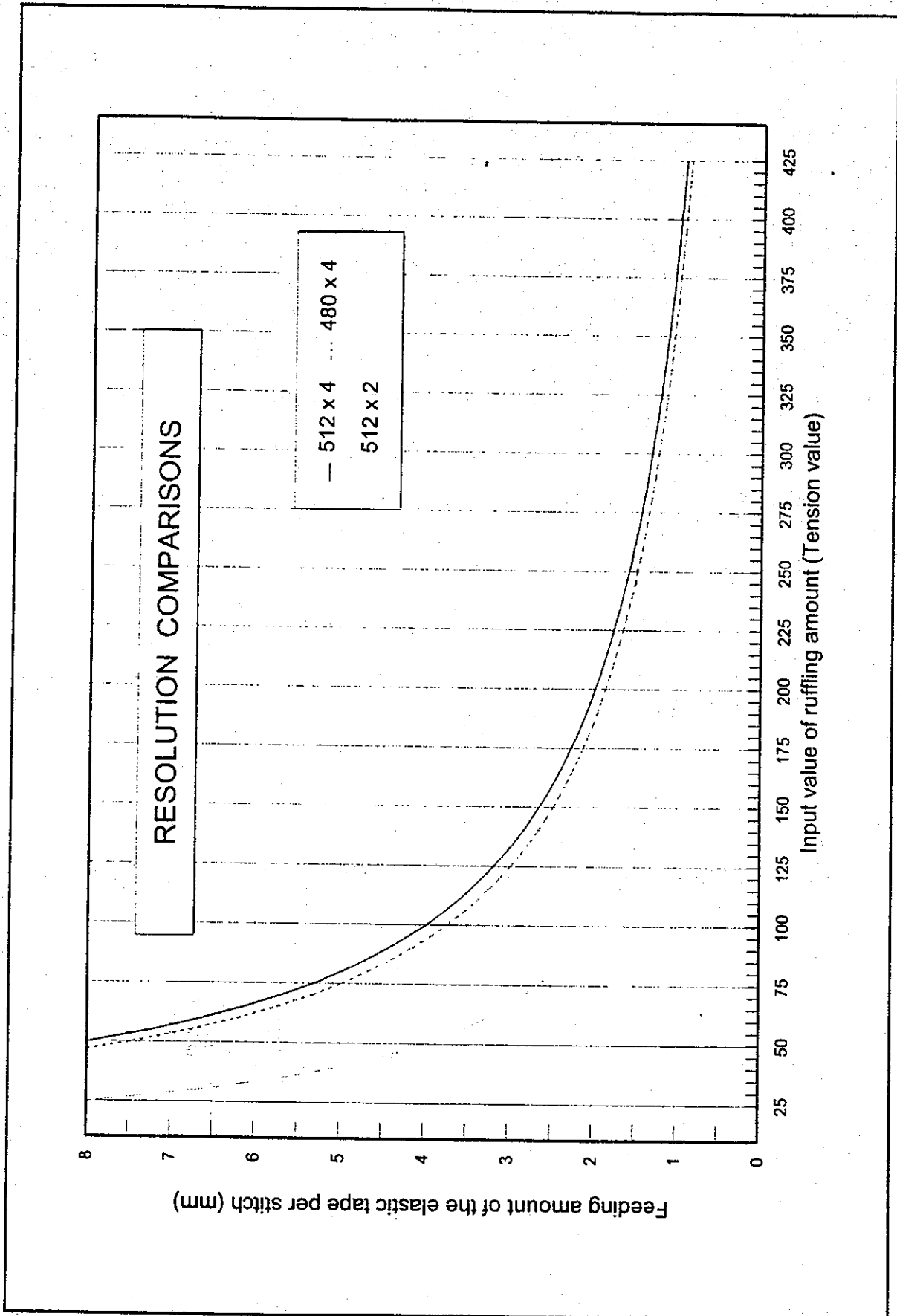




TABLE 1 - CLUTCH MOTOR - 512 x 4				
Input value of ruffling amount (tension)	Feeding amount of the elastic tape per stitch (mm)	Feeding amount of the elastic tape per stitch (in.)	Equivalent number of stitches per inch	Ruffling amount
25	15.89	0.63	1.60	 Decrease
50	7.95	0.31	3.20	
75	5.30	0.21	4.79	
85	4.67	0.18	5.43	
100	3.97	0.16	6.39	
115	3.45	0.14	7.35	
125	3.18	0.13	7.99	
135	2.94	0.12	8.63	
150	2.65	0.10	9.59	
165	2.41	0.09	10.55	
175	2.27	0.09	11.19	
185	2.15	0.08	11.83	
200	1.99	0.08	12.79	
215	1.85	0.07	13.74	
225	1.77	0.07	14.38	
235	1.69	0.07	15.02	Increase 
250	1.59	0.06	15.98	
275	1.44	0.06	17.58	
300	1.32	0.05	19.18	
325	1.22	0.05	20.78	
350	1.14	0.04	22.38	
375	1.06	0.04	23.97	
400	0.99	0.04	25.57	

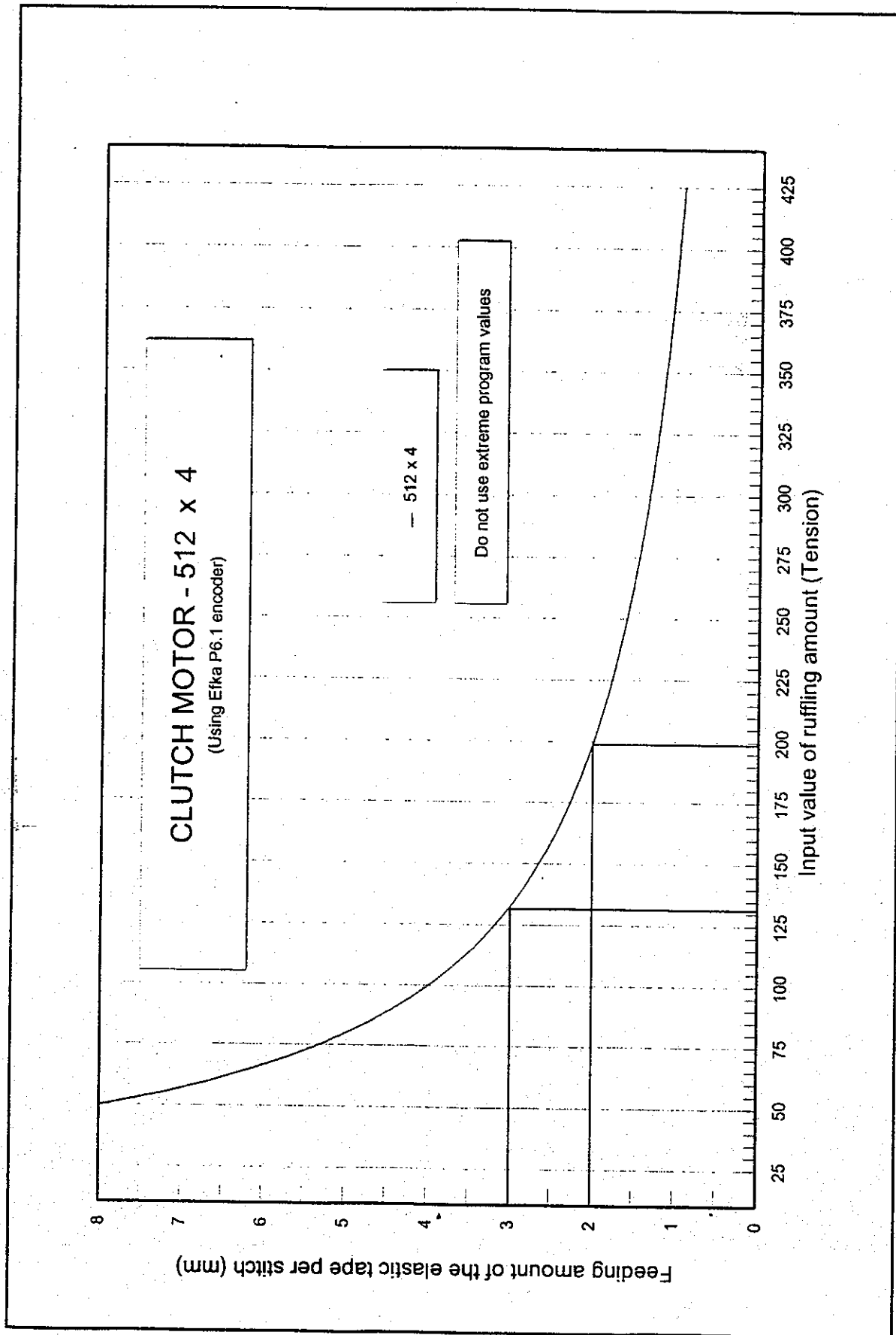




TABLE 2 - EFKA US80A - 512 x 2

Input value of ruffling amount (tension)	Feeding amount of the elastic tape per stitch (mm)	Feeding amount of the elastic tape per stitch (in.)	Equivalent number of stitches per inch	Ruffling amount
25	7.95	0.31	3.20	 Decrease
50	3.97	0.16	6.39	
75	2.65	0.10	9.59	
85	2.34	0.09	10.87	
100	1.99	0.08	12.79	
115	1.73	0.07	14.70	
125	1.59	0.06	15.98	
135	1.47	0.06	17.26	
150	1.32	0.05	19.18	
165	1.20	0.05	21.10	
175	1.14	0.04	22.38	Increase 
185	1.07	0.04	23.65	
200	0.99	0.04	25.57	
215	0.92	0.04	27.49	
225	0.88	0.03	28.77	
235	0.85	0.03	30.05	
250	0.79	0.03	31.96	
275	0.72	0.03	35.16	
300	0.66	0.03	38.36	
325	0.61	0.02	41.55	
350	0.57	0.02	44.75	
375	0.53	0.02	47.95	
400	0.50	0.02	51.14	

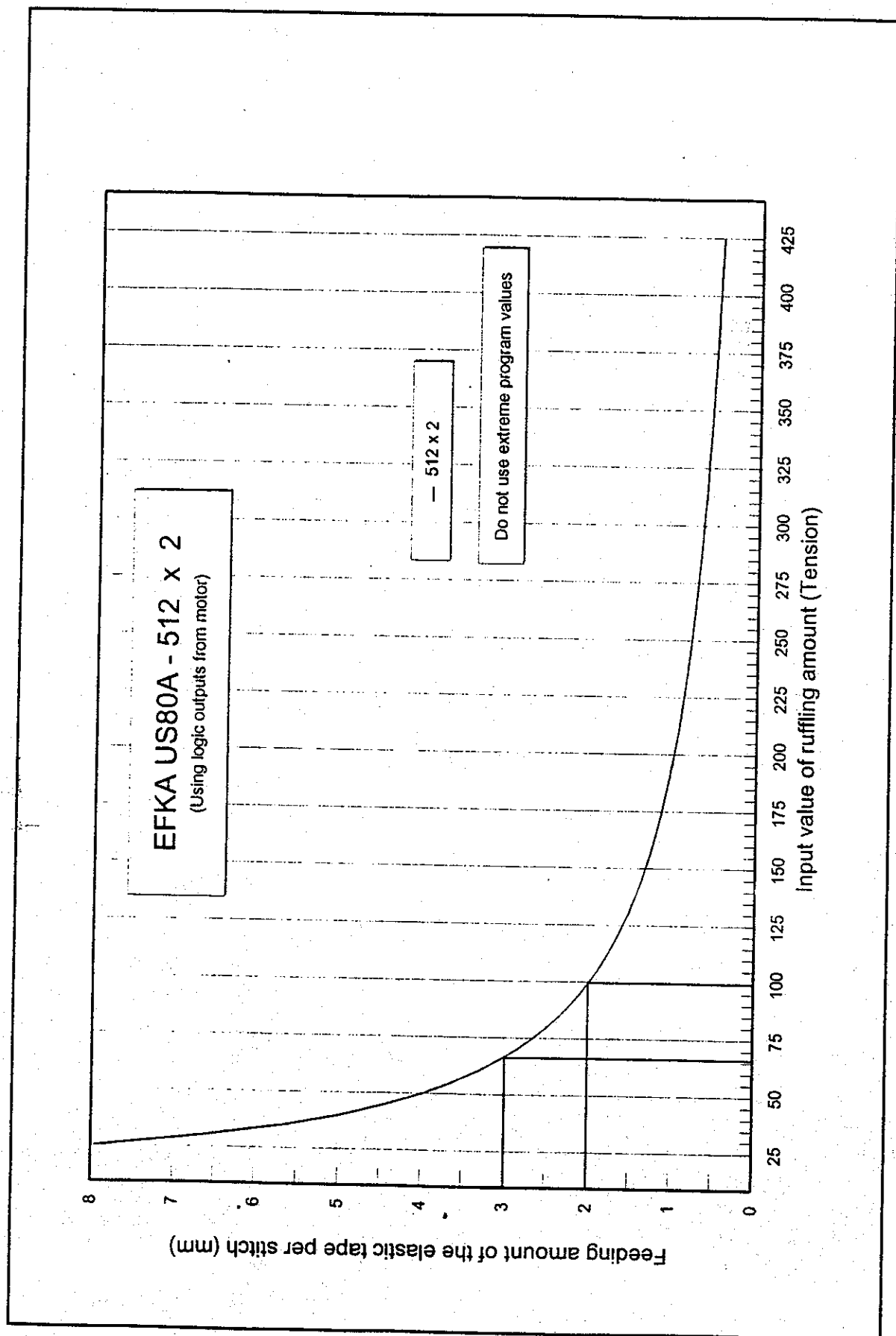




TABLE 3 - QUICK MOTORS - 480 x 4				
Input value of ruffling amount (tension)	Feeding amount of the elastic tape per stitch (mm)	Feeding amount of the elastic tape per stitch (in.)	Equivalent number of stitches per inch	Ruffling amount
25	14.90	0.59	1.70	 Decrease
50	7.45	0.29	3.41	
75	4.97	0.20	5.11	
85	4.38	0.17	5.80	
100	3.72	0.15	6.82	
115	3.24	0.13	7.84	
125	2.98	0.12	8.52	
135	2.76	0.11	9.21	
150	2.48	0.10	10.23	
165	2.26	0.09	11.25	
175	2.13	0.08	11.93	
185	2.01	0.08	12.62	
200	1.86	0.07	13.64	
215	1.73	0.07	14.66	
225	1.66	0.07	15.34	
235	1.59	0.06	16.03	Increase 
250	1.49	0.06	17.05	
275	1.35	0.05	18.75	
300	1.24	0.05	20.46	
325	1.15	0.05	22.16	
350	1.06	0.04	23.87	
375	0.99	0.04	25.57	
400	0.93	0.04	27.28	

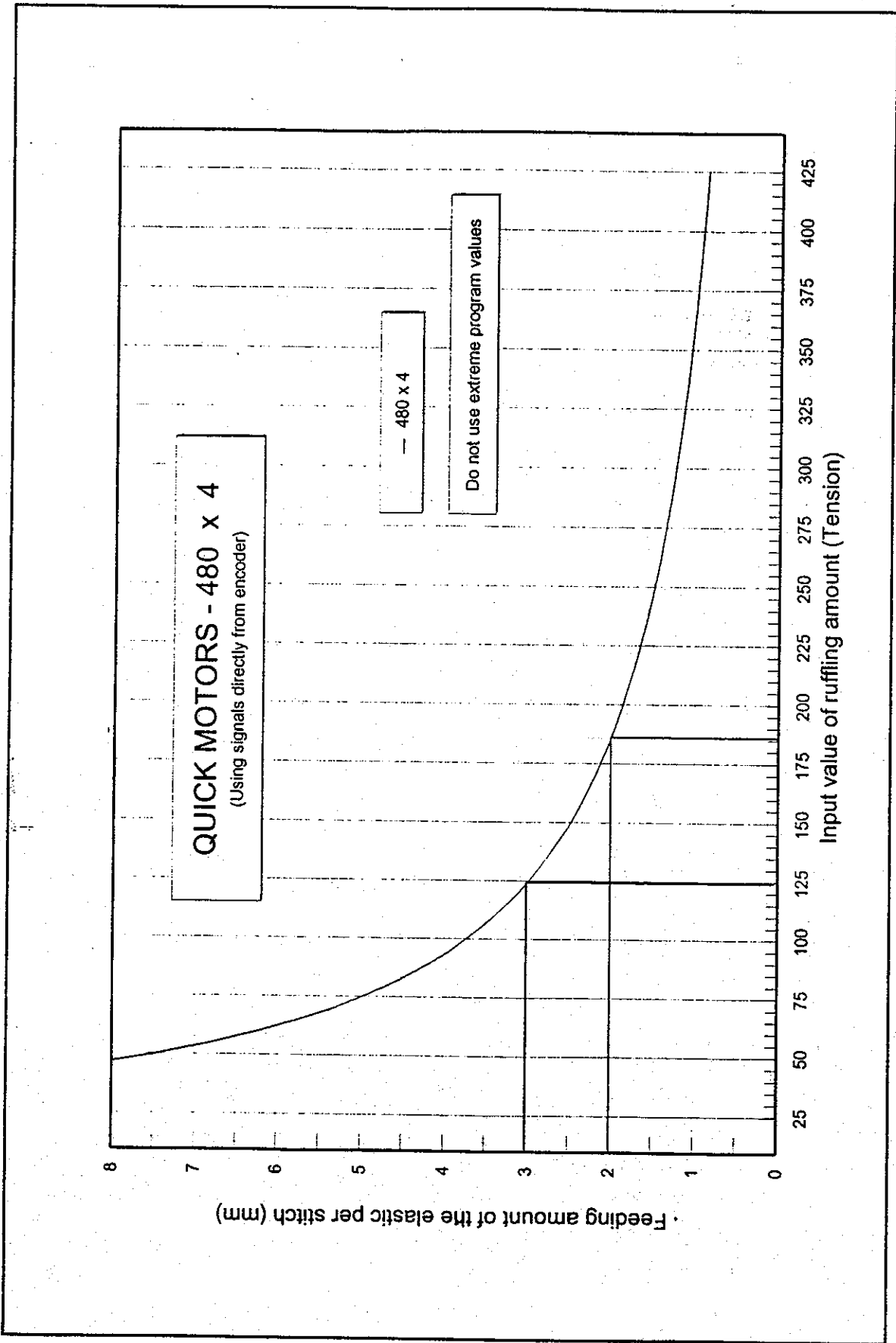


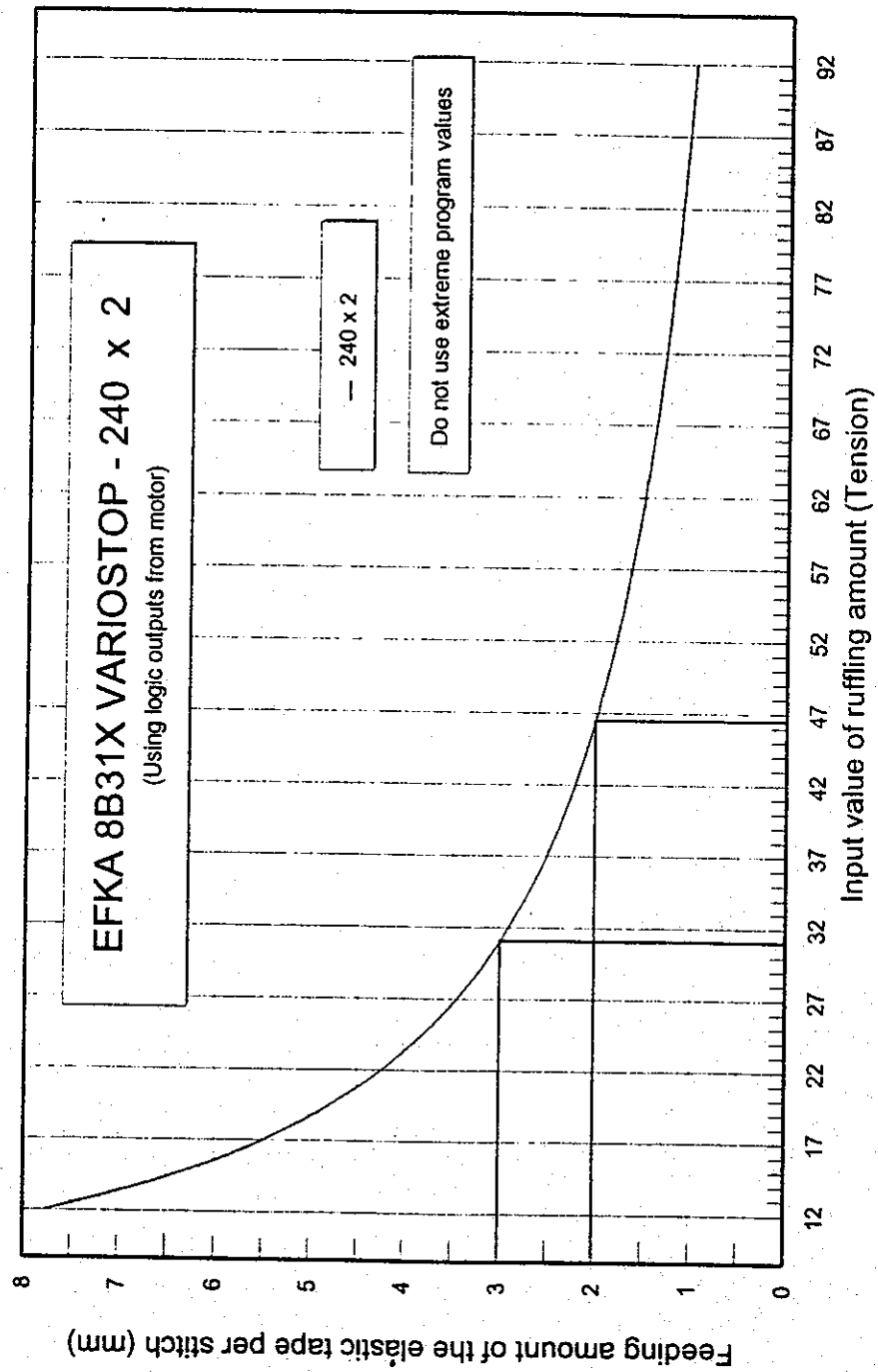
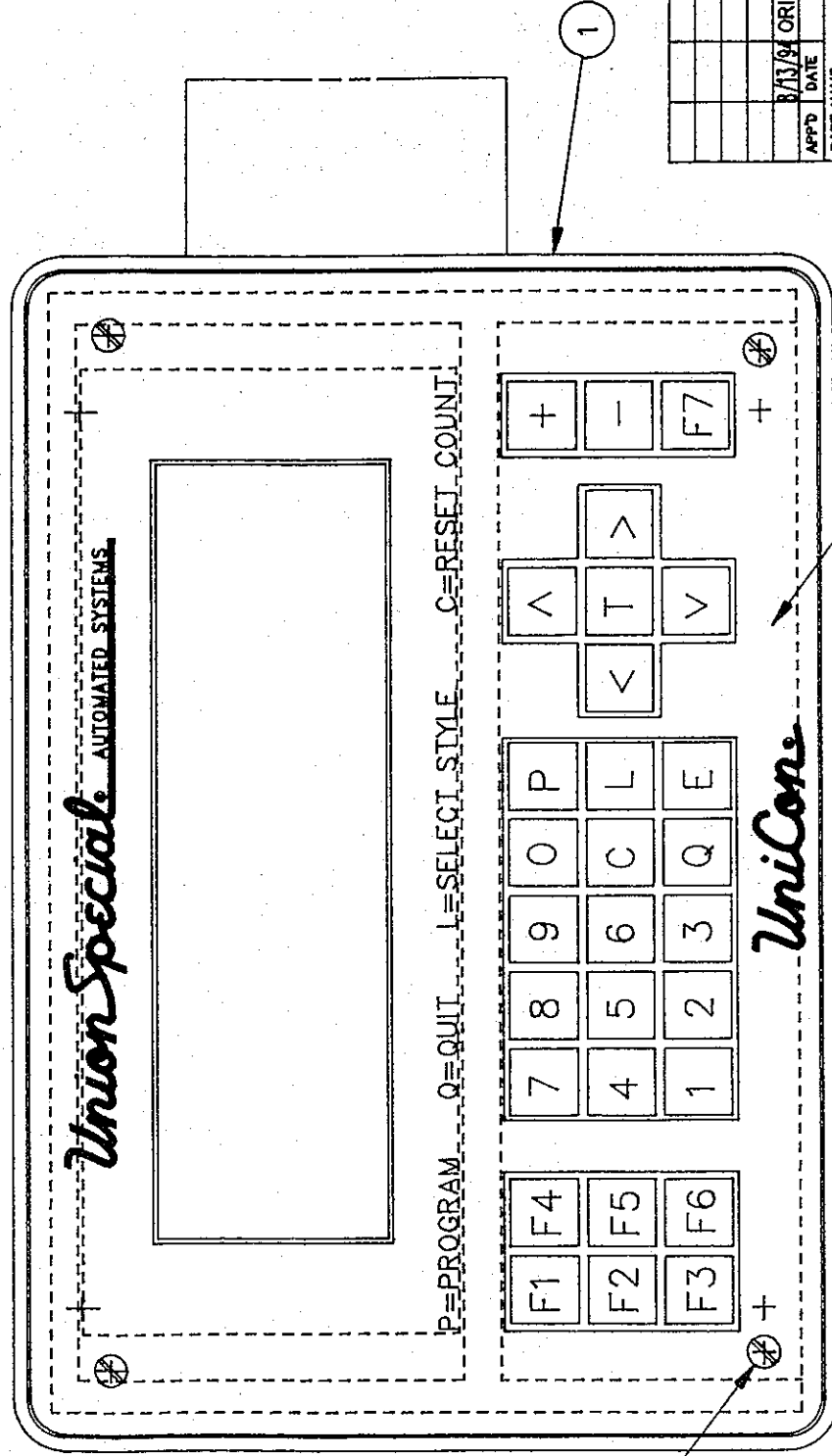


CHART 3

TABLE 4 - EFKA 8B31X VARIOSTOP - 240 x 2

Input value of ruffling amount (tension)	Feeding amount of the elastic tape per stitch (mm)	Feeding amount of the elastic tape per stitch (in.)	Equivalent number of stitches per inch	Ruffling amount
12	7.76	0.31	3.27	 Decrease
17	5.48	0.22	4.64	
22	4.23	0.17	6.00	
24	3.88	0.15	6.55	
26	3.58	0.14	7.09	
28	3.33	0.13	7.64	
30	3.10	0.12	8.18	
32	2.91	0.11	8.73	
34	2.74	0.11	9.27	
38	2.45	0.10	10.37	 Increase 
40	2.33	0.09	10.91	
42	2.22	0.09	11.46	
44	2.12	0.08	12.00	
46	2.02	0.08	12.55	
48	1.94	0.08	13.09	
50	1.86	0.07	13.64	
52	1.79	0.07	14.18	
57	1.63	0.06	15.55	
62	1.50	0.06	16.91	
72	1.29	0.05	19.64	
77	1.21	0.05	21.00	
82	1.14	0.04	22.37	
87	1.07	0.04	23.73	



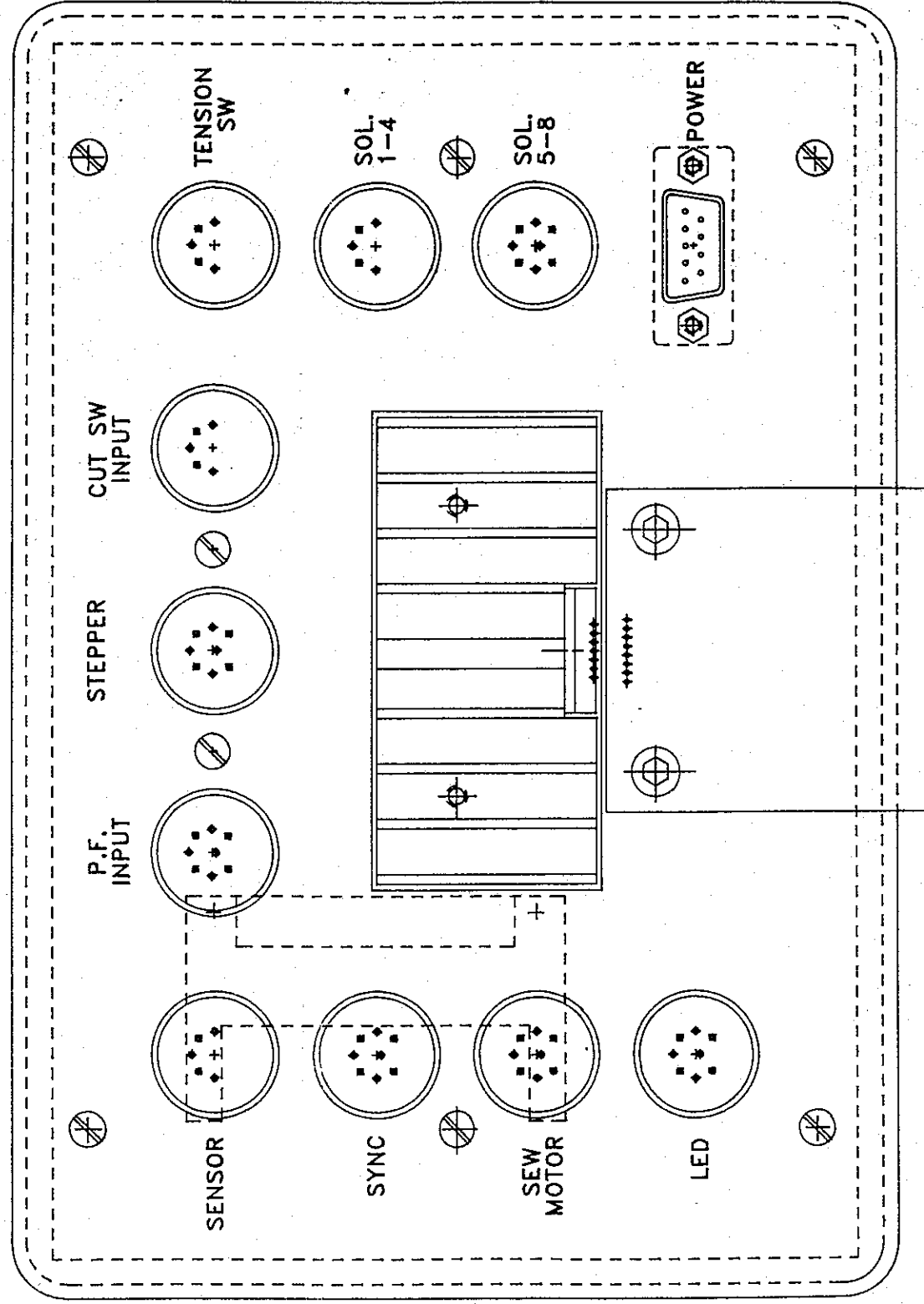
[illegible]

3	4	#4-40 x 3/16 BIND HD. SCREW	228298
2	1	PANEL-DISPLAY	AS87-1006
1	1	UNICON MICRO TERMINAL ASSEM.	2884W3
DET.	AMT	MATERIAL/DESCRIPTION	PART NO.

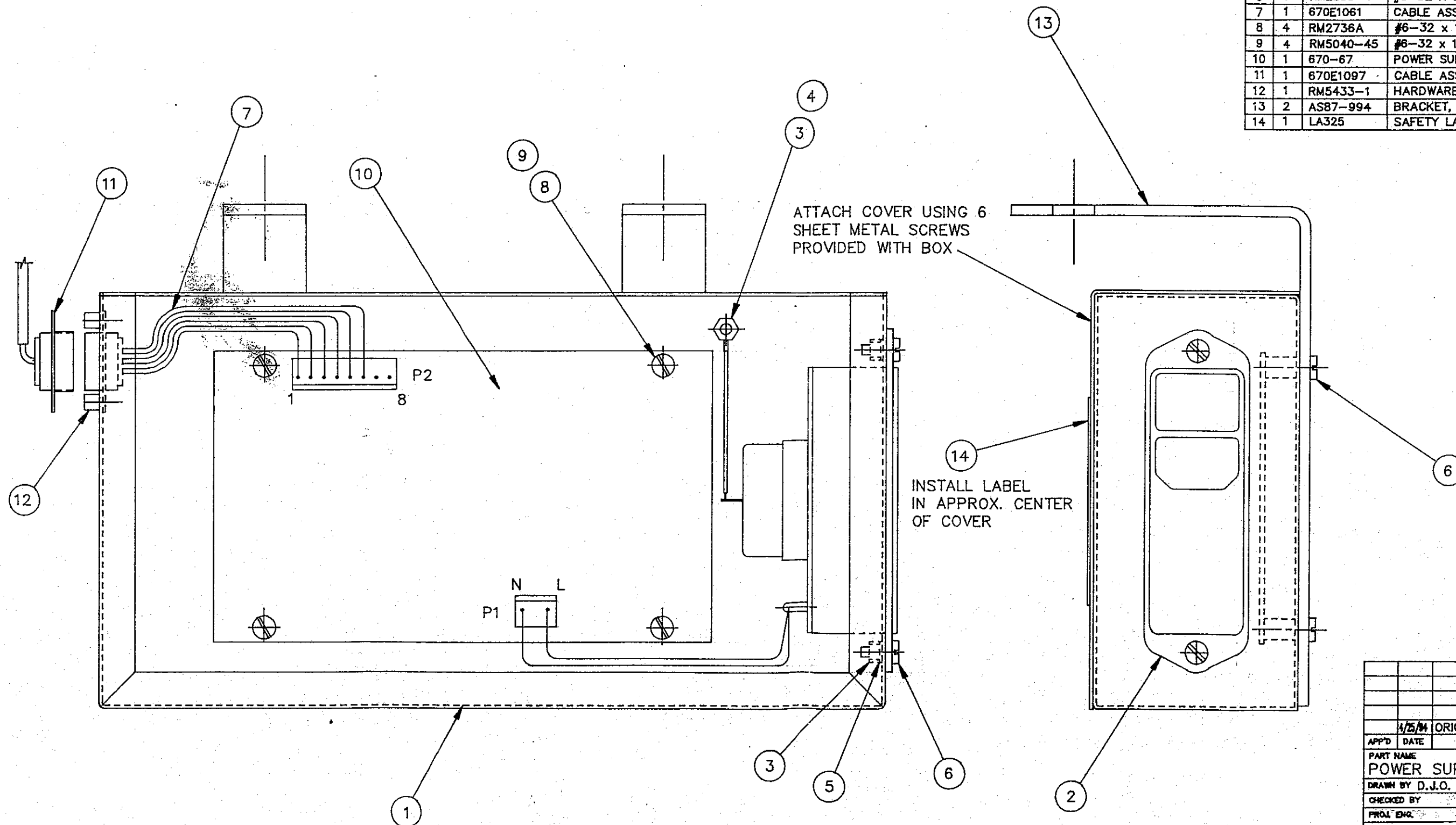
PROPRIETARY INFORMATION
UNION SPECIAL CORPORATION -- CHARLOTTE NC
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SIMILAR TO: 2884N4, RM6533

1 PER UNIT

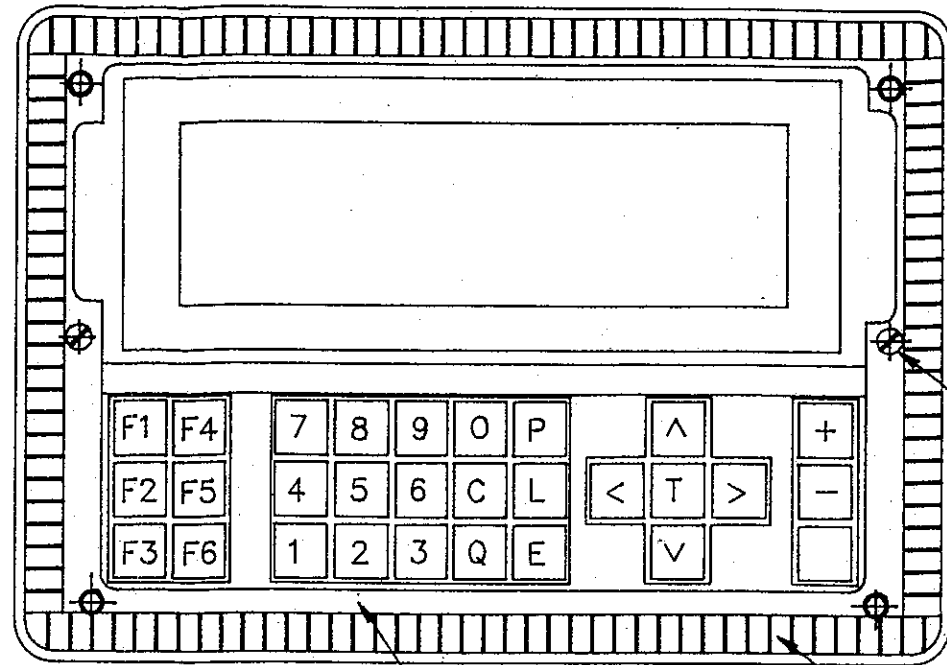
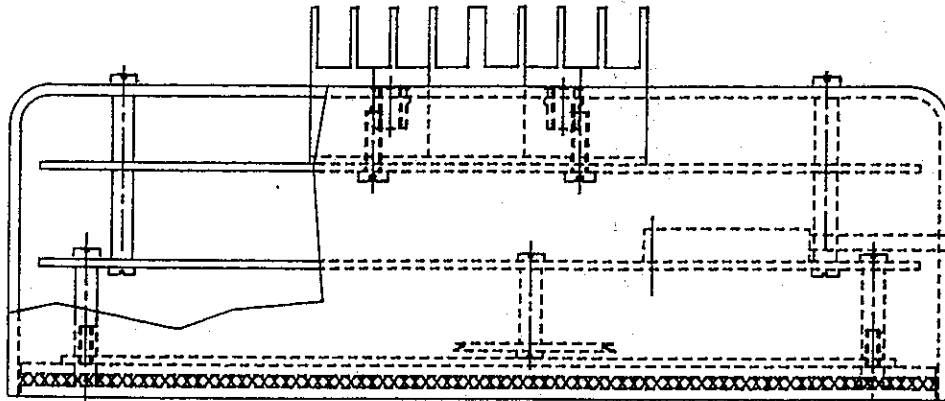
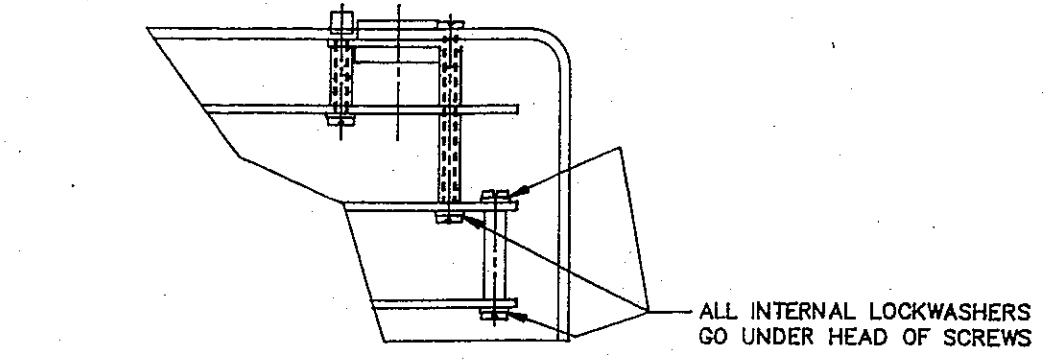


DET.	AM'T	PART NO.	MATERIAL / DESCRIPTION
1	1	AS87-1063	ENCLOSURE, POWER SUPPLY
2	1	RM6507	FILTER/SWITCH / CABLE ASSEM.
3	3	RM2791-2	#6-32 HEX NUT
4	1	RM2733A	#6-32 x 1/2 BIND. HD. SCREW
5	2	RM3993-6	#6-32 LOCK WASHER
6	6	RM2805-4	#6-32 x 3/8 BIND. HD. SCREW
7	1	670E1061	CABLE ASSEM., MICRO POWER BOX
8	4	RM2736A	#6-32 x 1/4 BIND. HD. SCREW
9	4	RM5040-45	#6-32 x 1/2 STANDOFF
10	1	670-67	POWER SUPPLY, 24V/2A, 5V/6A
11	1	670E1097	CABLE ASSEM., 24V TO MICRO ASSEM.
12	1	RM5433-1	HARDWARE, D-SUB
13	2	AS87-994	BRACKET, POWER SUPPLY
14	1	LA325	SAFETY LABEL



4/25/94	ORIGINATE	DJO
APP'D	DATE	REVISIONS
PART NAME		C.R.NO.
POWER SUPPLY ASSEM., MICRO		INT.
DRAWN BY D.J.O.	DATE 4-25-94	
CHECKED BY	SCALE 1"=1"	
PROJ. ENGR.	DWG. SIZE	
DEV. MGR.		
APPROVED		
UNION SPECIAL CORPORATION		
AUTOMATED SYSTEMS DIVISION		
CHARLOTTE, NC.		

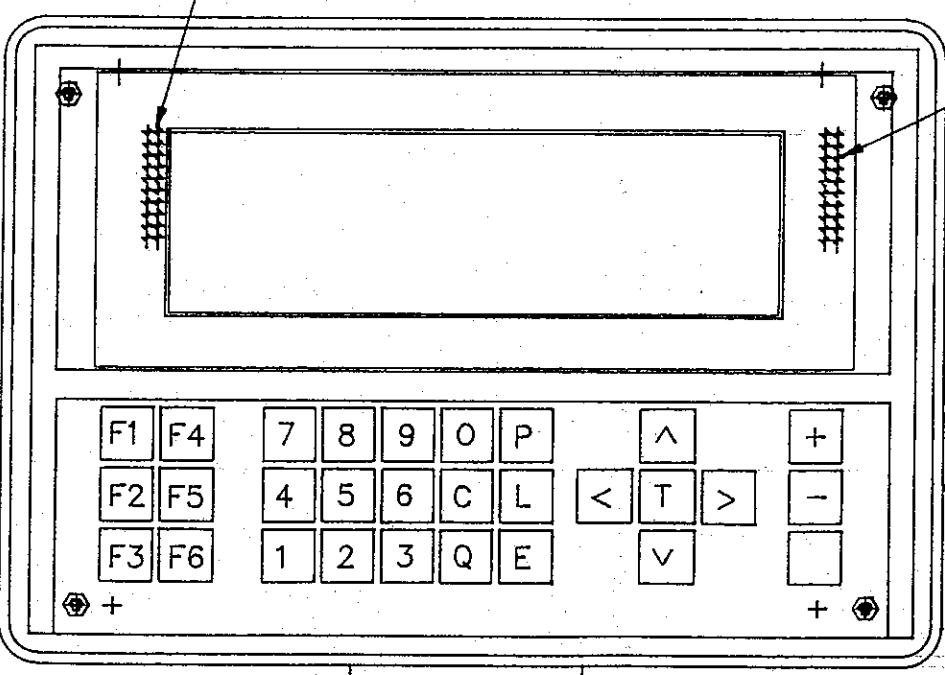
DET.	AM'T	PART NO.	MATERIAL/DESCRIPTION
1	1	AS87-1005	ENCLOSURE, MICRO-BOX
2	1	RM6515	DISPLAY ASSEM.
3	1	RM4480	BOARD ASSEM. CPU
4	1	RM6518	KEY BOARD ASSEM.
5	3	RM5433-1	HARDWARE, D-SUB
6	8	RM5040-50	STANDOFF, #4-40 x 9/16 LG.
7	2	RM4481-4	#4-40 x 3/8 BIND HD. SCREW
8	22	RM4481-6	#4-40 x 1/4 BIND HD. SCREW
9	8	RM5040-34	STANDOFF #4-40 x 5/8 LG.
10	8	RM5040-35	STANDOFF, #4-40 x 3/4 LG.
11	2	RM5040-15	NYLON SPACER
12	4	RM4481-6	#4-40 x 1" BIND HD. SCREW
13	1	RM4482	BOARD ASSEM. I/O
14	2	AS87-1001	GUIDE, MEMORY CARD
15	20	RM2747-1	#4 INT. L.W.
16	1	AS87-1004	PLATE, EMI
17	21 FT.	RM4489	SHIELDING, EMI
18	1	670E1092C	CABLE ASSEM. CPU PD5 TO I/O
19	1	670E1091A	CABLE ASSEM. CPU PD2 TO I/O
20	1	670E1091B	CABLE ASSEM. CPU PD3 TO I/O
21	1	670E1092A	CABLE ASSEM. CPU PD1 TO I/O
22	1	670E1092B	CABLE ASSEM. CPU PD4 TO I/O
23	1	AS87-896	BRACKET, DISPLAY
24	2	2285386	#10-32 x 1/2 S.H.C.S.
25	4	RM2747-4	#10 INTERNAL L.W.
26	2	RM3289-7	#10-32 x 1/4 B.H.M.S.
27	1	670E1140	CABLE ASSEM. I/O JP12 TO DISPLAY
28	1	670E1149	CABLE ASSEM. CPU JP1 TO DISPLAY



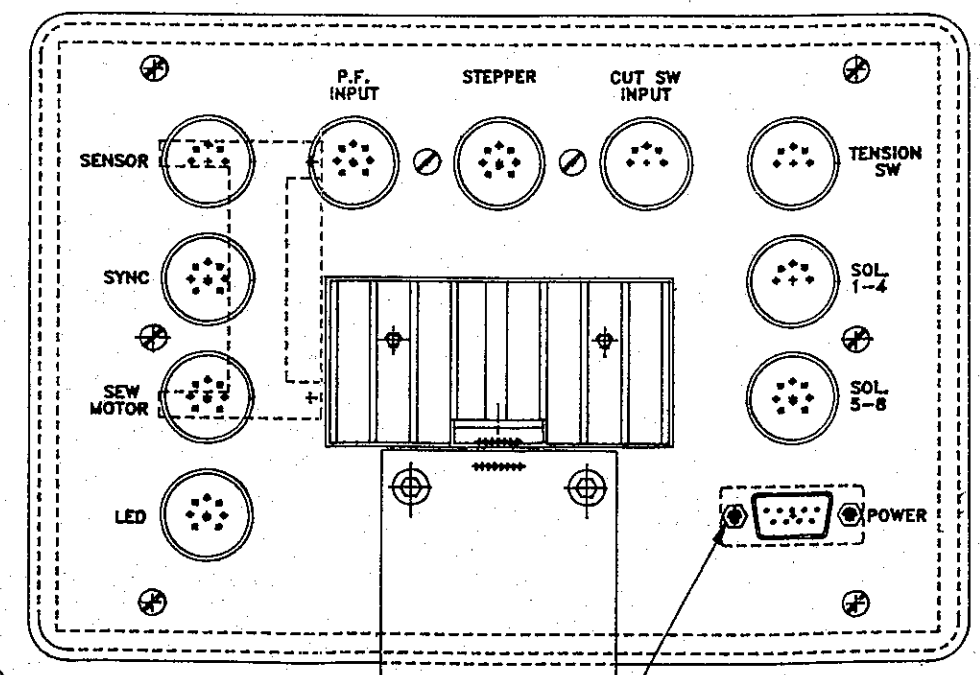
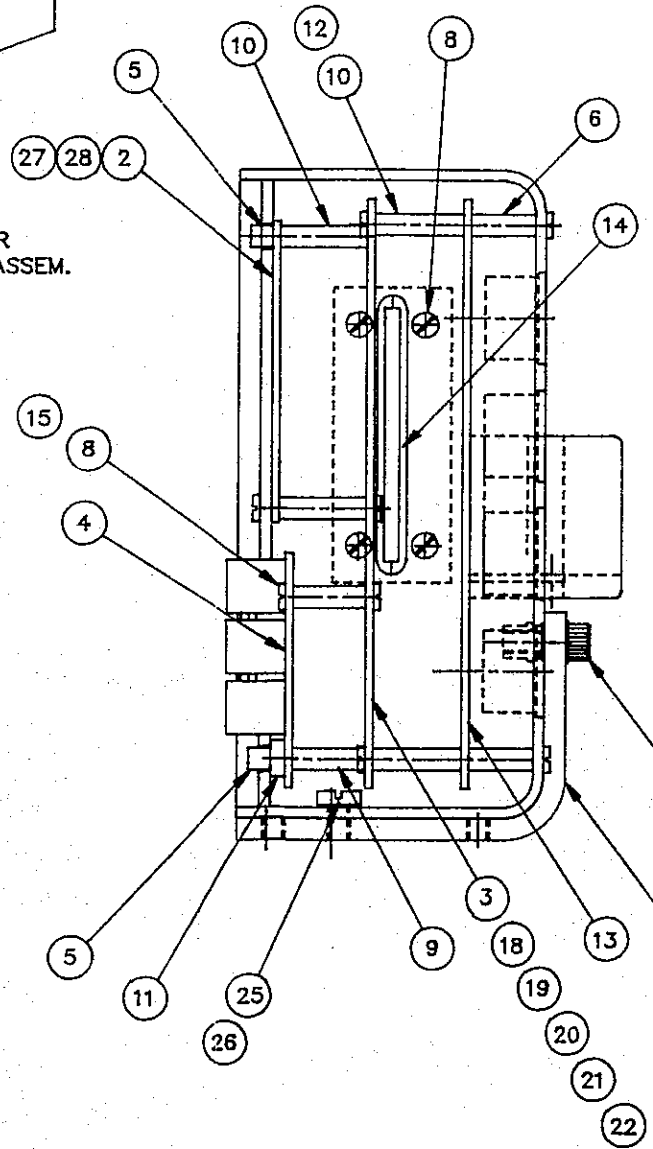
MOUNT EMI STRIP WITH OPEN END FACING OUT SO THAT IT WILL PUSH OUT TOWARDS THE EDGE OF THE PLATE.

EMI PANEL MOUNTS WITH ITEMS 7 AND 15, THEN MOUNT ITEM 17 AS DESCRIBED.

EMI SHIELDING NOTE:
CLEAN SURFACE WITH SAFETY KLEEN SOLVENT ON AREA THAT GASKET WILL BE MOUNTED. REMOVE ALL DIRT AND OIL. PEEL OFF PROTECTIVE BACKING FROM GASKET AND MOUNT EMI STRIP. AVOID FINGER CONTACT WITH ADHESIVE STRIP OR CLEAN AREA ON EMI PANEL.



NOTE:
MOUNT ITEMS 23,24,25, & 26 TO ITEM 1 FIRST BEFORE MOUNTING ELECTRONIC ASSEMBLY INTO ENCLOSURE.



DATE		ORIGINATE		DJO	
APP'D	DATE	REVISION	CURR.	REV.	
PART NAME UNICON MICRO TERMINAL ASSEM.					
DRAWN BY		D.J.O.		DATE 12/10/93	
CHECKED BY		M.P. 7/28/94		SCALE 1"=1"	
PROJ. ENGR.		DJO 7/24/94		SHEET NO. 1	
REV. NO.		MA 7/28/94		SHEET NO. 1	
UNION SPECIAL CORPORATION AUTOMATED SYSTEMS DIVISION CHARLOTTE, N. C.					