MOD.580 SERVICE MANUAL

For checking each unit (any failure and its troubleshooting) using the Design Controller PE1 and for replacing and adjusting each unit using the PE1 and an analog-type tester.

Foreword

Without locating where a trouble occurred, no repair is possible. This electronic knitting machine may cause a mechanical trouble or electrical trouble.

For a mechanical trouble, how to adjust the arm unit other than a breakdown or wear is described here.

For an electrical trouble, it is hard to locate an exact trouble spot without using various instruments and electrical knowledge.

In this basic and intermediate manual, how to detect a faulty unit, replace it and adjust and check the substituted unit is described. Therefore, with the PE1 and tester, anybody can repair, replace and adjust easily.

This can be used for the SK-840/860/890

[Note by shop owner]

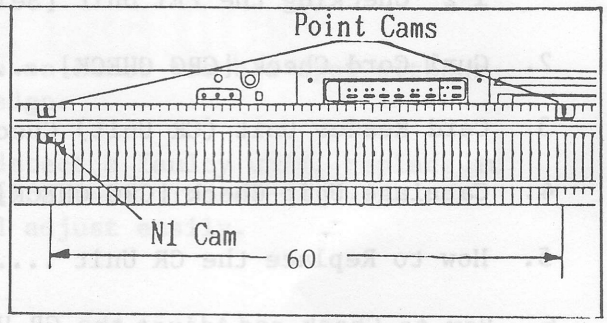
* Contents *

1. Checking the Knitting Machine and PE1 * Be sure to turn off the Power Switch after completing each item.

1-1 How to Check the Knitting Machine (Any Trouble)

Attach the Curl Cord to the Knitting Machine and Carriage

Set 60 Latch Needles to the Position B



Set the Point Cams and align the N1 Cam to the same position below the left Point Cam

Turn on the Power Switch

Press each switch of the Control Panel sequentially and check if its LED of each function has come on

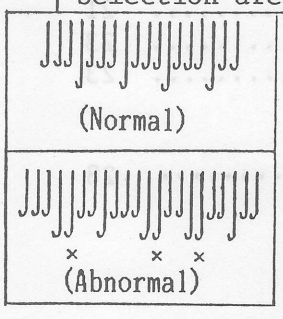
NO → Replace if any fault is found in Transformer Unit, R Board, Carriage, Curl Cord and CPU Board of Control Panel.

(1) Press the Inspection Key of Control Panel
(2) Set the Pattern Cards No. 1 (3) to the starting position
(3) Set the CR Pointer to 24
(4) Set the Cam Lever of Carriage to the Slip position
(5) Reset the Inspection Key

Operate the Carriage idly and check if the Pattern Card feeding and the Needle Selection are proper or not

NO → (1) Check if the CCP Sensors of Carriage are clean. (If not, wipe with a cotton stick)

(2) Check if the oil of Needle Selection cam is enough (Coat the oil to the Needle Selection Cam if not enough)



YES

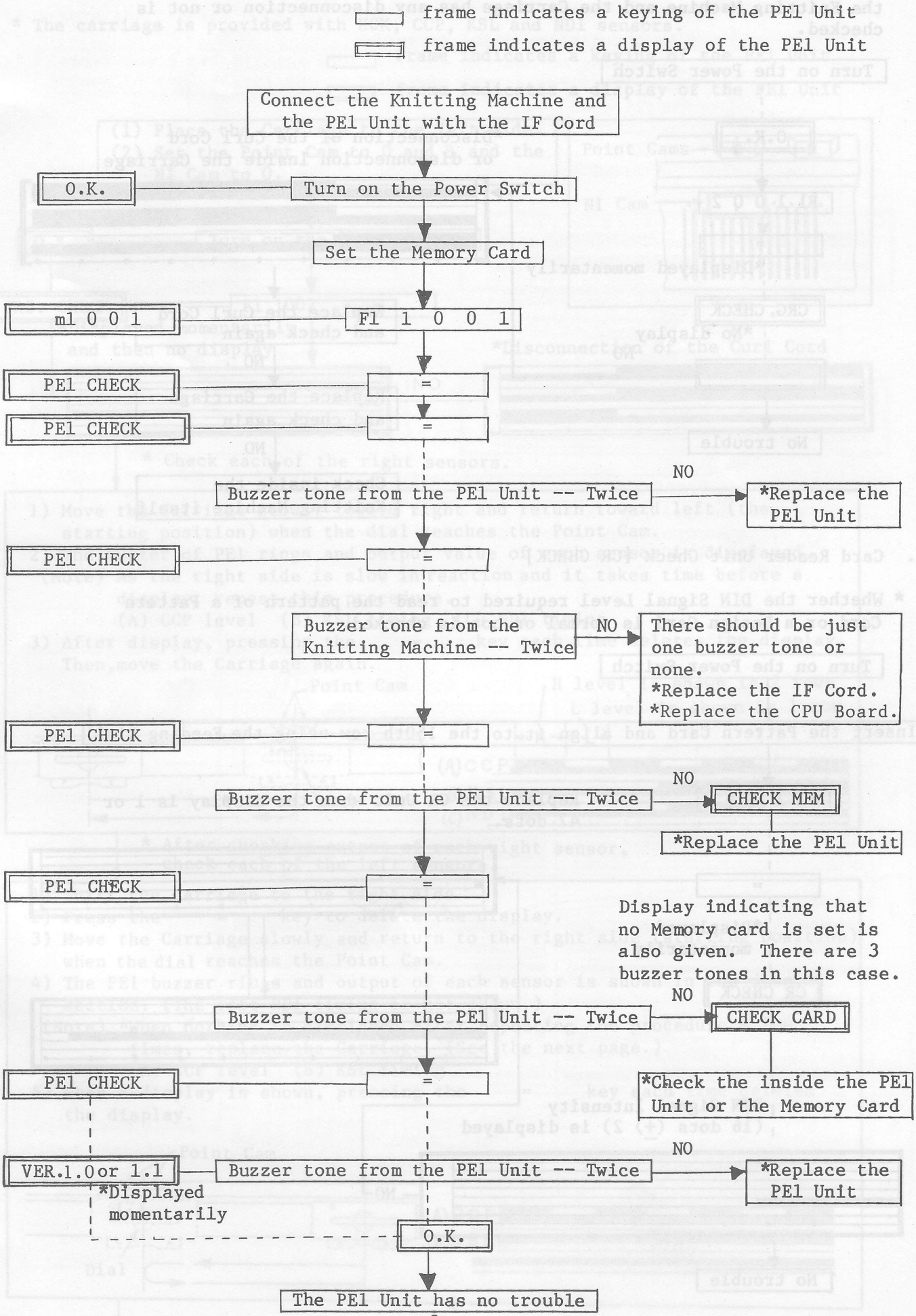
Try a knitting test

NO

Everything is proper and ready

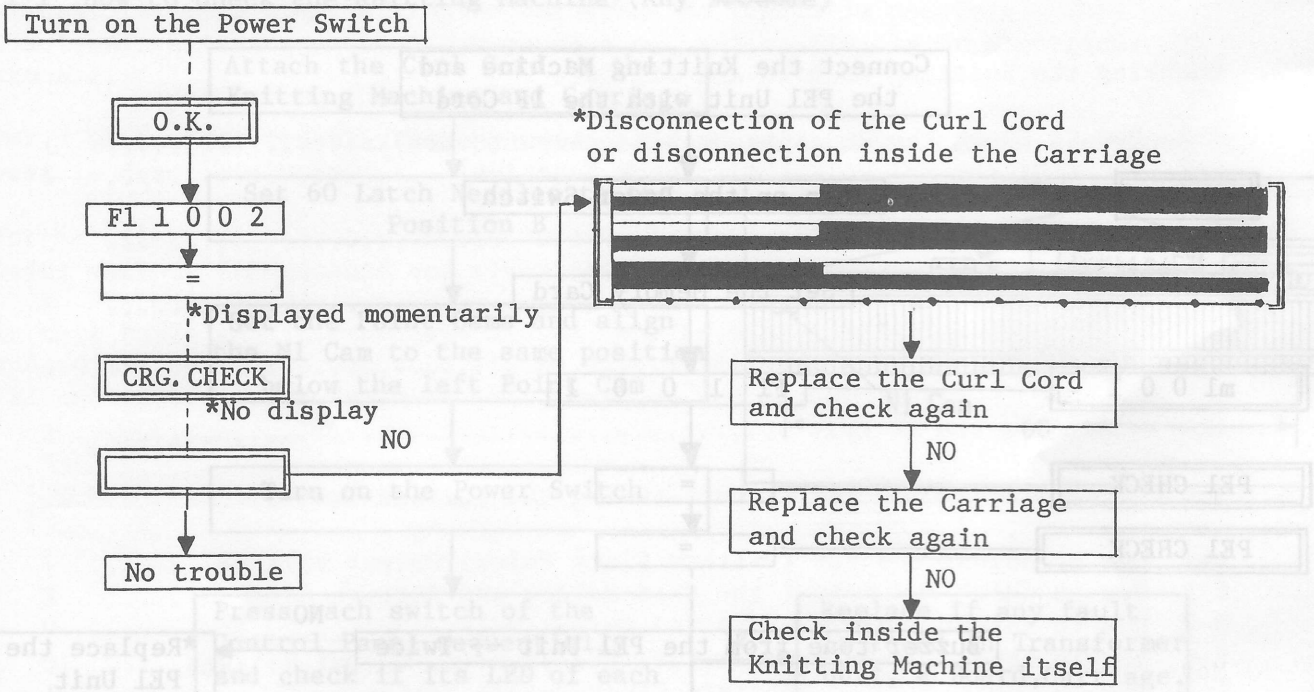
Check further, using the PE1 Unit

1-2 Checking the PE1 Unit [Self-check Function]



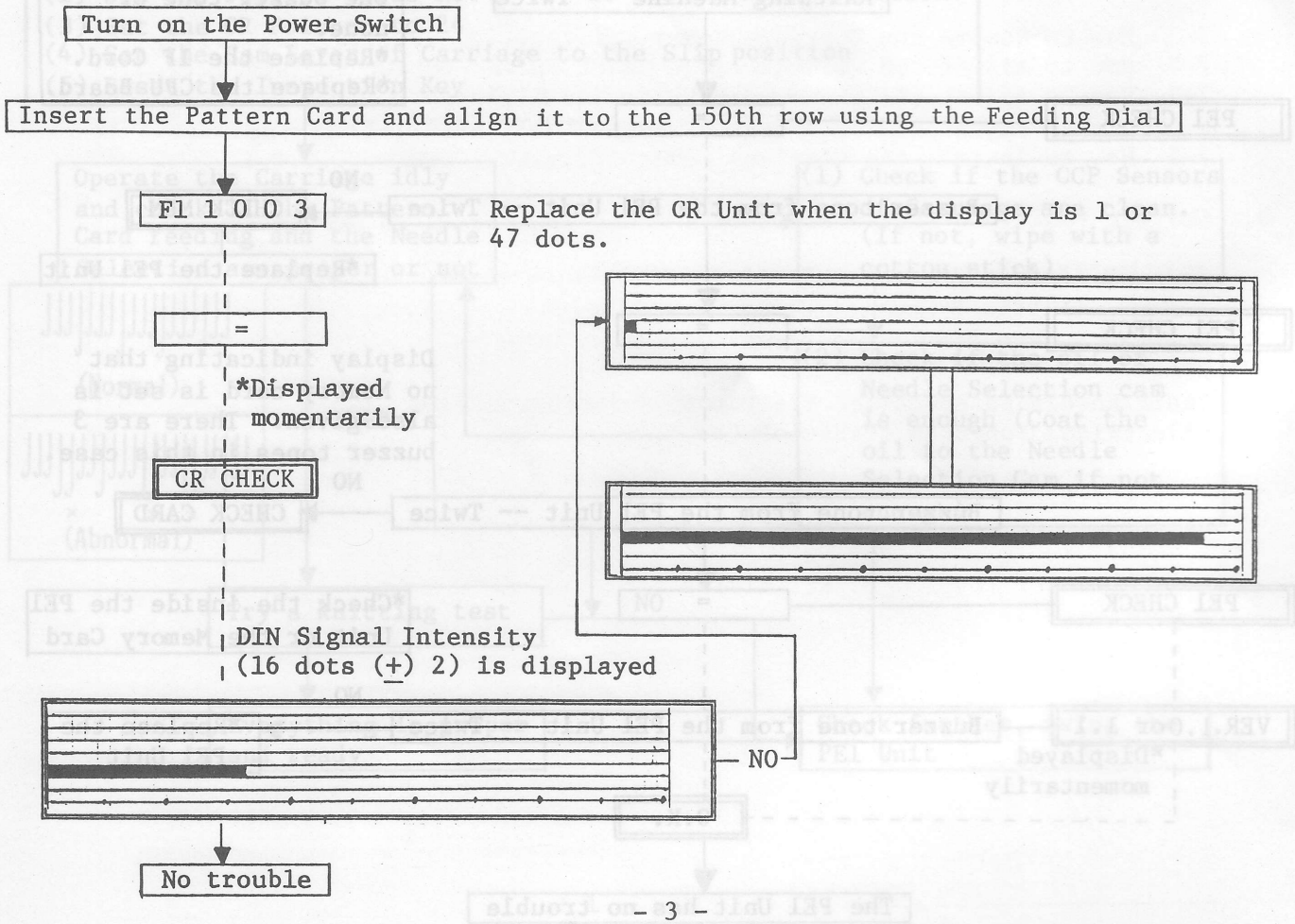
2. Curl Cord Check

* With the self-check function of PE1 Unit, whether the Curl Cord connecting the Knitting Machine and the Carriage has any disconnection or not is checked.



3. Card Reader Unit Check [CR CHECK]

* Whether the DIN Signal Level required to read the pattern of a Pattern Card or a Design Card is normal or not is checked.



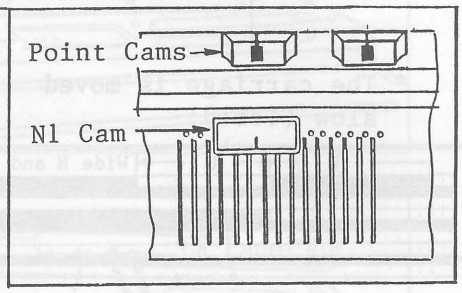
4. Carriage Unit Check [CRG.CHECK]

* The carriage is provided with HOK, CCP, KSL and ND1 sensors.

frame indicates a keying of the PE1 Unit

frame indicates a display of the PE1 Unit

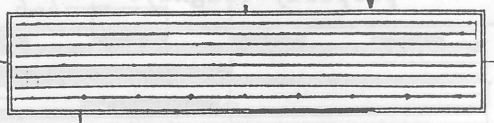
(1) Place the Carriage to the left side.
(2) Set the Point Cam to 0 and 8 and the N1 Cam to 0.



O.K. — Turn on the Power Switch

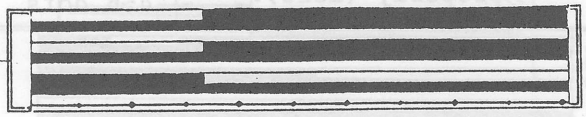
CRG. CHECK — F1 1002 =

*Displayed momentarily and then no display



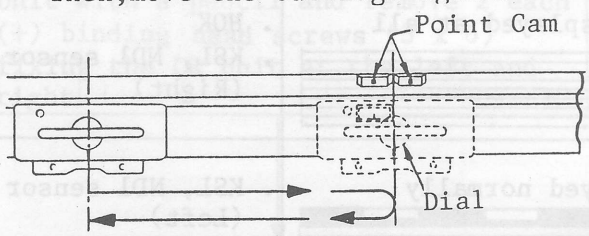
NO

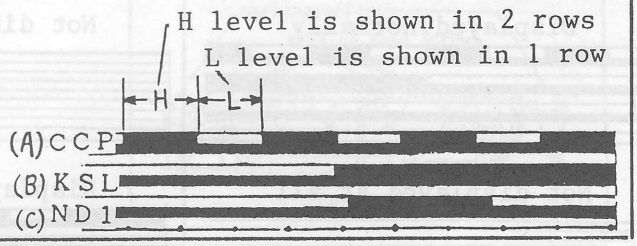
*Disconnection of the Curl Cord



* Check each of the right sensors.

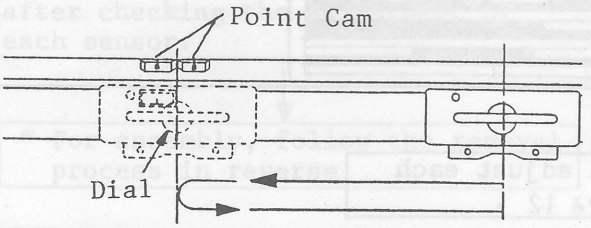
1) Move the Carriage slowly toward right and return toward left (the starting position) when the dial reaches the Point Cam.
2) The buzzer of PE1 rings and output value of each sensor is displayed.
(Note) As the right side is slow in reaction and it takes time before a display, repeat this procedure.
(A) CCP level (B) KSL timing (C) ND1 timing
3) After display, pressing the = key each time deletes the display. Then,move the Carriage again.

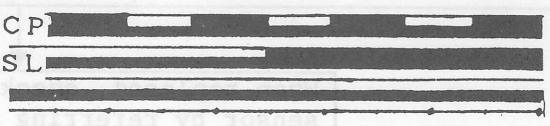




* After checking output of each right sensor, check each of the left sensors.

1) Shift the Carriage to the right side.
2) Press the = key to delete the display.
3) Move the Carriage slowly and return to the right side (starting position) when the dial reaches the Point Cam.
4) The PE1 buzzer rings and output of each sensor is shown in the display section. (The left ND1 timing is not shown.)
(Note) *When nothing is displayed after repeating the procedure a few times, replace the Carriage. (See the next page.)
(A) CCP level (B) KSL timing
5) When a display is shown, pressing the = key each time deletes the display.



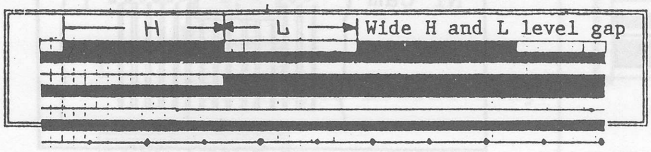


To be continued.

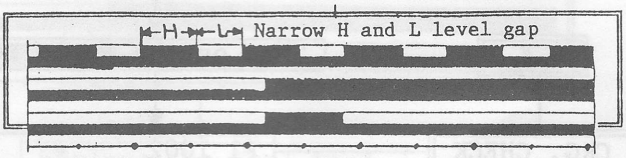
From the preceding page

* As the display value is varied depending on how the carriage is operated, repeat the procedure until a constant display is obtained.

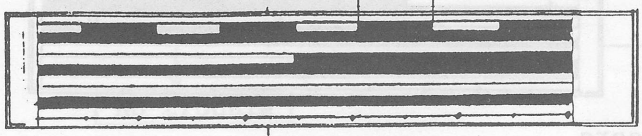
* The carriage is moved slow (left):



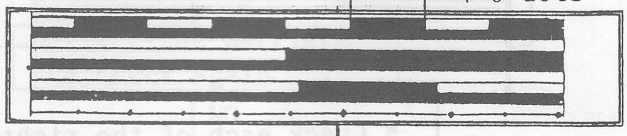
* The carriage is moved fast (right):



* The carriage is moved properly (left):



* The carriage is moved properly (right):



When the display is as in the above is not given even after several repetitions and the following displays are shown, the Carriage is out of order and has to be replaced.

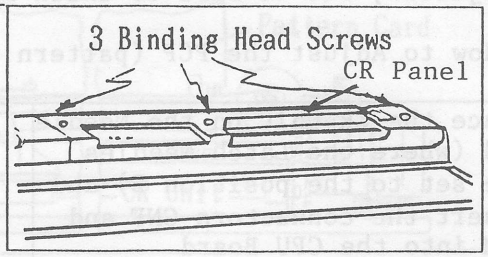
	Left	Right	Suspected trouble spot
1	Displayed normally	Not displayed at all	. HOK . KSL, ND1 sensor (Right)
2	Not displayed at all	Displayed normally	. KSL, ND1 sensor (Left)
3	Displayed normally	No ND1 display	. ND1 sensor
4	Displayed normally	All H display for CCP	. CCP sensor (Right)
5	All H display for CCP	Displayed normally	. CCP sensor (Left)

When replaced, check and adjust each sensor by referring to p. 12 .

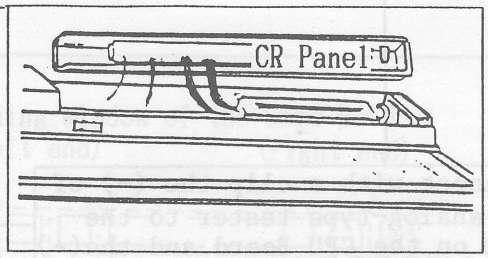
5. How to Replace the CR (Card Reader) Unit

* Remove the Pattern Card and turn off the Power Switch.

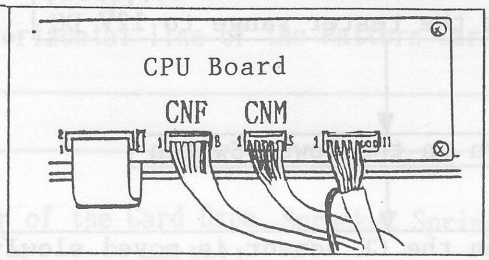
1 Remove the 3 (+) Binding Head Screws (3 x 8) fixing the CR Panel



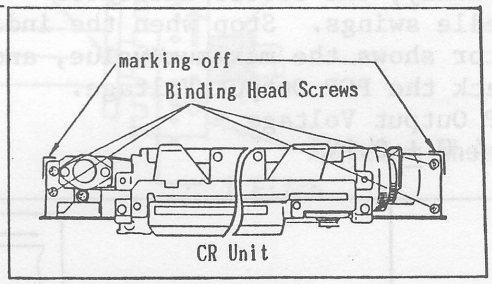
2 Open the CR Panel slowly toward the Carrying Handle



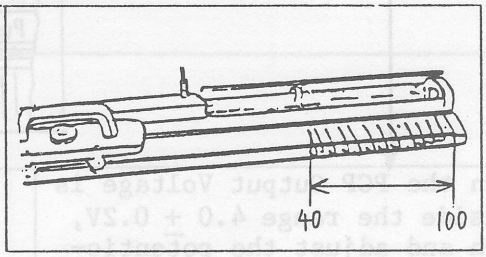
3 Remove connectors CNF and CNM of the CR Unit from the CPU Board by pulling their cords



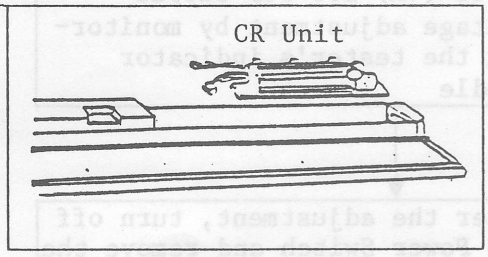
4 Mark the left and right ends of CR Unit with a pencil and remove 2 each (+) binding head screws (3 x 6) fixing the CR Unit at the left and right



5 Set the 40th to 100th Latch Needles at the right to the position B



6 Hold the left and right ends of CR unit and remove it from the case to replace with a proper CR Unit. In replacing, see the description on page 7 and install a new CR Unit after checking the adjustment of each sensor.



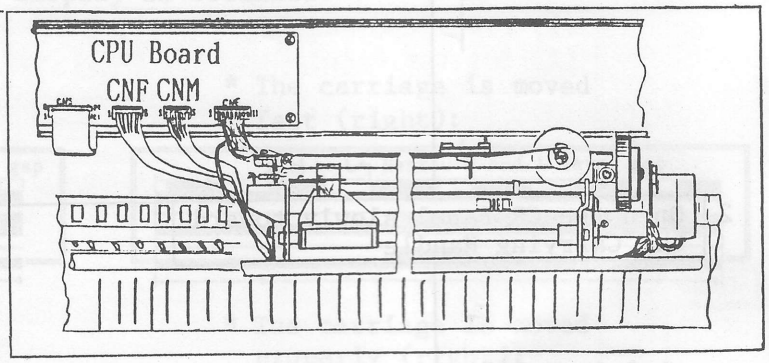
* For assembly, follow the removal process in reverse

6. How to Adjust the CR Unit (Using the PE1 Unit and Analog-type Tester)

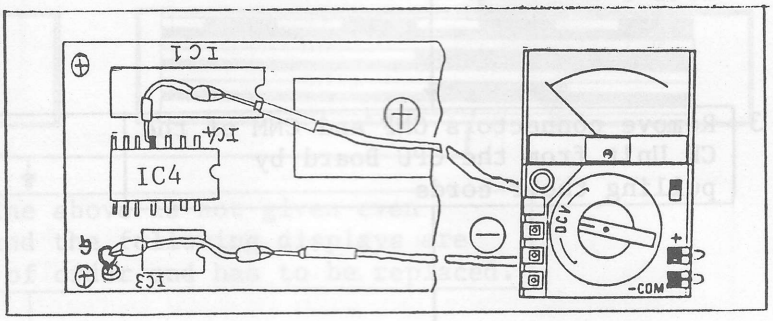
* The level of each sensor for the CR Unit replacement has been tentatively adjusted, but be sure to check again before replacement.

6-1 How to Adjust the PCP (pattern Clock Pulse) Output Voltage

1 Place the CR Unit on the Needle Bed (where the Latch Needles are set to the position B) and insert the connectors CNF and CNM into the CPU Board

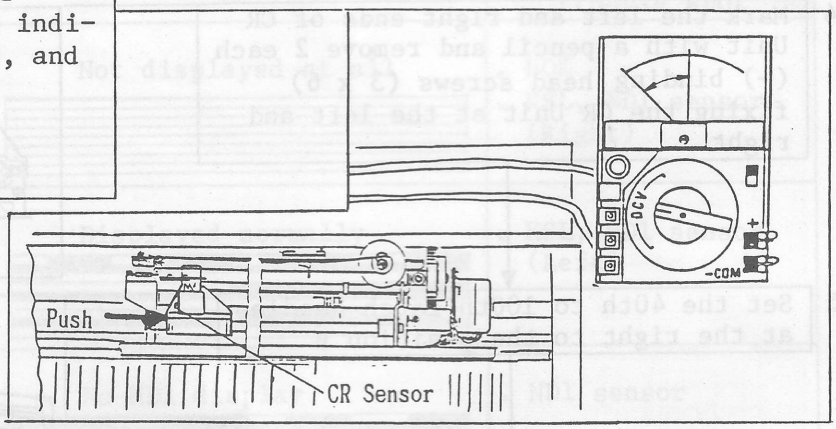


2 Connect with a clip the (-) of an analog-type tester to the GND on the CPU Board and the (+) to the 4P of IC4 (or TP-C6). Then, set the tester range to 12V DC

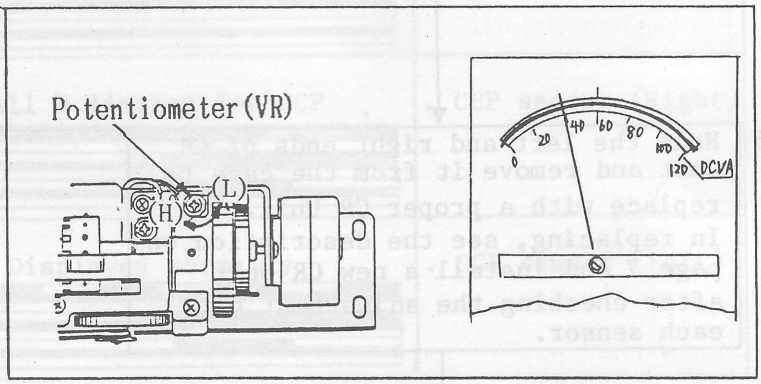


3 Turn on the Power Switch

4 When the CR sensor is moved slowly manually, the tester indicator needle swings. Stop when the indicator shows the maximum value, and check the PCP Output Voltage.
PCP Output Voltage = 4.0 ± 0.2V



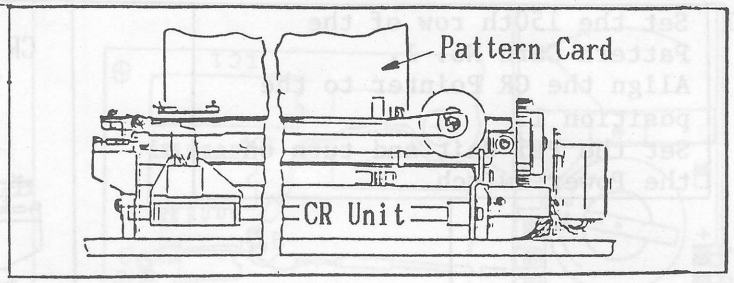
5 When the PCP Output Voltage is outside the range 4.0 ± 0.2V, turn and adjust the potentiometer (VR) for PCP Output Voltage adjustment by monitoring the tester's indicator needle



6 After the adjustment, turn off the Power Switch and remove the clip from the (+) of IC4

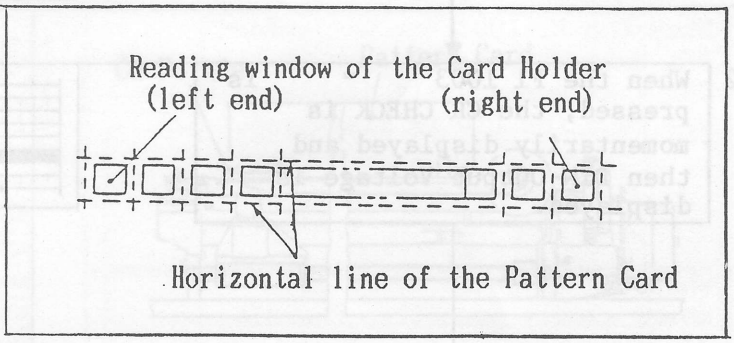
6-2 How to Check and Adjust the Card Holder and Pattern Card

1 1) Set the Pattern Card.
2) Turn on the Power Switch.

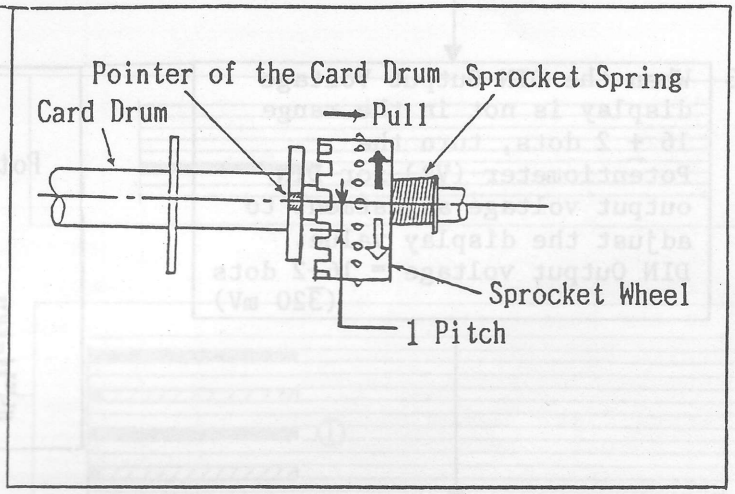


2 1) Feed the Card by 10 rows with the Feeding Dial.
2) See the Card Holder front of the CR Unit.

3 1) Check if horizontal lines of Pattern Card are seen through the Reading Window of Card Holder.
2) When horizontal lines of the Pattern Card are seen above the horizontal line width of Card Holder, adjustment is required.



4 1) Remove the Pattern Card.
2) When the Sprocket Wheel is pulled toward the Sprocket Spring, the link with the pointer of Card Drum comes off. Turn the Sprocket Wheel back and forth (white arrow indicates forward movement and the black arrow backward) for adjustment.
3) When the Sprocket Wheel groove section is shifted by one pitch, the Pattern Card position moves 0.15 mm.
4) Turning the Sprocket Wheel (backward) moves the Pattern Card downward.
5) Turning the Sprocket Wheel (forward) moves the Pattern Card upward.

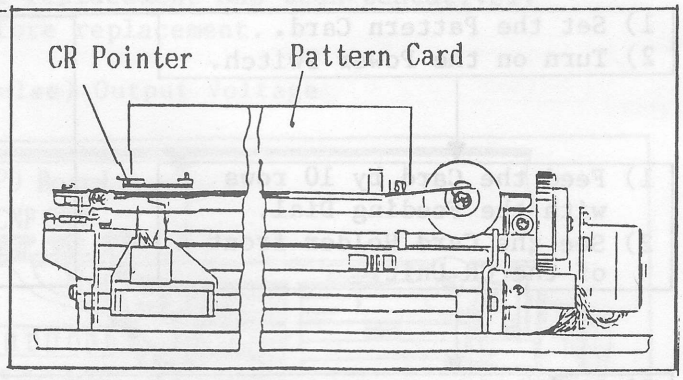


5 Set the Pattern Card again and recheck.

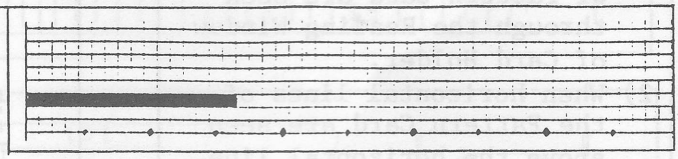
6 After the check or adjustment, remove the Pattern Card and turn off the Power Switch.

6-3 How to Adjust the DIN Output Voltage

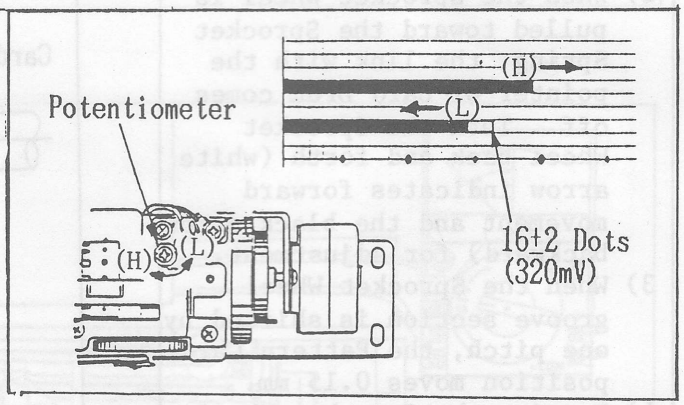
1 Set the 150th row of the Pattern Card No. 1.
Align the CR Pointer to the position 1.
Set the PE1 Unit and turn on the Power Switch.



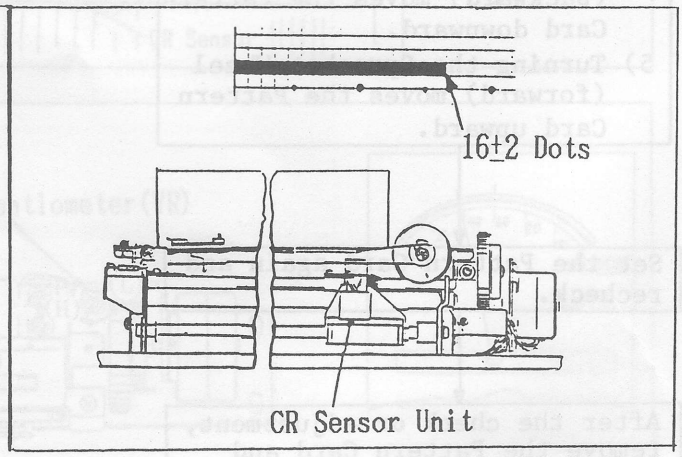
2 When the F1 1003 = is pressed, the CR CHECK is momentarily displayed and then DIN Output Voltage is displayed.



3 When the DIN Output Voltage display is not in the range 16 ± 2 dots, turn the Potentiometer (VR) for DIN output voltage adjustment to adjust the display value.
DIN Output voltage = 16±2 dots
(320 mV)



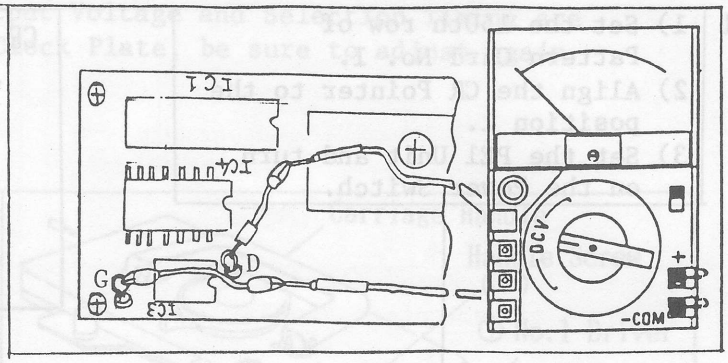
4 Move the CR Sensor Unit to the right and manually and check the DIN Output Voltage at the right end. When the display is not in the range 16 ± 2 dots (Note), move the CR box forward and backward for adjustment.



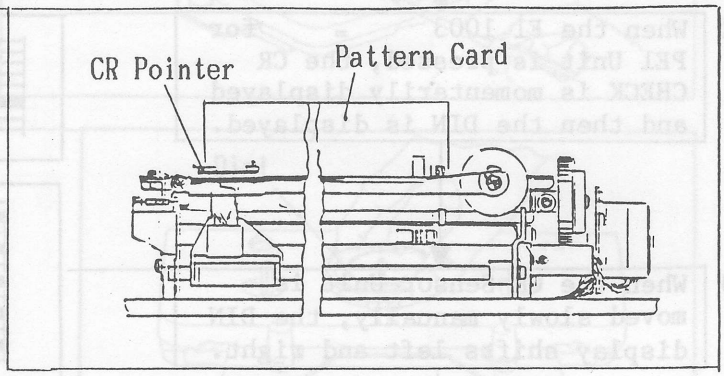
(Note) See Page 25 of the Service Manual for adjustment.

6-4 How to Check and Adjust the PSD (Preset Data) Output Voltage

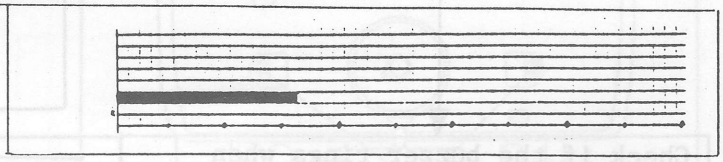
1 Connect with a clip the (-) of tester to G (GND) on the CPU Board the (+) to D (DIN) terminal and set the tester range to 12 V DC.



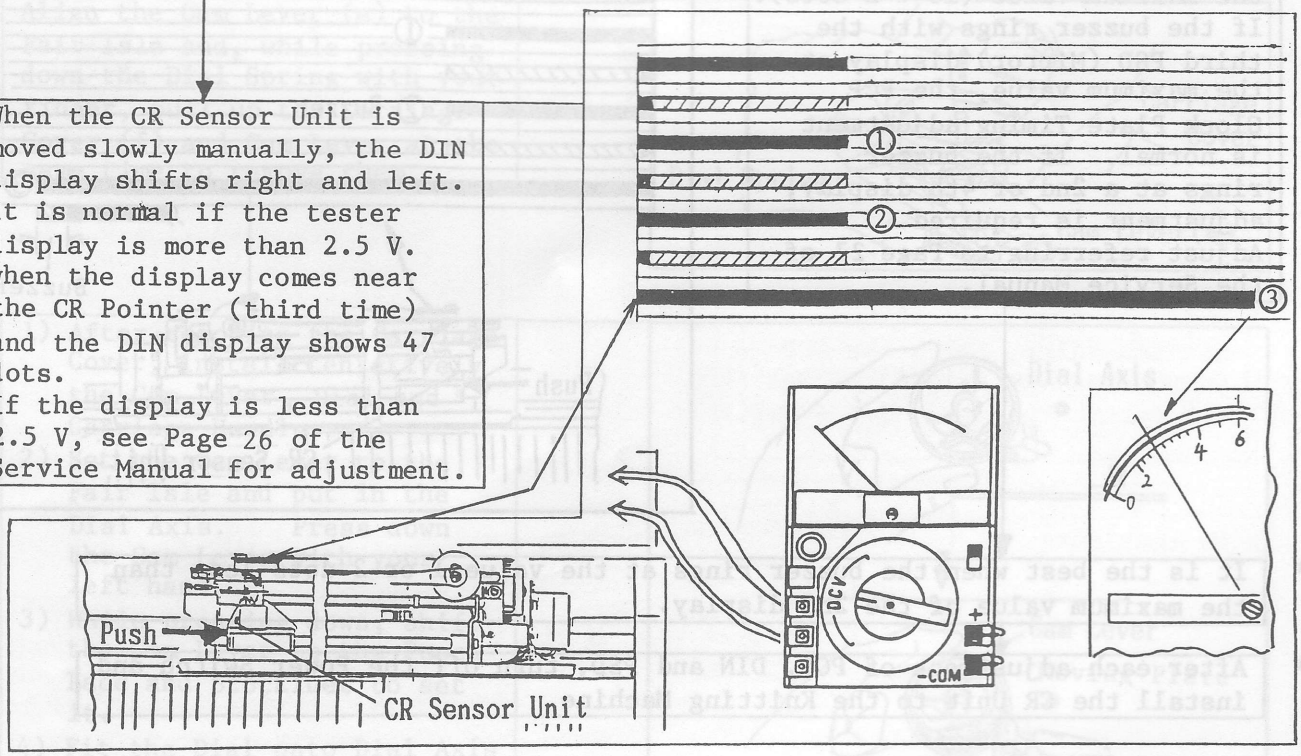
2 1) Set the 150th row of the Pattern Card No. 1.
2) Align the CR Pointer to the position 1.
3) Set the PE1 Unit and turn on the Power Switch. (Set as in the DIN Output Voltage adjustment.)



3 When the F1 1003 = of PE1 Unit is pressed, the CR CHECK is displayed momentarily and DIN is displayed.

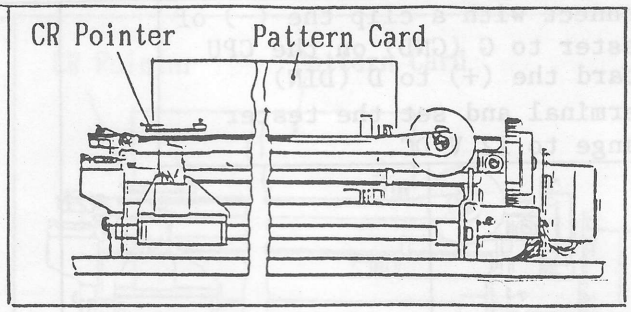


4 When the CR Sensor Unit is moved slowly manually, the DIN display shifts right and left. It is normal if the tester display is more than 2.5 V. when the display comes near the CR Pointer (third time) and the DIN display shows 47 dots.
If the display is less than 2.5 V, see Page 26 of the Service Manual for adjustment.



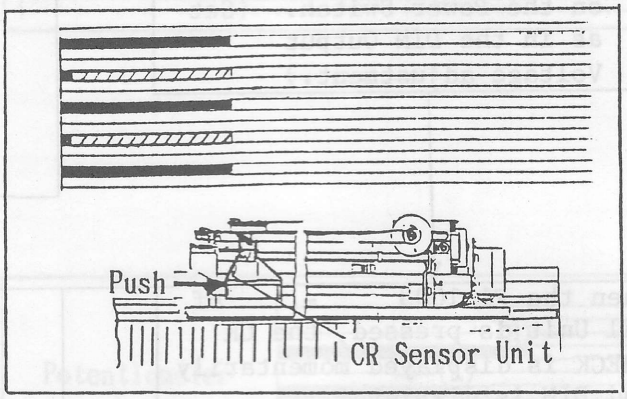
6-5 How to Check the PCP (Pattern Clock Pulse) Timing

1 1) Set the 150th row of Pattern Card No. 1.
2) Align the CR Pointer to the position 1.
3) Set the PE1 Unit and turn on the Power Switch.

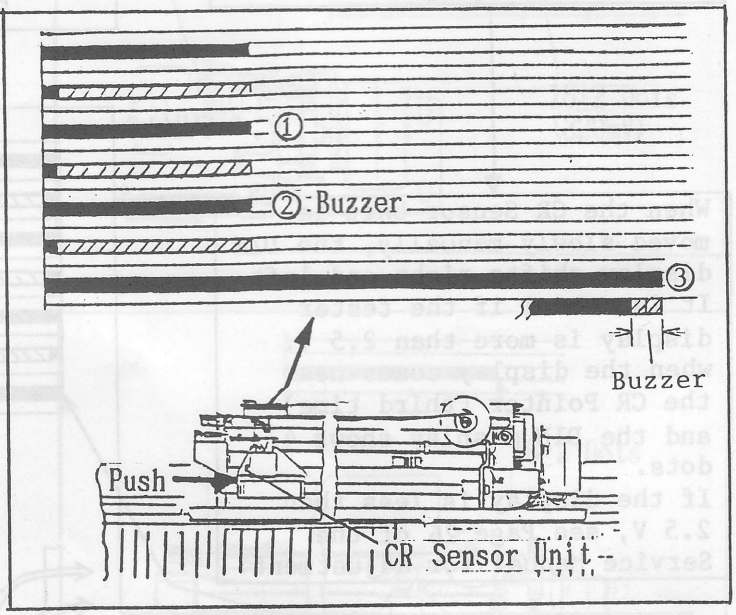


2 When the F1 1003 = for PE1 Unit is pressed, the CR CHECK is momentarily displayed and then the DIN is displayed.

3 When the CR Sensor Unit is moved slowly manually, the DIN display shifts left and right.



4 Check if the buzzer rings when the second DIN display reaches the maximum value (16 ± 2 dots). If the buzzer rings with the third PSD (Mirror) display at the maximum value, the PCP Clock Plate Timing adjustment is normal. If the buzzer rings at a 2nd or 4th display, adjustment is required. Adjust referring to Page 27 of the Service Manual.



* It is the best when the buzzer rings at the value 1 or 2 dots less than the maximum value of the 2nd display.

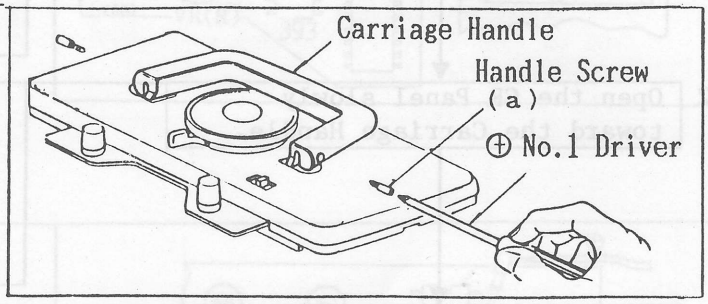
* After each adjustment of PCP, DIN and PSD, turn off the Power Switch and install the CR Unit to the Knitting Machine.

7. How to Adjust Each Sensor of the Carriage

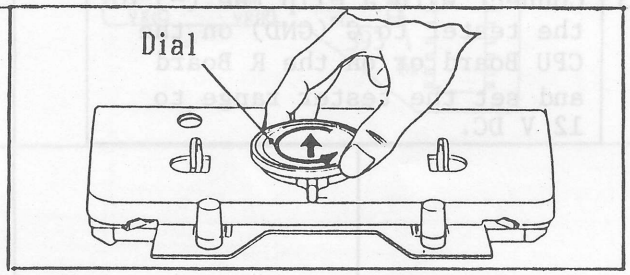
* Each sensor of the Carriage for replacement has been tentatively adjusted. However, as the CCP Output Voltage and Selection Timing are varied depending on a Needle Bed Clock Plate, be sure to adjust again whenever the Carriage is replaced.

7-1 How to Remove the Carriage Cover

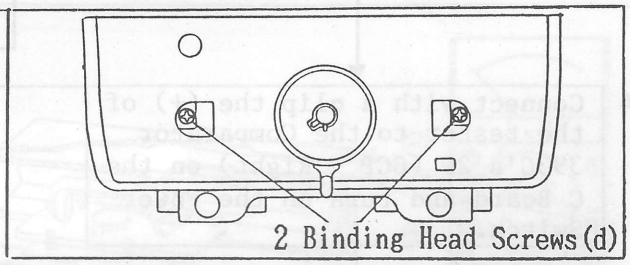
1 Pull down the Carriage Handle and remove the handle by unscrewing the two screws (a) with a (+) No. 1 screwdriver.



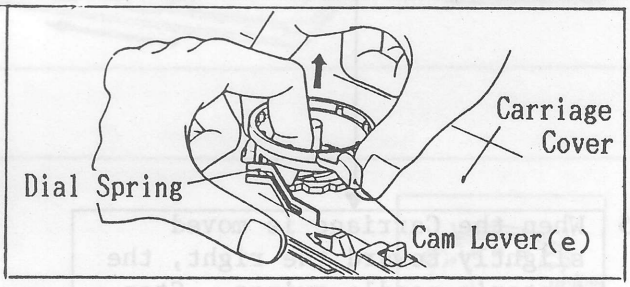
2 Turn the Dial toward 0 fully and pull the dial upward to remove the Dial Cap and Dial together.



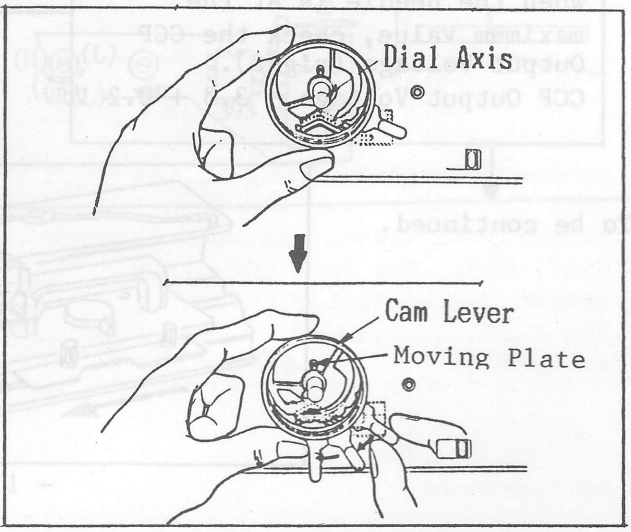
3 Remove the two screws (d) fixing the Carriage Cover with a (+) No. 2 screwdriver.



4 Align the Cam Lever (e) to the Fair Isle and, while pressing down the Dial Spring with your finger, pull up the Carriage Cover (f) and Cam Lever at the same time to remove them.



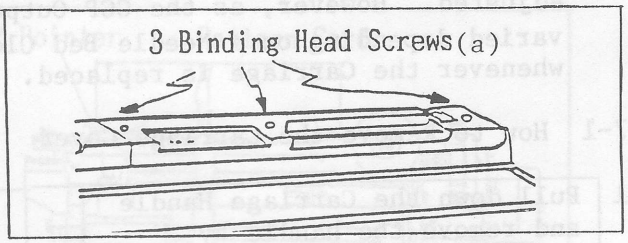
5 1) After removing the Carriage Cover, install tentatively the Cam Lever, Dial and Carriage Handle.
2) Set the Cam Lever to the Fair Isle and put in the Dial Axis. Press down the Cam Lever with your left hand.
3) While pressing down, shift the Cam Lever to the Punch Lace and Stockinet to set it.
4) Fit the Dial onto Dial Axis (Shift the Moving Plate toward the Dial Axis.)



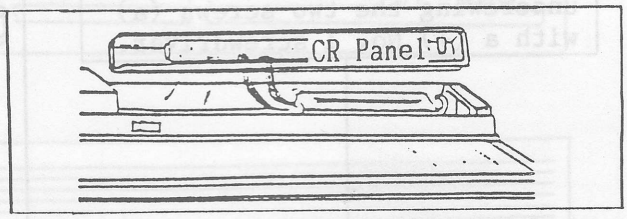
To be continued.

7-2 How to Adjust the CCP (Carriage Clock Pulse) Output Voltage

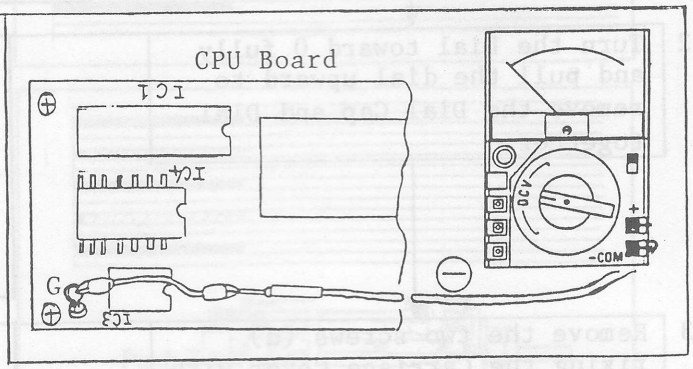
1 1) Place the Carriage on the Needle Bed.
2) Remove the three screws (a) fixing the CR Panel.



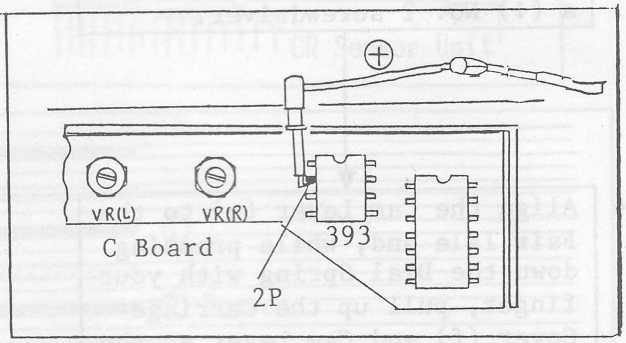
2 Open the CR Panel slowly toward the Carriage Handle.



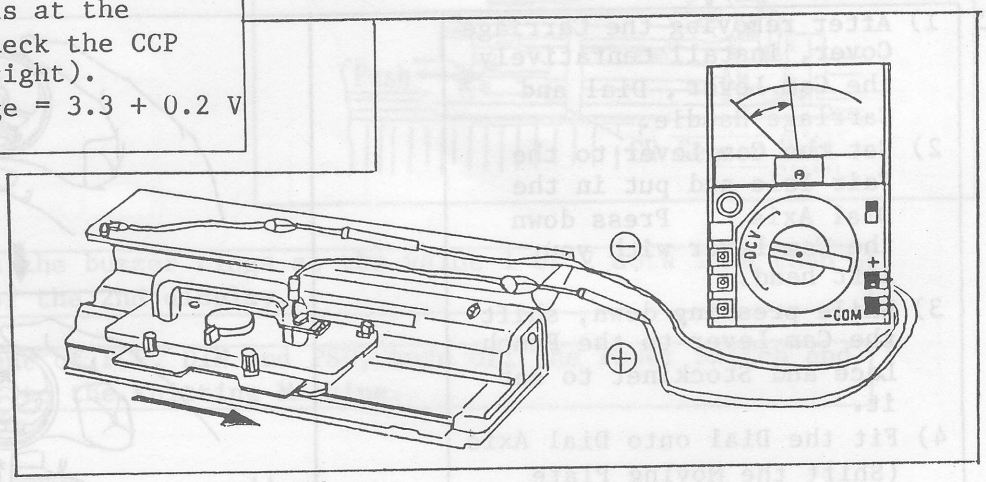
3 Connect with a clip the (-) of the tester to G (GND) on the CPU Board or on the R Board and set the tester range to 12 V DC.



4 Connect with a clip the (+) of the tester to the Comparator 393C's 2P (CCP - Right) on the C Board and turn on the Power Switch.

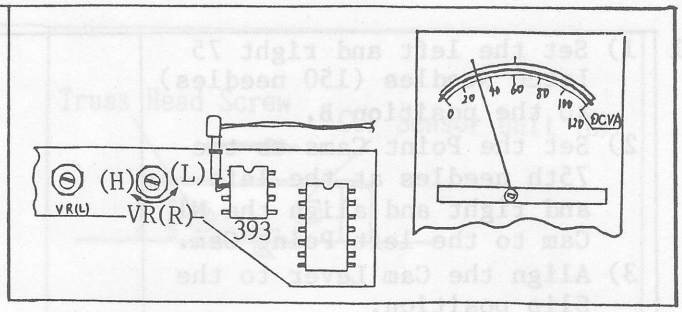


5 When the Carriage is moved slightly toward the right, the tester's needle swings. Stop when the needle is at the maximum value, check the CCP Output Voltage (right).
CCP Output Voltage = 3.3 + 0.2 V

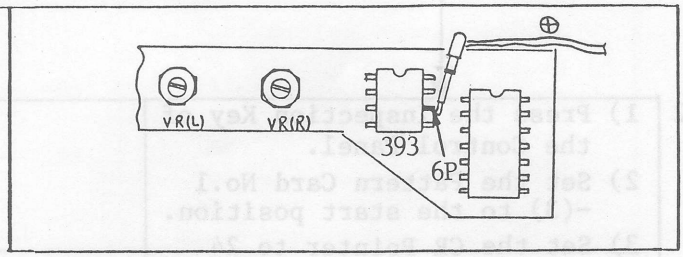


To be continued.

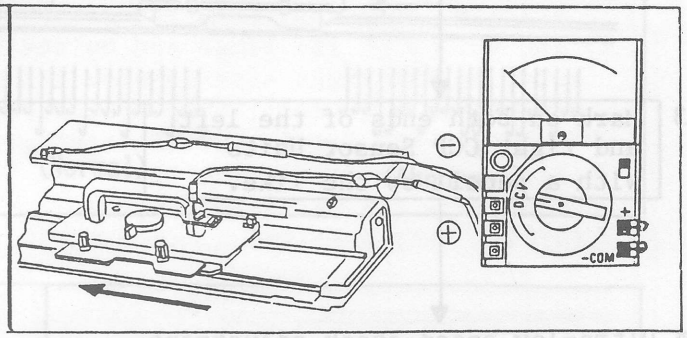
6 When the CCP Output Voltage (right) is not within the range 3.3 + 0.2 V, turn the Potentiometer (VR-R) for the CCP Output Voltage (right) adjustment and adjust to 3.3 + 0.2 V while monitoring the tester's indicator.



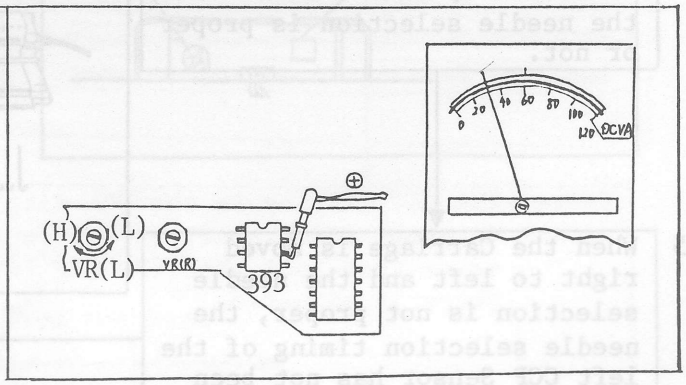
7 After adjusting the CCP Output Voltage (right), turn off the Power Switch. Then, connect the clip to the Comparator 393C's 6P (CCP - left) and turn on the Power Switch.



8 When the Carriage is moved slightly toward the left, the tester needle swings. Stop the needle at the maximum value and check the CCP Output Voltage (left).
CCP = 3.3 + 0.2 V



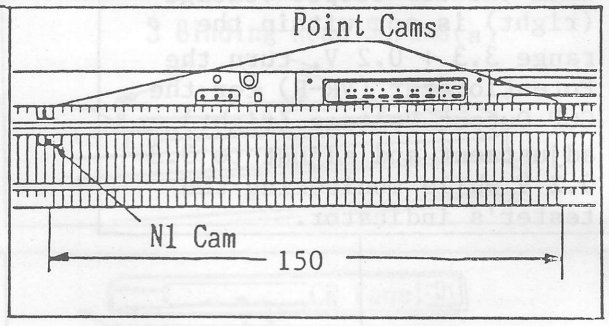
9 When the CCP Output Voltage (left) is not within the range 3.3 + 0.2 V, turn the Potentiometer (VR-L) for the CCP Output Voltage (left) adjustment and adjust to 3.3 + 0.2 V while monitoring the tester indicator.



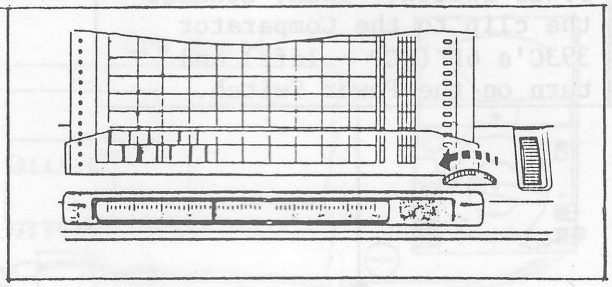
10 After the adjustment, turn off the Power Switch and remove the clips from the (+) and (-) of the tester and fix the CR Panel with three screws.

7-3 How to Adjust the CCP Needle Selection Timing

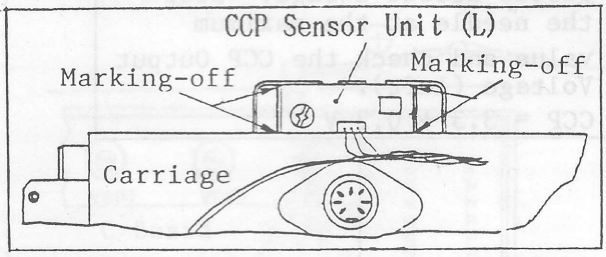
1 1) Set the left and right 75 Latch Needles (150 needles) to the position B.
2) Set the Point Cams to the 75th needles at the left and right and align the N1 Cam to the left Point Cam.
3) Align the Cam Lever to the Slip position.
4) Turn on the Power Switch.



2 1) Press the Inspection Key of the Control Panel.
2) Set the Pattern Card No.1 -(3) to the start position.
3) Set the CR Pointer to 24
4) Reset the Inspection Key.

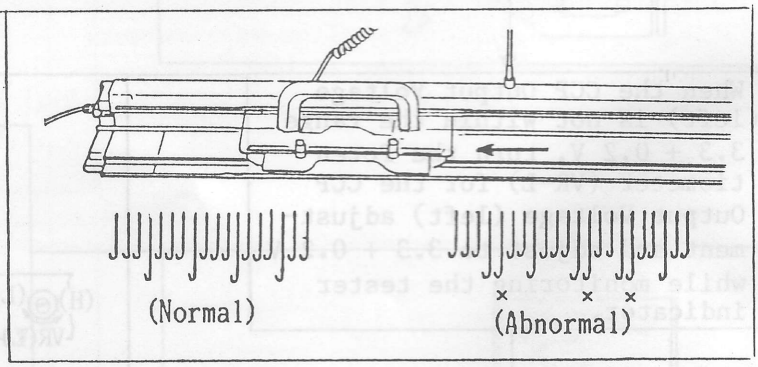


3 Mark on both ends of the left and right CCP Sensor Units with a pencil or the like.

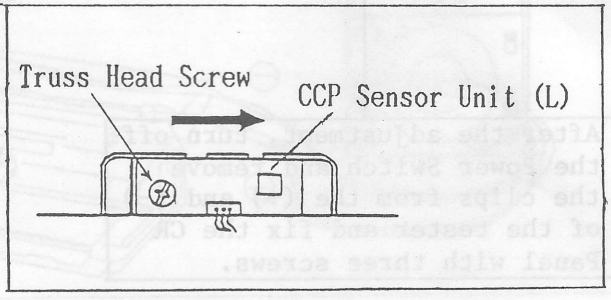


* Ultra-low speed check adjustment

4 Move the Carriage at an ultra-low speed and check if the needle selection is proper or not.

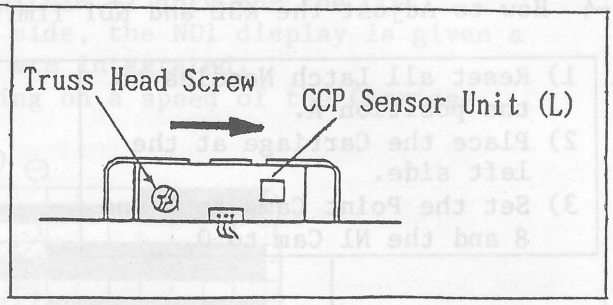


5 When the Carriage is moved right to left and the needle selection is not proper, the needle selection timing of the left CCP Sensor has not been properly adjusted. In such a case, shift the left CCP Sensor Unit slightly toward the right (inward) for adjustment.

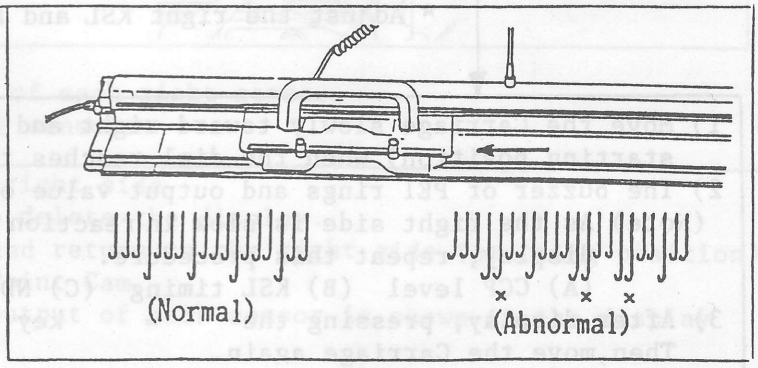


To be continued.

6 1) Loosen the one screw (1) fixing the CCP Sensor Unit with a (+) No. 1 screwdriver.
2) Tighten the screw after shifting the Unit slightly inward with a (-) screwdriver, etc., referring to the left and right positions of the CCP Sensor Unit.
3) Check if the needle selection is proper at an ultra-low speed and, otherwise, adjust by shifting the Unit little by little.

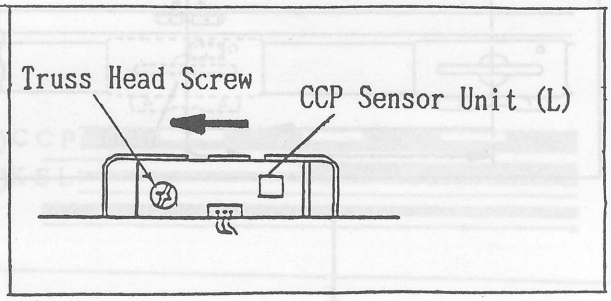


7 When the Carriage is moved left to right and the needle selection is not proper, the needle selection timing of the right CCP Secsor has not been properly adjusted. In such a case, shift the right CCP Sensor Unit slightly inward for adjustment.



* High speed check adjustment

8 1) Move the Carriage at a high speed (150 needles-55 rows /minute) and check if the needle selection is normal.
(Note) At a speed when the row counter is reset to 0 and shows 55 in 60 seconds.
2) Adjustment is similar to an ultra-low speed adjustment but shift the CCP Sensor Unit outward when the high speed needle selection is not normal.

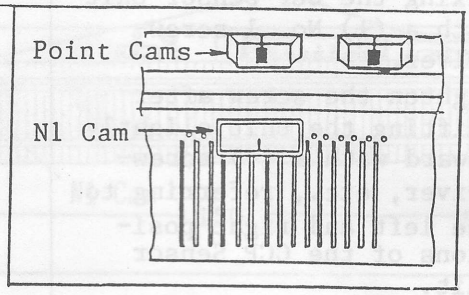


9 When the both ultra-low and high speed needle selections are normal, the needle selection timing has been properly adjusted. Turn off the Power Switch.

7-4 How to Adjust the KSL and ND1 Timing

1

1) Reset all Latch Needles to the position A.
2) Place the Carriage at the left side.
3) Set the Point Cams to 0 and 8 and the N1 Cam to 0.



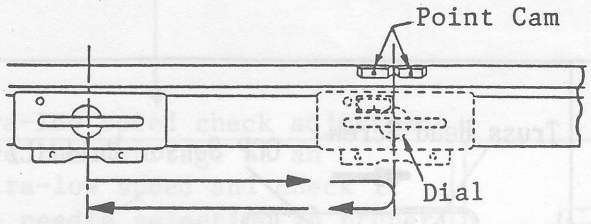
2

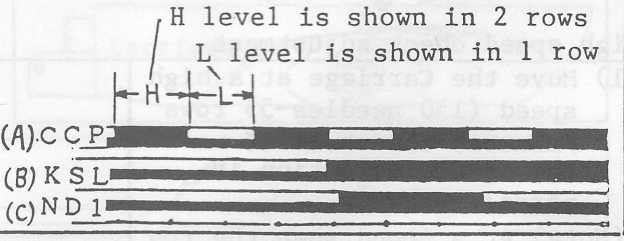
1) Connect the PE1 unit to the Knitting Machine and turn on the Power Switch.
2) Press the PE1 unit's operating key F1 1002 = to conduct the CRG CHECK.

* Adjust the right KSL and ND1.

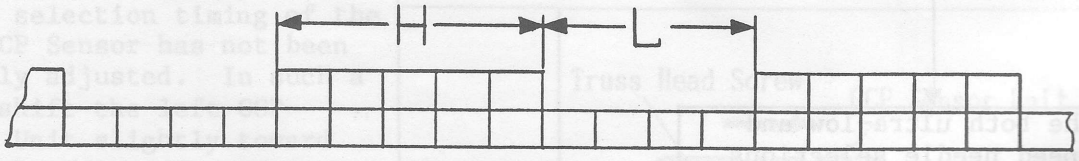
3

1) Move the Carriage slowly toward right and return toward left (the starting position) when the dial reaches the Point Cam.
2) The buzzer of PE1 rings and output value of each sensor is displayed.
(Note) As the right side is slow in reaction and it takes time before a display, repeat this procedure.
(A) CCP level (B) KSL timing (C) ND1 timing
3) After display, pressing the = key each time deletes the display. Then,move the Carriage again.





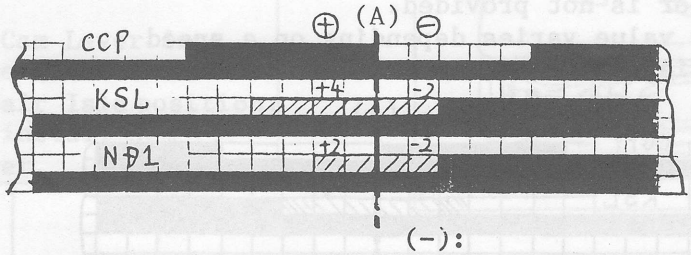
(Note) The CCP display in the PE1 display section is shown 1-1.4 times larger in its H (3.3+0.2V) value than in L when the CCP level has been properly adjusted.



To be continued

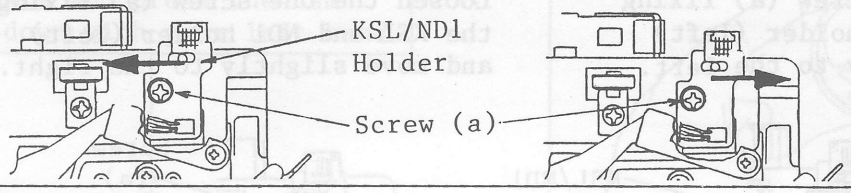
4 1) When the adjustment is correct, normal KSL display is within ±4 dots and the ND1 display within ±2 dots for the CCP display's (A) point. For the right side, the ND1 display is given a priority as the KSL and ND1 sensors are integrated.

(Note) The display value varies depending on a speed of the Carriage movement.



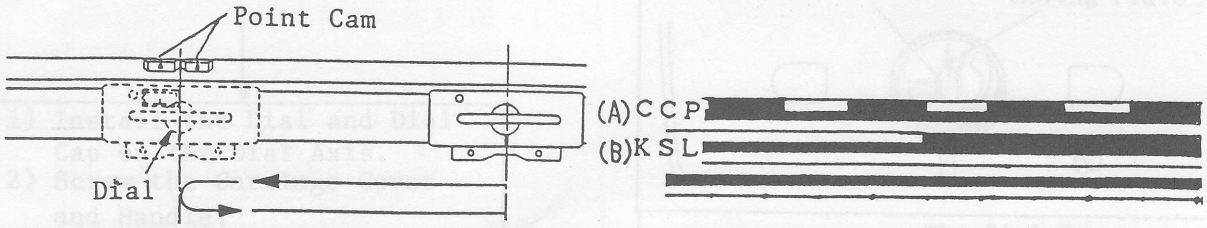
(+):
Loosen the one screw (a) fixing the KSL and ND1 holder (right) and move slightly to the left.

(−):
Loosen the one screw (a) fixing the KSL and ND1 holder (right) and move slightly to the right.

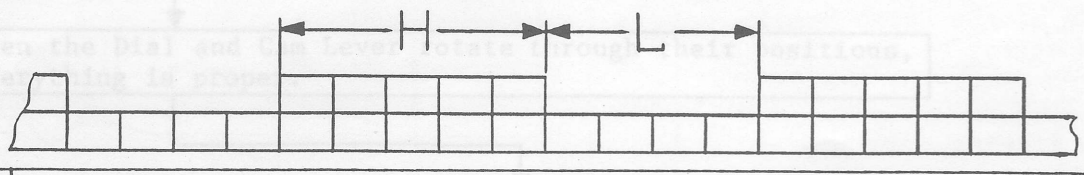


* After checking output of each right sensor, check each of the left sensors.

5 1) Shift the Carriage to the right side.
2) Press the = key to delete the display.
3) Move the Carriage slowly and return to the right side (starting position) when the dial reaches the Point Cam.
4) The PE1 buzzer rings and output of each sensor is shown in the display section.
5) When a display is shown, pressing the = key each time deletes the display.



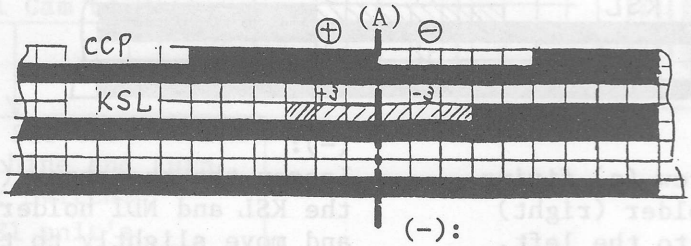
(Note) The CCP display in the PE1 display section is shown 1-1.4 times larger in its H (3.3+0.2V) value than in L when the CCP level has been properly adjusted.



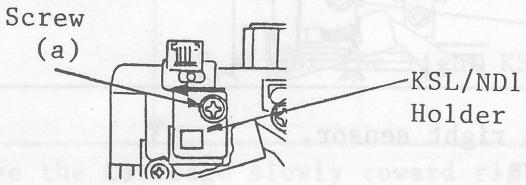
To be continued

6 1) When the adjustment is correct, the normal KSL display is within ±3 dots for the CCP display's (A) point. For the left side, the ND1 display is not shown as the ND1 sensor is not provided.

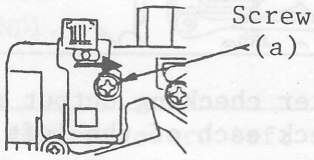
(Note) The display value varies depending on a speed of the Carriage movement.



(+):
Loosen the one screw (a) fixing the KSL and ND1 holder (left) and move slightly to the left.



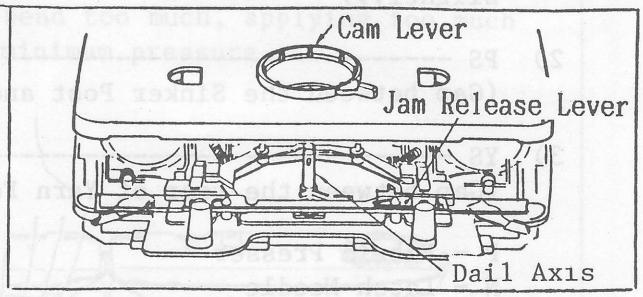
(-):
Loosen the one screw (a) fixing the KSL and ND1 holder (left) and move slightly to the right.



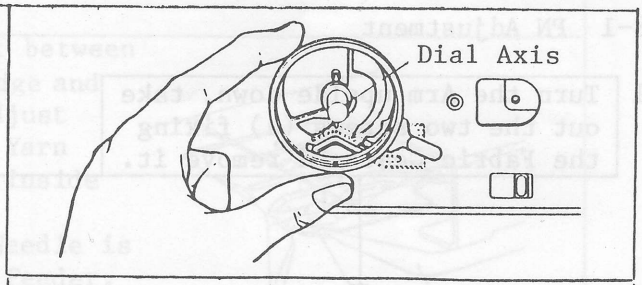
The check and adjustment have been completed after the procedures 7-2 ~ 7-4 in the above.

7-5 How to Install the Carriage Cover

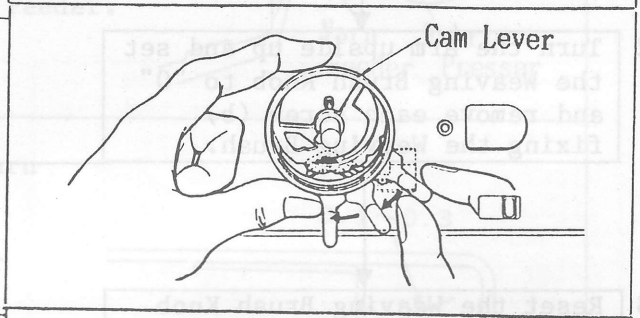
1 1) Remove the Cam Lever and Handle tentatively installed.
2) Insert the Cam Lever into the Carriage Cover and set it to the Fair Isle position. Be sure to install Jam Release Lever.



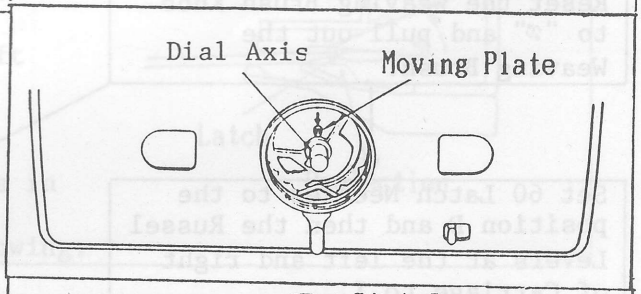
2 Insert the Cam Lever on the Dial Axis and press the Cam Lever down with your left hand.



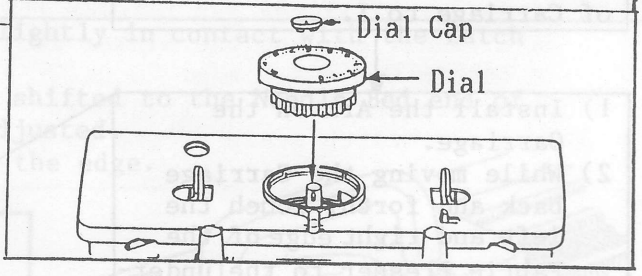
3 The Cam Lever is locked when it is shifted, while being pressed down, to the Punch lace and Stockinet positions.



4 Shift the Moving Plate toward the Dial Axis.



5 1) Install the Dial and Dial Cap on the Dial Axis.
2) Screw the Carriage Cover and Handle.



6 When the Dial and Cam Lever rotate through their positions, everything is proper.

7 Otherwise, repeat the procedure from the beginning.

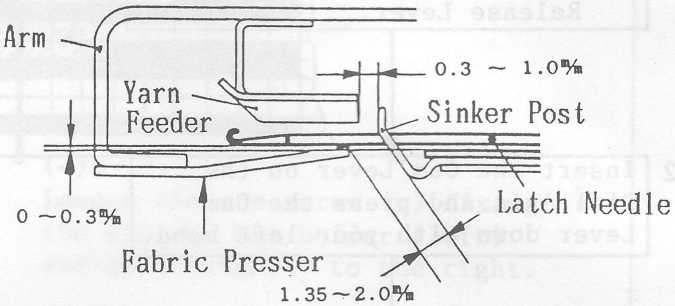
8. Correct Positions of the Arm, Needle Bed and Latch Needle

1) PN ---------- 0 - 0.3 m/m
(The edge of Fabric Presser touches the underside of the Latch Needle slightly.)

2) PS ---------- 1.35 - 2.0 m/m
(Gap between the Sinker Post and the edge of Fabric Presser)

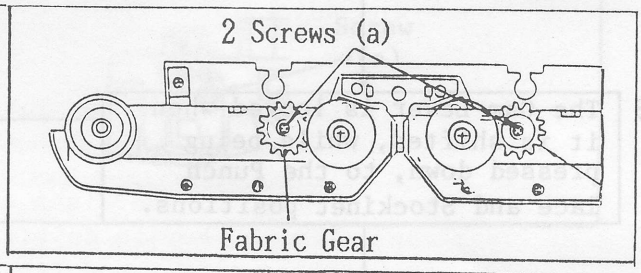
3) YS ---------- 0.3 - 1.0 m/m
(Gap between the rear of Yarn Feeder and Sinker Post)

P - Fabric Presser
N - Latch Needle
S - Sinker Post
Y - Yarn Feeder

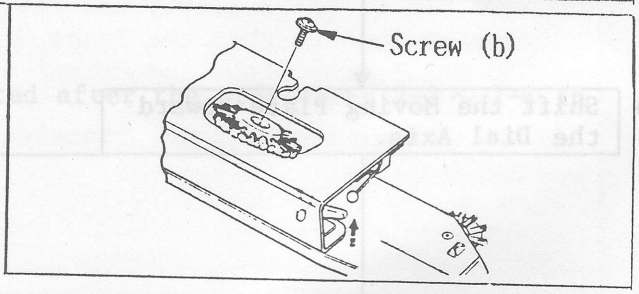


8-1 PN Adjustment

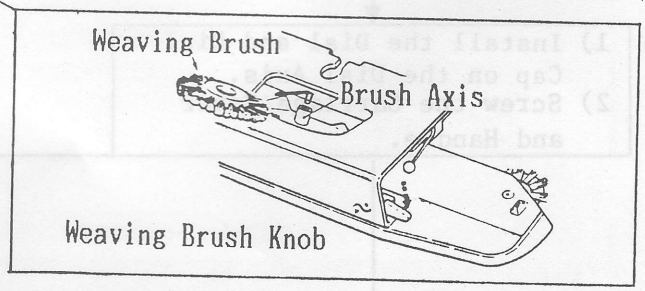
1 Turn the Arm upside down, take out the two screws (a) fixing the Fabric Gear and remove it.



2 Turn the Arm upside up and set the Weaving Brush Knob to "0" and remove each screw (b) fixing the Weaving Brush.

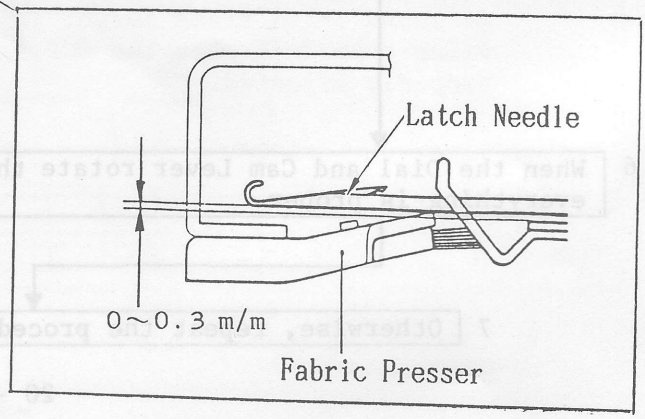


3 Reset the Weaving Brush Knob to "∞" and pull out the Weaving Brush.



4 Set 60 Latch Needles to the position D and then the Russel Levers at the left and right of Carriage to I.

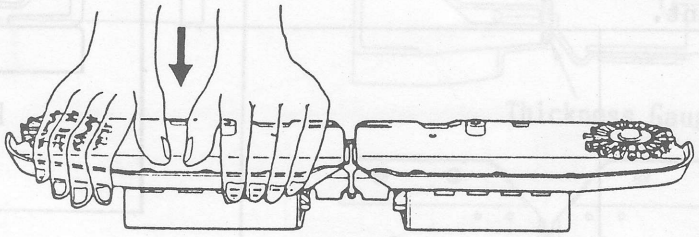
5 1) Install the Arm on the Carriage.
2) While moving the Carriage back and forth, touch the left and right edge of the Fabric Presser to the underside of the Latch Needle.
3) The extent of touching the Latch Needle by the Fabric Presser edge is proper if its lifting amount is within 0 - 0.3 m/m.



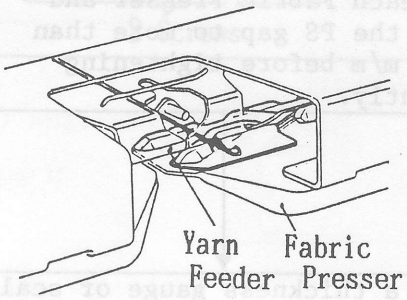
To be continued

6 When the Fabric Presser edge and the Latch Needle are in contact:

1) Remove the Arm from the Carriage.
2) Turn the Arm upside down and press it downward gently with your palm. If pressed too forcibly, the Arm may bend too much, applying too much force. Adjust gently so as to apply minimum pressure.



3) After adjusting the degree of contact between the Fabric Presser's left and right edge and the underside of the Latch Needle, adjust the gap between the Latch Needle and Yarn Feeder of the pointer right and left inside the Fabric Presser.
4) Move the Carriage so that the Latch Needle is positioned at the center of the Yarn Feeder.

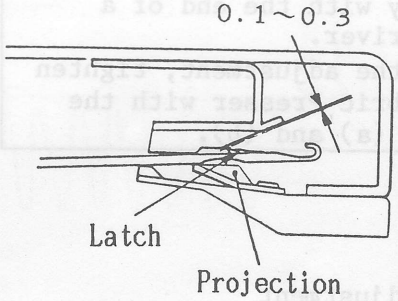


5) It is proper if the gap between the latch of 4th Latch Needle from the Yarn Feeder center and the Yarn Feeder is within 0.1 - 0.3 m/m.

* Use a thickness gauge or a thin paper sheet to measure the appropriate gap.

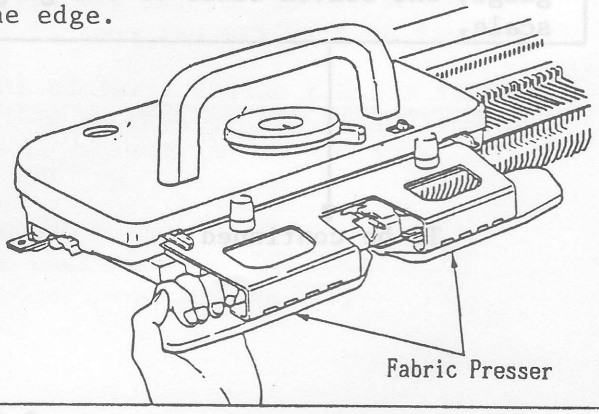
6) When the gap is more than 0.3m/m, lift the Fabric Presser upward as in the above description.

7) When the latch of the Latch Needle is in contact with the Yarn Feeder, without a gap, adjust as in the following.



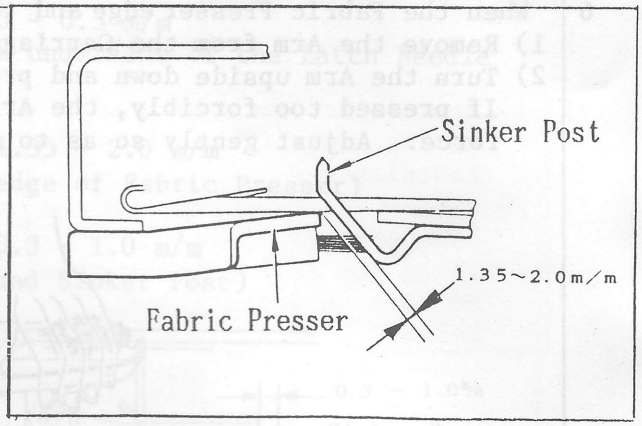
7 When the Fabric Presser's edge is not slightly in contact with the Latch Needle:

1) The Carriage with its Arm have to be shifted to the Needle Bed end of the Fabric Presser which has to be adjusted.
2) Hold the Fabric Presser end and bend the edge.

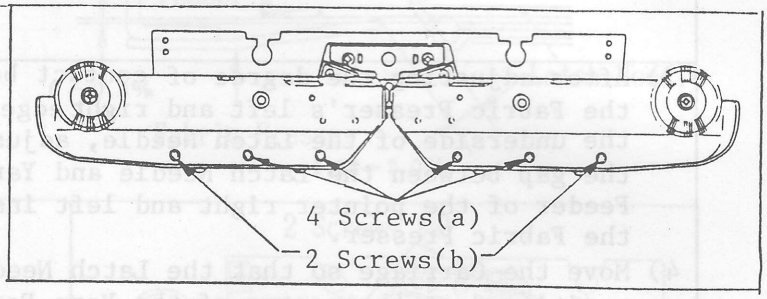


8-2 PS Adjustment

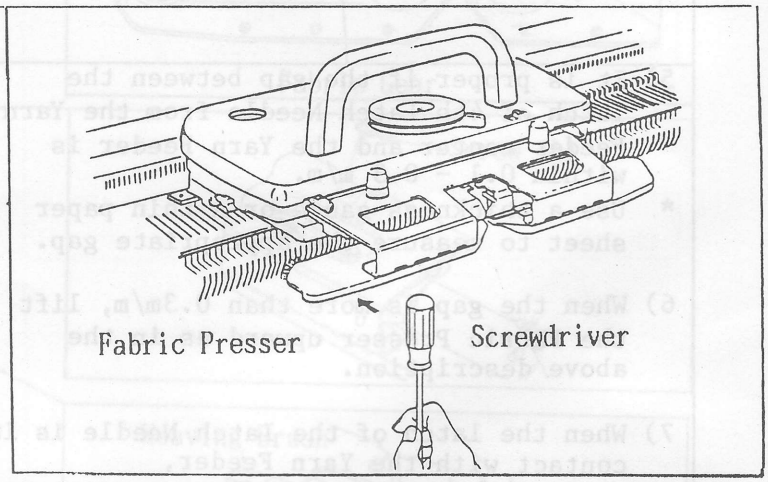
1 It is proper if the gap between the Fabric Presser edge and the Sinker Post is within 1.35 - 2.00 m/m.
*Use a thickness gauge or the provided gauge scale and 2 KR Stitch Scales (3 in total) (About 1.60 - 1.75 m/m) for measurement.



2 Loosen 2 screws (a) and one screw (b) on the bottom of each Fabric Presser and set the PS gap to more than 2.0 m/m before tightening lightly.

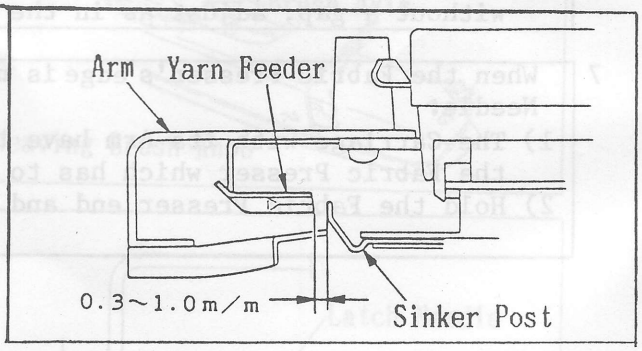


3 Put a thickness gauge or scale between the Fabric Presser and the Sinker Post and adjust by hitting the Fabric Presser lightly with the end of a screwdriver.
After the adjustment, tighten the Fabric Presser with the screws (a) and (b).



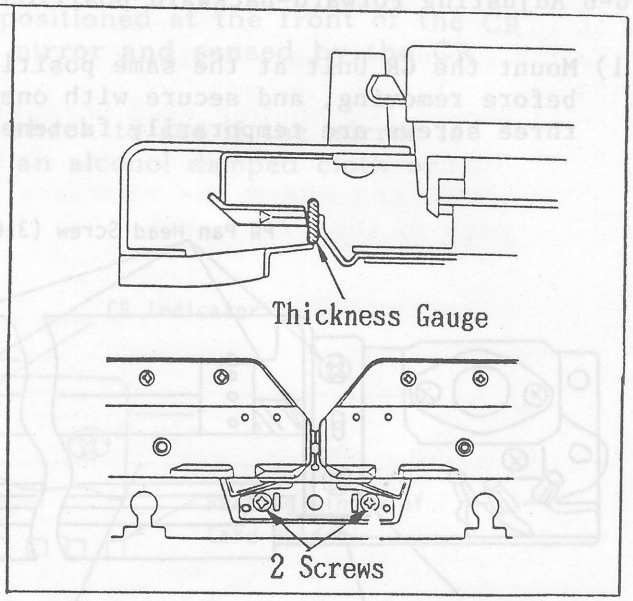
8-3 YS Adjustment

1 1) Shift the Carriage to the right end.
2) It is normal if the gap between the Yarn Feeder end and the Sinker Post is within 0.3 - 1.0 m/m.
*For measurement, use one thickness gauge, one stitch scale or one gauge scale.



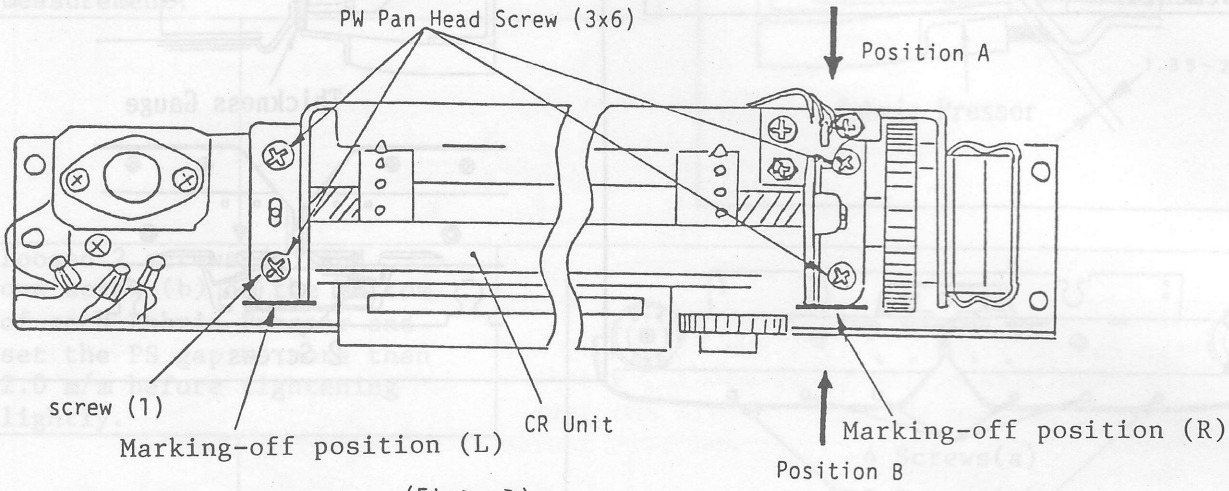
To be continued

2 When the gap is not in the range 0.3 - 1.0 m/m, remove the Arm from the Carriage and loosen the two screws (a) fixing the Yarn Feeder.
Install the Arm to the Carriage and insert the thickness gauge or scale for adjustment.



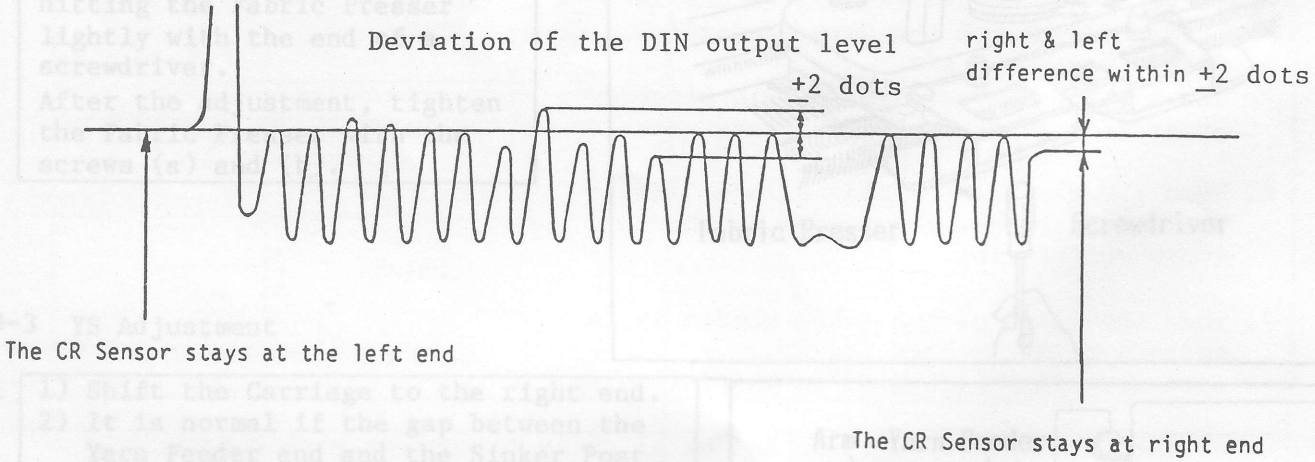
6-6 Adjusting Forward-Backward positioning of the CR Sensor

1) Mount the CR Unit at the same position where it was marking-off before removing, and secure with one PW Pan Head Screw and other three screws are temporarily fastened.



(Fig.3-13)

2) Adjust the deviation of the output voltage to the permissible range, ±2 dots, by patting the position A or B with a screwdriver. Then fasten the four screws securely.



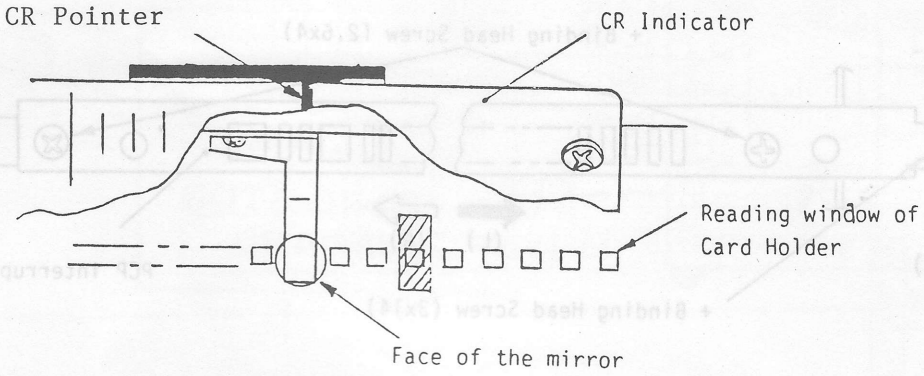
Note:
Check to see if the CR Sensor contacts the mirror or not.
if the CR Sensor touches the mirror, move backward the CR Sensor as much as they are not contact each other.

3) Adjust the DIN output level to 16±2 Dots (320±40mV) by turning the potentiometer (VR1).

6-7 Adusting the PSD Output Voltage

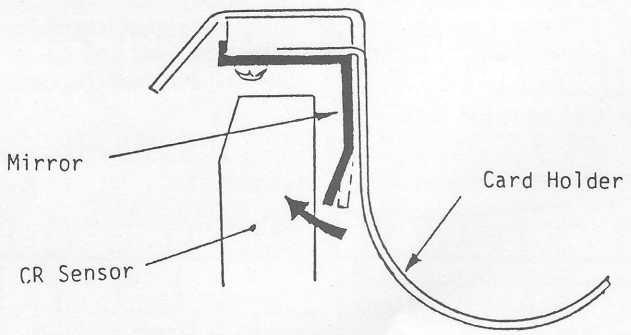
PSD level is produced by the mirror, positioned at the front of the CR Unit, when a light is reflected on the mirror and sensed by the CR Sensor.

1) If the PSD level is less than 2.5V, check to see if the mirror is dirty, and if so, wipe it clean with an alcohol damped cloth or using the sensor cleaner.



(Fig.3-26)

2) If the PSD output voltage is still less than 2.5V after the mirror has been cleaned, bring the mirror near to the CR Sensor by bending it as illustrated.



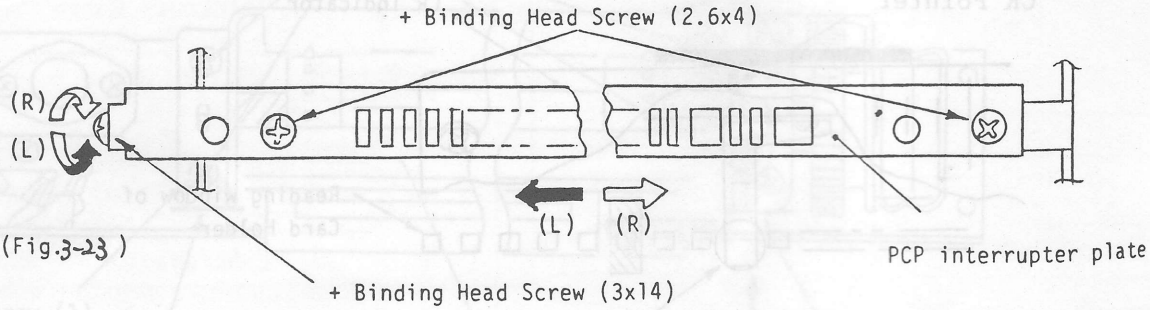
(Fig.3-27)

3) If the PSD output voltage is still less than 2.5V after the mirror has been brought near to the CR Sensor, replace the mirror with new one.

4) Check to see if the mirror contacts the CR Sensor or not. If the mirror touches the Sensor, move backward the CR Unit as much as they are not contact each other, but should stay as close as possible.

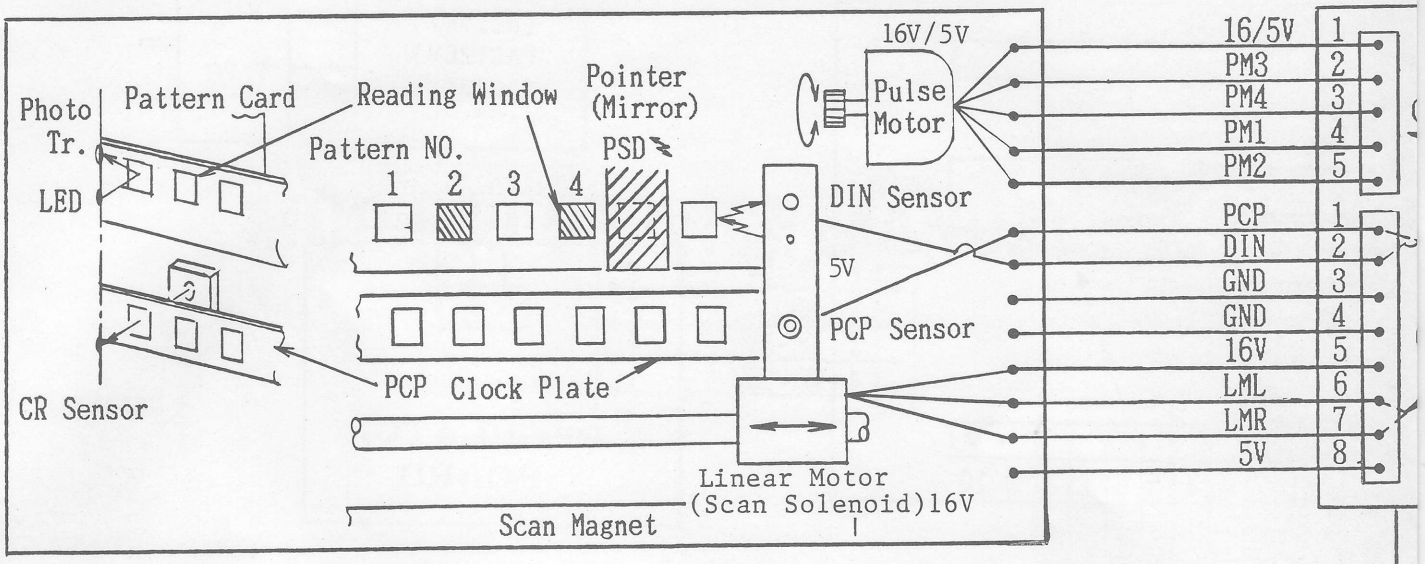
6-8 Adjusting the PCP Timing

1) Loosen two binding head screws(2.6x4) fixing the PCP interrupter.
2) Turn the binding head screw(3x14) at the left end of the interrupter plate, and adjust the reference level to come to the center of each peak of the DIN signal.



(Fig.3-23)

CR UNIT



* This unit consists of CR Sensor Unit, Pulse Motor Unit, Card Holder, CR Pointer (Mirror), etc. and the CR Sensor Unit is incorporated with DIN Sensor, PCP Sensor and Scan Solenoid needed to read out the patterns.

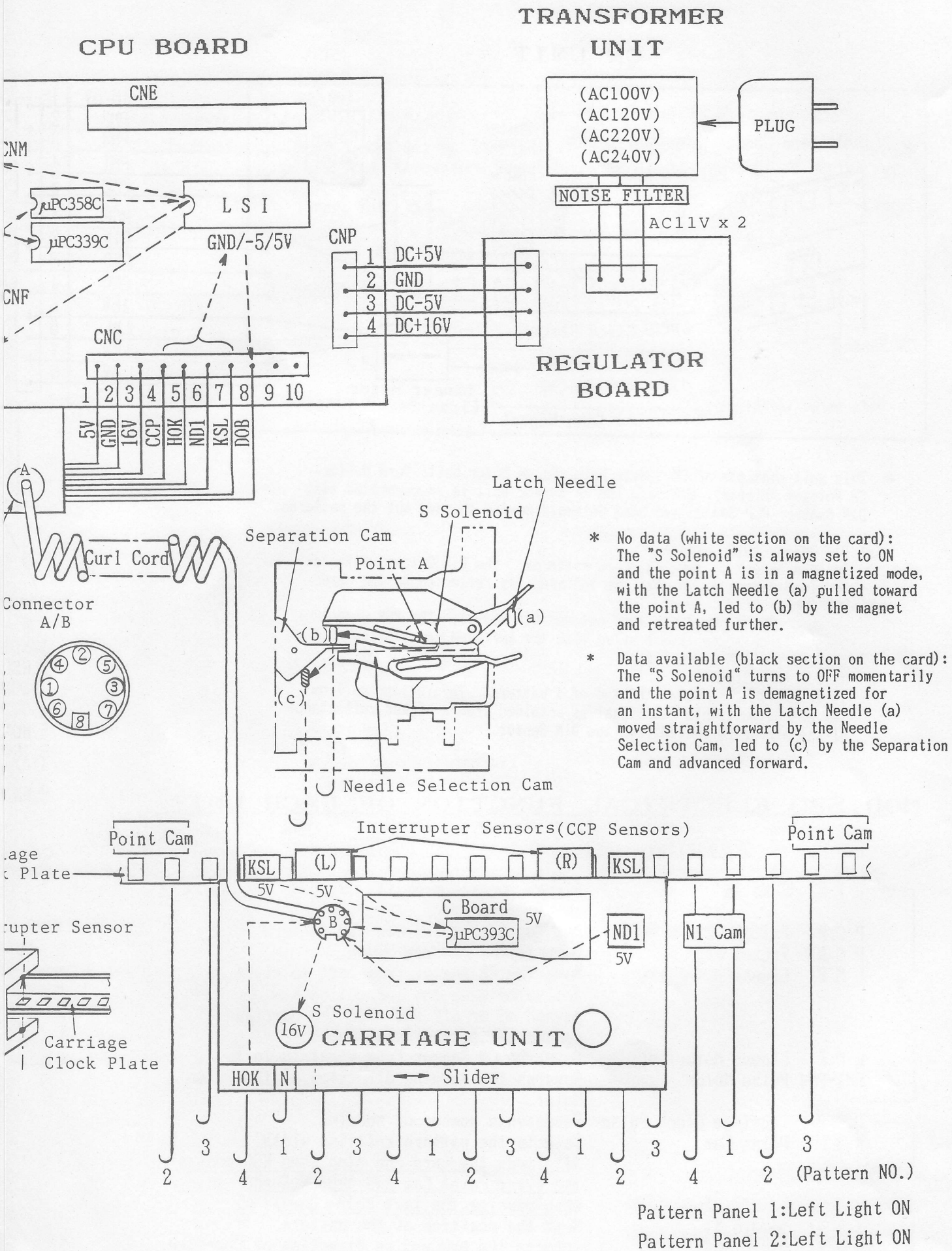
(a) DIN Sensor (DIN Output)
It is a sensor to read out Card Patterns. the DIN Output value is obtained from a value with the infrared ray reflected on the card.

(b) PCP Sensor (PCP Output)
It is a timing signal to read out the DIN signal. The PCP Output signal is obtained from a value with the infrared ray passing through the PCP Clock Plate.

(c) Mirror (PSD Signal)
It is provided to judge the end of a pattern. To distinguish from the DIN Output, this PSD Signal is obtained from a higher reflectance of the mirror reflected from the DIN Sensor.

MOD.580 ELECTRICAL FUNCTION OF EACH UNIT

	SYMBOL	DESCRIPTION	FUNCTION
C R UNIT	D I N	Data In	Signal generated by the patterns on the Pattern Card.
	P C P	Pattern Clock Pulse	Set the timing to read the pattern.
	P S D	Preset Data	Detects the Pattern Width.
	L M R	Linear Motor Right	Move the CR sensor from left to right. Activated when the Inspection Key is pushed on or off, and when the Carriage passes the second Point Cam.
	L M L	Linear Motor Left	Move the CR Sensor from right to left.
	PM1-PM4	Pulse Motor	Governs the turning direction of the Pulse Motor.
CARRIAGE UNIT	C C P	Carriage Clock Pulse	Represents number of needles.
	K S L	Point Cam	Detects the pattern knitting width. (It feeds the card one step when KSL passes the first Point Cam and the CR Sensor scans when passing the last Point Cam.)
	N D 1	Needle 1	Sets the position of the pattern.
	H O K	Direction	Detects the proceeding direction of Carriage.
	D O B	Data Out Buffer	Output of needle selection signal.



* No data (white section on the card):
The "S Solenoid" is always set to ON and the point A is in a magnetized mode, with the Latch Needle (a) pulled toward the point A, led to (b) by the magnet and retreated further.

* Data available (black section on the card):
The "S Solenoid" turns to OFF momentarily and the point A is demagnetized for an instant, with the Latch Needle (a) moved straightforward by the Needle Selection Cam, led to (c) by the Separation Cam and advanced forward.

Pattern Panel 1:Left Light ON
Pattern Panel 2:Left Light ON