Service Manual
For
Electronic Knitting Machine

Modular System

(Using Design Controller PE1 Self Check Functions)

CONTENTS

1. BASIC KNOWLEDGE OF THE ELECTRONIC KNITTER

1-1 SUMMARY OF THE MAIN ELECTRONIC COMPONENTS

TRANSFORMER

This transformer is attached with input and output cords. It transforms the AC (alternating current) power from outlet for household appliances into 9.6VAC and it includes a thermal-protector that cuts off the power supply when the transformer heats up to 120°C.

REGULATOR BOARD

The alternating current is rectified into direct current and regulated to +16V, +5V and −5V when it passes through the Regulator.

Each voltage functions as discribed below:—

+16V..... drives (Scan Solenoid) Pulse Motor, Buzzer, Feeding Direction Pointer, and Needle Selection Solenoids.
+5V.....carries signals, and lights on the LED's.
−5V.....LSI

CARD READER

The CR Sensor in the Card Reader is moved by the Linear Motor and reads the pattern on the Pattern Card/Design Card, and send the signals (analog signal) to CPU. The analog signal is converted to digital signals when it passes through the Signal Comparator. The Pattern Card is advanced or reversed in response to the marks in the instruction columns on the Card.

CPU (Central Processing Unit) BOARD

This is the heart of the electronic system, consisting of programmable controller, resistor array and buffer IC (Integrated Circuit), etc. The CPU stores the pattern signals from the Card Reader and processes them to actuate the Solenoids in the Carriage to select the needles. The pattern signals can be modified by pushing the Pattern Buttons.

CARRIAGE

The Carriage has CCP Sensor, Needle-1 Detector, Point Cam Detector and the Carriage direction detector (HOK).

CURL CORD

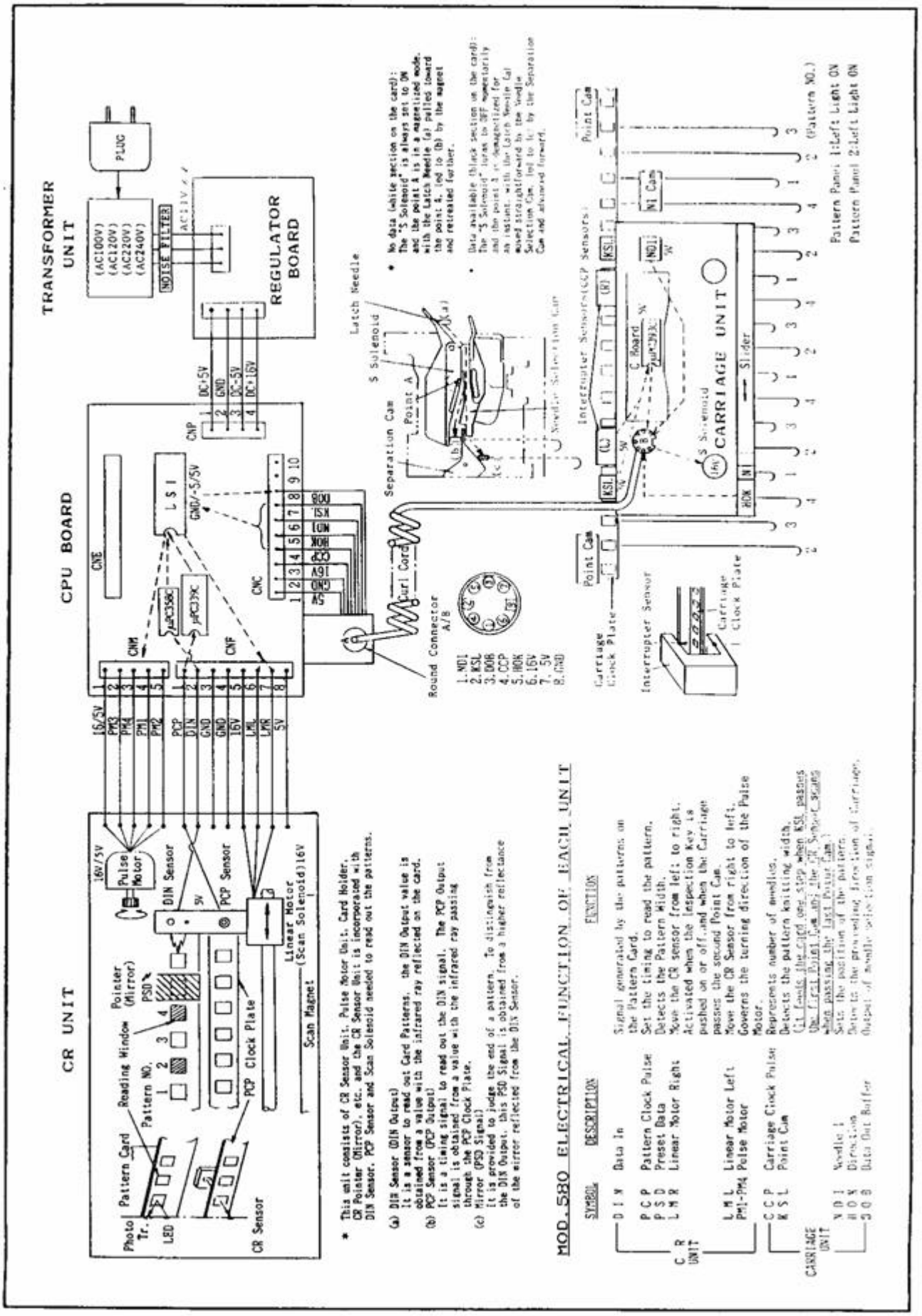
This cord is of 8 channel, and transmits input and output signals between CPU and the Carriage.

1-2 OPERATIONAL STEPS AND ELECTRONIC SIGNALS

At each step of the operation, electronic signals transmit the information and actuate each functional parts of the machine as described below:—

OPERATIONAL SEQUENCE	FUNCTION/SIGNALS
1. TURN ON THE MACHINE	+16V, +5V and −5V are supplied to the machine and the Buzzer is actuated and sounds for one second.
2. PUSH ON THE INSPECTION BUTTON (LIGHT IS ON.)	The Pulse Motor is actuated. (PM 1, 2, 3, 4.)
3. SET THE PATTERN CARD, PATTERN WIDTH, AND PATTERN BUTTONS	Pattern Buttons signals are input into LSI.
4. ARRANGE NEEDLES, POINT CAMS, NEEDLE-1 CAM	
5. MOVE THE CARRIAGE ACROSS THE NEEDLE BED (CAST ON)	The position of the Point Cams (KSL), Needle-1 Cam (ND1), CCP Signals are sent to the LSI.
6. PUSH OFF THE INSPECTION BUTTON (LIGHT IS OFF.)	Linear Motor (LM. = Scan Solenoid) moves the CR Sensor and the Pattern (DIN) Pattern Width (PSD) and PCP signals are sent to the LSI.
7. SET THE CARRIAGE TO SELECTED STITCH TYPE	
8. START PATTERN KNITTING	Needle Selection Signal (DOB) is sent to the Carriage and magnetizes the Needle Selection Cam to select the needles. Carriage Direction (HOK) signal selects CCP and KSL.

1-3 BLOCK DIAGRAM OF ELECTRONIC KNITTER (ELECTRICAL FUNCTION OF EACH 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.

* 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, (and 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, (and to (c) by the Separation Cam and advanced forward.

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 PM1-PM4	Linear Motor Left Pulse Motor	Move the CR Sensor from right to left. 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 signal one step when KSL passes the first Point Cam, and the CR Sensor scans when passing the last Point Cam.)
	N D I	Needle I	Sets the position of the pattern.
	H O K	Direction	Drive to the preceding direction of Carriage.
	S O B	Data Out Buffer	Output of needle selection signal.

1-4 DESCRIPTION OF SIGNALS

Characteristics and function of signals are described below.

CARD READER

DIN — DATA IN
The CR Sensor in the Card Reader reads the pattern information from the Pattern Card/Design Card. (When the Pattern Card is in use, its white area gives high voltage and black area gives low voltage.)

PSD — PRE SET DATA
A mirror in the Card Reader produces signal which designates the pattern width.

PCP — PATTERN CLOCK PULSE
These signals operate in synchronism with the DIN signals and are read by the micro-computer on the CPU Board. PCP threshold voltage is the standard level for the PCP signals.

PM 1, 2, 3, 4. PULSE MOTOR 1, 2, 3, 4.
These signals control the Pulse Motor.

LMR — LINEAR MOTOR RIGHT
These signals actuate the Linear Motor to move from left to right.

LML — LINEAR MOTOR LEFT
These signals actuate the Linear Motor to move from right to left.

DOB — DATA OUT BUFFER
This is needle selecting solenoid control signal.

CARRIAGE

CCP — CARRIAGE CLOCK PULSE
These signals operate in synchronism with selecting the needles.
CCP output voltages are the same as the CCP signals.
CCP threshold voltage is the standard level for the CCP signals.

KSL — POINT CAMS
The Point Cam detectors on the Carriage signal and demarcate a pattern width on the Needle Bed.
KSL timing is in synchronism with CCP signals.

ND1 — NEEDLE-1
This signal sets the position of pattern when it is detected on the needle bed within a pair of the Point Cam.
ND1 timing is in synchronism with the CCP signals.

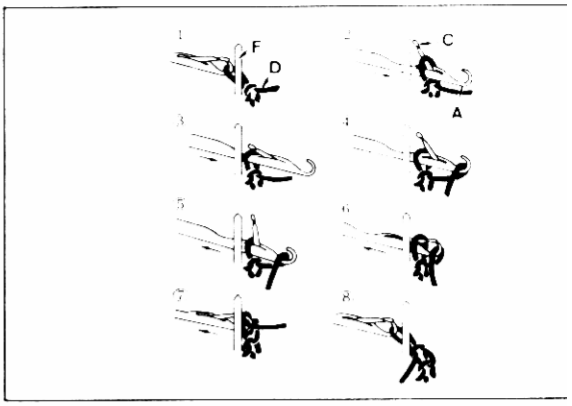
HOK — CARRIAGE DIRECTION
This signal selects either right or left of the KSL and CCP signals.

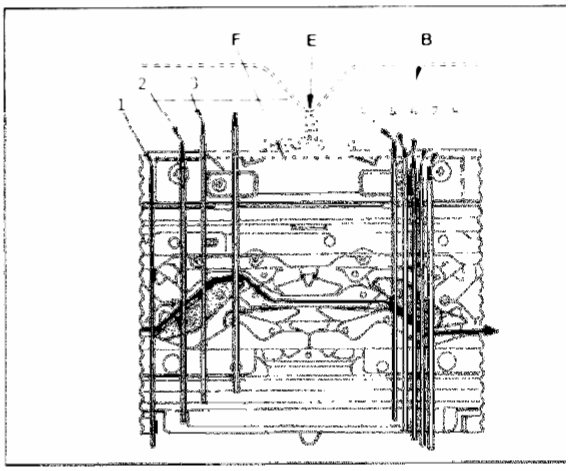
1-5 HOW A NEEDLE FORMS A STITCH

The sequence of a needle forming a stitch is described below.

1. An old stitch is hanging on the hook **A** of a needle.
2. The needle is pushed forward by a main and sub cam. The fabric is also carried forward but is stopped by the Fabric Presser **B** and only the needle is pushed forward getting its latch **C** opened by the stitch.
3. As the needle goes further forward, the stitch goes over and behind the latch.
4. Yarn **D** is fed on the hook of the needle through the Yarn Feeder **E** to form a new stitch.
5. The needle begins to move back as it is pushed by the other main cam.
6. As the needle goes back, the fabric pushes the latch causing it to close.
7. When the needle is led further back, the latch closes on the hook completely, confining the yarn under it.
8. When the needle is back in its original position, the old stitch slips from the hook, passing over the latch. (The sinker posts **F** serve to make even the size of the stitches.)

   Now a new stitch is on the needle.





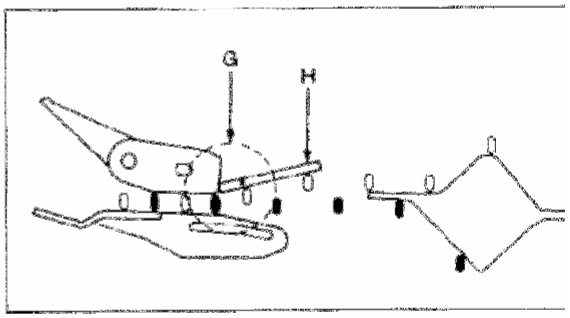
1-6 HOW A NEEDLE IS SELECTED

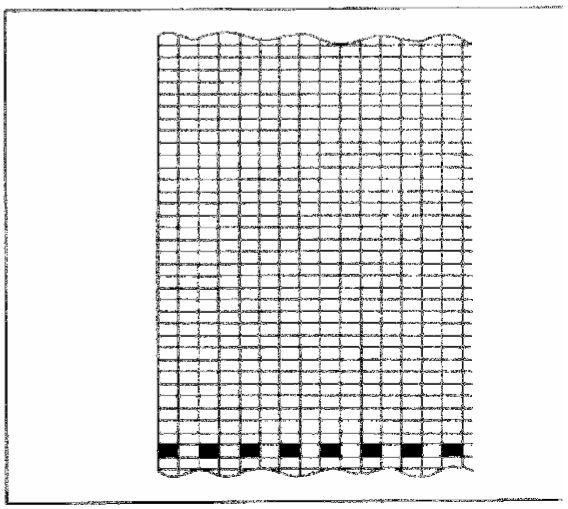
The principal how a needle is selected is described below.

1. The CR Sensor on the Card Reader reads a pattern information on the Pattern Card.
2. The pattern information (analog signal) is converted into digital signal and sent to CPU Board, and stored.
3. The solenoids **G** in the Carriage select a needle according to the pattern signals emitted by the programmable controller.
4. If a white square is read, the solenoid will magnetize completely the S magnet Plate **H** and the corresponding needle will be attracted to the plate and be guided back along the rear of the separation cam.
5. If a black square is read, the S Magnet Plate **H** will only be magnetized and the corresponding needle will be guided along the form of the separation cam.

Note:

The above 4 and 5 apply when Pattern Button 1 is positive. If Pattern Button 1 is depressed, the needle selection function would be reversed, i.e. black square will magnetize the solenoid in the Carriage and the needle goes back and the white square guide the needle forward.





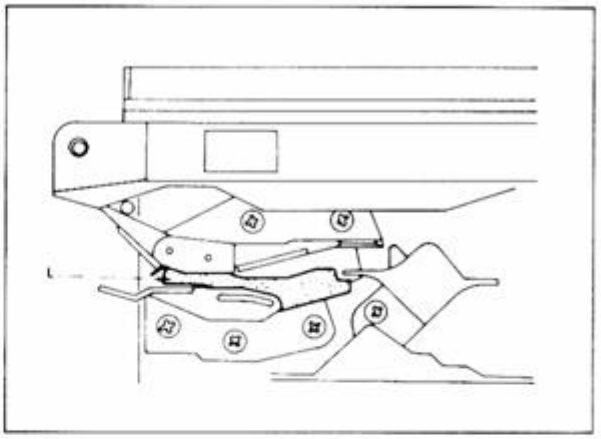
1-7 CLEANING AND LUBRICATION

Periodical cleaning and lubrication are very important to maintain proper operation of the machine.

NEEDLE SELECTION AREA

1-7-1 Problem:

Lack of lubricant on the Needle Selecting Base **L** will cause wear of the Base and result in occasional incorrect needle selection.



1-7-2 Measures:

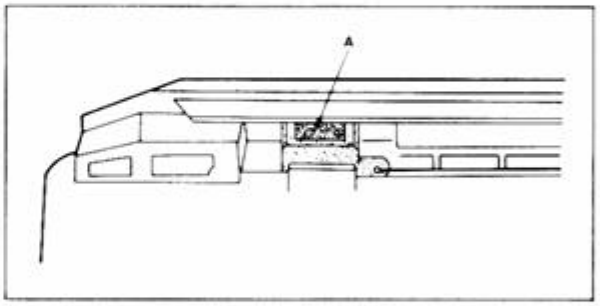
Clean and apply lubricant (machine oil) to the Needle Selecting Base and also to the needle butts.

- Lubrication once a month will be required for normal use at home.
- For an occupational use of the machine, apply the machine oil every 6 ~ 10 days to the Needle Selecting Base and needle butts.
- If wear on the Needle Selecting Base is noted, replace the whole Carriage Unit with new one.

SLIDER MAGNET

1-7-3 Problem:

Excessive lint on the HOK Slider Magnet **A** will disturb proper movement of the Slider and cause incorrect needle selection near the forward Point Cam on every row.



1-7-4 Checking:

Move the Carriage back and forth constantly and check the movement of the Slider Magnet by its constant clicking sound.

1-7-5 Measures:

If the clicking sound is irregular, remove any lint and excessive oil from the magnet. But if the magnet is still in a poor movement, replace whole the Carriage Unit.

(a) Problem:
Dust or creases on the Pattern Card/Design Card will cause incorrect needle selection.

Measures:
Wipe off the dust from the Card, and if the Card is creased or scratched, replace it with new one.

(b) Problem:
Yarn lint over the Pattern Reading Windows will cause incorrect needle selection.

Measures:
Take out the CR Unit and blow away the lint, or wipe off the lint with a use of the Cleaning Brush.

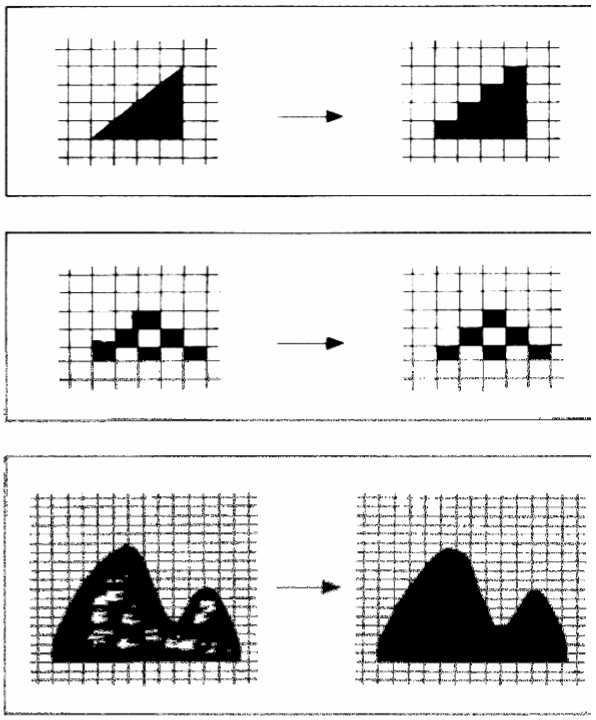
1-8 CARES IN DRAWING A PATTERN

Inappropriate drawing of a pattern and improper markings in the Instruction Columns will cause failure in needle selection and the card will move in an incorrect manner.

Following cares should be taken when drawing a pattern and giving marks in the Instruction Columns.

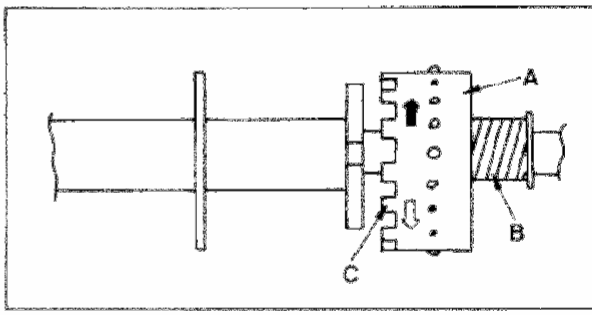
I. To make geometirical pattern, fill each section of the Design Card correctly and the thickness of the drawing must be even all over the pattern.
II. If the drawing protrudes to adjacent unnecessary sections, wrong needle selection can be caused.
III. Descriptive patterns as shown require even thickness of drawing, if not, the faint area will not produce pattern on the knitted fabric.

* When drawing of hte pattern is finished, blow away any dust from the card, and DO NOT CREASE the card.
* After 10 ~ 20 thousand rows of knitting with one pattern repeatedly, the pattern drawn on the card will be rubbed off and cause incorrect needle selection.
Draw the pattern over again with the pencil.



1-9 CARD POSITIONING ADJUSTMENT

If the Card stops out of position of the Pattern Reading windows, the pattern will not be read correctly.



1-9-1 Checking

Remove the CR Unit and insert a card into its slit, then turn on the machine and check to see if the Card stops so as its sections are viewed through the windows.
If the horizontal line is seen through the holes, the vertical position of the Card against the Pattern Reading Window is incorrectly adjusted.

1-9-2 Adjustment

Remove the Card from the slit and pull the Sprocket Wheel **A** toward the spring **B** to disengage it. And reengage the Sprocket Wheel by shifting its teeth **C** by one pitch or so. One pitch shift changes 0.15m/m shift in vertical position of the card against the Window.

Shift the Sprocket Wheel **A** to ⇧ mark, and the Card moves downward.
Shift the Sprocket Wheel **A** to ⇩ mark, and the Card moves upward.

2. CHECKING CHART TO LOCATE DEFECTIVE UNITS

Set the machine as follows before it is connected to electricity.

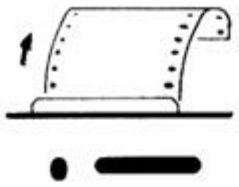
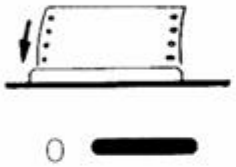
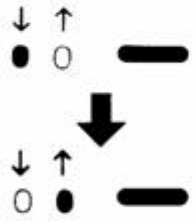
a) Set all the buttons at the upper position. STOP BUTTON, PATTERN BUTTONS 1, 2, 3, 4, 5, 6,
b) Set the Card Guide in position.
c) Select a Pattern Card and set it in the slit so as its first row appears at the Pattern Panel in parallel.
d) Set the Pattern Width at 60.
e) Push up 120 needles. 60 needles on both sides of 0, to B position.
f) Set the Point Cams at both end needles in B position.
g) Set the Needle-1 Cam at the center(0).
h) Set the Cam Lever on the Carriage at SLIP. Then follow the checking chart on the next page.

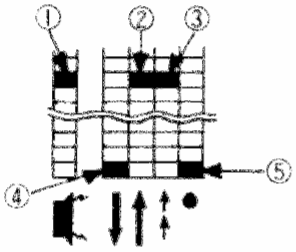
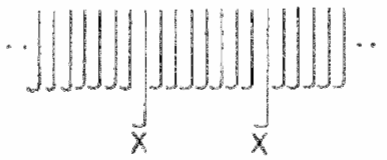
*Depending on the type of failure, a few hours of loading of the machine will be necessary before the same failure reccurs.

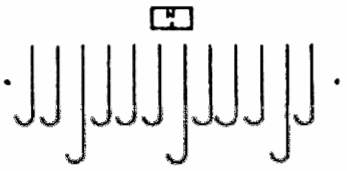
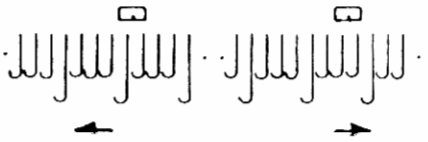
*When the Carriage Unit is replaced, confirm the CCP Holder positioning for correct needle selection timing, referring to page 33.

*Whenever defective units are replaced. confirm the proper operation of the machine.

	CHECK POINTS	FAILURE	UNITS TO BE REPLACED
1	— Turn on the machine. (The buzzer sounds, left lamp of the Buttons 1 & 2 and the lamp of the direction switch are on.)	— Buzzer does not sound. — Low sounds of Buzzer. — Buzzer sounds continuously.	(1) Regulator Board (2) CPU Board (3) CR Unit (4) Transformer
		— Lamps do not light on. — Lamps keep on flashing. — Right lamp of Switch 1 lights on. — Lamps light dark.	(1) Regulator Board (2) CPU Board (3) Transformer
2	— Depress the INSPECTION SWITCH. (Its lamp light on.) — Depress SWITCH 1. (Its right lamp on.) — Depress SWITCH 2. (Its right lamp on.) — Depress SWITCHES 3 ~ 6. (Their lamps on.) *When the testing has finished, push off the lamps of Insprction Switch and Switches 3 ~ 6. (Either lamps of Switches 1 ~ 2 and Direction Switch always light on.)	— All the lamps do not light on. — Lamps keep on flashing.	(1) Regulator Board (2) CPU Board
		— One lamp does not light on. — One lamp keeps on flashing. — One lamp is darker than the others.	(1) CPU Board

3	— Depress the INSPECTION SWITCH. (Pattern Card comes out by 10 rows.)  — Depress the INSPECTION SWITCH. (Its lamp is off and the Pattern Card moves in the machine by 10 rows followed by one reciprocation of the CR Sensor.) 	— Pattern Card does not moves up or down by 10 rows. — CR Sensor does not reciprocate.	(1) CR Unit (2) CPU Board (3) Carriage (4) Curl Cord
		— Pattern card moves in by only a few rows with a noise. — CR Sensor keeps on moving. — Buzzer sounds and Direction Pointer changes. — CR Sensor does not return to the left end position and the Buzzer keeps on sounding.	(1) CR Unit (2) CPU Board
		— CR Sensor stops midway, and an abnormal noise is noted.	(1) CR Unit
		— Pattern Card moves up and down a few times.	(1) CPU Board
4	— Change the Direction Pointer to ↑ and ↓ by hand.  When the testing is finished, set it to ↓.	— The pointer moves to one side only.	(1) CPU Board
5	— Move the Carriage from left to right. Card advances to the next row when the carriage passes the forward point cam, and pattern reading is executed when the carriage passes the rear point cam.	— Card advances irregularly. — CR Sensor does not move. — Alarming buzzer sounds on every row. — Alarming buzzer sounds on every row or at a few rows intervals. — Buzzer sounds on every row. — CR Sensor often keeps on moving.	(1) CR Unit (2) CPU Board (3) Carriage (4) Curl Cord

6	— Insert a stainless Pattern Card into the slit and operate the carriage to check to see if the card moves in response to the marks in the Instruction columns. (Direction Pointer changes in response to the direction marks on the card, buzzer sounds at the buzzer mark, card moves quickly in response to the mark in quick column, and stops at the stop mark.)	— Card moves quickly without quick motion mark. — Card does not respond to the quick motion mark. — Card feeding reverses without any mark put in its column. (Direction Pointer changes midway.) — Card feeding direction does not reverse with the mark put in its column. (Direction Pointer does not change.) — Buzzer sounds without mark in the column. — Buzzer does not sound with mark in its column. — Card stops without mark in its column.	— Check if the card is soiled or creased. — Incorrect markings on the card. — Yarn dust on the CR pattern reading holes. — Check to see if the card is set properly. *If the falilure is not yet mended, replace the CR unit.
	 ① actuates the Buzzer. ② advances upwards. ③ actuates quick motion. ④ advances down wards. ⑤ stops quick motion.	— The card does not stop at the stop mark.	
		— Feeding number of rows of the card is different from the rows expected. — The card is not fed correctly.	(1) CR Unit
		— Direction Pointer will not change, and the card moves up and down within two rows.	(1) CPU Unit
7	— Light on the left lamp of SWITCH 1, and Pattern Width to 60 Set blank area of a Pattern Card into the slit. (All the needles move backward.)	— Needle is selected at random intervals.  — The same needle is always selected.	(1) Check if the card is soiled or creased. (2) Check the pattern reading holes in the CR unit to see if yarn dust fills the hole. (3) CR Unit. (4) CPU Board.
	— Move the carriage quickly across 150 needles at the speed of 55 rows per minute. — Move the carriage slowly across 150 needles.	— Needles selected at random intervals when the carriage is moved quickly. — Needles selected at random intervals when the carriage is moved slowly.	— Check to see if needle selection cam is properly lubricated. If the failure is not yet mended, replace the carriage unit.

8	— Push on the left lamp of the SWITCH 1. — Push on the left lamp of the SWITCH 2. — Pattern Width at 24. — With the Pattern card 1 ~ 4, check the needle selection at row 1. 	— No needle selection. — No needle selection partily. — Wrong needles are selected. — Pattern width is wrong.	(1) Carriage (2) CR Unit (3) Curl Cord
		— Pattern shifts from the Needle-1 Cam. 	(1) Carriage
		— Needle selection only on one direction of knitting.	(1) Carriage
		— Wrong needle is selected at random when the Carriage is moved very fast or slowly.	— Positioning of the CCP Sensor Holder on the Carriage.
		— Pattern near the Point Cams are broken or out of position.	— Check the magnet on the slider.
		— Carriage jams midway.	(1) Carriage

3. ELECTRONICAL CHECK AND ADJUSTMENT (USING THE DESIGN CONTROLLER PE1)

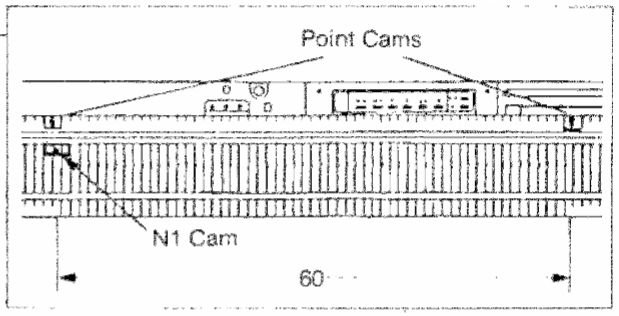
3-1 CHECKING THE KNITTING MACHINE AND PE1

Be sure to turn off the Power Switch after completing each item.

3-1-1 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.

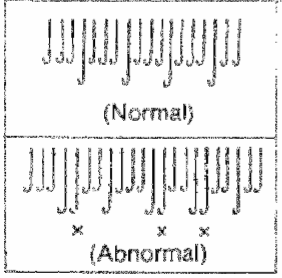
NO → Replace if any fault is found in Transformer Unit, R Board, Carriage, Curl Cord and CPU Board of Control Panel.

(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

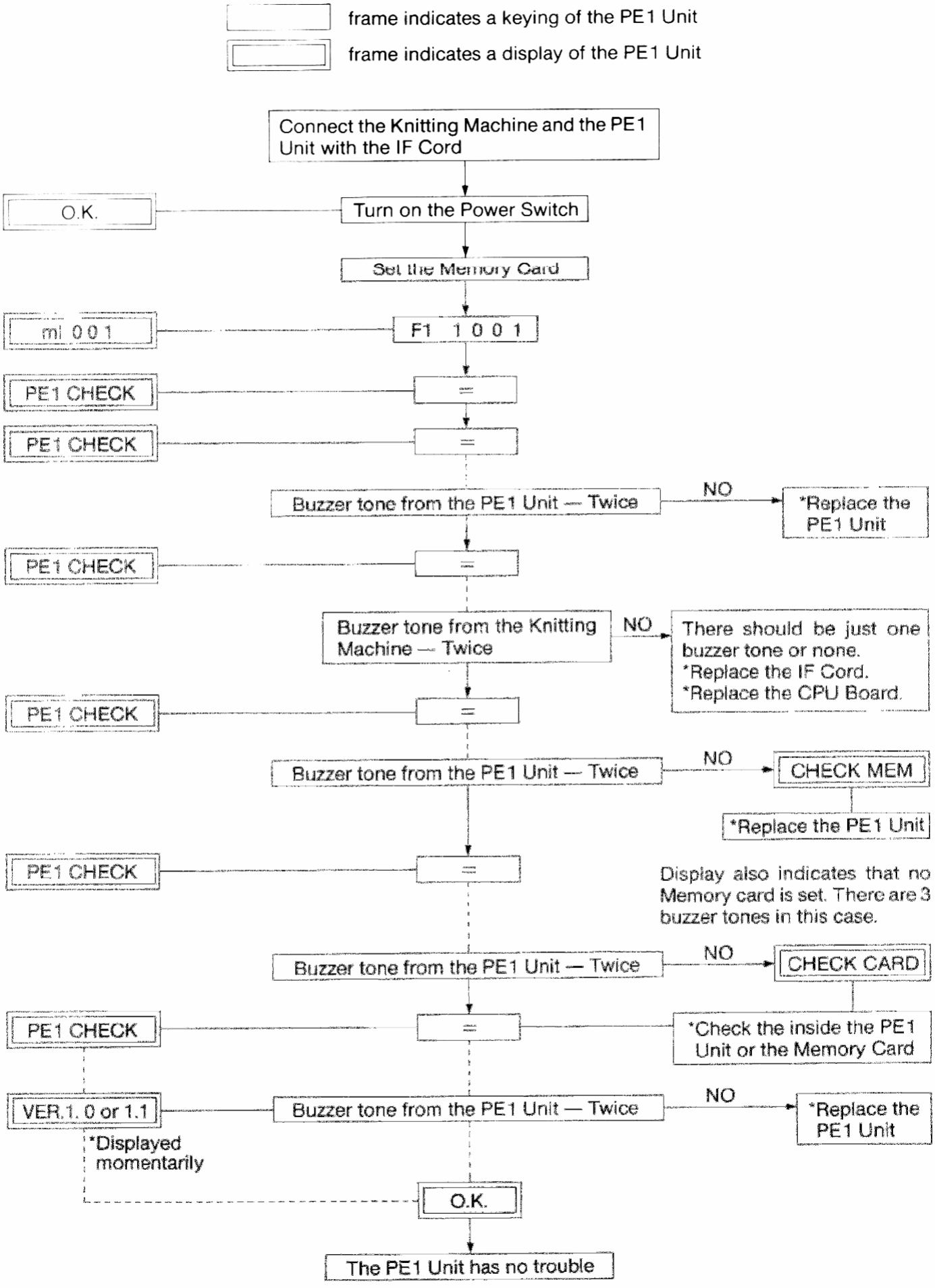
Try a knitting test.

NO

Everything is proper and ready.

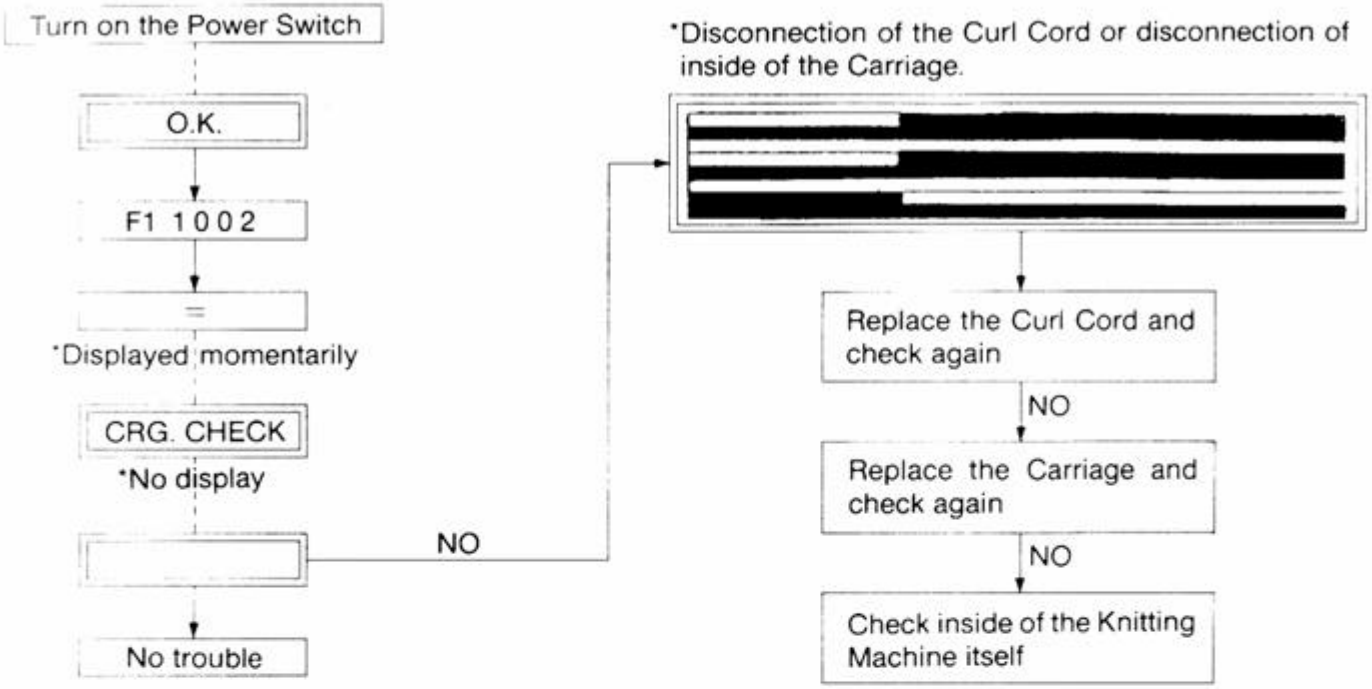
Check further, using the PE1 Unit.

3-1-2 Checking the PE1 Unit (Self-check Function)



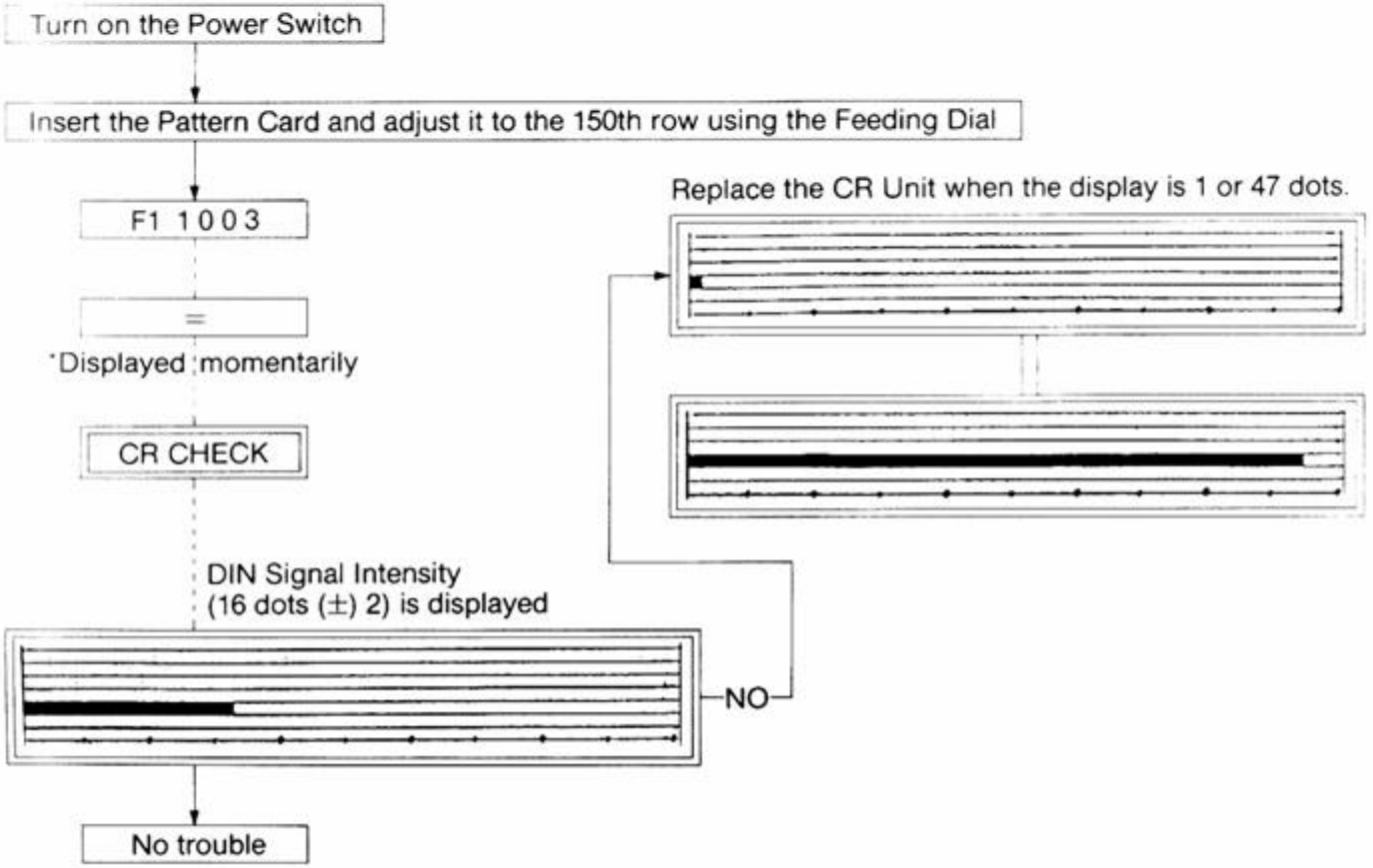
3-2 CURL CORD CHECK

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.



3-3 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.



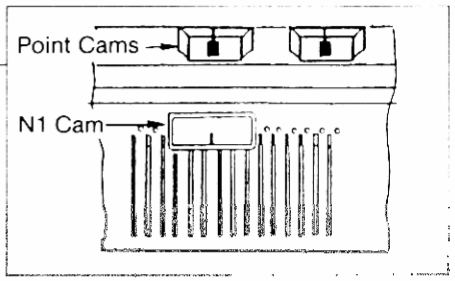
3-4 CARRIAGE UNIT CHECK (CRG. CHECK)

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 7, and the N1 Cam to 0.



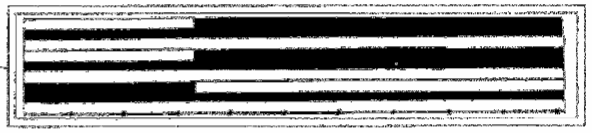
O.K. ← Turn on the Power Switch

CRG. CHECK ····· F1 1002 =

*Displayed momentarily and then no display

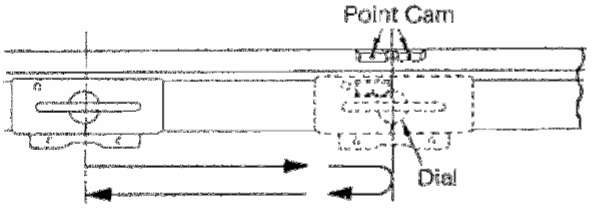
NO

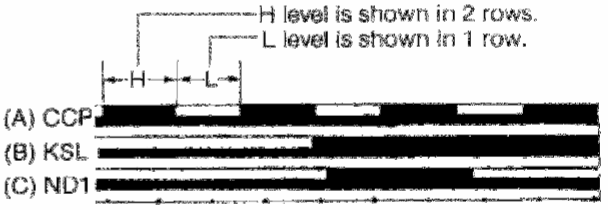
*Disconnection of the Curl Cord.



*Check each of the sensors in the right side.

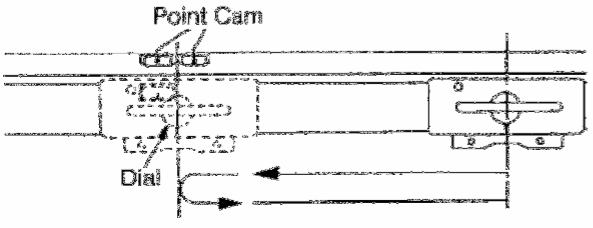
(1) Move the Carriage slowly toward the right and return toward left (the starting position) when the dial reaches the Point Cam.
(2) The buzzer of PE1 rings and output value of each sensor is displayed.
Note: As the right side is slow in reaction and it takes time to display the output value, repeat this procedure until displayed.
(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.

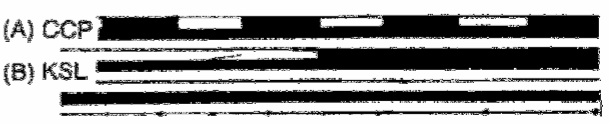




*After checking output of each right sensor, check each of the left-side sensor.

(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.



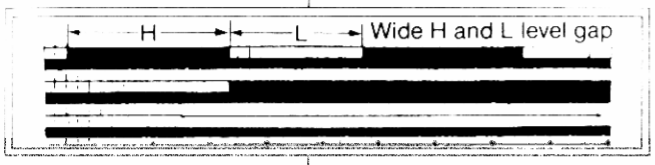


To be continued.

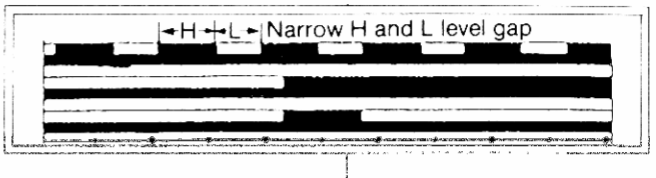
From the preceding page.

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

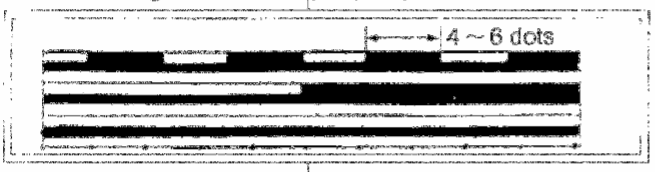
* The carriage is moved slow (left):



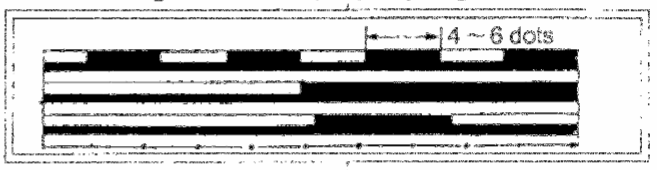
* The carriage is moved fast (right):



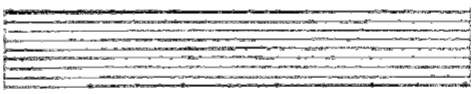
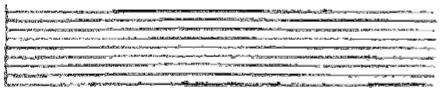
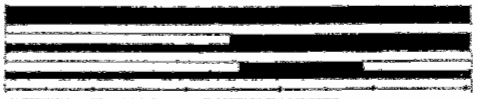
* The carriage is moved properly (left):



* The carriage is moved properly (right):



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

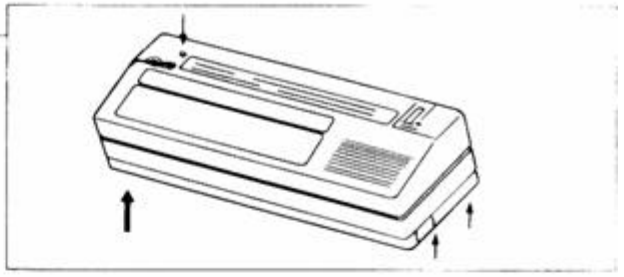
	Left	Right	Suspected trouble spot
1	Displayed normally 	Not displayed at all 	• HOK • KSL, ND1 sensor (Right)
2	Not displayed at all 	Displayed normally 	• KSL, ND1 sensor (Left)
3	Displayed normally 	No ND1 display 	• ND1 sensor
4	Displayed normally 	All H display for CCP 	• CCP sensor (Right)
5	All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

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

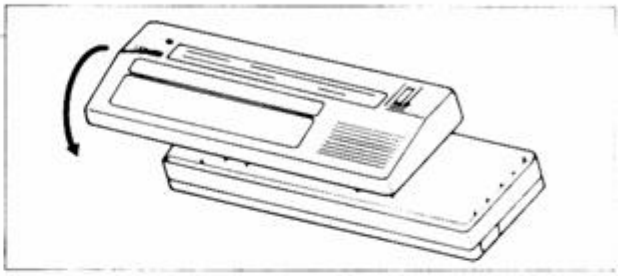
3-5 HOW TO REPLACE THE CR (CARD READER) UNIT

Remove the Pattern Card and turn off the Power Switch.

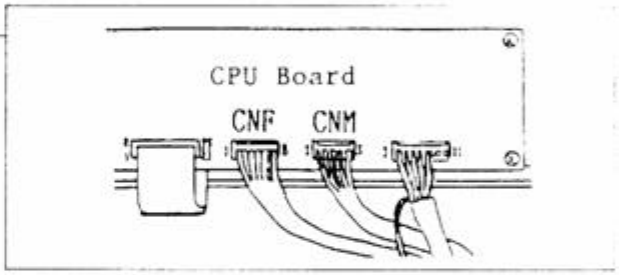
1 Remove one Binding Head Screw 3 × 8 fixing the Upper Cover, and 4 Binding Head Tapping Screws 2, 3 × 16 fixing the Bottom Cover.



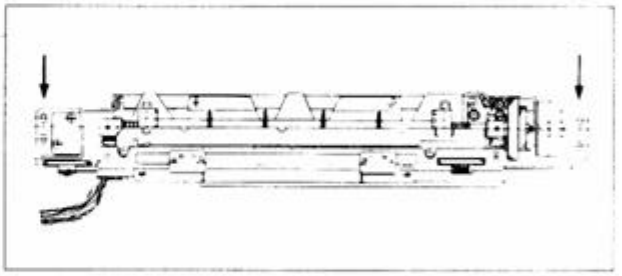
2 Open the Upper Cover slowly in the direction of the arrow.



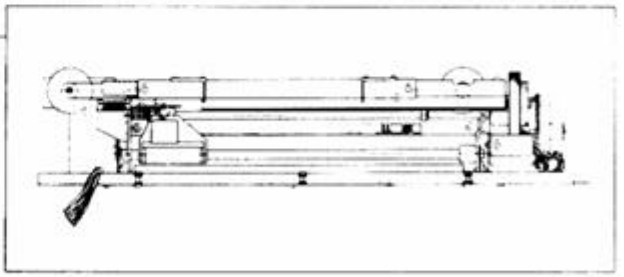
3 Remove the CNF and CNM connectors from the CPU Board by pulling the cords.



4 Mark with a pencil where 2 collar Head Screws 3 × 6 fis the CR Unit, and unscrew to remove the CR Unit.



5 Replace the CR Unit with a new one, holding the both ends to remove it from the Case.
Then, check and adjust each sensor before reassembling, referring to page 7.



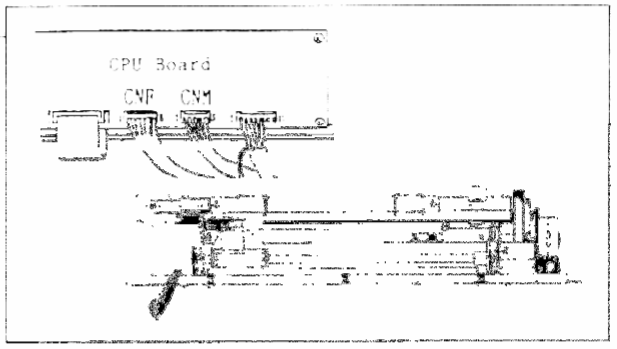
For reassembly, follow the removal process in reverse.

3-6 HOW TO ADJUST THE CR UNIT (USING THE PE1 UNIT AND ANALOG-TYPE TESTER)

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

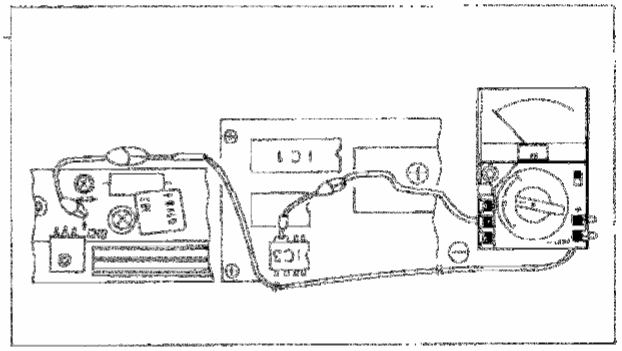
3-6-1 How to Adjust the PCP (Pattern Clock Pulse) Output Voltage.

1 Insert the CNF and CNM connectors into the CPU Board.

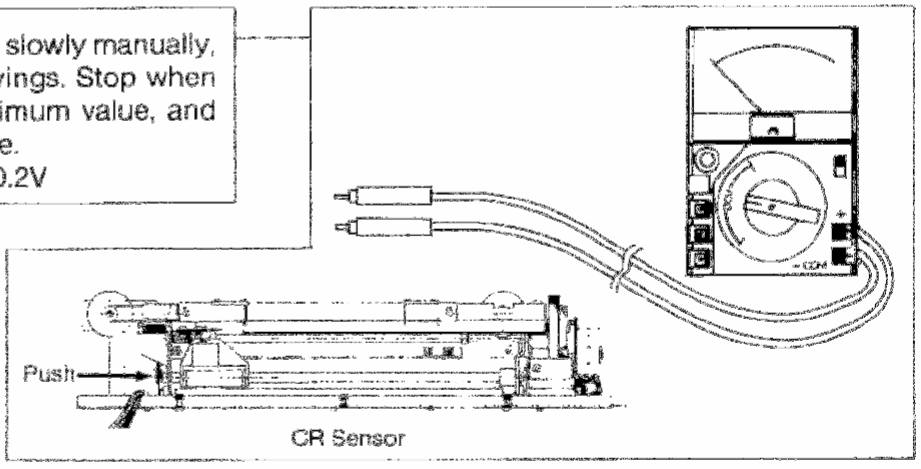


2 Connect with a clip the (−) of an analog-type tester to the GND on the Regulator Board and the (+) to the 4P of IC4 (or TP-C6). Then, set the tester range to 12V DC.

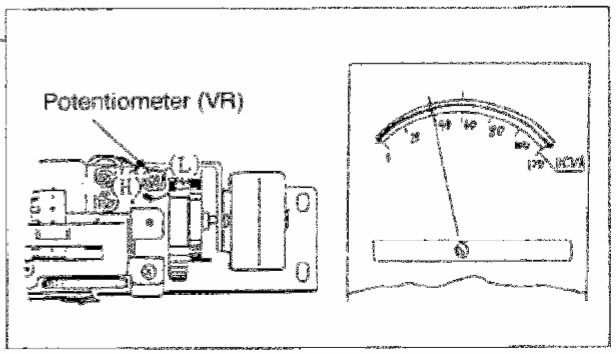
3 Turn on the Power Switch.



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



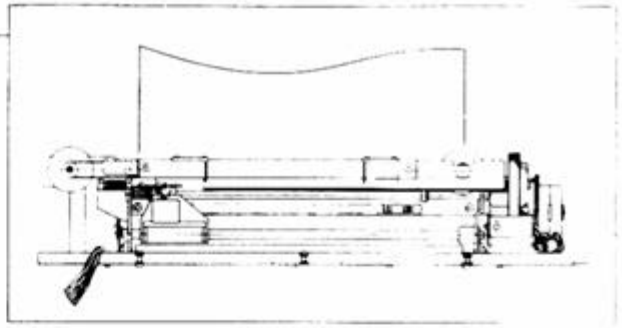
5 When the PCP Output Voltage is outside the range 4.0 ± 0.2V, turn and adjust the potentiometer (VR) for PCP Output Voltage adjustment by monitoring the tester's indicator needle.



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

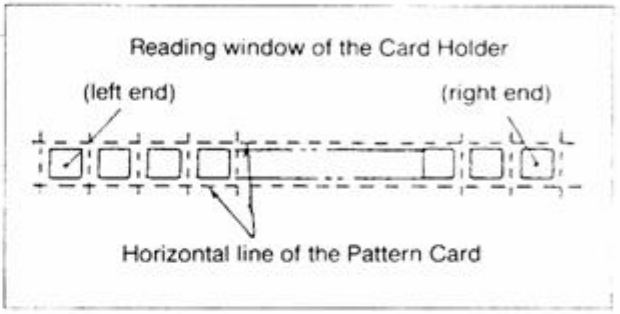
3-6-2 How to Check and Adjust the Card Holder and Pattern Card.

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

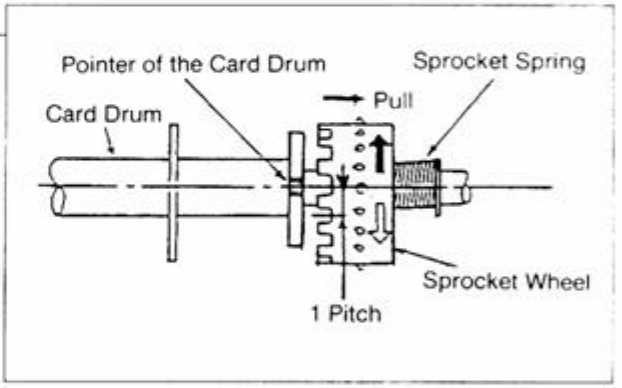


2 (1) Feed the Card by 10 rows with the Feeding Dial.
(2) See the Card Holder front of the CR Unit.

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 0.15mm.
(4) Turning the Sprocket Wheel (backward) moves the Pattern Card downward.
(5) Turning the Sprocket Wheel (forward) moves the Pattern Card upward.

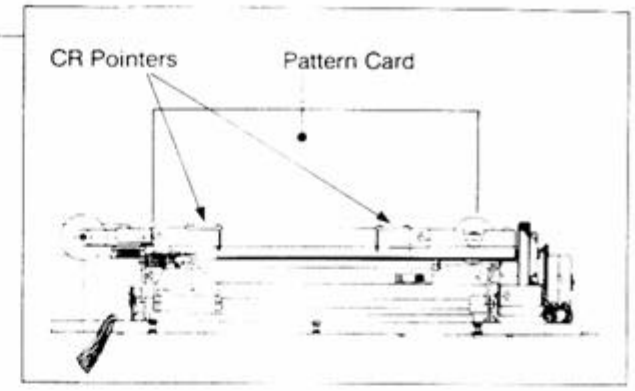


5 Set the Pattern Card again and recheck.

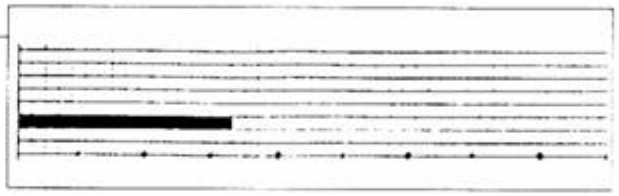
6 After the check or adjustment, remove the Pattern Card and turn off the Power Switch.

3-6-3 How to Adjust the DIN Output Voltage

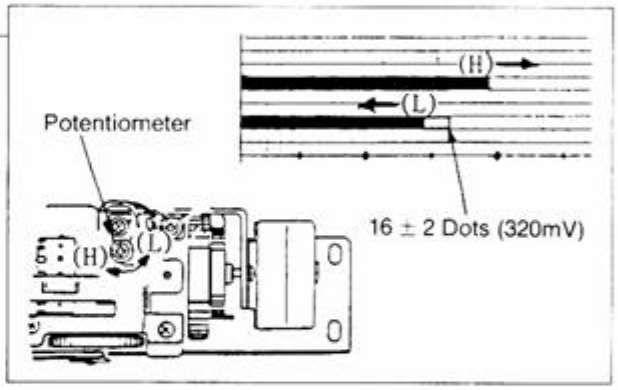
1 Set the 150th row of the Pattern Card No.1. Align the CR Pointer to the position 2 and 4, respectively. Set the PE1 Unit and turn on the Power Switch.



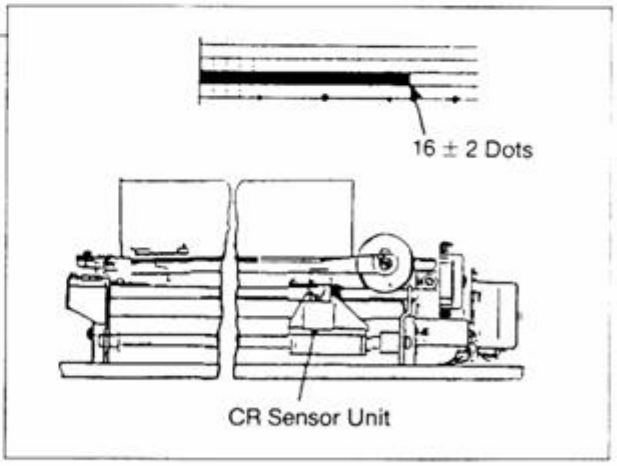
2 When the F1 1003 (=) is pressed, the CR CHECK is momentarily displated and then DIN Output Voltage is displayed.



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 displayed value. DIN Output voltage = 16 ± 2 dots (320 mV)



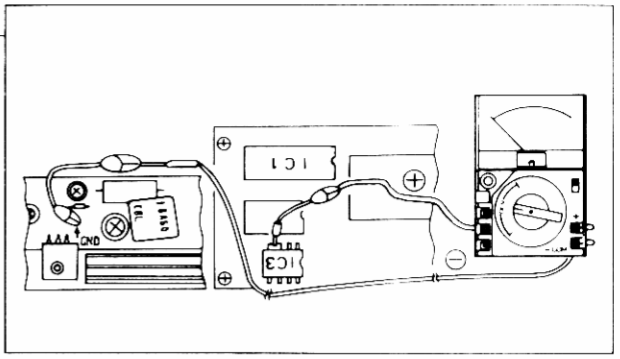
4 Move the CR Sensor Unit to the right and manually and check the DIN Output Voltage at the right end. When the display is not in the range 16 ± 2 dots (Note), move the CR box forward and backward for adjustment.



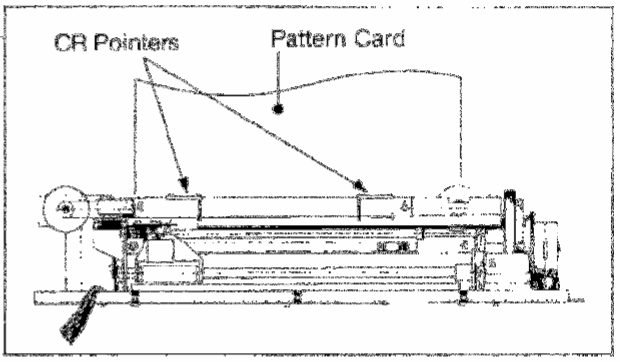
(Note)
See page 34, Reference (1) Forward — Backward Positioning of CR Sensor.

3-6-4 How to Check and Adjust the PSD (Preset Data) Output Voltage

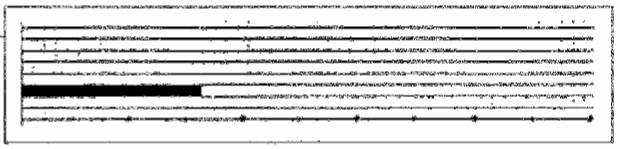
1 Connect with a clip the (−) of tester to G (GND) on the CPU Board the (+) to D (DIN) terminal and set the tester range to 12V DC.



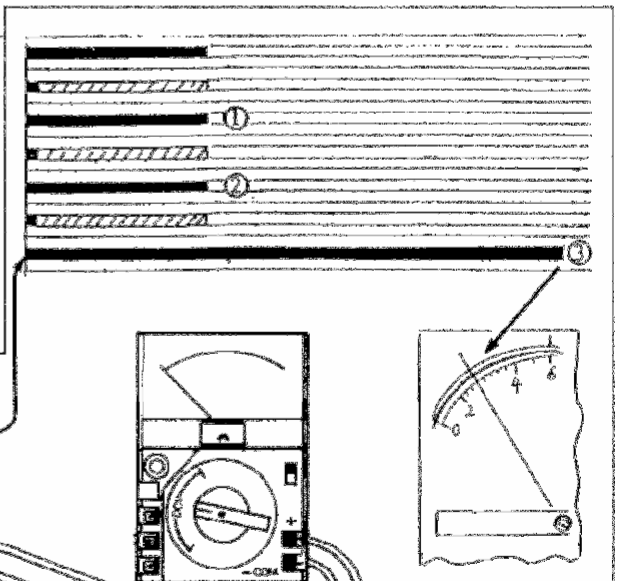
2 (1) Set the 150th row of the Pattern Card No.1.
(2) Align the CR Pointer to the position 2 and 4, respeetwely.
(3) Set the PE1 Unit and turn on the Power Switch. (Set as in the DIN Output Voltage adjustment.)

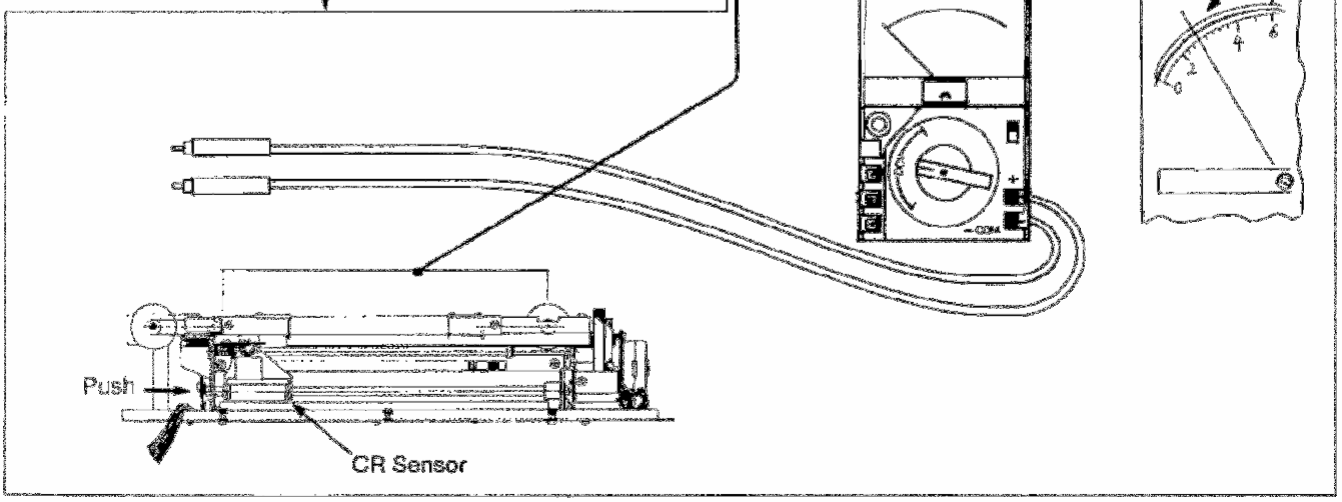


3 When the F1 1003 ⊜ of PE1 Unit is pressed, the CR CHECK is displayed momentarily and DIN is displayed.



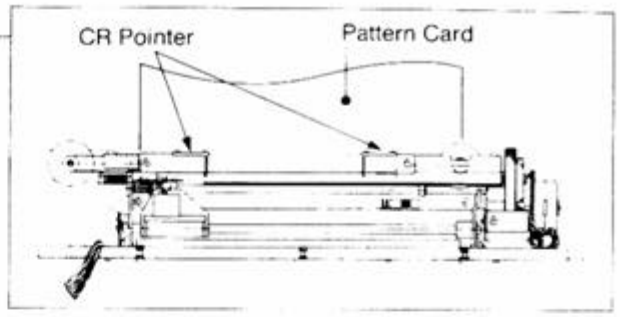
4 When the CR Sensor Unit is moved slowly manually, the DIN display shifts right and left. It is normal if the tester display is more than 2.5V. When the display comes near the CR Pointer (third time) and the DIN display shows 47 dots. If the display is less than 2.5V, see page 35, Reference (2) PSD Output Voltage Adjustment.



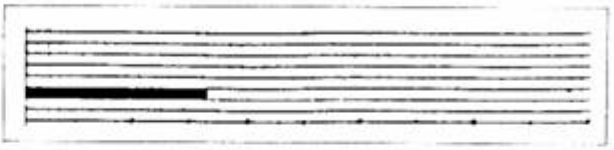


3-6-5 How to Check the PCP (Pattern Clock Pulse) Timing

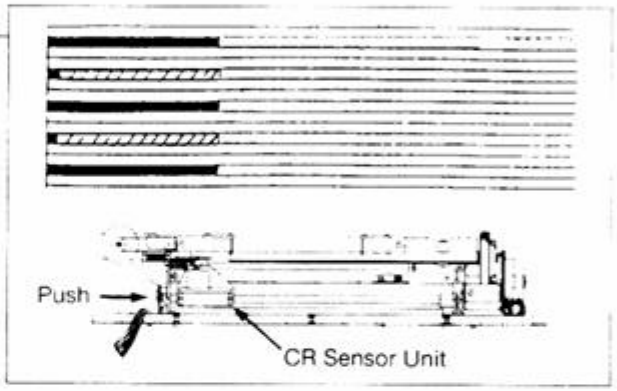
1 (1) Set the 150th row of Pattern Card No.1.
(2) Align the CR Pointer to the position 2 and 4, respectively.
(3) Set the PE1 Unit and turn on the Power Switch.



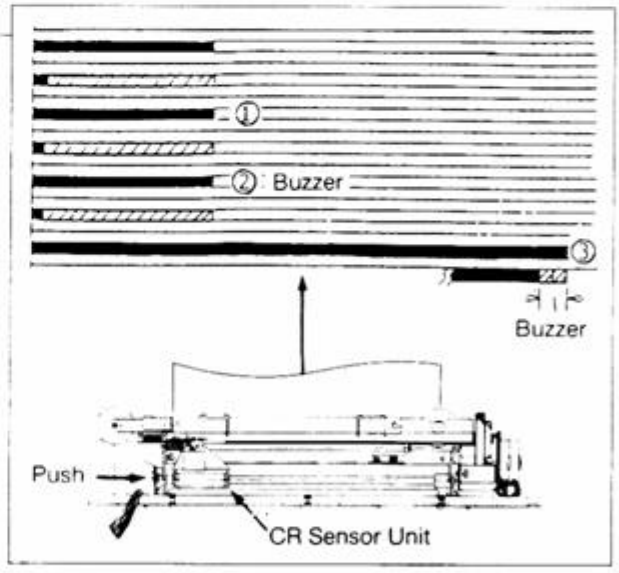
2 When the F1 1003 = for PE1 Unit is pressed, the CR CHECK is momentarily displayed and then the DIN is displayed.



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 36, Reference (3) PCP Timing Adjustment.



- 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.

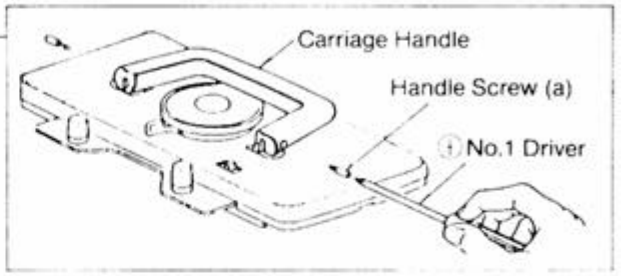
3-7 HOW TO ADJUST EACH SENSOR OF THE CARRIAGE

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.

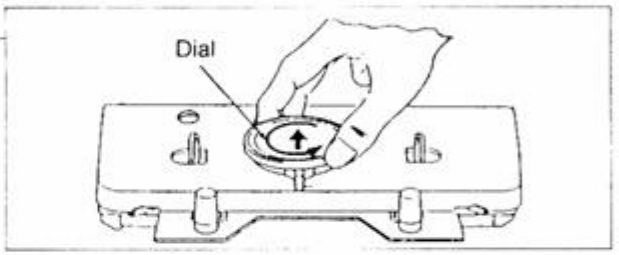
3-7-1 How to Remove the Carriage Cover

A) For SK840 and SK580 Carriages

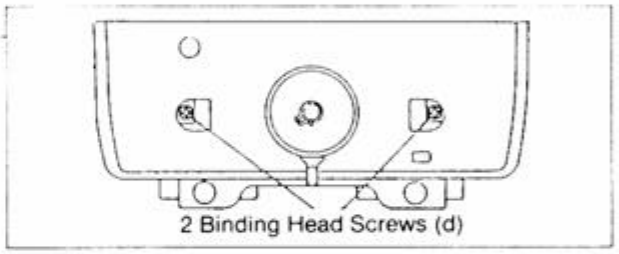
1 Pull down the Carriage Handle and remove the handle by unscrewing the two screws (a) with a (+) No.1 screwdriver.



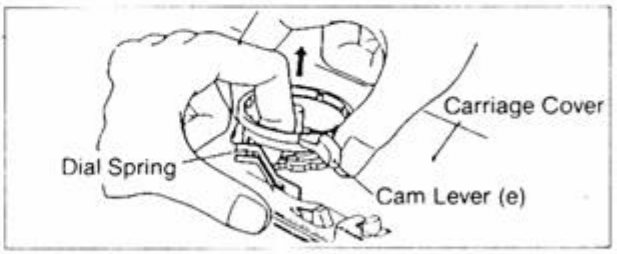
2 Turn the Dial toward 0 fully and pull the dial upward to remove the Dial Cap and Dial together.



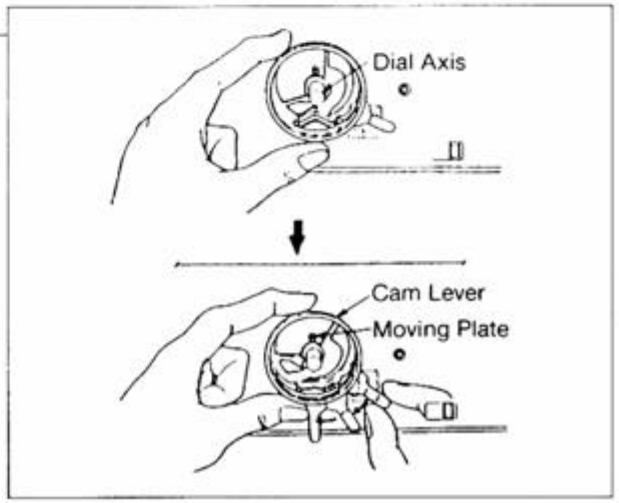
3 Remove the two screws (d) fixing the Carriage Cover with a (+) No.2 screwdriver.



4 Set 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.



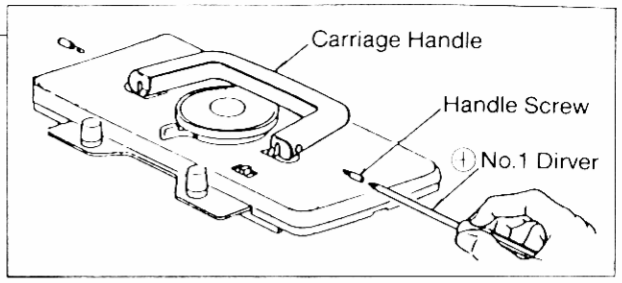
5 (1) After removing the Carriage Cover, install tentatively the Cam Lever, Dial and Carriage Handle.
(2) Set the Cam Lever to the Fair Isle and put in the Dial Axis. Press down the Cam Lever with your left hand.
(3) while pressing down, shift the Cam Lever to the Punch Lace and Stockinet to set it.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



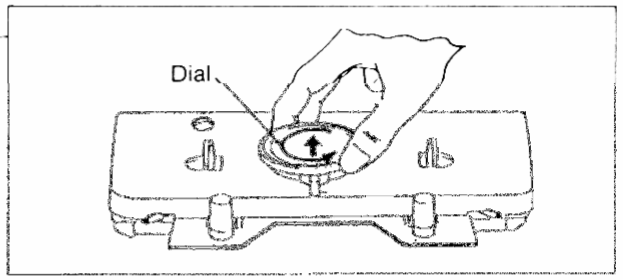
To be continued.

B) For **SK860 and SK890 Carriages.**

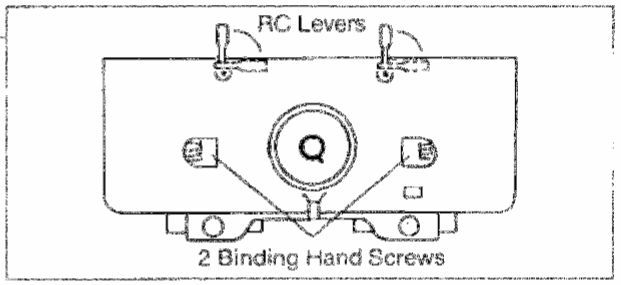
1 Pull down the Carriage Handle and remove the handle by unscrewing the two screws (a) with a (+) No.1 screwdriver.



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

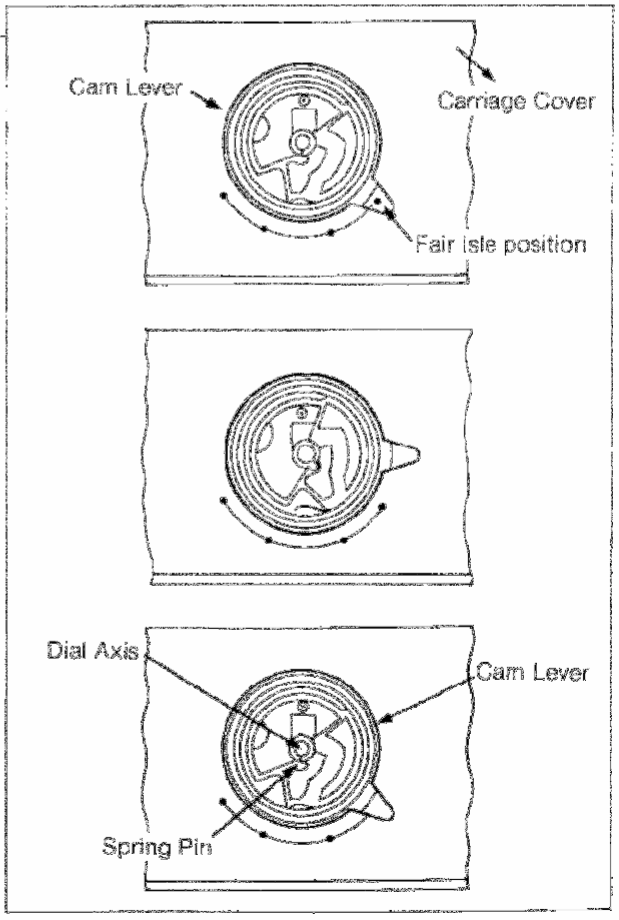


3 Remove the two screws fixing the Carriage Cover with a (+) No.2 screwdriver.
(Note)
RC Levers must be turened in the arrow directions.



4 Set the Cam Lever to the Fair Isle and, while holding (e) and (f) upward, turn the Cam Lever in the arrow direction. Then, pull up the Carriage Cover and Cam Lever at the same time to remove them from Dial Axis.

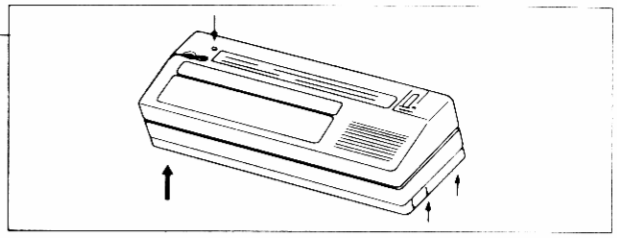
5 After removing the Carriage Cover, install tentatively the Cam Lever, Dial and Carriage Handle.



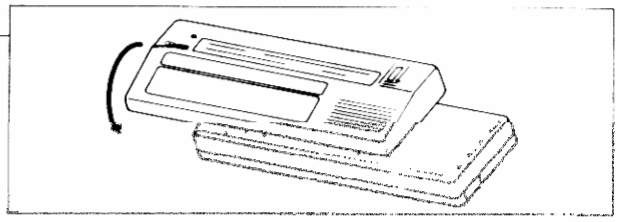
To be continued.

3-7-2 How to Adjust the CCP (Carriage Clock Pulse) Output Voltage

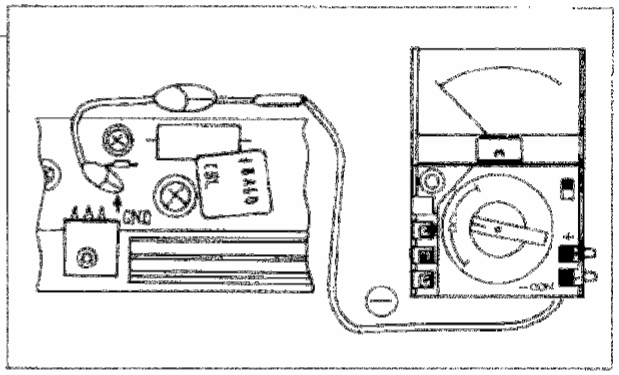
1 Remove one Binding Head Screw fixing the Upper Cover and 4 Binding Head Screws fixing the Bottom Cover.



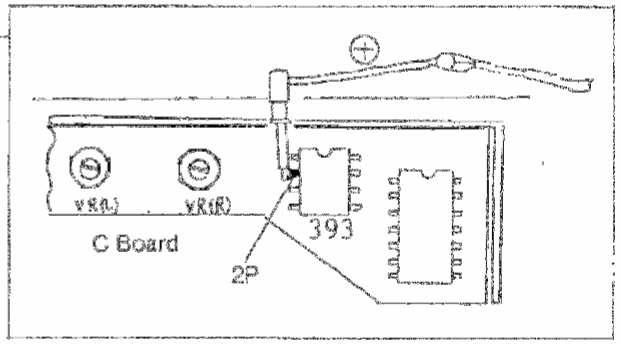
2 Open the Upper Cover slowly in the direction of the arrow.



3 Connect with a clip the (−) of the tester to G (GND) on the Regulator Board and set the tester range to 12V DC.

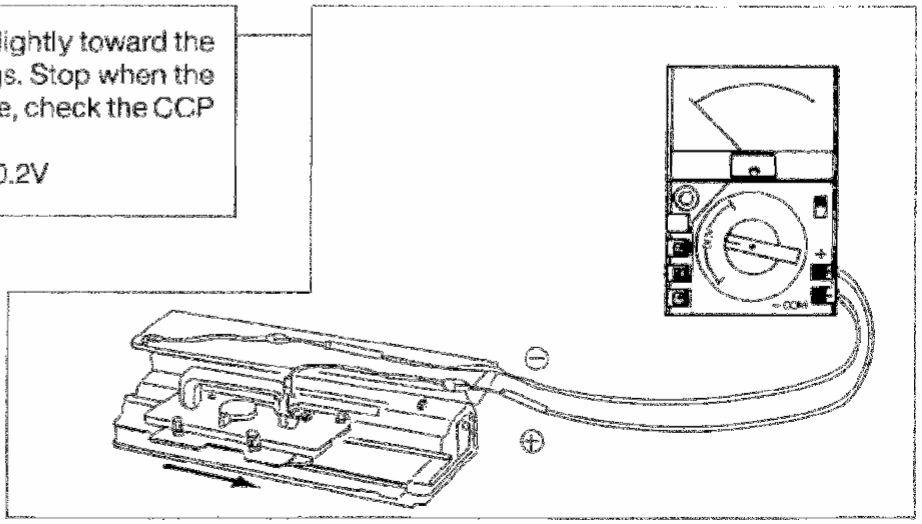


4 Connect with a clip the (+) of the tester to the Comparator 393C's 2P (CCP — Right) on the C Board and turn on the Power Switch.

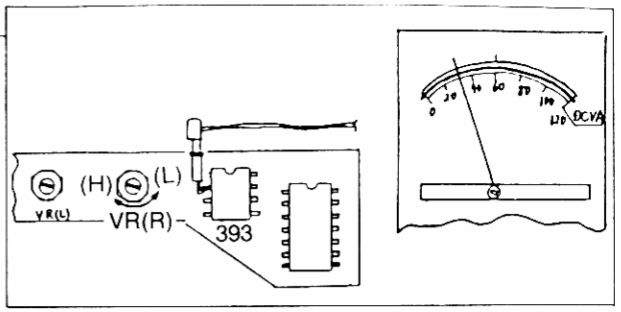


5 When the Carriage is moved slightly toward the right, the tester's needle swings. Stop when the needle is at the maximum value, check the CCP Output Voltage (right).
CCP Output Voltage = 3.3 ± 0.2V

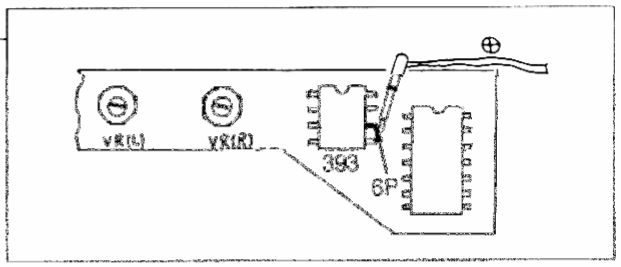
To be continued.



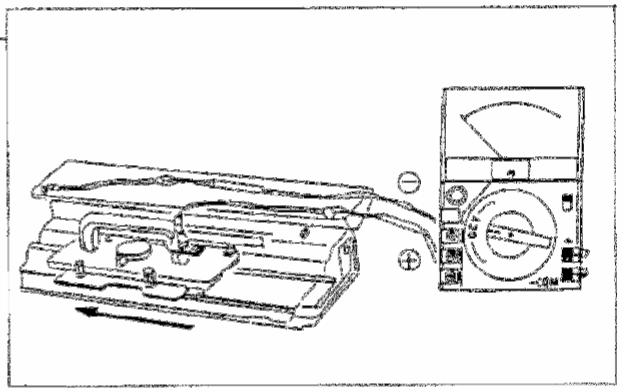
6 When the CCP Output Voltage (right) is not within the range 3.3 + 0.2V, turn the Potentiometer (VR-R) for the CCP Output Voltage (right) adjustment and adjust to 3.3 + 0.2V while monitoring the tester's indicator.



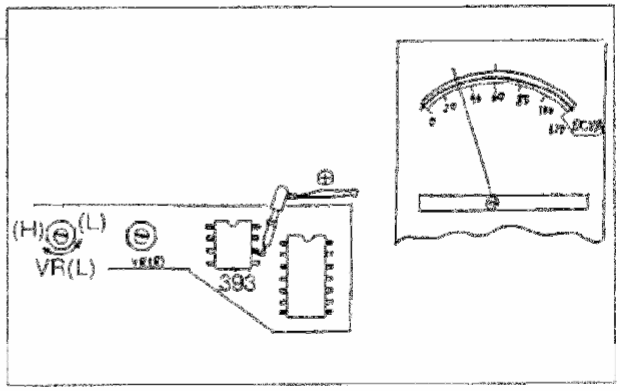
7 After adjusting the CCP Output Voltage (right), turn off the Power Switch. Then, connect the clip to the Comparator 393C's 6P (CCP — left) and turn on the Power Switch.



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 + 0.2V



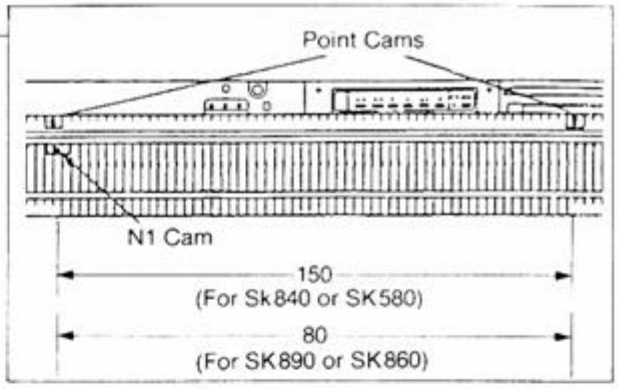
9 When the CCP Output Voltage (left) is not within the range 3.3 + 0.2V, turn the Potentiometer (VR-L) for the CCP Output Voltage (left) adjustment and adjust to 3.3 + 0.2V while monitoring the tester indicator.



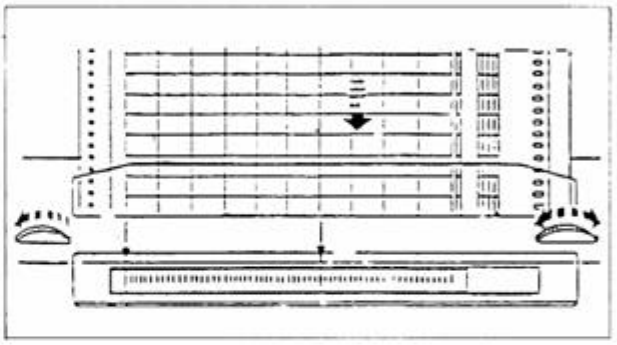
10 After the adjustment, turn off the Power Switch and remove the clips from the (+) and (—) of the tester and fix the CR Panel with three screws.

3-7-3 How to Adjust the CCP Needle Selection Timing

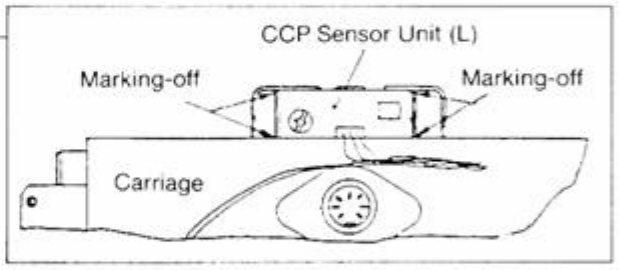
1 (1) For SK840 or SK580, set the left and right 75 Latch Needles (150 needles) to the position B.
For SK890 or SK860, set the left and right 40 Latch Needles (80 needles) to the position B.
(2) For SK840 or SK580, set the Point Cams to the 75th needles at the left and right and align the N1 Cam to the left Point Cam.
For SK890 or SK860, set the Point Cams to the 40th 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 Pointers to 0 and 24, reperctvely.
(4) Reset the Inspection Key.

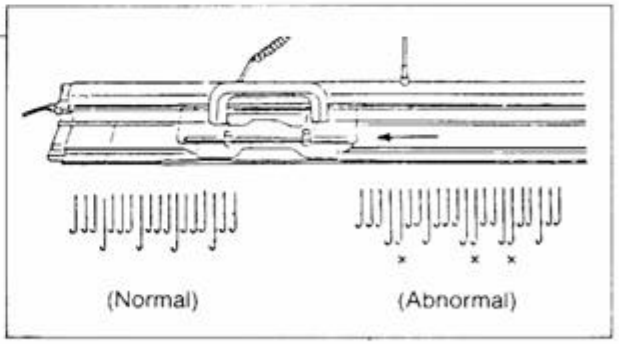


3 Mark on both ends of the left and right CCP Sensor Units with a pencil or the like.

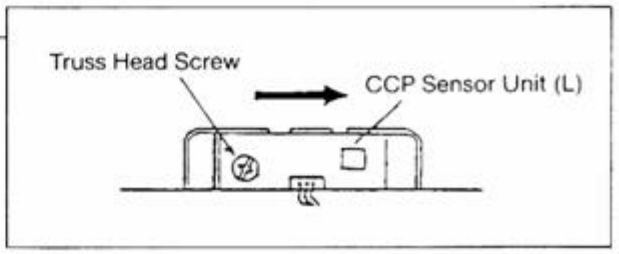


*Ultra-low speed check adjustment

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

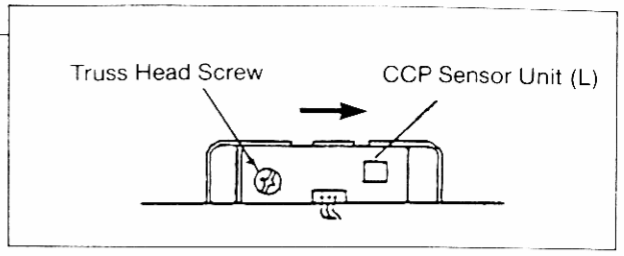


5 When the Carriage is moved right to left and the needle selection is not proper, the needle selection timing of the left CCP Sensor has not been properly adjusted. In such a case, shift the left CCP Sensor Unit slightly toward the right (inward) for adjustment.

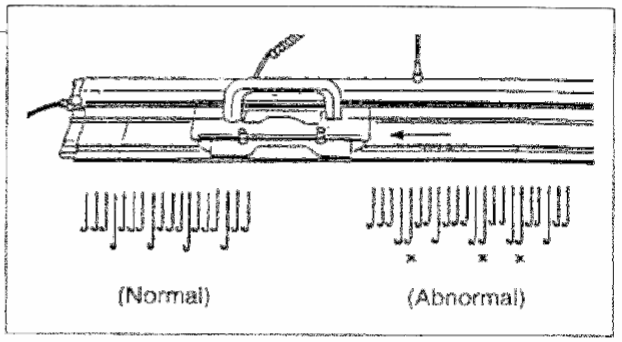


To be continued.

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 Marks put on the left and right positions of the CCP Sensor Unit.
(3) Check if the needle selection is proper at an ultralow speed and, otherwise, adjust by shifting the Unit little by little.

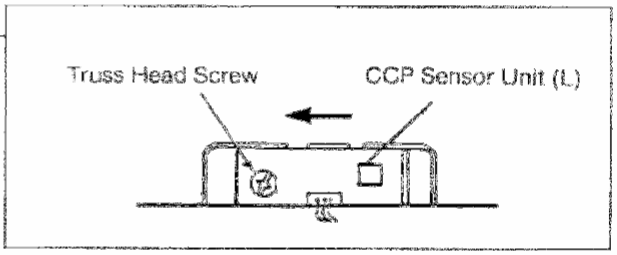


7 When the Carriage is moved left to right and the needle selection is not proper, the needle selection timing of the right CCP Sensor has not been properly adjusted. In such a case, shift the right CCP Sensor Unit slightly inward for adjustment.



*High speed check adjustment

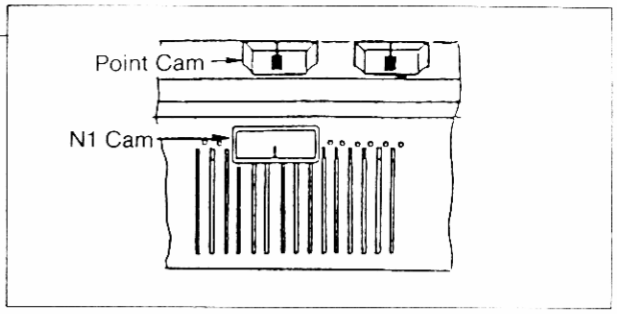
8 (1) For SK840 or SK580, move the Carriage at a high speed (150 needles-55 rows/minute) and check if the needle selection is normal. For SK890 or SK860, move the Carriage at a high speed (80 needles-55 rows/minute) and check if the needle selection is normal.
(Note)
At a speed when the row counter is 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.

3-7-4 How to Adjust the KSL and ND1 Timing

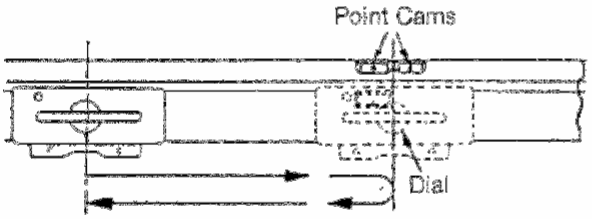
1 (1) Reset all Latch Needles to the position A.
(2) Place the Carriage at the left side.
(3) Set the Point Cams to 0 and 7 and the N1 Cam to 0.

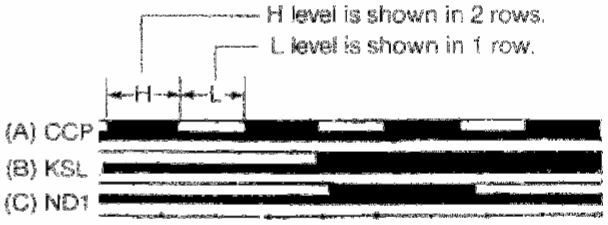


2 (1) Connect the PE1 unit to the Knitting Machine and turn on the Power Switch.
(2) Press the PE1 unit's operating key F1 1002 [ ] to conduct the CRG CHECK.

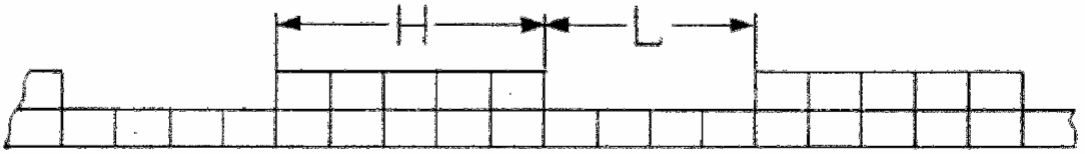
*Adjust the right KSL and ND1.

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.



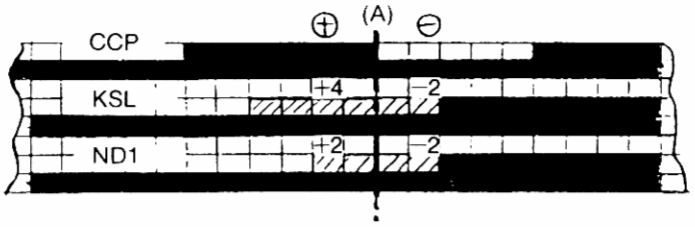


(Note)
The CCP display in the PE1 display section is shown 1-4 times larger in its H (3.3 ± 0.2V) value than in L when the CCP level has been properly adjusted.



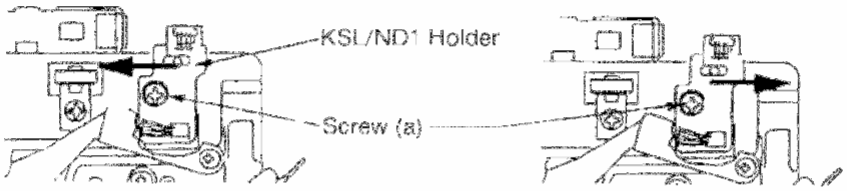
To be continued.

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 sped of the Carriage movement.



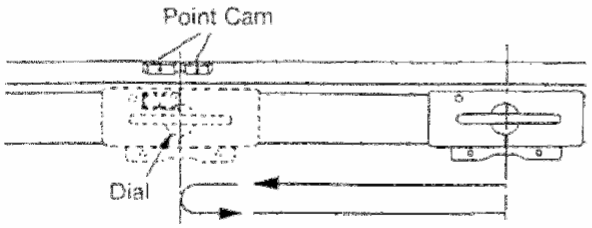
( ):
Loosen the one screw (a) fixing the KSL and ND1 holder (right) and move slightly to the left.

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

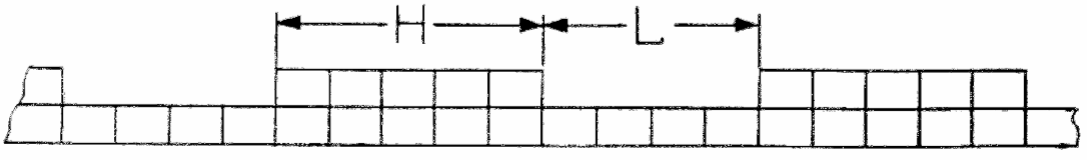


*After checking output of each right sensor, check each of the left sensors.

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.

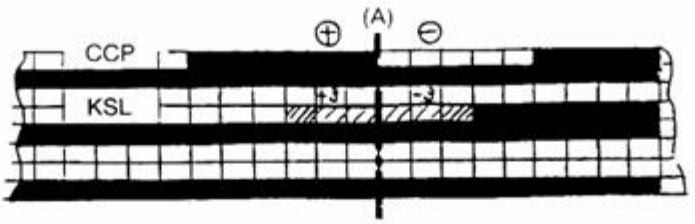


(Note)
The CCP display in the PE1 display section is shown 1-4 times larger in its H (3.3 + 0.2V) value than in L when the CCP level has been properly adjusted.



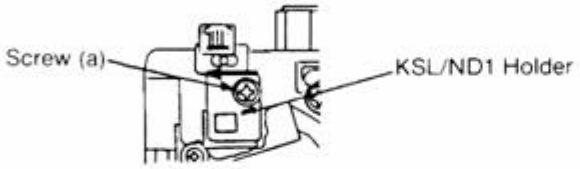
To be continued.

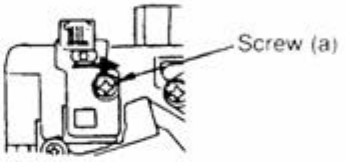
6 (1) When the adjustment is correct, the normal KSL display is within ±3 dots for the CCP display's (A) point. For the left side, the ND1 display is not shown as the ND1 sensor is not provide.
(Note)
The display value varies depending on a speed of the Carriage movement.



(+):
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.



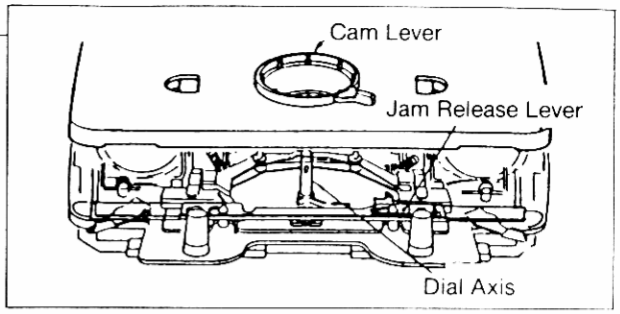


MEMO:

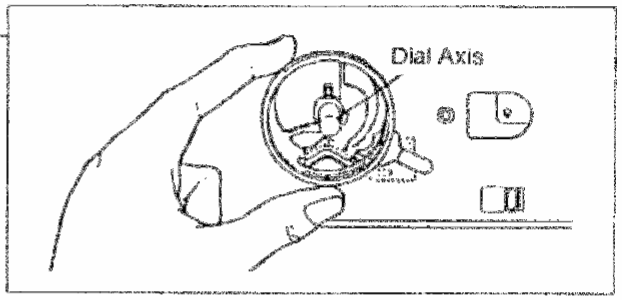
3-7-5 How to Install the Carriage Cover

A) For SK840 and SK580 Carriages

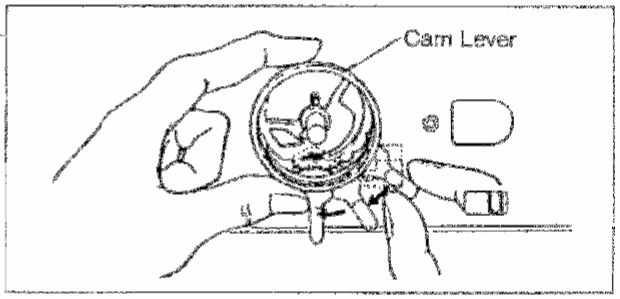
1 (1) Remove the Cam Lever and Handle tentatively installed.
(2) Insert the Cam Lever into the Carriage Cover and set it to the Fair Isle position. Be sure to install Jam Release Lever.



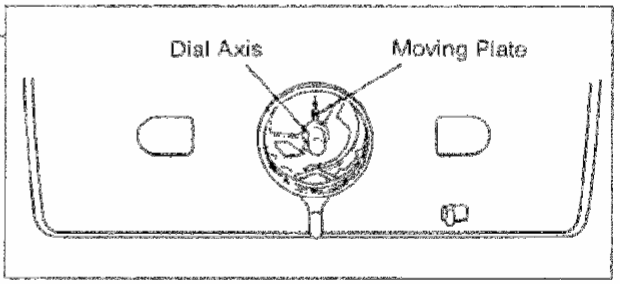
2 Insert the Cam Lever on the Dial Axis and press the Cam Lever down with your left hand.



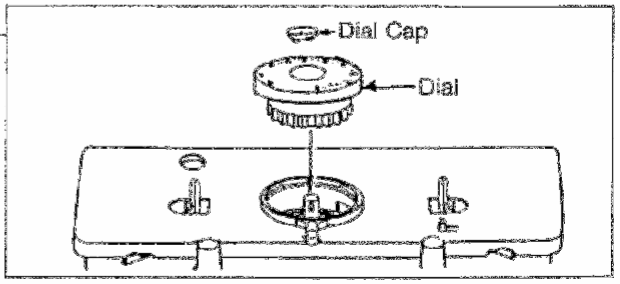
3 The Cam Lever is locked when it is shifted, while being pressed down, to the Punch lace and Stockinet positions.



4 Shift the Moving Plate toward the Dial Axis.



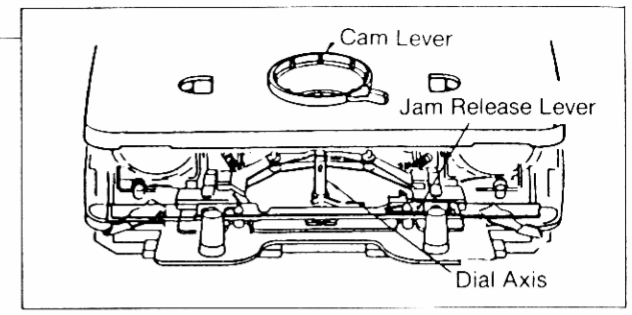
5 (1) Install the Dial and Dial Cap on the Dial Axis.
(2) Screw the Carriage Cover and Handle.



(Note)
If nothing wrong with card reading and needle selection when in test-knitting, everything properly adjusted.
If any trouble, take the steps from 3-7-1 to 3-7-5, again.

B) **For SK860 and SK890 Carriages.**

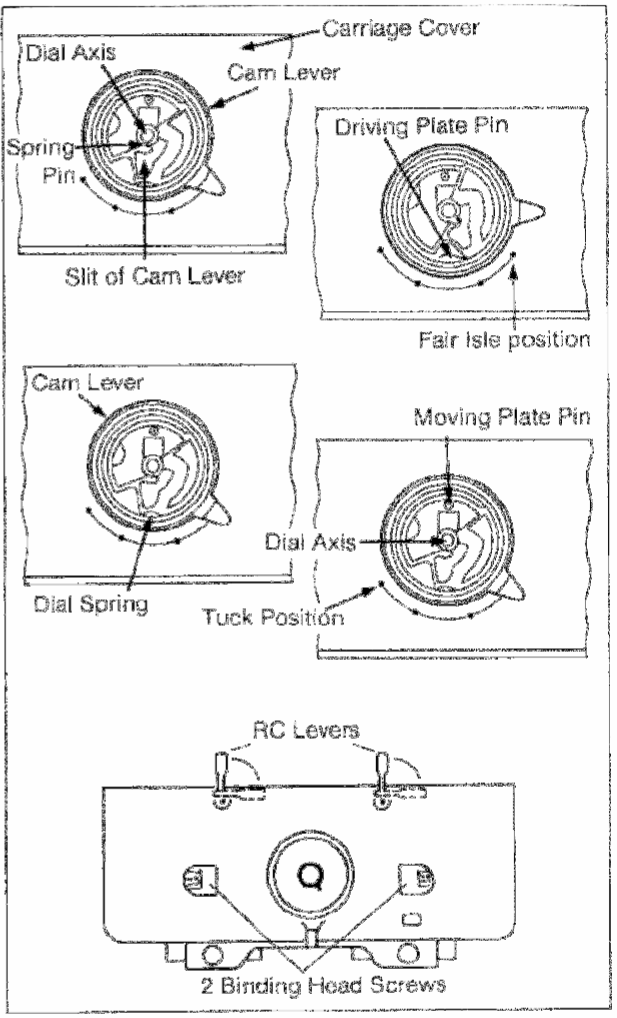
1 (1) Remove the Cam Lever and Handle tentatively installed.
(2) Insert the Cam Lever into the Carriage Cover and set it to the Fair Isle position. Be sure to install Jam Release Lever.



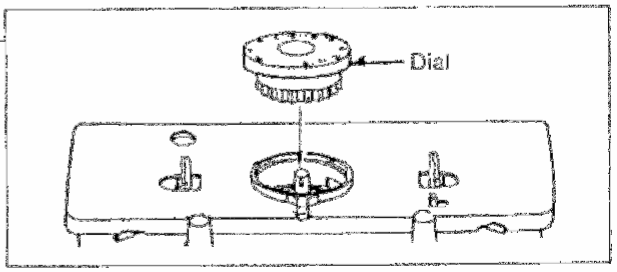
2 Set the Cam Lever in the Carriage Cover and then put the Cam Lever onto the Dial Axis, arranging Spring Pin to fit with a slit of Cam Lever.
When turn the Cam Lever in the arrow direction, the Driving Plate Pin is positioned as shown in the illustration.

3 When return the Cam Lever to the Fair Isle position, pressing down (a) and (b), the Driving Plate Pin is to be set on the Cam Lever.

4 Push up the moving Plate Pin to set the Dial onto the Dial Axis and then turn it counter clock wise.
Check surely if the Cam Lever moves smothly from Fair Isle to Tuck position.



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



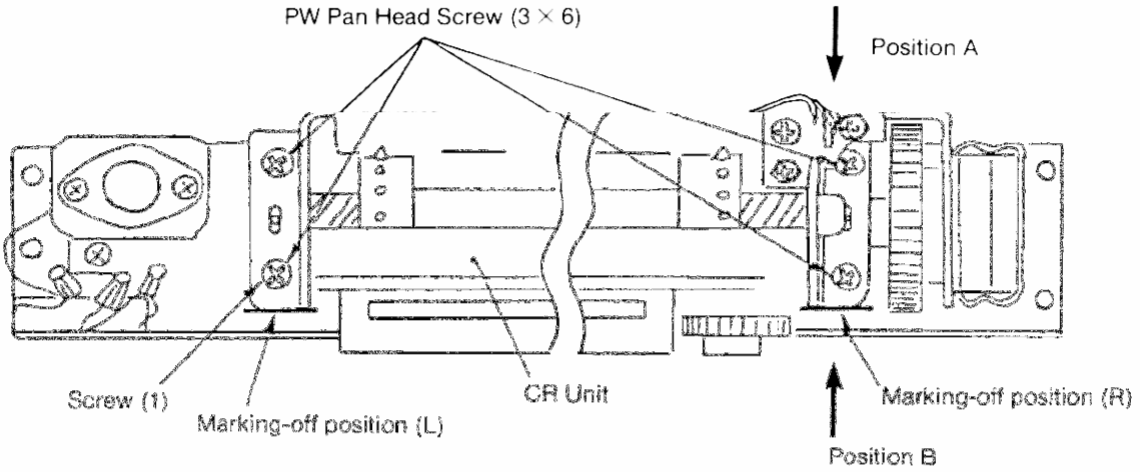
(Note)
If nothing wrong with card reading and needle selection when in test-knitting, everying is properly adjusted.

If any trouble, take the steps from 3-7-1 to 3-7-5, again.

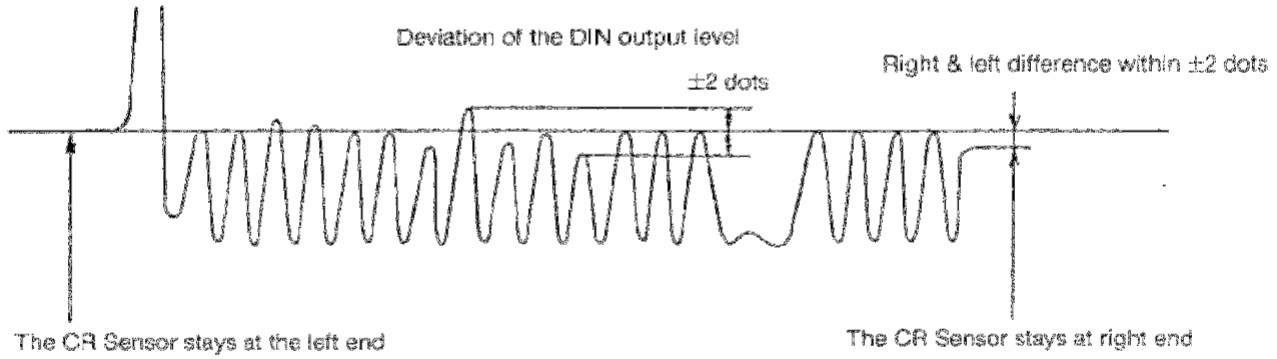
[REFERENCE]

1] ADJUSTING FORWARD-BACKWARD POSITIONING OF THE CR SENSOR
(See Page 20, Note)

(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.



(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.



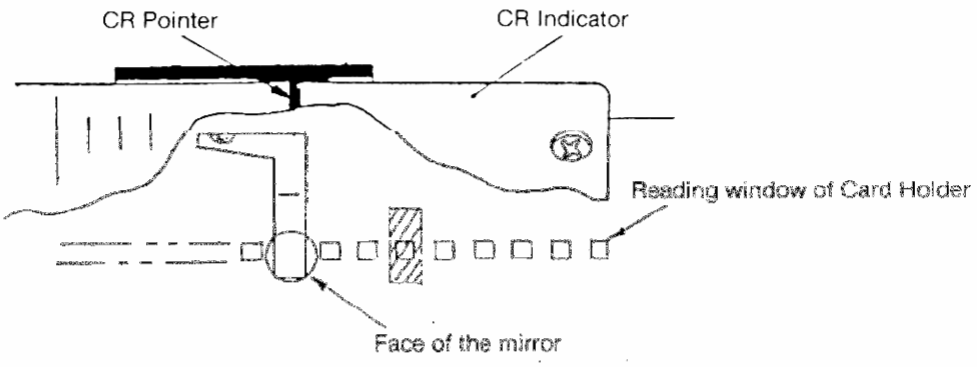
Note:
Check to see if the CR Sensor contacts the mirror or not. If the CR Sensor touches the mirror, move backward the CR Sensor as much as they are not contact each other.

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

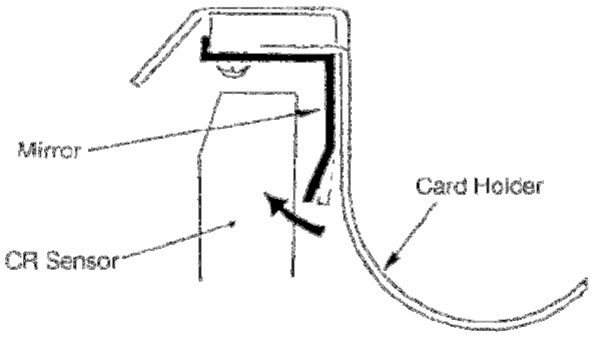
2] PSD OUTPUT VOLTAGE ADJUSTMENT
(See Page 21, item 4)

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.



(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.



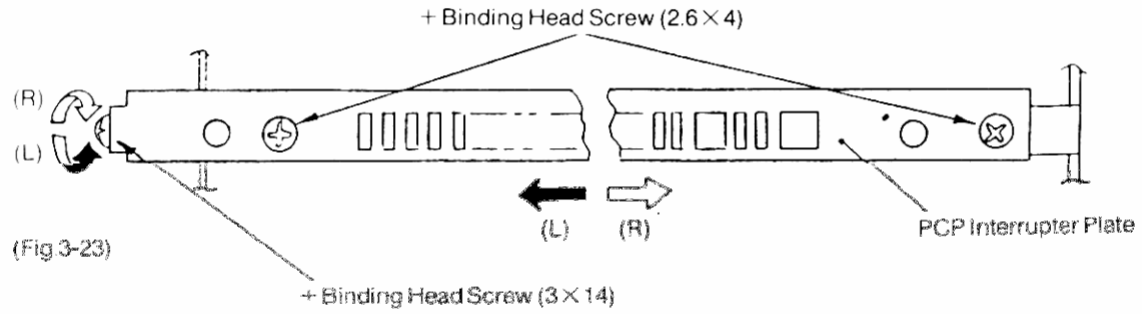
(3) If the PSD output voltage is still less than 2.5V after the mirror has been brought near to the CR Sensor, replace the mirror with new one.

(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.

3] PCP **TIMING ADJUSTMENT (See Page 22, item 4)**

(1) Loosen two binding head screws (2.6 × 4) fixing the PCP interrupter.

(2) Turn the binding head screw (3 × 14) 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)

MEMO:

4. MECHANICAL CHECK AND ADJUSTMENT

4-1 CORRECT POSITIONING OF CARRIAGE ARM

(1) PN CLEARANCE
The clearance between Fabric Pressers and Latch Needle. (Fabric Presser must contact the bottom of the needles in D position or lift them up slightly.)

(2) PS CLEARANCE
The clearance between Fabric Pressers and Sinker Posts.

(3) YS CLEARANCE
The clearance between Yarn Feeder and Sinker Posts.

(4) YP CLEARANCE
The clearance between Yarn Feeder and Fabric Presser.

(5) PW CLEARANCE
The relative measurement between Fabric Presser and Weaving Brush (Vertical Position).

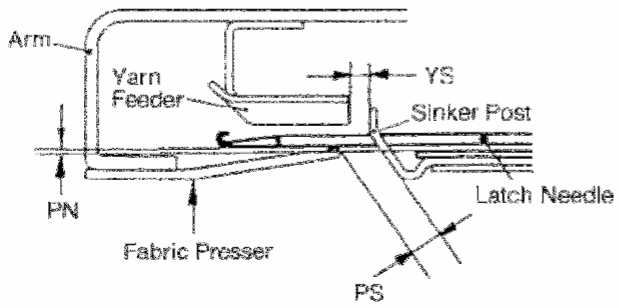
(6) WS CLEARANCE
The relative measurement between Weaving Brush and Sinker Posts (Horizontal Position).

CLEARANCE/MEASUREMENT TABLE

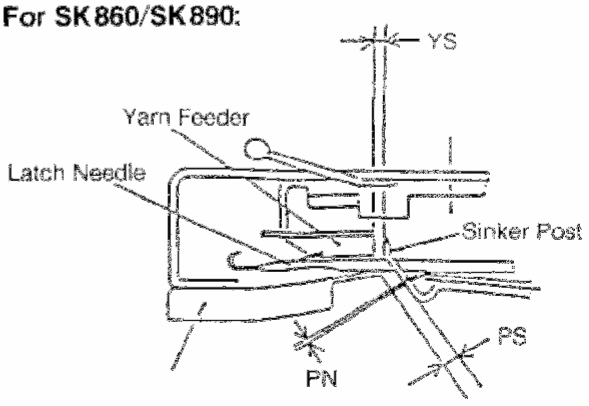
P — Fabric Presser, **N** — Latch Needle, **S** — Sinker Post, **Y** — Yarn Feeder, **W** — Weaving Brush

MODEL	PN	PS	YS	YP	PW	WS
SK840/SK580	0 ~ 0.3mm	1.35 ~ 2.0mm	0.3 ~ 1.0mm	1.75 ~ 2.25mm	−0.7 ~ 0.5mm	−0.5 ~ 1.5mm
SK860	−0.2 ~ 0.2mm	1.5 ~ 2.0mm	2.1 ~ 2.5mm	2.5 ~ 2.9mm	−0.9 ~ 0.3mm	−0.5 ~ 0.5mm
SK890	−0.2 ~ 0.2mm	1.5 ~ 2.0mm	0.3 ~ 0.7mm	3.0 ~ 3.4mm	−0.9 ~ 0.3mm	−0.5 ~ 0.5mm

For SK840/SK580:



For SK860/SK890:

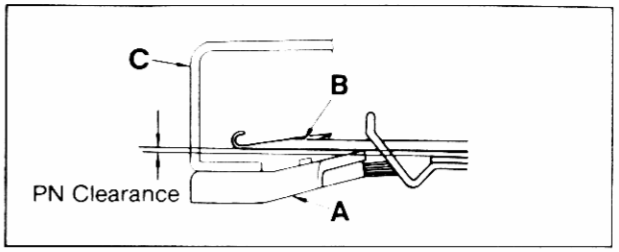


4-2 PN ADJUSTMENT

4-2-1 Problem:

If the **P.N. CLEARANCE** is **WIDER** than required, the Fabric Pressers **A** can not contact or push up the needle in D position **B**, and the yarn fed through the Yarn Feeder can not be caught by the needles and their stitches will float or drop.

If the **P.N. CLEARANCE** is **NARROWER** than required the Fabric Pressers **A** push up the needles **B** too much and break their hooks, and also operation of the Carriage becomes heavy.



4-2-2 Checking:

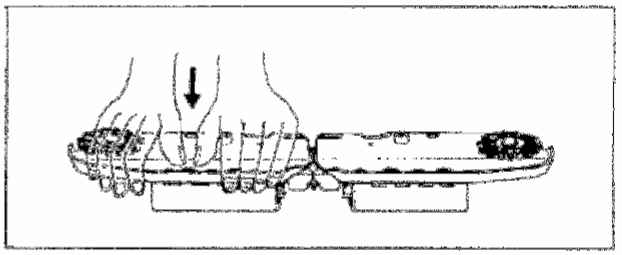
Set the Carriage Arm **C** on the Carriage, Russel Lever at "I" position, push up 60 needles at the centre portion of the needle bed to D position.

Bring the Carriage to the needles so as the Fabric Pressers come under the needles, and check if the Fabric Pressers lift up the needles and make a clearance of the required value between the Front Edge of the Needle Bed and the bottom of the Needle **B**.

4-2-3 Adjustment:

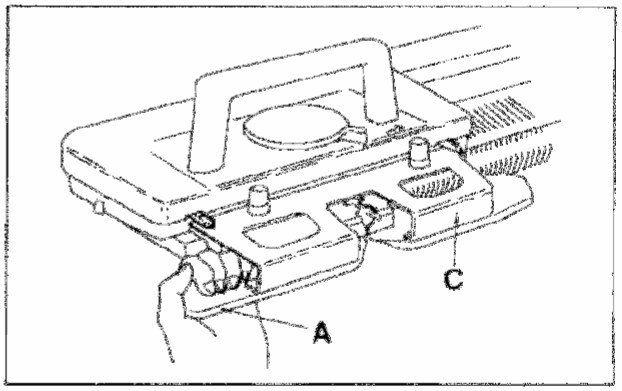
IN CASE THE P.N. CLEARANCE IS WIDER

1. Remove the Arm from the Carriage and place it on a flat surface with its bottom side up.
2. Press with both hands the Arm.



IN CASE THE P.N. CLEARANCE IS NARROWER

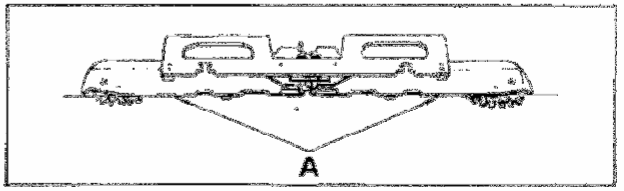
1. Set the Arm **C** on the Carriage.
2. With your hands, pull the Fabric Pressers **A** downward.



4-2-3 Checking:

Push the needles to D position and check if the Fabric Pressers push up the needles slightly.

Remove the Arm from the Carriage, and check if both Pressers are horizontal and in a straight line.

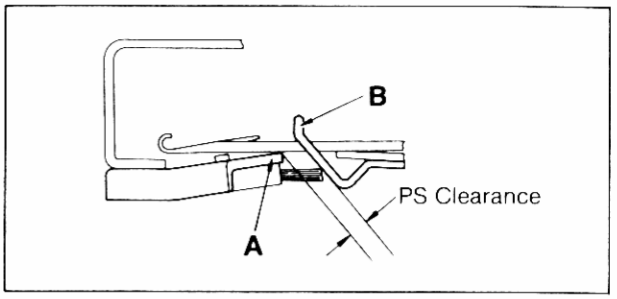


4-3 PS ADJUSTMENT

4-3-1 Problem:

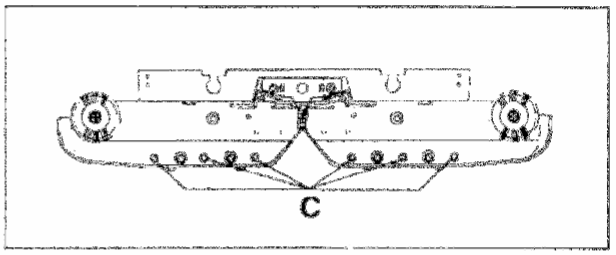
If the **P.S. CLEARANCE** is **WIDER** than required, the stitches can not be formed and stitch float is noted since insufficient Pressure is given to the fabric.

If the **P.S. CLEARANCE** is **NARROWER** than required, the brushes and the gears give too much pressure to the fabric and the operation of the Carriage becomes heavy.



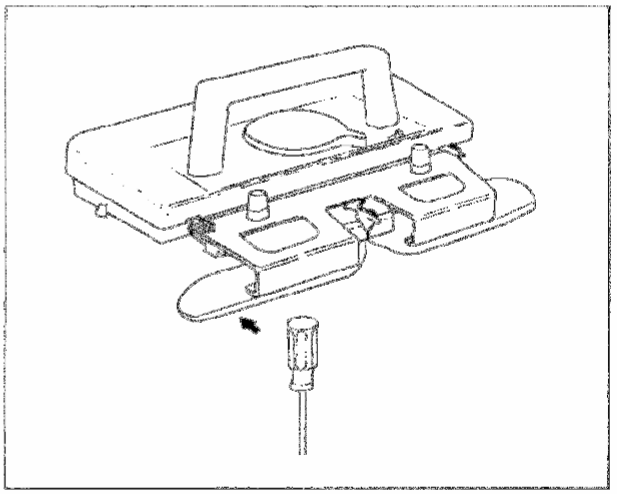
4-3-2 Checking:

Measure with a feeler gauge the clearance between the edge of the Fabric Presser **A** and the slanting surface of the Sinker Posts **B**.



4-3-3 Adjustment:

1. Loosen six binding head screws **C** securing the Fabric Pressers to the Arm.
2. Bring the Pressers to the widest position.
3. Fasten the screws to the extent that the Pressers are hard to move.
4. Adjust the P.S. clearance by patting the front edge of the Pressers with the handle of a screw driver and bring them within the required value of clearance.

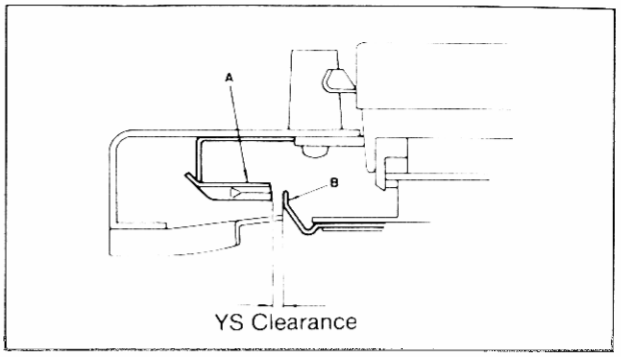


4-4 YS ADJUSTMENT

4-4-1 Problems:

If the **Y.S. CLEARANCE** is **WIDER** than required, nylon thread can not be caught by the needle hook in Punch Lace knitting and selected needles will rub the Yarn Feeder in Punch Lace and Weaving.

If the **Y.S. CLEARANCE** is **NARROWER** than required, the Yarn Feeder will rub the Sinker Posts or operation of the Carriage may become heavy.

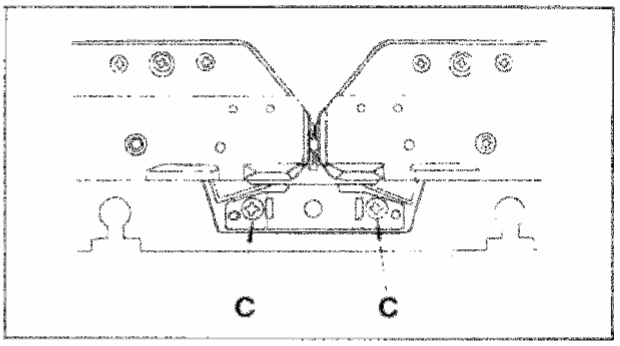


4-4-2 Checking:

Measure with a thickness gauge the clearance between the rear edge of the Yarn Feeder **A** and the front surface of the Sinker Posts **B**.

4-4-3 Adjustment

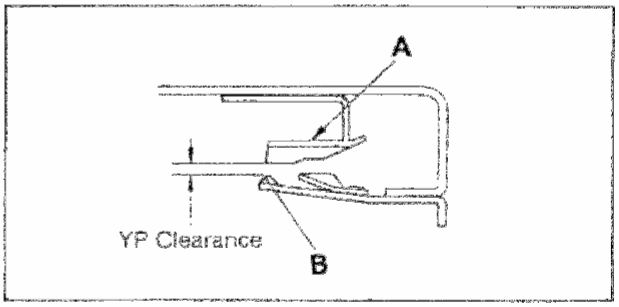
1. Loosen two binding head screws **C** securing the Yarn Feeder.
2. Move the Yarn Feeder forward or backward checking the clearance with a thickness gauge.
3. Fasten those two screws.



4-5 YP ADJUSTMENT

4-5-1 Problem:

If the **Y.P. CLEARANCE** is **WIDER** than required, the needles can not catch the yarn and their stitches will drop.
If the **Y.P. CLEARANCE** is **NARROWER** than required, the hook of the needles hit the bottom/surface of the Yarn Feeder.



4-5-2 Checking:

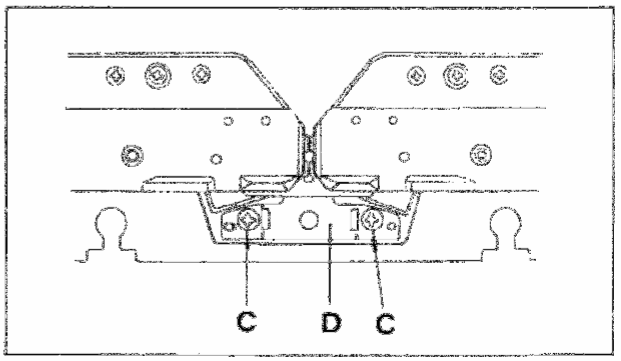
Measure with a feeler gauge the clearance between the bottom surface of the Yarn Feeder and the top of the protrusion on the Fabric Pressers, and the clearance must stay within the required value.

4-5-3 Adjustment:

This **Y.P. CLEARANCE** adjustment must be done in a same time with the **P.N. CLEARANCE** adjustment.

If **Y.P. CLEARANCE** is too **WIDE** when **P.N. CLEARANCE** is correctly adjusted, follow the procedure below.

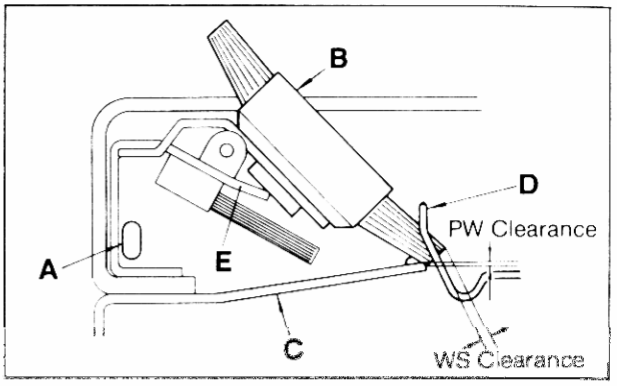
1. Remove two binding head screws **C** securing Platting Yarn Feeder **D**.
2. Insert a thin plane washer between Arm and the yarn Feeder.
3. Replace the Yarn Feeder and secure it with two binding head screws.



4-6 PW AND WS ADJUSTMENTS

4-6-1 Function:

The Weaving Brushes **B** on the Arm serve to keep weaving yarn at the rear edge of the Fabric Pressers so as it is easily woven into the fabric.



4-6-2 Checking:

when the Weaving Brushes are in an operative position, their bristles must engage the Sinker Posts **D** and contact the rear edge of the Fabric Pressers **C**.

4-6-3 Vertical Position:

The relative measurement between the Fabric Presser **C** and the Weaving Brush **B** (P.W. CLEARANCE) is within the required value.

4-6-4 Horizontal Position:

The relative measurement between the Weaving Brush **B** and the Sinker Posts **D** (W.S. CLEARANCE) is within the required value.

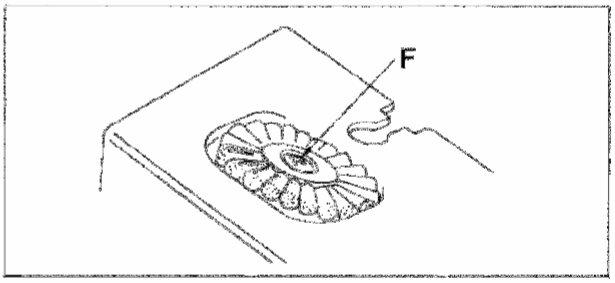
4-6-5 Problem:

If the Weaving Brushes are out of the required position, the weaving yarn will not be woven into the fabric.

4-6-6 Adjustments:

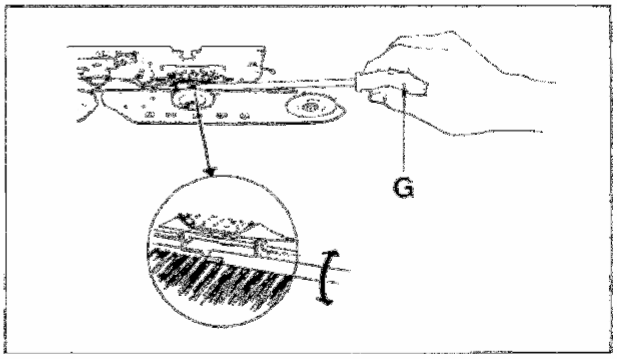
VERTICAL (P.W. CLEARANCE) POSITION

1. Set the Weaving Brush Knob **A** to upper position.
2. Bend the Brush Holder **E** with a screw driver **G** or pliers upward or downward.
   Take care not to break other parts.



HORIZONTAL (W.S. CLEARANCE) POSITION

1. Set the Weaving Brush Knob **A** to upper position.
2. Loosen pan head screw **F**.
3. Move the Brushes forward or backward.



4-6-7 Checking:

Set the Weaving Brushes at the operative position and check the vertical and horizontal position.

4-7 CORRECT ALIGNMENT OF MAIN CAMS

The dimension from Carriage Pipe to Main Cams is fixed by each model, as shown in the following Measurement Table:

For SK840 and SK580 Carriages, the Course Standard Gauge is applicable to measure the dimension **A** between Carriage Pipe (**inner** surface) and Main Cam Units when the Stitch Dial is set at 5.

For SK860 and SK890 Carriages, the existing Course Standard Gauge is not applicable. Use a vernier caliper to measure the distance **B** from **front** surface of Carriage Pipe to Main Cams with the Stitch Dial set at 6, while eliminating the play of Main Cam Unit by pushing it toward Carriage Slider.

MEASUREMENT TABLE

MODEL	A FROM INNER SURFACE OF CARRIAGE PIPE	B FROM FRONT SURFACE OF CARRIAGE PIPE	STITCH DIAL
SK840/SK580	34.1 ± 0.2mm	22.1 ± 0.2mm	5
SK860	$35.1 \pm \frac{0.2mm}{0.3mm}$	$23.1 \pm \frac{0.2mm}{0.3mm}$	6
SK890	35.1 ± 0.2mm	23.1 ± 0.2mm	6
Required Tool	Course Standard Gauge	Vernier Caliper	——

4-7-1 Problem:

Size of stitches varies on every alternate row and course stripes will be produced on the fabric.

4-7-2 Machine setting before adjustment

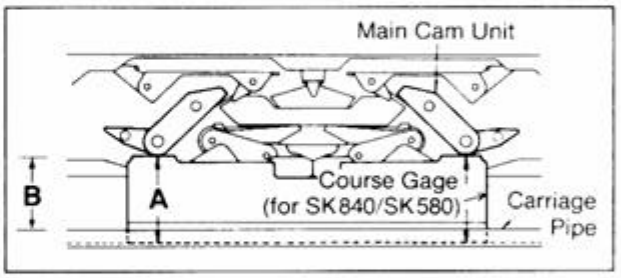
1. Remove the Carriage Cover.
2. Set the Cam Lever and Stitch Dial onto Dial Arbour.
3. Set the Cam Lever to SLIP position and Stitch Dial to 1.

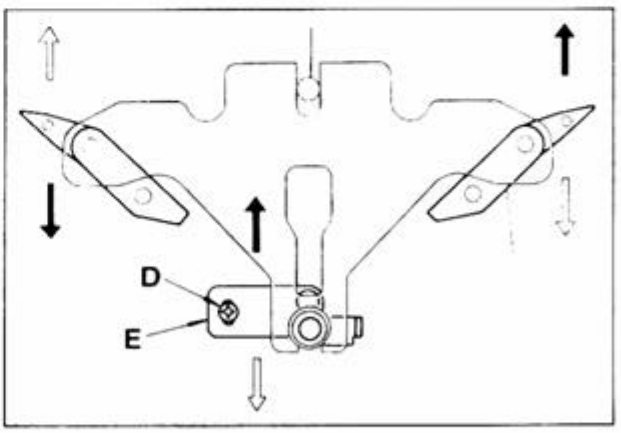
If the Course Standard Gauge is available for SK840 or SK580 Carriage adjustment;
If SK860 or SK890 Carriage is adjusted with a vernier caliper;

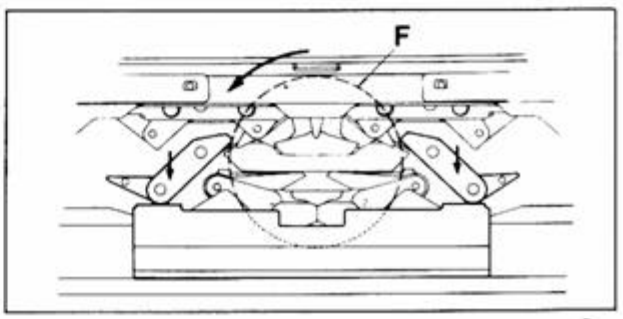
1. Turn and set the Stitch Dial **F** at 6.
2. Measure with a vernier caliper the distance from front surface of Carriage Pipe to both Main Cams.

4-7-3 Adjustment:

1. Insert Course Standard Gauge into Carriage Pipe.
2. Turn over the Carriage to the top.
3. Loosen binding head screw **D** securing Stitch Adjusting Plate **E**.
4. Turning the Stitch Dial **F**, bring the Main Cams to the Course Standard Gauge.
   *The Course Standard Gauge has the standard measurement of 34.1 ± 0.2mm. This measurement is the distance to the Main Cams from inner surface of the Carriage Pipe when the Stitch Dial is set at 5.
5. When both Main Cams contact the Gauge, fasten the binding head screws **D**.







4-8 CORRECT ADJUSTMENT OF NEEDLE BED

L DIMENSION

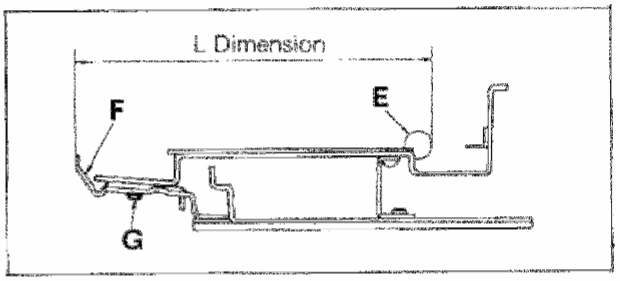
The measurement from the Rail to the tip of Sinker Posts.

MEASUREMENT TABLE

MODEL	L DIMENSION	DEVIATION
SK840/SK580	121.0 ± 0.25mm	0.2mm
SK860	149.35 ± 0.25mm	0.3mm
SK890	152.2 ± 0.25mm	0.3mm

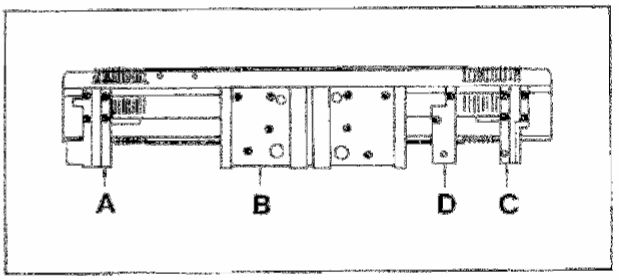
4-8-1 Problem:

The size of stitch will be larger or smaller than the standard stitch size.
If the diviation (permissible difference) between the maximum and mimimum measurements of the L Dimension is not within the required value, the length of the fabric on the right side differs from that on the left side.



4-8-2 Preparation:

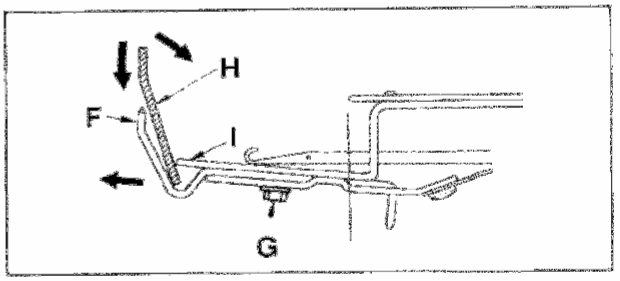
1. Remove the Needle Bed from the Casement.
2. Loosen hexagonal nuts **G** by a 1/4 turn, at the portion where the L dimension requires adjustment.
3. Loosen binding head screws securing Needle Bed Bracers A, B, C and D.



4-8-3 Adjustment:

TO MOVE THE SINKERS FORWARD

1. Insert a 1mm thick steel plate **H** between Front Edge I of the Needle Bed and Sinker Posts **F**.
2. Pressing the Plate downward, move it in the arrow-marked direction to lever out the Sinker Posts.



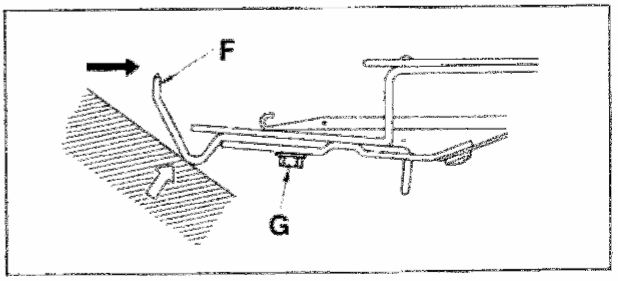
TO MOVE THE SINKERS BACKWARD

1. Press the Sinker Posts, with the round part of a wooden hammer, at the portion indicated by the white arrow mark.
2. The Sinker Posts **F** are pushed in.

4-8-4 Checking:

After the Sinkers have been moved forward or backward, check the L dimension.

1. Fasten the hexagnal nuts **G**.
2. Check the L dimension.
3. If the L dimension is adjusted to correct measurement, fasten all the screws previously loosened.
   Or if the L dimension is still out of the required measurement, repeat the above adjustment.



4-9 MECHANICAL ADJUSTMENT-TROUBLESHOOTING CHART

Nature of Trouble	Places to be inspected	Causes	Remedy
The length of both sides of the fabric differs.	Check the dimension between the Rail and the Sinkers. (L Dimension)	Dimensional differences at some points between the Rail and Sinkers, causes a knitted fabric to have different sized stitches resulting in differences in length of both sides of the fabric.	Adjust the dimension between the Rail and Sinkers to be precisely equal at all points.
	Check the speed at which the operator starts and finishes a stroke of the Carriage.	Difference in speed between the time the operator starts and finishes a stroke causes a knitted fabric to have different sized stitches due to the variable tension on the yarn. Consequently, both sides of the fabric will have different lengths.	Instruct the operator to operate the machine at as even a speed as possible both at the start and finish of a stroke.
Stitches float.	Check how the Arm is attached to the Carriage.	The position of the Fabric Pressers against the Needle Bed gets out of order unless the Arm is properly attached to the Carriage. If it is not properly attached, it will result in the floatation of the stitches and this makes knitting impossible.	Attach the Arm properly to the Carriage.
	Check how the edge of the Fabric Pressers touch the Needles.	If a clearance exists between the edge of a Fabric Presser and the Needles, the yarn is prevented from slipping off of the latches due to insufficient pressing force on the fabric by the Pressers. This also causes the stitches to float.	Adjust the Fabric Pressers (P.N. clearance).
	Check the clearance between the edge of the Fabric Pressers and the Sinkers.	If the clearance between the edge of the Fabric Pressers and the Sinkers is too wide, the stitch is prevented from coming over and behind the latches because of insufficient pressing force on the fabric. This causes stitches to float.	Adjust the Fabric Pressers (P.S. clearance).

Nature of Trouble	Places to be inspected	Causes	Remedy
The stitches on both edges of the fabric drop.	Check the condition of the Needles.	If the Needles get their hooks and latches bent, the yarn can neither pass over the hooks nor can it be pushed behind the latches, and stitches float as a result.	Correct the bent hooks and latches. If they are irreparable, replace those Needles with new ones.
	Auto-Tension.	If you continue knitting without noticing that the Tension Spring (a spring to take up the slack yarn) is jumping to its extremity and is not functioning the yarn sags at the starting point of knitting and the Needles cannot pick up the yarn. The stitches drop. (This often takes place when yarn is changed.)	Adjust the yarn tension through turning the Tension Dial.
	Check if the yarn is wrongly threaded through the Auto Tension.	If the yarn is wrongly threaded through the Auto Tension, the yarn sags and stitches come off the hooks due to insufficient yarn tension.	Instruct the operator to correctly thread the yarn through the Auto Tersion.
	Check the speed at which the Carriage is moved.	If the Carriage is moved extremely fast, the stitches will become tight and the stitches on both edges tens to drop.	Instruct the operator to move the Carriage at a reasonable speed.
	Check the accessory Weights.	The end stitches of the fabric easily drop from the Needle hooks.	Hang the accessory Weights on both sides of the fabric.
	Check if there is a burr on the Fabric Presser.	If there is a burr on the edge of the Fabric Presser, the yarn may get caught and the stitches may drop.	File such a burr with Emery Paper.
Open holes in the knitted fabric. (Dropped stitches)	Check how the Needle latches open and close.	When the Needle latches do not open or close smoothly, stitches tend to drop.	Correct the latches so that they open and close smoothly. If irreparable, replace them with new Needles.

Nature of Trouble	Places to be inspected	Causes	Remedy
	Check the clearance between the Fabric Pressers and the Needles (P.N. clearance).	If there is a clearance between the Fabric Pressers and Needles, the Needles become lower in position than the standard position, and the Y.S. (Yarn Feeder and Sinker) clearance becomes wider, so the Needles will not catch the yarn.	Adjust the P.N. clearance.
A knitted fabric shows Course Stripes (Irregular Stitches).	Check if both Main Cams are located at an equal distance from the inner surface of the Carriage Pipe. (Standard Level).	If the dimension between the Carriage Pipe (Standard Level) and one Main Cam is different from that of the other, Course Stripes occur.	Adjust the Main Cams so that they may be correctly positioned.
	The speed at which the Carriage is moved. (Speed at which knitting is done.)	Speed difference between starting and finishing a stroke, or between one stroke and another.	Instruct the operator to knit at an even speed. (Even if the machine is in good order, Course Stripes happen depending upon the operator or operating methods adopted.)
	Check the speed at which the Carriage is moved.	If the Carriage is moved extremely fast, the end Needle will be pulled out by a tightened stitch and the Needle will collide with the Separation Cam.	Instruct the operator to move the Carriage at a reasonable speed.
Carriage is heavy during operation.	Check if the Rail of the Needle Bed, Slider, Carriage Pipe and Cams etc., are properly lubricated.	In the case of the Rail, Slider, Carriage Pipe and Cams etc., if lubrication is poor the Carriage becomes heavy during operation.	Clean the soiled surfaces of those parts and apply the machine oil contained in the Accessories.

Nature of Trouble	Places to be inspected	Causes	Remedy
	Check the position of the Fabric Pressers.	If the edge of the Fabric Pressers is too high or come in contact with the Sinkers, the Carriage gets heavy during operation because of an increased resistance upon a Fabric Presser.	Adjust the P.S./P.N. clearances.
The latch and hook of Needles easily bends.	Yarn Feeder.	In case the Needles are lifted too much by the Fabric Pressers, the hook of a Needle will get caught by the Yarn Feeder when knitting.	Adjust the P.N. clearance.