

UPDATING, REVISION AND REPAIR PROCEDURE
FOR

00046-69583

00081-69564 PRINTER ASSEMBLY

09805-69479

IDENTIFICATION:

Exchange Part No. 00046-69583
 00081-69564
 09805-69479

New Part No. 0950-1479
 00081-69564
 0950-0538

Date Code: 1619

DESCRIPTION:

Modifications	Rev. Ref.	Change
1. 00081	#226	Current
00046 Plane bearing	May 1976	9203010
09805		New 1450120
2. 00081	#212	Current
00046 Motor circuit unit	Oct 1972	1201120
09805		6011010
		1211120
3. 00081	#211	Current
00046 Paper feed	Oct 1972	1404120
09805		1413120
		1401120
		New 1453120
		1454120
		1455120

WARRENTY REPAIR PROCEDURE FOR 46/81/9805 PRINTER

A. PRINTER

- 1) Try to verify failure
 - 2) Make necessary repairs
 - 3) Replace or straighten all bent sheet metal
 - 4) Replace cracked and excessively scratched plastic parts
 - 5) Check that ribbon reverse works in both directions
 - 6) Be sure ribbon doesn't curl
 - 7) Ship with no ribbon in printer
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REPAIR PROCEDURES

1. Should trouble occur, refer to Sect. 3 of Repair Standard to determine what is wrong; then proceed as follows:
 - a. Search for and determine the trouble.
 - b. Identify the trouble condition.
 - c. Locate the cause. Refer to 2-1 of the Repair Standard.
 - d. Examine the 'check point' and follow checking method.
 - e. Repair according to instructions under 'Repair Column'.
2. If trouble is not found after repair, check another 'cause'.

COMMON REPAIRS

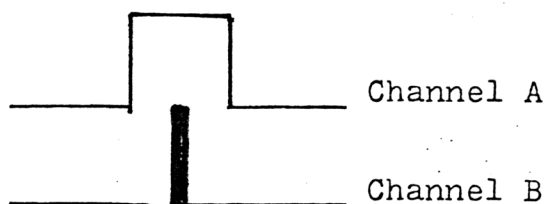
Set oscilloscope:

Volts/Div- 1 v

Time/Div- 2 M sec.

Mode- normal

TIMING SIGNAL (refer Sect. 5: 2-16)



RIBBON RETURN ADJUSTMENT (refer Sect. 5: 2-1-2)

B5-5 should set flush against B-5-1

B-5-15 sometimes missing a part

B-5-10 / B-5-12 sometimes bent

MOST COMMON TROUBLE: (Refer to Sect. 3 of Repair Standard Manual)

1. Motor doesn't rotate

(2) loose contact of conn. (B-2-13)

(5) B-2-1 is defective

(6) rotor assy. is defective

(7) idler gear is defective

a. timing adjustment

2. Motor doesn't start

(1) defective motor circuit unit (B-2-1)

(2) broken conn. (B-2-13)

3. _____ 22. (refer to manual repair standard)

23. No auto-return of ribbon feeding

(1) bent detecting lever G (B-5-10) M (B-5-12)

(2) missing spring (B-5-15)

24. Generation of noise

(3) wear of gears

a. ratchet shaft (B-2-3)

b. idler gear (B-2-11)

c. print drum (B-2-6-1)

IV MAINTENANCE AND REPAIR

1. Maintenance

Follow the maintenance instruction as described below, and the printer will keep the initial performance for a long time.

1-1 Cleaning

The printer should be cleaned with a brush to remove paper chips and dust after using 10 rolls of paper (or after 3 months).

- (1) For removing paper chips, dust and naps, it is desirable to clean the inside with a vacuum cleaner.
- (2) The type faces of the print drum should be completely cleaned with a hard-bristle brush to maintain initial clear printing.
- (3) Use alcohol and benzine to clean the printer. Thinner, trichloroethylene, ketone, etc. may damage the plastic parts.
- (4) After cleaning, pay attention to the quantity of oil and if necessary, lubricate the oil.

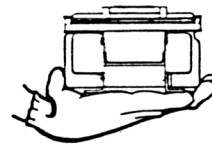
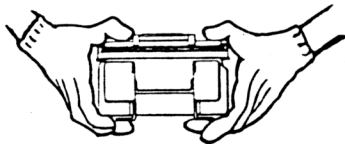
1-2 Replacement of Ribbon

- (1) Replace the black-and-red inked ribbon after using 5 to 8 rolls of paper (or after 6 months). When using only a black inked ribbon, service life of the ribbon is prolonged by 50 to 100%.
- (2) A nylon or vinylon ribbon is recommended because of their clear printing, durability and cost.
- (3) If the inside diameter of the spool for the inked ribbon is too small to operate smoothly with the spool shaft, replace the inked ribbon.
- (4) When replacing the inked ribbon, confirm the ribbon setting direction.
- (5) Before starting the motor, make sure that the inked ribbon stretches tightly. Rotating the motor with loose paper will cause the ribbon to wind round the print drum.

1-3 Precaution

Handling

- When carrying a printer without packing case, hold it from the bottom and the sides as shown in the fig. with gloves or finger stalls.



- Be careful not to drop the printer nor bump against each other.

Keeping

- Avoid the place where dust and chip easily adhere. Also avoid to expose the printer directly to the sunlight or high humidity.
- Keep the printer in a polyethethylene bag with Vapor Phase Inhibitor (VPI) to prevent rust.

Mounting

- When mounting the printing mechanism, insert the rubber buffer between the mounting plate of the printer and your equipment to absorb the printing action vibration. Without the buffer, noise will increase reflecting against the housing case of the equipment.

Using

- Utilizing many permanent magnets and electromagnets, iron filings are easily attracted to the printer. Never use in an environment where iron filings easily adhere.
- Do not attempt printing without inserting paper. When printing without paper for an extended period, this practice will cause wear and damage to the print drum, the hammer and the inked ribbon.
- When printing is postponed over a long period, rotation of the print drum should be stopped. Although the rotating gear wheel and the shaft are very durable, excessive continuous rotation will cause the bearing parts to wear which, in turn, will produce noise.

Repairing

- When using or repairing, in the following cases, it is feared that the teeth of the idler gear pinion should be broken, and phase lag or bad tone quality should occur.

- 1) The vertical motion of the paper feeding lever are not performed smoothly.
- 2) The paper feeding clutch lever and the paper feeding rack lever do not operate well.
- 3) Timing of paper feeding pulse does not agree with the time chart. (continuous energizing)

4 Periodical Checking

When cleaning or checking, check the following points.

1) Ribbon mechanism

- a. Each lever and the spool gear operate smoothly.
- b. Return of ribbon feed

Space between the periphery of spool shaft and the detecting lever 5.0 ± 0.3 mm

- c. Ribbon feed condition

2) Lubricating

Refer to VI ANNEX 1 for lubricants, and apply oil to the following parts.

M-1, 7, 8, 9, 14, 15

R-9~23

3) Shape of the spring hook

Especially the hammer lever spring

4) Operation of the hammer

5) Operation of the tension lever

6) Loading of the print drum

09684

Loosening of the screws

2. Repair

Repair is classified into three standards (A, B, and C) according to the difficulty involved.

2-1 Repair Standards

- A: General knowledge of construction and operating principle of the printer as well as basic technique of repair is necessary. No special experience nor trained skill is required.
- B: Thorough knowledge of construction and operating principle of the printer is necessary. Techniques for handling jigs and measuring instruments in disassembling and assembling as well as repair experience are requisite.
- C: Expert knowledge of construction and operation principle of the printer is demanded. High trained skill and techniques for handling special jigs and measuring instruments as well as thorough experience in repair are necessary.

2-2 Repair Procedures

Should trouble occur, refer to 3. Repair Manual to ascertain exactly what is wrong; then proceed as follows:

- 1) Search for and determine the "Trouble".
- 2) Identify the "Troubled condition".
- 3) Locate the "Cause". Refer to 2-1 Repair Standards.
- 4) Examine the "Check point" and follow the checking method specified.
- 5) Repair according to instructions under the "Repair" column. If the trouble is not remedied after repair, check another "Cause" and try again.

To identify the parenthesized parts numbers in 3. Repair Manual refer to chap. III, EXPLODED VIEWS.

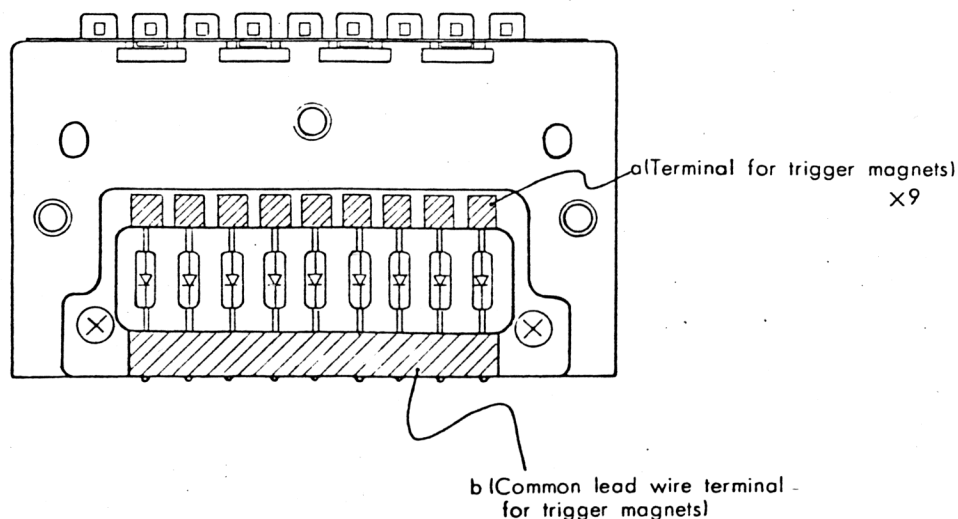


Fig. N-1 TRIGGER MAGNETS ASSEMBLY

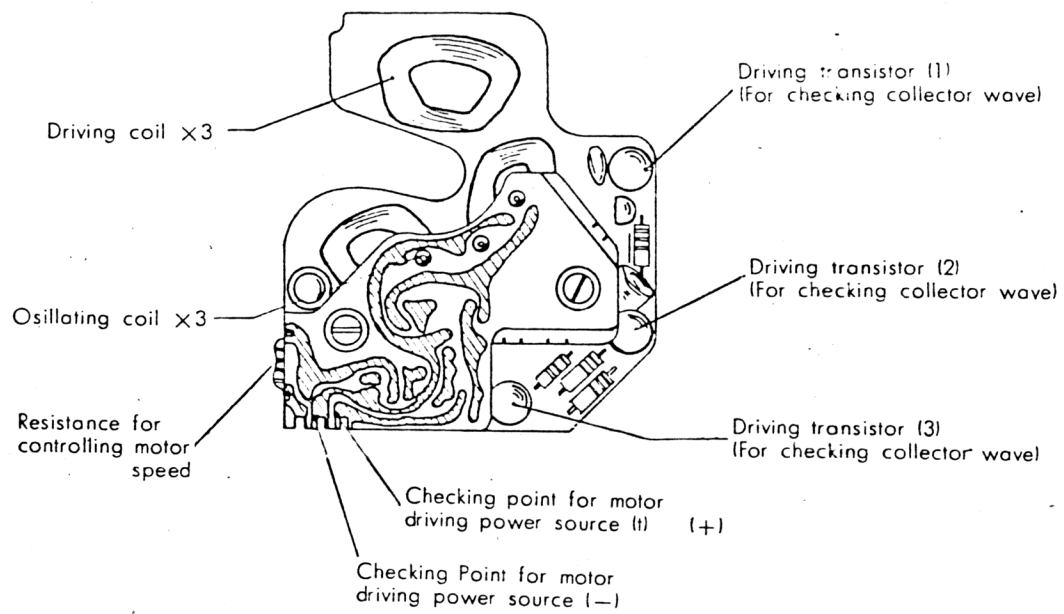
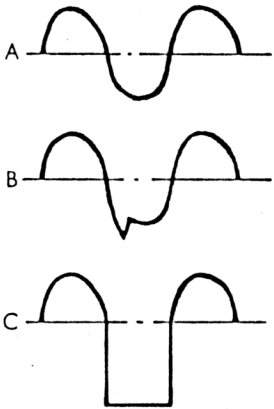
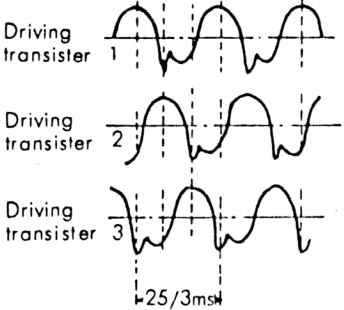


Fig. IV-2 MOTOR CIRCUIT UNIT

3. Repair Manual

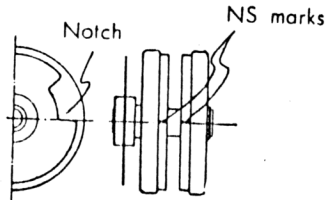
TROUBLE	TROUBLED CONDITION	CAUSE	REPAIR STANDARD	CHECK POINT	REPAIR
1. Motor does not rotate.	Motor does not drive after switching ON, and train gears and print drum do not start even when turned manually.	(1) Power source in control circuit is defective.	A	*Adjust input terminal of connector (B2-13). Terminal number #14A to + terminal of voltmeter Terminal number #12A to - terminal of voltmeter. *Rated voltage: 15 ± 2 V See Fig. I-3.	*Repair power source in your control circuit.
		(2) Loose contact of connector (B2-13)	A	*Unplug connector (B2-13) and check contact springs on both sides.	*If distorted, replace with new ones. See V-1-5 and V-2-7 *If dirty, clean with benzene.
		(3) Soldering of lead wires of connector is disconnected.	A	*Check lead wires by pulling it gently.	*Solder firmly, using a soldering iron of about 20 W. *Be careful not to contact the neighboring terminals.
		(4) Wiring of motor circuit unit (B2-1) is disconnected.	A	*Remove motor cover and check source lines of motor circuit unit. See Fig. IV-2.	*If wiring is disconnected, remove motor circuit unit (B2-1) and replace wiring between connector and circuit unit. See V-1-6
		(5) Motor circuit unit (B2-1) is defective.	B	*Use an oscilloscope to check wave forms of collectors (housing cases of three driving transistors) on motor circuit board Fig. IV-2). 1. Check if wave form A or B generates. 2. Check period of wave form. Within 25 ± 2 msec.	*If wave form as A or B is not observed replace motor circuit unit (B2-1) and adjust motor speed. See V-1-6 and V-2-8 *For adjusting motor speed replace resistor which determines motor speed (Fig. IV-2).

TROUBLE	TROUBLED CONDITION	CAUSE	REPAIR STANDARD	CHECK POINT	REPAIR
				3. Apply load to motor. If wave form as C appears, speed control circuit in motor circuit board is perfect. 4. Check if current consumption of motor in stand-by is less than 160 mA. 5. Change voltage from 12 V to 18 V and check period of wave form. 6. Print 18 columns at 15 V and check if mean current consumption is within 490 mA. 7. Changing ambient temperature from 0°C to 50°C, recheck the above items 1 through 6.  Voltage wave form of collector	*Rated motor speed 25 ± 1 msec/rev. (at no-load, 15 V DC, 25°C) To measure motor speed, measure period of timing signal TP _n to TP _{n+1} .  Driving wave form for motor
		(6) Rotor assembly (B2-2) is defective.	A	*Check if metal fillings are adhered to ferrite magnets of rotor (Fig. II-6).	*Remove with cellophane tape.

TROUBLE	TROUBLED CONDITION	CAUSE	REPAIR STANDARD	CHECK POINT	REPAIR
				<ul style="list-style-type: none"> *Check if detecting plate (Fig. II-6) is contacting oscillating or receiving boards (Fig. II-6). *Rotate the rotor with holding the ratchet released to check if the rotor is firmly fixed to the rotor shaft. *Check if there is no contact between ferrite magnet of the rotor and motor circuit board. (Fig. II-6). 	<ul style="list-style-type: none"> *By rotating detecting plate, correct warping so that detecting plate is centered in gap between the two boards. *Tighten a left-handed hexagonal nut #4 firmly. Fixing torque : 24 kg·cm *Adjust its position by inserting a washer into the fixing part of the motor circuit board. *A deformed motor circuit board should be replaced into a new one according to V-1-6 and V-2-7 and then adjust its motor speed.
		(7) An unusual condition.	A B	<ul style="list-style-type: none"> *Confirm if the print drum rotates lightly by hand and also if it continues to rotate by inertia for a further moment. <ul style="list-style-type: none"> • if a foreign matter is put in the gears. • if ferrite magnets buried in detecting wheel R (B2-6-3) and detecting wheel T (B2-15) are contacting detectors (B2-16 and B2-17). • if the gears engage too deeply. • if any of the gears lacks its tooth. 	<ul style="list-style-type: none"> *Remove foreign matter. *When adjusting the position of the detectors loosen the setting screws, then perform it according to V-2-4. *Adjust the position of the bridge for idler gear unit (B2-8) or replace a gear. The adjustment of the position should be performed according to V-2-16. *Replace the gears. The replacement should be performed according to V-1-3 and V-2-16.

TROUBLE	TROUBLED CONDITION	CAUSE	REPAIR STANDARD	CHECK POINT	REPAIR
				<ul style="list-style-type: none"> • if a foreign matter is interposed in the jaw of the ratchet shaft (B2-3). • if a foreign matter is interposed between print drum (B3-7) and paper guide assembly (B4-9). • if the setting bolts of the print drum is loosened. 	<ul style="list-style-type: none"> *Remove foreign matter. *Remove foreign matter.
2. Motor does not start for itself.	The motor does not make self-starting, but it makes a normal rotation when starting by hand.	(1) An usual condition in the motor circuit unit (B2-1).	B	Refer to CAUSE (5) of TROUBLE 1.	
		(2) Due to too low power supply.	A	Refer to CAUSE (1) of TROUBLE 1.	
		(3) No-good function in one of the tree wires.	B	Refer to " CAUSE (5) of TROUBLE 1 ".	
3. Irregular rotation	Printing speed increases and decreases, thus resulting in printing letter in light and dark condition.	(1) An unusual in the motor circuit unit (B2-1).	A	Refer to " CAUSE (5) of TROUBLE 1 ".	
		(2) Due to the fixing nuts of the rotor shaft (Fig. II-6) loosened.	A	*Check if the rotor rotates through rotating it by hand under the condition of having held the ratchet (B2-3).	*Tighten the rotor fixing nuts (left-handed thread) under the condition of having held the ratchet with torque of 24 kg-cm.
		(3) An unusual in the rotating mechanism.	A B	Refer to " CAUSE (7) of TROUBLE 1 ".	
		(4) An unusual in motor power supply.	A	Refer to " CAUSE (1) of TROUBLE 1 ".	

TROUBLE	TROUBLED CONDITION	CAUSE	REPAIR STANDARD	CHECK POINT	REPAIR
		(5) Due to too high power impedance to the motor.	A	*Switch it over to the lower impedance power supply of lower than $0.7\ \Omega$, or confirm if rotation irregularity is eliminated by inserting a condenser of $5,000\sim 10,000\ \mu\text{F}$ for withstand voltage test at 20 V into the connector terminals #12A and #14A of the power source.	*Reduce it in lower than $7\ \Omega$ when impedance in power supply is too high. Rated power source impedance lower than $7\ \Omega$.
4. Rotating speed is too slow.	This causes defects of rendering motor rotating speed out of its rating and printing too light or no printing.	(1) No-good adjustment in speed in motor circuit unit (B2-1).	B	Refer to the item Speed adjustment of CAUSE (5) in TROUBLE 1.	
		(2) The fixing nuts of the rotor shafts (Fig. II-6) are loosened.	A	Refer to CAUSE (2) of TROUBLE 3.	
		(3) An unusual in the motor power source.	A	Refer to CAUSE (1) of TROUBLE 1.	
		(4) Due to too high impedance in the motor power source.	A	Refer to CAUSE (5) of TROUBLE 3.	
5. Rotating speed is too high.	Motor speed is higher than its rating, thus causing no-good printing.	(1) No-good speed adjustment in the motor circuit unit (B2-1).	B	Refer to the item Speed adjustment of CAUSE (5) of TROUBLE 1.	
		(2) Motor power voltage is too high.	A	Refer to CAUSE (1) of TROUBLE 1.	
6. Rotating speed is decreased when printing.	Rotating period of the motor is reduced over 20% when printing.	(1) An unusual in the motor circuit unit (B2-1).	B	Refer to CAUSE (5) of TROUBLE 1.	

TROUBLE	TROUBLED CONDITION	CAUSE	REPAIR STANDARD	CHECK POINT	REPAIR
		(2) Power voltage to the motor is too low.	A	Refer to CAUSE (1) of TROUBLE 1.	
		(3) Power impedance is too high.	A	Refer to CAUSE (5) of TROUBLE 3.	
		(4) Slip in counterfacing position of N-S poles of the rotor ferrite magnet (Fig. II-6).	A	<p>*Check if each center of magnetic poles of 6 sets of the ferrite magnets coincides in the identical point.</p> <p>It can be confirmed with a center mark in the middle of a set of the rotor ferrite magnet.</p> <p>In case the magnetic poles are coincided, the center marks will also absolutely coincide in the identical point.</p> 	<p>*Replace the rotor according to V-1-6 and V-2-7 when a position of the magnetic pole is slipped and adjust motor speed.</p> <p>*As for its speed adjustment, refer to CAUSE (5) of TROUBLE 1.</p>
		(5) Slip in pole position of the detecting plate (Fig. II-6) and the ferrite magnet.	A	*Check if the center mark of N-S pole of the ferrite magnet and the right end of the notch in the detector wheel would be coincided.	<p>*In case of the position being slipped, replace the rotor according to V-1-2 and V-2-2, and adjust motor speed.</p> <p>As for its adjusting method, refer to CAUSE (5) of TROUBLE 1.</p>
		(6) The fixing nuts of the rotor shaft is loosened.	A	Refer to CAUSE (2) of TROUBLE 3.	

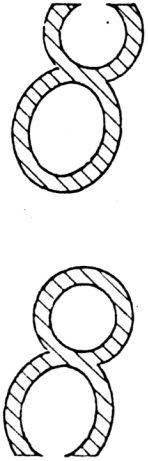

TROUBLE	TROUBLED CONDITION	CAUSE	REPAIR STANDARD	CHECK POINT	REPAIR
7. Unusual noise causes when rotating.	An unusual noise causes when rotating.	(1) Adherence of foreign matter.	A	*Adherence of foreign matter to the rotor (B2-2), gear train, or print drum (B3-7).	*Foreign matter and/or iron dirt can easily be removed with adhesive tape.
		(2) Contact of rotating part.	A	*Check contact between the following parts: Detecting plate (Fig. II-6) and oscillating/receiving board.	*Remove the motor cover and check improper positioning of the detecting plate.
8. Printing takes place at a same time with start of motor rotation.	A hammer at fixed figures prints 13 letters on a same place.	(1) Trigger magnets for printing (B3-1) is flowed with current.	A	*Check trigger signal in the corresponding figures making reference to Fig. I-3 and Fig. V-1.	*When trigger signal is kept flowed, adjust the driving control circuit.
		(2) Trigger lever spring (B3-4) is unhooked.	A	*Check a disconnection of the spring in the corresponding figures.	*Hook a hook of the spring to the spring holding plate by holding it with a tweezers (pincette).
		(3) Deterioration of a trigger lever spring (B3-6).	A	*Check deterioration of a trigger lever spring in a corresponding figure.	*Replace a deteriorated spring into a new one.
9. No printing figure at all	The hammer does not operate in spite of the motor being running normally.	(1) Bad contact of the connector (B2-13)	A	*Check a continuity test at connector terminals #1A and #1B by inserting base-plate.	*A defomed contact spring should be replaced into a new one according to V-1-5 and V-2-8. *Dirt should be cleaned away with benzene.
		(2) Disconnection in the common lead wire of 2 sets of the trigger magnet.	A	*Make a continuity test for the common lead wire terminal (Fig. IV-1) between connector terminals #1A and #1B and trigger magnets assembly.	*When recognized a disconnection make soldering or replace wiring.
		(3) Timing signal is in abnormal condition.	B	*Check connection of connector terminals #17 and #U.	*Clean dirt with benzene. If connector spring is damaged, replace it.

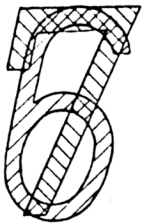

TROUBLE	TROUBLED CONDITION	CAUSE	REPAIR STANDARD	CHECK POINT	REPAIR
			B	*Check wiring between connector terminal and detecting head T (B2-16). *Check for disconnection, short-circuit, and layer-short of detecting head T. Ohmic resistance of detecting head T: $130 \pm 26 \Omega$. *Check if ferrite magnets for timing signals TP and TL buried in detecting wheel T (B2-15) are damaged.	*If it is disconnected, solder firmly or replace wiring. *Replace detecting head T. See V-1-7 and V-2-13. *If damaged, replace detecting wheel T.
		(4) Reset signal is in abnormal condition.	B	*Check contact of connector terminals #15 and #S. *Check wiring between connector terminal and detecting head R (B2-17). *Check for disconnection, short-circuit, and layer-short of detecting head R. Ohmic resistance of detecting head R: $3 \pm 0.6 K\Omega$ *Check if ferrite magnets buried in print drum gear set is damaged.	*Clean with benzine. If connector spring is damaged, replace it. *If it is disconnected, solder firmly or replace wiring. *Replace detecting head R. See V-1-7 and V-2-13. *Replace print drum gear set.
10. Omission of printing in certain columns.	No printing occurs at fixed figures at all.	(1) No good contact at the connector (B2-13).	A	*Check a corresponding connector terminal making reference to Fig. I-3.	*Clean dirt with benzine and replace a deformed contact spring into a new one according to V-1-5 and V-2-8.


TROUBLE	TROUBLED CONDITION	CAUSE	REPAIR STANDARD	CHECK POINT	REPAIR
	0000 00000 0000 1111 11111 1111 2222 22222 2222 3333 33333 3333 4444 44444 4444 5555 55555 5555 6666 66666 6666 7777 77777 7777 8888 88888 8888	(2) Breakage in lead wire of a corresponding trigger magnet.	A	*Make a continuity test for between a corresponding connector terminal and a trigger magnet driving terminal (Fig. IV-1).	*Non-continuous lead wire should be soldered or replace it.
		(3) Breakage in trigger magnets for printing.	A	*Connect — of a tester to point A of a corresponding trigger magnet in Fig. IV-2 and + of it to point B to measure a resistance value. Rated D. C. resistance : $100 \pm 10 \Omega$	*In case there is no rated resistance value, replace a corresponding trigger magnet into a new one according to V-1-12 and V-2-3.
		(4) Breakage or short circuit in a diode of a trigger magnet for printing (Fig. IV-1).	A	*Connect — of a resistor to point A of a corresponding trigger magnet in Fig. IV-1 and + of it to point B to measure a resistance value in $100 \pm 10 \Omega$ for confirmation if there can be short circuit, furthermore, + of a resistor to point A and — of it to point B to measure a power direction resistance of diode for checking an existence of a breakage. Power-direction resistance : about 30Ω	*In case of short circuit or breakage in a diode, replace it in a corresponding figure.
		(5) No-good in input trigger pulse.	B	*Observe at a connector terminal by a oscilloscope if input trigger pulse in a corresponding figure is within its rating.	*In case there exists no trigger pulse at all or it is out of rating, adjust its driving control circuit.


TROUBLE	TROUBLED CONDITION	CAUSE	REPAIR STANDARD	CHECK POINT	REPAIR
				Rated trigger pulse: Voltage : 15 ± 2 V Pulse width: more than 17.5 msec	
		(6) Inadequate setting of the trigger magnets for printing.	A	*Place an actuating plate of a corresponding trigger magnet in an actuating condition by an engaging check jig, and check if the hammering end of the trigger lever engages with the jaw of the ratchet shaft.	*Adjust the setting position of the trigger magnet so that the hammering end of the trigger lever engages with the jaw in 0.7 mm.
		(7) Breakage of the hammer lever (B3-5-2 and 3)	B	*Check if a corresponding hammer lever is broken.	*In case a hammer lever is broken, replace a hammer levers unit (B3-5) according to V-1-13 and V-2-4.
11. Random omission of printing.	No printing occurs at whole figures sometime. 0000 0000000000 111111 111 1111 222 2222222222 3333333 3333333 44444444 44444 55555 555555555 66 666666666666 777777777 77777 8888 8888888888	(1) No good in the printing mechanism.	B	*Check the lubricating condition at an actuating lever shaft, trigger lever, trigger lever guide, hammer lever shaft, etc.	*In case of oil being short or hardened, refill designated oil according to the Lubricants in N-1.
		(2) No good contact of the connector (B2-13)		Refer to CAUSE (1) of TROUBLE 10.	
		(3) Wear and tear of the trigger lever (B3-3-1).	C	*Check wear and tear at the hammering position of a corresponding trigger lever.	*In case the trigger lever got wear and tear, replace the trigger lever set (B3-3) according to V-1-10 and V-2-9.
		(4) Wear and tear of the jaw of the ratchet shaft.	B	*Check wear and tear condition in the jaw of the ratchet shaft.	*When got wear and tear, replace the ratchet shaft according to V-1-11 and V-2-6.

TROUBLE	TROUBLED CONDITION	CAUSE	REPAIR STANDARD	CHECK POINT	REPAIR
12. Irregular printing.		(5) Bad in input trigger pulse.	B	Refer to CAUSE (5) of TROUBLE 10.	
		(6) Disconnection of trigger lever (B3-3), hammer lever (B3-5) and actuating lever (B3-2).	C	*Check bending and engagement of a trigger lever and a hammer lever. *Check bending and engagement of an actuating lever and the trigger lever.	*Replace a bent part.
	Prints on recording paper are irregular. 3 4 5 6	(1) Bad condition in the paper feeding mechanism.	B	*Measure if a paper feeding time is ceased with a rated time through a continuity duration of printing condition, trigger magnet for paper feeding. Paper feeding duration : 75 msec Pulse width : 25 msec	*In case it takes more than 75 msec for a paper feeding duration, it proves the deterioration of a paper feeding spring (B4-6), so that replace it. *In case of continuity pulse being extraordinarily long, adjust the pulse width setting circuit of the control circuit.
		(2) Recording paper is slipped during printing.	C	*Check spring force of the paper holding roller in the paper guide assembly (B4-9).	*Strengthen the spring force, by lifting the paper holding roller guide. *Replace the paper guide assembly (B4-9).
		(3) There is a backlash inside the gear train.	B	*Fix the rotor (B2-2), move the print drum (B3-7) before and behind by hand to check its backlash.	*For gears with backlash, displace the bridge for idler gear unit to adjust the engagement of the idler gear (B2-11). In case of having adjusted, adjust its phase according to V-2-16.

TROUBLE	TROUBLED CONDITION	CAUSE	REPAIR STANDARD	CHECK POINT	REPAIR
13. Incomplete printing.	<p>A printing type and a position of hammering surface (head) does not coincide, thus causing the condition of being lack of a part of the printing letters.</p> 	(1) Bad synchronization of the jaw position of the ratchet shaft (B2-3) and the print drum (B3-7)	B	<p>*Check if there is no slip of the print drum in the rotating direction, or as to a looseness of 2 setting screws by fixing the rotor (B2-2) and rotating the drum towards the rotating direction.</p> <p>*Check a slip in the position of the bridge for idler gear unit (B2-8).</p> <p>*Check a backlash in the gear train by fixing the rotor (B2-2) and moving the print drum before and behind.</p>	<p>*In case of the setting screws being loosened, tighten them according to V-2-6.</p> <p>*Move the bridge for idler gear unit and adjust the position of the idler gear according to V-2-6.</p> <p>*In case of any of the ratchet shaft, an idler gear and the tooth-form of a print drum gear being getting wear and tear, replace them.</p>
		(2) A slip in the figure direction of the print drum and the hammer.	A	<p>*Check if there is a slip in the figure direction through looseness of 2 setting screws by moving the drum in the figure direction.</p>	<p>*In case there is looseness in the setting screws, tighten them according to V-2-6.</p>

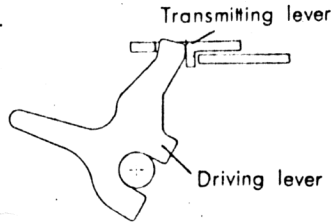
TROUBLE	TROUBLED CONDITION	CAUSE	REPAIR STANDARD	CHECK POINT	REPAIR
14. Over-printing.	<p>The hammer operates two neighboring letter in rotating direction of the print drum two times which results in printing same letters in duplicate.</p> 	(1) Weariness of the trigger lever spring (B3-6).	A	*Check weariness of a corresponding trigger lever spring.	*Replace the trigger lever spring.
		(2) Adherence of a trigger magnet and a suction plate.	A	*Hold a corresponding suction plate and check if it returns to an original point quickly.	*In case a suction plate does not restore, it can be imagined due to adherence of oil or others to the suction plate. If so, clean it way.
		(3) Due to an improper pulse width of input trigger signal.	B	*Check if a lower point of an input trigger pulse coincides with timing signal TL.	*If not, adjust a driving control circuit.
		(4) Motor speed is too fast.	B	<p>*Measure a wave-form of a driving transistor on the motor circuit board (Fig. IV-2) to check if it is higher than its rated speed.</p> <p>Rated speed: 25 ± 2 msec/rev. (only in no-load, 15 V DC at 25°C)</p>	*In case it is higher than the rated one, adjust motor speed in reference to REPAIR in CAUSE (5) of TROUBLE 1.
		(5) No good operation in a trigger lever.	C	*Check if the movement of a lever is too heavy due to oil hardening or adherence of foreign matter in a trigger lever guide.	*A trigger lever whose movement is dull should be cleaned and then lubricated according to V-1-12 and V-2-12.
15. Over-printing of another character.	<p>Letters separated in the rotating direction of the print drum are printed doubly in an identical figure.</p> 	(1) Improper input trigger pulse.	A	*Observe an input trigger pulse in a corresponding figure at the connector terminal (B2-13). (Check the input condition.)	*In case an input condition is not good, adjust the driving control circuit.

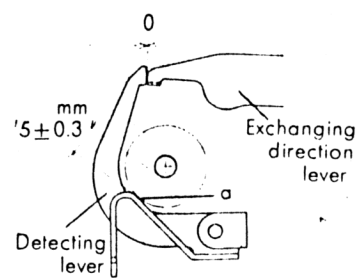
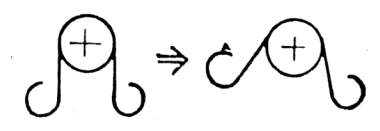
TROUBLE	TPOUBLED CONDITION	CAUSE	REPAIR STANDARD	CHECK POINT	REPAIR
16. Ghost printing 	An identical letter is printed at an identical figure in somewhat slipped condition.	(1) Motor speed is too fast.	B	*Refer to CAUSE (4) of TROUBLE 14.	
		(2) Weariness of a hammer lever spring (B3-6).	A	*Check weariness of a corresponding hammer lever spring.	*If its weariness is recognized, exchange it.
		(3) Weariness of a trigger lever spring (B3-4).	A	*Check weariness of a corresponding trigger lever spring.	*If its weariness is recognized, exchange it.
17. Blurred printing.	Printed letter is light and scratchy.	(1) Short of ink on an inked ribbon.	A	*Check the ribbon.	*In case of ink on an inked ribbon being short, exchange it (B5-23).
		(2) No good in winding up of an inked ribbon (B5-24).	A	*Check the ribbon winding up mechanism.	*Refer to TROUBLE 23.
		(3) Weariness in a printing type on the print drum (B3-7).	B	*Check weary condition of a printing type of the print drum.	*In case a type is weary, exchange the print drum according to V-1-8 and V-2-12.
		(4) Weariness of a hammering head of a hammer.	B	*Remove a hammer levers unit (B3-5) according to V-1-3, then check weariness of its hammering head.	*In case it is weary, exchange the hammer levers unit according to V-1-13 and V-2-4.
		(5) Motor speed is too slow.	B	*Measure a wave-form of a driving transistor on the motor circuit board to check if its speed is lower than the rated one. Rated speed: 25 ± 2 msec/rev. (only in no-load, 15 V DC, at 25°C)	*When adjusting its speed, perform it according to REPAIR in CAUSE (5) of TROUBLE 1.

TROUBLE	TROUBLED CONDITION	CAUSE	REPAIR STANDARD	CHECK POINT	REPAIR
		(6) Weariness at each operating part.	C	*Check weariness at a hammering head surface of a trigger lever with a ratchet shaft, a jaw of a ratchet shaft and a hammer lever bearing.	*In case the trigger lever is weary, exchange the trigger lever assembly according to V-1-12 and V-2-12. *In case the ratchet shaft is weary, replace it according to V-1-12 and V-2-12. *In case the hammer lever is in wear and tear, replace the hammer lever assembly (B3-5) according to V-1-13 and V-2-4.
		(7) Oil at each operating part is not good.	A	*Check oil at a ratchet shaft (B2-3), trigger lever (B3-3), trigger lever guide (B1-1-8), hammer lever shaft (B3-5-1), etc.	*Refill designated oil to the places where oil is short or deteriorated. (Refer to IV-1 Lubricants.)
		(8) Setting position of the trigger magnets for printing in not proper.	A	Refer to CAUSE (2) of TROUBLE 11.	
		(9) Recording paper is not good.	A	*Check if recording paper is extremely thick or its surface is coarse.	*Replace the recording paper into thinner good quality one.
18. Prints in two colors.	One character printed in two colors. 	(1) Loose tension of inked ribbon (B5-23).	A	*Check on looseness of inked ribbon.	*Bend and put stress on brake spring (B5-9) and detecting lever spring.
		(2) Situation of ribbon is too low.	A	*Check situation of ribbon against hammer.	*Bend and correct ribbon guide lever (B5-17).
		(3) No good ribbon shifting.	A	*Confirm if ribbon shift lever functions smoothly at ribbon shift condition.	*Adjust the position of trigger magnet of paper feeding. *If ribbon clutch lever does not operate, apply oil or replace it.

TROUBLE	TROUBLED CONDITION	CAUSE	REPAIR STANDARD	CHECK POINT	REPAIR
19. Paper does not feed. ▼	Recording paper is printed at one and same position instead of being fed.	(1) No good contact or broken wire of a connector (B2-13).	A	*Check wire breakage of a lead wire of the connector terminals N and #13 and also dirt of the connector spring.	*In case the lead wire is broken, solder it. *In case that contact spring is dirty, clean it with benzine.
		(2) Shortness in operating voltage of the trigger magnet for paper feeding (B4-1) or pulse width.	A	*Measure voltage between connector and terminal N or #13. Pulse width: 25 msec voltage : 15 ± 3 V DC	*In case rated pulse is not fed-in, check and adjust its input side.
		(3) Lead wire or wound wire of the trigger magnet for paper feeding is broken or burnt.	A	*Measure resistance between socket terminal N and #13. Resistance value: $50 \pm 5 \Omega$ *Check a soldered part of a lead wire of the trigger magnet for paper feeding. *Check color-change of over-wrapped paper of the coil of the trigger magnet for paper feeding.	*In case soldering is not good, solder it again. *In case of breakage or burnt down, exchange the trigger magnet for paper feeding (B4-1).
		(4) Bad feeding or recording paper.	A	*Check an interruption in the feeding passage of the recording paper. Check if it is with a standard width. Standard width: 58 ± 1 mm	*Use recording paper with a Standard width and adjust each feeding mechanism to ensure a smooth surface of the paper.

TROUBLE	TROUBLED CONDITION	CAUSE	REPAIR STANDARD	CHECK POINT	REPAIR
		(5) No good operation of the paper feeding lever (B4-2).	A B	*Confirm if the paper feeding lever functions smoothly with paper feeding spring by lowering the lever by hand.	*In case its operation is not smooth, lubricate it according to Lubricants. *In case the condition cannot be bettered with lubrication, replace the lever (B4-2).
		(6) Breakage of the paper feeding click (B4-2-6) or the paper feeding ratchet wheel (B4-8-2).	C	*Rotate the paper feeding ratchet wheel (B4-8-2) in one revolution to check breakage or damage of the teeth. Check a breakage at the bent part of the paper feeding click.	*Replace the paper feeding ratchet wheel (B4-8-2) or the paper feeding click (B4-2-6) into a new one.
20. Irregular pitch in recording paper feeding.	The line interval of printed record fed out is not becoming 4.24 mm but irregular.	(1) No good operation of the paper feeding lever (B4-2).	A	Refer to CAUSE (5) of TROUBLE 19.	
		(2) Rotation of the paper feeding roller is heavy.	A B	*Confirm in the rollers rotate smoothly by lifting and lowering the paper feeding lever (B4-2) by hand.	*Lubricate the paper feeding roller shaft according to Lubricants. *In case the bearing is seized, exchange the plane bearing B (B4-8-3).
		(3) Spring outside the paper guide set got wear and tear.	B	*Confirm if pulling force is too weak by pulling the inserted recording paper by hand.	*Adjust the spring under the paper guide assembly (B4-9) by bending it.
21. Paper feeding mechanism and ribbon mechanism do not operate at all.	Although the printing mechanism operates, the paper feeding mechanism and the ribbon mechanism do not operate at all.	(1) No good contact or breakage in the connection (B2-13).	A	Refer to CAUSE (1) of TROUBLE 19.	

TROUBLE	TROUBLED CONDITION	CAUSE	REPAIR STANDARD	CHECK POINT	REPAIR
		(2) Shortage in driving voltage or pulse width in the trigger magnet for paper feeding (B4-1).	A	Refer to CAUSE (2) of TROUBLE 19.	
		(3) Breakage or burnt down of lead wire or coil of the trigger magnet for paper feeding.	B	Refer to CAUSE (3) of TROUBLE 19.	
		(4) Disconnection between transmitting lever (B5-2) and driving lever (B5-19)	A	<p>*Check if the hooking between transmitting lever (B5-2) and driving lever (B5-19) is disengaged.</p>  <p>Transmitting lever</p> <p>Driving lever</p>	*Adjust the transmitting lever by bending downwards to engage with the driving lever.
22. Out of way of inked ribbon.	Even when setting an inked ribbon normally, it goes out of the way during printing.	(1) Bending in the ribbon guide roller A (B5-17-3) due to deformation of the ribbon guide lever (B5-17).	A	*Check if the ribbon guide roller A (B5-17-3) is bent (if it is vertical, the condition is normal).	*Adjust the ribbon guide roller A (B5-17-3) so as to be vertical by bending the ribbon guide lever (B5-17).
		(2) Bending in the ribbon guide roller shaft B (B5-17-5)	A	*Check if the ribbon guide roller shaft B is vertically set.	*Adjust the ribbon guide roller shaft B to be vertical by bending it.

TROUBLE	TROUBLED CONDITION	CAUSE	REPAIR STANDARD	CHECK POINT	REPAIR
		(3) Weariness of the brake spring (B5-9) of the ribbon spool.	A	*Check the strength of the brake spring (B5-9) by rotating the spool gear (B5-8) freely.	*Adjust the strength of the brake spring (B5-9) by bending it, or replace the spring. • Torque of spool gear 30~50 g·cm.
23. No auto-return of ribbon feeding.	Ribbon can be wound up to one direction, bt it cannot be wound up reversely.	(1) No good in form of the detecting lever G (B5-10) or M (B5-12).	A	*When the extreme points of the detecting lever and the exchanging direction lever (B5-5) get in touch with each other, check if the clearance between part a of the detecting lever and spool shaft is 5 ± 0.3 mm.	*When 5 ± 0.3 mm in the below drawing is obtained by bending the part A of the detecting lever, adjust the engagement volume between the exchanging direction lever and detecting lever to be zero. 
		(2) Weariness in the exchanging direction spring (B5-6).	A	*Check the operating conditions at two stationary points by operating the exchanging direction lever (B5-5) by hand.	*Adjust the exchanging direction spring as per in the below drawing, or replace it. 

TROUBLE	TROUBLED CONDITION	CAUSE	REPAIR STANDARD	CHECK POINT	REPAIR
24. Generation of noise. ▼	Rotating noise when waiting is enormously high.	(1) Contact between rotating and fixing parts or between both rotating parts.	A	*Check the contact between rotating parts such as motor mechanism gear train mechanism ratchet shaft print drum and fixed part or between both rotating parts.	*Take the following measure according to the situation : • When a part is bent, bend it back correctly to adjust. • Adjust an improper positioning with a washer. • When getting wear and tear, replace it.
		(2) Entry of foreign matter.	A	*Check an interior part if paper, cutting chip, large dirt or pile, etc. enters into the rotating section.	*Remove foreign matter.
		(3) No good engagement or wear and tear of the gears of the ratchet shaft (B2-3), idler gear (B2-11) or print drum gear (B2-6-1).	B	*Check if each gear is engaged with another normally.	*Loosen the bridge for idler gear unit screws to adjust the position. *In case of getting wear and tear in a gear, replace it.
		(4) Defect in the bearings.	C	*Remove the idler gear, then check noise from the bearing race when only the motor is rotating.	*When noise is so high, replace the bearing.

V DISASSEMBLY AND ASSEMBLY

When a repair overhaul for the printer, perform it in accordance with the following procedures.

1. Disassembly

1-1 Removal of covers:

SEQUENCE OF DISASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Remove tension lever (B4-12). 2. Remove ribbon shift lever (B5-21) and retaining ring TYPE-E 2.3 fixing ribbon guide lever (B5-17). 3. Remove ribbon guide lever (B5-17) from ribbon shift lever pin, and lift the lever towards ribbon mechanism side. 4. Remove the setscrews of gear cover (2 pcs of C.P. screw 3×8 and 2 pcs of plane washer 3-0.5-8). 5. Remove gear cover (B7-1). 6. Remove motor cover (B7-3). 7. Remove paper cutter lever (B4-11). 8. Remove print drum cover (B3-8). 	<p>*Attention should be paid not to miss paper tension spring (B4-3) behind.</p> <p>*When paper cutter lever is too tight, extend the tale of the lever.</p>

1-2-1 Removal of the ribbon mechanism:

SEQUENCE OF DISASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Remove driving lever spring (B5-20). 2. Remove 2 pcs of setscrew of ribbon feeding unit (2 pcs of C.P. screw 2.5×6) 3. Remove ribbon feeding unit (B5-A). 4. Remove ribbon shift spring (B5-22). 5. Remove plane washer 3-0.5-8 and retaining ring TYPE-E 2.3 from paper feeding lever guide shaft (B3-2-2). 6. Remove ribbon shift lever (B5-21). 	<p>*Do not extend the hook part of the spring.</p>

1-2-2 Disassembling of ribbon spool unit (5-A):

SEQUENCE OF DISASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Remove ribbon guide lever (B5-17). 2. Remove retaining ring TYPE-E 3 fixing spool gear (B5-8) (left and right). 3. Remove brake spring (B5-9) (left and right). 4. Remove spool gear (B5-8) (left and right). 5. Remove hook lever spring (B5-15) from the pin of the frame (left and right). 	<p>*It's easily dismantled when bending anend of basic plate assembly (B5-1) upwards.</p>

<ol style="list-style-type: none"> 6. Remove retaining ring TYPE-E 2.3 fixing detecting lever (left and right). 7. Remove detecting levers G (B5-10) and M (B5-12) and detecting lever springs G (B5-11) and M (B5-13) at a same time. 8. Remove hook lever G (B5-14) and M (B5-16) and hook lever spring (B5-15) at a same time. 9. Remove exchanging direction spring (B5-6) from the pin of transmitting lever (B5-2) and exchanging direction lever (B5-5). 10. Remove ribbon feeding pawl spring (B5-7) from projection of exchanging direction lever (B5-5) (3 positions) and the holes of ribbon feeding pawls G (B5-3) and M (B5-4). 11. Remove retaining ring TYPE-E 3 from transmitting lever shaft. 12. Remove exchanging direction lever (B5-5). 13. Remove retaining ring TYPE-E 3 from transmitting lever shaft. 14. Remove transmitting lever shaft (B5-2). 15. Remove retaining ring TYPE-E 2.3 fixing ribbon feeding pawl to transmitting lever (B5-2). 16. Remove ribbon feeding pawls G (B5-3) and M (B5-4). 	<p>*Detecting lever spring G-yellow Detecting lever spring M-white</p>
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1-3 Removal of the idler gear:

SEQUENCE OF DISASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Remove gear cover (B7-1) and ribbon shift lever (B5-21) recording to 1-1 and 1-2. 2. Remove the setscrews for bridge for idler gear unit (3 C.P. screw 3 x 6 and 3 plane washer 3-0.5-5). 3. Remove paper feeding clutch lever spring (B4-4). 4. Remove bridge for idler gear unit (B2-8). 5. Remove retaining ring TYPE-E 2 and plane washer 3-0.5-5 fixing idler gear (B2-11) to bridge for idler gear assembly (B2-9). 6. Remove idler gear (B2-11). 	

1-4 Paper feeding mechanism:

SEQUENCE OF DISASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Remove gear cover (B7-1), motor cover (B7-3), ribbon shift lever (B5-21) and bridge for idler gear unit (B2-8) according to 1-1, 1-2 and 1-3. 2. Remove retaining ring TYPE-E 4 of paper feeding roller shaft (B4-8-1) (left and right). 3. Remove 2 pcs of plane bearing B (B4-8-3) inwardly from frames G and M. 4. Remove the paper feeding roller unit (B4-8) while lifting. 5. Remove driving lever shaft (B4-7). 	<p>*Do not hurt the bearing.</p>

6. Remove driving lever (B5-19) and driving lever spring (B5-20).
7. Remove retaining ring type TYPE-E 4 of paper feeding lever guide shaft (B3-2-2) plane washer 5-0.3-10.
8. Remove paper feeding spring (B4-6).
9. Remove paper feeding lever unit (B4-2).

*Care should be taken in handling not to bend it after it is removed.

1-5 Removal of the electric wiring:

SEQUENCE OF DISASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Remove gear cover (B7-1) and motor cover (B7-3) according to 1-1. 2. Remove the lead wires of detecting head (B2-16, B2-17). 3. Remove the lead wires (3 wires) of trigger magnets for paper & ribbon feeding (B4-1). 4. Remove the lead wires (2 wires) of motor circuit unit (B2-1). 5. Remove the lead wires of the trigger magnets for printing (B3-1). 6. Remove C.P. screw 3×8 and plane washer 3-0.5-8 fixing wires holding clip (B2-14). 7. Remove connector with wires (B2-13). 	<p>*Detach it quickly using approx. 20~30 W soldering iron.</p>

1-6 Motor:

SEQUENCE OF DISASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Remove motor cover (B1-3) and the lead wires according to 1-1 and 1-5. 2. Remove motor circuit unit setscrews (each 2 pcs of C.P. screw 3×32 and plane washer 3-0.5-8). 3. Remove motor circuit unit (B2-1). 4. Remove bridge for idler gear unit (B2-8) according to 1-3. 5. Remove the rotor fixing nut (Hexagon nut L4 and out side toothed lock washer 4). 6. Remove rotor assembly (B2-2) from the ratchet shaft (B2-3). 7. Remove plane washer 7-0.1~0.5 built in the ratchet wheel. 	<p>*Take it out carefully not to contact the rotor.</p> <p>*Use a gear driver to prevent ratchet shaft from rotation.</p> <p>*The rotor is of strong magnetic force, so that it is liable to be stuck with iron dust. Care should be taken in handling if after dismantled.</p> <p>*When replacing motor circuit unit and the rotor, it is necessary to make a speed adjustment of motor after they are built in.</p>

1-7 Detector:

SEQUENCE OF DISASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Remove gear cover (B7-1) according to 1-1. 	

2. Remove the lead wires of detecting head T.R. (B2-16, B2-17) according to 1-5.
3. Dismantle detecting head T.R. by removing its setscrew 3 x 6 and plane washer 3-0.5.

*Detach it quickly using approx. 20~30 W soldering iron.

1-8 Print drum :

SEQUENCE OF DISASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Remove the covers according to 1-1. 2. Remove the ribbon mechanism according to 1-2-1. 3. Remove bridge for idler gear unit (B2-8) according to 1-3(2) and 1-3(3). 4. Remove detecting head T.R. according to 1-7. 5. Loosen the print drum setscrew (H.F. screw 4 x 5) on frame G (B1-1-1) side. 6. Loosen the print drum setscrews (screw 4 x 5) on frame M side. 7. Remove retaining ring TYPE-E 4 and plane washer 5-0.3-10 on frame M side. 8. Take print drum gear assembly (B2-6) out of frame G side. 9. Remove leaf spring 5-0.1 from print drum shaft. 10. Remove the print drum (B3-7). 11. Remove 4 pcs of the H.D. screws from both frames and the plain bearing A. 	<p>*In case the shaft could not be taken out, hold the print drum and take it out while its shaft is turned. Do not wrench the shaft to take it out, otherwise the bearing and the frame will be damaged with excessive strain.</p>

1-9 Paper guide assembly :

SEQUENCE OF DISASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Remove the following parts according to the disassembling method : <ol style="list-style-type: none"> 1-1. Covers 1-2. Ribbon mechanism 1-3. Bridge for idler gear unit 1-7. Detector 1-8. Print drum 2. Remove the paper guide assembly (4-9). 	<p>*Remove it from behind.</p>

1-10 Trigger lever :

SEQUENCE OF DISASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Remove respective parts according to 1-9 "Sequence of disassembling in the paper guide". 2. Disconnect the trigger lever spring (B3-4) from the hook position of the trigger lever guide (B1-1-5) (18 pcs). 	<p>*Do not extend the spring absolutely.</p>

3. Take the trigger lever assembly (B3-3) out of the trigger lever guide (18 pcs).

1-11 Ratchet shaft:

SEQUENCE OF DISASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Remove the paper feeding mechanism according to 1-4. 2. Remove the motor mechanism according to 1-6. 3. Remove Detecting head T, R according to 1-7. 4. Dismantle Detecting wheel T (B2-15) by removing its setscrew (H.F. screw 4 x 5). 5. Remove C.P. bind screw 2 x 4 (2 pcs) miniature bearing with flange 7 x 14 (B1-2) on frame M (B1-1-2) side and then miniature bearing with flange 7 x 14. 6. Take the ratchet shaft (B2-3) to frame M. 	<p>*When taking the bearing out, care must be taken not to scratch it, stick it with dirt or bend to cause deformation inside the bearing.</p> <p>*When sticking with Loctite outside the bearing circumference remove it.</p>

1-12 Trigger magnet:

SEQUENCE OF DISASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Remove all the lead wires of trigger magnet for paper feeding (B4-1), trigger magnets for printing (B3-1). 2. Remove 2 pcs of trigger magnet for paper feeding setscrew (C.P. screw with spring lock washer 3 x 6) and the trigger magnet for paper feeding (B4-1). 3. Remove 4 pcs of the trigger magnets for printing setscrew (C.P. screw with spring lock washer 3 x 6) and then the trigger magnets assembly for printing A and B. 	<p>*Remove the trigger magnets after taking the engagement between actuating lever hook position and the suction plate slowly.</p>

1-13-1 Removal of hammer lever unit:

SEQUENCE OF DISASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Remove gear cover (B7-1) and motor cover (B7-3) according to 1-1. 2. Remove 2 pcs of spring pin 2 x 6 fixing hammer lever guide (B3-5-5) to frame assembly. 3. Remove hammer lever unit (B3-5) after loosening 2 pcs of hexagon nut 4 of hammer lever shaft (B3-5-1). 	<p>*Push two pins to outside from inside.</p> <p>*Do not disassemble hammer lever unit usually.</p>

1-13-2 Disassembling of hammer lever unit:

SEQUENCE OF DISASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Remove 18 pcs of hammer lever spring (B3-6) from the hook of hammer lever guide (B3-5-5) and hammer levers A and B. 	<p>*Do not extend the hook of the spring.</p>

<ol style="list-style-type: none"> 2. Remove hammer lever guide (B3-5-5). 3. Remove Hexagon nut 4, spring lock washer 4 and plane washer 4-0.5-10 from the left and right of hammer lever shaft (B3-5-1). 4. Remove hammer guide ring (B3-5-4), hammer lever B (B3-5-3), plane washer 6-0.2-10, hammer lever A (B3-5-2) in the above order. 	<p>*Do not make any mistaken in this sequence of their layout.</p>
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1-14-1 Removal of the actuating levers unit:

SEQUENCE OF DISASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Remove gear cover (B7-1) and motor cover (B7-3) according to 1-1. 2. Remove ribbon shift lever and paper feeding lever according to 1-2 and 1-4. 3. Remove trigger magnets for printing A and B according to 1-12. 4. Loosen the paper feeding lever guide shaft (B3-2-2) on the frame G side of actuating lever shaft (B3-2-1) and hexagon nut 4 on the frame M side, then remove actuating levers unit (B3-2). 	<p>*During and after disassembling pay attention not to deform the actuating lever.</p>

1-14-2 Disassembling of actuating levers unit:

SEQUENCE OF DISASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Remove paper feeding lever guide shaft (B3-2-2) on frame G side of the actuating lever shaft (B3-2-1) then actuating lever A (B3-2-3), plane washer 6-1.5-9, and actuating lever B (B3-2-4) in the above sequence. 	<p>*Do not make a mistake in the above sequence of the layout of actuating levers unit.</p>

2. Assembly

2-1-1 Assembling of the ribbon feeding unit:

SEQUENCE OF ASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Lubricate oil (G-2) to paper feeding lever guide shaft (B3-2-2), set ribbon shift lever and put plane washer 3-0.5-8 retaining ring TYPE-E 2.3. 2. Hook the ribbon shift spring (B5-22) to the projection of bridge for idler gear unit (B2-8). 3. Set the ribbon feeding unit (B5-A) so that it is inserted into the frame, then fix it with 2 pcs of C.P. screw 2.5 x 6 with a torque of 8 kg·cm. 4. Hook the driving lever spring (B5-20) to the hook under the basic plate. 5. Fix gear cover (B7-1) with plane washer 3-0.5-8 and 2 pcs of C.P. screw 3 x 8. 6. Fix motor cover (B7-3) in the same way as in 5. 7. Insert ribbon guide lever (B5-17) into ribbon shift lever shaft (B5-2-2), then fix it with retaining ring TYPE-E 2.3. 8. Fix tension lever assembly (B4-12). 9. Coat thread lock 2 on to basic plate setscrew (2 pcs). 	<ul style="list-style-type: none"> *Lubricate oil (G-2) to the hook part of the spring. *Place the ribbon fixing plate under the dust cover of the paper guide (B4-9) without fail. *Engage the transmitting lever (5-2) with the driving lever firmly. *Lubricate oil (G-2) to the hook part of the spring. *Lubricate oil (G-2) to the hook part of the spring. *Lubricate oil (G-2) to ribbon shift lever spindle. *Retaining ring TYPE-E must be insert with keeping a burred surface upwards. *Set tension lever assembly (B4-12), so that its top should be engaged with paper guide (outside) (B4-9-2).

2-1-2 Assembling of ribbon feeding unit:

SEQUENCE OF ASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Lubricate oil (G-2) to the left and right ribbon feeding pawl of the transmitting lever (B5-2), set ribbon feeding pawls G (B5-3) and M (B5-4), then fix both with retaining ring TYPE-E 2.3. 2. Lubricate oil (G-2) to transmitting lever shaft, set transmitting lever assembly (B5-2), then fix it with retaining ring TYPE-E 3. 3. Set exchanging direction lever (B5-5) to transmitting lever shaft, then fix it with retaining ring TYPE-E. 4. Mount the ribbon feeding pawl spring (B5-7) inside the projection (3 positions) and the ribbon feeding pawls G (B5-3) and M (B5-4). 5. Hook exchanging direction lever spring (B5-6) to ribbon feeding jaw spindle and the change-over lever pin. 6. Lubricate oil (G-2) to the left and right detecting lever spindle, then insert hook levers G (B5-14) and M (B5-16) into both spindles. 	<ul style="list-style-type: none"> *Adjust the curvature of the lever if necessary so that transmitting lever (B5-2) and exchanging direction lever assembly cause locking phenomenon or become heavy while sliding.

7. Set detecting lever springs G (B5-11) and M (B5-13) to detecting levers G (B5-10) and M (B5-12), insert these into the left and right detecting lever shaft then fix it with the retaining ring TYPE-E 2.3.
8. Fix detecting lever spring G and M to the projection of ribbon fixing plate.
9. Fix hook lever spring (B5-15) to hook lever and spring hook pin of basic plate (left and right).
10. Confirm if detecting lever and hook lever can rotate lightly (left and right).
11. Lubricate oil (G-2) to the left and right spool to which spool gears (B5-8) and brake springs (B5-9) will be inserted in the above sequence, then fix those with retaining ring TYPE-E.
12. Confirm if spool gears rotate smoothly.
13. Check the clearances if rotating and sliding parts operate smoothly.
14. Adjustment of reversing time of the ribbon winding-up. Check when the detecting lever gets in touch with exchanging direction lever under the condition of ribbon spool being removed, if the clearance between the spool spindle and the part of detecting lever is within 5 ± 0.3 mm.
15. Fix ribbon guide lever (B5-17) to basic plate.
16. Lubricate oil (G-2) to the connection of each lever.

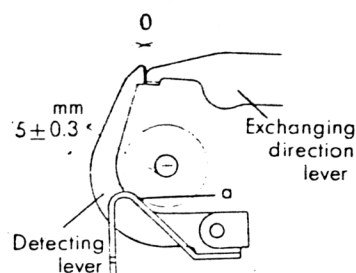
*Do not make a mistake in the direction between detecting lever spring G and M.

*Insert the retaining ring TYPE-E keeping its burred surface upwards.

*Be attentive not to deform the hook part of the spring.

*Insert retaining ring TYPE-E keeping its burred surface upwards.

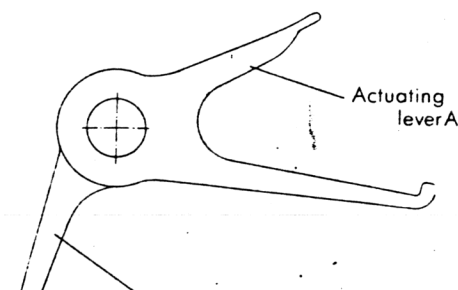
*Lubricate oil (G-2) to brake spring and the sliding surface of retaining ring TYPE-E.



*It can easily be built in when basic plate is bent upwards a little.

*Refer to "Lubricants" R-8 to R-23.

2-2-1 Assembling of actuating levers unit:

SEQUENCE OF DISASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Insert actuating lever A (B3-2-3), plane washer 6-1.5-9, actuating lever B, plane washer 4-0.5-10,in the above sequence while lubricating oil (G-2) to actuating lever shaft (B3-2-1). 2. Arrange actuating lever to be in the middle of the spindle, then confirm if it rotates lightly. 	<p>*Do not make a mistake in the sequence.</p> 

2-2-2 Setting of actuating levers unit:

SEQUENCE OF DISASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Lubricate oil (G-2) to trigger lever guide (B1-1-8) and actuating lever guide (B1-1-9) inside the frame. 2. Place frame assembly (B1-1) in upside down position. 3. Lubricate oil (G-2) to the striking surface at the extreme point of actuating levers unit with trigger lever. 	<p>*Lubricate the whole part of comb-shape. Refer to VII 1 Lubricants M-2 and M-3.</p> <p>*Refer to VII 1 Lubricants M-1.</p>

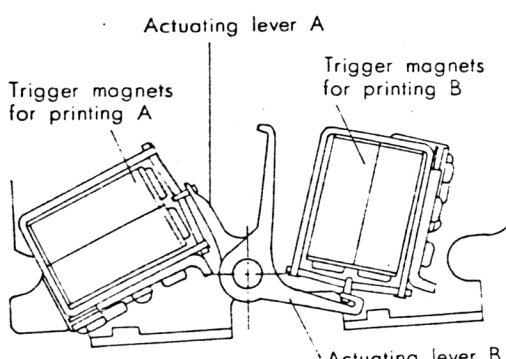
4. Arrange actuating lever to be in the middle of the spindle.
5. Array each extreme edge of actuating levers A (B3-2-3) and B (B3-2-4) separately.
6. Insert actuating levers unit (B3-2) into the frame, and insert each actuating levers unit into actuating lever guide (B1-1-9) one by one.
7. Fix plane washers 4-0.5-10 and hexagon nut 4 to frame M side and paper feed lever guide shaft (B3-2-2) to frame G side, tighten evenly on left and right sides with a torque of 24 kg·cm.

*In regard to a lever direction, refer to 2-3.

*Do not bend actuating lever guide and actuating lever.

*Tighten actuating lever shaft (B3-2-1) pushing into the groove lest it should float up.

2-3 Trigger magnets assembly:

SEQUENCE OF DISASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Insert trigger magnets assembly for printing (B3-1) into trigger magnets mounting plate (B1-1-7), then tighten temporarily at two positions with C.P. screw with spring lock washer 3 × 6 after keeping the lever-hooking of the trigger magnet and the jaw in an engaged condition and then setting two dowels of the fixing plate into the holes of trigger magnets assembly. 2. Tighten with screw trigger magnets for printing B (B3-1) in the same way as in 1. 3. Fix temporarily trigger magnet for paper feeding (B4-1) to frame G side with C.P. screw with spring lock washer 3 × 6 (2 pcs). 	 <p>The diagram illustrates the assembly of trigger magnets. It shows two main components: 'Trigger magnets for printing A' and 'Trigger magnets for printing B'. These are mounted on a common plate. 'Actuating lever A' is shown connected to the first set of magnets, and 'Actuating lever B' is connected to the second set. The levers are positioned to engage with the magnets during the printing process.</p>

2-4-1 Assembling of hammer lever unit:

SEQUENCE OF DISASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. While lubricating oil (G-2) to hammer lever shaft (B3-5-1) keeping the tale of it forward, insert hammer guide ring (B3-5-4), hammer lever A (B3-5-2), plane washer 6-0.2-10, hammer lever B (B3-5-3) from left to right in this sequence. 2. Lubricate oil (G-2) to hammer lever guide (B3-5-5), with the groove of which the projection of the hammer lever is coincided. 3. Hook hammer lever spring (B3-6) (18 pcs) to hammer lever and the hook of hammer lever guide. 4. Lubricate oil (G-2) to the hook of the spring and the sliding part. 	<p>*Do not make a mistake in this order.</p> <p>*When hooking the spring, do not deform the hook of it.</p> <p>*Refer to VII 1 Lubricants M-7 to M-9.</p>

2-4-2 Setting of hammer levers unit:

SEQUENCE OF ASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Array the hammer lever to be nearly in the middle of the hammer lever shaft (B3-5-1). 2. Insert hammer levers unit (B3-5) into the frame. 3. Push the hammer lever guide to the projection on the frame at its end, insert spring pin 2.6 into the hole at left and right sides of the frame to fix. 4. Tighten the left and right hexagon nuts 4 evenly with a torque of 24 kg·cm. 5. Check the 18 hammer levers one by one if they return to their original points smoothly by pushing them softly. 6. Lubricate oil (G-2) to the striking surface at the tale of hammer lever. 7. Coat Neji lock #2 on to hammer lever shaft fixing nut (left and right) and the spring pin (left and right) of hammer guide. 	<p>*Insert both hammer lever shaft (B3-5-1) and hammer lever guide at a same time. If inserting only the hammer lever shaft first, then the hammer lever spring is disconnected.</p> <p>*Tighten it while the hammer lever shaft is pushed into the groove to prevent from floating up.</p> <p>*Push the spring pin into the middle depth with its converged end forward.</p> <p>*Refer to VII Lubricants M-8.</p>

2-5 Plane bearing A:

SEQUENCE OF ASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Press plane bearing A (B2-7) in frames M and G from their outside respectively. 2. Fix plane bearing A with 2 C.P. bind screws 3 × 3 with a torque of 6 kg·cm after its extreme point is coated with Loctite. 4. Lubricate oil (O-2) to the both bearings. 	<p>*Look for the position for the spindle to fit in smoothly while it is rotated, and do not force it to press in absolutely.</p> <p>*Do not let the bearing to float.</p> <p>*C.P. bind screws must not be tightened firmly in any case (be careful about deformation in bearing). Tighten them to contact the flange of the bearing with the one of the screws slightly.</p> <p>*Refer to VII 1 Lubricants M-14.</p>

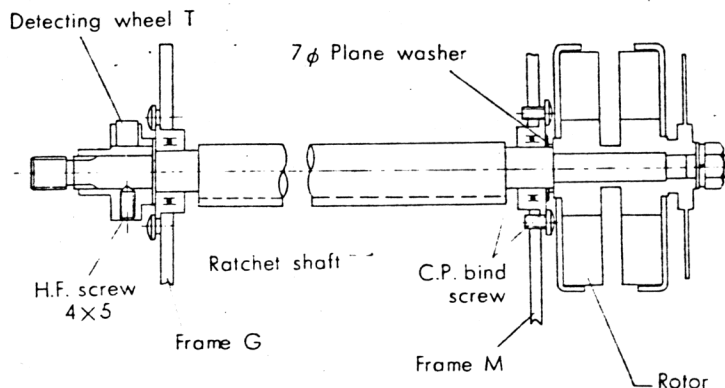
2-6 Ratchet shaft and detecting wheel T:

SEQUENCE OF ASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Insert the ratchet shaft (B2-3) into the bearings from frame M side to frame G side making the geared end ahead. 2. Coat Loctite a little to the miniature bearing with flange 7 × 14 (B2-4), and then press it into frame M with the ratchet wheel mounted. 	<p>*Press it smoothly without picking or force.</p>

3. Fix the bearings with C.P. bind screws 2 × 4 (2 pcs), on the extreme end of which Loctite is coated a little.
4. Insert plane washer 7-0.5-11 on to ratchet shaft of frame M side, then set Detecting wheel T (B2-15) to the spot of ratchet shaft.
5. Confirm if ratchet shaft (B2-3) rotates smoothly.
6. Apply Loctite to H.F. screw 4 × 5 and tighten firmly.

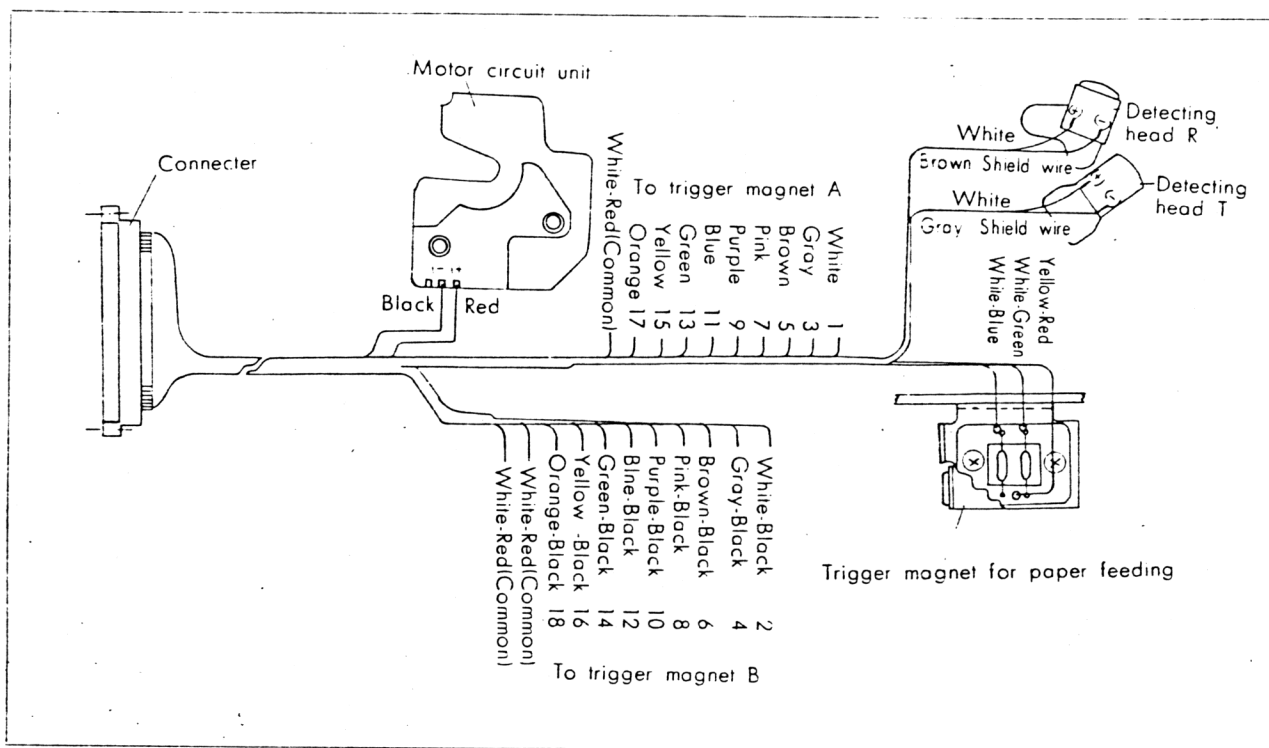
*Do not tighten C.P. bind screw too tightly. (Be careful about deformation of the bearings). Tighten the screws enough to contact the flange of the bearing with the one of the screws lightly.

*The ratchet shaft should move in the thrust direction with its self-weight.

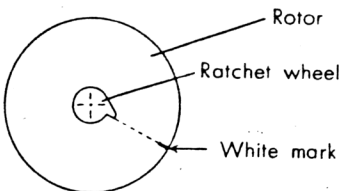
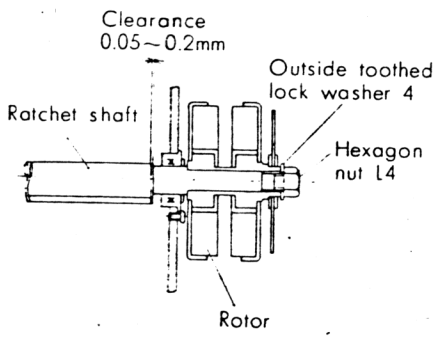


2-7 Electric wiring (connector with wires)

SEQUENCE OF ASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Pass the longer bound cords of connector with wires (B2-13) through the cord-through-hole below frame M, among which longer 5 lead wires further through the cord-through-hole of frame G. 2. The shorter bound cords of connector with wires lead from the recess behind the frame M to trigger magnets for printing (B3-1). 3. Wire to the motor board. 4. Wire to the trigger magnets for printing (B3-1) A and B. 5. Wire to trigger magnet for paper feeding (B4-1). 6. Wire to the detector (B2-16) (B2-17). <p>Note:</p> <p>Perform it after temporarily fixing the detector according to 2-13.</p> <ol style="list-style-type: none"> 7. Fix the bound lead wires of the connector with wires with plane washer 3-0.5-8 and C.P. screw 3 × 8 to frame M side. <p>The number on the figure is a figure number from first place from below on frame M side.</p>	<div data-bbox="979 1173 1382 1396" data-label="Image"> </div> <p>*Do not mix up connector number in a corresponding figure position of the trigger magnet.</p> <p>*Use a soldering copper of around 20~30 W, the extreme print of which should not be contacting a terminal for a long time.</p> <p>*To prevent rubbing lead wires on corner of the frame.</p>



2-8 Motor:

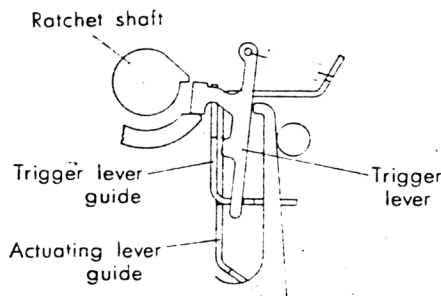
SEQUENCE OF ASSEMBLING	POINTS DEMANDING ATTENTION
<p>1. Mount plane washer 7φ into ratchet shaft on frame M side, insert the rotor assembly (B2-2) then outside toothed lock washer 4, and finally tighten with a hexagon nut (left handed) 4 with a torque of 24 kg·cm.</p>  <p>2. Insert motor circuit unit (B2-1) into the gap of the rotor assembly put a corner of the board into the groove of the paper cutter lever shaft M (B1-1-6), then fix them with 2 C.P. screw 3 × 32. (Fixing torque: 10 kg·cm)</p> <p>3. Wire lead wires from the connector to the motor board (Refer to "Electric wiring" 2-7).</p>	<p>*The number of plane washer (7φ) piled is decided so that the clearance in the thrust direction would be 0.05-0.2 mm.</p> <p>*Set to coincide a jaw of the ratchet shaft with the white line of the rotor assembly.</p>  <p>*Decide a position of the circuit unit so that the rotor and detecting plate do not contact the circuit unit.</p> <p>*Position it nearly in the middle of the motor circuit unit ferrite magnets. If necessary, use a washer for 3φ plane headed screw.</p> <p>*Confirm if unusual noise (rubbing noise) generates when slanting the machine proper towards left and right sides.</p>

4. Adjustment of motor rotating speed.
 - (1) Observe a collector (sealed case) wave-form of the driving transistor on a Braun tube oscilloscope to measure its period.
 - (2) Adjust a resistance so that its rotation period becomes 25 ± 2 msec at motor driving voltage of 15 ± 3 V.
5. Paint Neji Lock on setscrews for motor circuit unit.
6. Mount the motor cover (B7-3) (Refer to Covers 2-19).

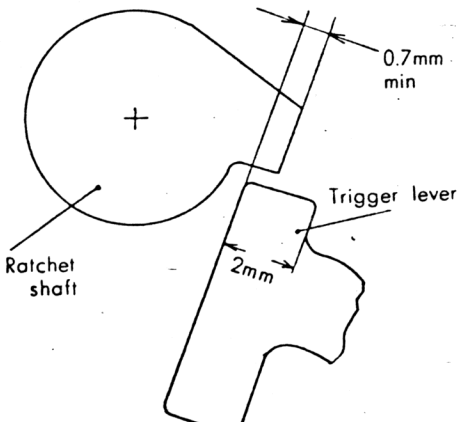
*Simultaneously check a collector wave-form. Refer to "Cause 5" of TROUBLE 1 in "Repair Manual" N-3.

*With reference to a resistance for adjustment, refer to VI "PARTS LIST".

2-9 Trigger lever:

SEQUENCE OF ASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Coincide the groove of trigger lever guide (B1-1-8) and below hole, then insert a trigger levers assembly into one by one, then attach a trigger lever spring (B3-4) to the hook of the trigger lever guide. 2. Lubricate oil (G-2) to the hook part of the springs. 	<p>*Be careful not to extend a hook part of the springs.</p>  <p>*Refer to VII Lubricants M-4, 5.</p>

2-10 Adjustment of engagement:

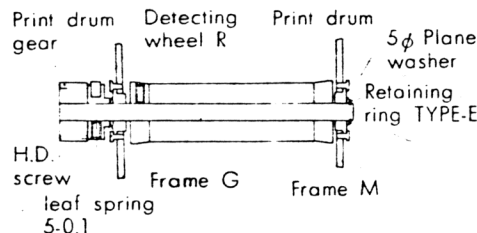
SEQUENCE OF ASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Supply DC current of 10~12 V to trigger magnets assembly for printing (B3-1). 2. Loosen setscrews of trigger magnets assembly for printing (3×6) to slide it up and down, adjust the the engagement volume between trigger lever and ratchet shaft so that it would be more than 0.7 mm as shown in the right-hand drawing. 3. Adjust the other trigger magnet in the same way. 4. Confirm if the trigger levers function quickly by switching power source on or off after adjustment, then tighten 2 setscrews with a torque of 10 kg·cm. 	<p>*There should be no clearance between head of the trigger magnet and the actuating plate in a suction condition.</p> 

2-11 Paper guide assembly:

SEQUENCE OF ASSEMBLING	POINTS DEMANDING ATTENTION
1. Place the rug side of paper guide (outside) of paper guide assembly (B4-9) towards the hammer side, coincide 4 pins protruded inside the frame with the hook part of paper guide, then push it up to the position where the hook effects.	*At the beginning when the hook is set to the pin on the hammer side, then pushing whole part into it, it can get in smoothly.

2-12 Print drum:

SEQUENCE OF ASSEMBLING	POINTS DEMANDING ATTENTION
1. Place print drum in the recess on the hammer side above paper guide assembly (B4-9) so that figures can be seen in a positive direction viewed from the hammer side.	*If the outside circumference of the print drum bush is scratched, it causes a paper sliding noise, so be careful about it.
2. Insert the leaf spring 5-0.1 on to the print drum shaft (B2-6-2) of the print drum gear assembly (B2-6) so that its convex surface is placed on the gear side, then insert the print drum spindle into it from frame G side.	*Insert without excessive stress on to the bearing.
3. Insert plane washer 5-0.3-10 on to print drum spindle projected on frame M side, then insert TYPE-E 4 on it.	*Place the burred surface of the retaining ring TYPE-E.
4. Fasten temporarily H.F. screw 4 x 5 hole on frame G side of print drum (B3-7).	
5. Confirm if print drum shaft rotates smoothly.	



2:13 Detector

SEQUENCE OF ASSEMBLING	POINTS DEMANDING ATTENTION
1. Set detecting head (B2-16) on frame G (B1-1), opposite to detecting wheel T. (B2-15) and temporarily tighten with two C.P. screws 3 x 6 using plane washer 3-0.5 with a given clearance.	
2. Set detecting head R (B2-17) on frame G (B1-1), opposite to detecting wheel R (B2-6-3) and temporarily tighten as mentioned in 5 above.	
5. Wire lead wires on detecting head T.R. (See 2-8 "Wiring")	

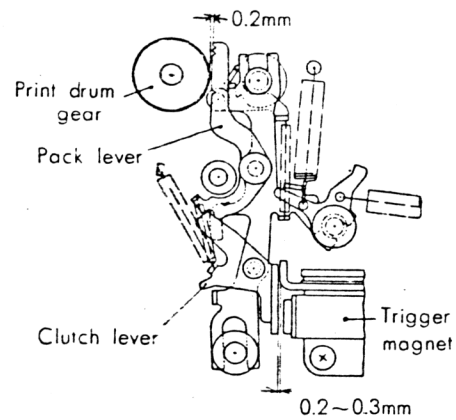
2-14 Paper feeding lever assembly:

SEQUENCE OF ASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Insert the paper feeding lever assembly (B4-2) into the supporter of the driving lever shaft (B4-7) and paper feeding lever guide shaft (B3-2-2), then set it on frame G side. 2. Coat Loctite a little on to the threaded part of driving lever shaft (B4-7), then fasten with a torque of 15 kg·cm. 3. Insert plane washer 5-0.3-10 on to paper feeding guide shaft (B3-2-2), and tighten it with retaining ring TYPE-E 2.3. 	<p>*Pay attention to the fact that thread lock should be applied a little not to be extruded outwards.</p> <p>*Set plane washer and the retaining ring TYPE-E placing their burred surface outside.</p>

2-15 Paper-feeding roller unit:

SEQUENCE OF ASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Lubricate oil (G-2) into U type groove of paper guide (outside) (B4-9-2). 2. Insert paper holding roller (B4-10) into paper guide unit (outside). 3. Confirm if the roller rotates smoothly. 4. Set paper feeding spring (B4-6) between paper feeding lever (B4-2-1) and paper cutter lever shaft G (B1-1-2). 5. Mount on to both sides of the paper-feeding roller shaft (B4-8-1) of the paper feeding roller unit (B4-8) plane washer 6-0.5-10, plane bearing B (B4-8-3) in this order. 6. Put paper feeding roller unit (B4-8) on the recess of paper guide assembly (B4-9), engage paper feeding ratchet wheel (B4-8-2) with paper feeding click (B4-2-6), then push the plane bearing B (B4-8-3) into both frames. 7. Insert the retaining ring TYPE-E 4 into the left and right groove of paper feeding roller shaft. 8. Check if paper feeding roller unit rotates smoothly by rotating it by hand. 9. Insert the driving lever (B5-19) into the driving lever shaft (B4-7). 10. Check the operation of paper feeding lever unit. <ol style="list-style-type: none"> (1) Confirm if the lever unit function smoothly by hand. (2) Confirm if paper feeding rack lever (B4-2-2) and paper feeding clutch lever (B4-2-4) are operation rightly. 	<p>*Confirm if the paper guide (outside) got wear. Refer to VIII Lubricants M-16.</p> <p>*When it does not rotate smoothly, expand the U type groove to adjust.</p> <p>*Do not deform the spring hook.</p> <div data-bbox="925 1008 1396 1281"> </div> <p>*Insert the plane bearing B by keeping its flanged part inwards and its shape with that of the frame. Do not force it into the frame with excessive stress by any means.</p> <p>*Mount the retaining ring TYPE-E and plane washer placing both towards the center.</p> <p>*Make the paper-feeding roller in a reverse motion, then check if it is locked.</p> <div data-bbox="925 1659 1396 1911"> </div>

- (3) Confirm if it to be 0.2 mm Min. of the clearance between print drum gear (B2-6-1) and rack lever (B4-2-2).
11. Adjusting for trigger magnet for paper feeding (B4-1).
 - (1) Adjust the trigger magnet for paper feeding set by moving in such a way that the clearance between trigger magnet for paper feeding and suction plate in the locked condition would be 0.2 mm.
 - (2) After adjustment, tighten with a torque of 10 kg·cm.
 - (3) Confirm if the engagement between clutch lever and rack lever is disconnected lightly in the condition of keeping the suction plate in slightly engaged state.
12. Lubricate oil (O-2) to the plane bearing B.
13. Lubricate oil (G-2) to the sliding parts, bearings of each lever and spring hooks.



2-16 Bridge for idler gear unit:

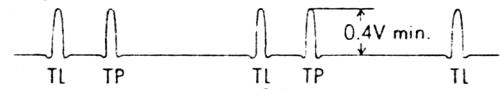
SEQUENCE OF ASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Mount idler gear (B2-11). <ol style="list-style-type: none"> (1) Lubricate oil (G-2) to idler gear shaft (B2-9-2) of the bridge for idler gear (B2-9), then insert idler gear (B2-11) into it. (2) Insert washer 3-0.5-5 and tighten it with retaining ring TYPE-E 2. (3) Check if idler gear rotates lightly by rotating it by hand. 2. Set paper feeding clutch lever spring (B4-4) on to the spring hook part projected inward from bridge for idler gear unit (B2-8). 3. Coincide the mark ⊙ of idler gear with the mark ● of ratchet shaft gear, putting the holes of bridge for idler gear unit, idler gear and print drum gear (B2-6-1) together, then insert bridge for idler gear unit into this hole. 4. Set to 3 spindles plane washers 3-0.5-6 and C.P. screw 3 × 6, then tighten softly. 5. Coincide the position of reset signal R with that of timing signal TL (Coincidence of phase). <ol style="list-style-type: none"> (1) Observe timing signal and reset one simultaneously on a Braun tube oscilloscope for 2 phenomenon observation to confirm if each pulse is within rated standard. 	<p>*Be careful about that it causes a noise when dirt or iron dirt sticks to the toothed part of the idler gear.</p> <p>*Be careful not to deform the spring hook.</p> <p>*When pulse is unusual, replace the detector according to 1-7 and 2-13.</p> <p>Handwritten notes:</p> <ul style="list-style-type: none"> 12 tooth → 68 tooth 17 tooth → 32 tooth

- (2) At the place where sound volume quality and current are smallest while moving bridge for idler gear unit by hand, fasten it with 3 pcs of bridge for idler gear unit setscrews with a torque of 10 kg·cm.
 - (3) Loosen the setscrews for the detector, putting the phases with the one in the right hand diagram, then tighten it with a torque of 10 kg·cm.
6. Hook the paper feeding clutch lever spring (B4-4) to the paper feeding clutch lever.
 7. Paint Neji Lock #2.
 Detector setting screw
 Setscrews (3 pcs) for bridge for idler gear unit
 Setscrews (2 pcs) for trigger magnet for paper feeding
 8. Lubricate oil (G-2) to gear surfaces of the gears and the paper feeding clutch lever spring hook.
 9. When bridge for idler gear, idler gear, print drum gear, etc. were moved for adjustment, an adjustment or check in position of screws of print drum set is absolutely necessary. (As for alignment of the print drum, refer to 2-18 "Alignment of the printing metal")

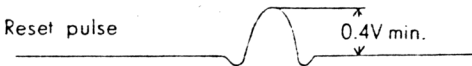
*Average current at waiting condition :
... less than 160 mA

*Confirm if backlash at the gear train is too excessive.

Timing pulse



Reset pulse



*Refer to VII-2 Adherence.

2-17 Ribbon shift lever:

SEQUENCE OF ASSEMBLING	POINTS DEMANDING ATTENTION
<ol style="list-style-type: none"> 1. Lubricate oil (G-2) to the extreme end of paper feeding lever guide shaft (B3-2-2). 2. Insert the ribbon shift lever (B5-21) to the shaft at the extreme end of paper feeding lever guide shaft, and fix it with retaining ring TYPE-E 2.3. 3. Mount the ribbon shift spring (B5-22) to the ribbon shift lever and the bridge for idler gear unit (B2-8). 4. Fix the ribbon feeding unit (B5-A) according to 2-1-1. 5. Insert the ribbon shift lever shaft (B5-21-2) into the ribbon shift lever setting hole of the ribbon guide lever A (B5-17), then tighten it with the retaining ring 2.3. 	<p>*Insert retaining ring TYPE-E keeping its burred surface outside.</p> <p>*Insert the retaining ring TYPE-E keeping its burred surface outside.</p>
	<p>Ribbon shift lever</p> <p>Ribbon clutch lever</p> <p>Trigger magnet</p> <p>0.2mm</p>

<p>6. Mount the driving lever spring (B5-20) between driving lever (B5-19) and the spring hook projected under the basic plate.</p> <p>7. Confirm if the ribbon shifting can be performed firmly and smoothly.</p> <p>8. Lubricate oil (G-2) to the hook of the driving lever spring, the one of ribbon shift springs and the ribbon shift lever shaft.</p>	<p>*The ribbon clutch lever must be positioned so that the clearance between it and the ribbon shift lever is about 0.2 mm. If this clearance is smaller, loosen the setscrews of the trigger magnet for paper feeding (B4-1), adjust its position. In this case, since the clearance between actuating plate of paper feeding clutch lever (B4-2-4) and trigger magnet varies, adjust it to be 0.2 mm making reference to 2-15.</p>
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2-18 Position alignment of print drum:

SEQUENCE OF ASSEMBLING	POINTS DEMANDING ATTENTION
<p>1. Loosen H.F. screw with which the print drum (B3-7) is temporarily fixed, coincide the ferrite magnet of detecting wheel R (B2-6-3) between the letter 2 to 3 on print drum.</p> <p>2. Make a fine adjustment in position of the print drum so that printed letter comes right under the hammer just before the hammer is about to strike print drum, then tighten it 4 × 5 strongly.</p> <p>3. Make a printing test of firm if there is missing of printing and inclined contact of the hammer.</p> <p>4. Coat thread lock on to double point screws 4 × 5, then tighten.</p> <p>5. Make a printing test again.</p>	<p>*When replaced or built-in actuating levers unit (B3-2), trigger magnets for printing (B3-1), hammer levers unit (B3-5) and print drum (B3-7), make a printing test to confirm printing quality.</p>

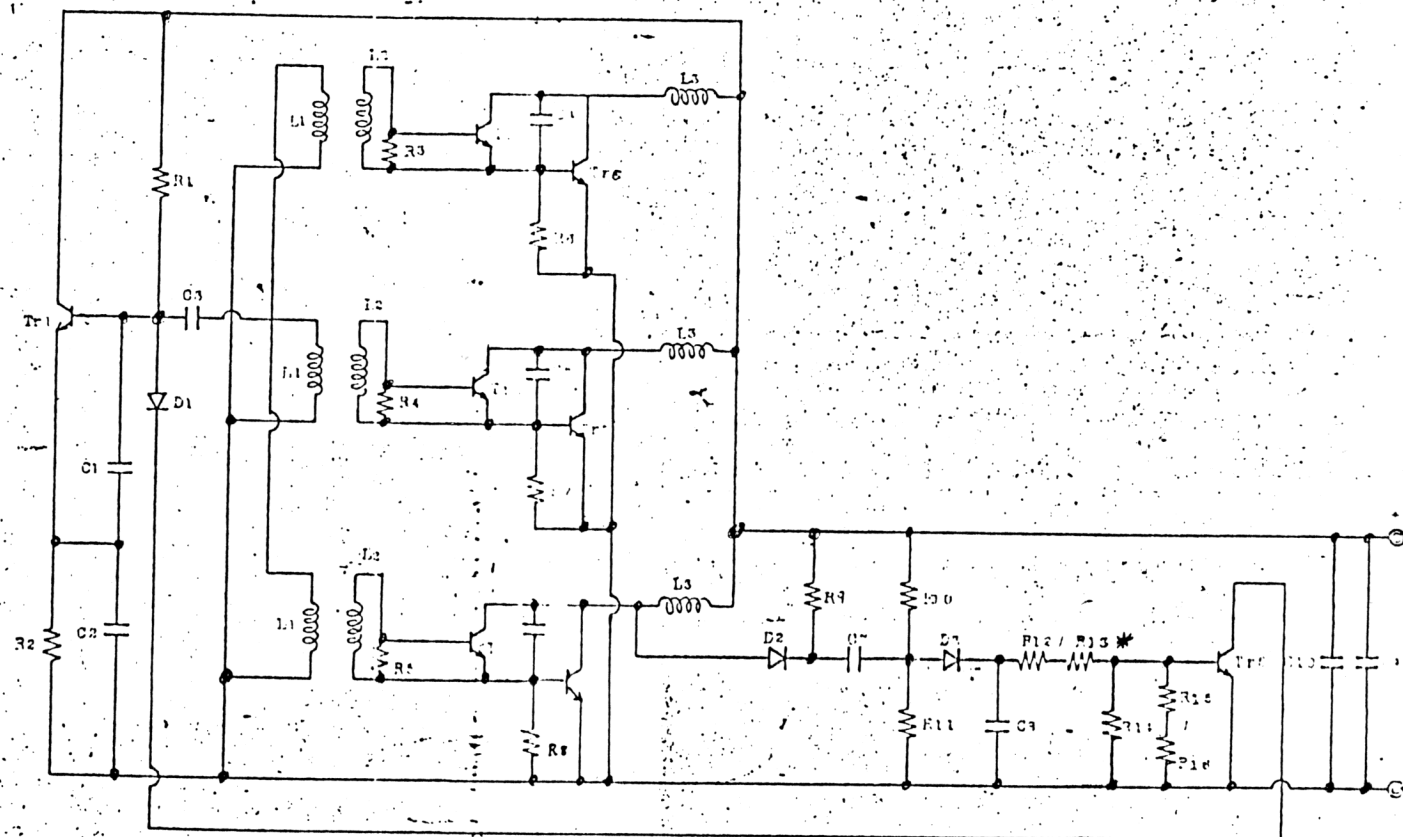
2-19 Covers:

SEQUENCE OF ASSEMBLING	POINTS DEMANDING ATTENTION
<p>1. Press both so that the projection of print drum cover (B3-8) is fitted perfectly into the recesses inside both frames.</p> <p>2. Insert the paper cutter lever (B4-11) into the paper cutter lever spindles G (B1-1-2) and M (B1-1-6), then press into it completely keeping it with the pins on the outside of both frames.</p> <p>3. Mount rubber bushing to motor cover, and tighten it with plane washer 3-0.5-8 and C.P. screw 3 × 8 with a torque of 2 kg·cm.</p>	<p>*In case the paper cutting lever is fluttered too much, bend its tale upwards to decrease fluttering.</p> <p>*Check if rotor assembly is sticked with foreign matter.</p>

4. Remove retaining ring TYPE-E of ribbon shift lever shaft (B5-21-2), then remove ribbon shift lever (B5-21) from ribbon guide lever (B5-17).
5. Insert rubber bushing (B7-2) into gear cover (B7-1), and tighten it with plane washer 3-0.5-8 and 3 x 8 with a torque of 2 kg-cm.
6. Insert ribbon shift lever shaft into ribbon guide lever, then retaining ring TYPE-E 2.3 into it.
7. Set tension lever assembly (B4-12) into the hole of basic plate, and press it downwards under paper guide auxiliary plate in a manner of the pressing the above slightly downward.

*Set the cover upwards in a slightly pressing manner.

Number	Component Name	Standard	Quantity
L1	INDUCTORS(O)		3
L2	" (R)		3
L3	" (D)		3
Tr1	TRANSISTOR	2SC828(F)	1
Tr2	"		1
Tr3	"		1
Tr4	"		1
Tr5	"		1
Tr6	"	2SD204	1
Tr7	"		1
Tr8	"		1
Di1	DIODE	1N953(u)	1
D2	"		1
D3	"		1
C1	FILM CAPACITOR	0.0022uF	1
C2	"		1
C3	"	0.015uF	1
C4	"	0.047uF	1
C5	"	0.047uF	1
C6	"	0.1uF	1
C7	ALUMINUM ELECTROLYTIC CAPACITOR	3.3uF	1
C8	"	22uF	1
C9	FILM CAPACITOR	0.05uF	1
C10	ALUMINUM ELECTROLYTIC CAPACITOR	3.3uF	1
R1	RESISTOR	4.7kΩ	1
R2	"	470Ω	1
R3	"	33kΩ	1
R4	"	33kΩ	1
R5	"	33kΩ	1
R6	"	3.3kΩ	1
R7	"	3.3kΩ	1
R8	"	3.3kΩ	1
R9	"	470Ω	1
R10	"	470kΩ	1
R11	"	4.7kΩ	1
R12	"	2.2kΩ	1
R13	"	1-5.6kΩ	1
R14	"	10kΩ	1



MODEL-102 MOTOR CIRCUIT

For Speed Control

Seiko Model 102 Printer Parts

<u>-hp- Part Number</u>	<u>Description</u>
1150-1092	Motor Assy
-1093	Rotor Assy
-1094	Ribbon Feed Assy
1150-1165	Gear & Shaft
-1166	Harness
-1167	Paper Guide Assy
1535-3061	Wrench, Torque
1535-3064	Driver, Gear
-3065	Conn. Timing Adj
-3066	Conn. Check Cont.
1535-3068	Brush, Cleaning
-3069	Tool, Retainer
1535-3104	Magnet, Paper Feed
-3105	Hammer Lever Unit
-3106	Levers, Actuating
-3107	Magnet, Print Trig
-3108	Shaft, Ratchet
-3109	Cover, Gear
-3110	Cover, Motor
-3111	Bridge, Idler Gear
-3112	Drum, Print, 81A
-3113	Drum, Print, 46A
1535-3199	Bearing
-3200	Bearing
-3201	Cover, Drum
-3202	Lever
-3203	Lever, Ribbon Guide
1535-3204	Washer
-3205	Washer
-3206	Washer
-3207	Washer
-3208	Washer
-3209	Washer
-3210	Washer
-3211	Washer
-3212	Washer
-3213	Washer
-3214	Washer
-3215	Screw
-3216	Screw
-3217	Screw
-3218	Screw
-3219	Screw
-3220	Screw
-3221	Screw
-3222	Screw
-3223	Screw
-3224	Screw
-3225	Nut
-3226	Pin
-3227	Pin, Spring
-3228	Spring, Leaf

1535-3229	Lever, Drive
-3230	Roller, Paper Feed
-3231	Spring, Lever
-3232	Shaft
-3233	Roller, Paper Holding
-3234	Wheel, Detecting
-3235	Spring
-3236	Lever, Trigger
-3237	Head, Detecting
-3238	Head, Detecting
-3239	Spring, Tension
-3240	Lever, Tension
-3241	Ring, Retaining
-3242	Ring
-3243	Ring, Retaining
-3244	Ring, Retaining

Ref. No.	Parts Name	H.P. Part No.	Seiko Part No.	Qty.
B-2-1	Motor Circuit Unit	1150-1092	1294120	1
W-1	Plane Washer	1535-3206	5002010	2
CP-13	C.P. Screw	1535-3220	6032010	2
B-2-2	Rotor Assembly	1150-1093	1295120	1
B-2-3	Ratchet Shaft	1535-3108	1246120	1
PW-21	Plane Washer	1535-3210	5024010	2
PW-22	Plane Washer	1535-3211	5023010	2
PW-23	Plane Washer	1535-3212	5022010	2
PW-24	Plane Washer	1535-3213	5021010	2
B-2-4	Minature Bearing	1535-3199	9102010	2
CPB-1	C.P. Bind Screw	1535-3215	6301010	4
B-2-6	Print Drum Gear/Shaft	1150-1165	1288120	1
PW-6	Plane Washer	1535-3208	5007010	1
RE-6	Retaining Ring	1535-3244	8504010	1
LS-2	Leaf Spring	1535-3228	5401010	1
B-2-7	Plane Bearing	1535-3200	9202010	2
CPB-2	C.P. Bind Screw	1535-3217	6302101	4
B-2-8	Bridge for idler gear	1535-3111	1235120	1
PW-16	Plane Washer	1535-3205	5017010	3
CP-4	C.P. Screw	1535-3218	6004010	3
B-2-11	Idler Gear Wheel	1535-3243	1240120	1
PW-15	Plane Washer	1535-3204	5025010	1
RE-13	Retaining Ring		8602010	1
B-2-13	Conn. with wires	1150-1166	1259120	1
B-2-14	Holding Clip	1150-1166	1223120	1
PW-2	Plane Washer	1535-3206	5002010	1
CP-5	C.P. Screw	1535-3219	6005010	1
B-2-15	Detecting Wheel T	1535-3234	1251120	1
HC-1	Setscrew	1535-3222	6501010	1
B-2-16	Detecting Head T	1535-3238	1253120	1
PW-16	Plane Washer	1535-3205	5017101	2
CP-4	C.P. Screw	1535-3218	6004010	2
B-2-17	Detecting Head R	1535-3237	1254120	1
PW-2	Plane Washer	1535-3206	5002010	2
CP-4	C.P. Screw	1535-3218	6004010	2
B-3-1	Trigger Magmets Assy.	1535-3107	1301120	1
PW-2	Plane Washer	1535-3206	5002010	4
CP-11	C.P. Screw	1535-3216	6010010	4
CP-1	C.P. Screw with spring	1535-3221	6016010	4
Diode	1s-953 (10)	1901-0050	4202010	18

Ref No	Parts Name	H.P. Part No.	Seiko Part No.	Qty.
-3-2	Actuating Lever	1535-3106	1316120	1
PW-5	Plane Washer	1535-3207	5005010	1
-3	Spring Lock Washer	1535-3214	5304010	1
HN-3	Hexagon Nut	1535-3225	7104010	1
-3-3-1	Trigger Lever Assy.	1535-3236	1321120	18
-3-4	Trigger Lever Spring	1535-3235	1322120	18
-3-5	Hammers Lever Unit	1535-3207	1327120	1
PW-5	Plane Washer	1535-3207	5005010	2
SW-3	S.L.W.	1535-3214	5304010	2
HN-3	Hex Nut	1535-3225	7104010	2
SP-2	Spring Pin	1535-3227	8005010	2
-3-6	Hammer Lever Spring	1535-3227	8005010	2
-3-7	Print Drum 81A	1535-3112	8622174	1
-3-7	Print Drum 46A	1535-3113	8622173	1
-3-7	Print Drum 9805A			1
-3-8	Print Drum Cover	1535-3201	1341120	1
-4-1	Paper Magnet	1535-3104	1434120	1
Diode	Diode	1901-4050	4204010	2
PW-2	Plane Washer	1535-3206	5002010	2
CPS-1	Screw with Spring Lock	1535-3221	6016010	2
-4-2	Paper Feeding Lever Assy		1404120	1
PW-6	Plane Washer	1535-3208	5007010	1
RE-6	Retaining Ring	1535-3244	8604010	1
-4-7	Driving Lever Shaft	1535-3232	1416120	1
-4-8	Paper Feeding Roller	1535-3230	1455120	1
PW-6	Plane Washer	1535-3209	5008010	1
RE-6	Retaining Ring	1535-3244	8604010	2
-4-9	Paper Guide Assy.	1150-1167	1419122	1
-4-10	Paper Holding Roller	1535-3233	1424120	1
-4-11	Paper Cutter	1535-3202	1425120	1
-4-12	Paper Tension Lever	1535-3240	1430122	1
-4-13	Paper Tension Spring	1535-3239	1433122	1
-5-A	Ribbon Feeding Unit	1150-1094	1501121	1
CP-11	C.P. Screw	1535-3216	6010010	2
-5-7	Ribbon Guide Assy.	1535-3203	1533121	1
-5-19	Driving Lever	1535-3229	1539120	1
-5-20	Driving Lever Spring	1535-3231	1540120	1

Ref. No.	Parts Name	H.P. Part No.	Seiko Part No.	Qty.
-7-1	Gear Cover	1535-3109	1257120	1
PW-2	Plane Washer	1535-3206	5002010	2
CP-5	C.P. Screw	1535-3219	6005010	2
-7-3	Motor Cover	1535-3110	1256120	1
PW-2	Plane Washer	1535-3206	5002010	2
CP-5	C.P. Screw	1535-3219	6005010	2

MAIN ASSEMBLY:

9805A (0950-1479)

46A (0950-0538)

81A (0950-1564)

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