

NEEDLE POSITIONER Technical Manual

INSTALLATION INSTRUCTION SERVICE TROUBLE SHOOTING PARTS LIST

TOKYO JUKI INDUSTRIAL CO., LTD.

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INTRODUCTION

This needle positioner represents a new concept in needle-positioning motor. This device meets all requirements for control functions that may be needed in the future. It is controlled by an electronic circuit which enables the powerful electro-magnetic clutch and brake to increase and decrease the speed of the sewing machine promptly. Variations of the operational speed are stepless and accomplished by simply touching the pedal softly.

1-1 Component of the needle positioner

This electronic needle positioner consists of a squirrel-cage induction motor, an electro-magnetic clutch and brake, and a control box and synchronizer. All assemblies are designed in a modular system and are easily replaced.



1-2 Principle of operation

The electro-magnetic clutch and brake consists of the clutch coil and brake coil assemblies, the output shaft, the clutch end cover, and two moving discs which are slidable on the output shaft. (fig. 2) When the clutch coil is energized by operating the pedal, the moving disc is engaged with the friction disc fixed on the flywheel. And then the rotation is transferred to the output shaft. When the brake coil is energized, the moving disc is engaged with the friction disc fixed on the clutch end cover. And it stops the rotating output shaft.



FEATURES

1)

PEDAL OPERATION CONTROLS FUNCTIONAL SPEED

Pedal operation alters the speed of the sewing machine, and maximum speed of the output shaft can be easily adjusted. As a result, straight, curved and zig-zag sewing can be smoothly accomplished, therefore, improving the efficiency and simplicity of operation.

2) HAND WHEEL FLEXIBILITY

The hand wheel can be freely turned to any position by hand even when the sewing machine is stopped. This is a great convenience, should the thread become entangled.

3) TIRELESS OPERATION

Only modest foot pressure is required to operate the pedal optimally. Strength of the pedal fowarding can be adjusted by changing the hook-up position of the spring. Therefore, each operator can conveniently adjust the pedal to his or her desired foot pressure.

4) AUTOMATED QUALITY CONTROL CIRCUITRY

Long operational life and extraordinarily high reliability are characteristic of the most advanced analog and digital semi-conductor elements. Because all control circuitry is controlled by electric signals, programmed operation and control can be systematized. This enables automatically-controlled operation of a number of sewing machines.

5) NEEDLE POSITIONING AND STOPPING ACCURACY

Specially designed electro-magnetic clutch and brake ensure very precise needle positioning and stopping accuracy, which helps prevent needle breakage.

6) ABNORMAL OPERATION

- (a) Abnormal high speed operation results thread breakage. Should this occur, the pedal will not function because it is interlocked by an electric signal which safeguards against irregular pedal operation.
- (b) In case the V-belt is off and the pedal is pressed accidentally, a protection circuit disengages the clutch automatically.
- (c) When the manual back tack switch is accidentally pressed while the sewing machine is stopped, the protection circuit disconnects the back tack solenoid in 12 seconds to protect the solenoid from burning.

These factors enhance the safety of the unit greatly.

7) JAMMING OR FREEZING PREVENTION

A special protection circuit is engaged when the machine freezes, automatically disengaging the clutch, and therefore, protecting the motor from burning out.

CLUTCH AND BRAKE AIR GAP ADJUSTMENT

Should the clutch and brake need operational adjustment, the air gap space can be easily altered with a turn of the adjustment screw.

MODEL AND TYPES

3-1 MODEL

| Phase | Model | Motor | Control box | | Synchronizer |
|-------|-----------|---------|-------------|------|--------------|
| | EPS1E-JTG | | ENC3E-JTG | 115V | |
| 1 | EPS1E-JTH | ENAP-DS | ENC3E-JTH | 115V | ENS2-02 |
| | EPS1E-JTK | | ENC3E-JTK | 115V | |
| | EPS1E-JTL | | ENC3E-JTL | 115V | |
| | EPS3E-JTG | | ENC3E-JTG | 220V | |
| 3 | EPS3E-JTH | ENAM-DS | ENC3E-JTH | 220V | ENS2-02 |
| | EPS3E-JTK | | ENC3E-JTK | 220V | |
| | EPS3E-JTL | | ENC3E-JTL | 220V | |

* Models of 2 positioning function are also available EPS1B-JA2 (1 phase), EPS3B-JA2 (3 phase)

3-2 MOTOR

| Туре | Phase | Voltage | Frequency | Output | Pole | Rating |
|---------|-------|---------|-----------|--------|------|--------|
| ENAP-DS | 1 | 115V | 60Hz | 3/4HP | 2P | Cont. |
| ENAM-DS | 3 | 220V | 60Hz | 3/4HP | 2P | Cont. |

3-3 CONTROL BOX

| Function Type | Needle Positioning | Thread Trimming | Thread Wiping | Presser Foot Lifting | Automatic Back Tacking |
|------------------|-----------------------|--------------------|------------------|-------------------------|---------------------------|
| ENC3E-JTG | 0 | 0 | 0 | | |
| ENC3E-JTH | 0 | С | 0 | 0 | |
| ENC3E-JTK | 0 | 0 | 0 | | 0 |
| ENC3E-JTL | 0 | 0 | 0 | 0 | 0 |

3-4 SYNCHRONIZER

| Туре | Coupling to the sewing machine | Performance | |
|---------|--------------------------------|--|--|
| ENS2-02 | Flange type | Needle down and up position signal, and tachogenerator | |

3-5 AVAILABLE MODELS

| MODEL | SEWING MACHINE | MACHINE SPEED (MAX) |
|-----------|----------------|---------------------|
| EPS1E-JTG | DDL-555-4-3 | 5000 RPM |
| EPS1E-JTH | DDL-555H-4-1 | 4000 RPM |
| EPS3E-JTG | DDL-555H-4-3 | 4000 RPM |
| EPS3E-JTH | DLD-432-4-1 | 4500 RPM |
| | DLN-415-4-1 | 5000 RPM |
| | DLU-450-4-1 | 4000 RPM |
| EPS1E-JTK | DDL-555-4-3B | 5000 RPM |
| EPS1E-JTL | DDL-555H-4-3B | 4000 RPM |
| EPS3E-JTK | DLN-415-4-1B | 5000 RPM |
| EPS3E-JTL | DLD-432-4-3B | 4500 RPM |
| | DLU-450-4-1B | 4000 RPM |

* All motors are supplied with the pulley for 5000 RPM.

If your machine speed is not 5000 RPM (refer above table), please ask the proper pulley to your supplier.

* EPS1B-JA2, EPS3B-JA2 can be applicable to any machine.

INSTALLATION

4-1 Installation of motor to sewing machine table

1) Drill three holes in the sewing machine table. (See fig. 3)



- Install the motor beneath the sewing machine table, observing the following precautions: A. Don't drop or subject it to shock.
 - B. The motor should be mounted so that the drive pulleys of the motor and the sewing machine are properly alined.
 - C. The V-belt connecting the motor to the sewing machine should be tensioned properly. It should be possible to pull a correctly tensioned belt together between two fingers within approximately 2cm (0.80 inches). Excessive tension may not only shorten the life of the bearings, but could also affect the

excessive tension may not only shorten the life of the bearings, but could also affect the operation of the sewing machine.

- Loose tension will affect the position accuracy.
- D. After installing the motor, please make sure that the output shaft can be freely turned by hand. If not, please adjust the clutch air gap, as instructed in item "7. maintenance."

4-2 Installation of synchronizer

Attach the synchronizer to the handwheel of the sewing machine. (See fig. 4)



Note: The cable extending from the synchronizer should be fixed to the retaining bolt with the band. The grounding terminal should be fixed by mean of the screw diagramed on the sewing machine.





Before making any connections to the power supply, check the nameplate rating to ensure conformance to the line voltage.

5-2 Change for the direction of rotation

If the sewing machine is operated in the reverse direction, be sure to turn off the motor and change the wiring as indicated on the connection diagram.

5-3 Wiring connections of the sewing machine solenoids.

The solenoid connectors of the sewing machine shall be connected to their corresponding connectors on the connector panel as indicated on the following drawings.



5-4 Synchronizer connection

Before starting operation, insert the synchronizer connector into the corresponding connector on the connector panel.

5-5 Connection of the lighting fixture

Two black wires are provided for 6 Volt 20 Watt lighting fixture in the end cover of the motor. Please connect properly when it will be needed.

5-6 Changing the primary taps of the transformer used in 220V control box

The transformer which is located in the control box has the four taps (190v-208v-220v-240v). At ex-factory, it is used the 220v tap.

Before starting operation, check your power supply and if necessary, change the connection to the proper terminal.



When the foot pedal of the sewing machine is pressed forward, the pitman rod moves the speed governor in the control box. The clutch coil is energized by a control system so that the sewing machine can be operated at the desired speed; depending on the position of the foot pedal.

When the sewing operation is completed and the foot pedal is released to its neutral position, the brake coil is energized through the control circuit. By means of the synchronizer, the sewing machine will stop in the needle down position immediately. By heeling the foot pedal backward, the clutch coil is reenergized. Therefore, the sewing machine will move into the needle up position at the thread trimming speed and the thread trimming operation will be performed. After the sewing machine is stopped in the needle up position, the thread wiping operation is performed once.



Note: (a) The handwheel of the sewing machine can be turned freely when the sewing machine is not operating.

(b) When the operator stops the sewing machine in the needle down position, once she turns the handwheel of the sewing machine manually, the thread trimming and thread wiping operations cannot be performed even when the foot pedal is heeled backward.

6-1 BACK TACKING

JTK and JTL type motors have an automatic back tack operation. The automatic start back tacking is performed at the beginning of the sewing operation by pressing the pedal forward. The end back tacking is performed at the completion of the sewing operation by heeling the pedal backward. Even when the pedal is released to its neutral position at the end back tack, the sewing machine is moved into the needle up position; performing the thread trimming operation after the end back tacking. The sewing machine then performs the thread wiping operation.

When the pedal is released to its neutral position at the start back tack, the sewing machine will immediately stop in the needle down position. By heeling the pedal backward during the start back tack, the sewing machine performs the thread trimming and wiping operation without the end back tacking.

1) Back tack patterns

The patterns are selected by changing the BACK TACK SW. located on the connector panel.

| | BACKT | ACK SW. | |
|--------------|----------------|----------------|---------------------------------------|
| | START | END | Pattern |
| Start | upper position | | • • • • • • • • • • • • • • • • • • • |
| back tacking | OFF position | | |
| | down position | | 0.0.0 |
| End | | upper position | |
| back tacking | | OFF position | |
| | | down position | |



table 6.1

2) Programming the stitches of back tacking

The switch to program the stitches of back tacking is located on the "L P. C. Board" in the control box. (fig. 12)



Back tacking is consisted of two portions, Part A and Part B. (fig. 13)

PART A: forward portion of back tacking

PART B: backward portion of back tacking

The stitches of part A and B can be programmed independently from 0 to 15 by changing the switch.

Note: Part A is double only.

The programming should be done by changing the switch as per the following combination table.

fig. 14

| 8 | | 2 | ZO |
|------|---|-----|-----|
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| 38 | | - | 00 |
| φŏ | | 4 | 20 |
| 9 | | SWI | тсн |

table 6.2 Combination table

| Swit | ches | | Number of stitches | | | | | | | | | | | | | | |
|------|------|-----|--------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
| А | В | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 1 | 1 | OFF | ON | OFF | ON | OFF | ON | OFF | ON | OFF | ON | OFF | ON | OFF | ON | OFF | ON |
| 2 | 2 | OFF | OFF | ON | ON | OFF | OFF | ON | ON | OFF | OFF | ON | ON | OFF | OFF | ON | ON |
| 4 | 4 | OFF | OFF | OFF | OFF | ON | ON | ON | ON | OFF | OFF | OFF | OFF | ON | ON | ON | ON |
| 8 | 8 | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF | ON | ON |

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Example:

When the start back tacking is programmed to 3 stitches forward and 4 backward, the end back tacking is 4 stitches forward and 3 backward.



6-2 FOOT LIFTING

JTH and JTL type motors have a presser foot lifter. The presser foot is lifted by heeling pedal backward to the intermediate position while the needle is down position. When the pedal is fully heeled backward, the needle is positioned at the upper position while thread trimming and wiping operations are performed before lifting the presser foot. The presser foot is kept lifted as long as the pedal is heeled backward.



6-3 SLOW START AND NUMBER OF NEEDLE POSITIONS

1) Number of needle positions

When the single positioning is required, open the control box and change the select switch "1" located on the "L P. C. Board" from "OFF" to "ON" position. (fig. 19)

2) Slow start

When the slow start is required at the beginning of the sewing, open the control box and change the select switch "3" and "4" located on the "L P. C. Board" in accordance with the following combination table. (table 6.3)



MAINTENANCE

REPAIRS AND ADJUSTMENT

1) Adjustment of clutch air gap

- A) Turn the adjustment screw counterclockwise at least two turns, until it becomes not to turn the output shaft freely.
- B) Turn the adjustment screw clockwise carefully until the rotation becomes tighter. (At this point, clutch air gap is zero and the output shaft is turned freely.)

Complete the adjustment by turning the adjustment screw 120° clockwise (8 steps of notches).

C) When the clutch air gap is adjusted, brake air gap is done accordingly.



2) Replacement of the control box

- A) Switch off the motor, remove the pitman rod from the speed control lever.
- B) Pull out all connectors and unscrew the four bolts which hold the control box to the motor.
- C) Remove the control box from the motor and replace it with the new control box.

3) Replacement of speed control lever assembly

- A) Pull out the connector connected from the speed control lever assembly to another printed circuit board.
- B) Remove the strain relief. (JTK, JTL type)
- C) Unscrew five screws which fix the speed control lever assembly to the control box, and remove it from the control box.
- D) Replace it with the new speed control lever assembly.



Important:

Removal and replacement of circuit boards must be done by qualified service personnel with care to avoid static electricity damage to "MOS" component.

4) Replacement of printed circuit board "M" (JTK, JTL type)

- A) Pull out all connectors which are connected to the printed circuit board "M."
- B) Remove the four screws which fix the printed circuit board "M."
- C) Replace it with a new printed circuit board "M."
- D) Reinsert securely all connectors.



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5) Replacement of printed circuit board "L" (JTK, JTL type)

A) Pull out all connectors which are connected to the printed circuit board "L."
B) Push the nail to free the lock of the nylon spacer, and remove the P. C. Board "L."
C) Relace it with a new printed circuit board "L" and push until the board is snapped completely.
D) Reinsert securely all connectors.



6) Replacement of printed circuit board "C" (JTG, JTH type)

Refer to the instruction of replacement for the printed circuit board "M."

7) Replacement of the synchronizer (See fig. 22)

A) Remove the connector from the control box.

B) Unscrew the three screws, and remove the synchronizer from the handwheel of the sewing machine.

C) Then replace it with a new adjusted synchronizer.

Coution:

With cover removed and power on, the rotation of the synchronizer magnet carrier plate can cause severe physical injury to hands, arms, etc. Never remove cover or adjust magnet carrier plates with power on.

Note: If necessary, readjust the needle stop position by turning the magnet carrier plates. Turn the sewing machine manually into the needle down position. (Make sure that the direction of rotation is correct!) Remove the cover from the synchronizer, loosen the screw, and turn the magnet carrier plate; which has the red magnet so that it will be located in the "1" position on the synchronizer socket. Then turn the sewing machine to the needle up position and adjust the magnet carrier plate; which has the yellow magnet so that the plate will be located in the "2" position on the synchronizer socket.

To make a fine adjustment;

- A) Pull out the solenoid connectors of the sewing machine from the control box.
- B) Operate the sewing machine.
- C) Press the foot pedal forward and release.
- D) Make sure the sewing machine is in the needle down position.
- E) Correct to the required needle position by adjusting the red magnet carrier plate.
- F) Heel the foot pedal backward. (Needle stops in the up position.)
- G) Correct to the required position by adjusting the yellow magnet carrier plate.
- H) Tighten the screw and install the synchronizer cover.
- I) Finally reinsert the solenoid connectors of the sewing machine to the control box.



8) Use of special lining application material

For longer lining life, it is important that the lining should be coated at least once a half year. Also use the material if noise is heard in the clutch and brake.

Note: Don't use any application material other than this for the PANA-STOP E. This tube contains enough for 4 applications, and the material should be used accordingly.

How to use;

- A) Motor disassembly (fig. 23)
 - a) Switch off the motor, and remove the pulley cover and V-belt.
 - b) Pull out the three-pole connector from the control box.
 - c) Remove the clutch end cover by unscrewing the three bolts.
 - d) Remove the spline cover and the spring.
 - e) Remove the clutch disc from the output shaft, and remove the nylon ring together with the brake disc.
 - Note: Be careful not to drop otherwise damage the movable plates, nor to scratch or scar the lining surfaces.

Don't permit dust to adhere to the lining surfaces of the moving discs while they are disassembled.



B) Cleaning of moving discs and motor interior

Clean away any cotton waste or other dirt adhered to the moving discs, clutch end cover, flywheel and each ventilation channel of the motor bracket. Use a soft, dry cloth to clean away any cotton waste adhered to the lining surfaces.

C) Application to lining surfaces

- a) Squeeze an amount equal to about 2 match heads from the tube and apply to the lining surfaces of either the clutch or brake in 8 places. (See fig. 24)
 - **Note:** Be careful not to apply too much, because this may cause a malfunction of stopping precision, or the motor might not operate even if power is turned on.
- b) Firmly press the uncoated lining surface against the coated surface. (See fig. 25)
- c) Rotate the moving discs against each other. (See fig. 26)
- d) Clean away any excessive material which comes out between the lining surfaces. (See fig. 27)



D) Application to clutch shaft Clean away any cotton waste adhered to the cogs of the clutch shaft, and apply the material evenly.



E) Motor assembly

Assemble the motor in the opposite order of disassembly.

F) Break-in operation

Perform a break-in operation soon after application of material to the lining surfaces. a) Switch on the motor.

b) After the motor is operating normally, perform the break-in operation by operating the pedal more than 100 times.

Note: If too much material is applied to the lining surfaces, the motor might not operate even if power is turned on. If this happens, remove excessive material from the friction disc surfaces.

9) Cleaning up the filter

When the filter is filled up with the cotton waste, the motor will be heated up. This may shorten the service life of the motor and reduce efficiency.

Cleaning up:

- A) Remove the filter by pulling the part A shown in fig. 29.
- B) Clean up the filter.
- C) Replace the filter.



10) Adjustment of the speed control lever strength

The pull strength of the speed control lever will be changed by relocating the hooked position of the spring. When the pull strength is adjusted too lighter, positioning accuracy will be impaired.



11) Adjustment of the maximum speed and back tacking speed

The potentiometers to adjust the speeds are located on the front of the control box.

a) Maximum speed (JTG, JTH, JTK and JTL) The maximum speed is adjustable by the potentiometer "MAX." from the synchronous speed to lower than 2000RPM. At ex-factory, it is adjusted the highest position. The lower speed is convenient for the training the beginner. However, the longer use of the lower speed will shorten the life of the clutch and brake linings.
b) Back tacking speed (JTK and JTL)

The start back tacking speed is linearly variable by pressing the pedal forward from 180RPM to upper limit which is adjusted 2000RPM at ex-factory. The speed of backward portion of the end back tacking is 2000RPM and the speed of forward portion of the end back tacking is 1500RPM. The upper limit of the start back tacking speed and the speed of backward portion of the end back tacking should be adjusted by the potentiometer "B.T." from 1000RPM to 2500RPM.



O HOW TO CHECK THE DRIVE UNIT

In case the trouble, proceed as follows:
 Switch off the motor.
 Pull out all connectors, then reinsert them.

TROUBLESHOOTING

| PROBABLE CAUSE | CORRECTIVE ACTION | | | |
|--|--|--|--|--|
| Power supply cord (plug, protection switch) not properly connected. | Correct connection in accordance with Instructions. | | | |
| Power supply cord (plug, cord, protection switch) defective. | Replace defective parts. | | | |
| Motor winding defective. | Replace motor or have motor repaired by manufacturer. | | | |
| Plug for synchronizer, clutch, or clutch cord defective; connection in plug for clutch and brake interrupted. | Replace defective parts or repair connections respectively. | | | |
| s, but Plug for synchronizer or clutch and Plug in. brake not inserted. | Plug in. | | | |
| Power supply cord (plug, cord) for control box defective, or plug not inserted. | Replace defective parts, or plug in. | | | |
| Fuse in control box open. | Replace fuse. | | | |
| Clutch air gap too narrow, or after a long time of use, clutch lining worn down or defective. | Adjust clutch air gap in acc- ordance with Instructions. If necessary replace clutch and brake discs. | | | |
| | PROBABLE CAUSE Power supply cord (plug, protection switch) not properly connected. Power supply cord (plug, cord, protection switch) defective. Motor winding defective. Plug for synchronizer, clutch, or clutch cord defective; connection in plug for clutch and brake interrupted. Plug for synchronizer or clutch and brake not inserted. Power supply cord (plug, cord) for control box defective, or plug not inserted. Fuse in control box open. Clutch air gap too narrow, or after a long time of use, clutch lining worn down or defective. | | | |

| PROBLEM | PROBABLE CAUSE | CORRECTIVE ACTION |
|--|--|---|
| Matan da mara | Voltage too low. | Have power supply checked. |
| speed considerably or | Machine or devices (e.g. thread trimmer) binding or seized. | Repair machine or devices. |
| stops entirely. Motor overheats. | Power rating of motor too low for particular operation. | Exchange motor for another with higher power rating. |
| | Control box defective. | Replace control box. |
| | Air channels within motor and clutch filled with lint. | Clean air channels in motor and clutch. |
| | Machine or devices (e.g. thread trimmer) binding or seized. | Repair machine or devices. |
| Motor overheats | Clutch air gap too narrow. | Adjust clutch air gap in accordance with Instructions. |
| wotor overheats. | Clutch and/or brake coil defective. | Replace defective parts. |
| | Motor winding defective. | Replace motor. |
| | Control box defective. | Replace control box. |
| | Two phase operation for three phase motor. | Check the power supply. |
| Once main switch | Machine pedal is jammed or actuates by own weight. | Replace or repair pedal. |
| machine operates without pedal | Clutch air gap too narrow. | Adjust clutch air gap in accordance with Instructions. |
| being actuated. Stop is only possible by switching off. | Control box defective. | Replace control box. |
| Machine runs at first actuation at full speed. Stop | Cord of synchronizer torn off, connection in synchronizer or plug broken. | Repair cord or connections. |
| only possible by | Synchronizer defective. | Replace synchronizer. |
| switching off. | Control box defective. | Replace control box. |
| | Hub of synchronizer in- securely fixed on machine shaft. | Fix hub in accordance with Instructions. |
| Irregular stopping | Tension of V-belt not taut enough. V-belt slips. | Correct tension in accordance with Instructions. |
| or continuation of operation after | Machine pedal is jammed or actuates by own weight. | Repair or replace pedal. |
| Stop only possible by switching off. | Positioning speed (speed of machine shaft on which synchronizer is mounted) too high. | Adjust correct positioning speed in accordance with Instructions. |
| | Synchronizer defective. | Replace synchronizer. |
| | Control box defective. | Replace control box. |
| Intermediate | Synchronizer defective. | Replace synchronizer. |
| speed ranges are missing. (Machine runs only at positioning or maximum speed.) | Control box defective. | Replace control box. |

| PROBLEM | PROBABLE CAUSE | CORRECTIVE ACTION | |
|---|--|--|--|
| | Clutch air gap too wide. | Adjust clutch air gap. | |
| | Clutch bearing defective. | Replace bearing. | |
| Mater has upusual | Clutch and/or brake lining, or friction disc worn down or defective. | Replace defective parts. | |
| noise and vibration | Hub of synchronizer insecurely fixed on machine shaft. | Fix hub in accordance with Instructions. | |
| | Control box defective. | Replace control box. | |
| | Tension of V-belt too taut or not taut enough. | Correct tension in accordance with Instructions. | |
| | Pulleys of motor and machine are not alined. | Alined. | |
| No additional | Additional device improperly connected, cord wrong or defective. | Correct connections. If necessary, replace cord. | |
| functions (e.g. trimming, wiping, foot lifting, etc.) | Additional device defective (e.g. magnet or magnetic valve is jammed or burn out, knife jams, etc.) | Repair devices. | |
| | Control box defective. | Replace control box. | |

* When ordering extra control box, printed circuit board, or speed adjuster assembly for service or repair, please refer to the following tables.

1) Control box

| TYPE | PHASE | PARTS NUMBER |
|------|-------|--------------|
| | 1 | MTS-N5905501 |
| JIG | 3 | MTS-N5905101 |
| | 1 | MTS-N5905601 |
| JIH | 3 | MTS-N5905201 |
| | 1 | MTS-N5905701 |
| JIK | 3 | MTS-N5905301 |
| 171 | 1 | MTS-N5905801 |
| JIL | 3 | MTS-N5905401 |

2) Printed circuit boards & Speed adjuster assembly

| TYPE | ''M'' P.C. Board | "L" P.C. Board | "C" P.C. Board | Speed adjuster ass'y |
|------|---------------------|-------------------|-------------------|-------------------------|
| JTG | | | MTS-N5801301 | MTS-N5905901 |
| JTH | | | MTS-N5801401 | MTS-N5906001 |
| JTK | MTS-N5801101 | MTS-N5801501 | | MTS-N5906101 |
| JTL | MTS-N5801201 | MTS-N5801501 | | MTS-N5906201 |





| Ref. | Note | Part No. | Description | Ref. | Note | Part No. | Description |
|------|------|----------------|----------------------------|-------|------|-----------------|----------------------------|
| 1 | | MTS-N2007601 | Pulley cover B | 100-1 | • 75 | MTS-N1300602 | Control box |
| 2 | | MTS-N7001213 | Washer | 101 | * 70 | MTS-N5905901 | Speed control lever ass'y |
| 3 | | MTS-N7000112 | Screw | 101-1 | * 71 | MTS-N5906001 | Speed control lever ass'y |
| 4 | | SL-4051041-SE | Screw | 101-2 | *72 | MTS-N5906101 | Speed control lever ass'y |
| 5 | | MTS-N2007701 | Pulley cover A | 101-3 | *73 | MTS-N5906201 | Speed control lever ass'y |
| 6 | | NM-6100002-SE | Nut M10 | 102 | | MTS-N7000119 | Screw |
| 7 | | MIS-N2500501 | Tube | 103 | | MTS-N2009101 | Washer Maunting plate A |
| 8 | | SL-4040841-SE | Screw | 105 | | MTS-N2009201 | Mounting plate A |
| 10 | | MTS-N1300301 | Adjustment screw | | | MTS-N2009401 | Mounting plate b |
| 11 | | MTS-N7001006 | Ball bearing 6302 | 109 | •74 | MTS-N7109944 | Potentiometer |
| 12 | | MTS-N7000606 | Key | 109-1 | *75 | MTS-N7109945 | Potentiometer with switch |
| 13 | | MTS-N2007901 | Output shaft | 110 | | MTS-N7000120 | Screw |
| 14 | | MTS-N7000607 | Key | 111 | | MTS-N2700601 | Cap |
| 15 | | MTS-N7100111 | Spring | 112 | | MTS-N7109946 | Resister |
| 16 | | MTS-N2501401 | Filter ass'y | 113 | | NM-6040002-SE | Nut |
| 17 | | MTS-N1300401 | Clutch-end cover | 114 | | WS-0410002-KR | Spring washer |
| 18 | | MIS-N7100316 | Connector ass'y | | | WP-0430801-SE | Washer |
| 19 | | MIS-N2501501 | Strain relief | | | SM-4041001-SE | Bectifier |
| 20 | | SI -4041091-SE | Screw | | | MTS-N7000121 | Screw |
| 21 | | MTS-N2006001 | Friction disc | - 110 | | MTS-N5705601 | Transformer (Pri. 220V) |
| 23 | | WT-0400001-KE | Toothed lock washer | 119-1 | | MTS-N5705701 | Transformer (Pri. 115V) |
| 24 | | MTS-N7000109 | Screw | 120 | | WP-0531001-SE | Washer |
| 25 | | MTS-N5101601 | Brake coil ass'y | 121 | | MTS-N7109926 | Capacitor |
| 26 | | MTS-N5101501 | Clutch coil ass'y | 123 | •70 | MTS-N5705801 | Connector panel ass'y (1 |
| 27 | | MTS-N7000113 | Screw | 123-1 | *71 | MTS-N5705901 | Connector panel ass'y (1 |
| 28 | | MTS-N5906501 | Moving disc ass'y | 123-2 | •72 | MTS-N5706001 | Connector panel ass'y (1 |
| 29 | | MTS-N2500601 | . Nylon ring | 123-3 | *73 | MTS-N5706101 | Connector panel ass'y (1 |
| 30 | | MTS-N7100112 | Spring | 123-4 | *70 | MTS-N5706201 | Connector panel ass'y (2 |
| | | MIS-N1002301 | Bearing housing | 123-5 | *71 | MTS-N5706301 | Connector panel ass'y (2 |
| 32 | | MTS-N2008001 | washer | 123-6 | •72 | MTS-N5706401 | Connector panel ass y (|
| - 33 | | SM-10400004-RE | Screw | 123-7 | *70 | MTS-N5706501 | Printed circuit board Mas |
| 35 | | MTS-N7000114 | Screw | 125-1 | *73 | MTS-N5801201 | Printed circuit board M as |
| 36 | | MTS-N2008101 | Collar | 126 | 15 | MTS-N7001221 | Nylon washer |
| 37 | | MTS-N1002401 | Flywheel | 127 | | MTS-N7001220 | Nylon washer |
| 38 | | MTS-N2008201 | Fan | 128 | *75 | MTS-N5801501 | Printed circuit board Las |
| 39 | | MTS-N1002501 | Motor-end cover | 129 | * 75 | MTS-N7109948 | Cover ass'y |
| 40 | | MTS-N7001001 | Ball bearing 6202 | 130 | *75 | MTS-N7109927 | Mounting spacer |
| 41 | | MTS-N7001003 | Ball bearing 6203 | 131 | *75 | MTS-N2501601 | Strain relief |
| 42 | | MTS-N7001222 | Thrust wave washer | 132 | *75 | MTS-N2501701 | Strain relief |
| 43 | | MTS-N2009501 | Retaining ring | 136 | • 75 | SM-4041001-SE | Screw |
| 44 | *20 | MTS-N7000608 | Retor and'w | | *75 | ST-4040821-SH | Printed aircuit board case |
| 45-1 | *10 | MTS-N5200001 | Rotor ass'y | | *71 | MTS-N5801401 | Printed circuit board cas |
| 45-1 | 10 | MTS-N2008301 | Collar | | *74 | MTS-N710949 | Cover ass'y |
| 47 | | MTS-N7000115 | Screw | | *74 | MTS-N2501801 | Nylon bushing |
| 48 | *20 | MTS-N5101701 | Frame ass'y | | 17 | MTS-N7109950 | Fuse holder |
| 48-1 | *10 | MTS-N5101801 | Frame ass'y | 200 | | MTS-N5906601 | Tachogenerator ass'y |
| 48-2 | •20 | MTS-N5102201 | ' Frame ass'y | 201 | | MTS-N7000111 | Mounting screw |
| 48-3 | •10 | MTS-N5102301 | Frame ass'y | 202 | | MTS-N2500801 | Spacer |
| 49 | | NM-6100002-SE | Nut M10 | 203 | | MTS-N2500901 | Spacer for magnet carrie |
| 50 | | WS-1020002-KR | Spring washer M10 | 204 | | MTS-N5901101 | Magnet carrier plate |
| 51 | | WP-1052001-SE | Washer Roll adjustice Fall | 205 | | MTS-N5901201 | Magnet carrier plate |
| 52 | | MTS. N2000601 | Betaining rise | 206 | | MIS-N2501001 | Magnet carrier plate hold |
| 53 | | MTS-N2009601 | Relt tightener binge bin | 207 | | SIVI-1051001-SE | Cover |
| 54-1 | | MTS-N2009701 | Belt tightener hinge pin | 208 | | MTS-N2000304 | Retaining bolt |
| 55 | | MTS-N2008501 | Washer | 210 | | MTS-N7000407 | Nut SM 15/64 |
| 56 | | MTS-N1002601 | Belt tightener | 211 | | MTS-N2501901 | Nylon band |
| 57 | | MTS-N7000205 | Mounting bolt | 300 | | MTS-N5101901 | Clutch-end cover ass'y |
| 58 | | MTS-N7001216 | Washer | 310 | *20 | MTS-N5102001 | Rotor and flywheel ass'y |
| 59 | | WS-0820002-KR | Spring washer M8 | 311 | *10 | MTS-N5102101 | Rotor and flywheel ass'y |
| 60 | | NM-6080002-SE | Nut M8 | 320 | | MTS-N5901301 | Synchronizer |
| 61 | *20 | MTS-N7109941 | Terminal block | 330 | | MTS-N7109935 | Fuse |
| 61-1 | •10 | MTS-N7109942 | Terminal block | 331 | | MTS-N7109951 | Special lining application |
| 62 | | MIS-N/000116 | Screw | | •70 | MTS-N5905501 | Control box ass'y (115V) |
| 64 | | MTS-N2008601 | Terminal washer | 341 | •71 | MTS-N5905601 | Control box ass'y (115V |
| 65 | *20 | MTS-N2008701 | End-cover | 342 | •72 | MTS-N5905701 | Control box ass y (115V |
| 65-1 | •10 | MTS-N2008801 | End-cover | 343 | *70 | MTS-N5905001 | Control box assly (115V |
| 66 | 10 | MTS-N2008901 | Strain relief | 345 | *71 | MTS-N5905201 | Control box ass'y (220V) |
| 67 | | MTS-N7000122 | Grounding screw | 346 | *72 | MTS-N5905301 | Control box ass'v (220V |
| 68 | | SM-8051030-SE | Set screw | 347 | •73 | MTS-N5905401 | Control box ass'y (220V) |
| 69 | | MTS-N7001223 | Washer | 350 | | MTS-N5702201 | Spring ass'y |
| 70 | •10 | MTS-N7109943 | Capacitor | 360 | •76 | MTS-N5706601 | Spring ass'y |
| 71 | •10 | MTS-N2009001 | Mounting plate | 361 | •76 | MTS-N5706701 | Spring ass'y |
| 72 | •10 | MTS-N7000118 | Screw | | | | |

Note

- *10 For single phase motor *20 For JTG type *70 For JTG type *71 For JTH type *72 For JTK type

| *73 | For JTL type | |
|-----|-----------------------|---|
| *74 | For JTG, JTH type | 2 |
| *75 | For JTK, JTL type | |
| *76 | For JTH, JTL type | |

#JTH #JTK

| #JTG | with trimmer and wiper |
|------|---|
| #JTH | with trimmer, wiper and presser foot lifter |
| #JTK | with trimmer, wiper and back tacker |
| #JTL | with trimmer, wiper, back tacker and |
| | presser foot lifter |

EXPLODED VIEW

