RAYON **RAYON INDUSTRIAL Co., Ltd.**

OPERATION MANUAL FOR AUTOMATIC PCB/FILM CLEANER:

CLEAN ROLLER: RY-500AE SERIES

CE

1 Data

1.1 The language used in this manual:

- □ English (the original)

1.2 Name of the machine

- □ Clean Roller

1.3 Model Numbers RY-500AE series

- □ RY-501AE
- □ RY-503AE
- □ RY-505AE
- □ RY-581AE
- □ RY-583AE
- □ RY-585AE

1.4 Limit of use:

- □ The machine is to be used in factory building.

1.5 Foreseen lifetime of the machine:

- □ 8 years

1.6 Name, Address, etc. of the producer

- □ Rayon Industrial Co., Ltd.
- □ 2F Yoshino Building, 1-9-24, Shimizugaoka.Fuchu-city, Tokyo, JAPAN, 183-0015
- □ Tel. +81-42-333-4111
- □ Fax +81-42-333-4112

1.7 Name, Address, etc, of the representative

- □ LACS; Longlands Advisory & Consultancy Services
- □ Teesside Tertiary College, Marton Campus, Marton Road,Middlesbrough, CLEVELAND, United Kingdom TS4 3RX
- □ Tel. 44-1642-300100
- □ Fax 44-1642-300893

2 Note to Users

A) All those who are to operate RY-500AE system must read through this operation manual and fully understand the instructions given there about safety usage of the system.

B) This manual contains instruction for the operation, maintenance and trouble shooting method with fault finding of the machine. Do not lose this manual, and keep it where operators can read it any time.

C) Specification and equipment are subject to change without any obligation to the part of the manufacturer.

D) The following servicing instructions are for use by qualified personnel only. To avoid personal injury or damage to the equipment, do not perform any servicing other than that contained in this manual.

3 Warranty

3.1 Warranty Period

Rayon Industrial Co., Ltd. proudly warrants RY-500AE to be manufactured in accordance with specifications explained in this manual (or additional specifications agreed on with the customer) and free of defects in components, workmanship, or materials for a period of full one year from the date of purchase.

3.2 Warranty Limits

The Company will exchange any defective parts during the warranty period provided such parts are returned prepaid to the manufacturer or the agency with the dated purchase receipt.

For the first 90 days the defective parts will be delivered without charge. After the 90th day, shipping and handling fee will be charged.

This warranty does not apply to any physical or electrical damage done to the product through misuse or abuse or negligence (such as any modifications made to the unit or service work done by any other than from the Company or the agency. Any unit that has had its serial number altered or removed will be ineligible for warranty.

The Company will not be liable for loss or damage due to directly or indirectly to an occurrence or use for which the product is not designed or intended. In no event shall the Company be liable for incidental or consequential damages except where state laws override.

This warranty extends to the original purchaser and is not transferable. No person, agent, distributor, dealer or company is authorized to change, modify, or amend the terms of this warranty in any manner whatsoever.

3.3 Specification amendments and revise of the manual

The design of the product is under constant review and the Company reserves the right to change specifications and equipment within the extents of the Directives at any time without prior notice. While every effort is made to keep this manual up to date, and information in the manual is subject to change without notice.

3.4 Prohibition of copying

4 Introduction

4.1 Functions of RY-500AE

RY-500AE is designed to clean the surface of the PCB (Printed Circuit Board) or of Film sheet (such as artwork pattern film), with high efficiency. This machine features motor-driven high quality sticky rubber rolls and fine dust absorbing Adhesive tape rolls for clean room use.
RY-500AE is especially designed and constructed to be conformed with the Essential health and safety requirements

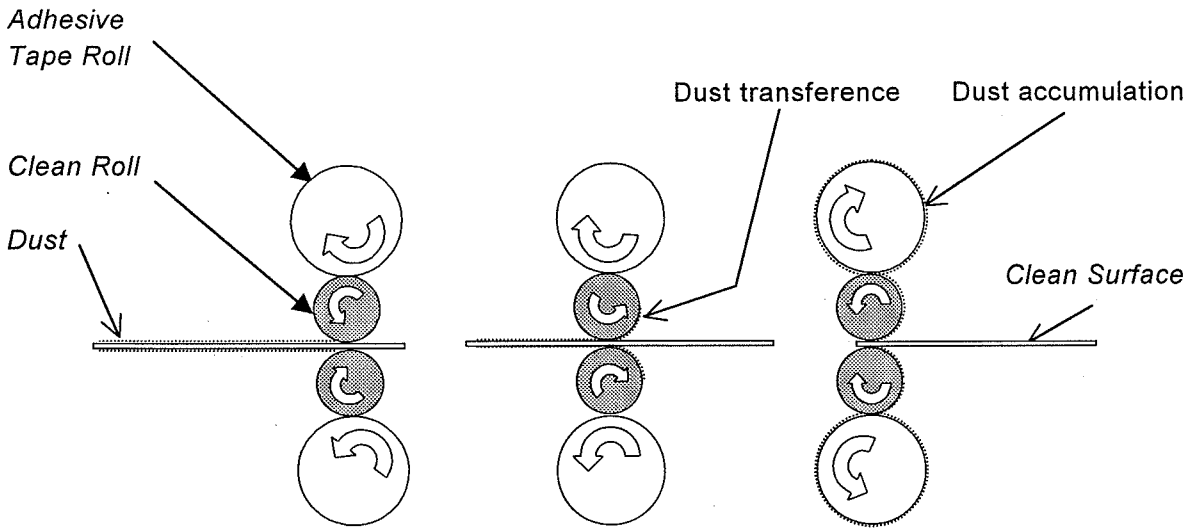
4.2 Cleaning Method of RY-500AE

RY-500AE will work as an automatic dust remover to get clean surfaces by the following mechanism

A) PCB is loaded between the upper and lower special sticky rolls called Clean Rolls by the rolling conveyer guides. Line speed is adjustable by a variable adjuster. The motor synchronously drives the upper and lower clean rolls.

B) Dust and particles on PCB is once absorbed on the surface of Clean Rolls and then transferred to the surface of Adhesive Tape Rolls. Adhesive Tape Rolls accumulate the dust and particles until it is no longer possible for the tape rolls to get any more dust and particles from Clean Rolls without renewing the surface of Adhesive Tape Rolls, i.e. cutting off the contaminated part of Adhesive Tape Roll sheet.

C) Adhesive Tape Rolls are mechanically pressed to Clean Rolls with adjustable force by a compressed air regulator. When the machine is turned off, Adhesive Tape Rolls are separated from Clean Rolls automatically.



4.3 Features

A) Adhesive Tape Rolls are easily drawn out in the front direction with sliders. Therefore, the operators can easily peel and cut off Adhesive Tape Roll sheet, or replace the used-up tape rolls for new ones.

B) Static Eliminator bars installed at the entrance and the exit reduce static electricity to help Clean Rolls remove dust and particles and prevent the cleaned panels from recollecting dust. (The bars do not have a long-lasting anti-static effect)

C) Remote control terminal units are installed at Base Unit. They can be connected to other machines to exchange signals: The machine can send signals to indicate whether it is not in operation, as well as it can be controlled by outer signals.

D) Run-state tape free mechanism

The operator can pull the drawers while the machine is in operation by pressing the 'TAPE FREE' button, since Adhesive Tape Rolls go free of the rotating Clean Rolls.

E) Pressure Reducing Device

The pressure reduction valve can independently and precisely adjust the air pressure to the upper Adhesive Tape Rolls. This will prevent excessive air pressure to the panels and reduce unnecessary friction between Clean Rolls and panels to be cleaned. It is also effective in preventing thin panels from being wrapping around Clean Rolls (or Mylar film peelings).

4.4 Options

Options explained below can be applied to help the user's productive line.

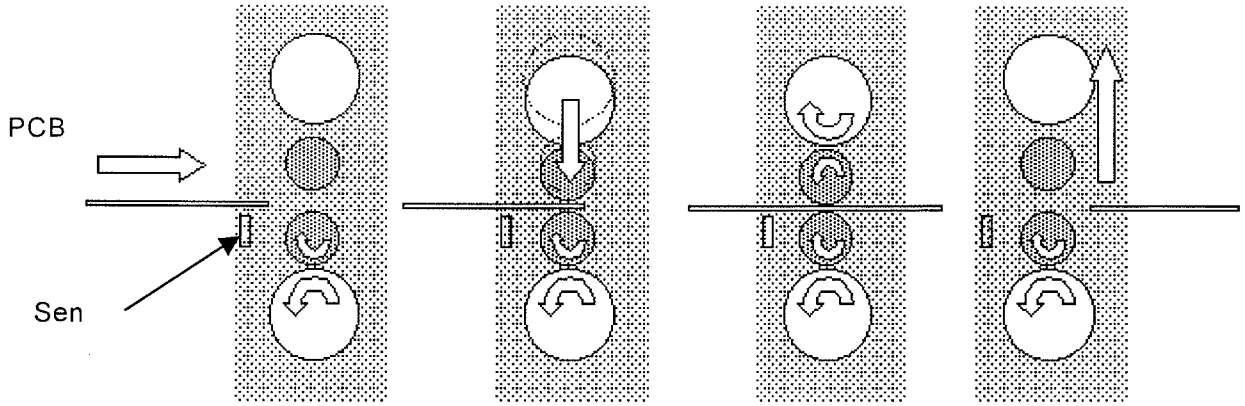
4.4.1 Signal Light Tower: illuminations and siren: Patlite; LH-110BT

4.4.2 Panel Counter: Omron; H7CL-A

4.4.3 Clean Roll Vertical motion mechanism

A programmable sequencor (Mitsubishi: Fxo-14[or20]MR-DS) controls the vertical motion of upper Clean Rolls, and the upper Clean Rolls go down when the PCB enters the machine. The upper Clean Rolls are not to touch the edge of the PCB, and this is effective in preventing Clean Rolls from peeing or damaging the over coat film on the PCB, esp., photo-sensitive dry film.
There will be a zone, which remains uncleaned between the edge of the PCB and the line where Clean Rolls actually start to clean. Still, the zone can be drastically minimized by a timer (Omron: H5CL-A) adjustable by 1/100 second.

Fig. 1 Upper Clean Roll vertical motion



①PCB enters /Sensor ON ②Roll goes DOWN ③Cleaning ④Roll goes UP

For further instructions, please see Chapter 14

4.5 Selection of Clean Rolls and Adhesive Tape Rolls

Clean Rolls and Adhesive tape rolls are selected so as to match the match the productive line.

4.5.1 Clean Rolls

A) CR-065WN-S/CR-080WN-S:
Low Adhesiveness Silicon Roll
Useful for patterning process such as dry films, etc.

B) CR-065WS-S/CR-080WS-S:
High Adhesiveness Silicon Roll
Before Laminator, Printer, etc.

C) Clean Roll Width 650mm/800mm
E.g. CR-065WN-S: 650mm, CR-080WS-S: 800mm

4.5.2 Adhesive tape rolls

A) CL-***WF Versatile Standard
For Clean Rooms

B) CL-***S Thermally Durable; over 60 C°
After Heat Roll Conveyors, etc.
(580mm width: as of April 1997)

C) Tape Roll Width 650mm/800mm
E.g. CL-065WF-35: Width 650mm
Length 35 M

5 Specifications

5.1 Function Capacity

A) Available PCB Sheet Width
RY-501, 503, 505AE, ～650 [mm]
RY-581, 583, 585AE, ～800 [mm]
B) Line Speed Ranges 0.0～9.0/～18.0/0～30.0 [m/min]
C) Height of Passing Line(Standard) 950±50 [mm]
D) Flow Direction Left to Right/Right to Left

5.2 Installed Utilities

E) Clean Rolls Width 650/800 [mm]
Adhesiveness High (CR-065/080WS-S)
Low (CR-065/080WN-S)
F) Adhesive Tape Rolls Width 650/800 [mm]
Length 15 [mm]
G) Assortments of Clean Rolls and Adhesive tape rolls

Models	RY-501AE RY-581AE		RY-503AE RY-583AE		RY-505AE RY-585AE	
Upper Ad.T. Rls.	1	○	2	○○	2	○○
Upper Clean Rls.	1	●	2	●●	2	●●
Lower Clean Rls.	1	●			2	●●
Lower Ad. T. Rls.	1	○			2	○○

H) Static electricity eliminator bars at the Entrance and the Exit
I) Run-state Tape Free mechanism
J) Pressure Reducing Device
K) Remote Control terminal units

5.3 Options

L) Clean Roll vertical motion mechanism
M) Signal Light Tower(1-3colors with/without siren)
N) Panel Counter
O) Input/Exit Conveyors

5.4 General Specifications

P) Standard Input 220/230/240 1φ [AC V]
50/60 [Hz]
Q) Power Rate 160 [VA]
R) Input air pressure 3.0 [kg/cm²]
S) Air Consumption 10(maximum) [l/min]
T) Noise Level less than 70 [dB]
U) Dimensions and Weights

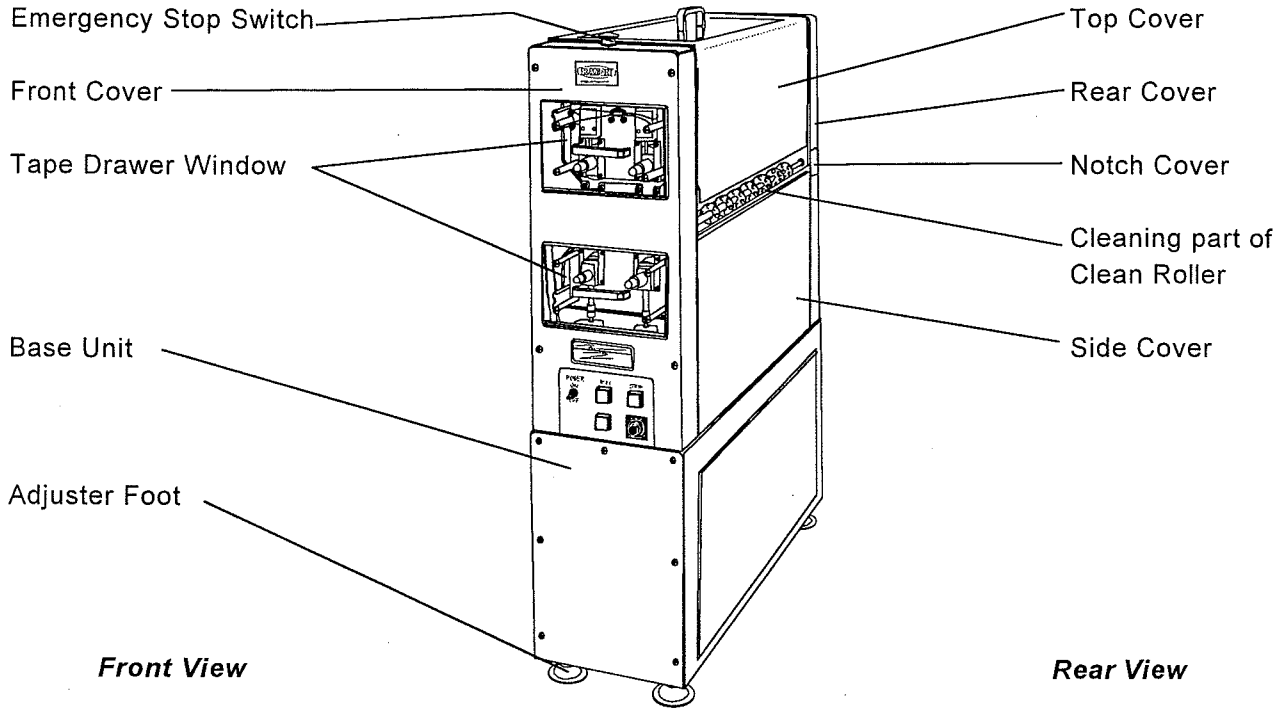
Models	RY-501AE	RY-503AE	RY-505AE
Width (Travel)	920 mm (+830 mm)	920 mm (+830 mm)	920 mm (+830 mm)
Depth	232 mm	316 mm	316 mm
Height	1125±50 mm	1125±50 mm	1125±50 mm
Weight(approx.)	69 kg	79 kg	84 kg

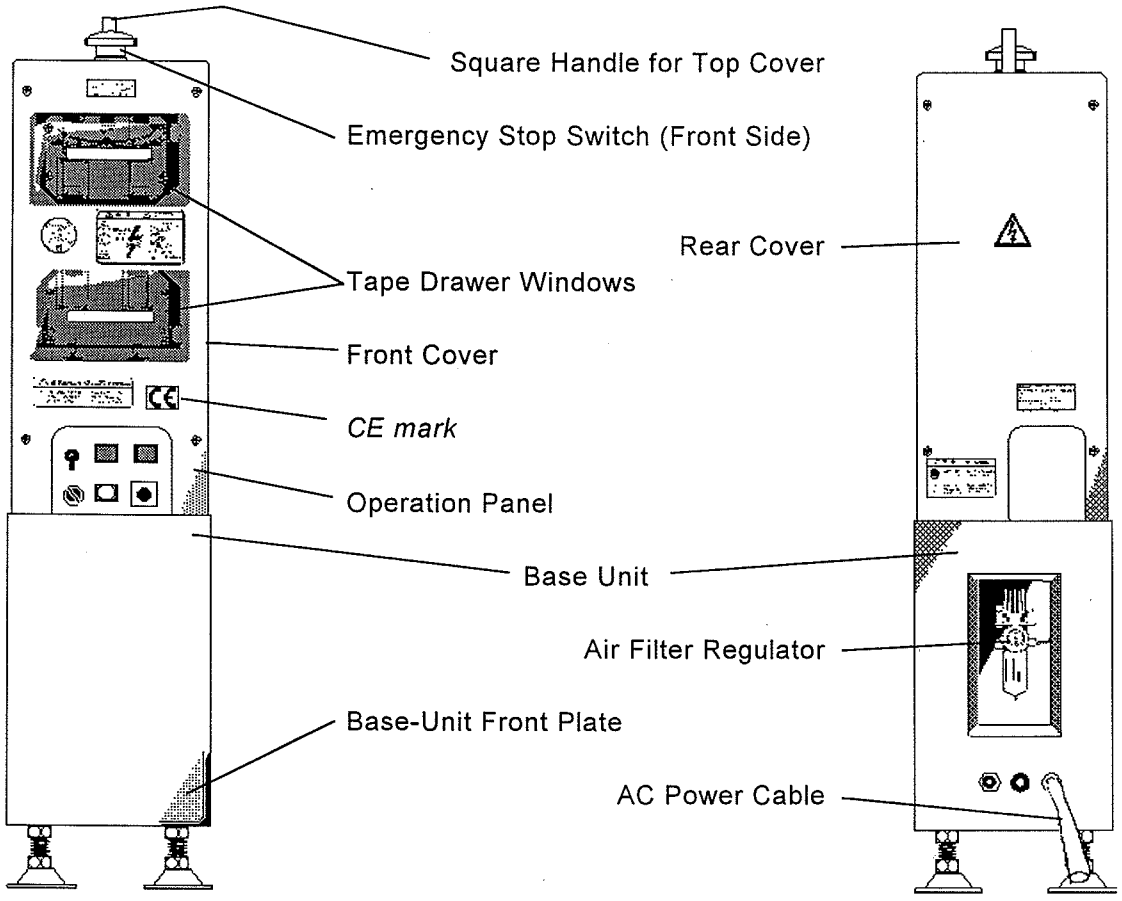
Models	RY-581AE	RY-583AE	RY-585AE
Width (Travel)	1070 mm (+830 mm)	1070 mm (+830 mm)	1070 Mm (+830 mm)
Depth	232 mm	316 mm	316 mm
Height	1125±50 mm	1125±50 mm	1125±50 mm
Weight(approx.)	-- kg	-- kg	-- kg

6 Elements and Names

6.1 General view

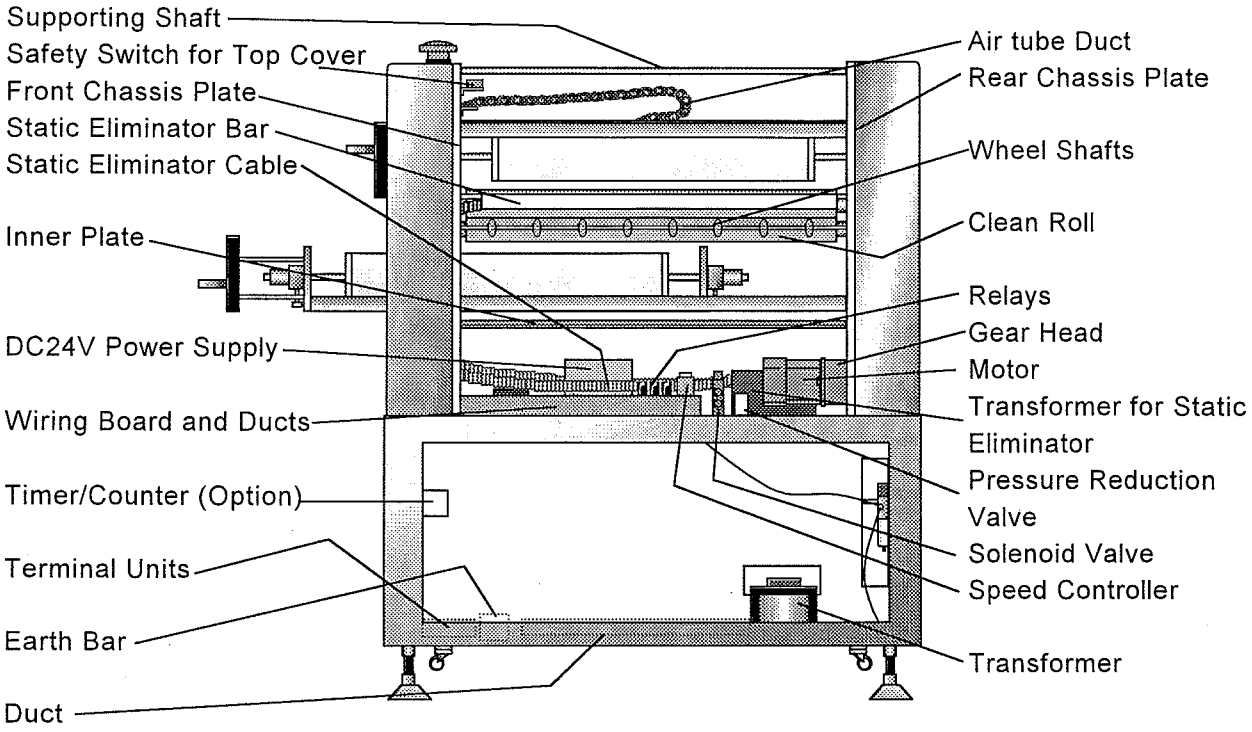
Fig. 2 General view of RY-505AE





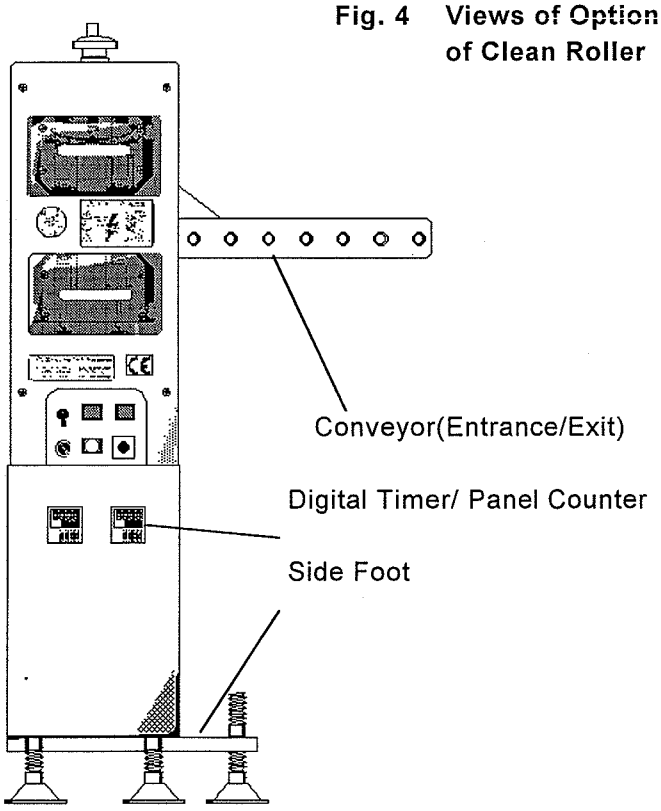
6.2 Inner View

Fig. 3 Inner View of RY-505AE



6.3 Options

Fig. 4 Views of Optional Parts of Clean Roller



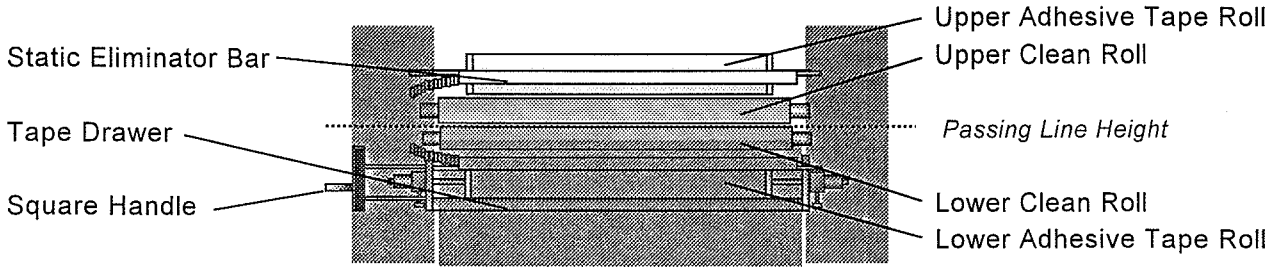
7 Functions of each part of the machine.

In this chapter, functions of each part of the machine are explained.

7.1 Cleaning Part

7.1.1 General View

Fig. 5 Elements of cleaning part of RY-505AE



7.1.2 Functions of each section

A) Clean Roll

- Clean Rolls rotate and directly touch the surface of PCBs which come in, and collects dust and particles from there.
- Adhesive tape rolls clean the surface of Clean Rolls as long as the machine is running, therefore, the PCB is touched by a cleaned surface of Clean Roll all the time.

For selections of Clean Rolls, see *4.5.1 Clean Rolls*

B) Adhesive tape roll

- Adhesive tape roll collects the dust and particles on the surface of Clean Roll.
- It is pressed to Clean Roll while the machine is running.
- When the surface of Adhesive tape roll gets dirty, it can be purged by peeling one turn and cutting off the dirty part of the tape sheet.

For purge of Adhesive tape roll sheet, see also *10.2 Tape purge operation*

C) Static Eliminator bar

- *Simco* Static Eliminator bars are installed at the entrance and exit of the machine.
- The bars supplied AC high voltage produce ionized air and eliminate the static electricity on the surface of the PCB while the machine is running.
- The bars function as static eliminator and do not have an anti-static effect.

CAUTION: ***Do not touch the bars.***
Grounding is absolutely necessary for the unit to keep effects.

D) Tape Drawer

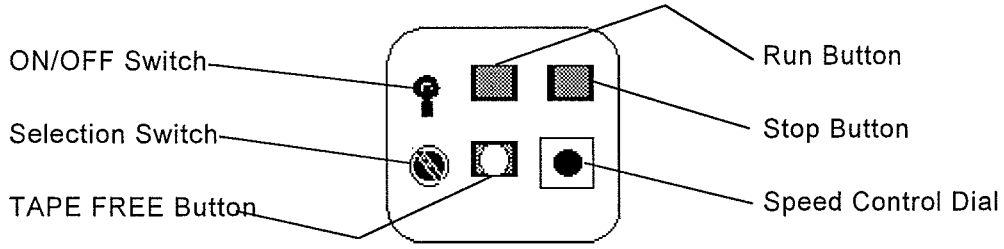
- Tape Drawer can be drawn in the front direction, and makes it easy for the operator to renew or replace Adhesive Tape Roll.
- There installed a magnetic catch and an interlock switch, and without closing Tape Drawer completely, the machine does not start. (EXCEPT in case that the TAPE FREE Button is pressed.)

7.2 Operation Panel

On Operation Panel are installed several switches and buttons to operate the machine.
The Emergency Stop Button is on the top of Front Cover.

7.2.1 General View

Fig. 6 Operation Panel



7.2.2 Definition of operation states

Before stating the functions of each element on Operation Panel, definitions are given to various states that are realized or altered by each switch and button on the panel.

A) OFF state
- The state in which the machine is not powered.
- Realized by selecting ON/OFF Switch *OFF*.
- Starting is not allowed
- No illumination of push-button is lit.

B) ON state
- The state in which the machine is powered.
- Realized by selecting ON/OFF Switch *ON*
- Either Run Button or Stop Button is illuminated respective colour.
- The machine is either in the Stop state or the Run state.

C) Stop state
- The state in which the machine is powered, but allowed to start to run, i.e. not running
- It follows the OFF state after selecting ON/OFF Switch *ON*.
- From the Run state, it is realized by pressing Stop Button.

D) Run state
- The state in which the machine is running.
- Realized from the Stop state by pressing Run Button

- If the drawer is opened, the machine cannot be brought into this state so long as it is in the Normal state. (not TAPE FREE state.)
- In the run state, the static eliminator unit is working.

E) Normal state

- The state in which the TAPE FREE mechanism is not activating.

F) TAPE FREE state

- The state in which the TAPE FREE mechanism is activating.
- Realized by pressing the TAPE FREE Button.
- When the machine is in ON state and TAPE FREE Button is actuated, the TAPE FREE Button is lit yellow.
- When the machine is in TAPE FREE state, the air pressure to press Adhesive Tape Rolls to Clean Rolls is released, and at the same time, the interlocking circuit for Tape Drawers becomes inactive. As a result, the operator can pull Tape Drawers to the front even the machine is in the run state.

G) Emergency Stop state

- The sort of the Stop state in which the Emergency Stop function is actuated.
- No illumination of push-button is lit
- Realized by pressing the Emergency Stop Button, and releasing is only possible by twisting the same button.
- It will not allow the machine to start until it is released.

7.2.3 Functions of each element

Functions of each element on Operation Panel are explained below.

A) ON/OFF switch

- An alternate switch
- By selecting ON/OFF Switch OFF, the machine is brought into OFF state.
- By selecting ON/OFF Switch ON, the machine is brought into ON state.
- Selecting ON/OFF Switch ON only does not bring the machine into the Run state, in other words, it does not start the machine itself.

B) Stop Button

- A momentary switch.
- By pressing Stop Button, the machine is brought into the Stop state.
- Pressing Stop Button does not bring the machine into the Stop state from the Run state when the outer circuit controls the machine.

C) Run Button

- A momentary switch.
- By pressing Run Button, the machine is brought into the Run state from the Stop state.
- Pressing Run Button does not bring the machine into the Run state form the Emergency Stop state.

- Pressing Run Button does not bring the machine into the Run state form the Stop state when either or both of Tape Drawer is left open.

D) TAPE FREE Button

- An alternate switch
- By pressing the TAPE FREE Button, the machine is brought into the TAPE FREE state. And it will never be brought back into the Normal state again until the TAPE FREE Button is pressed again and released.
- When the TAPE FREE Button is actuated the button is illuminated yellow, if the machine is in the ON state.

E) Speed Control Dial

- By turning Speed Control Dial, the speed of rotation of Clean Rolls (i.e. the line speed) can be adjusted.
- The scales behind Speed Control Dial are not necessarily in proportion to the actual increase/decrease of the speed of rotation of Clean Roll.

F) Selection Switch

- When the machine is equipped with such options as Clean Roll vertical motion mechanism, this switch can select whether the function is active or inactive.

7.3 Emergency Stop Switch

7.3.1 General View

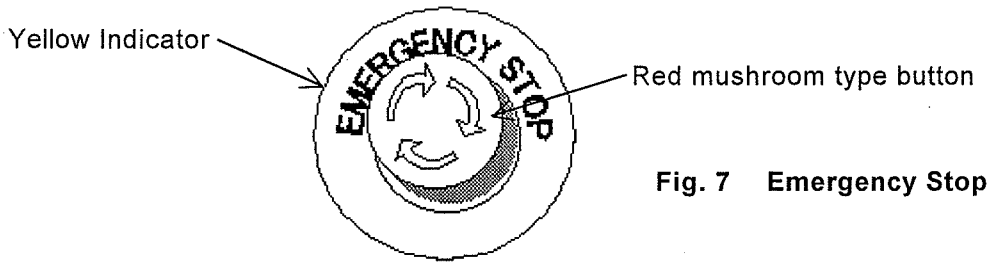


Fig. 7 Emergency Stop Switch

For the position of the Emergency Stop Switch, see also *6.1 General view*

7.3.2 Function

- Pressing the Emergency Stop switch brings the machine into the Emergency Stop state. (See.*7.2.2G) Emergency Stop state*)
- Once the Emergency Stop Switch button is pressed, the button will remain in the actuated position until the latch is released by a clock-wise turning of the same button.

7.4 Level adjuster feet and casters

7.4.1 General View

For general view of level adjuster feet and casters, see *6.1 General view*

7.4.2 Function

- Casters will facilitate short distance travel of the machine.
- Level adjuster feet enable the adjustment of passing line height of the machine.

For the method of adjustments, see *8.1 Installation procedures*

7.5 Functions of Remote Control terminal Units

7.5.1 Introduction

At the bottom of Base Unit in the front side, remote control terminal units are installed, which are to be connected to other machines to exchange signals.

- OK/NG signals are output from RY-500AE
- P1 and P8 are input terminals for remote control

Functions available with these units are:

- INPUT: Start and stop the machine.
- OUTPUT: Send normally closed signal while the machine is running.
  Send normally open signal while the machine is running.

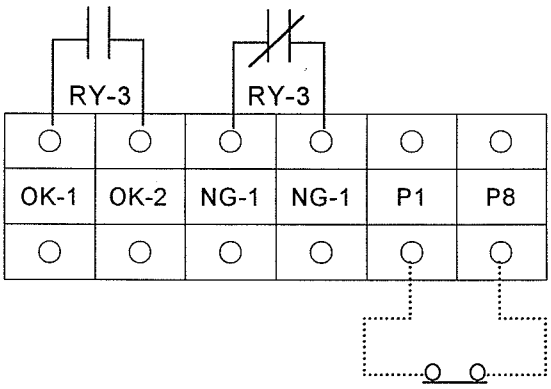
Use these signals to control the peripheral machines synchronously.

7.5.2 Connection

Connect the cable for remote control to the terminals below through the control line inlet.

Run state: RY-3 is ON

Fig. 8 Remote Control Conneciton



CLOSE: Run State
OPEN: Stop State

This circuit is for the standard model. When options are applied to the machine, please check the diagram in the circuit diagram.

7.5.3 Function

A) Terminals P1/P6(Remote Control INPUT terminals)

- Closing P1 and P6 brings the machine into the Run state.
- Opening P1 and P6 brings the machine into the Stop state.

Caution: When the circuit between the terminals P1 and P6 is closed, the pressing Stop Button cannot bring the machine into the Stop state, but the machine continues running.

B) Terminals OK-1/OK-2 (OUTPUT signal)

The circuit between the terminals OK-1 and OK-2 is normally Open.
When the machine runs, it is closed.

C) Terminals NG-1/NG-2 (OUTPUT signal)

The circuit between the terminals NG-1 and NG-2 is normally Closed.
When the machine runs, it is open.

7.6 Pressure Reducing Device

7.6.1 General View

Fig. 9 Solenoid Valve and Pressure Reduction Valve

(For standard model)

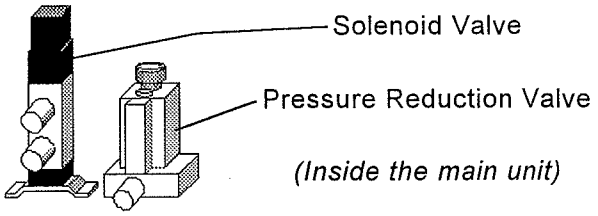
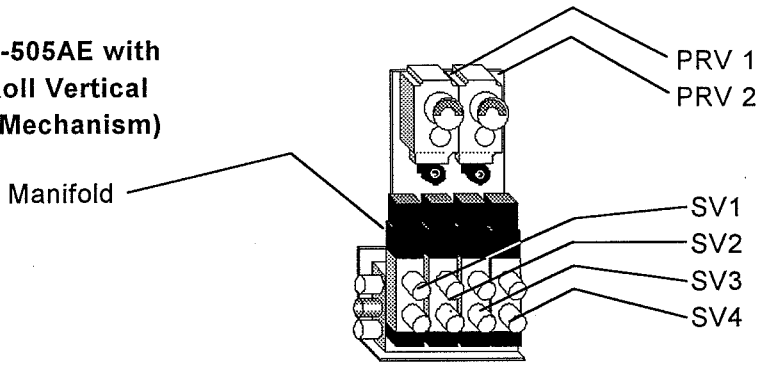


Fig. 10 (For RY-505AE with Clean Roll Vertical Motion Mechanism)



* PRV1: Pressure reduction for the first row
* PRV2: Pressure reduction for the second row

* SV1: For the cylinders for vertical motion at the first row
* SV2: For the cylinders for vertical motion at the second row
* SV3: For the cylinders for Adhesive Tape Roll pressing at the first row
* SV4: For the cylinders for Adhesive Tape Roll pressing at the second row

See also 14 Clean Roll Vertical motion mechanism

7.6.2 Function Model

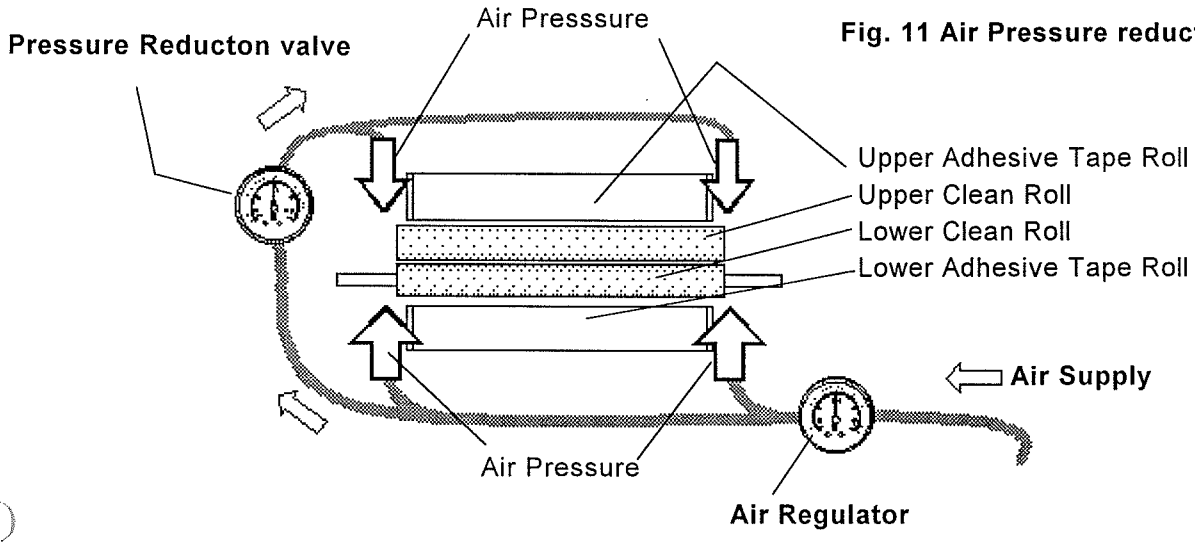


Fig. 11 Air Pressure reduction (model)

7.6.3 Function

- When compressed air is supplied to the upper Adhesive tape Rolls, this device controls the pressure to them. This will prevent excessive air pressure to the panels and reduce unnecessary friction between Clean Rolls and panels. It is also effective in preventing thin panels from wrapping around Clean Rolls (or Mylar film peelings).

8 Installation

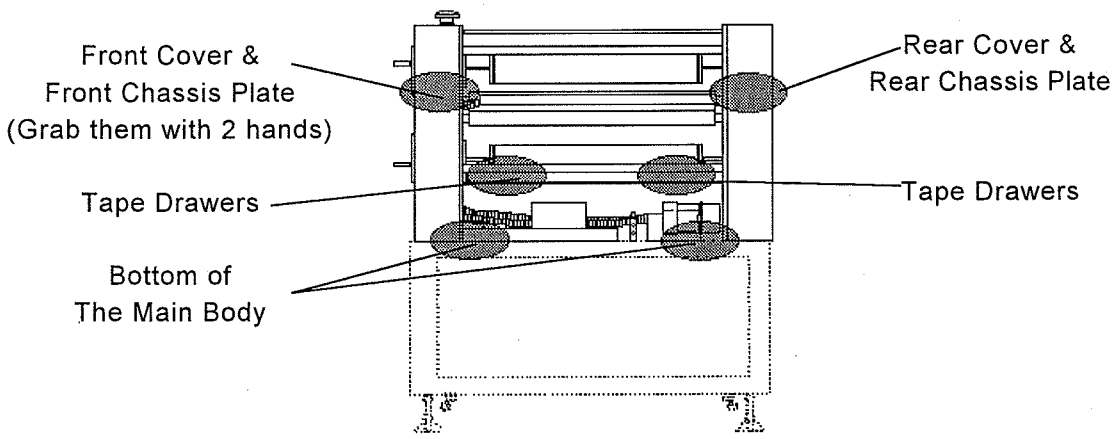
8.1 Installation procedures

① Carry the equipment RY-500AE on to the best position in the productive line.

§ *How to Carry the machine*

- When the floor is flat, utilize the casters at the bottom of Base Unit.
- Otherwise, utilize an appropriate carrier.
- When the machine must be carried by hand, carry the main body and Base Unit separately. Before lifting the main body off Base Unit, *be sure to disconnect the connector for power cable, wires, and air tube* inside Base Unit. Acceptable grip points are the followings.

Fig. 12 Gripping Points of the Main Body (With Top and Side Covers Removed)



- **No other part is good for gripping.**
- **Especially, do not grip the Static Eliminator bars**
- **For Base Unit, utilize the casters.**
- **For the weight of the machine, see *5.4 General Specifications***

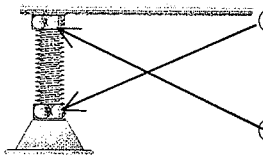
② Adjust the level adjusters so that RY-500AE cleaning height should match the passing line in the factory. Pay much attention to this adjustment since difference in passing line height may cause unnecessary friction between the PCB and Clean Rolls.

§ *Recommended Procedures*

a) Bridge between the highest point of the lower Clean Roll and the prior/posterior passing line with leveling gauge,

b) Turn the lower nuts of level adjuster until the machine comes to be in the horizontal position

c) Tighten the upper nuts for the level adjuster.



①Turn the lower nuts to adjust the height
CW: Higher
CCW: Lower
②Tighten the upper nuts to fix the height.

Fig. 12 Adjustment of the passing line height

③ Attach the Emergency Stop Button in the following order

□ Note :

The Emergency Stop Button has been removed from the bracket and been put inside Front Cover when shipped. This is for preventing the button from being damaged during transportation.

a) Remove Upper & Lower Tape Drawer Windows
b) Remove Front Cover.
c) Attach the Emergency Stop Button at the bracket in the following way.
d) Place the covers back.

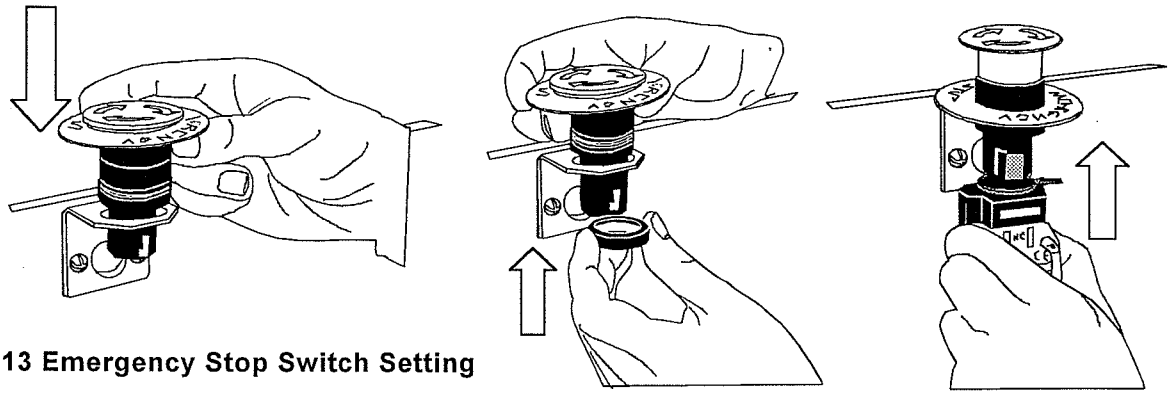


Fig. 13 Emergency Stop Switch Setting

④ Connect the AC power cable to the power source terminal.

⑤ Supply compressed air by putting 6mm-diameter plastic air tube into the air input on the rear side of Base Unit. Check Adhesive Tape Rolls are set at the non-pressing position.

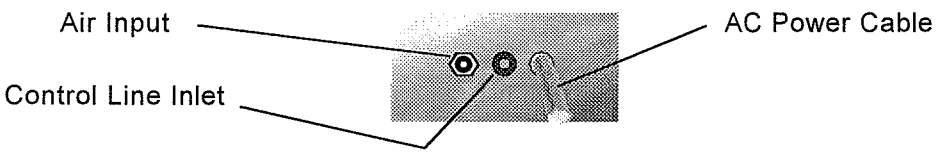


Fig. 14 Utility Inlets: *see also 6.1 Rear View*

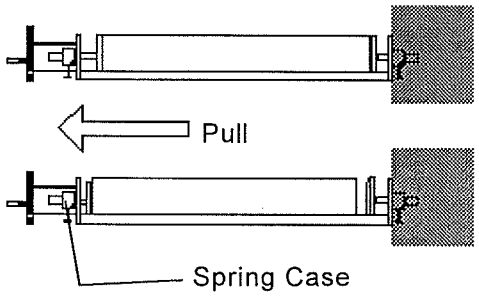
⑥ Set the air pressure to get 2.5~3.5kgf/cm² pressure by adjusting Air pressure Regulator.

⑦ When the machine is to be automatically operated, connect the remote control line through control line inlet to the terminal units located at the front of Base Unit.

- □ For the connections of the remote control line, see *7.5.2*
- □ For the position of the terminal units, see *6.2*

9 Procedures before operating

① Check ON/OFF Switch on Operation Panel is turned off.
② Remove Top cover.
③ Pull the Drawers and take out Adhesive Tape Rolls.



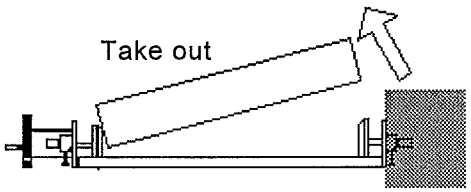


Fig. 15 Removal of Adhesive tape rolls

Caution: **Do not try to open the *upper* Tape Drawer without air supplied to the machine.**
Without the compressed air being supplied to the machine, the upper cylinders extend down (the upper Adhesive tape roll stays down). Therefore, when you try to pull the upper Tape Drawer, open Top Cover, and lift Adhesive Tape Roll by hand, and then pull the drawer; otherwise, it will hurt the cylinders.

④ Remove the protective cover papers of Adhesive tape rolls and Clean Rolls.
⑤ Fix Adhesive Tape Rolls in the machine in the direction indicated in the warning label.

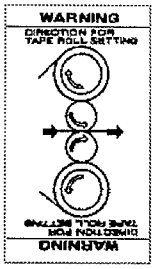


Fig. 16 Warning label

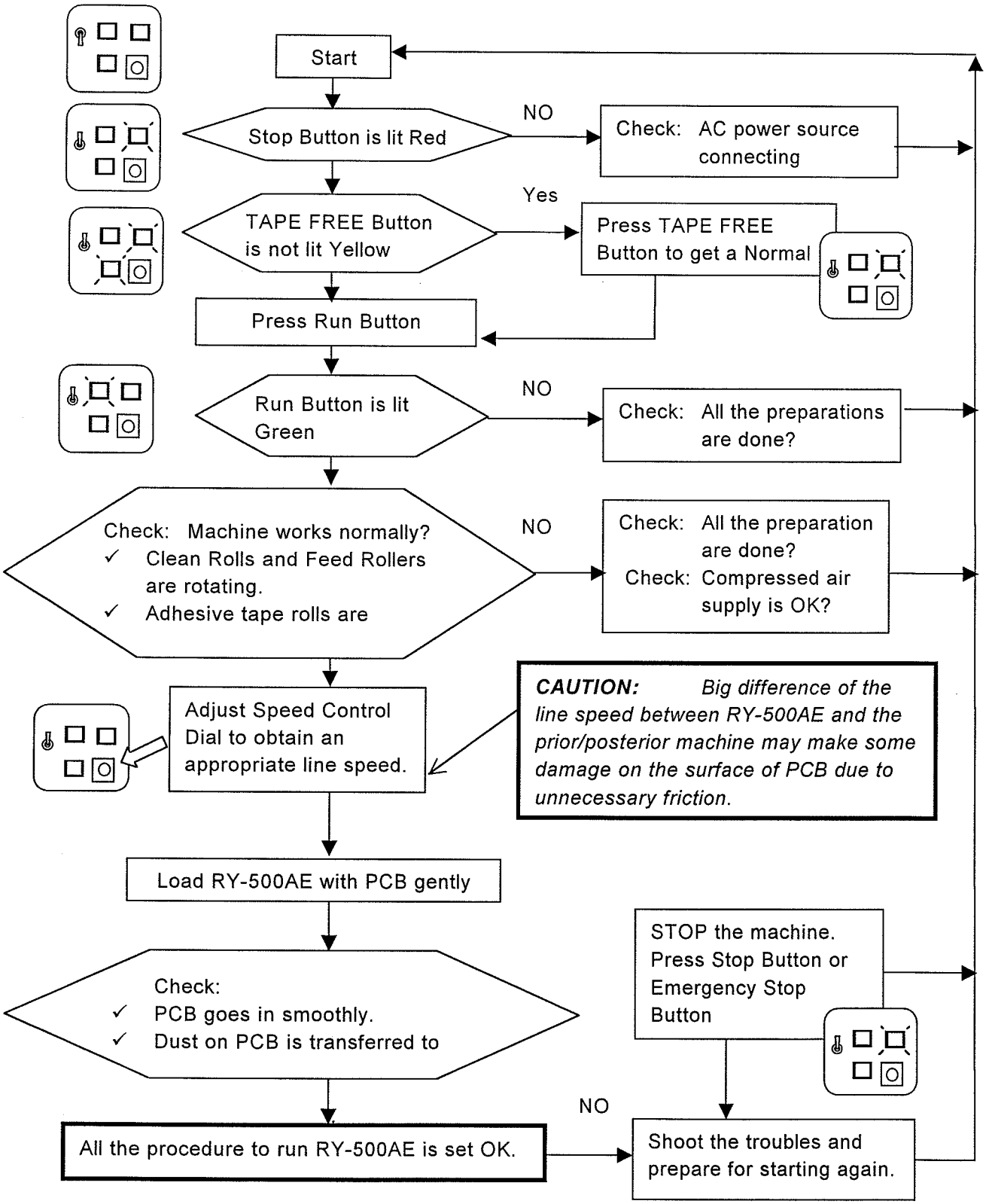
Caution: Opposite setting of Adhesive Tape Rolls makes adhesive tape sheet go around Clean Roll to result in a waste of tape sheet.

⑥ Push and close the Drawer to the end where magnet chuck is fixed.
⑦ Put Top Cover back.
⑧ Check the Emergency Switch is released (not in the actuated position). If pressed, twist the button to release the switch
⑨ Turn on ON/OFF Switch.
⑩ If the Stop switch is illuminated red, RY-500AE is ready for operation.

10 Operating Procedures

10.1 Standard operation

Operation procedures are described in the following flow chart.



10.2 Tape purge operation

10.2.1 Tape purge operation in normal state

When Adhesive Tape Rolls absorbs much dust and particles, and adhesiveness of the tape sheet is no longer strong enough to clean Clean Rolls, it is time to purge Adhesive Tape Roll sheet by peeling and cutting off the contaminated part of the sheet. The procedure is as follows.

① Be sure that the machine is turned off.
② Pull Tape Drawer to the front.
③ Strip the edge of the surface of the tape roll.
④ Peel and pull the tape edge slowly, by turning the Tape Roll.
⑤ Cut the contaminated part of Adhesive Tape Roll sheet with a cutter knife to get the new surface.
⑥ Replace Tape Drawer into the machine gently.

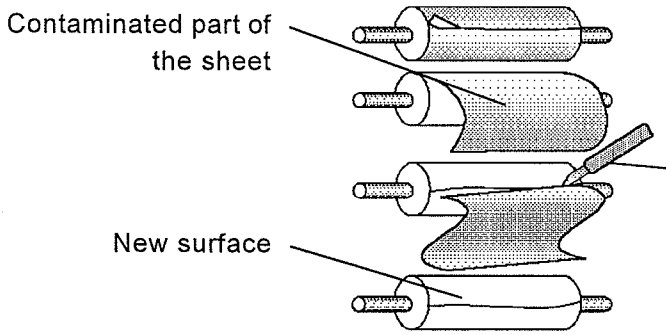


Fig. 17 Purge of Adhesive tape roll sheet

10.2.2 Tape purge operation in the Run state

A) Procedure

When the operator wants to purge Adhesive Tape Rolls while the machine is in operation, utilize the run-state tape free mechanism. The procedure is as follows:

① Press the TAPE FREE Button on Operation Panel to get the tape free state.
② Draw Tape Drawer to the front.
③ Purge Adhesive Tape Roll in the way indicated in the last section.
④ Replace Tape Drawer into the machine gently.
⑤ Press the TAPE FREE again to get the normal state.(OVER)

B) Caution

- ***Do not replace a used-up Adhesive tape roll for a new one while running by pressing the TAPE FREE Button.***
- **Be careful in using knife so as not hurt your fingers or hands.**
- **All the operators must read and fully understand the risk analysis sheet for the run-state tape free mechanism, which is attached to this manual.**

11 Cautions on Handling

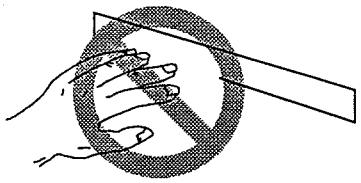
In order to keep RY-500AE series in good condition for a long time, it is important to handle and operate the machine in the following manners.

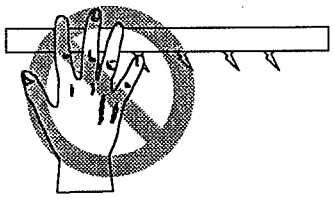
11.1 Cautions with general specification

- Please supply AC input power in general spec. ±10%. Over power voltage may cause overheating the driving motor.
- Set the compressed air pressure in adequate range 2.5~3.5kg.f/cm² with air pressure regulator. Over-pressure may cause shortening Clean Roll's life (sticky rubber roll) by pressing Adhesive Tape Rolls to Clean Rolls too strongly.

11.2 Cautions on Operating

- **Never draw Tape Drawers while Clean Rolls are rotating**. This manner may hurt the sliding mechanism of drawers and the power transmission mechanism of the machine. *(except in the TAPE FREE State)*
- Do not put your hands and may other tools close the entrance of the machine during the Run state. You may get your hands hurt and may be facing a danger of the electric shock. In case that you have any trouble during operation, immediately press the Emergency Stop Button to stop the machine.
- Do not touch the static eliminator bars.





- Be sensitive to cleanness on the surface of both Clean Rolls and Adhesive tape rolls. Do not run the machine with extremely dirty rolls.

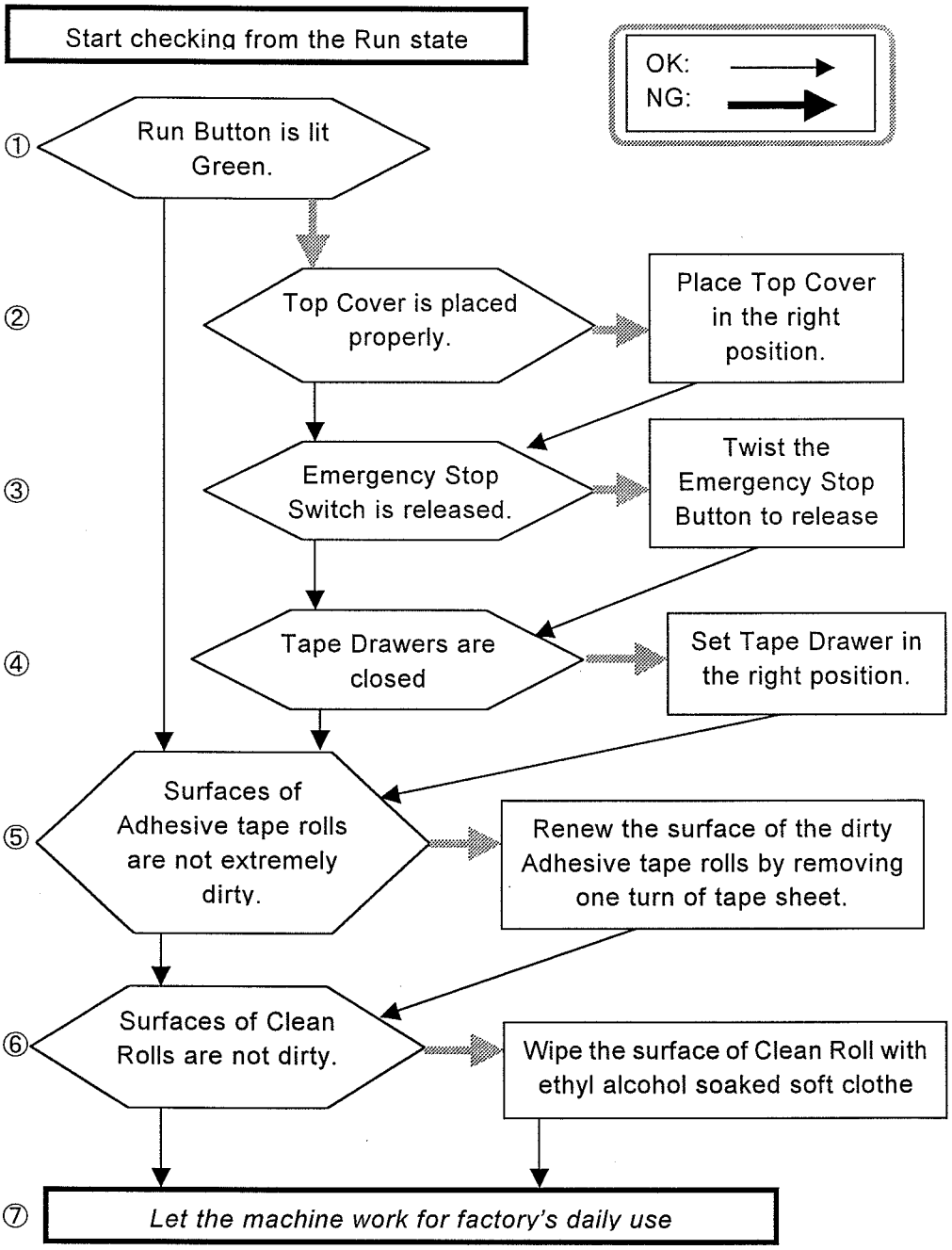
11.3 Others

- Never fail to connect earth grounding. Poor grounding may make static eliminator not work well and also cause hazard of electrical shock.
- Handle Top Cover carefully and so as not to get it hurt, crushed, or dropped to the floor.
- Drawing and resetting Tape Drawer must be proceeded gently without any unnecessary big force, especially in case of the latter. Slide the drawer slowly and fix it at the end firmly so as not to hurt the limit switch installed in the rear end.
- Do not weight Tape Drawers while they are drawn out. It may hurt the sliders for Tape Drawer.
- Do not clean Clean Rolls with liquid solvents.

12 Maintenance

12.1 General Check

□ There are several points to check for a better performance of the machine.



12.2 How to check the saftety components performance

An Emergency Stop Switch and Limit Switches are installed as electrical safety components. They must be checked occasionally, and here below are the procedures for checking them.

See also *12.3.1 Periodical routine.*

12.2.1 Emergency Stop Switch

A) Checking Procedure

① Turn ON/OFF Switch ON
② Press Run Button to start the machine
③ Press the Emergency Stop Switch to stop the machine
If the machine stops, there is no problem.
④ Press Run Button
If the machine does not restart, there is no problem.
⑤ Release the Emergency Stop Switch (OVER).

B) In case of trouble

If a problem is found with Emergency Stop switches, trouble shoot there promptly.

12.2.2 Interlock Switches for Tape Drawers.

A) Checking Procedure

① Turn ON/OFF Switch ON (Stop Button is lit red)
② Make sure the TAPE FREE Button is not actuated (The button must not be lit yellow). If the button has been actuated, release it by pressing it once.
③ Pull one of Tape Drawers to the front.
④ Press Run Button to see the machine will not start.
If the machine will not start, there is no problem.
⑤ Close Tape Drawer completely
⑥ Pull the other Tape Drawer to the front.
⑦ Press Run Button to see the machine will not start.
If the machine will not start, there is no problem.
⑧ Close Tape Drawer completely
⑨ Press Run Button to see the machine will start normally
⑩ Stop the machine by pressing Stop Button (OVER).

B) In case of trouble

If a problem is found with limit switches for Tape Drawers, trouble shoot there promptly.

C) Caution: Do not try to open Tape Drawer while the machine is running.

12.2.3 Interlock Switches for Top Cover (& the options of openable side covers and Slding Base Unit)

Check if they work by opening the covers while the machine is running and see if it actually stops. After it stops, press Run Button to see that the machine will not restart until the cover is properly replaced again.

12.3 Periodical maintenance

12.3.1 Periodical routine.

The machine is almost of maintenance free, still, do check the following points periodically.

Period	
1. Daily	□ Check the cleanness of Adhesive Tape Rolls.

2. Weekly	□ Press the Emergency Stop Switch and see if it works
	□ Check and see if the interlock switches for Tape Drawers work.
	□ Clean the ionizing points of static eliminator bars with soft brush.
	□ Clean Clean Rolls

3. Monthly	□ Check and see if the machine has any problem listed in 13.2.1 Fault Finding Table

- For the intervals of purges of Adhesive tape rolls, find the most appropriate period in each line.

12.4 Method of cleaning the machine.

12.4.1 Main body

- □ Use an ethyl alcohol soaked soft cloth to wipe the body of the machine.
- □ Never use any kind of solvent, paint thinner, and so on. That may cause damages to the machine body to the fed PCB. Also, chances are the leftover solvent may transfers to the fed PCB.

12.4.2 Clean Rolls

- □ Wipe the surface of Clean Rolls with soft cloth soaked in ethyl alcohol(ethanol)
- □ Never use other materials, e.g. strong cleaner containing acid, alkali-cleaner, organic-solvent, etc., such as Benzine, Gasoline, etc.
- □ Method of Cleaning
  - ① Open Top Cover
  - ② Draw the upper Tape Drawer
  - ③ Take out the upper Clean Roll and clean it. (See also *12.6*)
  - ④ Clean the lower Clean Roll.
  - ⑤ Replace the upper Clean Roll.
  - ⑥ Replace the upper Tape Drawer.
  - ⑦ Replace Top Cover. Be sure it is fixed with bolts (OVER).

12.4.3 Static Eliminator bars

- □ Clean the Static Eliminator bars periodically in order to prevent the ionizing points on the bar from collecting hardened balls of lint, grease, and other foreign matter that reduce their sharpness and decrease efficiency.
- □ Method of Cleaning

① Turn ON/OFF Switch off.
② Clean the ionizing points with soft brush. Compressed air is also effective in order to keep the inside of the bar clean.(OVER)

□ **Never use water to clean the bars.**

12.5 Adjustments

12.5.1 Passing line height

For the adjustment of the passing line height, utilize the adjustment feet.
See also *8.1 Installation procedures.*

12.5.2 Line speed

Line speed can be adjusted by Speed Control Dial.
See also *7.2.3E) Speed Control Dial.*

Notes: Depending on the models of Gear Head installed to the machine, there are three ranges in line speed of the machine: 0～9.0m/min., 0～17.0m/min., and 0～30.0m/min. Maximum speed available slightly differs depending on the size of the machine (number or length of Clean Rolls).

12.5.3 Pressing mechanism of Adhesive tape rolls

Air Cylinders push the both ends of Adhesive Tape Rolls, which are then pressed to Clean Rolls.
Both ends of each Adhesive tape roll must be pressed to Clean Rolls at the same time in order to get a good effect of cleaning.

□ Method of adjustment

By adjusting the speed controller knobs on the air cylinders, pressing speed can be balanced. Open the Front and Rear Covers and turn the knobs.

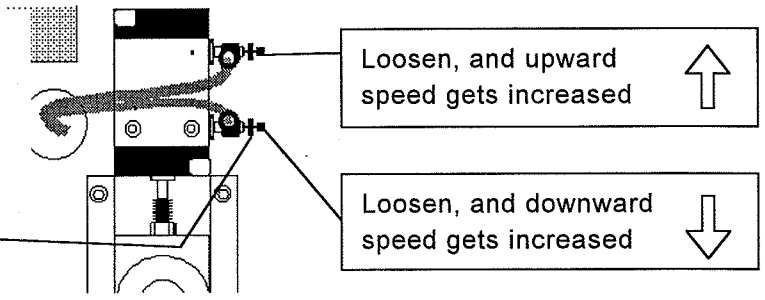


Fig. 18 Upper Air Cylinder Adjustment

□ Lower Air Cylinder needs the inverse pattern adjustment.
□ Get the good balance for both cylinders and fasten the Lock Nuts.

12.6 Exchange of consumptive parts

12.6.1 Exchange of Adhesive tape rolls

When Adhesive Tape Roll sheet is used up, replace Adhesive Tape Rolls for new ones in the following procedures.

① Turn ON/OFF Switch OFF.
② Pull Tape Drawer to the front until it stops.
③ Remove the used-up Adhesive tape rolls in the way indicated in *9③*.
④ Fix new Adhesive tape rolls without protective cover paper in Tape Drawer in the way indicated in *9⑤*.
- □ ***Pay great attention to the tape direction***

⑤ Press Tape Drawer back into the machine.(OVER)

Caution: Do not replace Adhesive Tape Rolls without switching off.
Do not replace Adhesive Tape Rolls in the TAPE FREE state.
(See also 10.2.2B)

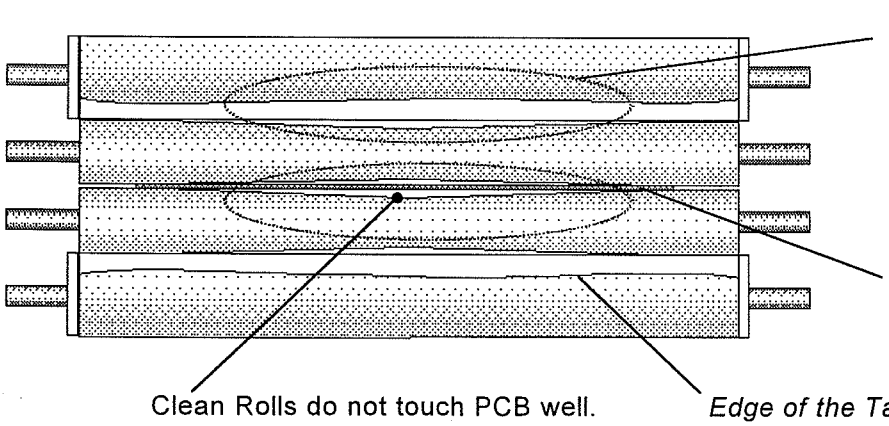
12.6.2 Exchange of Clean Rolls (For standard version)

A) Time to exchange Clean Rolls

It is time to replace Clean Rolls for new ones when

- □ The surface of Clean Roll is worn away and no longer touches the surface of PCB completely.
- □ The surface of Clean Roll gets damaged, hurt, slashed.

Fig. 19 Worn out Clean Rolls



- □ This part of Adhesive Tape Roll sheet does not collect particles well when Clean rolls are worn away.

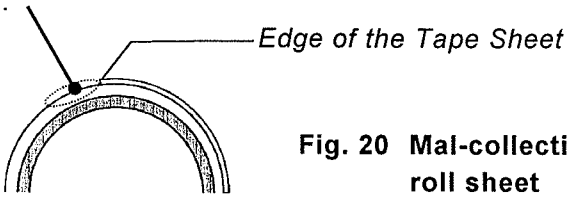


Fig. 20 Mal-collection of dust on Adhesive tape roll sheet

B) Structures of the upper and lower Clean Rolls

① Clean Roll Parts

The upper and lower Clean Rolls are used with the following parts.

a) Roll Sliders, bearings, and C-rings(for the upper and Lower)

b) Spur gears, Pulleys, and Key Blocks(for the lower Clean Rolls)

② Note

a) Roll Sliders for the *upper* Clean Rolls are *resinous*, while those for the *lower* are *metal*.(Dimensions are exactly the same)

b) There is no difference between the upper and lower Cleans themselves.

c) When the machine is equipped with *upper Clean Roll vertical motion mechanism*, a pair of bearings and their stopper are added to each upper Clean Roll. (See the appendix for options)

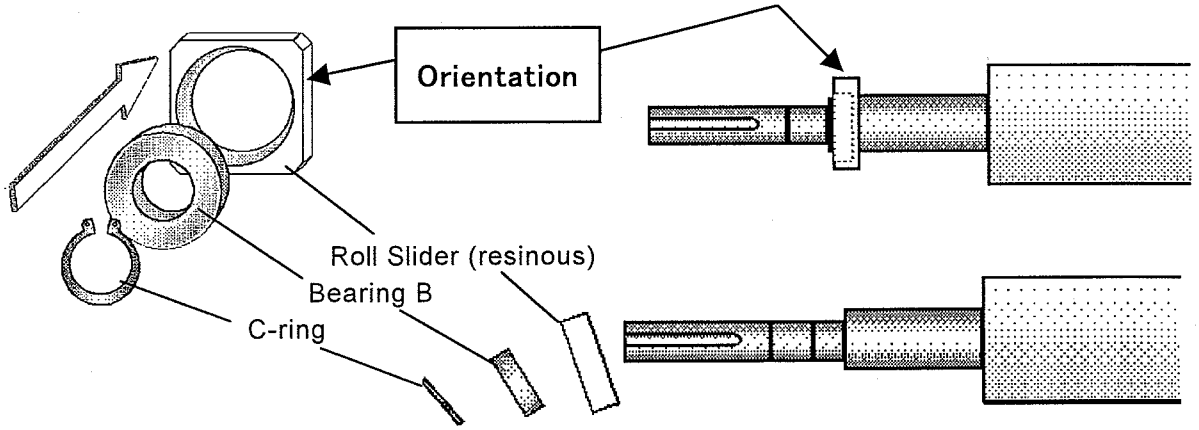
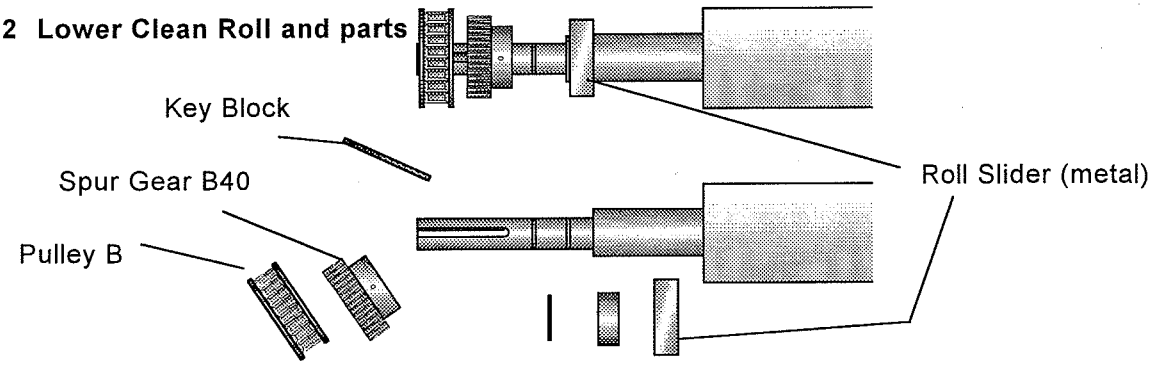


Fig. 21 Upper Clean Roll and parts

Fig. 22 Lower Clean Roll and parts



- The upper Roll Sliders are of resin for the sake of preventing particles from arising by frictions between Chassis and Roll Sliders.
- The lower Roll Sliders are of metal for the sake of grounding.

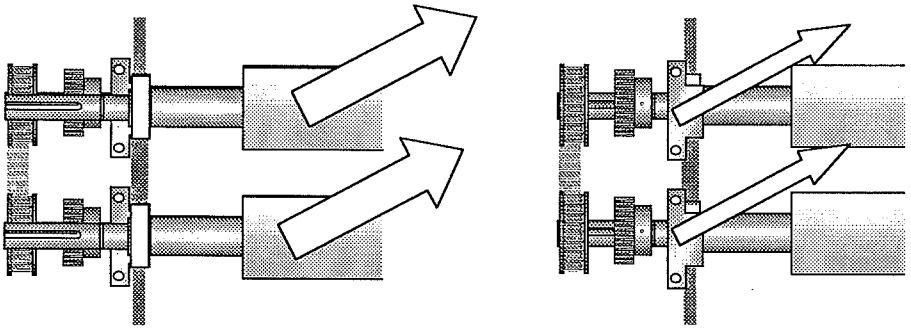
C) Procedures of Exchange of Clean Rolls

Exchange Clean Rolls in the following procedures.

① Be sure that ON/OFF Switch is turned off.
② Remove both of Drawer Windows.
③ Remove Top Cover, Front Cover, and Rear Cover.
④ Pull Tape Drawer and remove the upper Clean Rolls.
⑤ Take the Upper Clean Roll parts (Roll Sliders, Bearings, C rings) out of the both ends of Clean Roll's Core.
⑥ Fix the parts on the new Clean Roll's core.

Fig. 23

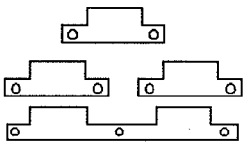
Exchange of Clean Rolls (1)



⑦ Remove the Holding Plate for the Lower Clean Rolls

Fig. 24 Holding Plate for the Lower Clean Rolls

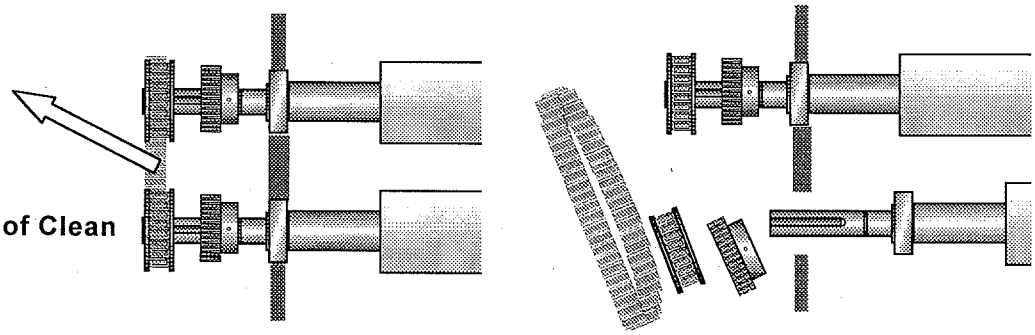
- □ For RY-501AE
- □ For RY-503AE, & RY-505AE
- □ For RY-506E



⑧ Loosen the Set Screws on the Motor Holder, and remove the timing belt from the Pulleys.
⑨ Remove the Lower Clean Rolls from the machine.
⑩ Take the Pulley and Gears out of the rear end of Lower Clean Roll's core.

Fig. 25

Exchange of Clean Rolls (2)



⑪ Take the Lower Clean Roll parts (Roll Sliders, Bearings, C-rings, and Key Blocks) out of both ends of Clean Roll's cores.

⑫ Fix the Roll Sliders, Bearings, and C-rings on the new Clean Roll's core.

⑬ Attach the parts which have been removed in the following order:

a) The new Lower Clean Rolls with Roll Sliders, etc.

b) Key Blocks, Spur Gears, Pulleys
(Get an appropriate position for a good mechanical transmission)

c) Timing belt
(Tighten the set screws for Motor holder.)

d) Holding Plates for the Lower Clean Rolls.

e) The new Upper Clean Rolls with Roll Sliders, etc.

⑭ Replace Tape Drawer in the machine.

⑮ Replace Top Cover(for overriding the safety switch).

⑯ Turn ON/OFF Switch ON, and then procedure to make the machine run, and see if all the mechanical transmissions work well.

Caution: Do not touch the moving parts.

⑰ If the transmission does not work well, adjust the malfunctioning part.

⑱ If it works well, turn ON/OFF Switch OFF, and fix the Front Cover, Rear Cover, and Drawer Windows. (OVER)

13 Trouble Shooting

13.1 Introduction

Most of the machine trouble is related to two mechanical transmissions:

A) Clean Roll Drive(rotation) Transmission
From motor to lower Clean Rolls through the timing belt, pulleys and gears.

B) Adhesive tape roll pressing mechanism
From air cylinders to Adhesive tape roll holders

In this section, troubles that may happen to each part are explained.

13.2 General View of Rear mechanical construction.

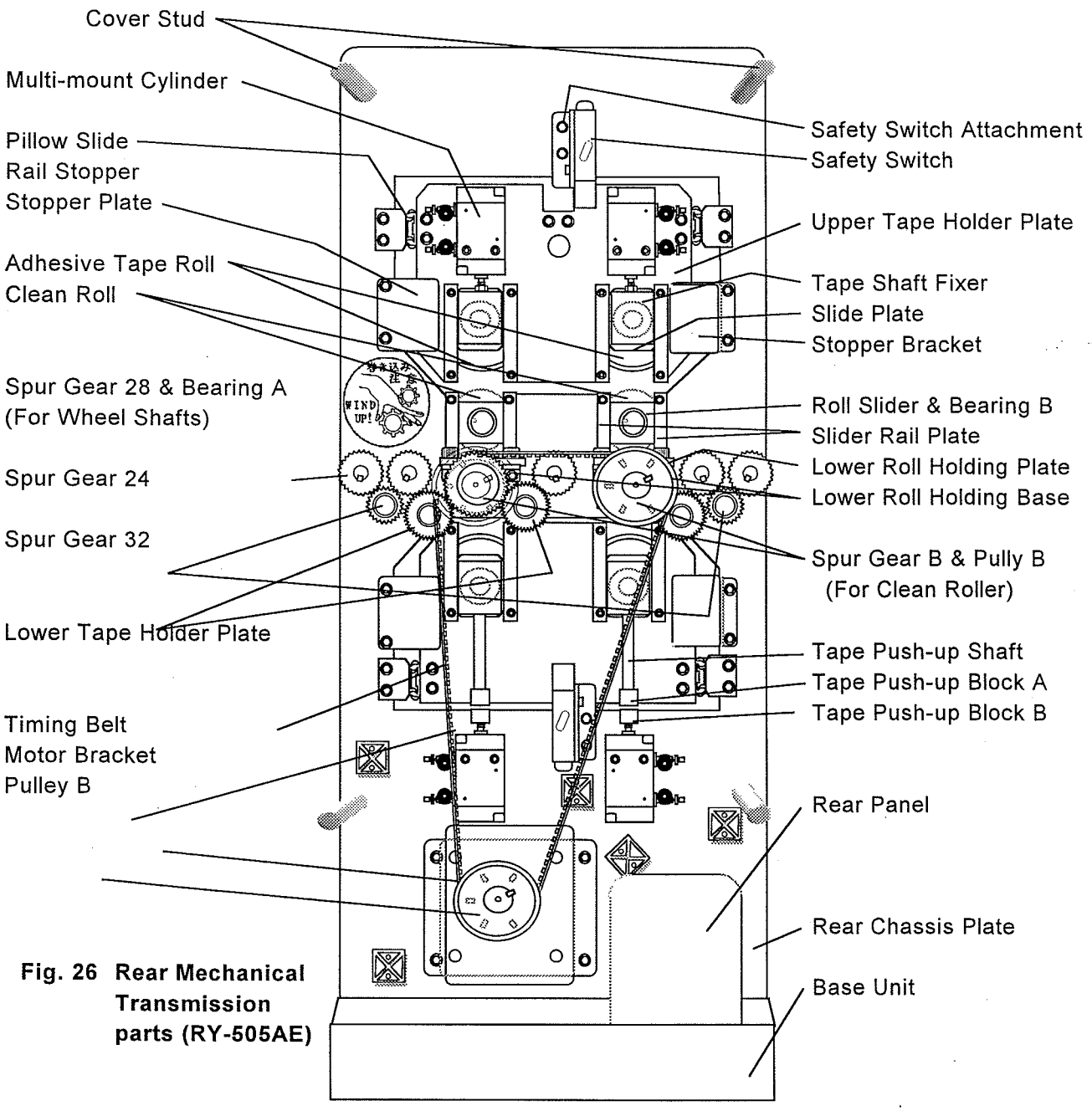


Fig. 26 Rear Mechanical Transmission parts (RY-505AE)

13.2.1 Fault Finding Table

□ Here below is the fault-finding table which operator can take into account in order to use the machine in maximum effect.

Checking Problem	Probable Cause	Solution
✓ Adhesive tape rolls are dirty.	Adhesive tape roll sheet gets too much dust and particles.	Purge the dirty sheet of Adhesive tape rolls by one turn.(See *10.2*) When dusts and particles are no longer transferred from Adhesive tape rolls from Clean Rolls, Adhesive tape rolls are Saturated
✓ No rotation of Clean Rolls and Adhesive tape rolls.	The M/C is not powered	Refer to *10.1*
	The M/C is in the OFF/ Stop state.	Refer to *12.1*
✓ No rotation of Adhesive tape rolls	Air pressure to Adhesive Tape Rolls is not adequate.	Check the air pressure gauge and supply proper air pressure.(see *8.1⑥*)
	The M/C is in the TAPE FREE state	Press the TAPE FREE Button and bring the machine into the Normal state.
	The solenoid valve is broken(RARE)	Replace it.
✓ Abnormal rotations of Clean Rolls or of feed roller. Strange sound Motor's over heat Difference of driving speed for each roll.	Trouble of mechanical transmission parts □ Belts and Pulleys are loosen □ Gears are loosen □ Shafts are bent. □ Damages	□ Fix the parts by fastening bolts and screws. □ If you find parts strongly damaged, exchange them. □ For motors over heat, check also the input voltage and that the speed controller is properly installed.
✓ PCB gets hurt after cleaning.	Clean Rolls has strongly attached material.	Remove it with pincettes, and wipe Clean Roll with alcohol.
✓ Static Electricity is not eliminated well.	Ionizing points of the static eliminator bars collect built-up deposits.	Turn off the machine, and clean the Static Eliminator bras with soft brush to get rid of them See also *12.4.3*
	The lifetime of the unit is over.	Replace it.
✓ Cleaning effect gets worse after a long period of use.	Clean Roll has been worn away and the rubber does not touch the surface of PCB well.	Replace it for a new one. For the method of replacement, see *12.6*
✓ The machine sways back and forth when PCB pass through it	Speeds difference between Clean Roller and prior/posterior machine.	Adjust the speed of the machine precisely by the speed adjustment dial.
✓ No vertical motion of Clean Rolls	Failure of Electrical parts Either timer, solenoid valve, or sensor. Failure of Air cylinders	Check those parts

13.2.2 Parts that may be broken, bent or worn away

Those parts below should be replaced for new ones in the event of break down. In order to order spare parts, see

A) Wheel Shaft

Wheel shafts might be bent, and may cause a bad effect on transmissions.

B) Idler Pin

It might be bent and cause bad effects on transmissions.

C) Roll Slider (resinous)

It might be cracked after repeated installations and replacement of Clean Rolls.

D) Bearings

It might be broken.

E) Timing Belt

It might be worn away (very rare)

F) Motor and gear head

It might be broken down.

G) Air cylinders

Shaft might be broken.

H) Solenoid Valves

It might be broken down. (rare)

13.2.3 Parts that need tightening or adjusting the screws and nuts on them.

A) Pulleys(For motor, and Lower Clean Rolls)

A loosened pulley causes unstable power transmission and rotation. Tighten the grub screws on them.

B) Spur Gears(for Lower Clean Rolls, idler pins, and Wheel Shafts)

Loosened spur gears will also cause unstable power transmission and rotation. The Spur gear for Feed Rollers, if loosened, makes itself slipping.

Tighten the grub screws on them.

C) Motor holder plate

The position of motor holder plate should be adjusted to improve the tension of timing belt.

D) Lower Clean Roll Holding plate

It should be fixed tightly with screws.

14 Clean Roll Vertical motion mechanism

14.1 Introduction: mylar peeling prevention mechanism

A programmable sequencor controls the vertical motion of upper Clean Rolls, and the upper Clean Rolls go down when the PCB enters the machine. The upper Clean Rolls are not to touch the edge of the PCB, and this is effective in preventing Clean Rolls from peeing or damaging the over coat film on the PCB, esp., photo-sensitive dry film. There will be a zone, which remains uncleaned between the edge of the PCB and the line where Clean Rolls actually start to clean. Still, the zone can be drastically minimized by a timer (Omron: H5CL-A) adjustable by 1/100 second.

14.2 Mechanical system

A) Introduction

Air cylinders installed at both ends of Clean Rolls realize the vertical motion of upper Clean Rolls.

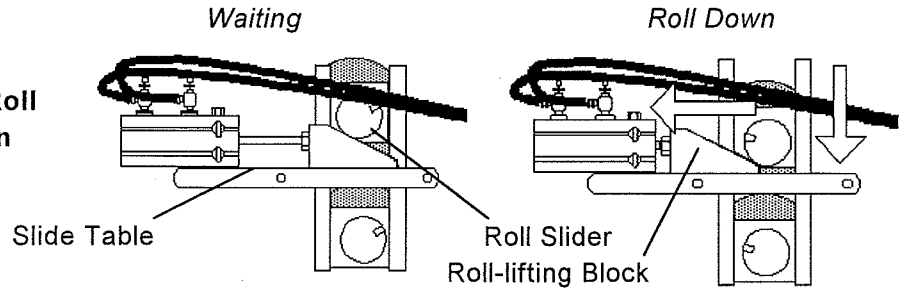


Fig. 27 Upper Clean Roll vertical motion

B) Adjustment

The timing of descending of upper Clean Rolls can be adjusted by digital timers on Base Unit. Before adjusting these timings, be sure to adjust the line speed of Clean Roller.

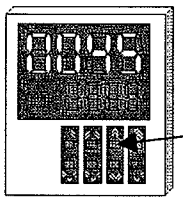


Fig. 28 Digital Timer to set the decending time

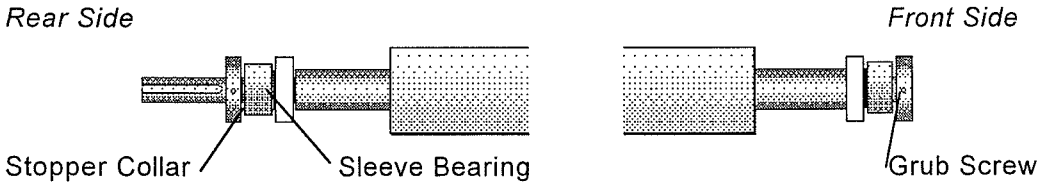
Clean Roll Down:
Set the duration of time after which Clean Roll goes down.

14.3 Exchange of Clean Rolls

A) Structures of the upper and lower Clean Rolls

Bearings and stoppers are fixed at both ends of upper Clean Rolls when vertical motion mechanism is applied to the machine. See the drawings below for their view. There is no chage applied to the lower Clean rolls.

Fig. 29 Upper Clean Rolls with Collar Stoppers & Sleeve Bearings

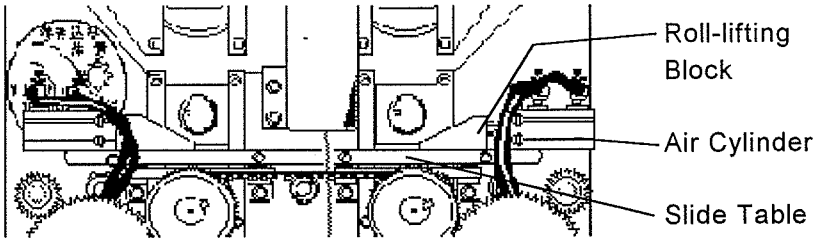


B) Procedures of Exchange of Clean Rolls

Exchange Clean Rolls in the following procedures.

① Be sure that ON/OFF Switch is turned off.
② Remove Top Cover, Front Cover, and Rear Cover.

Fig. 30 Rear Construction with Roll-up system (RY-505AE)



③ Pull Tape Drawer and remove the upper Adhesive tape rolls.

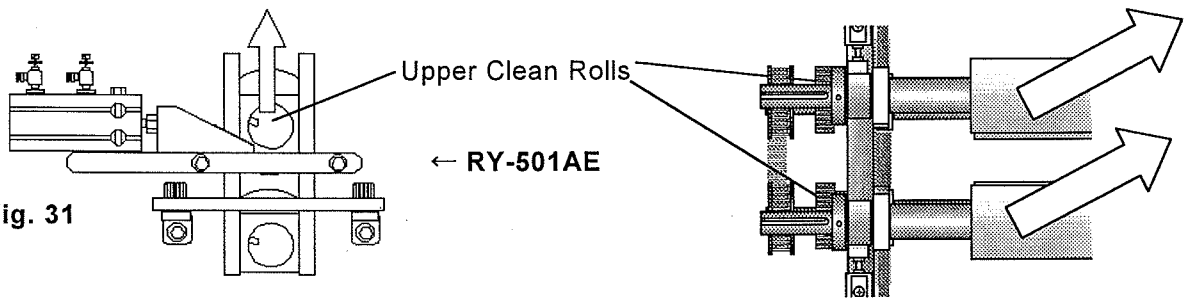


Fig. 31

④ Take the Upper Clean Roll parts (Roll Sliders, Bearings, C rings, Stopper Collars, Sleeve Bearings) out of the both ends of Clean Roll's Core.

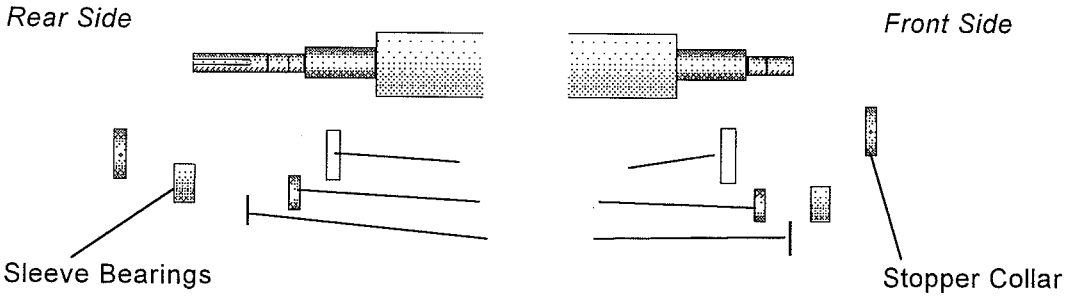
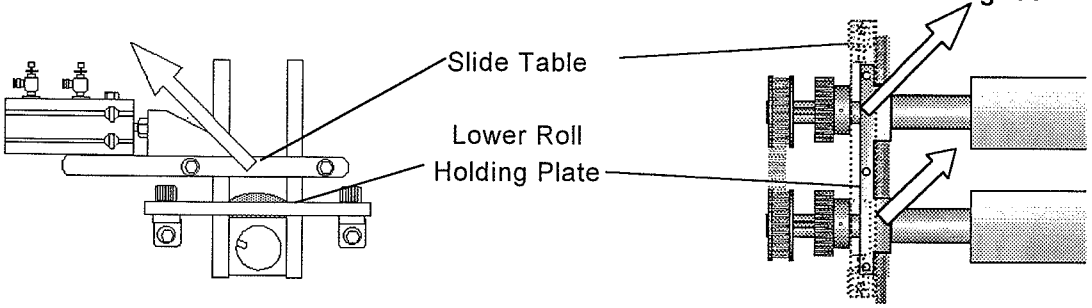


Fig. 32 Upper Clean Rolls with Collar Stoppers & Sleeve Bearings (Taken apart)

⑤ Fix the parts on the new Clean Roll's core.

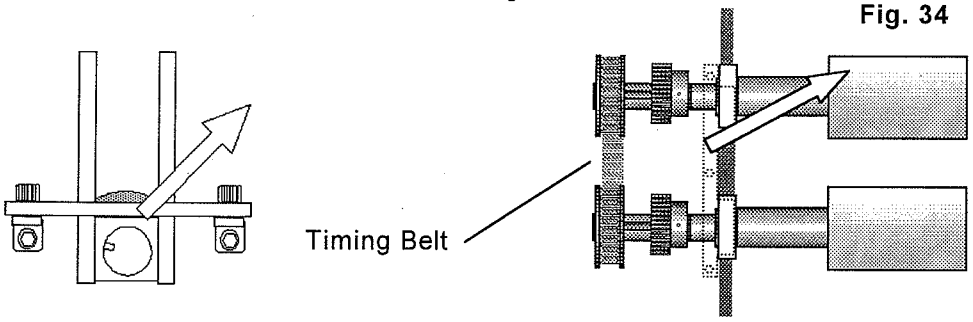
⑥ Remove the Slide Table with Air Cylinder.

Fig. 33



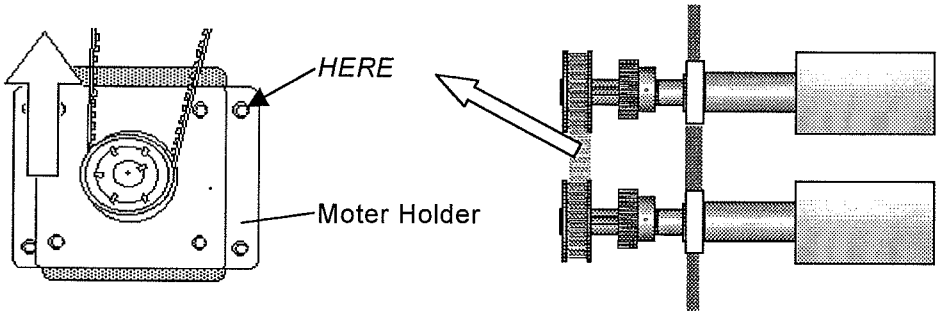
⑦ Remove the Lower Roll Holding Plates.

Fig. 34



⑧ Loosen the Set Screws on the Motor Holder, and remove the timing belt from the Pulleys.

Fig. 35



⑨ Remove the Lower Clean Rolls from the machine.

⑩ Take the Pulley and Gears out of the rear end of Lower Clean Roll's core.

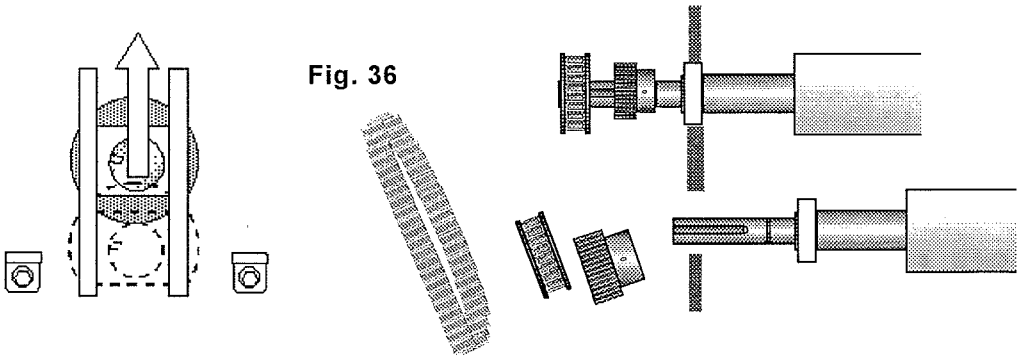
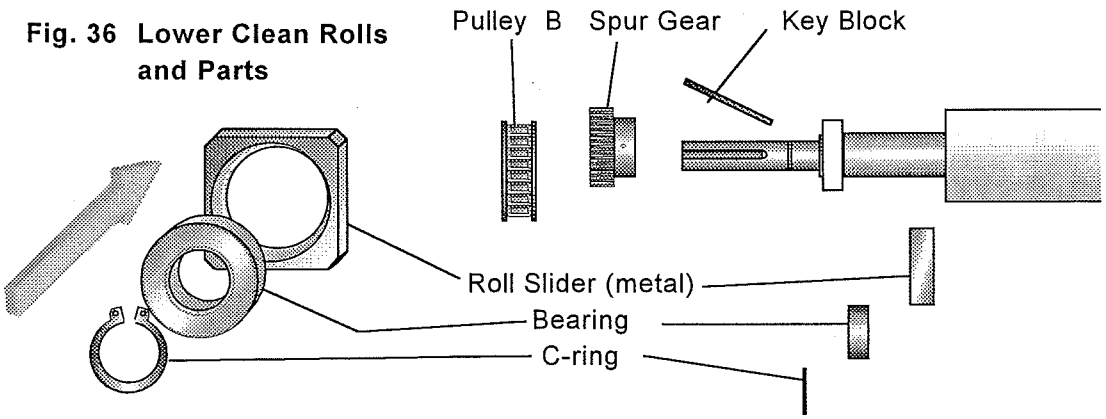


Fig. 36

⑪ Take the Lower Clean Roll parts (Roll Sliders, Bearings, C-rings, and Key Blocks) out of both ends of Clean Roll's cores. Note that Roll Sliders for lower Clean Rolls are metal

Fig. 36 Lower Clean Rolls and Parts



⑫ Fix the Roll Sliders, Bearings, and C-rings on the new Clean Roll's core.

⑬ Attach the parts which have been removed or loosened in the following order:

a) The new Lower Clean Rolls with Roll Sliders, etc.

b) Key Blocks, Spur Gears, Pulleys
(Get an appropriate position for a good mechanical transmission)

c) Timing belt
(Tighten the set screws for Motor holder.)

d) Lower Roll Holding Plate.

e) SLIDE TABLE with Air Cylinder

f) The new Upper Clean Rolls with Roll Sliders, etc.

⑭ Replace Tape Drawer in the machine.

⑮ Replace Top Cover on the machine so that the safety switch may not be open.

⑯ Turn ON/OFF Switch ON, and then procedure to make the machine run, and see if all the mechanical transmissions work well.

Caution: Do not touch the moving parts.

⑰ If the transmission does not work well, adjust the malfunctioning part.
⑱ If it works well, turn ON/OFF Switch OFF, and fix the Front Cover, Rear Cover.

(OVER)

14.4 Adjustment of Air Cylinders for Roll lifting

When the speed balance is lost for the air cylinders at each end of Clean Roll, and the vertical motion does not take place at the same time, adjust the speed controllers on each air cylinder and get a good balance of the motion.

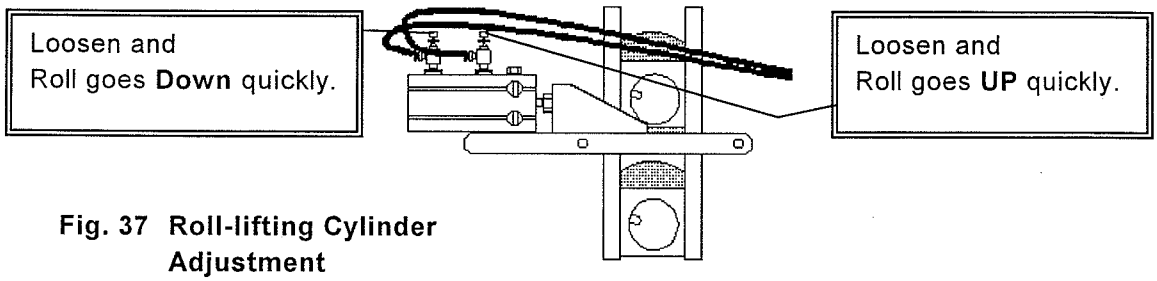


Fig. 37 Roll-lifting Cylinder Adjustment

- Adjustments of descending speed is especially important.
- Note that this adjusment is different from the setting for timing of Clean Roll descension that takes place when the panel enters. See also 14.2 14.2B)

15 Electrical parts list

	Name of Parts	Producer	Model No.	Relevant Standards
1	Circuit Protector	Idec Izumi	NRT-2100-4AAA	EN60934, VDE0642
2	LED Push-Button Switch	Idec Izumi	LW2L-MIC64GR	EN60947-1, EN60947-5-1
3	LED Push-Button Switch	Idec Izumi	LW2L-MIC64GM	EN60947-1, EN60947-5-1
4	LED Push-Button Switch	Idec Izumi	LW3L-AIC64YM LW2L-AIC64YM	EN60947-1, EN60947-5-1
5	DC 24 Power Supply	Idec Izumi	PS3E-C24A1	EN60950(LVD), EN55011,EN55022(EMC)
6	Emergency Stop Switch	Idec Izumi	AVW401-R	EN418,EN60947-5-1
7	Selection Switch	Idec Izumi	HW1B-V401R	EN60947-5-1
8	Solenoid Valve	Koganei	A110-4E1-J6	VDE0580
9	Safety Switch	Guardmaster	02001	EN1088
		Hoeneywell	GKMB23W2	EN1088
10	Terminal Units	Kasuga	TX10S	EN947-7-1
11	Driving Induction Motor	Matsushita	M9IC60GV4L M9IC90GV4L	EN60034-1
12	Gear Head	Matsushita	M9GD12.5B	
13	Speed Controller	Matsushita	DV1104	
14	Relay	Omron	MY4ND	EN60335-1,EN60950
16	Socket for Relay	Omron	PYF14A-E	VDE0106
17	Relay	Omron	MY2ND	EN60335-1,EN60950
18	Socket for Relay	Omron	PYF08A-E	VDE0106
19	Control Socket	Omron	PF083A-E	VDE0106
20	Variable Resistor	Oriental Motor	PAVR-20KY	
21	Static Eliminator	Simco	FH-7R	
22	Transformer for Static Eliminator	Simco	TR-2	
23	Transformer	Swallow	SCT-300E	

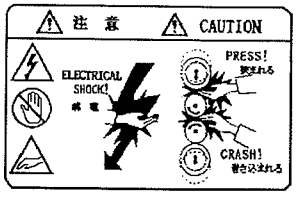
Electrical Parts installed as Options

101	Programmable Sequencor	Mitsubishi	Fxo-14MR-DS Fxo-20MR-DS	
102	Timer	Omron	H5CL-A	EN50081-2,EN50082-2
103	(Electrical Counter)	Omron	H7CL-A	EN50081-2,EN50082-3
104	Sensor	Omron	E3HT-DS3EI	
105	(Signal Light Tower)	Patlite	LH-110BT	EN60598-1,EN60598-2-6

* Please also refer to attached parts list

16 Copies of Warning Signs

No.1



Name : **General Warning Sign**
Location : *Front Cover*
Meaning : It illustrates general risk that Clean Roller may cause while it is in operation.: getting your fingers caught in the moving Clean Rolls, getting electrical shcok when the machine is not properly grounded, or when touching the electrical part inside, etc.

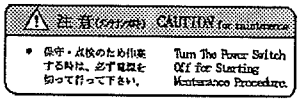
No.2

N : **Don't Get Your Fingers Caught Warning Sign**
L : *Front Cover*
M: It warns against getting fingers caught in Tape Drawer when closing it.

No.3

N : **Electical Warning Sign**
L : *All the Covers behind which electrical parts lie*
M: It indicates electrical parts lie behind it.

No.4



N : ***Do Switch OFF When Maintenancing Warning Sign***
L : *Front Cover*
M: It tells it is necessary to turn ON/OFF Switch OFF in mentenance procedures.

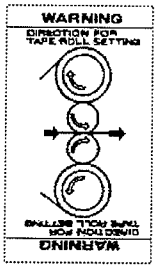
No.5

N : **Don't Touch Moving Parts Warning Sign**
L : *Rear Chassis Plate*
M: It warns against getting fingers in the moving gears when test-running.

No.6

N : **Motor Heat Warning Sign**
L : *Above the motor, on the inside of Rear Chassis Plate*
M: It warns against Moter Hear after having run.

No.7



N : **Tape Orientation Sign**
L : *Above Tape Drawers, on the inside of Front & Rear Chassis Plate*
M: It tells the direction of Adhesive Tape Rolls when it is placed in the Tape Roll Holders

No.8

DO SWITCH OFF WHEN REPLACING THE TAPE ROLLS

N : **Risk Analysis No.1 Warning Sign**
L : On Tape Drawer
M: This shows the ***absolute prohibition*** of replacing Adhesive tape rolls while the machine is running by pressing the TAPE FREE Button.

No.9

N : **Static Eliminator Transformer High Voltage Warning Sign**
L : *On the transformer for Static Eliminator*
M : It tells it is necessary to pay attention to the Static Eliminator Transformer, which generates a high voltage of 7000 V.

No.10

N : **Static Eliminator Bar Earth Grounding Warning Sign**
L : *On the Static Eliminator Bars*
M : It tells it is necessary to connect earth grounding for the equipment's safety use

17 Risk Analysis of Clean Roller

This Risk Analysis must be fully understood and must be always taken into account by the operators.

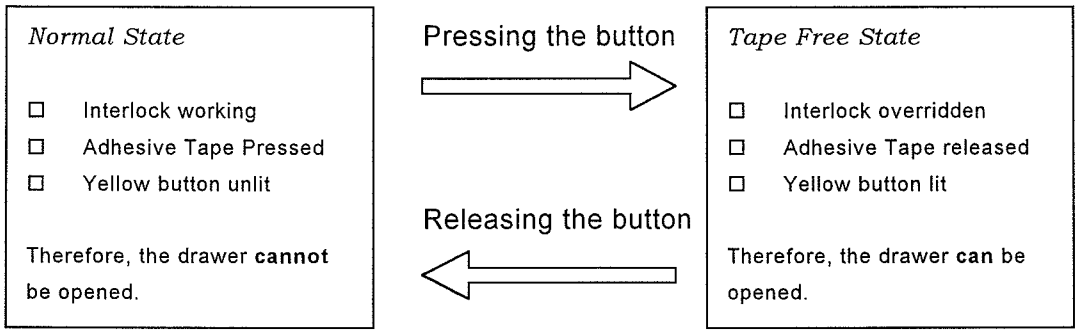
17.1 N.01 TAPE FREE mechanism

A) Definition

TAPE FREE state: Interlock switch is overriden, and Adhesive tape rolls are not pressed to Clean Rolls, therefore, the operator can pull the drawer for Adhesive tape rolls while the machine is running

Normal state: Adhesive tape rolls are pressed to Clean Rolls, and the interlock switch is working. There is no opening the drawer while the machine is running.

The machine is installed an alternate switch(a yellow LED-lit push button) which changeovers from the TAPE FREE state to the Normal state and vise vasa.



Notice : The Yellow button remains actuated until being released by pressing the same button

B) Foreseeable Misuse

In the TAPE FREE state, the operator can open Tape Drawer to the front even while the machine is running.

And if Adhesive Tape Rolls are taken out from the machine, and Tape Drawer is half opened/closed, the rotating Clean Rolls are accessible by finguards or hands of the operator.

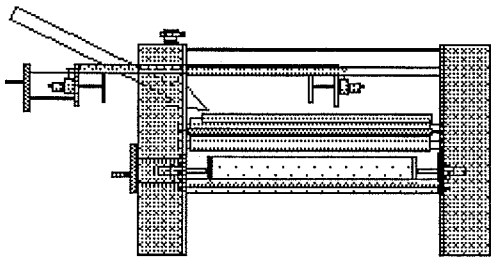
1. Actions taken by the manufacture so as to reduce the risks.

(a) The operators are supposed to have training programs for the operators so that they are well informed about the mechanism mechanis.

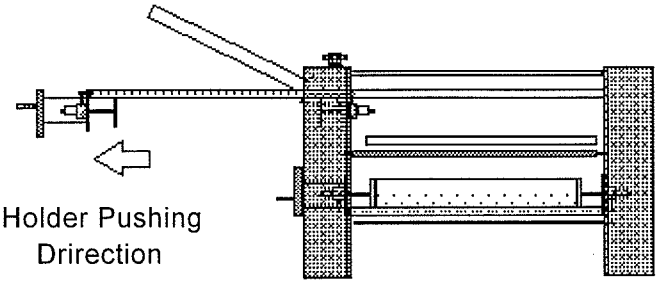
(b) Sliding direction of Adhesive Tape Rolls when replaced is changed from the rear direction to the front.

So long as Tape Drawer is fully drawn to the front, the access to the rotating Clean Rolls are completely restricted, and this modification help the drawer to stay in the front, therefore, degree of danger is much reduced.

ACCESS ANALYSIS



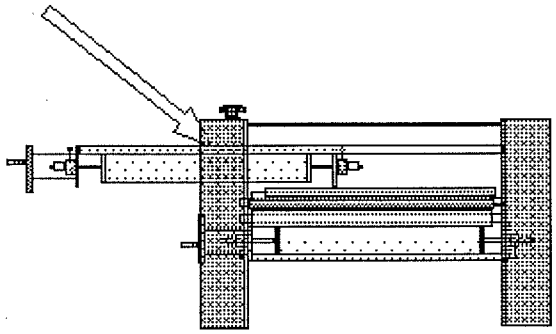
Half Opened : more risky



Fully Opened : No Access

An access to the rotating Clean Rolls is most likely to happen when Adhesive Tape Rolls are not installed, and the drawer is not fully opened but remain half opened/closed.

Changing the direction of pushing holder to the front will help the drawer to be fully opened, and as a result, reduces the degree of risk.



With Tape Roll installed:
No Access to rotating

At each drawer, there also installed a device which keeps the drawer in the fully opened position.

(c) Replacement of Clean Rolls in the TAPE FREE state is not allowed.

Theinstruction manual abandons the replacement of Clean Rolls without switching off.

Warning lable is put on the bar of the Drawer that says :

SWITCH OFF WHEN REPLACING THE TAPE ROLLS.

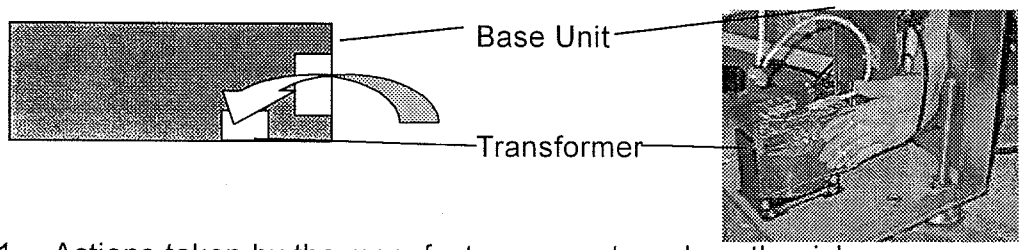
C) Cautions which the operator must take into account.

- **The operators must be instructed from a view point of safeties by a person of responsibility who has read and fully understand of the Instruction Manual.**
- **The operators must fully understand this risk analysis.**
- **The operators must not try to touch the rotating Clean Rolls by any circumstances**
- **The operators must not replace Adhesive Tape Rolls by pressing the TAPE FREE Button while the machine is running.**

17.2 N.02 Access to Transformer Terminals

A) Foreseeable Misuse

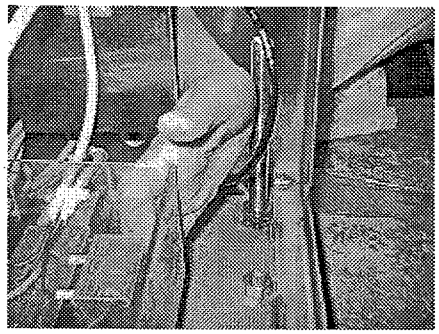
The transformer in Base Unit is accessble by hand through the hole made in order to install the air filter regulator.

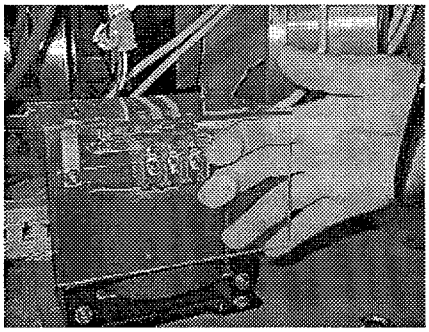


1. Actions taken by the manufacture so as to reduce the risks.

(d) The Transformer is covered by plastic plate at its terminals, which makes is impossible to touch there.
(e) The operators are supposed to be instructed not to try to touch the terminals when it is not necessary.

B) Acces Analysis





Normaly, Access is imposible by hands or fingers

C) Cautions which the operator must take into account.

□ **The operators must not try to touch the terminals of Transformer when the machine is powered.**

This is the end of the Operation Manual for Clean Roller: Model RY-500AE Series.

Rayon Industrial Co., Ltd.

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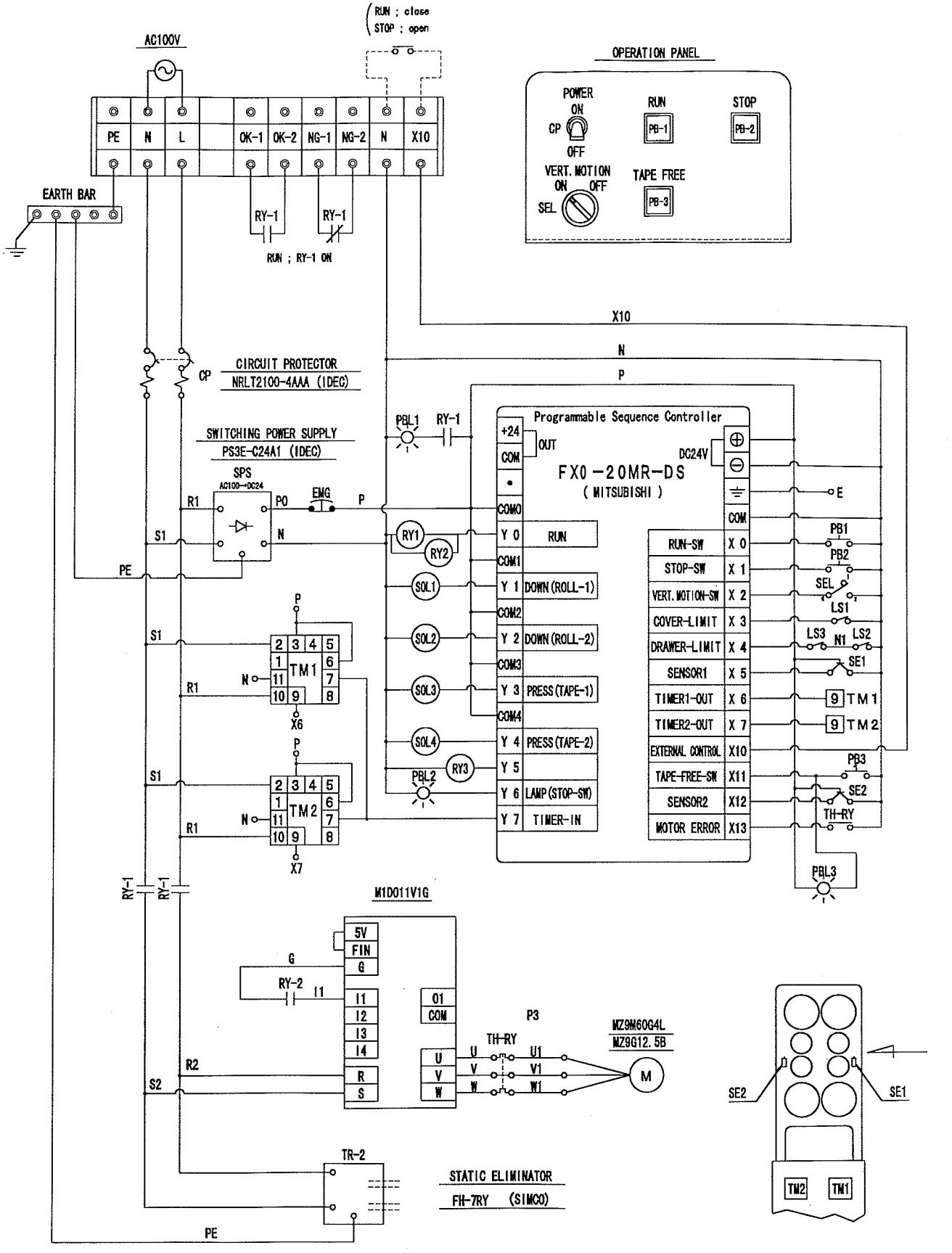

NEW NIC

	材質		処理		個数		尺度	
	品名	CIRCUIT DIAGRAM			図番	RY-980127-		
株式会社レヨーン工業	装置	CLEAN ROLLER			型式	RY-505AE		

DECLARATION OF CONFORMITY

89/392/EEC - Machinery
89/336/EEC - EMC
73/23/EEC - Low Voltage

Name of manufacturer or supplier
Rayon Industrial Co. Ltd

Full postal address including country of origin
2F Yoshino Building, 1-9-24, Shimizugaoka, Fuchi-City, Tokyo, Japan

Description of product
Clean Roller

Name, type or model, batch or serial number
Serial No. :- Series RY500E, RY600E, RF600E

Standards used, including number, title, issue date and other relative documents
N / A

Place of issue LACS

Name of authorised representative (printed) Paul Laidler

Position of authorised representative SILC / LACS Manager

Full postal address if different from manufacturers
Teesside Tertiary College, LACS, Marton Campus, Marton Road, Middlesbrough, Cleveland, England, TS4 3RZ

Declaration

I declare that as the authorised representative, the above information in relation to the supply / manufacture of this product, is in conformity with the stated standards and other related documents following the provisions of 89/382/EEC Directives and its amendments.

Signed 

Date 26th November 1997