

Standard BQ-P6 Binder Padder and Spine Taper

Service Manual

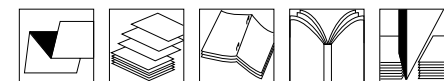


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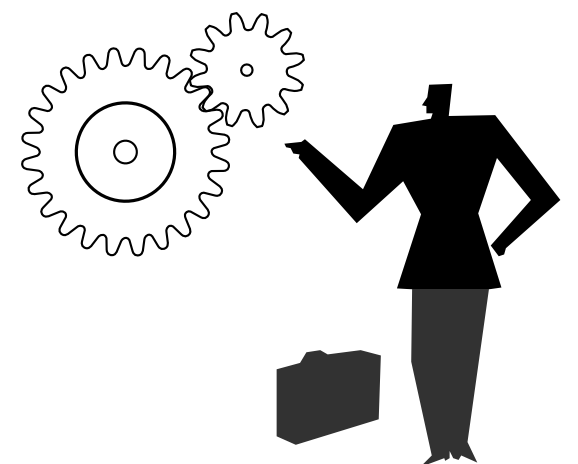
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SERVICE MANUAL

BQ-P6 Perfect Binder



Horizon



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HORIZON INTERNATIONAL, INC.

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FOREWORD

Perfect Binder

Model BQ-P6

This manual is designed to help you to keep the machine in a good operating condition. Read, study and keep this manual in a safe and convenient place.

Do not perform any maintenance until you read and understand the instructions in this manual.

If you have questions regarding maintenance or this publication, please contact our service division.

The machine design and specifications are subject to change without notice.



Safety Instruction

1. Read and understand all safety instructions with a signal  **WARNING**, and  **CAUTION**. If safety instructions are ignored, personal injury will result.
2. HORIZON INTERNATIONAL INC. cannot anticipate every possible situation that might involve a potential hazard. The instruction in this manual are therefore not all inclusive.
3. Be sure to unplug the power cord when replacing the parts or repairing the machine.
4. Take care with the rotating parts when the machine is operated with the covers being opened.
5. Use the original HORIZON spare parts when replacing the parts.

I Necessary Tool for Maintenance and Repair

Use the following tools for maintenance and repair.

- | | | | | |
|----|--------------------|--------------------------------|--------|---------|
| 1. | Screw Driver | No. 2 | | |
| 2. | Screw Driver | 6 to 7 mm | | |
| 3. | Allen Wrenches | 1.5, 2, 2.5, 3, 4, 5, and 6 mm | | |
| 4. | Open-ended Wrench | 5.5 x 7 mm | 8 x 10 | 13 x 17 |
| 5. | Box Wrench | 5.5 mm | | |
| 6. | Snap-ring Expander | | | |

II Signs and Abbreviations in This Manual

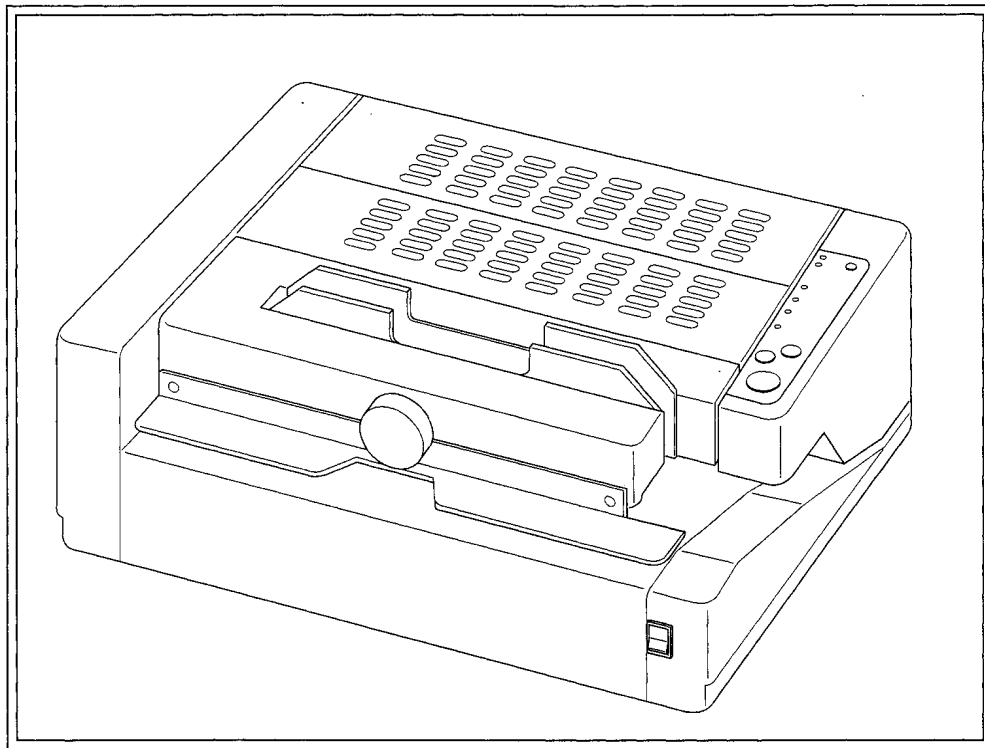
1. The following signs in this manual represent wire color.
2. The following abbreviations in this manual represent electronic and electrical parts.

Sign	Color	Abbreviation	Meaning
C	Brown	CL	Clutch
R	Red	BK	Brake
O	Orange	SW	Switch
Y	Yellow	mSW	Microswitch
G	Green	M	Motor
B	Blue	LED	Light Emitted Diode
V	Violet	VR	Potentiometer
H	Gray	RY	Relay
W	White		
D	Black		
S	Transparent		
<u>DH</u>	Dark Gray		

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1. Specifications



Maximum Book Size	Up to A4 Size
Maximum Book Thickness	25 mm (1")
Binding Type	Cover Binding, Tape Binding and Padding
Production Speed	Cover / Tape Binding Mode: 30 seconds / book (50 Hz) 27 seconds / book (60 Hz) Pad Binding Mode: 36 seconds / book (50 Hz) 33 seconds / book (60 Hz)
Warming Up Time	13 minutes
Power Consumption	100 V - 50/60 Hz 1050 W 115 V - 60 Hz 1050 W 230 V - 50 Hz 1050 W
Machine Dimentions (W x D x H)	560 x 460 280 mm (22" x 18" x 11")
Machine Weight	32 kg (64.8 lb)
Melt Tank Capacity	350 g

2. Operation Procedure

Cover/Tape Binding Mode

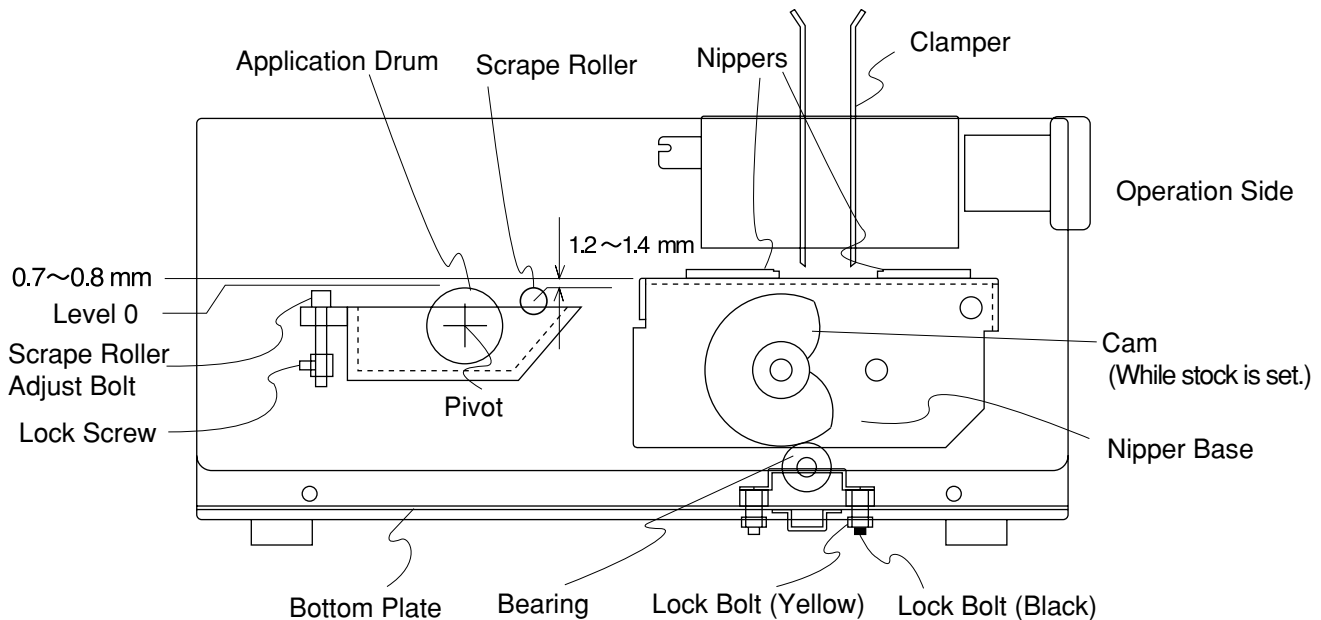
	Operation	Action (Operation Panel LED)	Sensor or Switch
1	Turn on power switch.	- Heater begins to warm up. - "Preparation" lamp illuminates. - "Cover/Tape Mode" lamp illuminates.	- Clamper home position switch ON - Nipper upper limit microswitch OFF
2	About 13 minutes later.	- Alarm sounds. - "Preparation" lamp goes out. - "Insert stock. Depress start button." lamp illuminates.	
3	Set sheets into clamper.		- Sheet presence microswitch ON
4	Press start button.	- Nipper lowers and clamper moves to the rear side and stops above melt tank while "Operation" lamp is illuminating. - "Operation" lamp goes out. - "Place cover sheet. Depress start button." lamp illuminates.	- Nipper lower limit microswitch OFF - Clamper reverse switch ON
5	Set cover sheet or tape and press start button again.	- "Operation" lamp illuminates. - Clamper goes back to home position and stops on nipper. - Nipper rises to nip cover sheet and stock. - Alarm sounds and nipper lowers. - "Operation" lamp goes out. - "Take out stock. Depress reset button." lamp illuminates.	- Cover sheet sensor ON - Clamper home position switch ON - Nipper lower limit microswitch OFF
6	Take out book.		- Stock presence microswitch OFF
7	Press reset button.	- "Operation" lamp illuminates. - Nipper rises. - "Operation" lamp goes out. - "Insert stock. Depress start button." lamp illuminates.	- Nipper upper limit microswitch OFF

2. Operation Procedure

Padding Mode

	Operation	Action (Operation Panel LED)	Sensor or Switch
1	Turn on power switch.	- Heater begins to warm up. - "Preparation" lamp illuminates. - "Cover/Tape Mode" lamp illuminates.	- Clamper home position switch ON - Nipper upper limit microswitch OFF
2	About 13 minutes later.	- Alarm sounds. - "Preparation" lamp goes out. - "Insert stock. Depress start button." lamp illuminates.	
3	Select binding mode.	- Lamp moves from "Cover/Tape Mode" to "Padding Mode".	
4	Set sheets into clamper.		- Sheet presence microswitch ON
5	Press start button.	- Nipper lowers and clamper moves to the rear side and stops above melt tank while "Operation" lamp is illuminating. - Alarm sounds - "Operation" lamp goes out. - "Take out stock. Depress reset button." lamp illuminates.	- Nipper lower limit microswitch OFF - Clamper switch temporarily ON - Clamper home position switch ON
6	Take out book.		- Stock presence microswitch OFF
7	Press reset button.	- "Operation" lamp illuminates. - Nipper rises. - "Operation" lamp goes out. - "Insert stock. Depress start button." lamp illuminates.	- Nipper upper limit microswitch OFF

3. Leveling Adjustment for Glue Application



Construction

Each section is adjusted based on the upper surface of application drum as the pivot of application drum is fixed to the standard position.

1. Nipper Base Adjustment during Nipping Stocks

- Adjust nipper base with adjust bolt (Yellow) on the bottom of melt tank.

NOTE

- The clearance between the upper surface of application drum and the upper surface of nipper must be 0.7 ~ 0.8 mm.
- Be sure to loose lock bolt (Black) before adjustment and fasten lock bolt (Black) after adjustment.

2. Scrape Roller Adjustment

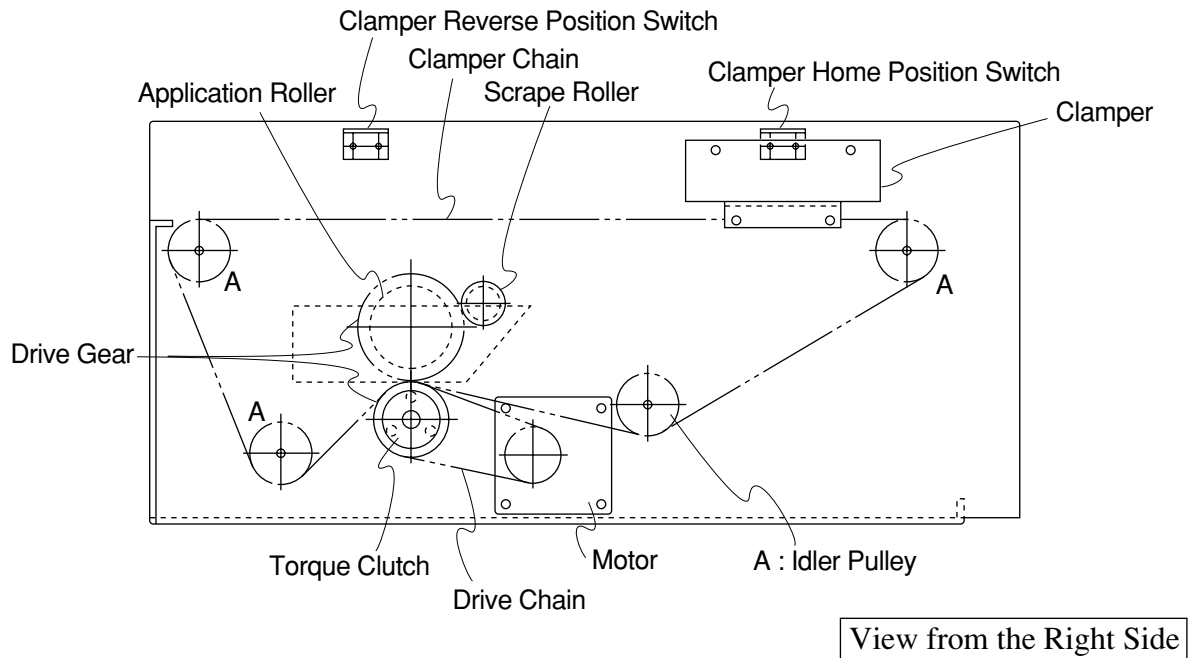
- Adjust scrape roller with scrape roller adjust bolt on melt tank.

NOTE

- It is easier to adjust scrape roller based on the upper surface of nipper which is adjusted before.
- The clearance between the upper surface of scrape roller and the upper surface of nipper must be 1.2 ~ 1.4 mm.
- Be sure to loose lock screw before adjustment and fasten lock screw after adjustment.
- Nipper base is lowered by cam while stock is nipped.

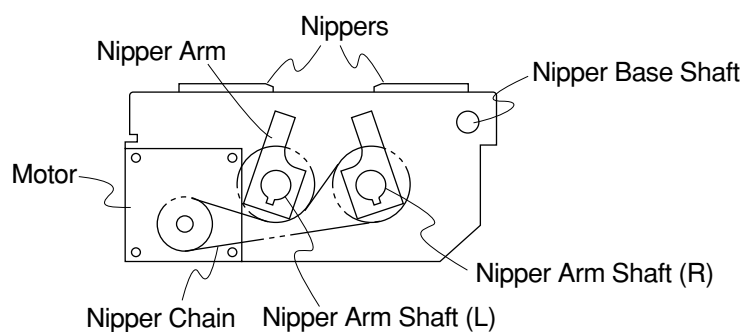
4. Drive Section Descriptions

A. Clamper and Melt Tank



1. While motor is rotating clockwise, drive chain and drive gear are activated, and application roller rotates counterclockwise and scrape roller rotates clockwise in melt tank.
2. Motor rotation transmits to torque clutch and then rotates clamper chain, and finally clamper moves to the left.

B. Nipper



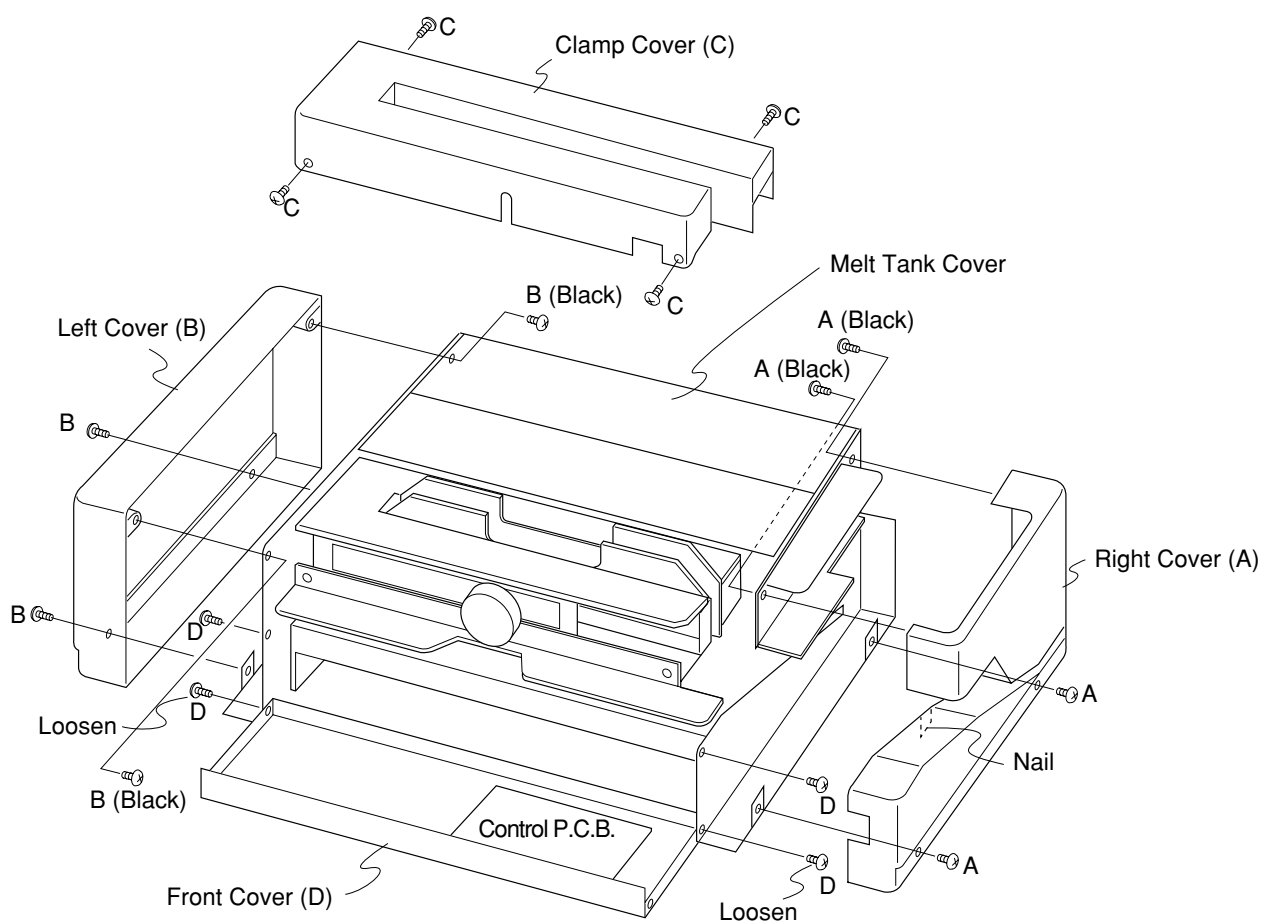
View from the Left Side

1. While motor is rotating clockwise, nipper chain is activated, and nipper arm shaft (L) rotates counterclockwise and nipper arm shaft (R) rotates clockwise to rotate nipper arm. Nipper arms move nippers to nipping direction.
2. Cam fixed in nipper arm shaft (L) pivots nipper base on nipper base shaft.

5. How to Remove Cover

CAUTION

- Be sure to turn power off before any cover is removed.
 - Melt tank is heated up to 180 °C.
 Wait until melt tank is cooled down before covers are removed.



Tool : Phillips Screwdriver

A	Right Cover	M4 x 12	Tapping (Black)	2 pcs
		M4 x 8	Bind	2 pcs
		Nail		1 pcs
B	Left Cover	M4 x 14	Tapping (Black)	2 pcs
		M4 x 8	Bind	2 pcs
C	Clamper	M3 x 8	Bind	4 pcs
D	Front Cover	M4 x 8	Screw	2 pcs
		M4 x 8	Screw (Loosen)	2 pcs

6. Troubleshooting

A. Glue is not applied on spine (partially).

(Cause)

Nipper base is too high.

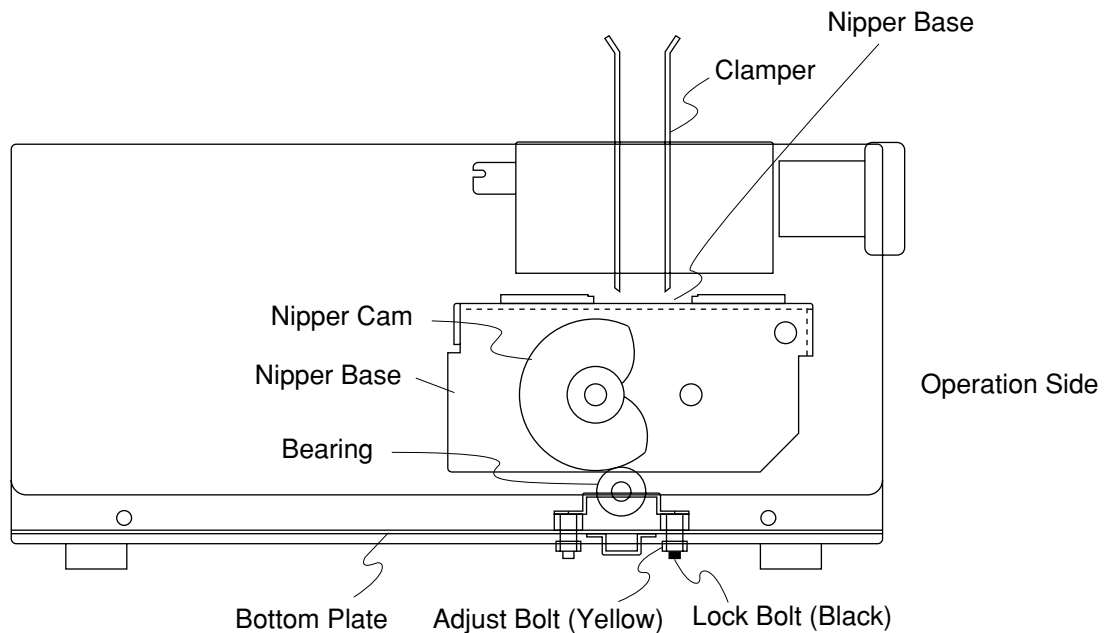
(Remedy)

Lower nipper base.

Loosen two lock bolts (Black) on the operation side and turn adjust bolt (Yellow) clockwise, and bearing will lower and nipper base lower.

NOTE

- If nipper level is lowered too much, glue is not applied enough.
- Do not adjust adjust bolt more than 1/4 turn at one time. Nipper base lowers by 0.1 mm with 1/4 turn.
- Turn both adjust bolts equally.



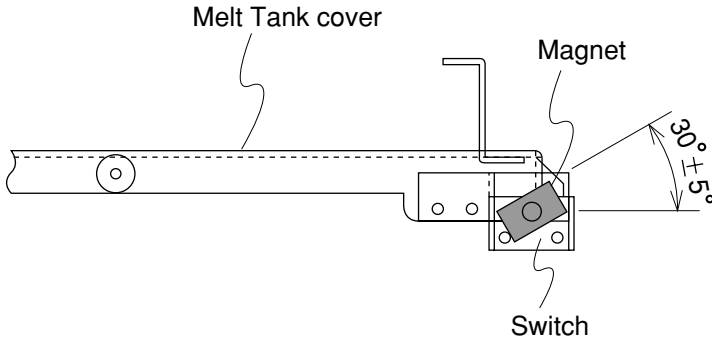
View from the Left Side

6. Troubleshooting

B. Enough glue is not applied on spine.

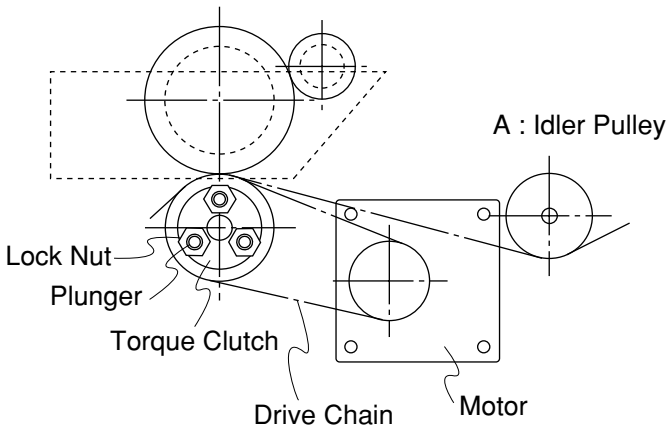
(Cause) Nipper base is too low.	(Remedy) Rise nipper. - Loosen two lock bolts (Black) on the operation side and turn adjust bolt (Yellow) counterclockwise, and bearing will lower and nipper base lower. (Refer to page 7.) NOTE - If nipper level is raised too much, glue is not applied . - Do not adjust adjust bolt more than 1/4 turn at one time. Nipper base lowers by 0.1 mm with 1/4 turn. - Turn both adjust bolts equally.
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C. BQ-P6 stops suddenly during operation and not possible to start with any button.

(Cause 1) Safety switch for melt tank is activated.	(Remedy 1) - When melt tank switch is activated, check that the clearance between magnet and switch is 0.5~1.0 mm. - Check that magnet is set as shown in the drawing below. - Control P.C.B. tells whether switch is activated or not. (Refer to page 14.) Serial Number : 039 -, 049 -, 059 -, 010 -, 020 -, 022001 -  The diagram illustrates the adjustment of the melt tank safety switch. It shows a side view of the 'Melt Tank cover' which has a 'Magnet' attached to its bottom edge. Below the magnet is a 'Switch' mechanism. An arrow indicates the angle between the magnet's face and the switch, specified as $30^{\circ} \pm 5^{\circ}$.
(Cause 2) Clamper safety cover switch is activated unnecessarily.	(Remedy 2) Adjust switch so that switch will be activated when safety cover for the front of clamper rises 5 ~ 10 mm upward. (Refer to "Clamper Safety Cover Switch Adjustment" in page 13.) Serial Number : from 03915 to 039 -, 049 -, 058 -, 059 -, 010 -, 020 -

6. Troubleshooting

D. Clamper stops during operation. (Motor is making noise and application drum is rotating.)

(Cause 1) Torque clutch is adjusted improperly, and drive power is not transmitted.	Remedy 1) Adjust torque again. Serial Number : from 03915 to 03999, 049 -, 058 -, 059 -, from 01001 Move clamper to the far side by hand. Turn torque clutch until click sound is heard from torque clutch. Then turn further 60° and fasten plunger lightly. Turn back torque clutch by 20 to 30° and then lock plunger with lock nut.  View from the Left Side
(Cause 2) Clamper home position switch or clamper reverse switch is broken. If clamper stops at the far side, clamper reverse switch is broken. If clamper stops at the operation side, clamper home position switch is broken. - Control P.C.B. tells whether switch is activated or not. (Refer to page 15.)	(Remedy 2) Replace switch.

E. Cover sheet is not perfectly bound.

(Cause 1) Glue is not applied on spine enough.	(Remedy 1) Refer to "Enough Glue is not applied on" in page 8.
(Cause 2) Glue is dried because of slow set up of cover sheet.	(Remedy 2) Set cover sheet quickly.

6. Troubleshooting

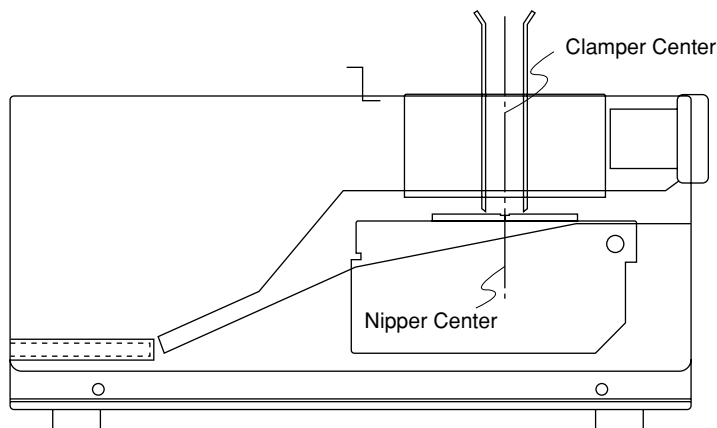
F. One side of spine corner is not bent.

(Cause)

Nipper center and clamber center are not aligned.

(Remedy)

Adjust nipper center and clamber center by moving clamber home position switch. (Refer to page 12.)

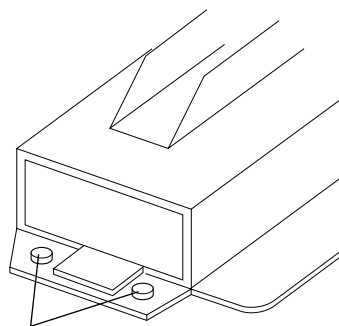


(Cause)

Nipper center and clamber center are not parallel.

(Remedy)

Remove clamber cover, loosen clamber fix bolts and adjust clamber so that nipper and clamber are parallel.



Clamber Fix Bolts

G. All lamps on operation panel flash and BQ-P6 does not work.

(Cause)

Nipper does not work properly.

(Remedy)

Adjust the positions of nipper highest and lowest position microswitches. (Refer to page 12.)

6. Troubleshooting

H. BQ-P6 does not work with "Preparation" LED illuminating.

(Cause 1) Thermal fuse is blown.	(Remedy 1) Replace thermal fuse. (167°C) NOTE - Do not put excessive strength on terminal of thermal fuse when replacing thermal fuse.
(Cause 2) Heater is blown.	(Remedy 2) Replace heater.

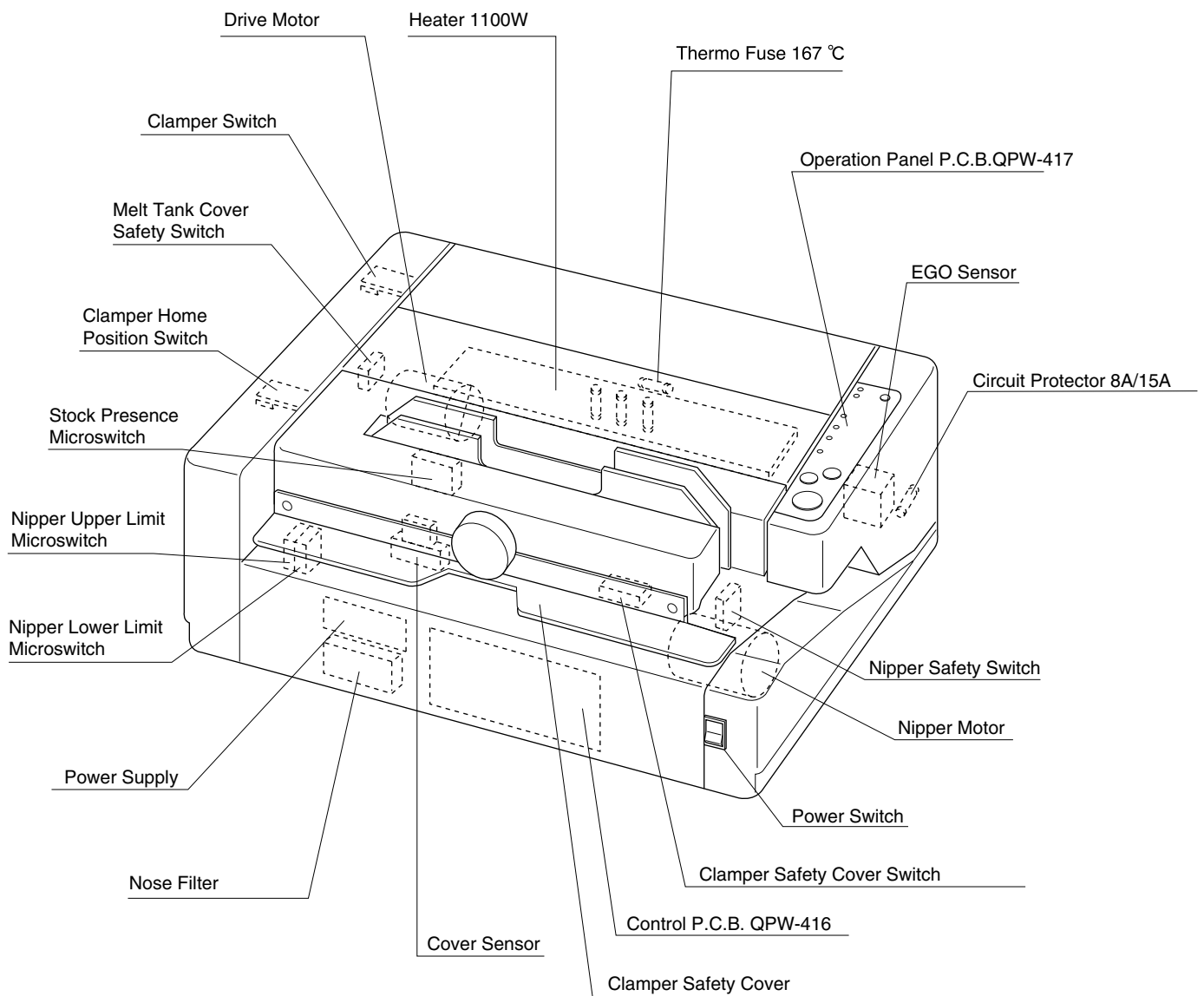
I. Glue is not appeared on application drum because glue becomes gel.

(Cause) Hot melt glue is not good to use.	(Remedy) Replace glue.
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J. The circuit protector trips when the power is turned on.

(Cause) Internal circuit has a problem.	(Remedy) Check the power circuit. Refer to the figure on page 15.
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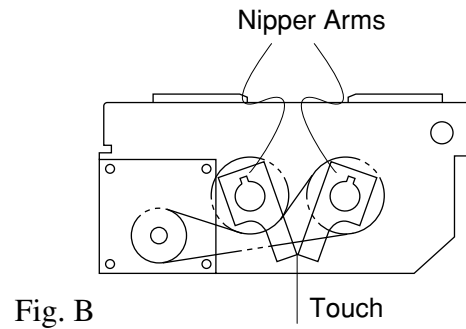
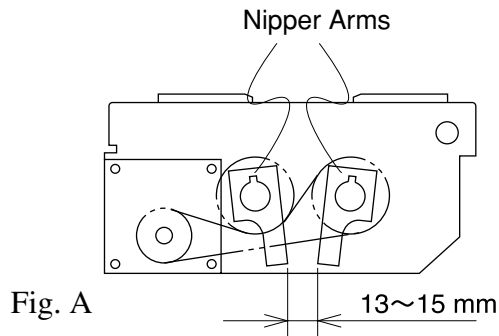
7. Sensor and Electronic Parts Locations



8. Switch Position Adjustment

A. Nipper Upper / Lower Limit Microswitch Adjustment

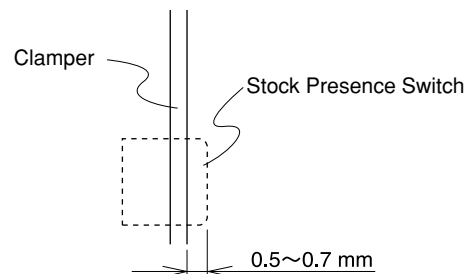
Nipper upper limit microswitch : Adjust the position of switch cam so that microswitch is off when the positions of nipper arms is either Fig. A or B.
(Refer to page 12.)



Nipper lower limit microswitch : Adjust the position of cam so that microswitch turns off when nipper base is at the lower limit and also nipper up cam is at the center of the lower limit.

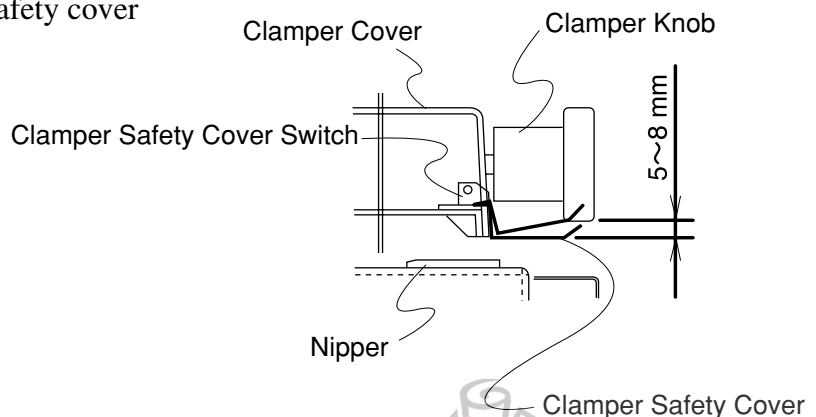
B. Stock Presence Switch Adjustment

Adjust the position of stock presence switch so that stock presence switch is stick out of clumper by 0.5 to 0.7 mm while stock presence switch is on.

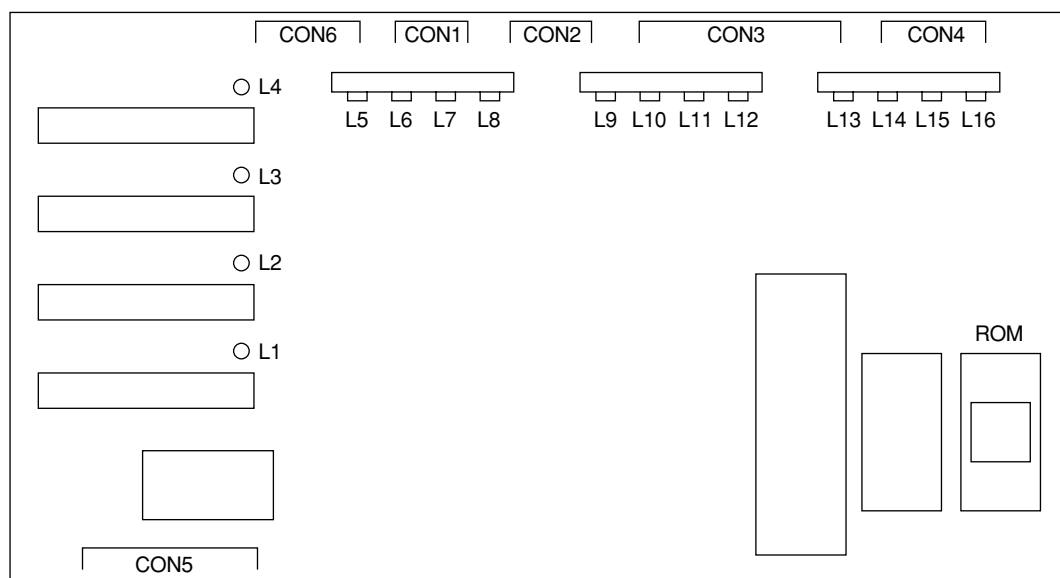


C. Clumper Safety Cover Switch Adjustment

Adjust clumper safety cover switch so that switch turns on when clumper safety cover is raised by 5 to 8 mm.

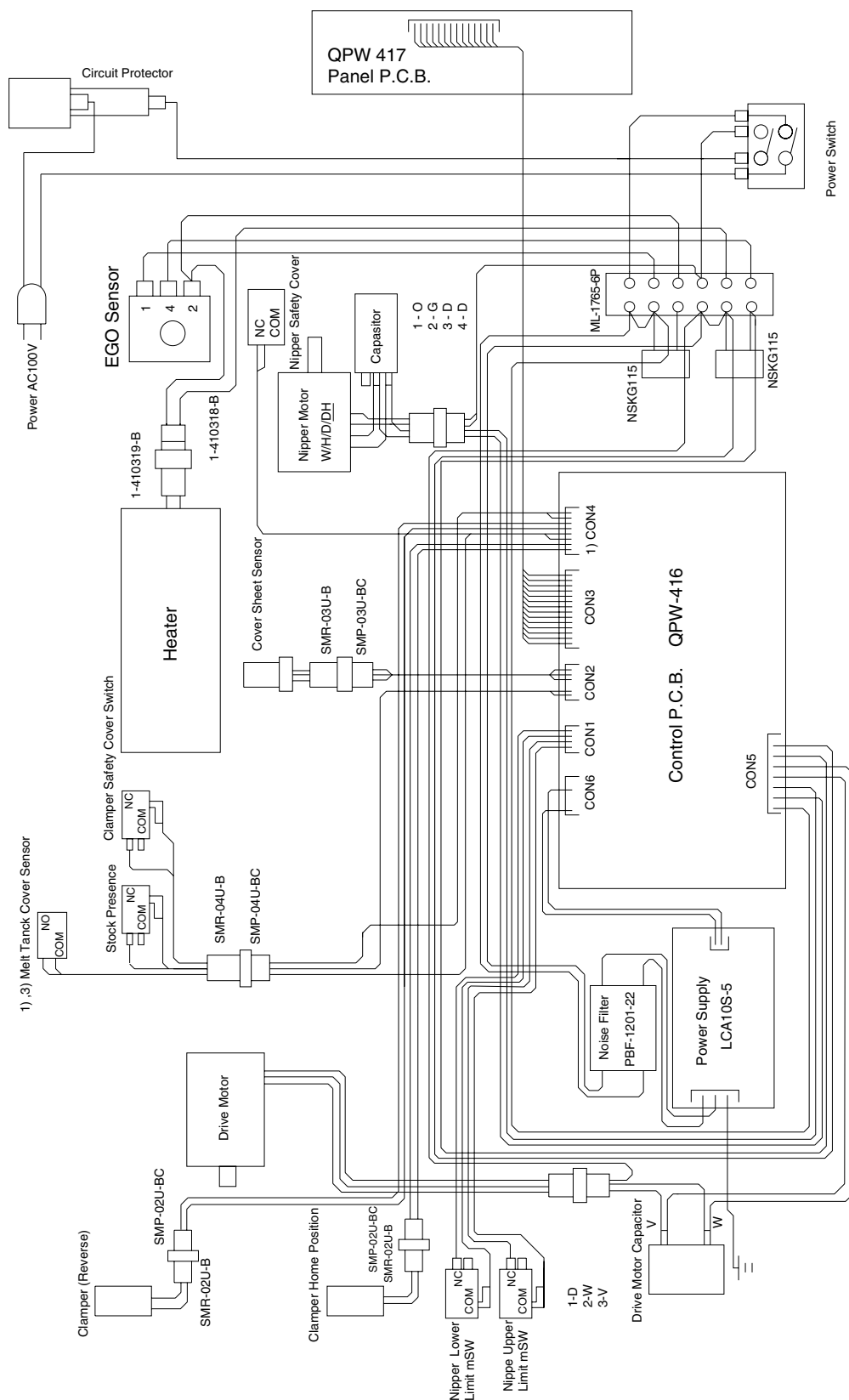


9. Control P.C.B. LED Descriptions



L1	Nipper Up	Nipper rises from nipping position.
L2	Nipper Down	Nipper lowers to nip stock.
L3	Clamper Home Position Switch	
L4	Clamper Reverse Switch	
L5	Nipper Home Position Switch	Illuminates at home position.
L6	Nipper Lowee Limit Switch	Illuminates at lowest position.
L7	Stock Presence switch	Illuminates when stock is not in clamper.
L8	Cover Sheet Sensor	Illuminates when cover is used.
L9	Start Switch	Illuminates by being pressed.
L10	Stop Switch	Illuminates by being pressed.
L11	Reset Switch	Illuminates by being pressed.
L12	Padding or Cover/Tape Binding Switch	Illuminates by being pressed.
L13	Clamper at Home Position	Illuminates at home position.
L14	Melt Tank Cover	Illuminates when cover is closed. S/N : from 03915 to 03999 049 -, 058 -, 059 - 010 -, from 02001 to 02047
L15	Clamper	Illuminates at reverse position.
L16	Clamper Safety Cover Switch	Illuminates when cover is closed. S/N : from 03915 to 03999 049 -, 058 -, 059 - from 01001

10. Electronic Circuit Diagram



- 1) BQ-P6 from No.03915 to No.02047 has melt tank cover sensor.
No.03001 or above BQ-P6 does not have melt tank sensor, but the same control P.C.B. is used by connecting No.3 and 4 pins on CON4.
- 2) No.03915 or above BQ-P6 has clamper safety cover switch.
- 3) No.022001 or above BQ-P6 has melt tank switch and nipper safety cover.

11. Check Mode

Turn on power switch during pressing start button.

- Padding or cover/tape binding mode lamps illuminate and the following actions are repeated automatically; clamper moves, clamper reverse and nipper moves to nip stock.

Turn on power switch during pressing stop button.

- Padding mode and cover/tape mode lamps flash.
- Press start button, and clamper will move to far end position. Press start button again, and clamper will return to home position.
- Press stop button, and nipper base will be raised to the highest position and then stopped in the case that nipper base is at the lowest position or nipper base will be lowered to the lowest position and then stopped in the case that nipper base is at the highest position.
- Press reset button, and nipper will move up and nip for 5 seconds and then stop at the lowest position.

12. Melt Tank Replacement

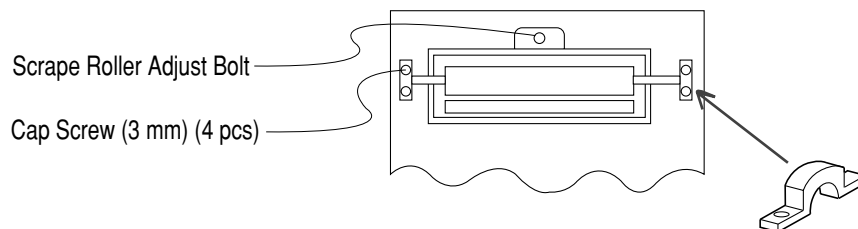
Serial Number : 029 -, 039 -, 049 -, 059 -, 010 - and 020 -



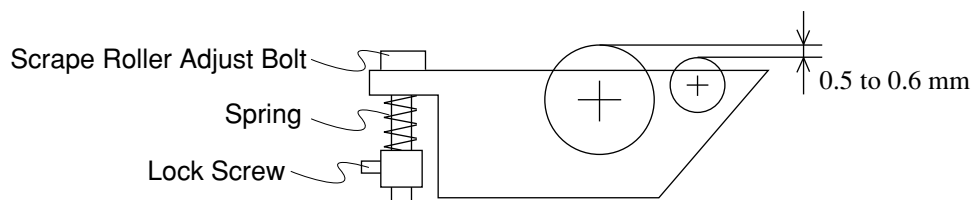
CAUTION

- Melt tank and hot melt glue have been heated very high temperature, so take utmost care when replacing.

1. Remove melt tank cover and rear cover.
2. Disconnect heater connector.
3. Remove thermal adjuster (EGO sensor).
4. Remove scrape roller adjust bolt.
5. Remove application drum bush.



6. Pull melt tank upward.
7. Remove DU bushes on the both sides of drum in melt tank. Those DU bushes will be used when new melt tank is installed.
8. Install new melt tank in the reverse procedure of removing.
9. Adjust the upper surface of scrape roller as shown in the drawing below and then lock scrape roller. If bolt length is not long enough, replace the bolt with accessory bolt.



12. Melt Tank Replacement

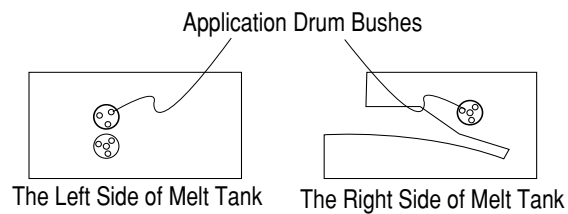
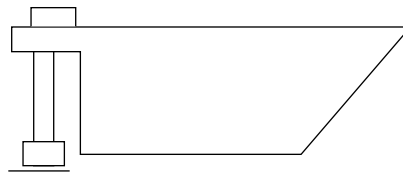
Serial Number : from 03001



CAUTION

- Melt tank and hot melt glue have been heated very high temperature, so take utmost care when replacing.

1. Remove melt tank cover and rear cover.
2. Disconnect heater connector.
3. Remove thermal adjuster (EGO sensor).
4. Remove scrape roller adjust bolt.
(Hold spring when adjust bolt is removed.)
5. Remove screws which fix application drum bush.



6. Pull both application drum bushes to the thrust direction while melt tank is held.
7. Pull melt tank upward.
8. Install melt tank in the reverse procedure of removing.
9. Adjust the upper surface of scrape roller as shown in the drawing below and then lock scrape roller.

