

MKS-L

SIDE FEED APPLICATOR

Instruction Manual

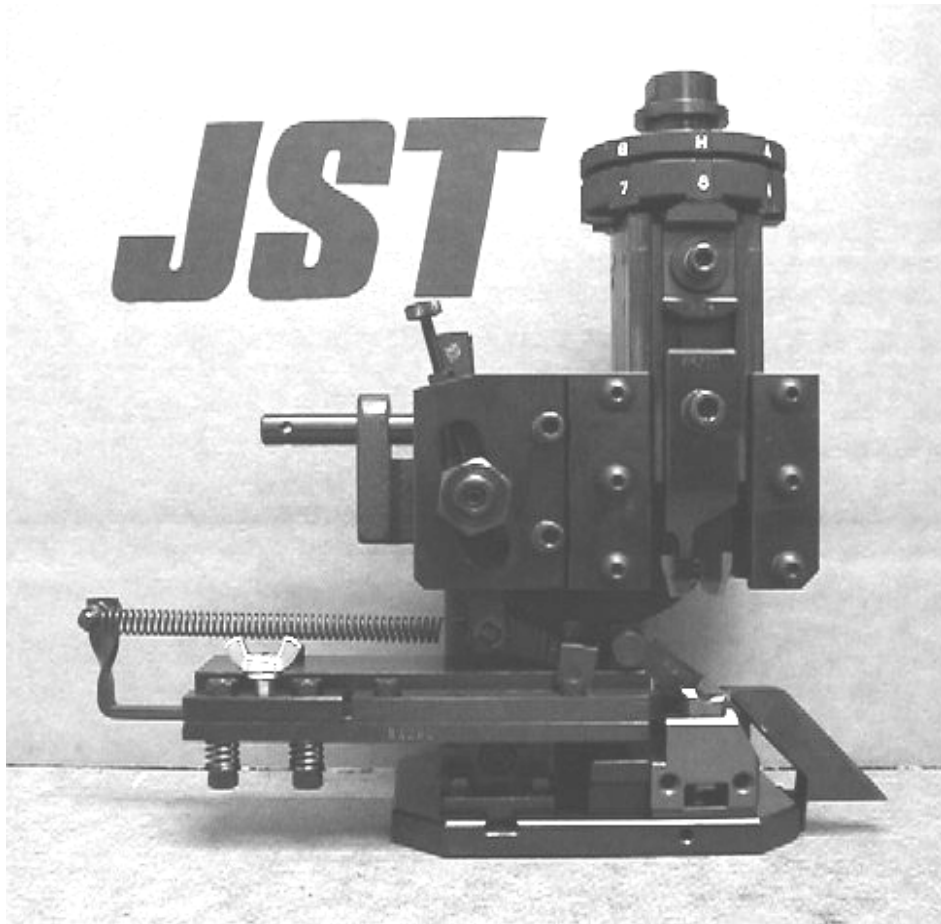


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1. Introduction

The JST MKS-L applicator applies side feed terminals to prestripped wires. A silver nameplate has been affixed to the side of the applicator indicating the die set that has been attached to the applicator to crimp the specified contact. The applicator has been preset and tested for this specific contact and samples crimped with the applicator at the time of assembly are included. In addition to this manual a copy of the Die Construction Sheet has been included with the applicator. The Die Construction Sheet includes crimp height and width information, die set parts list, and an exploded view drawing of the die set.

2. Specifications

The JST MKS-L side feed applicator was designed to operate in a JST AP-K2N crimping press and is fitted with a pre feed cam. Before installing this applicator in any other crimping press it is very important to check that the press can accept the following specifications.

- Weight.....14.1lbs (6.4kgs)
- Feed Distance.....1.18" (30mm) max.
- Crimp Height Adjustment.....Dial Type
- Shut Height.....6.299" (160mm)
- Applicator Speed.....4000 Cycles Per Hour**

**As a bench top operation the speed of the applicator is dependent upon the skill level of the operator. If mounted in an automated machine the applicator is reliable up to a speed of 4000 cycles per hour. In this case the optimum speed is dependent upon the characteristics of the machine and the rigidity of the wire insulation.

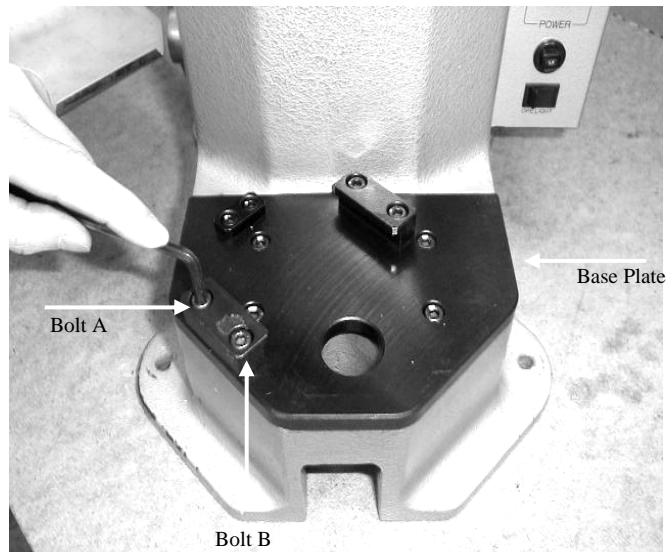
When installing the applicator to a press other than the JST Model AP-K2N it is extremely important to check that the shut height of the press is 6.299" (160mm). Installation in a press with the incorrect shut height can cause severe damage to the tooling. When the applicator has been newly installed to a press always hand cycle the press to confirm that it will cycle freely. If it will not cycle freely the press shut height will need to be adjusted.

3. Installation and Removal

3-1 Installation into AP-K2N press

3-1-1 Turn presses power off and disconnect from the receptacle.

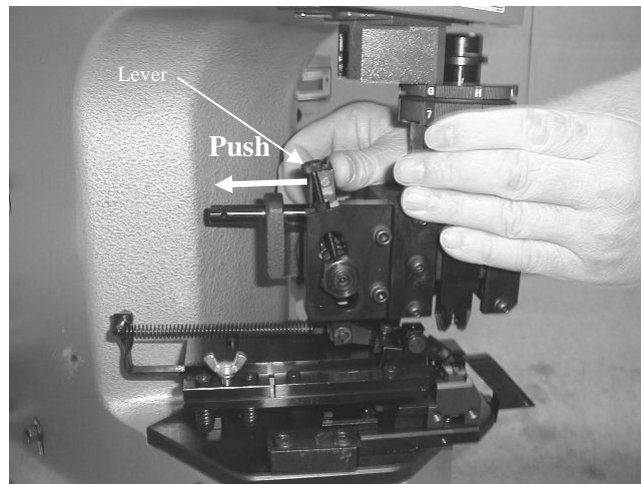
3-1-2 Loosen two bolts, A and B, on the applicator hold down guide with a 5mm hex wrench.



3-1-3 Remove the rubber-tooling protector from the applicator. Retain the rubber-tooling protector, as it must be replaced any time the applicator is removed from the press.



- 3-1-4 Place the applicator on the applicator base plate of the crimping press. Pull up on the slide while pushing back on the lever in the direction of the arrow shown in photo below so the collar on the top shank slides into the ram groove of the machine. Then push the applicator until it stops.



- 3-1-5 Snugly tighten bolts A and B on the applicator hold down guide with a 5mm hex wrench.



- 3-1-6 Replace all safety equipment per the instructions in the crimping machine manual.

3-2 Removal from AP-K2N press

3-2-1 Turn presses power off and disconnect from the receptacle.

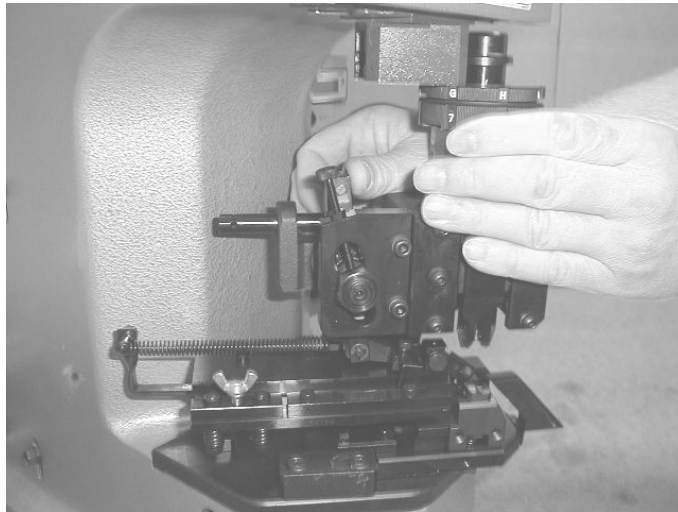
3-2-2 Replace the rubber-tooling protector around the slide of the applicator.



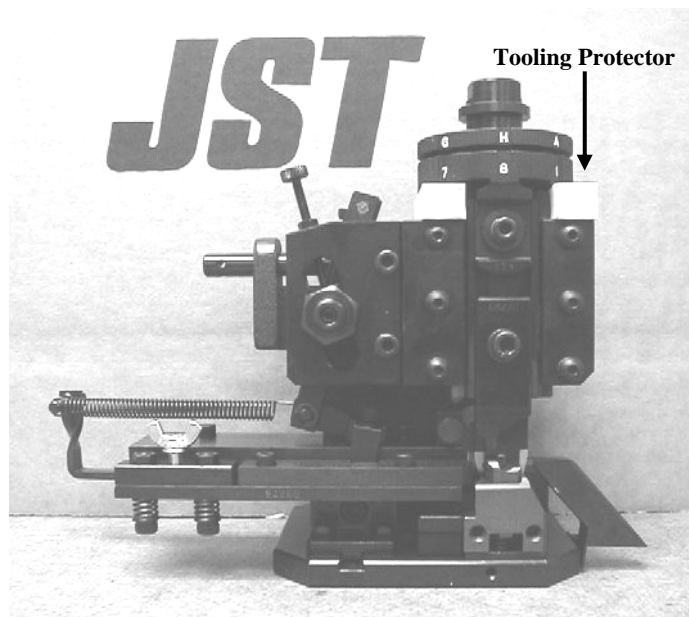
3-2-3 Loosen two bolts, A and B, on the applicator hold down guide.



3-2-4 Remove the applicator from the press while holding the slide so that it does not drop.



3-2-5 Lower the slide until it is closed on the protective tooling rubber.

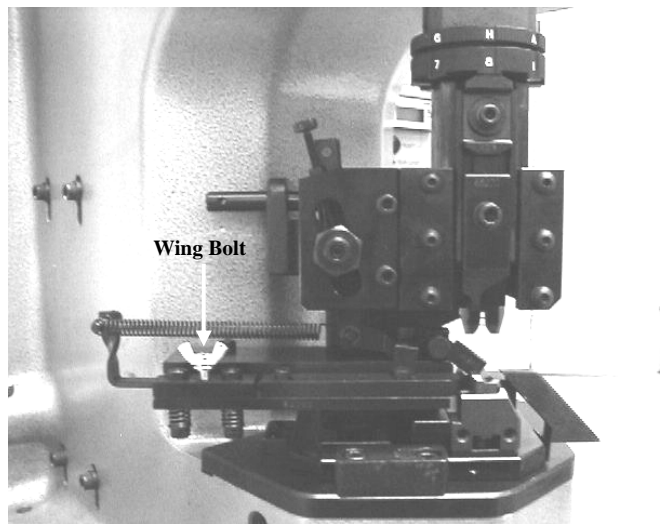


4. Loading and Unloading Terminals

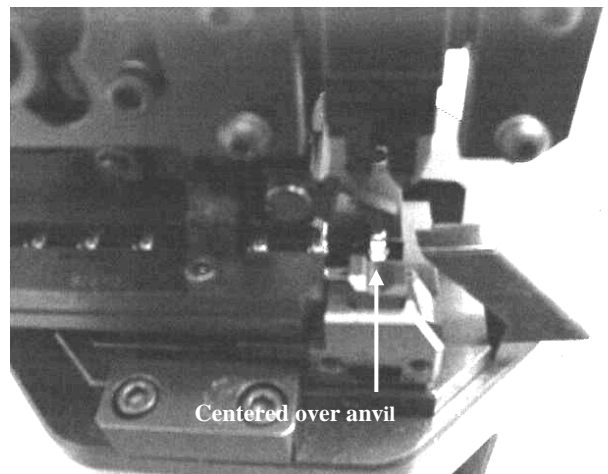
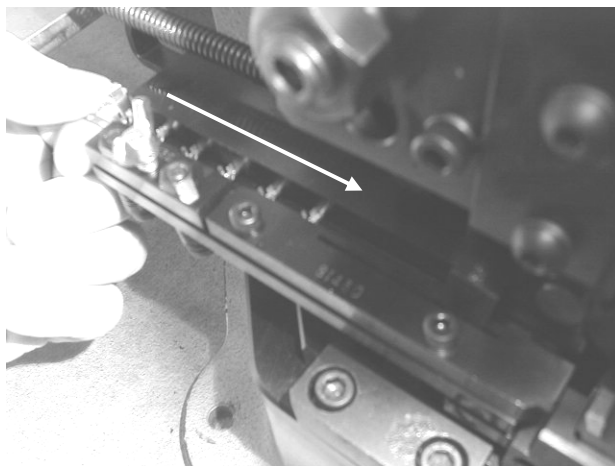
4-1 Loading Terminals Into The Applicator

4-1-1 Turn presses power off and disconnect from receptacle.

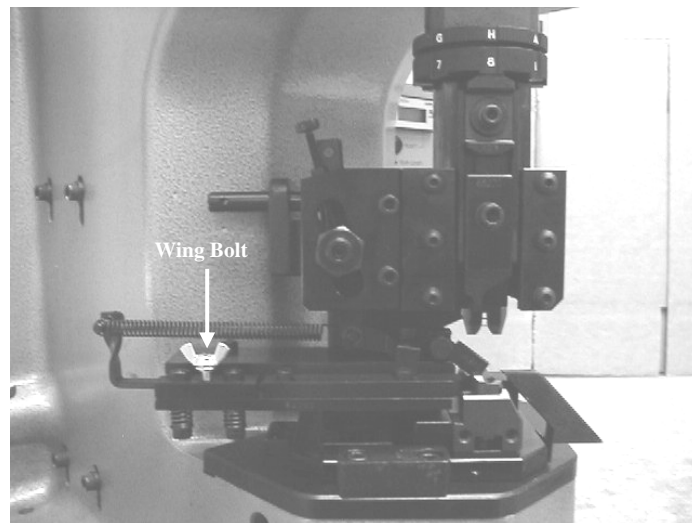
4-1-2 Rotate the wing bolt on the pressure plate clockwise to raise the pressure plate.



4-1-3 Feed the terminal strip under the pressure plate and through the guide plates until the first terminal is centered over the crimp anvils.

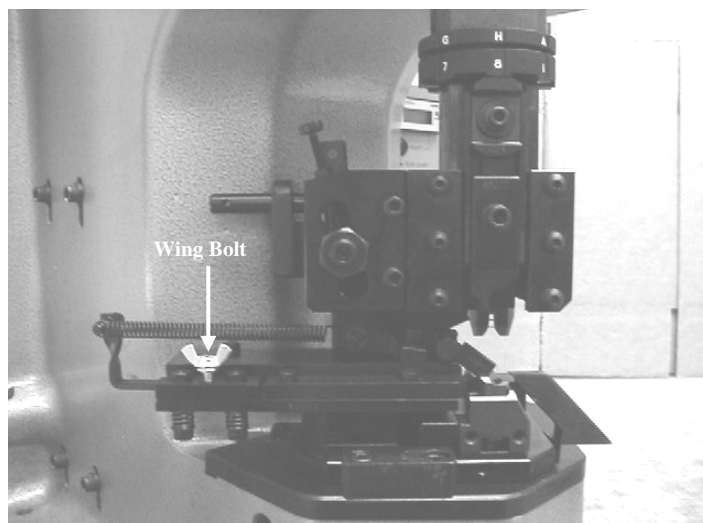


- 4-1-4 Rotate the wing bolt counterclockwise to lower the pressure plate so that pressure is applied to the terminal strip.

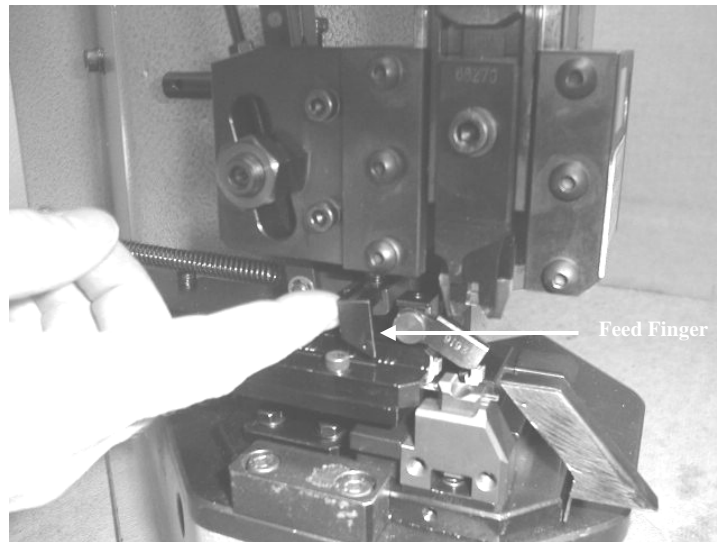


4-2 Unloading Terminals From The Applicator

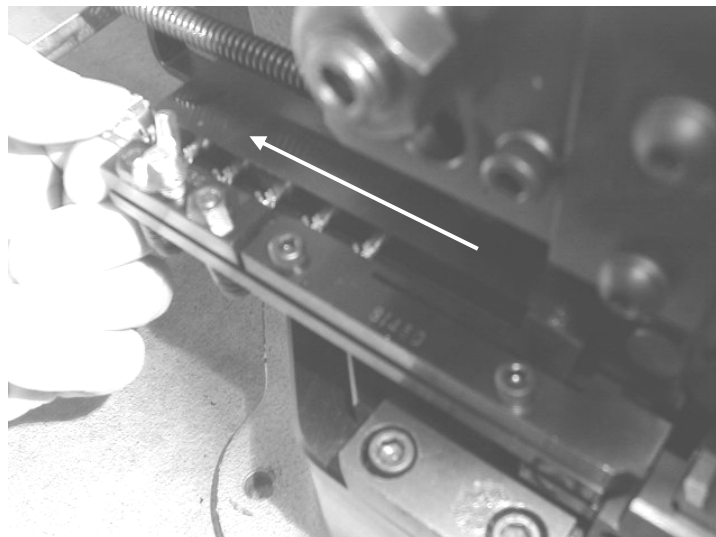
- 4-2-1 Turn presses power off and disconnect from receptacle.
4-2-2 Rotate the wing bolt on the pressure plate clockwise to raise the pressure plate.



4-2-3 Lift the feed finger so that it is no longer engaging the terminal strip.

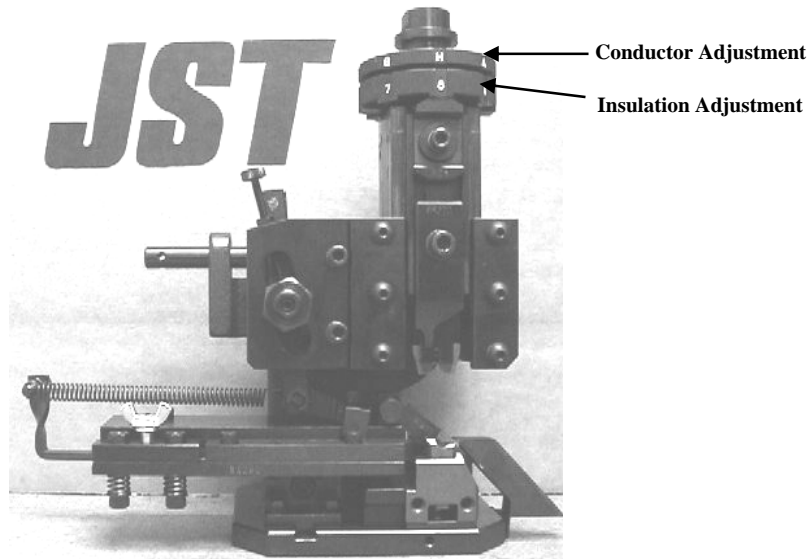


4-2-4 Remove the terminal strip from the applicator.



5. Crimp Height Adjustment

The applicator has two dials that are used to adjust crimp heights. The top dial is marked with letters A through H and is used to adjust the crimp height of the conductor barrel. The lower dial is marked with the number 1 through 8 and is used to adjust the crimp height of the insulation barrel.



CAUTION

1. *To avoid damage to the dies from excessive crimping set the dials to H-8 to begin crimp height adjustment.*
2. *The proper dial settings may differ depending on the wire. Always measure the crimp height with a micrometer to be sure the crimp height meets the desired value.*
3. *If the applicator does not provide the desired by adjusting the dials, replace the wire block of insulation block. Various sizes are available from JST. Tell JST the numbers on the blocks you are using and how far out of spec the crimp height is and we will be able to assist with the appropriate blocks. Do not adjust the shut height of the AP-K2N press to adjust crimp height.*

5-1 Conductor Crimp Height Adjustment

- 5-1-1 Turn the power to the press off and be sure the motor has come to a complete stop.
- 5-1-2 Set the top dial in the H position. This is the highest crimp height and is always the correct starting position.
- 5-1-3 Measure the crimp height and check to see if it is within the specification found on the Die Construction Sheet. If it is not within the specification lower the letter setting on the dial. The crimp height will decrease approximately .002" (0.05mm) per graduation. Continue the process until the correct crimp height is achieved.

5-2 Insulation Crimp Height Adjustment

- 5-2-1 Turn the power to the press off and be sure the motor has come to a complete stop.
- 5-2-2 Set the bottom dial in the 8 position. This is the highest position and is always the correct starting position.
- 5-2-3 Crimp a sample. If the desired crimp height is not attained lower the dial number. Continue the process until the desired crimp height is attained.

6. Assembly and Adjustments

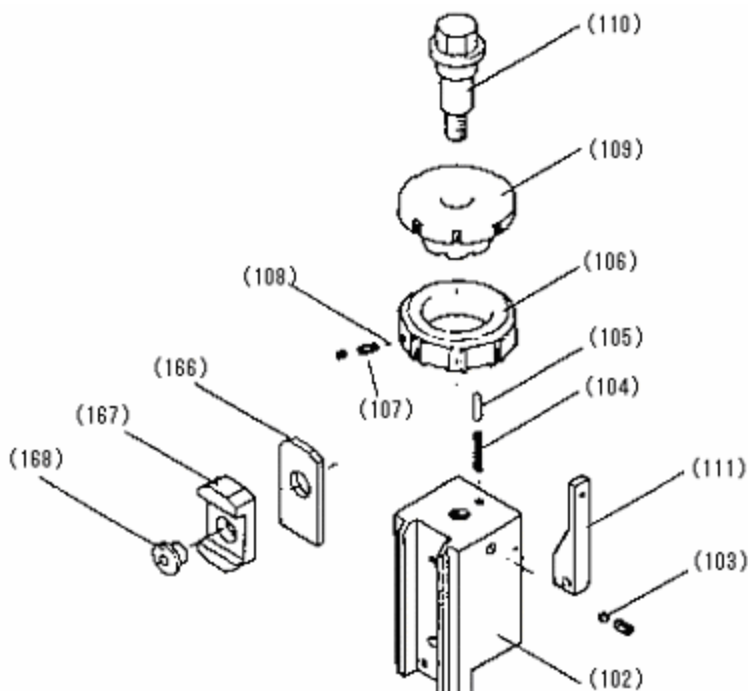
6-1. Slide part

6-1-1 Assembly of slide part

Install each part so that the part number faces outward and can be seen. Wire disk (No.109) and insulation disk (No.106) are attached by the shank (No.110). When removing them, loosen the set bolt on the right side of slide (No. 102), and then loosen shank (No.110). Tighten wire block (No.166), insulation block (No.167) and block ring (No.168) with fitting bolt. Wire block and insulation block should have movement in up and down directions.

6-1-2 Trouble cases

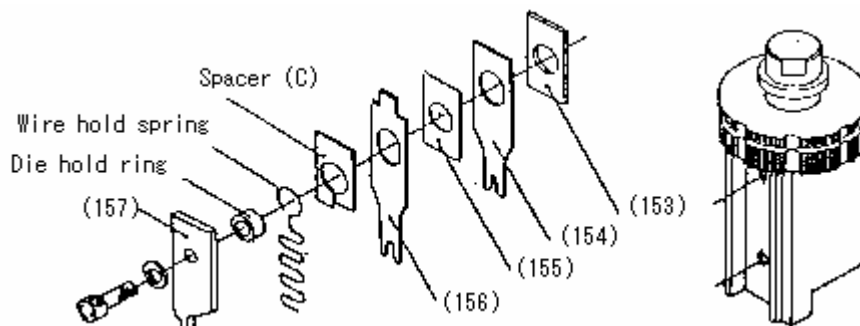
- (1) Dial does not turn smooth or not at all,
 - Caused by wire disk (No.109)
 - Positioning pin (No.105) and spring (No.104) do not work well due to rust, etc.
 - Wire block (No.166) and crimper (A) (No.154) are not assembled correctly due to slanting, adhesion of foreign matters, etc.
 - Insulation disk (No.106)
 - Steel ball (No.108) and spring (No.107) are defective or excessively tightened.
 - Incorrect fitting of insulation block (No.167) and crimper (B) (No.156) due to slanting, adhesion of foreign matters, etc.
- (2) Dial does not stop,
 - Wire disk (No.109)
 - Broken spring (No.104) or broken positioning pin (No.105).
 - Insulation disk (No.106)
 - Steel ball (No.108) is missing; spring (No.107) is missing or damaged, etc.



| | Part name |
|-----|---------------------|
| 102 | Slide |
| No. | Copper bar (*3.8x2) |
| 104 | Positioning spring |
| 105 | Positioning pin |
| 106 | Insulation disk |
| 107 | Spring |
| 108 | Steel ball |
| 109 | Wire disk |
| 110 | Shank |
| 111 | Cam |
| 166 | Wire block |
| 167 | Insulation block |
| 168 | Block ring |

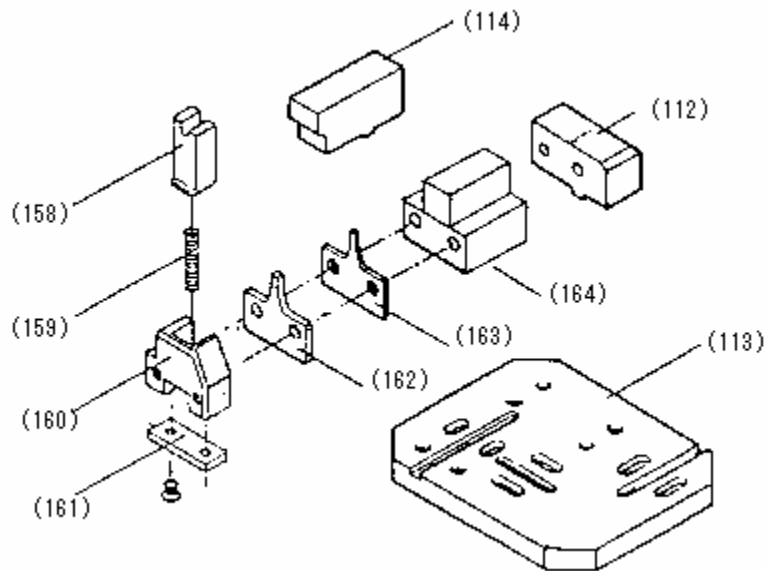
6-2. Upper die part

- 6-2-1 Install die parts so that part numbers face outward. Install spacer (A) (No.153) to the slide (No.102). Some die sets may not have a spacer (A). Install crimper (A) (No.154) and crimper (B) (No.156). Spacer (B) may be used between crimpers (A) and (B) for some die sets. Install punch (No.157) and tighten with bolt. Spacer (C) may be used between punch and crimper (B) for some die sets.
- 6-2-2 After tightening, crimpers (A) and (B) should have movement in the up and down directions. If the crimpers will not move check that the die parts have been installed flat, there is no foreign matter, all die parts are correct, etc.
- 6-2-3 Accessories
In cases where a wire hold spring, die hold ring, tongue hold punch, tongue hold punch holder and spring are included, pay attention to the length of fitting bolt so that it does not extrude to the front. This will prevent movement of crimpers (A) and (B).



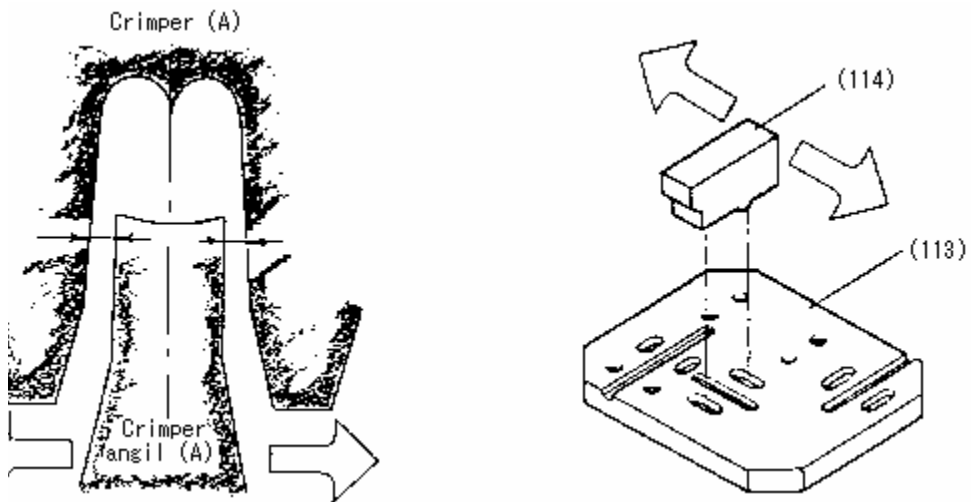
6-3. Lower Die Part

- 6-3-1 Do not move die block (No.112) and side block (No.114) that have been preset on the die plate (NO. 114) by JST. These blocks properly set the position of the crimper anvils in the side-to-side and front to back directions. Install spacer (No.164), crimper anvil (A) (No.163), crimper anvil (B) (No.162), shear blade supporter (No.160), shear blade base (No.161), shear blade spring (No.159), shear blade (No.158) in order and tighten with two bolts from the back of die block (No.112).
- 6-3-2 When tightening the two bolts, do so slowly alternating between the two bolts until they are snug. Be sure all parts are pushed against the side block (No. 114) and finish tightening.



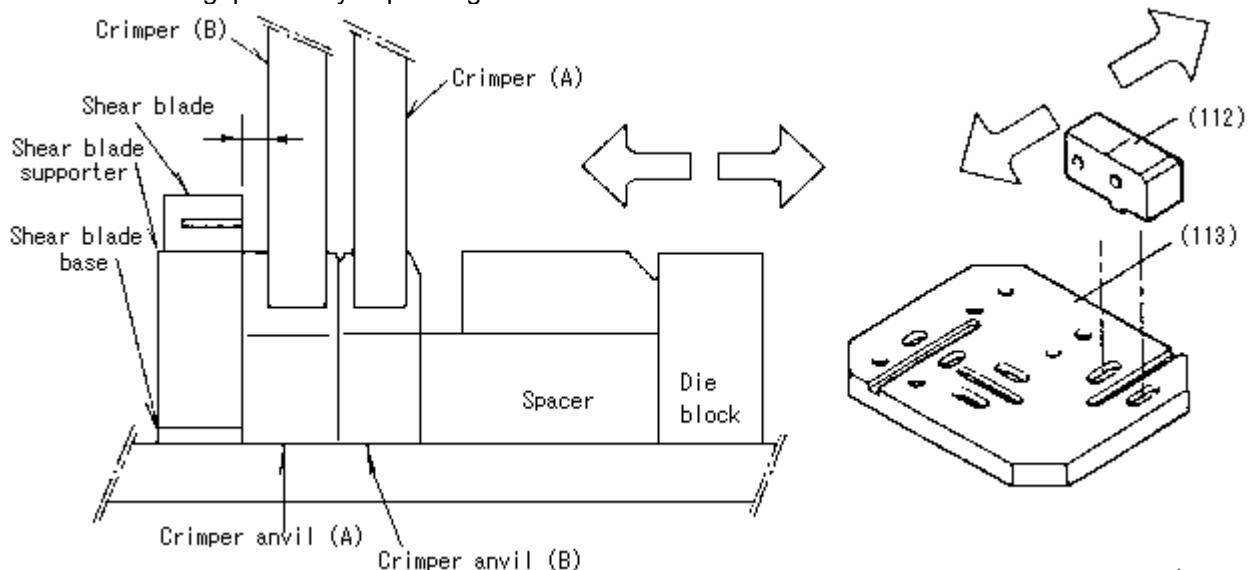
6-4 Centering of crimper and crimper anvil

- 6-4-1 Lower slide (No.102) little by little and check the gaps on both right and left sides of crimper and crimper anvil with loupe, etc. A white paper can be used in back to check the gaps more easily.
- 6-4-2 When the gaps are not even on the right and left sides, loosen bolt on side block (No.114) and adjust the gaps evenly on both the right and left sides and tighten the bolt securely.



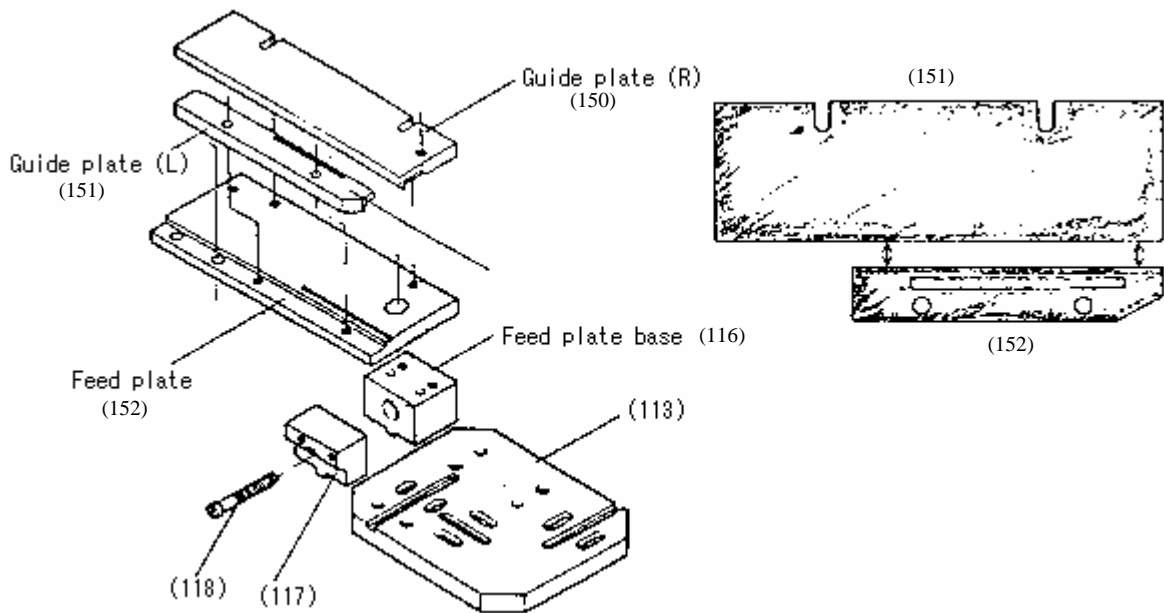
6-5 Gap between crimper (B) and shear blade

- 6-5-1 Check the gap between crimper (B) (No.156) and shear blade (No.158) lowering slide (No.102) little by little. (Reference the die construction sheet for value of gap).
- 6-5-2 When the gap is not within reference value, loosen the bolt on the die block (No.112). Move die block little by little to adjust the gap, and tighten bolt securely. The value of gap will vary depending on terminal to be used.



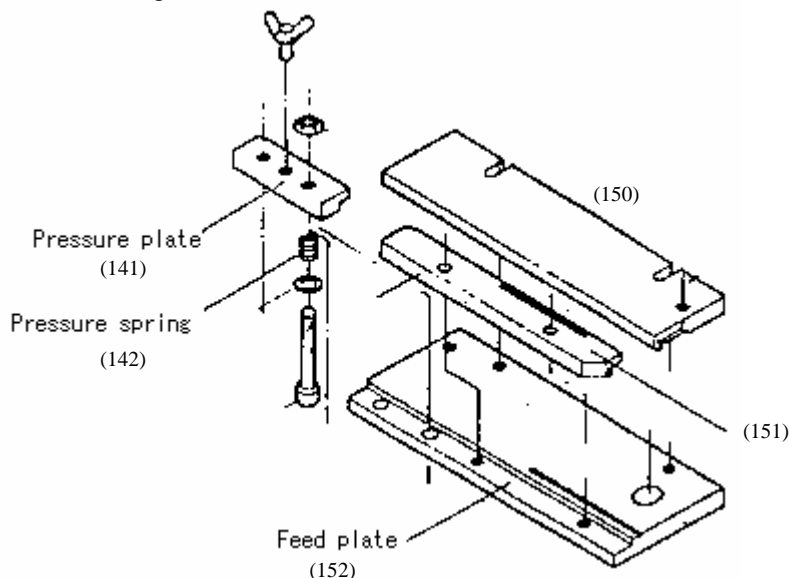
6-6. Guide plate part

Install feed plate (No.152) on feed plate base (No.116), which is mounted on die plate (No.113). Feed plate (No.152) is to be installed on feed plate base (No.116) in parallel. Install guide plate (L) (No.151) on feed plate (No.152) pushing to the back. Then, install guide plate (R) (No.150) on feed plate (No.152). Feed a strip of terminals between guide plate (R) (No.150) and guide plate (L) (No.151). Adjust guide plate (R) (No.150) so that the terminals are held straight, yet still move freely and tighten the screws. When properly adjusted the terminals will move freely from left to right, but will have no movement front to back.



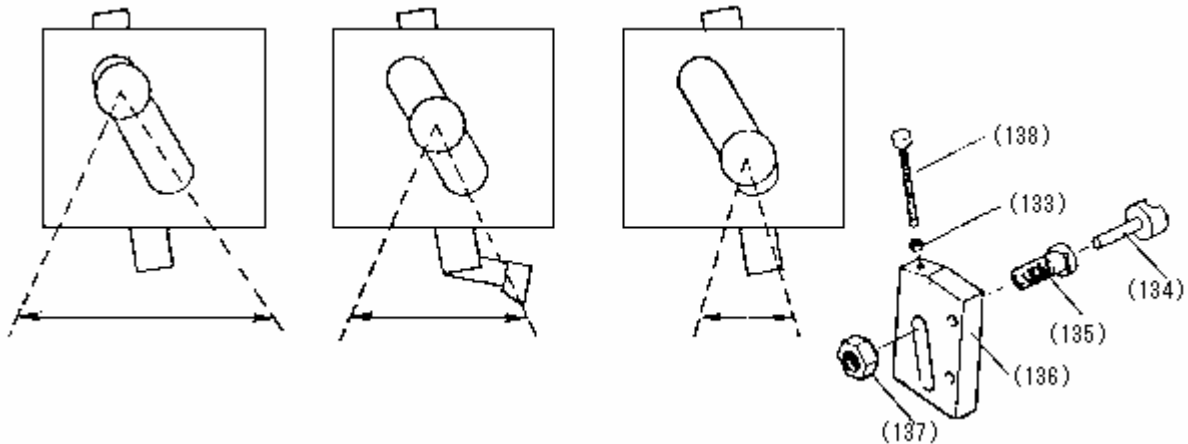
6-7 Pressure plate

Tighten pressure plate (No.141) with two bolts that have been placed through the pressure springs (No.142) from under the left side of feed plate (No.152). Adjust pressure strength so that terminal does not move back as the feed finger moves. After adjusting, lock securely with hexagon nut.

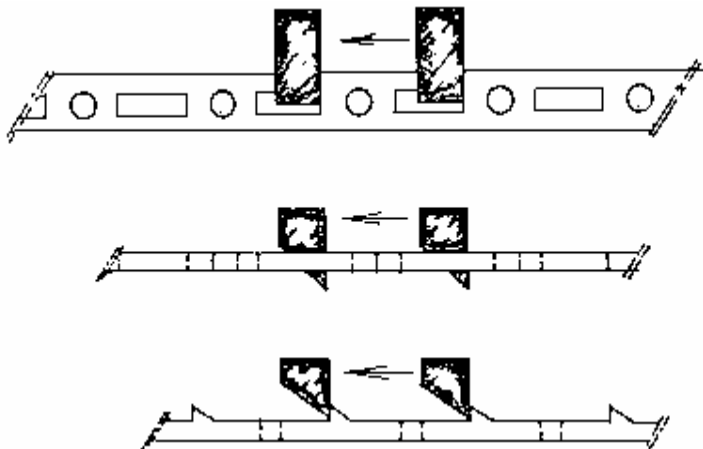


6-8 Terminal Feed Pitch

- 6-8-1 Adjustment of terminal feed pitch by stroke adjustment
Feed the terminals so that the contact is centered over crimper anvil (A) (No.163). Hold the terminal with pressure plate (No.141). To adjust the stroke pitch of feed finger (No.144) loosen the stroke adjust bearing nut (No.137) fitted to stroke adjust plate (No.136). Remove stroke adjust screw (No.138) and hexagon nut (No.133), and move the stroke adjust bearing (No.135) and stroke adjust shaft (No.134). Moving the stroke adjust bearing up will make the stroke pitch longer. Moving it down will shorten the stroke pitch.

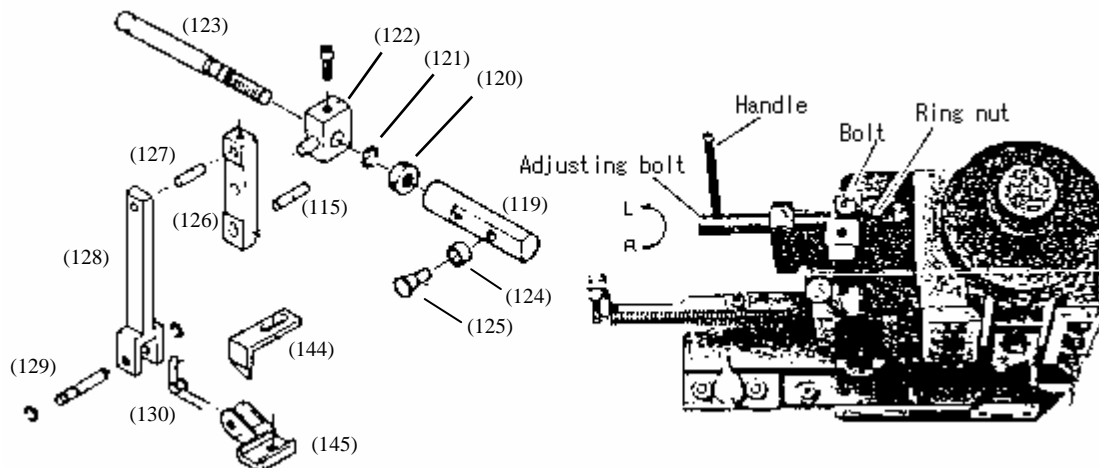


- 6-8-3 Adjust the stroke pitch from one square hole on the terminal carrier strip to the next square hole. When a square hole is not provided on the terminal carrier strip, use the round hole instead. When triangular protrusion is provided on the terminal strip carrier, use the protrusion to adjust terminal feed.



6-9. Terminal feed position

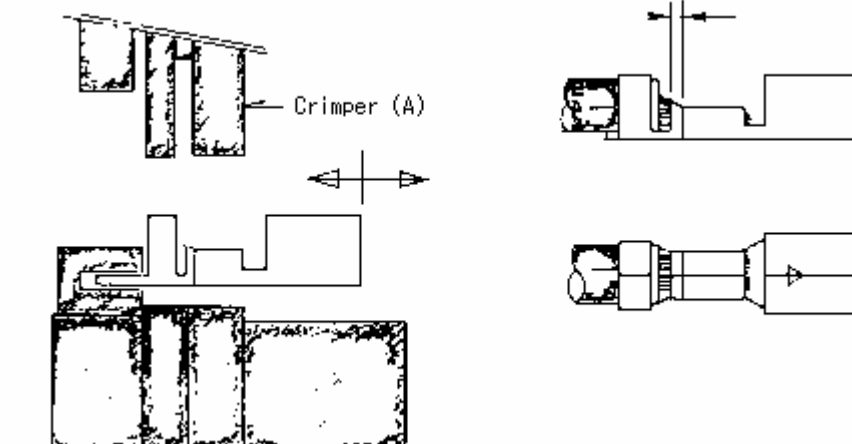
- 6-9-1 The relative position of terminal and crimping die is determined by the feed position. Adjust the feed position so that terminal is centered over the crimper anvil.
- 6-9-2 Loosen ring nut (No.120) and the screw on the lever block (No.122), turn adjusting bolt (No.123) to move feed finger (No.144) back and forth together with the terminal, and terminal position is adjusted. When adjusting bolt (No.123) is turned in the up (L direction), the feed finger moves forward. Turning in the down (R direction) moves the feed finger backward. Adjust the terminal position so that it is centered over the crimper anvil.
- 6-9-3 Adjust terminal feed positions after mounting applicator on crimping machine and checking that ram is upper dead center.



- 6-9-4 After adjustment, securely tighten the loosened bolt and ring nut (No.120).

6-10. Bell-mouth (Adjustment of crimping position)

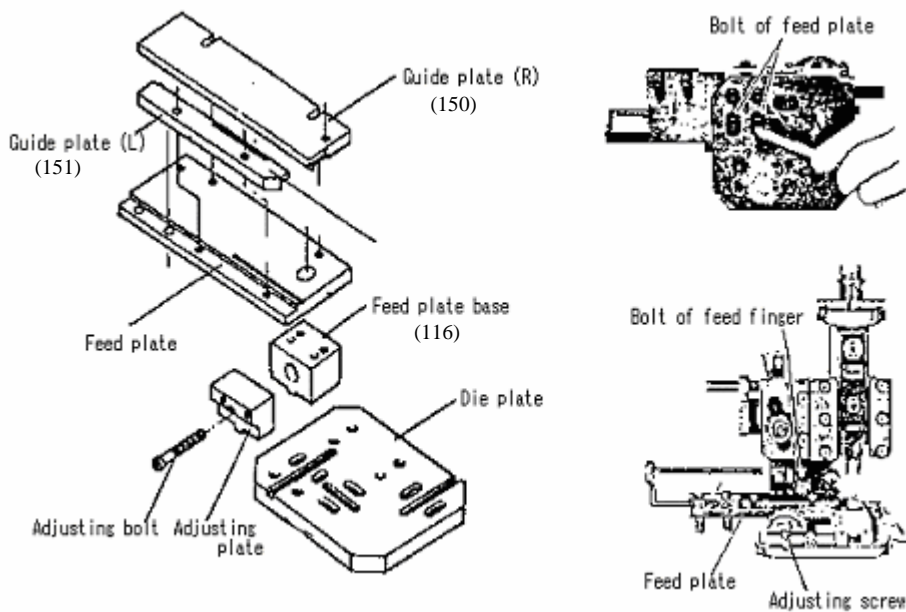
- 6-10-1 The bell-mouth is the area of the conductor barrel that is not hit by the crimper on a crimped terminal. The area that was not hit by the crimper slightly bulges and is called the bell-mouth. The proper bell-mouth on the insulation side of the conductor barrel will prevent breakage of wire conductor by providing a transition area from the insulation barrel to the conductor barrel. Reference value of the bell-mouth is the material thickness of the terminal.
- 6-10-2 When the terminal position is moved forward along with guide plate (L) (No.151) and guide plate (R) (No.150) the size of the bell-mouth increases. When the terminal position is moved back the size of the bell-mouth decreases.



6-11. Bell-mouth Size

6-11-1 When adjusting bolt (No.118) is turned to right (clockwise) after loosening the two bolts on feed plate base (No.116), feed plate (No.152) moves to back decreasing the bell-mouth. When the adjusting bolt is turned to left (counterclockwise), quantity of the bell-mouth increases.

6-11-2 Before feed plate (No.152) is moved to adjust the bell-mouth; the screw that holds feed finger (No.144) must be loosened. Failure to loosen the feed finger screw will either prevent the feed plate from moving or break the feed finger. After adjusting quantity of bell-mouth, center the feed finger (No.144) in the slot part of guide plate



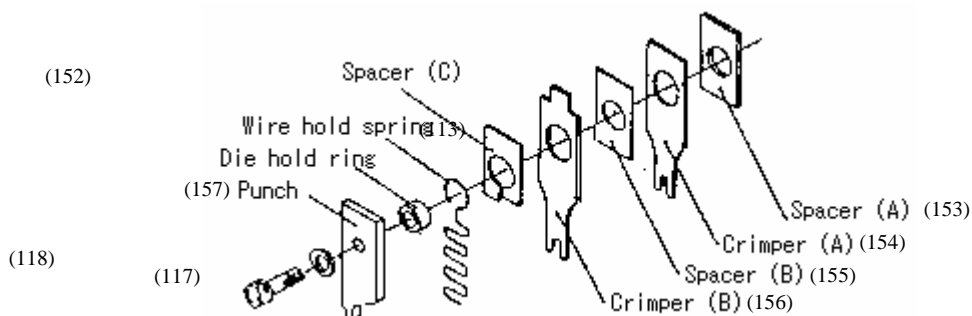
(L) (No.151) and tighten the screw.

6-12 Accessories

6-12-1 Wire hold spring can be mounted in two areas.

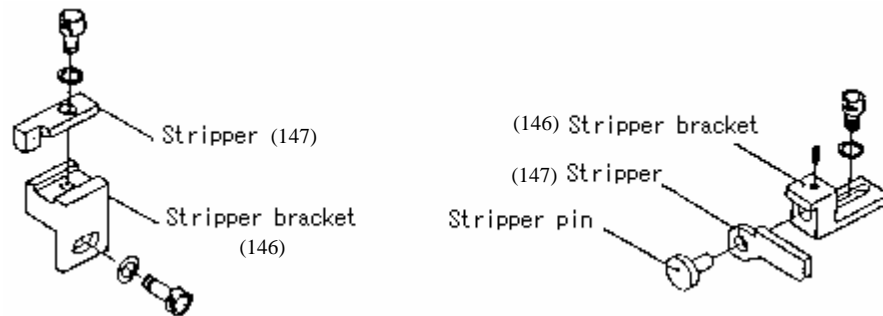
- Between crimper (A) (No.154) and crimper (B) (No.156).
- Between crimper (B) (No.156) and punch (No.157). In this case, Note that configuration and part number of shear blade (No.158) change.

Always check the explode view of the Die Construction Sheet before assembling this section.



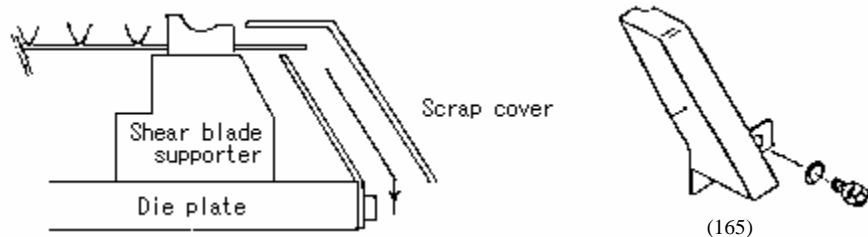
6-12-2 Stripper

Stripper (No.147) is available in two types. A stationary type (left below) that is mounted to the spacer (No.164) or a moving type (right below) that is mounted to guide plate (R) (No.150). To adjust stripper position, move the stripper bracket (No. 146) back or forth depending on the wire strip length. Note that moving the stripper too far forward will place it under crimper (A) (No.154) causing all the parts to be damaged, while moving the stripper too far backward may cause deformation and bending of the terminal.



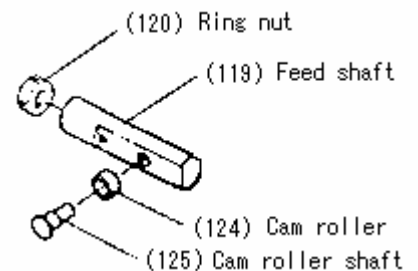
6-12-3 Scrap cover

Scrap cover (No.165) is to collect the cut off terminal carrier strip pieces away from the working area. Note that dislocation of position may cause clogging of terminals or damage to dies.



6-12-4 Cam roller and cam roller shaft

Cam roller (No.124) rotates as it moves along the cam (No.111). Abnormal abrasion of the cam roller may cause dispersion in terminal feeding.



7. Trouble Shooting

7-1 When dial does not turn or stop,

- Crimper, spacer and each block are not assembled correctly due to slant, adhesion of foreign matters, etc.
- Incorrect die hold ring is used. (Dimension is different.)
- Defective parts
 - Disk at wire conductor side (Dial: A ~ H)
...Malfunction of positioning pin (No.105) and spring (No.104)
 - Disk at wire insulation side (Dial: 1 ~ 8)
...Malfunction of steel ball (No.108) and spring (No.107)

7-2 Dispersion or malfunction of terminal feeding

- Improper stroke adjustment of feed finger (No.144)
- Broken feed finger spring (No.130)
- Loosened fitting bolt of feed finger (No.144)
- Deformation, crack, breakage, abnormal abrasion, etc. of cam roller (No.124) and cam roller shaft (No.125)
- Abnormal abrasion of cam (No.111)
- Insufficient pressure strength of pressure plate (No.141)
(Improper adjustment and adhesion of foreign matters such as waste, dust, paper, plating powder, etc.)

7-3 Jamming of terminals

- Incorrect adjustment (too narrow) of guide plates (L) (No.151) and (R) (No.150)
- Shear blade (No.158) does not cut well due to abrasion. Check shear blade supporter (No.160) as well.
- Deformation of terminal

7-4 It is difficult to remove the crimped terminal from the applicator after crimping.

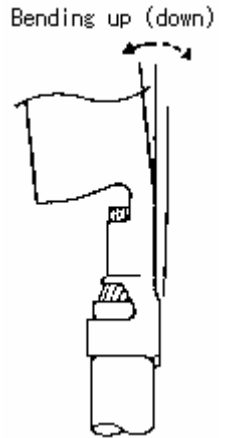
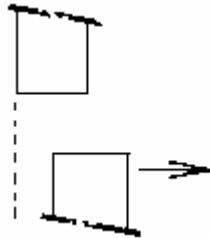
- Abnormality of internal surface of crimper (A) (No.154) and (B) (No.156) caused by
flaw, roughness, peeling off of plating, etc.
- Malfunction such as incorrect position, coming off, etc. of stripper (No.147)

7-5 Dispersion of bell-mouth

- Incorrect adjustment such as excessive gap of guide plates (L) (No.151) and (R) (No.150)
- Incorrect mounting of crimper
- Dispersion of feeding position
 - Bolt-holding feed finger (No.144) is not secure
 - Insufficient pressure of pressure plate (No.141)
- Bolts holding the feed plate (No.152) are not secure

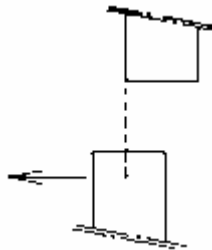
7-6 Bending up

- The position of crimper anvil (A) (No.163) is adjusted too far back from crimper (A) (No.154).
- Excessive crimping



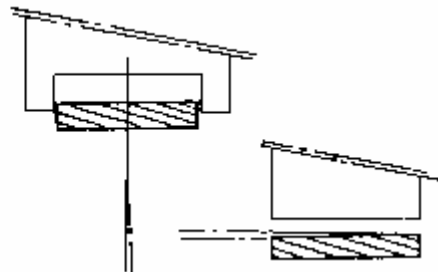
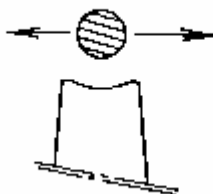
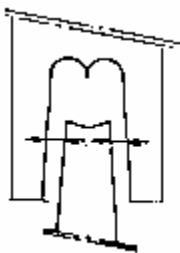
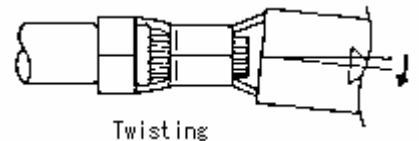
7-7 Bending down

- The position of crimper anvil (A) (No.163) is excessively this side (near side) against crimper (A) (No.154).
- Incorrect position of stripper (No.147) (The position is excessively back.)
- Malfunction of crimper (Biting)



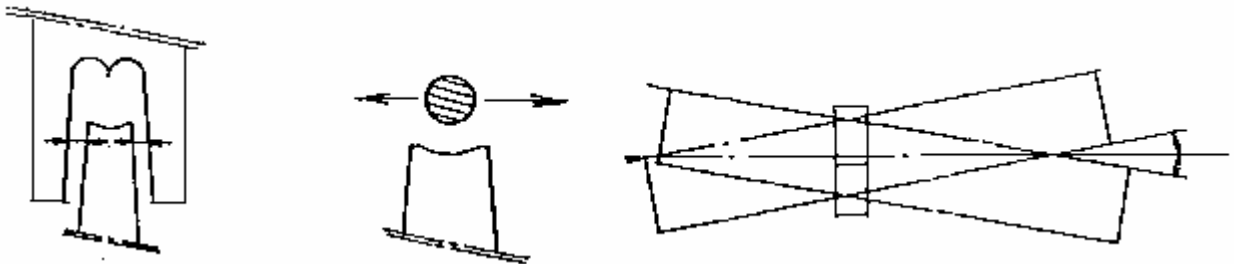
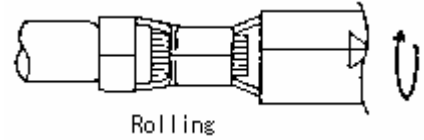
7-8 Twisting (Bending, shaking)

- Incorrect centering of dies
- Incorrect mounting of dies
- Defective feeding (The position of terminal is not right on crimper anvil.)



7-9 Rolling

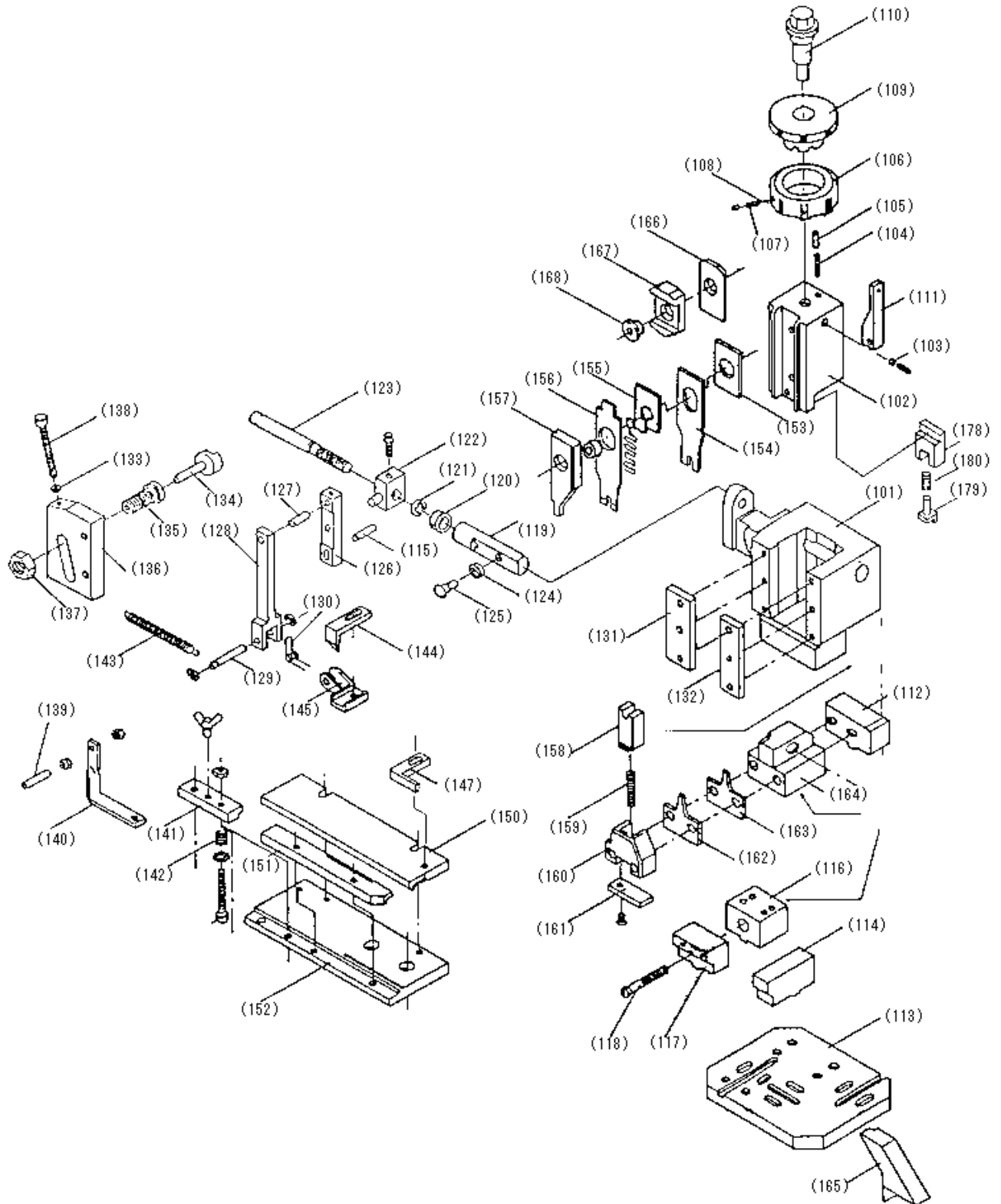
- Incorrect centering of dies
- Defective feeding (The position of terminal is not right on crimper anvil.)
- Terminal is install on the slant against crimper anvil (A) (No.163).



8. MKS-L Parts List

| No. | Part name | Part No. | No. | Part name | Part No. |
|-----|------------------------------|------------|-----|-------------------------------|----------|
| 101 | Body | MA03-101 | 143 | Return spring | MA03-349 |
| 102 | Slide | MA03-210 | 144 | Feed finger | |
| 103 | Copper bar (*3.8 x 2) | | 145 | Feed finger holder | |
| 104 | Positioning spring | MA01-214 | 146 | Stripper bracket | |
| 105 | Positioning pin | MA01-213 | 147 | Stripper | |
| 106 | Insulation disk | MA01-215 | 148 | | |
| 107 | Spring | MA01-216 | 149 | | |
| 108 | Steel ball | | 150 | Guide plate (R) | |
| 109 | Wire disk | MA01-211 | 151 | Guide plate (L) | |
| 110 | Shank | MA01-217 | 152 | Feed plate | |
| 111 | Cam | MA03-335 | 153 | Spacer | |
| 112 | Die block | MA03-105-1 | 154 | Crimper (A) | |
| 113 | Die plate | MA03-104 | 155 | Spacer (B) | |
| 114 | Side block | MA03-107 | 156 | Crimper (B) | |
| 115 | Feed lever support pin | MA01-343 | 157 | Punch | |
| 116 | Feed plate base | MA03-106 | 158 | Shear blade | |
| 117 | Adjusting plate | MA03-108 | 159 | Shear blade spring | |
| 118 | Adjusting bolt | MA03-109 | 160 | Shear blade supporter | |
| 119 | Feed shaft | MA01-338 | 161 | Shear blade base | |
| 120 | Ring nut | MA01-341 | 162 | Crimper anvil (B) | |
| 121 | E-shaped retaining ring (*6) | | 163 | Crimper anvil (A) | |
| 122 | Lever block | MA01-340 | 164 | Spacer | |
| 123 | Adjusting bolt | MA01-339 | 165 | Scrap cover | |
| 124 | Cam roller | MA01-308A | 166 | Wire block | |
| 125 | Cam roller shaft | MA01-337A | 167 | Insulation block | |
| 126 | Feed lever (A) | MA01-342 | 168 | Block ring | MA01-225 |
| 127 | Feed lever pin | MA01-344 | | | |
| 128 | Feed lever (B) | MA01-345 | | | |
| 129 | Feed finger pin | MA01-347 | | | |
| 130 | Feed finger spring | MA01-348 | 178 | Tongue part hold punch holder | |
| 131 | Plate (L) | MA03-102 | 179 | Tongue part hold punch | |
| 132 | Plate (R) | MA03-103 | 180 | Tongue hold spring | |
| 133 | Hexagon nut (M4, type 1) | | | | |
| 134 | Stroke adjusting shaft | MA01-331 | | | |
| 135 | Stroke adjusting bearing | MA01-332 | | | |
| 136 | Stroke adjusting plate | MA03-330 | | | |
| 137 | Stroke adjusting bearing nut | | | | |
| 138 | Stroke adjusting screw | MA01-334 | | | |
| 139 | Spring anchor pin | MA03-352 | | | |
| 140 | Spring anchor | MA03-350 | | | |
| 141 | Pressure plate | | | | |
| 142 | Pressure spring | | | | |

9. MKS-L Exploded View Drawing



10. Preventive Maintenance

Quality Statement

The quality of a finished crimp is dependent on the use of the manufacturers specified application tooling that has been cleaned and maintained in accordance with the following schedule.

10-1. Daily Care

- 10-1-1 Turn off the crimping press and isolate from the electricity supply. Remove the safety covers from the crimping press.
- 10-1-2 Clean all wire and terminal scrap from the tooling with the aid of a small paintbrush.

Caution



The use of a pneumatic airline to clean the tooling should be avoided. Any debris on the tool will be blown away under great force and could either cause injury to persons nearby or be forced into moving parts of the tooling.

- 10-1-3 Visually check the crimping dies, shear section and stripper blade for evidence of wear or damage. If any parts are damaged, please contact JST to order replacement parts.
- 10-1-4 Check that there is a thin film of grease on the bearing surface of the ram, if necessary apply general-purpose grease to restore the lubrication. Do not over grease the ram, because the excess grease will either drip onto the tooling or will attract debris.
- 10-1-5 Check that the dial settings are aligned correctly over the crimping punches and that they are correctly set to the pre-determined reference position.
- 10-1-6 Check that the safety covers are in a good serviceable condition and replace on the tooling. Clean the polycarbonate safety cover with a general-purpose aerosol spray cleaner to restore good visibility.

10-2 Weekly care, or when removing the applicator from the press for storage.

In addition to the daily checks, the following maintenance should also be carried out on the tooling.

- 10-2-1 Remove the crimping punches from the ram (part numbers are affixed 63*** or 64***); please note the sequence of disassembly so that the parts can be replaced in the correct order. Refer to the Dies Construction Sheet supplied with the tooling for the assembly order.
- 10-2-2 Hold each crimping punch in a vice and with the aid of a piece of waste cloth apply a small amount of a good quality metal polish into the crimp form of the punch. Using a sawing motion, polish the form until a brilliant mirror-like finish is restored.

- 10-2-4 Replace the crimping punches in the ram ensuring that the punches are free to move in a lateral axis when the retaining screw is fully tightened.
- 10-2-5 Remove the applicator from the crimping press (check the press operation manual for instructions if you are unsure of how to remove the applicator from the press.)
- 10-2-6 Check the security of the fastenings. If any part is loose, tighten with the appropriate hexagon key or spanner supplied with the crimping press.
- 10-2-7 Remove the ram from the main body of the applicator and clean off all the old grease from the ram, feed cam and the mating surface of the applicator.

Caution



If an aerosol degreaser is used to clean the tooling, ensure that all traces of the solvent are removed prior to reassembly.

- 10-2-8 Apply a thin smear of general-purpose grease to the bearing surfaces of the ram, feed cam and cam-roller assembly and replace in the body of the applicator.
- 10-2-9 Apply a few drops of light machine oil to each of the pivot points on the feed-arm mechanism.
- 10-2-10 Replace the applicator in the press.
- 10-2-11 Replace the safety covers.
- 10-2-12 If it is not intended to replace the applicator in the press, please ensure that the rubber collar supplied with the tooling is placed between the dials and the applicator body. This action will avoid any damage occurring to the crimping dies due to percussive shock when the crimping punches make contact with the crimping anvils.

Notes

Recommended materials for maintenance:

Recommended grease should be of the general purpose 'LM' type.

Recommended oil is general-purpose machine oil, i.e. '3-In-OneTM' oil

Recommended metal polish is of the paste type, i.e. 'Solvol AutosolTM'

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The contents of this document are subject to revision from time to time. For the latest issue of this leaflet, please contact J.S.T.