

ROYAL MASTER

Revision:2007.6

# Royal Puncher

## Instruction Manual

### Models

506NSW  
606NSW  
706NSW  
711NSW  
911NSW  
1101SW  
1150SW



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## SAFETY PRECAUTIONS FOR ROYAL PUNCHERS

1. To ensure safe operation of hydraulic punchers, be sure to first read the following instructions:

The following provides important safety instructions that must always be observed in connecting, operating and inspecting a hydraulic puncher(s).



1) Be sure to read the instruction manual for a hydraulic pump to be connected to a puncher(s), and observe all the safety instructions. Improper handling of the hydraulic pump may cause electric shock or an injury when the puncher is operated.



2) An ultra-high hydraulic pressure exceeding 70 MPa is used. Therefore, even if there should be an oil leak from the coupler, a hydraulic hose or other connections, never try holding down, plugging or covering the leaking part with bare hands. Doing so may result in a risk of oil being injected to the inside of the hand skin.



3) Use a puncher within its maximum capacity, and do not use it in other purposes than punching steel plates. Ignoring this warning and performing compression, compaction or punching may damage its cutting section (punch and dice), causing an unexpected accident or puncher failure.



4) To replace a cutting tool (punch and dice) for instance, be sure to first turn off the hydraulic pump, or disconnect the puncher operating cord connector. Failure to do so may result in accidental operation of the puncher, resulting in an injury.



5) Use the puncher within its specified capacity. Even if the puncher has a higher punching capacity, using it outside the specified value may extremely shorten the puncher life.



6) Avoid making modifications to or welding on the puncher body without consultation with us. Failure to do so may result in damage or failure, meaning that it will not covered by our guarantee.

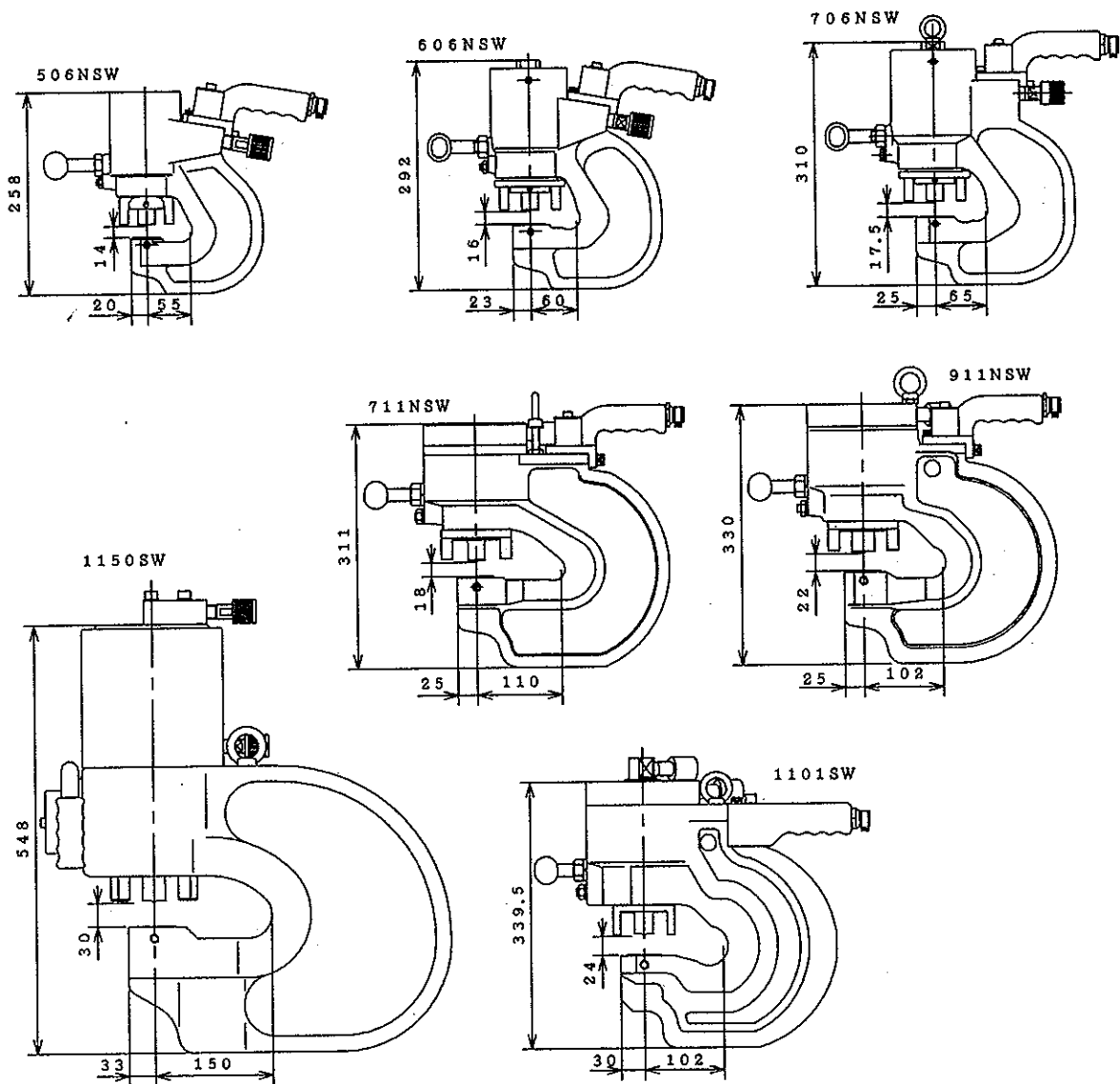
## 2. Puncher capacity and outside appearance by model

Max. hole diameter for max. plate thickness, and max. plate thickness for max. hole diameter  
(for plate material SS400)

Model	506NSW		606NSW		706NSW		711NSW		911NSW		1101SW		1150SW	
Max. hole diameter ( $\phi$ )	18	24	22	24	24	25	24	28	24	28	25	28	30	32
Max. plate thickness (mm)	↑	↓	↑	↓	↑	↓	↑	↓	↑	↓	↑	↓	↑	↓
	12	9	12	12	16	15	16	15	20	17	21	19	25	23

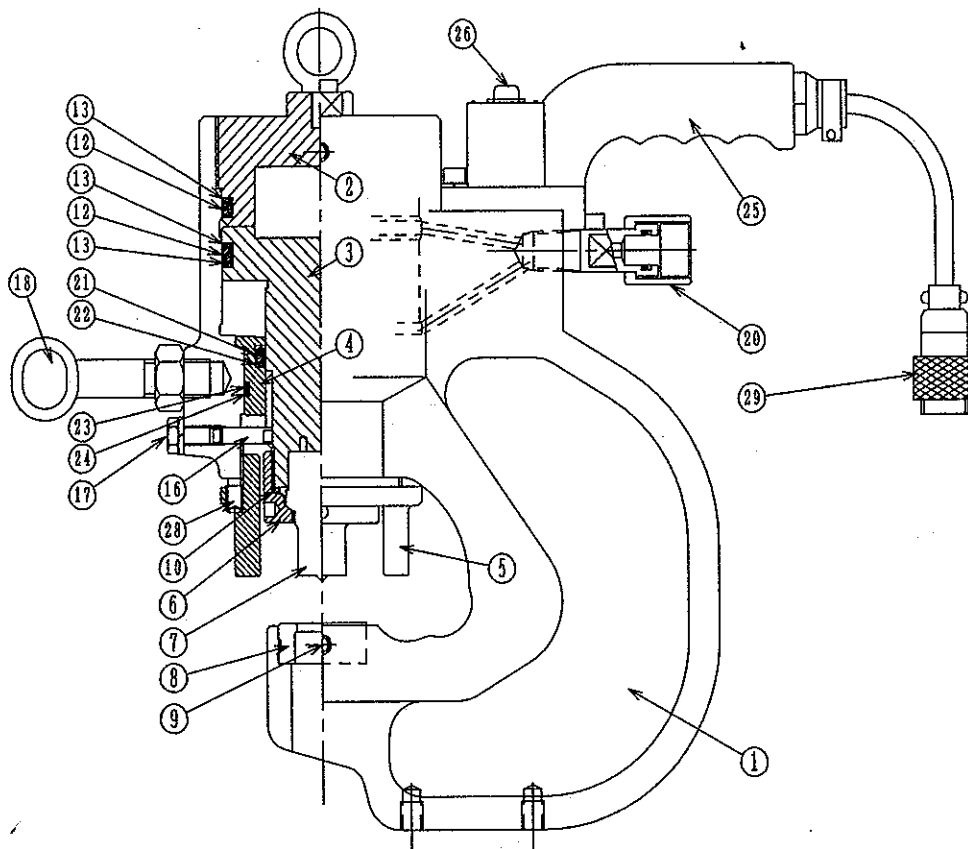
Note: Punching under combination of max. hole diameter and max. plate thickness exceeds the puncher capacity.

### External View of Each Royal Puncher Model



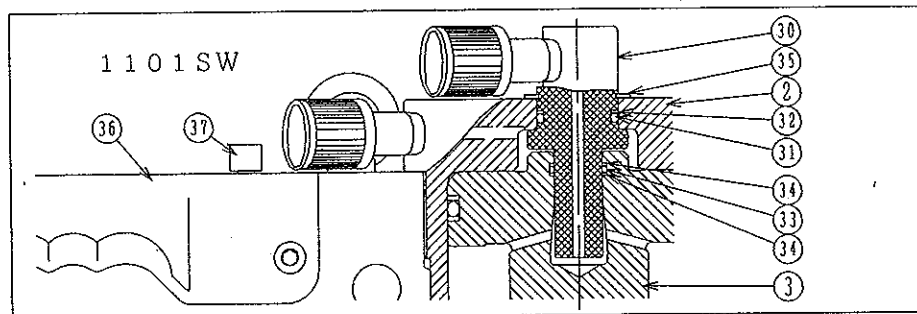
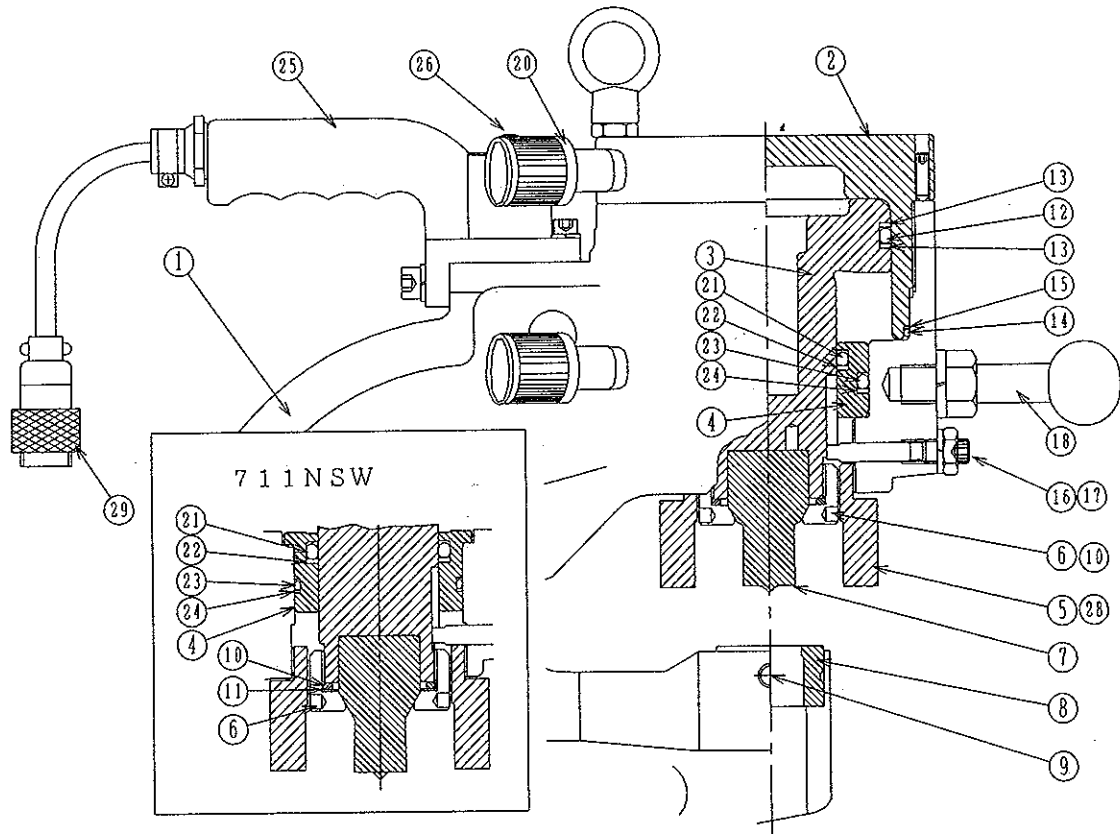
### 3. Name of each part

Models: 506NSW, 606SW & 706SW



No.	Part Name
1	Puncher body
2	Cylinder cap
3	Piston rod
4	Seal ring
5	Stopper
6	Punch cap
7	Punch
8	Die
9	Die setscrew
10	O-ring for locking punch cap
12	O-ring
13	Backup ring
16	Detent key
17	Detent screw
18	Front handle
20	Female coupling (black & white)
21	O-ring
22	Backup ring
23	O-ring
24	Backup ring
25	Rear handle
26	Pushbutton switch assy.
28	Fixing screw
29	Metal connector

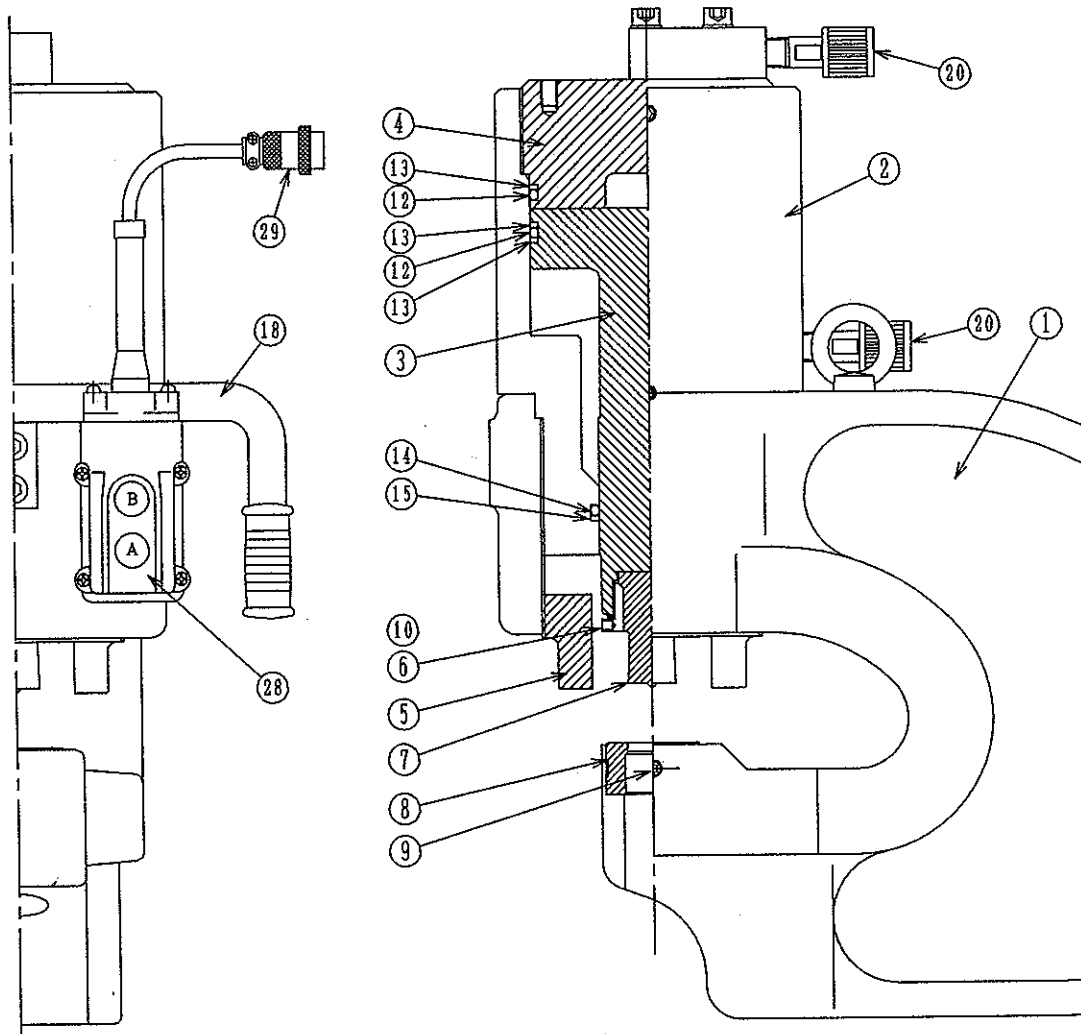
Models: 711NSW, 911NSW & S1101SW



No.	Part Name
1	Puncher body
2	Cylinder
3	Piston rod
4	Seal ring
5	Stopper
6	Punch cap
7	Punch
8	Die
9	Die setscrew
10	O-ring for locking punch cap
11	711N spacer
12	O-ring
13	Backup ring
14	O-ring
15	Backup ring
16	Detent key
17	Detent screw
18	Front handle

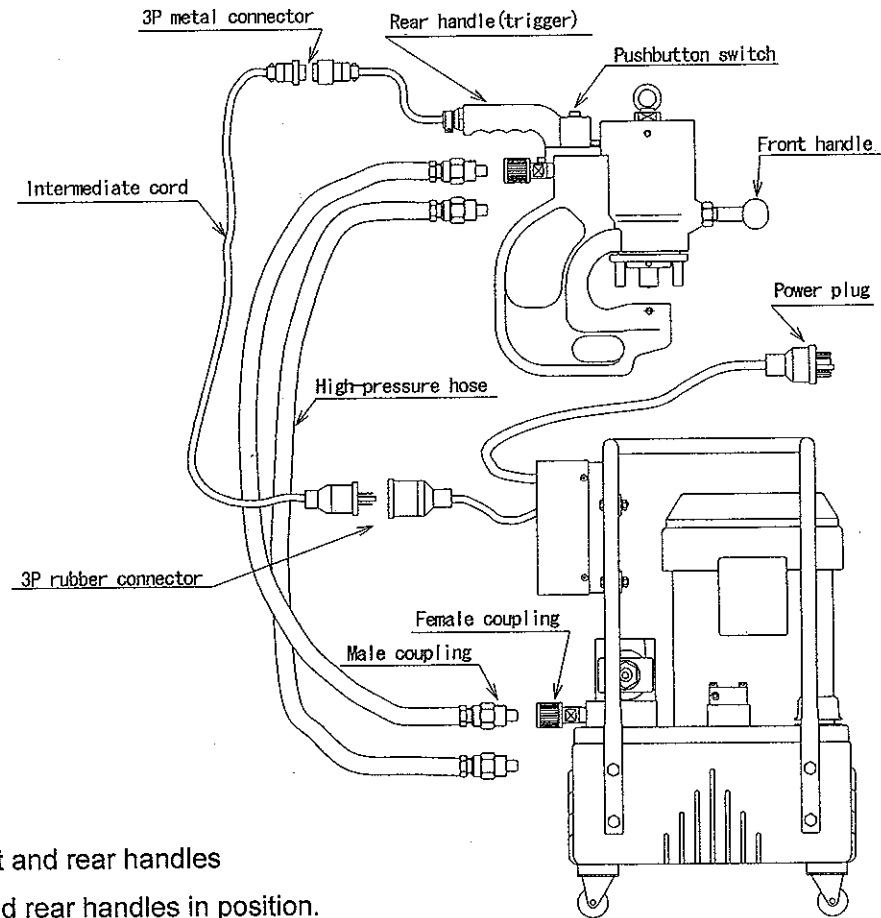
No.	Part Name
20	Female coupling (black & white)
21	O-ring
22	Backup ring
23	O-ring
24	Backup ring
25	Rear handle
26	Pushbutton switch assy.
28	Fixing screw
29	Metal connector
30	B-port shaft
31	O-ring
32	Backup ring
33	O-ring
34	Backup ring
35	Retaining ring
36	1101 rear handle
37	Pushbutton switch

Model 1150SW



No.	Part Name
1	Puncher body
2	Cylinder
3	Piston rod
4	Cylinder cap
5	Stopper
6	Punch cap
7	Punch
8	Die
9	Die setscrew
10	O-ring for locking punch cap
12	O-ring
13	Backup ring
14	O-ring
15	Backup ring
18	Handle
20	Female coupling (black & white)
28	Operating switch
29	Metal connector

## 4. Assembling and connecting the puncher



### 1) Installing the front and rear handles

Install the front and rear handles in position.

### 2) Connecting the hydraulic hoses

Disconnect the coupling caps from the puncher, hydraulic pump and hoses. Match the color each of the male and female couplings.

### 3) Connecting the intermediate cord for pump operation

Connect one end of the intermediate cord to the rear handle connector and the other end to the connector for pump operation.

### 4) Connecting a power cable



Connect the hydraulic pump power plug to the power outlet. Be sure to use an outlet equipped with an earth circuit, and make sure that the earth polarity is correct.

## 5. Test operation

### 1) Checking the motor for rotating direction

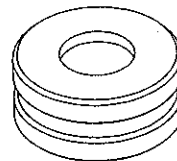
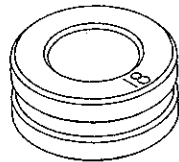
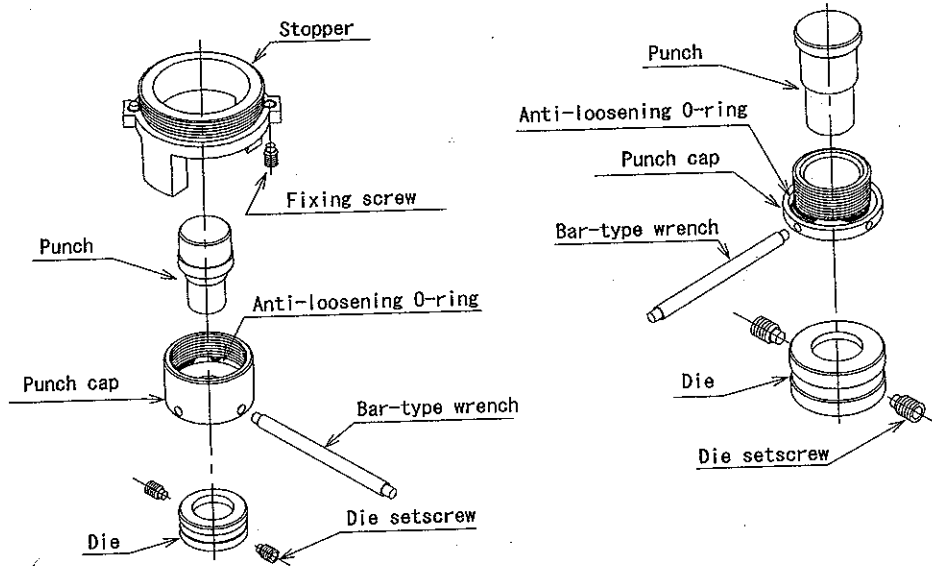
Press the puncher pushbutton switch for a short period of time to check that the hydraulic pump motor will rotate in the arrow direction.

### 2) Releasing entrapped air

To check the puncher for proper operation and perform air releasing, move the piston back and forth several times to the extent that pressure will not be imposed on the puncher.

## 6. Installing a round-hole punching tool

- 1) Press the RETURN button to return the piston rod up to its top end.
- 2) For safety, turn off the hydraulic pump.
- 3) Check that the punch and die are both proper in dimensions. Insert the punch into the hole on the die top surface, and check that an appropriate clearance (normally, 0.5 to 1 mm) is maintained.
- 4) Loosen the die setscrews, check the die for the top and bottom surfaces, install the die in position, and refasten the setscrews. Note that the top surface hole is smaller than that of the bottom surface, and the die size is stamped on the bottom surface for surface identification.



If the die is used upside down by mistake, the puncher may be subjected to fatal damage. Therefore, if it should be wrongly used (i.e. upside down), scraps caused by punching will not fall smoothly. In that case, never try to continue punching, but loosen the die setscrews and immediately hit the die for subsequent removal of scraps from the puncher bottom surface.

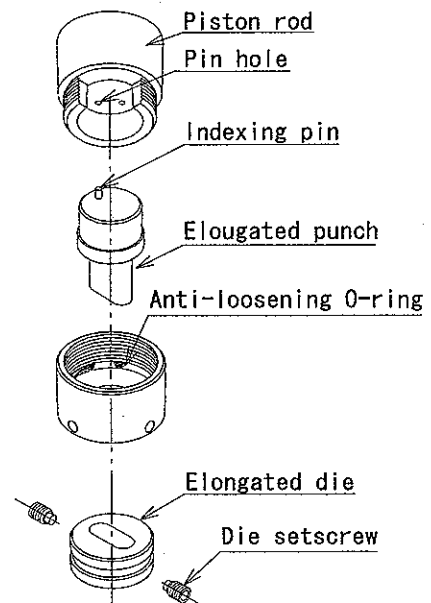
- 5) Put the punch in the punch cap and screw it in the piston rod.
- 6) Tighten the punch cap firmly using the supplied bar-type wrench. Never operate the puncher in a condition where the punch cap is not completely fastened. Note that the punch cap may become loose during work depending on the operating condition, in which case it should be retightened.
- 7) Decide the stopper height and orientation, and then fasten the fixing screws. (Note that models 506NSW and 1150SW have no fixing screws provided.)

## 7. Installing a elongated/square hole punching tool

### Applicable models

506NSW, 606SW, 706SW, 711NSW, 911NSW, 1101SW  
1150SW for punching slots (Standard model 1150SW cannot make slots or rectangular holes.)

- 1) Press the RETURN button to raise the piston rod to the return end.
- 2) For safety reasons, turn off the hydraulic pump.
- 3) Check that the punch and die dimensions are each appropriate. Insert the punch into the hole on the die top surface to check for an appropriate clearance (normally, 0.5 to 1 mm). (Such a clearance may differ depending on the puncher model and die size.)
- 4) Loosen the die setscrews and check the die for the top and bottom surfaces. Then, roughly align the slot die in the slot direction, and install the slot die in the hole. At this stage, do not fasten the setscrews yet.
- 5) With the punch in the punch cap, fit the punch indexing pin in the piston rod pin hole, and fasten the punch cap. Insert the indexing pin into one applicable pin hole of the two located in the piston rod.
- 6) Fasten the punch cap firmly using the supplied bar-type wrench.
- 7) Make sure that the die orientation is roughly in agreement with the punch orientation, and then turn on the pump.
- 8) Press the PUNCH button of the puncher little by little, to perform careful inching until the punch is made closer to the die, and then stop the inching operation.
- 9) Slightly raise the die with fingers, and with the punch edge in the die slot, press the PUNCH button again for inching, and return the die to the installation hole in accordance with the punch position lowered. Perform this work while taking care not to have a finger pinched.
- 10) Make fine adjustments of the die orientation so that a uniform clearance is secured between the die hole and the punch clearance, and firmly fasten the die setscrews to immobilize the die.



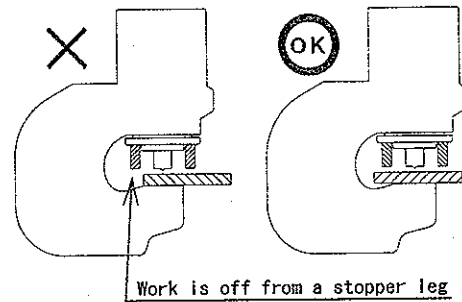
If the die is used upside down by mistake, the puncher may be fatally damaged. In that case, scraps caused by punching will not fall properly and therefore never force to continue the work. Instead, loosen the die setscrews and immediately hit the die out from the puncher bottom surface.

## 8. Operating precautions and operation



- 1) Orient a work so that it will be positioned on both stopper legs.

Performing the return process with the work off from one of the legs may cause damage to the punch or the stopper or even bend the work.



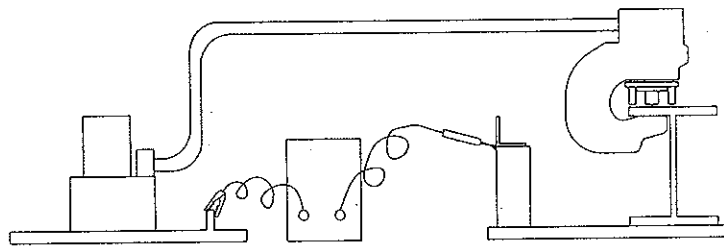
- 2) Keeping pressing the PUNCH button switch will lower the punch to punch the work. Continuing to press the RETURN button will allow the punch to go up and the work will be stopped by the stopper, thus causing the punch to come off from the work. Operating precautions of these switches: When punching is complete or when the punch has reached the TOP end, do not try to keep pressing the switch any further. Doing so will impose useless and excess load on the puncher and the pump, possibly resulting in shorter life of the hydraulic equipment.

- 3) Do not tramp down a hydraulic hose or the operation cord or crush them with a work or the like. Furthermore, use the hydraulic hoses in a straightened condition or in a condition wound in a large diameter as far as the situation permits. Forced bending will damage the hose interior, making the hose unusable.

- 4) If the earth circuit of a welding machine is in contact with either the hydraulic pump or the puncher and welding is done in a condition in which a specific work is insulated and the earth circuit is cut off, then an earth circuit may form between the wire inside the hydraulic hose via the puncher and the hydraulic pump. In such a case, a large welding current may flow through this circuit, causing a problem in all parts of the puncher system.



Therefore, take special care that such an earth circuit will not form.



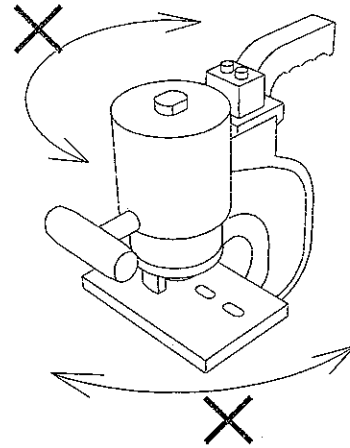
- 5) Depending on the punching conditions, the punch cap and/or the die setscrews may become loose. Therefore, check them from time to time, and refasten them as required.
- 6) The cap nut of the female coupling may become loose. Likewise, check occasionally and refasten it as required.
- 7) When a work is relatively thin and the punch returns, the die may not come off by the stopper, thus bending the work. In this case, take the following corrective action.
- \* Apply some lubricating oil to the punch to reduce the friction caused when the punch is pulled back.
  - \* Use a die one size larger. (This will make the punching noise greater.)
  - \* Use a thin-plate stopper (optional).

8) Precautions for punching elongated and square holes.



When the elongated/square hole punch is in contact with a work, imposing force on the work, or the work is in the returning process, never force to turn the puncher or the work.

To correct the rotating direction or the angle formed by the work and the puncher, temporarily return the punch until the work is off from the punch surface. Please note that trying to rotate the puncher or the work while the work is under force will dislocate the piston rod indexing device or break the punch indexing pin. Therefore, this should be kept in mind when punching plates.



9. Daily inspection and maintenance

1) Hydraulic pump

Read the instruction manual for the hydraulic pump because daily inspection and maintenance of the pump are related to those of the puncher.

2) Service life and replacement timing of the punch and die

- \* If hard or highly tough plates are punched, the punch/die life will be shorter.
- \* If the relationship between plate thickness and hole diameter exceeds the values shown in the table below, the punch/ die life will become extremely short.
- \* Using a punch/ die that has scuffed in the punch side surface will bend a plate when retracting the punch or will break the punch. Therefore, earlier replacement is recommended. If using a work that is too soft or that is made of material easily scuffed (such as SUS), apply some lubricating oil to the punch for better punching results.
- \* If a significantly worn punch or die is used, a greater punching force will be required, leaving burrs on the hole. Therefore, replacement will be needed.

Acceptable range of relationship between hole diameter and plate thickness according to plate materials

Mild steel plate (SS400)	Hole diameter $\geq$ 1.1 x plate thickness
Silicon steel plate	Hole diameter $\geq$ 1.3 x plate thickness
Stainless steel plate (SUS304)	Hole diameter $\geq$ 1.5 x plate thickness
Aluminum plate	Hole diameter $\geq$ 0.8 x plate thickness

For hole diameters of below 10 mm, plate thickness will be even smaller.

### 3) Disconnecting the coupling

If there is a pressure remaining inside the hoses, the coupling screw is too hard to turn. In that case, lower the piston position slightly and disconnect the coupling. Or, alternatively, press the top of the pump solenoid valve to release the remaining pressure. Then, disconnect the coupling. To prevent a blocking accident our couplings are of valveless type and therefore oil spills when disconnecting the coupling. Such spilled oil should be wiped out.

### 4) Overhauling the puncher

Overhaul the puncher once every year or two. Note that packings are consumables. Even if the puncher should be internally damaged due to dirt or other foreign matter, it can be repaired if still in the initial stage.

### 5) Modification and disassembly

Modification if done will invalidate the guarantee. Furthermore, do not try disassembling the puncher unnecessarily. If the puncher is not operating properly, then contact us or your dealer for consultation.

If some modification is necessary for convenience of punching work at the Customer, contact us for consultation, and we will be happy to help you.

### 6) Pushbutton switch connection diagram

