# INSTRUCTION MANUAL

## IW-45K

## Hydraulic Punch & Shear (415V)

## 45T

## Includes 10 Sets of Punch & Dies 6-26mm

P171

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# INTRODUCTION

The Sunrise Ironworker is a hydraulically powered metal shearing and punching machine. The machine is equipped with Flat Bar Shear, Angle Bar / Round Bar / Square Bar Shear, Notching and Punching stations. This multi-function aspect allows the Sunrise Ironworker to meet the diversified needs of the metal forming industry. There are many optional accessories that will further increase the versatility of the machine, such as Press Brake, Channel / Sectional Bar Shear, Pipe Notching, Pipe Punching, and punches and dies of various shapes and sizes.

Each machine has been individually tested in the factory and under-gone an extensive pre-delivery check to ensure that the machines meet the highest quality standard. The ironworker has been designed to be a reliable and dependable machine with excellent performance. We know the working quality of the machine will confirm that you have made a good choice by selecting Sunrise products for your facility.

In order to have a better understanding of the operating procedures, to obtain maximum benefits from the machine, and to minimize the maintenance cost of the equipment, please have the operators and engineers read this Manual thoroughly and carefully before operating the machine.

# SAFETY PRECAUTIONS

**IMPORTANT:**
**It is the duty of both employer and employees to acquaint themselves with the safe working practices contained in this manual and ensure that all operators adopt these practices.**

The Sunrise Ironworker IW-45K/60K has these working stations:

- PUNCHING
- FLAT BAR SHEAR
- ANGLE BAR/SQUARE BAR/ROUND BAR SHEAR
- NOTCHING.

To ensure safe operation, guards are provided for each work stations. NEVER REMOVE THESE GUARDS. If any guards are damaged or worn out, replace immediately with new guards.

While every effort has been made to furnish sufficient safe guards, this equipment, if not operated and maintained properly, has the potential to cause serious injury or death. A thorough knowledge of the machine and operating with carefulness is the best protection against accidents.

All operations are controlled by either the foot switch or by the optional electric backgauge. The operator should be familiar with the control and function of the switch/backgauge before perform the operation.

Many warning labels are fixed on the machine. NEVER REMOVE THESE LABELS. Be sure to follow these warnings to avoid injury. Please also pay attention to the following general rules:

1. Only one operator is allowed to operate on the IW-45K/60K. Before each operation, make sure no other person is near the machine.

2. **Operator must wear Protective Glasses during operation to protect the eyes.**

3. Do not operate the machine unless all safety guards and hold-downs are in place. Use of optional attachments/tooling should also have proper hold-downs and guards installed.

4. The SHEAR/NOTCH switch requires use of key. The key is intended for authorized operators only. Misusage of the key may increase the risk of injury at the Notching station. **NEVER LEAVE THE KEY ON THE MACHINE.** Also refer to the section "Control Panel" in regard to the SHEAR/NOTCH switch and the notcher safety interlock.

5. On IW-45K/60K, all stations move at the same direction at the same time, yet only one station can be used at one time. This has the potential of body injury. During operation, be sure that no personnel and material are near the other stations *not* in use. **When using the shearing stations, turn to SHEAR mode and make sure that the punching stripper is closed and the notching cover is closed.**

6. Any maintenance/repair of electrical/hydraulic circuit; change/adjust of blade/tooling; and alignment of punch-die should be done only by qualified engineers or personnel.

7. Always turn off power and disconnect electric supply before doing any tool change or maintenance work.

8. After tool changes, always check punch & die alignment and blade clearances before operation.

9. **Keep hands clear of all moving parts at all times. Fingers must not go under or inside the safety guards, stripper, and holddowns.**

10. Do not punch, shear, or notch parts that are too small to fit under the safety hold downs.

11. If any problem or abnormal condition arises during operation, stop the machine immediately and report to a supervisor. Do not turn on the machine again until the problem is rectified by qualified personnel.

12. The machine should never be left under power when not in operation or unattended. Always isolate the machine after turned the power off.

13. After completion of operation, all slugs and waste materials must be cleaned away from the machine.

14. Regularly check all stations and tooling for defects and wear to ensure safety and maintain good condition.

15. Heavy materials should be supported.

16. Use handling equipment when lifting heavy tooling and materials.

17. Do not punch partial holes as this creates a side load force on the punch and can result in tool breakage. Special tooling may be available for this purpose.

18. **Do not punch material thicker than the diameter of the punch.** Doing so can overload and break the punch and create a hazard.

19. Never exceed the rated capacity of the machine. Refer to the specification chart for details.

**The manufacturer shall not be held for any liability for damages/body injuries or other consequences to machine, material, and persons caused by the non-compliance of the above safety precaution procedures, in particular for the following situations:**

1. **Removal or non-use of any safety protection.**
2. **Place of any body part under or inside the safety guards, stripper, and holddowns.**
3. **Did not wear protective glasses for the eyes.**
4. **Did not close the stripper during operation.**
5. **Did not close the notcher safety cover when using other workstations.**
6. **Did not properly adjustment the clearance resulting the punch/die/blades hitting each other.**
7. **Did not interrupt the main electric power supply before any maintenance work.**
8. **Damage of electric parts due to incorrect electric power supply.**
9. **Damage of pump or other hydraulic parts due to incorrect setting of the limit switches.**

# DANGER

- **KEEP HANDS CLEAR OF ALL MOVING PARTS.**
- **ALL GUARDS AND HOLD-DOWNS MUST BE IN POSITION BEFORE OPERATING THE MACHINE.**
- **ALWAYS POSITION MATERIAL UNDER A CORRECTLY SET HOLD-DOWN. NEVER ALLOW THE MATERIAL TO FEED BEYOND THE HOLD-DOWN.**

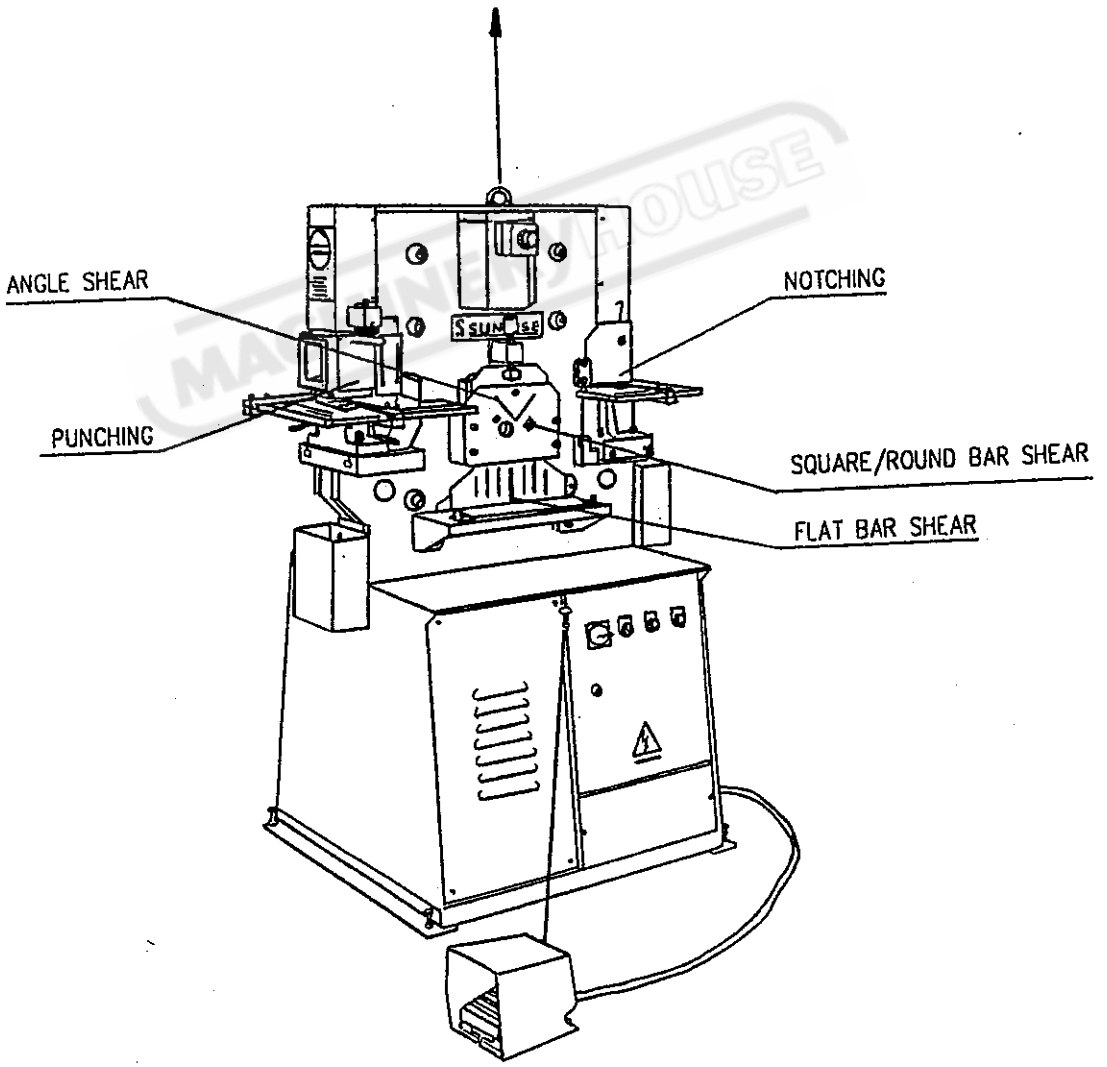
# CAUTION

- **THOROUGHLY READ THE OPERATION MANUAL BEFORE OPERATION.**
- **TURN OFF POWER AND ISOLATE THE MACHINE WHEN CHANGING TOOLING OR DOING MAINTENANCE.**
- **ALL MAINTENANCE/REPAIR WORK MUST BE DONE BY QUALIFIED PERSONNEL.**
- **IF ANY PROBLEM OR ABNORMAL CONDITION OCCURS, STOP THE MACHINE IMMEDIATELY. DO NOT OPERATE THE MACHINE AGAIN UNTIL THE PROBLEM IS FIXED.**

# TRANSPORT

When transporting the machine by a crane, hook the crane to the eye bolt on top of the machine. **Do not use slings under the machine.** Pay special care if lifting / transporting the machine with forklifts. The forks should extend fully to cover the width of the machine. **Do not put the forks from either end.**

**NOTE:** As the top of the machine is heavy, the high center of gravity can cause the machine to tip over if machine is not in good balance.



# INSTALLATION

The machine only requires the normal industrial concrete foundation. If the ground is uneven and the machine vibrates during operation, use foundation bolts to tighten the machine firmly to the ground or alternatively mount the machine on anti-vibration pads.

IMPORTANT:

- Maintain a spacious working area around the machine for safety.
- Have the work area well illuminated with proper lighting.
- Clean the scraps and waste materials regularly, and make sure the work area is free of obstructing objects.
- Keep the ground free of oil and make sure it is not slippery.
- If long lengths of material are to be fed into the machine, make sure that they will not extend into any gangways.

*Crowded, poorly illuminated or slippery areas are often causes for accidents.*

Remove all anti-corrosion grease after installing the machine. Check that the oil reservoir, located in the machine base, has been properly filled. When refilling oil, use recommended oil and fill the reservoir to the upper level of the oil level gauge.

## Connecting Power Supply

Electrical wiring must be done by a qualified electrician. Before connecting the electrical supply, make sure the voltage and current is compatible to the electrical components in the machine. Check the data shown in the electrical control box.

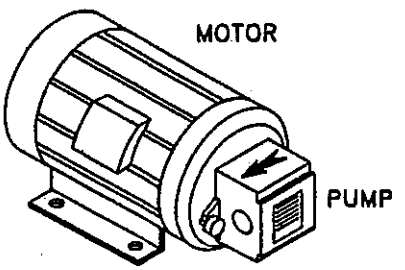
**IMPORTANT: Turn off Supply Electricity at your facility's circuit breaker before making electrical connections to the machine.**

To connect the power cord

1) Open the electric box.
2) Remove the small panel under the electric box.
3) Insert the power cord through the entrance hole on the base of machine, and then through the base of electric box.
4) Connect the three phase wires to the power terminal strip in the electric box.
5) Also make sure to ground the machine properly.
6) Check that the power cord surface is not damaged, scratched or cut during installation.
7) Reinstall the panel and close the electric box.

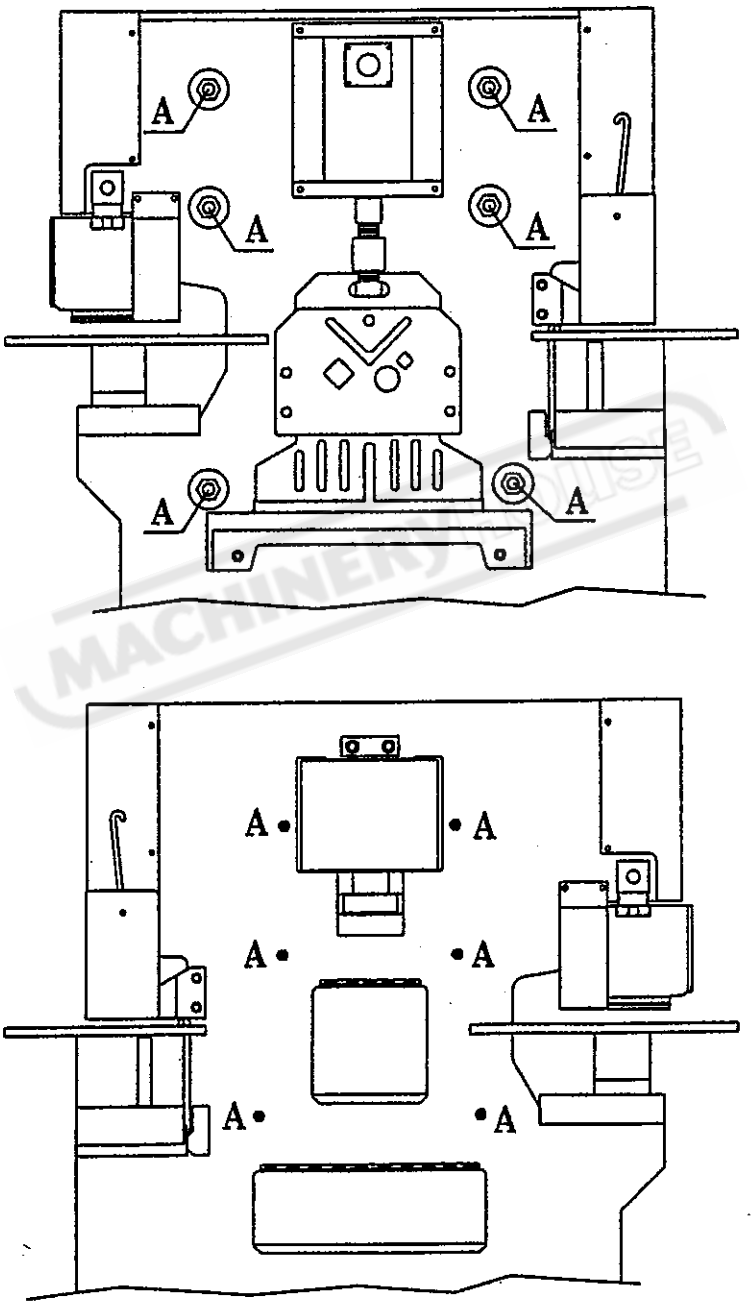
To check the correct rotation of the motor.

- Remove the back cover.
- Briefly start and stop the motor and check that the motor rotates in the same direction as the arrow indicated on motor. **Improper rotation can severely damage the pump.**
- To change the motor rotation, first make sure the power is disconnected, then reverse any two of the three phases of the electrical power supply.



# LUBRICATION

Lubricate the machine with recommended grease every 8 working hours. Use the grease gun provided to supply grease to all lubrication points which are located on both sides of the machine as shown in the figure.




A: Lubricate Points

## RECOMMENDED GREASE

Lubricant Grease (or equivalent):

| | |
|---|---|
| Esso | Beacon 2 |
| Shell | Alvania Grease R-2 |
| Kraff | KL2 |

## STANDARD EQUIPMENT SUPPLIED WITH MACHINE
**(including items pre-installed on the machine)**

| | |
|---|---|
| Flat Bar Shear Blades | 1 set |
| Angle/Round/Square Bar Shear Blades | 1 set |
| Rectangular Notch Blades | 1 set |
| Round Punch and Die (Ø20mm) | 1 set |
| Punch and Notch Support Tables | 1 set |
| Punch Retaining Nut / Sleeve | 1 set |
| Die Holder | 1 pc |
| Punch Stripper Unit | 1 pc |
| 1 Meter backgague | 1 pc |
| Work station Safety Guards | 1 set |
| Lifting Eye Bolt | 1 pc |

| | |
|---|---|
| TOOL BOX | 1 pc |
| Grease Gun | 1 pc |
| Adjustable Spanner (250mm) | 1 pc |
| Screw Drivers (+) | 1 pc |
| Screw Driver (-) | 1 pc |
| Hex Key Wrench Set | 1 set |
| Hex Wrench (12mm) | 1 pc |
| Hex Wrench (14mm) | 1 pc |
| SPA Spanner | 1 pc |

# CONTROL PANEL

**ISOLATOR Switch** - This switch controls the main electric source. It also functions as a lock for the electric box. At the ON position the switch locks the electric box and enables you to start the machine. At the OFF position, the power is cut off and the electric box can be opened.

**PUMP ON** - Push this button to turn on the machine. The EMERGENCY STOP button must be released before the PUMP ON button will function. The green POWER LIGHT stays on when the machine is turned on.

**PUMP OFF** - Push this button to turn off the machine.

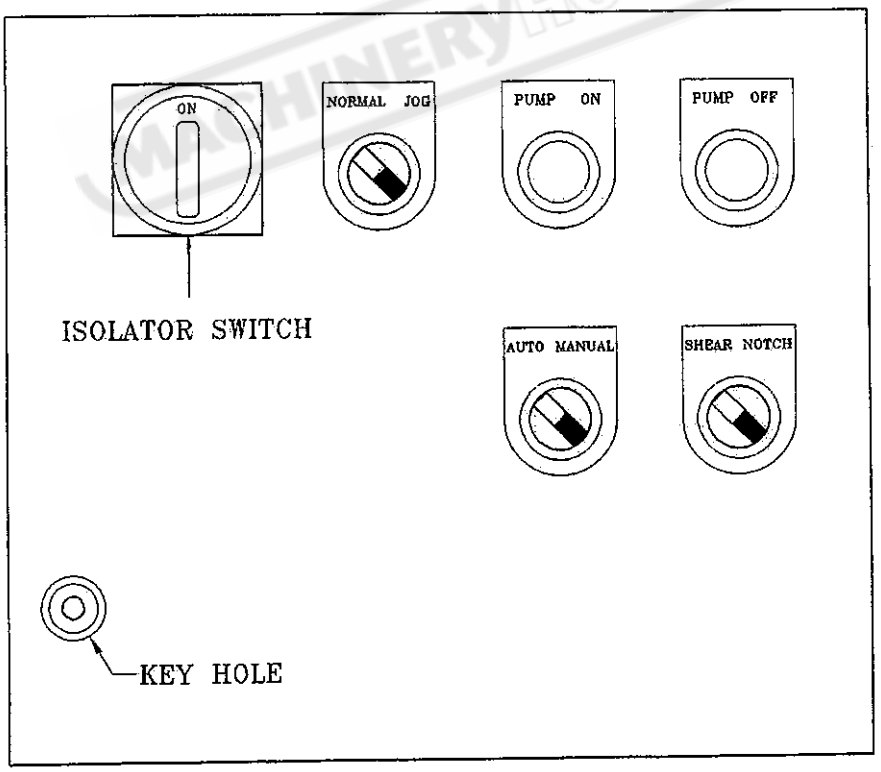
**EMERGENCY STOP** - Use the EMERGENCY STOP button to stop the machine in an emergency. The Emergency button must be released before the PUMP ON button will function. To release it, turn knob slightly to the right.

**NORMAL/JOG Switch** - This switch allows selection between the normal (automatic return) mode and the jog (inching, non return) mode. Use the normal mode to operate the machine. Use the jog mode to align punch/die, to set blade clearance, and to set the strokes. In NORMAL mode, the ram/slide move in both up and down directions. In JOG mode, the ram/slide move only in downward direction. Also refer to the section on foot switch.

**AUTO/MANUAL Switch** – This switch is for machines equipped with the optional electric backgauge only. Turn to AUTO to use the backgauge, and turn to MANUAL to use the foot switch. Also refer to the section on electric backgauge.

**SHEAR/NOTCH Key Switch** - Use this switch to select between shearing or notching operations. This switch is electrically interlocked with the Notch Safety Guard. Use of key is required to switch to notch mode. When in SHEAR mode, the machine is IMMOBILIZED if the Notch Safety Guard is lifted.

**Warning: Due to the nature of the ironworker, the punching station, shearing stations, and notching station all moves together. In notch mode, the machine CAN operate (with all punch/shearing/notching blades moving) when the Notch Safety Guard OPEN. There is high potential risk for body injury if the operator turn the SHEAR/NOTCH switch to NOTCH, keep the notcher cover open, and use the punching/ shearing stations. The key for the SHEAR/NOTCH switch is intended ONLY for the supervisor of the IW-45K/60K who understands the potential risk of the machine and is authorized to use the notching station. The key should be safely kept by the supervisor and must NOT be left on the machine.**



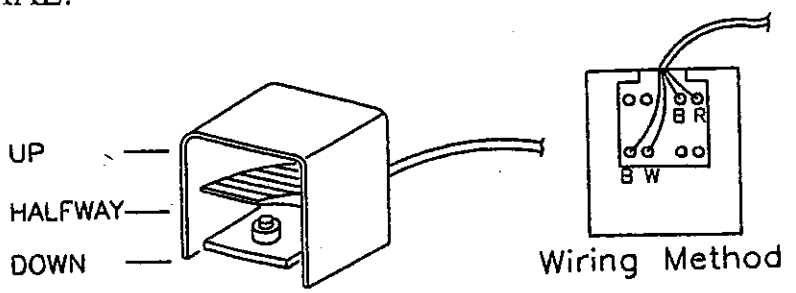
# FOOT SWITCH

The machine uses a foot switch for easy and fast operation control. The foot switch enables the operator to use the machine while holding the work piece with both hands. NEVER has one operator hold the material and another operator press the foot switch.

The foot switch has three positions: UP, HALFWAY and DOWN.
UP position is when you release the foot switch completely.
HALFWAY position is when you press or release the foot switch halfway.
DOWN position is when you press the foot switch all the way down.
When not pressed, an internal spring pushes the switch to the UP position.
The foot switch functions differently in the NORMAL and the JOG modes.

**In NORMAL mode**, press the foot switch to DOWN position for the downward motion of the slide. Release the foot switch to HALFWAY position will cause the slide to stop. This is very useful in position the work piece without using the gauge stoppers. Press the foot switch again to Down position and the slide will continue moving downward until reaching the lowest position set by the limit switches. Releasing the foot switch completely (UP position) will cause the slide to return to its up position.

**In JOG mode**, press the foot switch to the DOWN position for the downward motion of the slide. The slide stops moving when the foot switch is released to either HALFWAY position or UP position. The slide does not move back up even when foot switch is completely released. This allows the operator to make necessary adjustment / alignment. In other words, the slide moves only in one direction in JOG mode. To move the slide back to the up position, switch the Normal/Jog switch to NORMAL.



# ELECTRIC BACKGAUGE

Optional electric touch-and-cut back gauge is also available to control the movement of the machine (instead of using the foot paddle). To use the electric back gauge, turn the Auto/Manual switch to AUTO. To use the foot switch, turn the switch to MANUAL.

To use the electric backgauge:

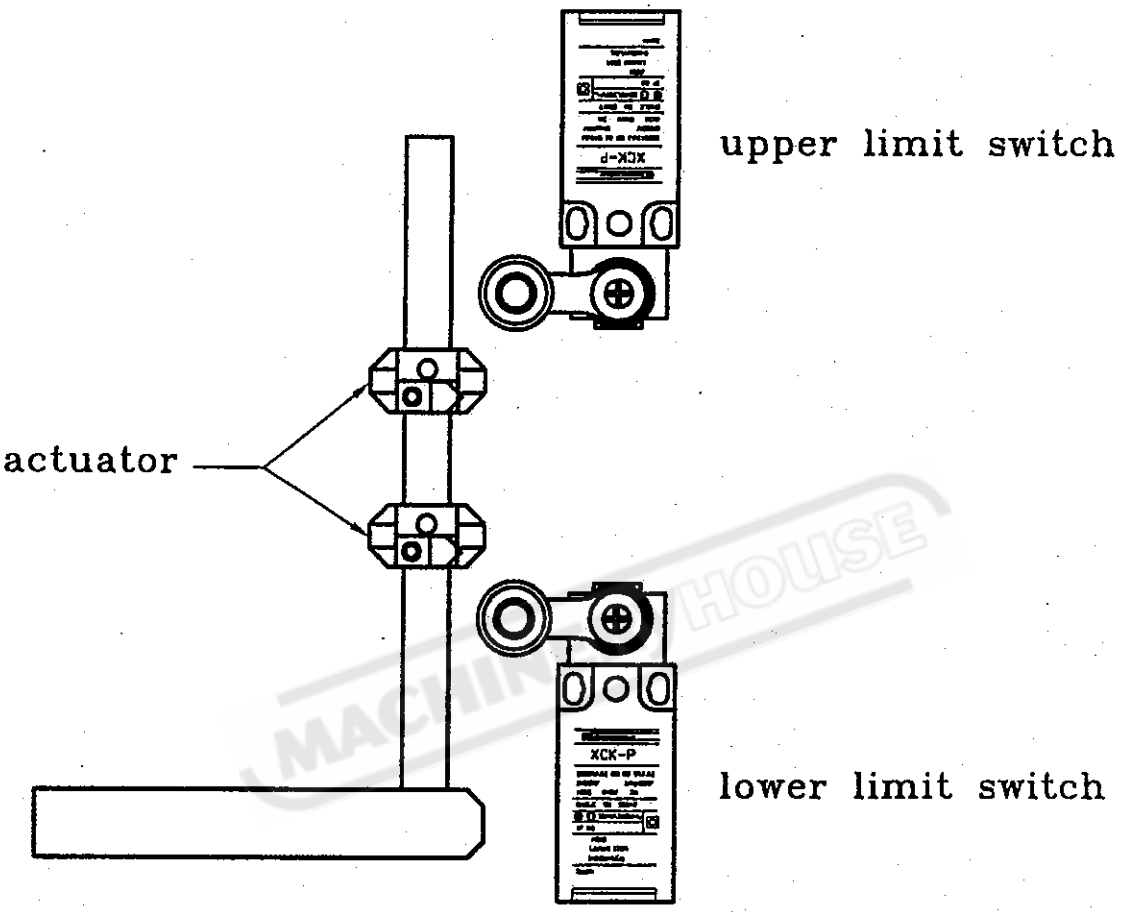
1) Install the two pipes of the backgauge.
2) Connect the sensor wire to the socket on the back of the machine with the key way correctly aligned.
3) Turn the switch to AUTO.
4) Adjust the back gauge to the desired length.
5) Position the sensor on the back gauge so that the working piece will touch the sensor during operation.
6) To operate, simply push in the work piece. When the sensor is touched by the work piece, the blade will start moving down after a short delay. The delayed time can be adjusted by a timer inside the electrical box. After the shear, the cut piece falls out and the blade automatically moves back up for next shear.
7) If the length of the sheared piece is not the same as the reading on the backgauge, there is a adjustment nut on the backgauge to set the zero-position of the backgauge reading.

**NOTE:** Once the sensor is touched and the shearing operation has started, *the machine will complete the whole shearing cycle*. The machine cannot be stopped halfway unless the emergency or stop button is pushed. Although the electric backgauge increases the working efficiency, special care is required when using this function. Carelessness often causes accidents.

# STROKE ADJUSTMENT

Certain working operations do not require a full working stroke. For large quantities of the same operation, merely execute the required working stroke distance to save operating time. The position and length of the cylinder strokes are controlled by limit switches and actuators on a drive bar installed inside the back panel of machine. There are two limit switches, one for the upper limit and one for the lower limit. Adjust the length of stroke by shifting the position of the actuator mount on the drive bar. See Figure.

**IMPORTANT:** The limit switch must be actuated before the Cylinder reaches the full extend or full extract position. In other words, the pump should be unloaded in upper or lower limit of the slide travel. *Fail to do so can overload the motor and damaging the pump.* If the pump is not in unloading position at either upper or lower limit, a loud noise is heard from the pump. Immediately turn the machine off and adjust the limit switch actuators to set the proper stroke movement.



# ADJUST THE MAIN CENTRAL SLIDE

The main central slide is the large middle plate that holds the moving shear blades, notch top blade, and the punch. It should be pushed against the rear machine body plate and stay vertical with the machine body. The movement of the main central slide should be stable and without side shifts. If the main central slide moves sideways front to back or left and right, or if the blades wear abnormally, the central slide needs to be adjusted.

To adjust the main central slide contact with the rear machine body plate, following the steps below:

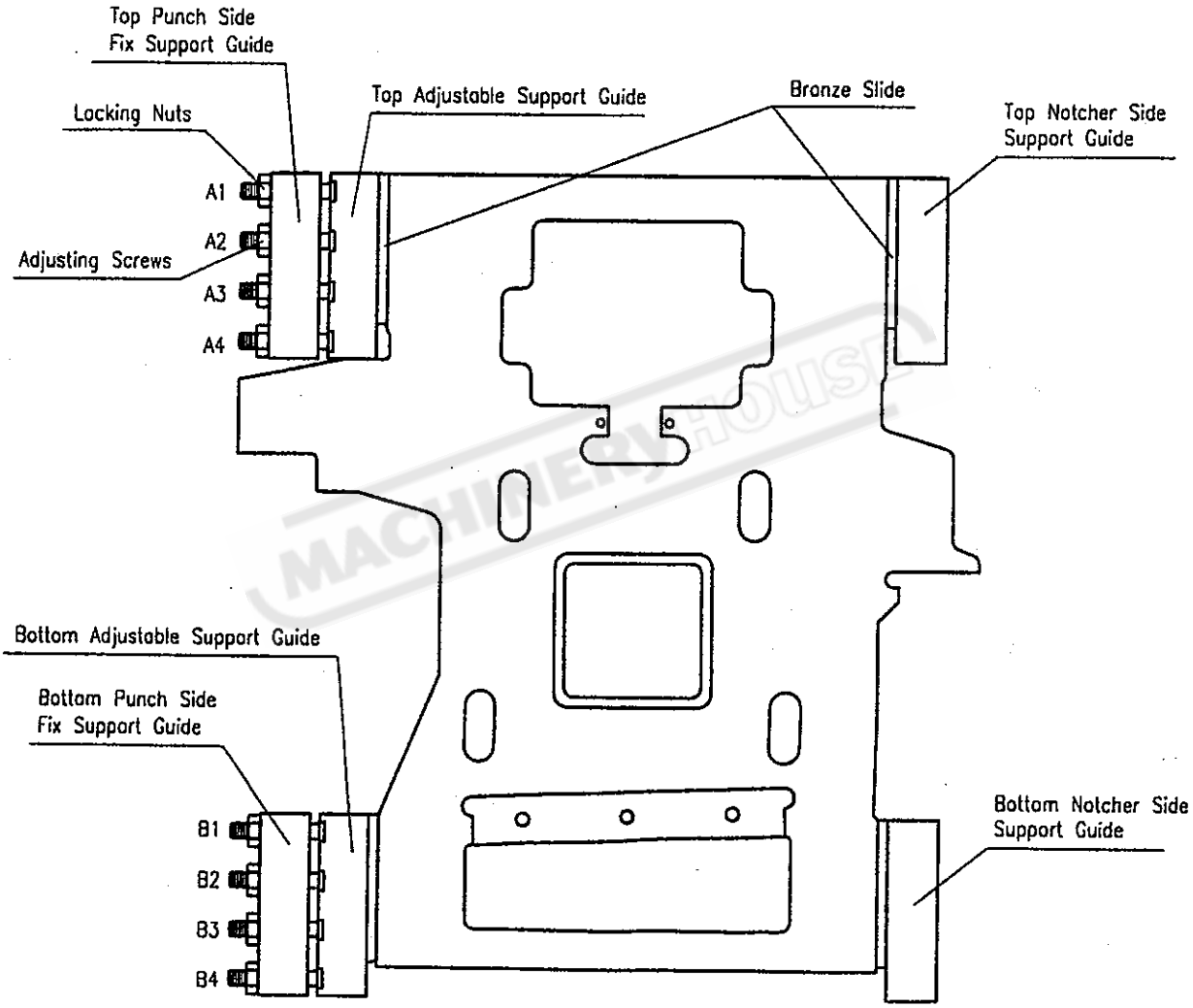
1.) Loosen the locking nuts for the "Pressure Pads" that are located on the front body of the machine. They can easily be identified as each has a grease nipple (same location as the grease points).
2.) Turn on the power. Then, tighten the Pressure Pad Screws firmly while moving the central slide up and down. The Pressure Pad Screws should be adjusted in the diagonally cross order. Then, loosen each screw *one third of a turn.*
3.) Repeat the procedure for each of the pressure pads to make sure each screw is adjusted correctly. When finished, lock in position by tighten the locking nuts.

The central slide moves straight up and down. This vertical movement is guided by four support guides on both sides of the slide, one at the top and one at the bottom on each side. The two guides on the notcher side are fixed, and the two guides on the punch side can be adjusted. To adjust, follow the steps below:

1.) Remove the covers at the top of the punching station, and remove the scrap box at the bottom and the cover beneath it.
2.) Four adjusting screws at the top and four adjusting screws at the bottom will be exposed. Loosen the locking nuts on the eight adjusting screws.
3.) Tighten the adjusting screws firmly in the order of A2→B2→A3→B3→A1→B1→A4→B4 (see figure on next page). Then loosen each screw *one third of a turn.*
4.) Repeat the procedure for each of the adjust screws. Lastly, lock in

position by tighten the locking nuts.

5.) Put back the covers and check all blade clearances and the main slide movement again.



# PUNCHING STATION

## Standard Equipment

The machine is equipped with one set of Ø20mm round punch and die. Many other punching tools of different sizes are also available upon request. In addition, a large 2-piece support table with gauges is installed as standard equipment.

**IMPORTANT:** The punch stripper must be closed properly during operation. On some models with an interlock limit switch inside the stripper back cover, the punching station is IMMOBILIZED if the stripper is open.

## Alignment of Punch and Die

The punch and the die may have previously been centered. However, you should check the tools regularly for proper alignment. To center the die, follow these steps:

1) Insert Punch into Retaining Nut, then tighten the nut onto the Retaining Thread.
2) Insert the Die into the Holder and secure the set screw.
3) Loosen all of the die holder fixing bolts
4) Lower the punch gradually (by using the JOG mode).
   **WARNING: Be very careful that the punch does not hit the die which can break the punch and create a hazard.**
5) After the punch is inside the die, turn power off and isolate the machine.
6) Adjust the position of the Die Holder until the Clearance around the punch and die is even all the way around.
7) Tighten the die holder bolts to fix the die position.
8) Adjust the limit switches to change the stroke length if necessary.

When setting up square or oblong punches and dies, be sure to properly locate the key on top of the punch in the keyway of the punch retaining thread. Check carefully the alignment (both position and direction) of the die with the punch. Incorrect set up will damage the punch and die, and may cause danger.

**IMPORTANT:** Be sure to check the alignment of the punch and die whenever tools are changed.

## Punch and Die Clearance

Punch size is the same as the desired hole size. Die size is bigger by the clearance. The clearance depends on the thickness of the material. The clearance is usually about 10% of the material thickness. Please also refer to the following chart for recommend clearance.

| Material Thickness | mm | up to 4 | 4 - 9 | 9 – 14 | 14 - 20 |
|---|---|---|---|---|---|
| Die Clearance | mm | 0.2 | 0.7 | 1.2 | 1.7 |

## Adjusting Stripper

- The distance between the stripper and the material should be adjusted to about 2~3mm. Adjust the stripper height each time when changing to material of different thickness.
- Adjust the stripper height by turning the large knurled screws at both sides of the stripper.
- If the stripper tend to fall down at the right side, tighten the spring at the left side of stripper.
- Make sure the stripper is at even height for left and right sides. The stripper should be adjusted so that the work-piece contacts the stripper evenly when the punch retracts out of the material. Unbalanced stripping may break the punch and cause hazard.
- If the material cannot have adequate contact with the stripper when stripping, such as asymmetrical material, material too small, or punched hole too close to the edge of material, do not proceed with the punching operation.

The stripper has exchangeable plates with various opening sizes to match the size of the hole. Select the plate with the smallest suitable opening. Keeping the opening close to the size of punch will greatly reduce deformation, especially on thinner materials.

## Actual Punching Force

The actual force required in a punching operation is calculated by the circumference of the hole multiplied by the thickness of material multiplied by tensile strength of material.

**Max. Capacity = circumference x thickness x tensile strength**

The capacity chart is based on material with 45 kg/mm$^2$ tensile. Do not attempt a punching operation that requires force over the maximum capacity of the machine.

## Precaution

1) Always use die with the proper clearance.
2) Always check the alignment after each tool change.
3) To prevent overloading and breakage of the punch, do not punch material which is thicker than the hole diameter,
4) Do not punch partial holes. Punching incomplete holes will cause the punch and die to bend and break.
5) Applying some lubricant oil on the punch will prolong the life of the punch and reduce the stripping load.
6) Regrinding of punching tools is not recommended.

## Punch and Die Lubricant

| | | |
|---|---|---|
| SHELL | - | GARIA 927 |
| B. P. | - | SERVORA 68 |
| CASTROL | - | ILOBROACH 219 |
| DUCKHAMS | - | ADFORNOL EP7 |
| JOSEPH BATSON | - | LB 733 |

## Punch Operation

Punching on Flat Plates:

1) Turn the SHEAR/NOTCH switch to SHEAR and be sure the notcher cover is closed.
2) Check again that the stripper, punch/die alignment is properly adjusted, and the height of the stripper is adjusted to about only 2 to 3mm above the work material.
3) Set the gauging stoppers to the desired position.
4) Position the plate on the working table against the stoppers.
5) Press the foot switch to the DOWN position to execute the punch.
6) Release the foot switch for the punch to retract. During stripping, the material can be lifted up against the stripper and then dropped off when the punch retracts out of the hole. **Be very careful with fingers as the material movement has potential of hazard.**

Punching on Angles:

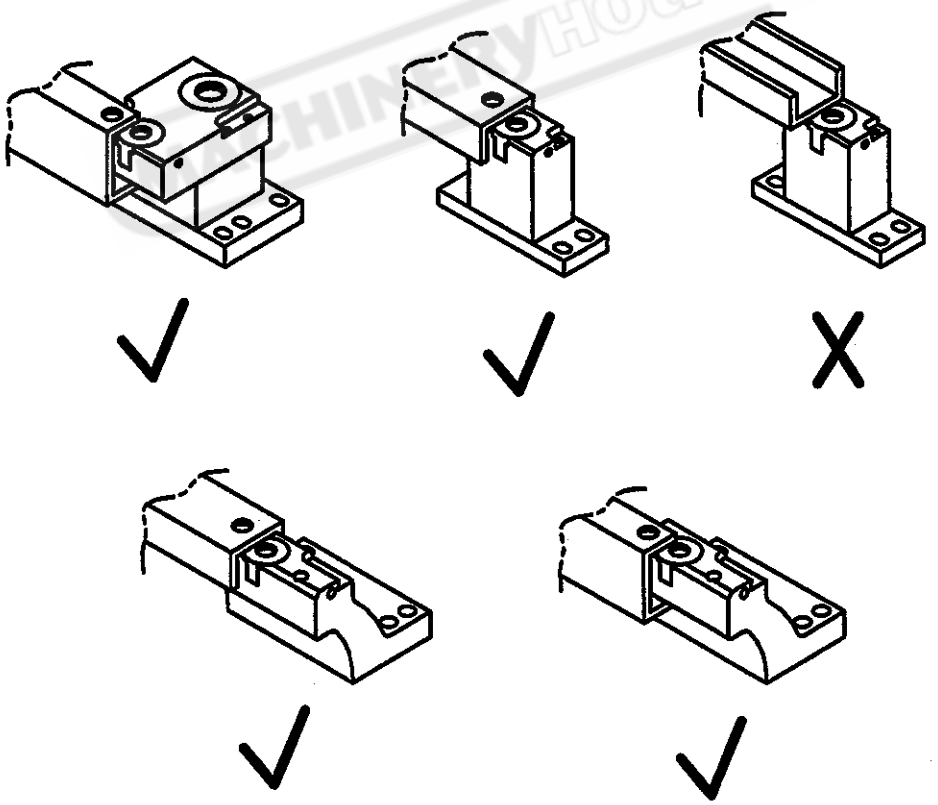
1) Turn the SHEAR/NOTCH switch to SHEAR and be sure the notcher cover is closed.
2) Check again that the stripper, punch/die alignment is properly adjusted, and the height of the stripper is adjusted to about only 2 to 3mm above the work material.
3) Remove the front piece of the 2-piece table.
4) Set the gauging stoppers to the desired position.
5) Position the angle against the die holder with one flange facing downward. **Do not position the angle with one flange facing upward.**
6) Press the foot switch to the DOWN position to execute the punch.
7) Release the foot switch for the punch to retract. During stripping, the material can be lifted up against the stripper and then drop off when the punch retracts out of the hole. **Be very careful with fingers as the material movement has potential of hazard.**

Punching on Channels:

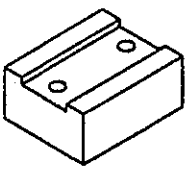
1) Turn the SHEAR/NOTCH switch to SHEAR and be sure the notcher cover is closed.
2) If punching the channel web, use the single-hole die holder with the

table removed. If punching the channel flange, use the optional overhang two-hole die holder with the lower support portion and the front piece of the 2-piece table removed. Special goose-neck die holder is also available for punching both channel web and channel flange. See figure.

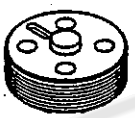
3) Check again that the stripper, punch/die alignment is properly adjusted, and the height of the stripper is adjusted to about only 2 to 3mm above the work material.
4) If punching channel web, position the channel with both flanges facing downward. If punching channel flange, position the channel with the flange being punched on top. See figure.
5) Press the foot switch to the DOWN position to execute the punch.
6) Release the foot switch for the punch to retract. During stripping, the material can be lifted up against the stripper and then drop off when the punch retracts out of the hole. **Be very careful with fingers as the material movement has potential of hazard.**



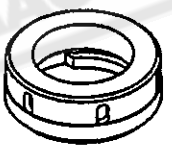
# Punching Station Assembly



Retaining Thread Support

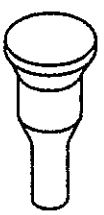


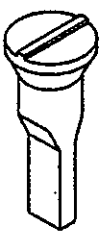
Punch Retaining Thread



Punch Retaining Nut

Round Punch





Oblong Punch

Punch Sleeve

# FLAT BAR SHEAR STATION

This station is equipped with a hold down suitable for shearing of various material thickness. The machine also comes with a feed table with guides for material support and positioning. Besides shearing flat bars, this station can also shear the flange of angles.

## Blades

Upper Blade (Moving): The moving blade can be turned to utilize both cutting edges.

Lower Blade (Stationary): The stationary blade can be turned for the use of all four cutting edges to provide a long blade life.

## Cutting Clearance

The width of the cutting clearance (the distance between the moving and stationary blades) had been pre-adjusted in the factory to be between 0.2 and 0.3mm. The cutting clearance depends on the thickness and tensile strength of the material. The thicker the material, the wider the cutting clearance should be. Improper cutting clearance can result in the deformation of the working piece. Too large of clearance when shearing thin material can cause the material to bend over instead of being sheared.

The cutting clearance can be adjusted by the fix bolts that "pull in" the stationary blade and the adjusting screws that "push out" the stationary blade. To adjust clearance, follow these steps:

1) In JOG mode, move down the top blade to the lower position so that the opening between blades are closed.
2) Turn power OFF and isolate the machine.
3) Remove the holddown and the feed table.
4) Loosen the large fixing bolts that hold the lower blade.
5) Loosen the locking nuts on the adjust screws.
6) Adjust the clearance by turning the adjusting screws, which push the lower blade towards the upper blade.
7) Check clearance using a feeler gauge. **It is very important to make sure that the cutting clearance is uniform for the entire blade.**
8) Tighten the fixing bolts to fix the position of lower blade.

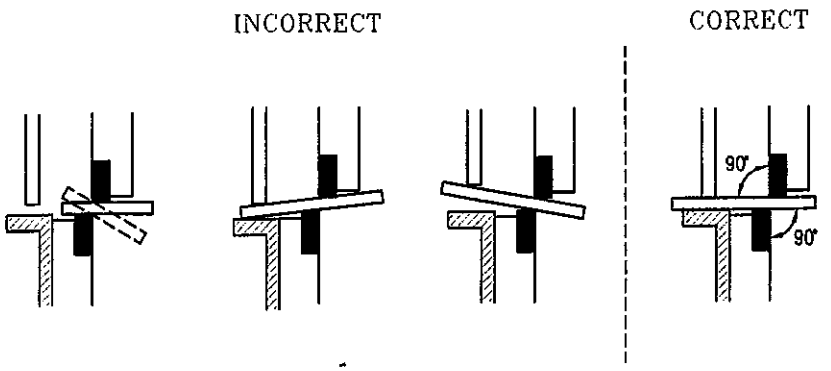
9) Tighten the locking nuts of the adjust screws to prevent loosening.
10) Reinstall the table and holddown.
11) Check clearance again to ensure even clearance.

**Precaution**

1) **Do not shear any pieces too small to be secured in position by the holddown. Doing so can seriously damage the machine beyond repair. See Figure.**
2) Always feed cutting material from front. Never insert material from back.
3) Keep the cutting edges sharp. Check the sheared material to see whether the cutting clearance is properly set and that the condition of the blades are O.K.
4) Clean the scraps and waste materials regularly and keep the work area clean.

**Flat bar Shear Operation**

1) Turn the SHEAR/NOTCH switch to SHEAR and be sure the notcher cover is closed
2) Push the material under the hold-down to the desired length. Use the backgauge for getting the precise length.
3) Be sure that the material is properly positioned on the table and under the hold-down. Incorrect positioning can damage the blades and/or the machine.
4) Use the guide stoppers on the table to position and stabilize the material.
5) Lower the holddown to firmly press the material.
6) Press the foot switch to execute the shear and release foot switch for the slide to move back up. Alternatively the electric backgauge can be used. See section on Electric Backgauge for details.



## Angle Flange Shear Operation

**(Note: not available on models with hydraulic holddown)**

The vertical slot on the hold-down allows the shearing of angle flanges at various degrees. To operate:

1) Push the material into the vertical slot on the hold-down until the vertical flange touches the upper blade.
2) Align the material to the desired shearing degree using the marks on the feeding table, then use the movable guide to stabilize the material.
3) Lower the holddown to firmly press the material.
4) Press the foot switch to execute the shear and release foot switch for the slide to move back up. Electric backgauge should not be used in this operation.

# OPTIONAL HYDRAULIC HOLDDOWN

The hydraulic holddown for flat bar shear and angle/sqaure/round shear station can increase the efficiency and performance of the machine. The hydraulic holddown press down the material before shear, so the material is well fixed in position during shearing, which can minimize deformation due to material movement.

The hydraulic holddown can be turned off by turn the hydraulic valve at the side of holddown by 90 degrees.

The shearing operation with hydraulic holddown is similar to the standard holdown, except the holddown will move down automatically when the foot paddle is pressed.

DANGER: NEVER PUT FINGER OR ANY BODY PARTS UNDER THE SAFETY BAR THE BOTTOM OF THE HOLDDOWN.

# ANGLE SHEAR and SQUARE/ROUND BAR SHEAR STATION

This station is equipped with a hold down suitable for shearing angle at 90 degree and for shearing various sizes of square and round bars. As optional tooling, this station can also shear various type of channels or section bars by changing the moving and stationary blades and hold-downs.

## Cutting Clearance

Adjustment of the clearance of the bar shear station is by the adjusting screws that push-in the stationary blade against the moving blade. To adjust the clearance, follow these steps:

1) Turn power OFF and isolate the machine.
2) Remove the holddown.
3) Loosen the locking nuts.
4) Tighten the pushing screws firmly. Then, loosen each screw *one third of a turn*. Lock in position by tighten the locking nuts.
5) Reinstall the holddown.

## Precaution

1) **Do not shear any pieces too small to be secured in position by the holddown.**
2) Always feed cutting material from the front. NEVER insert material from the back.
3) Clean the scraps and waste materials regularly and keep the work area clean.

## Angle/Square Bar/Round Bar Shear Operation

1) Turn the SHEAR/NOTCH switch to SHEAR and be sure the notcher cover is closed
2) Push the bar through the slot on the holddown to desired length. Use of the backgauge for precise length.
3) Lower the holddown to firmly press on the angle / bar.
4) Press the foot switch to execute the shear and release foot switch for the slide to move back up. Alternatively the electric backgauge can be used. See section on Electric Backgauge for details.

# NOTCHING STATION

The rectangular notcher is very useful to notch the edges and corners of flat plates, as well as to notch the flanges of Angles and Channels. The triangular Vee-notcher is also available as an optional tooling.

## Blades

The three lower blades each has four cutting edges. Turn the blades to use the other cutting edges. The top blade cannot be turned. We do not suggest grinding of these blades.

## Bolster Adjustment

The notch bolster can be adjusted for alignment of the lower blades with the upper blade. To adjust, follow these steps:

1) Lower the working slide until the upper blade inserts into the lower blades by about 3 to 5 mm below the top surface of the lower blades.
2) Turn power OFF and isolate the machine.
3) Remove the safety cover.
4) Loosen the bolster fixing bolts.
5) Loosen the nut on the side adjust screws.
6) Loosen the nut for the back hold-back bolt.
7) Adjust the bolster position by turning the side adjust screws and the back hold-back bolt.
8) Check the cutting clearances on all three cutting faces with a feeler gauge. **It is very important to make sure the cutting clearance is uniform for the entire blade at all 3 cutting faces.**
9) Tighten the nuts for the side adjust screws and the back hold-back bolt to lock the screw/bolt in position.
10) Tighten the bolster fix bolts to fix the position of the bolster.
11) Check clearance again to ensure even clearance.
12) Reinstall the safety cover.

**WARNING**

The notch station has been provided with a safety guard. **Do not remove this safety cover at anytime, not even during notching operation.** Use the gauging stoppers on the notcher table to position the material. **Always make sure that no fingers and other body parts are near the blade contacts.**

**Notching Operation**

1) Turn the Shear/Notch switch to NOTCH.
2) Open the safety cover.
3) Position the plate or angle on the support table. Use the gauging stoppers on the support table for more accurate and safer operation.
4) Adjust the screws on the two strippers to just 1~2mm above the material.
5) Press the foot switch to execute the notch and release foot switch for the slide to move back up. During stripping, the material can be lifted up against the stripper and then drop off when the top blade retracts out of the material. **Be very careful with fingers as the material movement has potential of hazard.**
6) **Close the safety cover after each operation. Do not leave the cover open.**
7) **Turn the key switch to SHEAR mode and promptly remove the**

# MAINTENANCE

1. **Before operating the machine**:
   Routinely check the electrical power cable and the foot switch cable for any loosening or damage.
   Inspect all the blades, punch, die, and safety guards to ensure they are in good condition.
   Clean all slugs, cut off pieces, and other waste material from each work stations and around the machine.

2. **Filter and Oil Change**:

   Take off and clean the suction filter inside the oil tank every time when changing oil. The first oil change should be performed after approximately 600 operating hours. Further oil change is needed for every 1200 operating hours. A drain outlet is located at the base of the oil tank.

   Screw back the cleaned suction filter after the draining the oil. If the suction filter is damaged or clogged, replace the suction filter. Do not mix different brands of oil.

   Hydraulic Fluid (or equivalent)

| | |
|---|---|
| Mobil | DTE 46 |
| Esso | Nuto H46 |
| Shell | Tellus 46 or Hydraulic oil 46 |
| B.P. | Energol HLP 46 |
| Castrol | Hyspin AWS 46 6018 |

3. **Lubrication**
   Lubricate the machine with recommended grease every 8 working hours. Use the grease gun provided to supply grease to all lubrication points which are located on both sides of the machine. (See section on Lubrication)

4. **Oil level**:
Make sure the hydraulic oil level is in the range indicated on the oil level gauge. It is better to keep the oil level close to the high mark indicated on the gauge.

| Model | Capacity (liter) | Oil Required (liter) |
|---|---|---|
| IW-45K | 65 | 48 |
| IW-60K | 75 | 58 |

5. **Oil temperature**:
The oil temperature should be under 50 degrees Celsius. If the upper/lower limit switches are not set correctly for unloading of the pump, the oil temperature can raise quickly. Adjust the limit switches so the pump will be in the unloading condition.

6. **Hydraulic pressure**:
The working pressure of the hydraulic system is pre-set in the factory. The pressure should ONLY be adjusted by a service engineer. There is a pressure gauge to indicate the working pressure of the machine. The pressure gauge should normally be closed and be used only during service/maintenance work.

| **Model** | **IW-45K/60K** |
|---|---|
| **Max Pressure** | 250 $Kg/cm^2$ |

## AIRBORNE NOISE

The continuous airborne noise level of the machine under normal condition is approximately 75 dB ± 5 dB.

# TROUBLE SHOOTING

| Problem | Probable cause | Solution |
|---|---|---|
| Motor cannot start | 1. No power. | Check the power source. |
| | 2. Isolator switch not turn on. | Turn the switch to ON position. |
| | 3. Emergency buttons not released. | Release the emergency button by turning the knob to the right. |
| | 4. Motor broken. | Replace motor. |
| | 5. Motor power cable not connected properly. | Check the cable connection and reconnect cable. Change cable if worn out. |
| | 6. Motor circuit breaker jumped to OFF. | Reset the breaker to ON position. |
| | 7. Fuse broken. | Check and replace fuse. |
| | 8. Magnetic switch broken or burn out. | Replace switch |
| | 9. Transformer broken. | Replace transformer |
| | | |
| Motor is on, but machine won't move | 1. Motor turning in wrong direction. | Turn machine off. Change any two of the three power source wire. Re-check motor direction. |
| | 2. Not enough hydraulic oil. | Check oil level and add oil if necessary. |
| | 3. Solenoid valve stuck. | Clean or replace valve. |
| | 4. Solenoid valve coil burn out. | Replace solenoid valve. |
| | 5. Foot paddle not sending signal. | Check paddle and replace switch if necessary. |
| | 6. Relay stuck or burn out. | Replace relay |

| Problem | Probable cause | Solution |
|---|---|---|
| (cont.) | 7. Interlocked safety covers not closed. | Close covers/stripper. |
| | 8. Limit switch not set at correct position. | Adjust the limit switch for proper stroke travel setting. |
| | | |
| Machine moves, but cannot reach capacity | 1. Relieve valve not set correctly | Check hydraulic pressure and adjust relieve valve (tighten to increase pressure) |
| | 2. Relieve valve broken. | Replace relieve valve. |
| | 3. Pump broken. | Replace pump. |
| | 4. Cylinder internal leak. | Contact dealer for service. |
| | 5. Pilot check valve not set correctly. | Adjust the correct pressure setting of the valve. |
| | | |
| Excess hydraulic noise | 1. Motor turning wrong direction. | Turn machine off. Change any two of the three power source wire. Re-check motor direction. |
| | 2. Pump worn out. | Replace pump. |
| | 3. Filter is dirty. | Replace filter element. |
| | 4. Not enough oil. | Check oil level and add oil if necessary. |

# Hydraulic Circuit Parts

## IW-45K

| No. | Description | Q'ty | Specification / Part No. |
|---|---|---|---|
| 1 | Oil Tank | 1 | 1602910 |
| 2 | Filler Breather Filter | 1 | OLHW-HY-08A |
| 3 | Oil Level Gauge | 1 | OLHW-LG-4" |
| 4 | Motor | 1 | 5HP |
| 5 | Pump | 1 | OLPM-SAL1-12 |
| 6 | Relief Valve | 1 | OLOV-RPEC-FAN |
| 7 | Gauge Cock | 1 | OLOV-ST-02L |
| 8 | Pressure Gauge | 1 | OLOV-CB-LM-63-350KG |
| 9 | Solenoid Valve | 1 | OLSV-DFA-02-3C60 |
| 10 | Suction Filer | 1 | OLFL-MF-086 |

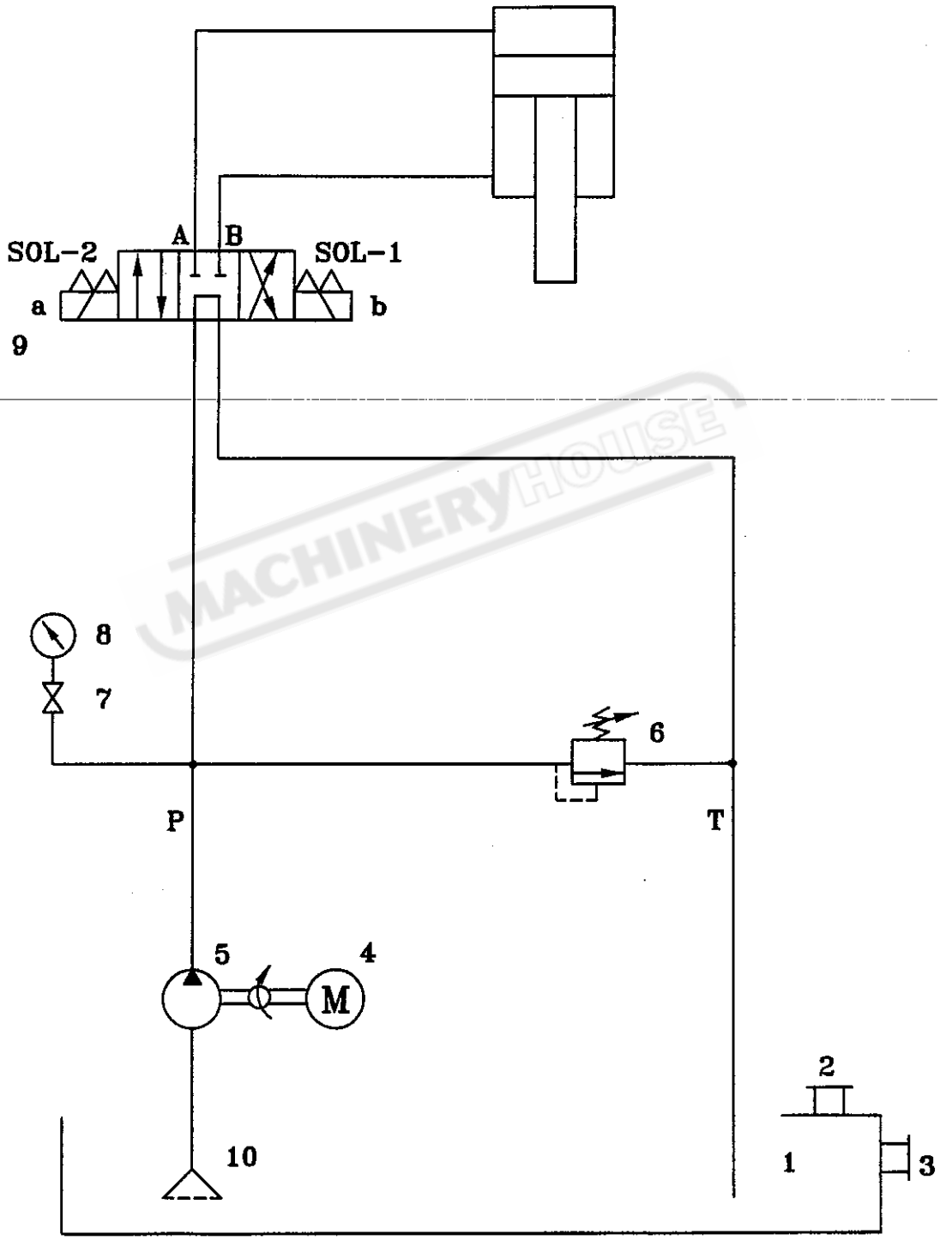
# Hydraulic Circuit Parts

## IW-60K

| No. | Description | Q'ty | Specification / Part No. |
|---|---|---|---|
| 1 | Oil Tank | 1 | 2902910 |
| 2 | Filler Breather Filter | 1 | OLHW-HY-08A |
| 3 | Oil Level Gauge | 1 | OLHW-LG-4" |
| 4 | Motor | 1 | 7.5HP |
| 5 | Pump | 1 | OLPM-SAL1-16 |
| 6 | Relief Valve | 1 | OLOV-RPEC-FAN |
| 7 | Gauge Cock | 1 | OLOV-ST-02L |
| 8 | Pressure Gauge | 1 | OLOV-CB-LM-63-350KG |
| 9 | Solenoid Valve | 1 | OLSV-DFA-02-3C25 |
| 10 | Suction Filer | 1 | OLFL-MF-106 |
| 11 | Globe Valve | 1 | OLOV-4730061R |

# Hydraulic Circuit

## IW-45K



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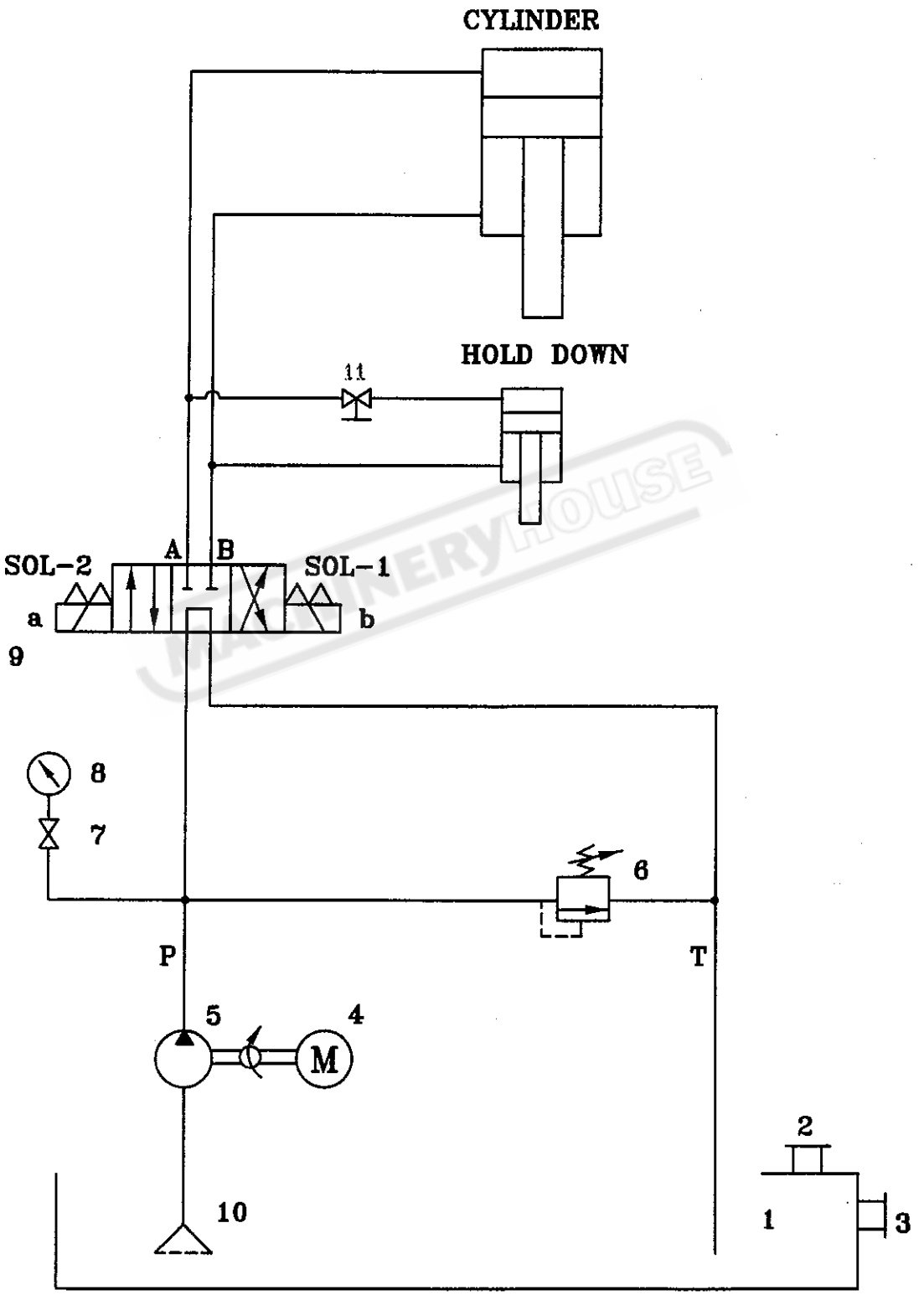
# Hydraulic Circuit

# IW-60K



# Electrical Parts

## IW-45K/60K (CE)

| Code | Description | Q'ty | Function |
|---|---|---|---|
| QF | Motor Circuit Breaker | 1 | Motor Protection |
| FU1,FU2,FU3 | Fuse | 3 | Control Circuit Protection |
| QS | Isolator Switch | 1 | Circuit Interrupter |
| SB1 | Push-Lock Push Bottom | 1 | Emergency Stop |
| SB2 | Flush Push Bottom (Red) | 1 | Pump Off |
| SB3 | Flush Push Bottom (Green) | 1 | Pump On |
| SA1 | Selector Switch | 1 | Normal/Jog Switch |
| SA2 | Selector Switch | 1 | Shear/Notch Key Switch |
| FS | Foot Switch | 1 | Foot Switch Control |
| KA1 | Relay | 1 | Ram Upward |
| KA2 | Relay | 1 | Ram Downward |
| KA5 | Relay | 1 | Sensor Control |
| SQ1 | Limit Switch | 1 | Ram UP Limit Switch |
| SQ2 | Limit Switch | 1 | Ram Down Limit Switch |
| SQ3 | Limit Switch | 1 | Punch Safety Interlock |
| SQ4 | Limit Switch | 1 | Notch Safety Interlock |
| SOL | Solenoid Valves | 1 | |
| KM | Magnetic Switch (Contactors) | 1 | |
| | Bridge Rectifiers | 1 | |
| TR | Transformer | 1 | |

## Specification

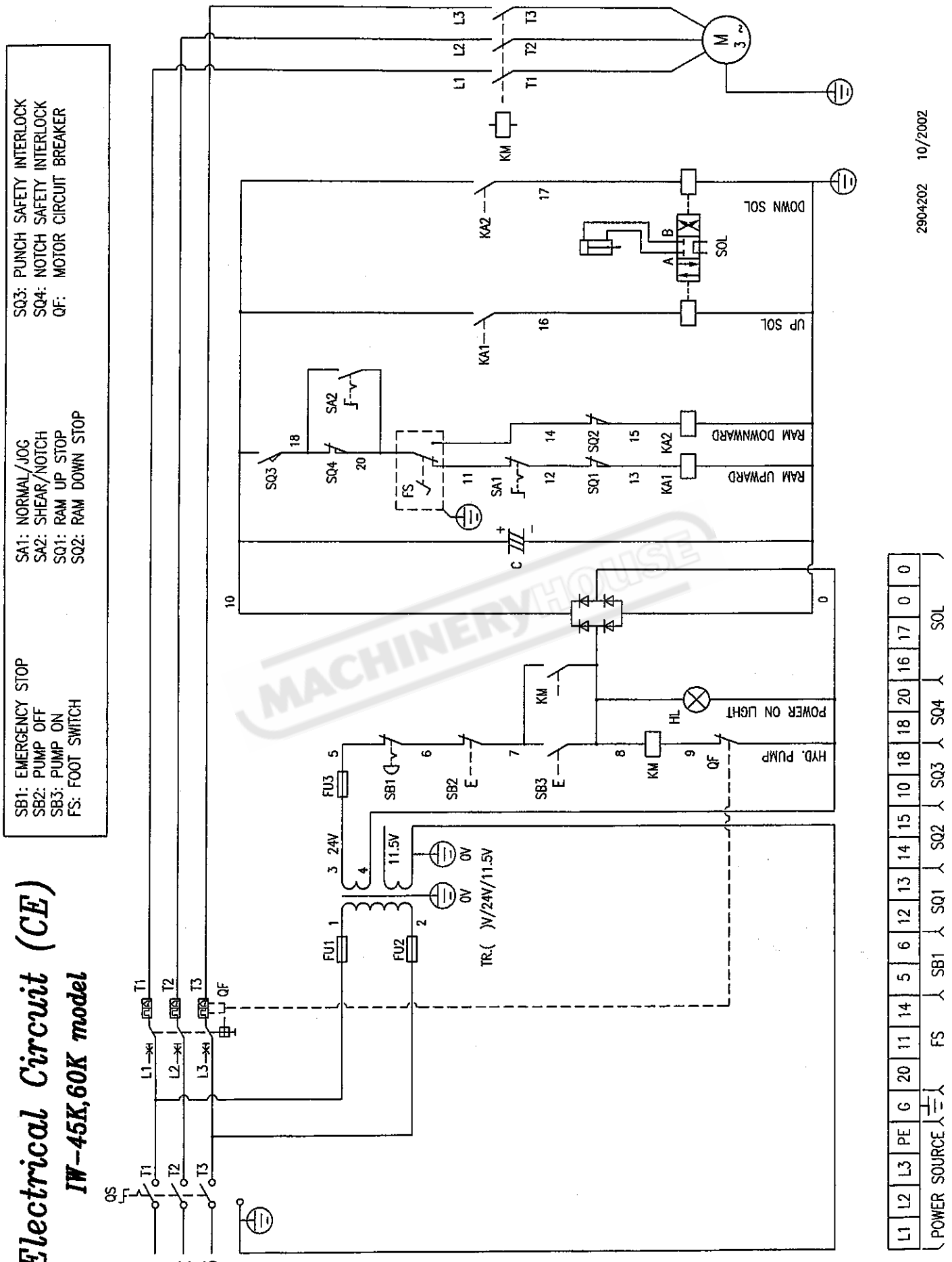
Unit: mm

| MODEL | IW-45K | IW-60K | IW-85KD |
|---|---|---|---|
| **PUNCHING** | | | |
| Punching Pressure | 45 Ton | 60 Ton | 85 Ton |
| Punch Capacity | ø22 x 15 | ø22 x 20 | ø27 x 22 |
| (Diameter x Thickness) | ø40 x 8 | ø40 x 11 | ø50 x 12 |
| Throat Depth | 165 | 200 | 410 |
| Channel Flange Punch | -- | -- | 75 ~ 180 |
| Maximum Stroke Length | 30 | 40 | 100 |
| Cycles / Min. (15 mm stroke) | 37 | 34 | 29 |
| Working Height Up to Die | 1050 | 1050 | 1050 |
| **ANGLE SHEARING** | | | |
| Shearing Capacity | 45 Ton | 60 Ton | 110 Ton |
| Shearing cylinder Stroke Length | -- | -- | 50 |
| At 90° Shearing | 75 x 75 x 6 | 100 x 100 x 8 | 130 x 130 x 12 |
| Working Height | 1000 | 1070 | 1040 |
| **BAR SHEARING** | | | |
| Round Bar Shear | ø30 | ø40 | ø50 |
| Square Bar Shear | 25 x 25 | 38 x 38 | 50 x 50 |
| Channel Shear | 76* | 102* | 152* |
| I-Beams Shear | 76* | 102* | 152* |
| **FLAT SHEARING** | | | |
| Flat Bar Shearing | 300 x 10 | 350 x 15 | 406 x 20 |
| Blade Length | 310 | 360 | 410 |
| Working Height | 800 | 805 | 726 |
| **NOTCHING** | | | |
| Rectangular Notcher (W x D x T) | 50.8 x 90 x 7 | 50.8 x 90 x 8 | 63.5 x 90 x 12 |
| Vee-Notcher (Side x Side x T) | 90 x 90 x 8* | 90 x 90 x 8* | 105 x 105 x 12* |
| Channel notching | -- | -- | 180 ~ 200 |
| Working Height | 1050 | 1050 | 1050 |
| **SPECIAL TOOLING** | | | |
| Large V-Notcher (Side x Side x T) | -- | -- | 145 x 145 x 10* |
| Single Vee Press Brake (W x T) | 160 x 8* | 160 x 8* | 250 x 15* |
| Multi-Vee Press Brake (W x T) | 250 x 4* | 250 x 6* | 500 x 5* |
| Angle Bending | 65 x 8* | 65 x 8* | 102 x 8* |
| Pipe Notching | ø63* | ø63* | ø114* |
| **OTHER** | | | |
| Electric Power (HP) | 5 HP | 7.5 HP | 10 HP |
| Net Weight (Apr.) | 840 kg | 1180 kg | 2750 kg |
| Gross Weight (Apr.) | 940 kg | 1320 kg | 2900 kg |
| Machine Dimension (Apr.) | 1050 x 760 x 1490 | 1180 x 760 x 1630 | 1755 x 1020 x 1865 |
| Packing Dimension (Apr.) | 1320 x 920 x 1770 | 1450 x 920 x 1910 | 2150 x 1180 x 2170 |

* : Optional Tooling

Note: Based on material strength of 45kg/mm² tensile.
Design and specifications subject to change without notice.

# Electrical Circuit (CE)
## IW-45K,60K model

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