METALMASTER

Hydraulic NC Guillotine
OPERATION MANUAL

Models.
SG2504E, SG2506E, SG3206E

Product Code S915, Product Code S916, Product Code S918

Edition No : 005
Date of Issue : 01/2025

MACHINE DETAILS

MACHINE	HYDRAULIC NC GUILLOTINE
MODEL NO.	
SERIAL NO.	
DATE OF MANF.	

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Note:
This manual is only for your reference. Owing to the continuous improvement of the Metalmaster machines, changes may be made at any time without obligation or notice. Please ensure the local voltage is the same as listed on the specification plate before operating any electric machine.

NOTE:
In order to see the type and model of the machine, please see the specification plate. Usually found on the back of the machine. See example (Fig.1)

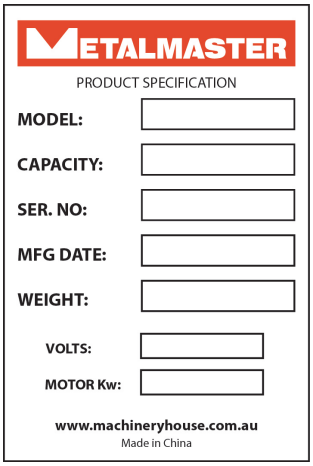


Fig.1

CONTENTS:

1.1 SPECIFICATIONS:

Order Code	S915	S916	S918
Model	SG-2504E	SG-2506E	SG-3206E
Shearing Length (mm)	2500	2500	3200
Material Capacity Mild Steel (mm)	4	6	6
Material Capacity Mild Steel (mm)	2	3.5	3.5
Shear Angle (degree)	1°30′	1°30′	1°30′
Back Gauge Range (mm)	10 - 600	10 - 600	10 - 600
Back Gauge Type	Screw	Screw	Screw
System Pressure (MPa)	18	18	18
Oil Tank Volume	157	170	210
Overall Dimensions Width (mm) Depth (mm) Height (mm)	3175 1950 1750	3190 2050 1750	3890 2200 1800
Packing Dimensions Width (mm) Depth (mm) Height (mm)	3200 1450 1720	3250 1550 1800	4000 1750 1850
Height of Work Table (mm)	800	800	800
Weight (kgs)	3205	4300	5550
Voltage 50Hz (V)	415 3Ph	415 3Ph	415 3Ph
Main Motor 3 Phase 415 V 50Hz (kW)	5.5	7.5	7.5
Back Gauge 3 Phase 415 V 50 Hz (kW)	0.37	0.37	0.37

1.2. STANDARD EQUIPMENT:

Back-gauge assembly
Front guarding
Foot switch and control panel
Front sheet supports
Tool-set and Instruction manual

OPTIONAL EQUIPMENT

Rear pneumatic sheet supports

1.3. OVERALL DRAWINGS

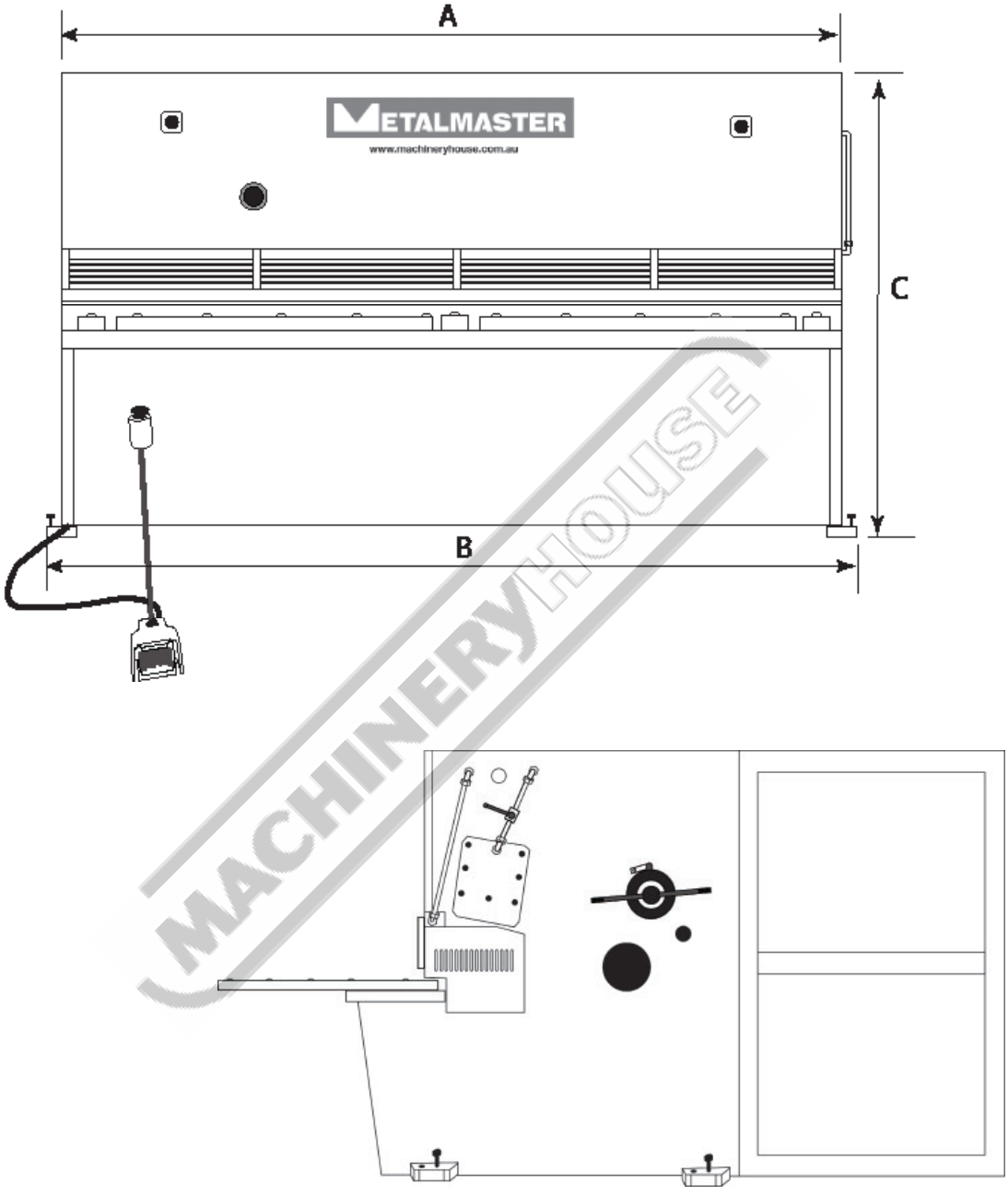


Fig. 1.2

mm	SG-2504E	SG-2506E	SG-3206E
A	3175	3190	3890
B	3230	3250	3990
C	1750	1800	1850
D	1450	1550	1750

2.1 SAFETY REQUIREMENTS

DO NOT use this machine unless you have read this manual or have been instructed in the use of this machine in its safe use and operation

WARNING

This manual provides safety instructions on the proper setup, operation, maintenance, and service of this machine. Save this manual, refer to it often, and use it to instruct other operators. Failure to read, understand and follow the instructions in this manual may result in fire or serious personal injury—including amputation, electrocution, or death.

The owner of this machine is solely responsible for its safe use. This responsibility includes, but is not limited to proper installation in a safe environment, personnel training and authorization to use, proper inspection and maintenance, manual availability and comprehension, of the application of the safety devices, integrity, and the use of personal protective equipment.

The manufacturer will not be held liable for injury or property damage from negligence, improper training, machine modifications or misuse.

Safety glasses must be worn at all times in work areas. Earmuffs should be worn if the work area is noisy.

Gloves should NOT be worn when operating this machine. Should only be used when handling the workpiece

Sturdy footwear must be worn at all times in work areas.

Long and loose hair must be contained with a net or under a hat

OWNER'S MANUAL. Read and understand this owner's manual before using the machine.

DISCONNECT POWER FIRST. If using power, always disconnect the machine from power supply before making adjustments, or servicing the machine. This prevents any risk of injury from unintended startup or contact with live electrical equipment

TRAINED OPERATORS ONLY. Operators that have not been trained have a higher risk of being seriously injured. Only allow trained or supervised people to use this machine. When the machine is not being used, disconnect the power, to the machine to prevent unauthorized use—especially around children. Make the workshop safe.

2.1 SAFETY REQUIREMENTS Cont.

WEARING PROPER APPAREL Do not wear clothing, apparel or jewelry that can become entangled in moving parts. Always tie back or cover long hair. Wear non-slip footwear to avoid accidental slips, which could cause loss of operating control.

HEARING PROTECTION. Always wear hearing protection when operating or observing loud machinery. Extended exposure to this noise without hearing protection can cause permanent hearing loss.

REMOVE ADJUSTING TOOLS. Tools left on machinery can become dangerous projectiles upon startup. Never leave hex keys, wrenches, or any other tools on machine. Always verify removal before starting!

USE CORRECT TOOL FOR THE JOB. Only use this tool for its intended purpose. Do not force the machine or its attachments to do a job for which they were not designed. Never make unapproved modifications. Modifying the machine or using it differently than intended may result in malfunction or mechanical failure that can lead to personal injury or death!

AWKWARD POSITIONS. Keep proper footing and balance at all times when operating machine. Do not overreach! Avoid awkward hand positions that make operating control difficult. This could increase the risk of accidental injury

GUARDS & COVERS. Guards and covers reduce accidental contact with moving parts or flying debris. Make sure they are properly installed, undamaged, and working correctly.

FORCING MACHINERY. Do not force the machine. It will do the job safer and better at the rate for which it was designed.

NEVER STAND ON MACHINE. Serious injury may occur if the machine is tipped or if the cutting tool is unintentionally contacted

STABLE MACHINE. Unexpected movement during operation greatly increases risk of injury or loss of control. Before starting, verify machine is stable and if using a mobile base it is locked in position.

UNATTENDED OPERATION. To reduce the risk of accidental injury, turn the machine OFF and ensure all moving parts have completely stopped before walking away. Never leave the machine running while unattended.

MAINTAIN WITH CARE. Follow all maintenance instructions and lubrication schedules to keep the machine in good working condition. A machine that is improperly maintained could malfunction, leading to serious personal injury or death.

CHECK DAMAGED PARTS. Regularly inspect the machine for any condition that may affect the safe operation. Immediately repair or replace damaged or parts that are incorrectly fitted before operating.

CHILDREN & BYSTANDERS. Keep children and bystanders at a safe distance from the work area. Stop using machine if they become a distraction.

2.2 SPECIFIC SAFETY FOR GUILLOTINES

SAFETY CHECKS BEFORE OPERATING

- ❑ Ensure fixed guards are in place to prevent hands or other parts of the body from entering area's of high risk.
- ❑ Guards or safety devices must never be removed or adjusted, except by an authorized person for maintenance purposes.
- ❑ Working parts should be well lubricated and free of rust and dirt.
- ❑ The area around the machine must be adequately lit and kept free of materials, which might cause slips or trips.
- ❑ Be aware of other personnel in the immediate vicinity and ensure the area is clear before using equipment.
- ❑ Familiarize yourself with and check all machine operations and controls.
- ❑ Ensure cutting table is clear of scrap and tools.
- ❑ Faulty equipment must not be used. Immediately report suspect machinery.

SAFETY CHECKS WHEN OPERATING

- ❑ Do not attempt to cut material beyond the capacity of the machine.
- ❑ Never attempt to cut rod, strap or wire with this machine.
- ❑ Use correct lifting procedures when handling large sheets of material.
- ❑ Take extreme care during the initial feeding of the workpiece into the machine.
- ❑ The workpiece should always be held sufficiently far back from the edge being fed into the guillotine.
- ❑ Ensure fingers and limbs are clear before operating the guillotine.
- ❑ Hold material firmly to prevent inaccurate cutting due to creep.
- ❑ When cutting ensure feet are positioned to avoid contact with the foot operated lever.

SAFETY CHECKS AFTER OPERATION

- ❑ Remove all off cuts and place them in either the storage rack or waste bin.
- ❑ Leave the work area in a safe, clean and tidy state.

POTENTIAL HAZARDS

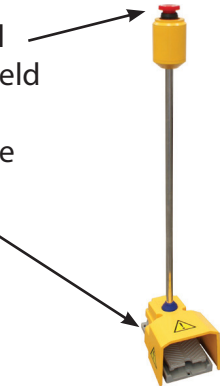
- ❑ Cuts from the sharp edges and burrs on the sheets before and after cutting.
- ❑ Parts of the body being caught in crush and pinch points.
- ❑ Injuries caused when handling metal sheets.

2.3 SAFETY FEATURES OF THE MACHINE:

The electrical and hydraulic circuits of your machine are designed to allow operation with maximum safety. The following precautions are available on the machine for enhanced safety. There are three Emergency stop buttons (engaging type) on the machine. One is found on the front of the machine, one on the foot switch control unit, and one on the control panel. Once the button has been pressed to reset the emergency stop, the red button must be rotated to release the stop button.

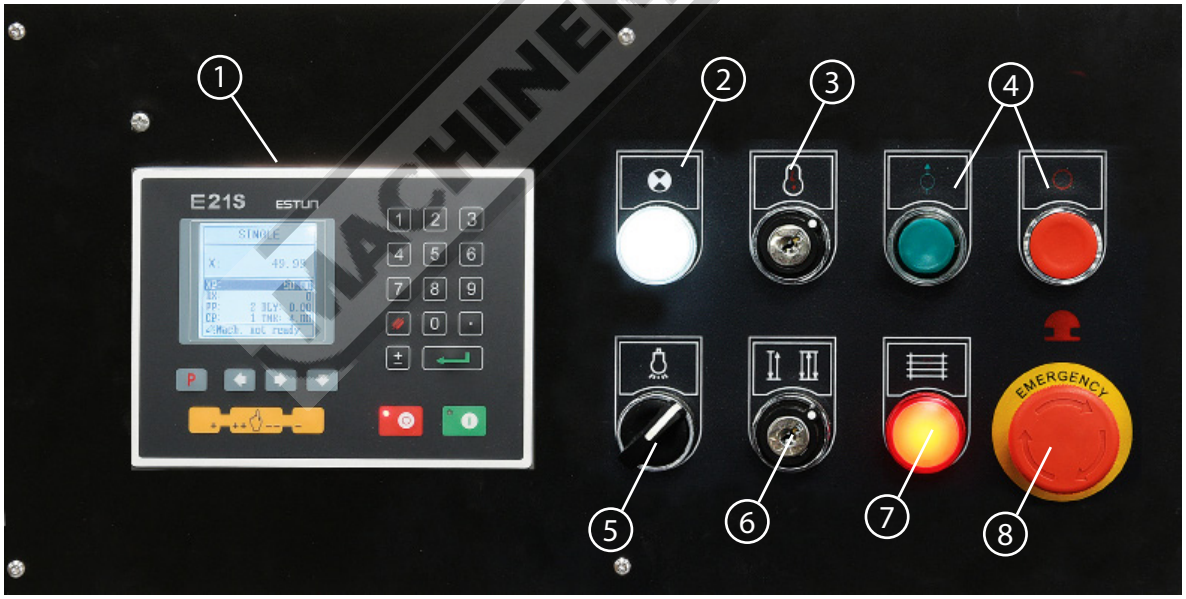
FOOT PEDAL CONTROL

Emergency stop button (engaging type) is available on the foot switch control unit. The foot pedal when pressed activates the shearing beam and must be held in the depressed position until the machine has completed its cut. Releasing the foot pedal during the shearing operation will return the machine to the top of its stroke when controller is set to single cut.



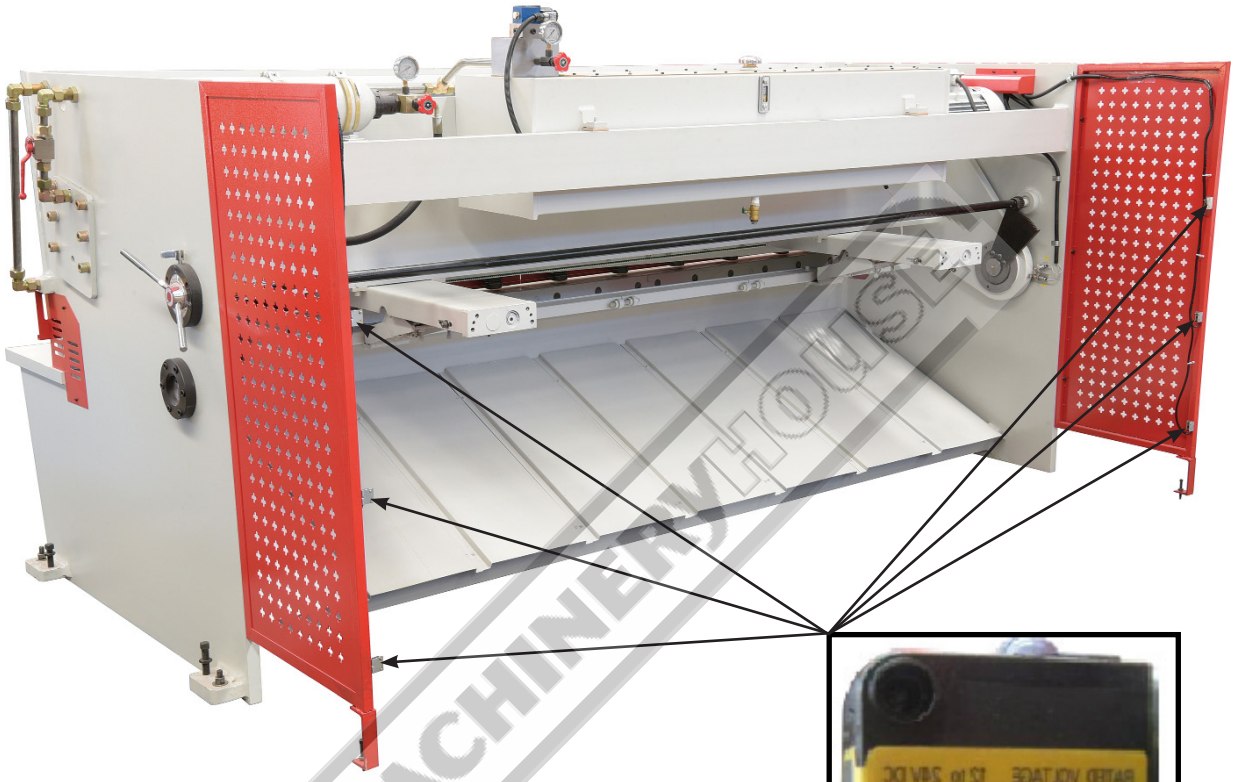
MAIN CONTROLS

The main machine operating controls are located on the control panel mounted on the front of the machine.



1	E21S Controller	5	Shadow Light ON/OFF
2	Power ON Light	6	Single / Continuous Cycle
3	Switch ON Electrical Circuit	7	Rear Guard Warning Light
4	Pump Motor ON/Off Buttons	8	Emergency Stop Button

To prevent the operator or other persons from accidental injury the machine operation includes a photoelectric light guard at the back of the machine



3 x Photoelectric safety cells are placed on both sides of the back of the machine. When the beam is broken the machine stops.

Once the beam has been broken the system needs to be reset. This is done by pressing the reset button. The reset button is found on the electrical cabinet under the main isolating switch.

2.4 LIFTING INSTRUCTIONS

On the day that the machine arrives, make sure that a crane with sufficient capacity is available to unload the machine from the vehicle. Make sure access to the chosen site is clear and that doors and ceilings are sufficiently high and wide enough to receive the machine.
To handle the Guillotine, use only the two sling lifting points located on the top of the end plates. (Fig. 2.3) The slings should be positioned so the machine is level when lifted.
When using slings please take note of the sling angle and the loads that apply.

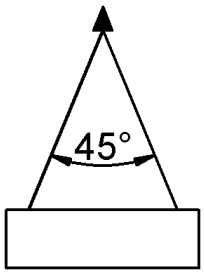
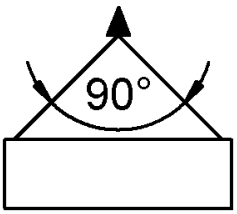


Fig 2.1.

When the slings are at a 45° angle then each sling is carrying the equivalent of 50% of load weight. (Fig.2.1).

When the slings are at a 90° angle then each sling will have a weight equal to 75% of the load on each sling. (Fig 2.2)
Note! The manufacturer recommends not to exceed 90° angle

Fig 2.2

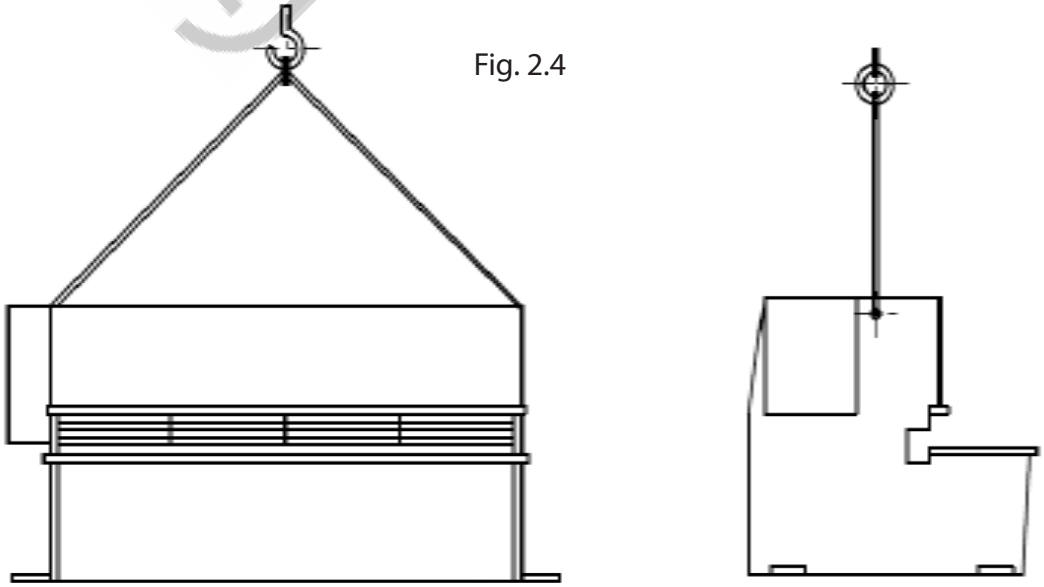


LIFTING POINTS

When lifting the machine only use the lifting points on the machine. (Fig. 2.3) and sling as per diagram below. (Fig. 2.4) Ensure that when lifting, the machine does not tip over.
Check that the lifting slings do not interfere with the hydraulic pipes or electrical conduits. Certified lifting slings only should be used. Failure to follow these instructions could cause damage to the machine.

Fig. 2.3

Fig. 2.4

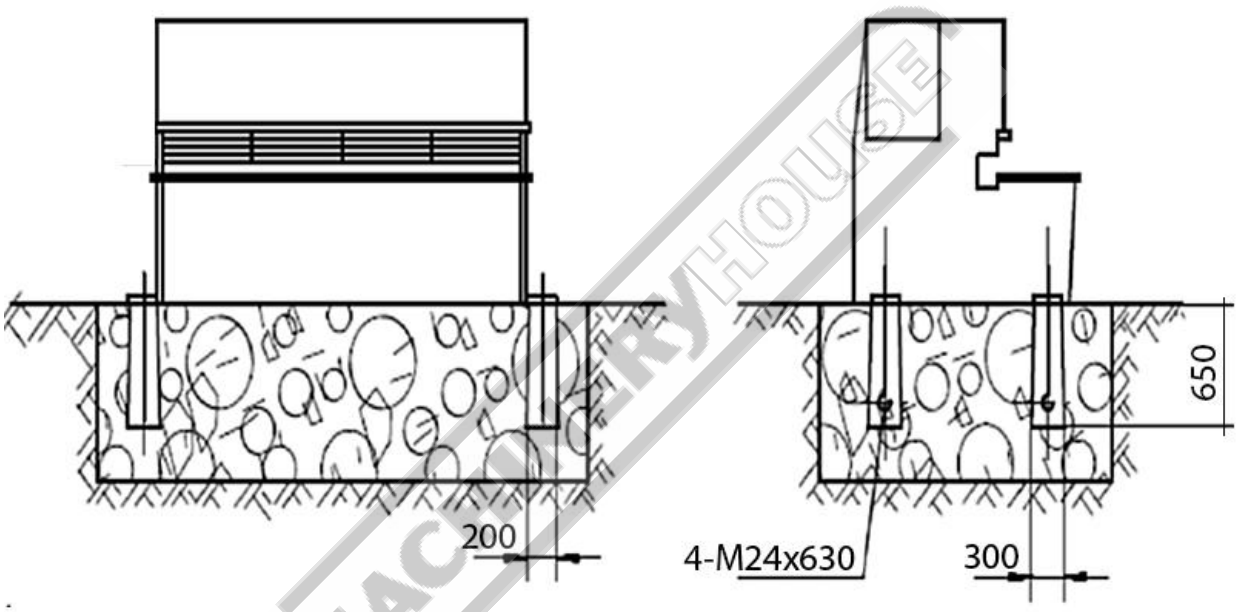


3. INSTALLATION

3.1 BASE FOUNDATION AND SECURING POINTS

The machine must be leveled and firmly stationed on the floor where it is to be used, according to the Installation Diagram attached. The floor load, must be suitable for the weight of the machine.

Before securing the machine a solid concrete base must be prepared to the specification of the machine. The sizes for the bolt holes position are listed as A-B listed in the chart below. Check the sizes with the distributor.



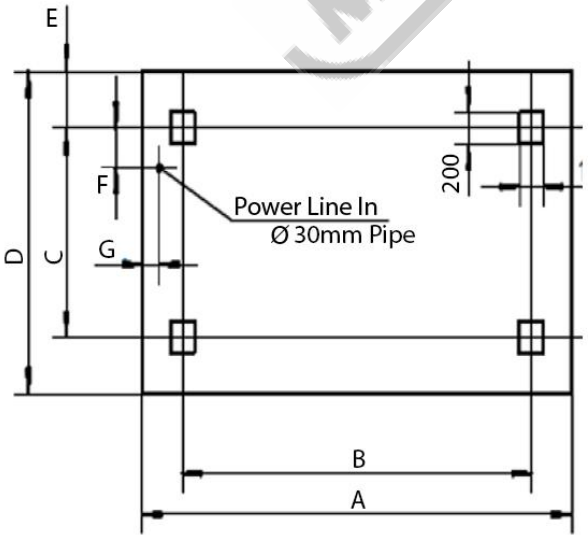


Table of Measurement

Model	SG-2504E	SG-2506E	SG-3206E
A	3500	3500	4200
B	2840	2860	3583
C	1000	1200	1350
D	1750	1900	1900
E	300	300	300
F	130	130	130
G	100	100	100

3.2 MACHINE LEVELING

To set your machine up so that it operates to optimum performance, apply the following procedure. After your guillotine has been anchored to a concrete slab floor, it then needs to be leveled. The leveling is performed by using the screws on each pad.(Fig. 3.1). To adjust the level, loosen the hold down bolts and place a level on the surface of the working table.
Tolerances: 1000:0.30mm, for both longitudinal and transverse.
Metal plates need to be placed under each jacking screw to distribute the load. Once level tighten the locknuts on the jacking screws and then tighten the hold down bolts.

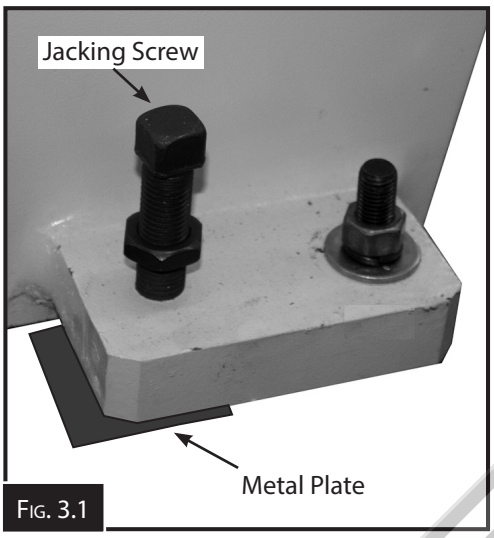


FIG. 3.1

The machine must not rest on supports other than those defined in Fig. 3.1.

3.3 ELECTRICAL INSTALLATION

Place the machine near an existing power source. Make sure all power cords are protected from traffic, material handling, moisture, chemicals, or other hazards. Make sure there is access to a means of disconnecting the power source. The electrical circuit must meet the requirements for 415V. To minimize the risk of electrocution, fire, or equipment damage, these machines should be hard wired with installation work and electrical wiring done by a qualified electrician.
NOTE : The use of an extension cord is not recommended as it may decrease the life of electrical components on your machine.

ELECTRICAL REQUIREMENTS

Nominal Voltage.....415V
Cycle.....50 Hz
Phase.....Three Phase
Power Supply Circuit.....20 Amps
Full Load Current (SG-2504E)**.....10.5 Amps**
Full Load Current (SG-2506E, SG-3206E)**..14.3 Amps**

(Full load current rating is also on the specification plate on the motor.)

3.4 FULL-LOAD CURRENT RATING

The full-load current rating is the amperage a machine draws when running at 100% of the output power. Where machines have more than one motor, the full load current is the amperage drawn by the largest motor or a total of all the motors and electrical devices that might operate at one time during normal operations.
Full-Load Current Rating for the SG-2504E machine at 415V is 14.3 amps.
Full-Load Current Rating for the SG-2506E and SG-3206E machines at 415V is 10.5 amps.
It should be noted that the full-load current is not the maximum amount of amps that the machine will draw. If the machine is overloaded, it will draw additional amps beyond the full-load rating and if the machine is overloaded for a long period of time, damage, overheating, or fire may be caused to the motor and circuitry.
This is especially true if connected to an undersized circuit or a long extension lead. To reduce the risk of these hazards, avoid overloading the machine during operation and make sure it is connected to a power supply circuit that meets the requirements.

METALMASTER machines are supplied without a lead and must be connected to the power supply. Check the specification plate on the machine to confirm that the voltage is compatible with the local power supply.
The machine must be connected to the power by a qualified and licensed electrician.
Warranty may be voided if it is found that the connection was not carried out by a qualified electrician.
Check the rotation of the motor. (Fig. 3.2) If the direction does not match the arrow below, (Fig. 3.3) isolate the machine and change the wiring.

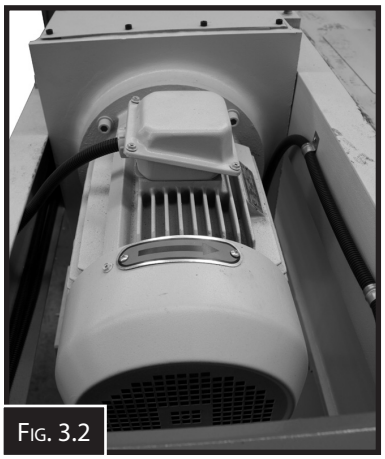


Fig. 3.2

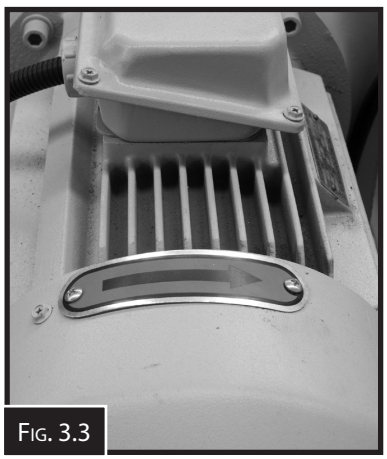


Fig. 3.3

3.4 ATTACHING THE ACCESSORIES.

- ❑ Bolt the support arms onto the feed table. Ensure they are level and square to the table. (Fig 3.4)

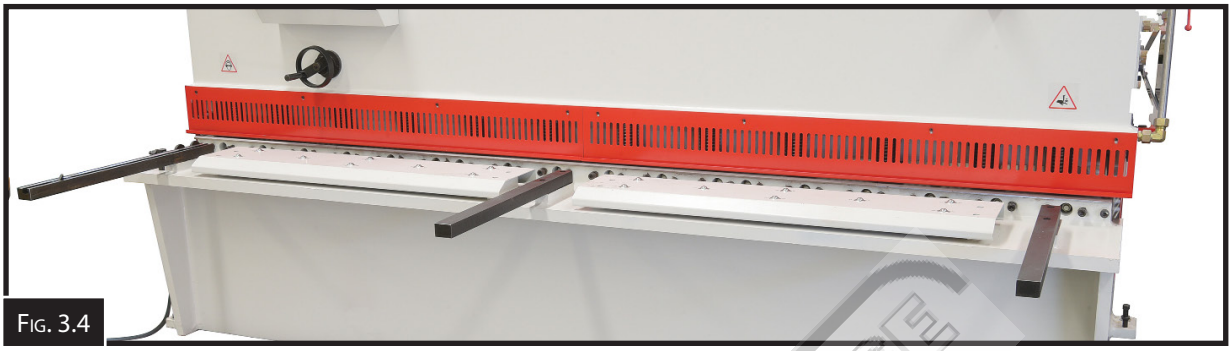


Fig. 3.4

- ❑ Place the squaring stops Fig 3.5 into position on the table top, securing into place with the bolts supplied. Check that the square stops are square to the blade. Adjust by loosening the bolts and moving by the adjusting screw and the amount allowed by the clearance-of the holes.

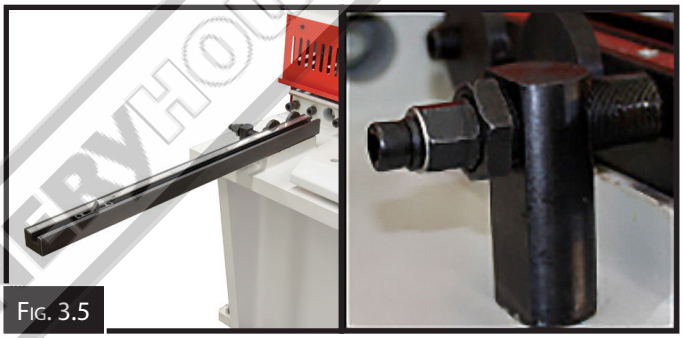


Fig. 3.5

- ❑ Re tighten the screws.
- ❑ Unpack and attach the rear fence to the back of the machine. Ensure that the sensors have been connected and set up. (Fig.3.6)
- ❑ Unpack the mobile foot control and plug it into the socket provided on the machine under the electrical box. (Fig.3.7) The plug can only be inserted one way so the plug needs to be twisted around until the plug slips easily into the socket.

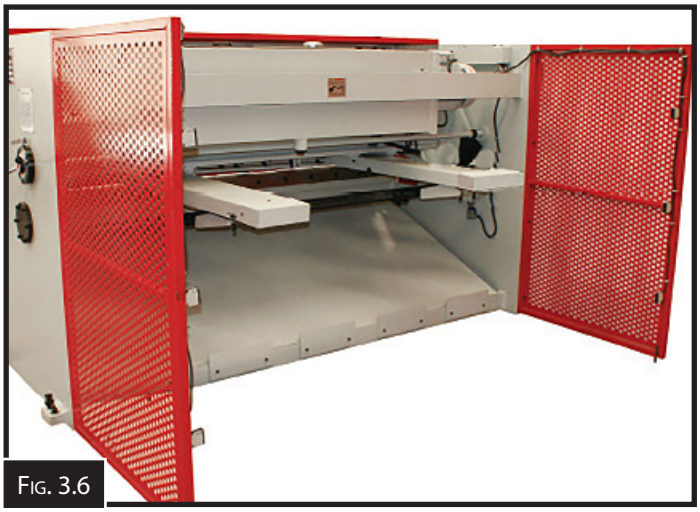


Fig. 3.6

Fig. 3.7

3.5 FILLING THE HYDRAULIC OIL TANK.

When filling the tank with oil, make sure that the top of the tank is clean and free from dust and dirt. (Fig. 3.8)
Use General hydraulic oil that is suitable for hydraulic machines. (**46 grade hydraulic oil**)

- ❑ Remove the oil tank filler cap. (Fig 3.9)
- ❑ Using a pump add the oil into the tank.
- ❑ Oil level must be filled until the oil reaches the middle mark of the oil indicator. (Fig. 3.10)
- ❑ Always keep the oil at the same level.

Fig. 3.8

Sight Glass

Fig. 3.10

Filler Cap

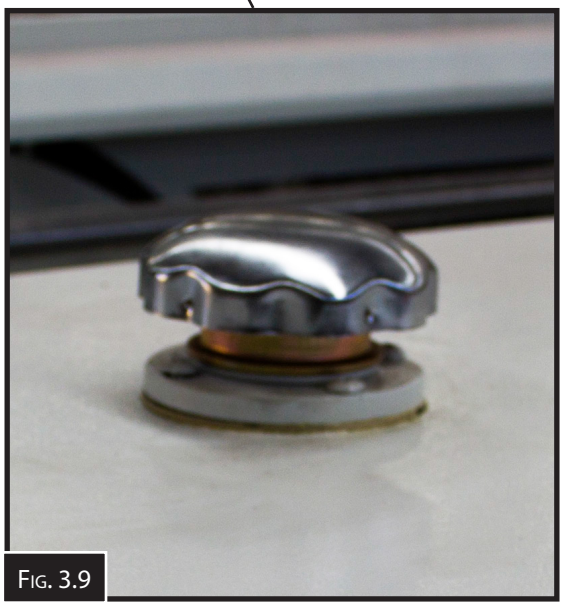


Fig. 3.9

4. COMMISSIONING

OMRON E3Z - SAFETY SENSORS OPERATION & ALIGNMENT

The safety circuit consists of a reset switch and two rear side fences, each having 3 sensors. Your machine has a RED warning light on the pendant and a message "Machine Not Ready on the E21S controller. When the main power is switched on the safety circuit must be reset before the hydraulic pump can be started.

A: Basic Control - Light on **OR** **B: E21S Control Display**

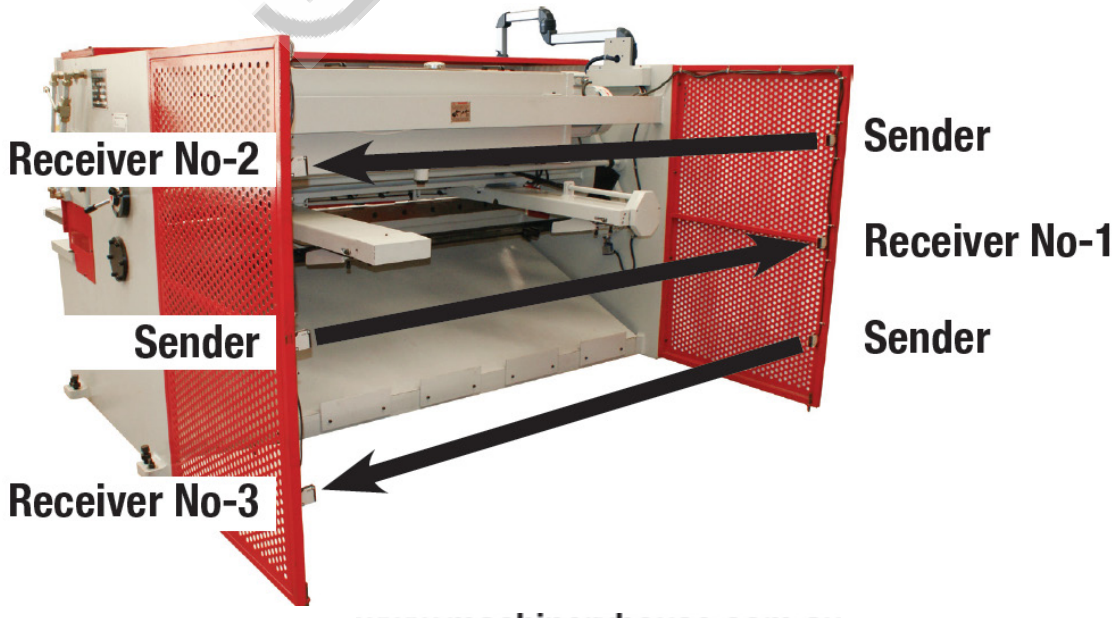
THESE INDICATE THE SAFETY CIRCUIT HAS NOT BEEN RESET.

RESET BUTTON

The green reset button is found on the rear of electrical box

The rear sensors must be aligned before this reset switch can be pressed.

REAR FENCES WITH SENSORS MOUNTED

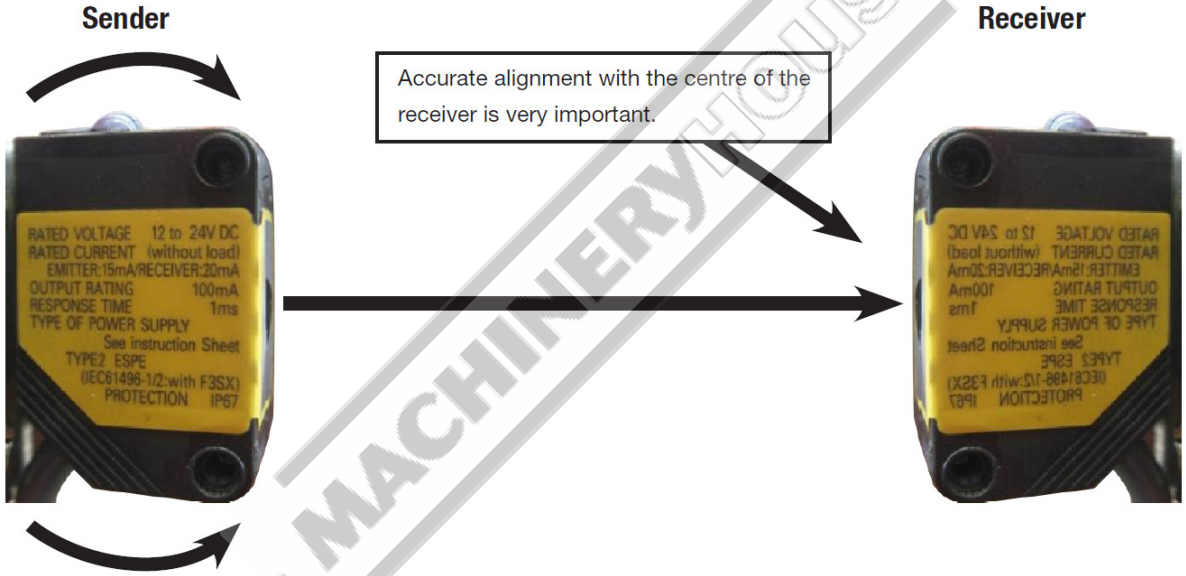


MACHINE SETUP

First ensure that the machine is level and all four levelling jacking bolts are correctly adjusted. Ensure the rear fences are tight and the stabilizing bolt is on the ground to stop the fence moving around.

ALIGNMENT

The sensors are sensitive to alignment so try to align as accurately as possible. If the sender is only slightly aligned with the receiver, any vibration when cutting will stop the pump and the safety circuit will have to be reset again. Alignment could involve loosening the sensor mounting screws or bending the mounting brackets to get the best alignment.



IDENTIFYING SENSORS

SENDERS

Each sender has a red light on top of the unit and a red light on the front. These two lights will be on all the time while the machine has power.

RECEIVER
Each receiver has two lights on top of the unit. These lights indicate if the receiver has power and if it has been aligned correctly with the sender.

No lights on

No Power

Green light on

Power on & not aligned

Green & Orange lights on

Power on & aligned

ALIGNMENT ORDER
The receivers are wired in series and must be aligned in the correct order. As each receiver is aligned correctly it will send power to the next receiver.

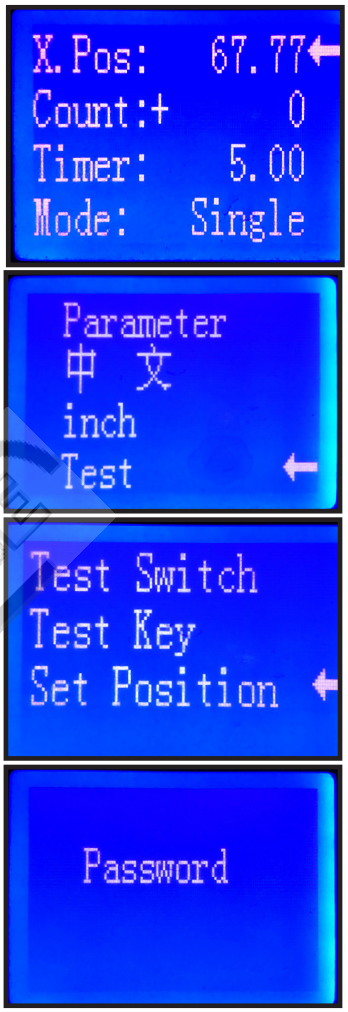
No-1 receiver (middle) A green light on indicates it has power. When it is correctly aligned with the sender a orange & green light will be on and it will send power to No-2 receiver.

No-2 receiver (top) A green light on indicates it has power. When correctly aligned with the sender a orange & green light will be on and it will send power to the No-3 receiver.

No-3 receiver (bottom) will have a green light on and when it is correctly aligned with the sender the orange & green light will be on and it will send power to the reset button.

Successful alignment When all 3 receivers are aligned correctly with their corresponding senders, they should all have orange and green lights on top.

4.3 CALIBRATE "X" AXIS ON CONTROLLER



Before operating the machine the "X" axis needs to be checked. The following is that process.

1. Cut a piece of material and measure it with a vernier. Check the dimension against the x position on the readout. If the measurement is the same then the "X" axis has been set. If they are different then do the following.
2. With power off depress the red button on the controller and turn on the power key.
3. Arrow down to test and press OK.
4. Arrow down to set position and press OK. The controller will ask you to enter the access code below.

ACCESS CODE IS 258

5. After entering the access code delete size on screen and enter new size.
6. Press OK to save changes.
7. Press ESC 3 times to exit out to normal screen.

4.4. COMMISSIONING CHECK LIST.

Before starting the machine the following checks must be made.

- ❑ Setup rear sensors.
- ❑ Check pump rotation.
- ❑ All grease nipple points have been lubricated.
- ❑ Installation and machine preparation has been performed according to the manuals instructions.
- ❑ Fill the oil reservoir with 46 grade hydraulic oil and ensure that the oil filter breather cap is fitted.
- ❑ Electrical earth fitted and power circuits, switches, and foot-pedal checked.
- ❑ Check power connections and any damage to any wiring.
- ❑ Test safety operation, Estop, rear sensors, stop button etc.
- ❑ Test controller operation.
- ❑ Test all mechanical operation on the machine including blade and back gauge travel and limit switch operation.
- ❑ Calibrate x axis on controller.
- ❑ Test cut material and check quality of cut.
- ❑ Tools, equipment and personnel are clear of the machine.
- ❑ Operation Manual on how to operate the machine has been read.

5. OPERATION INSTRUCTIONS

5.1 PRE-OPERATIONAL SAFETY CHECK PRIOR TO OPERATING

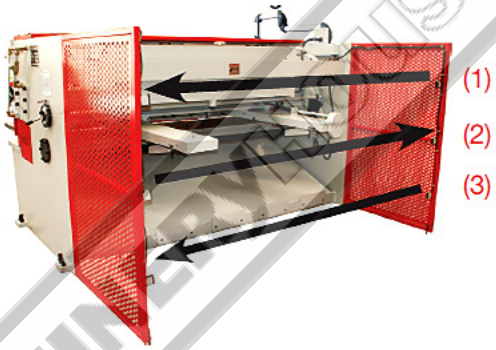
Before operating the machine the rear safety beam guard needs to be checked. Below are the steps that need to be followed.

1. Start machine as per instruction procedures.
2. Stand outside rear safety gate & obstruct sensor. (1)
3. Ensure machine has stopped and is disabled.
4. Check your control: Warning message. (A)
5. Press green reset button rear of electrical box image. (C)
6. Press OK on NC-89 control panel to activate guard system. (A)
7. Repeat steps 1 to 6 for each sensor. (2) & (3)

Control Panel

A: NC89 Control Display

B: Rear Guarding Sensors



C: Guard Reset Button

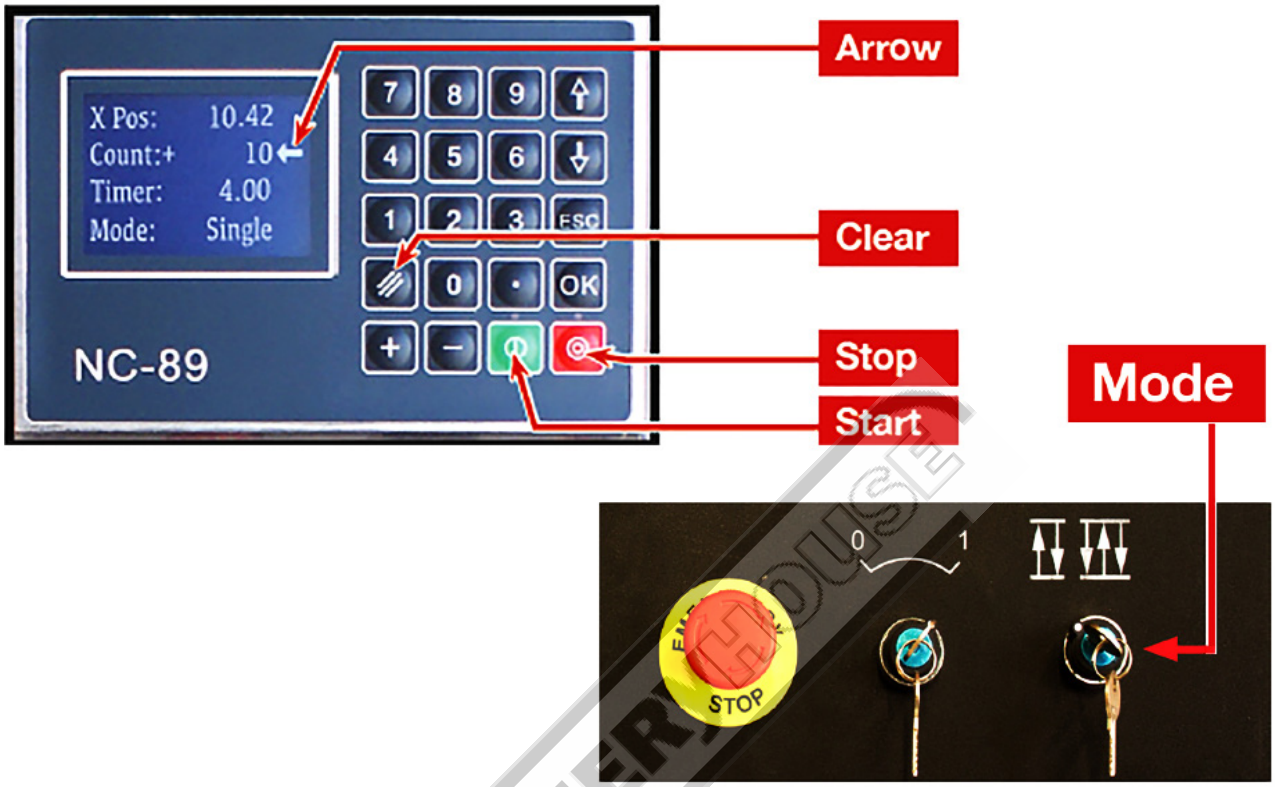
EMERGENCY STOP CHECK,

1. Start machine as per instruction procedures.
2. Press emergency stop button on control panel.
3. Ensure machine has stopped and is disabled.
4. Reset emergency stop button by twisting red dial.
(Some models may need the guard to be reset. (D)
5. Repeat steps 1 to 4 for each emergency stop on your machine.

Emergency Stop Buttons

D: Guard Reset Button

5.2 NC89 CONTROLLER OPERATION



X. Pos: Back Gauge Position,
Operation: Move Arrow to X Pos, press to clear number, enter desired value, press OK and start button.
The back gauge will now go to the new entered position to within 0.5mm. Once back gauge has stopped searching use the manual handle for fine adjustment.

Count: Number of cuts.
Count can be cleared at any time by using clear button, it will then count upwards with each cut. A set number of cuts can also be entered.
Operation: Move Arrow to Count, clear the number, enter 3 and press. OK After 3 cuts it will count down to 0 and the controller will stop cutting. You must now arrow down to Count and press + for counting upwards or enter any number for counting downwards.

Timer: Length of cut.
The length of cut can be changed to suit the width of material being cut.
Operation: Arrow down to timer, clear value and enter new value for cut length time, press OK and start button.

Mode: Continuous / Single
Mode Single - Used to perform 1 cut at a time when foot pedal is pressed.
Mode Continuous - Used to perform continuous cutting when foot pedal is pressed.

5.3 SETTING THE BLADE GAP

Blade clearance is the distance between the upper and lower blade of the shear as they pass each other during the shearing process. For optimum shearing quality, the clearance between the upper and lower blades should be set to suit the material thickness.
To adjust the blade gap for the material thickness and type, firstly check the chart in Fig 5.3 for correct setting.

TABLE FOR ADJUSTMENT GAP

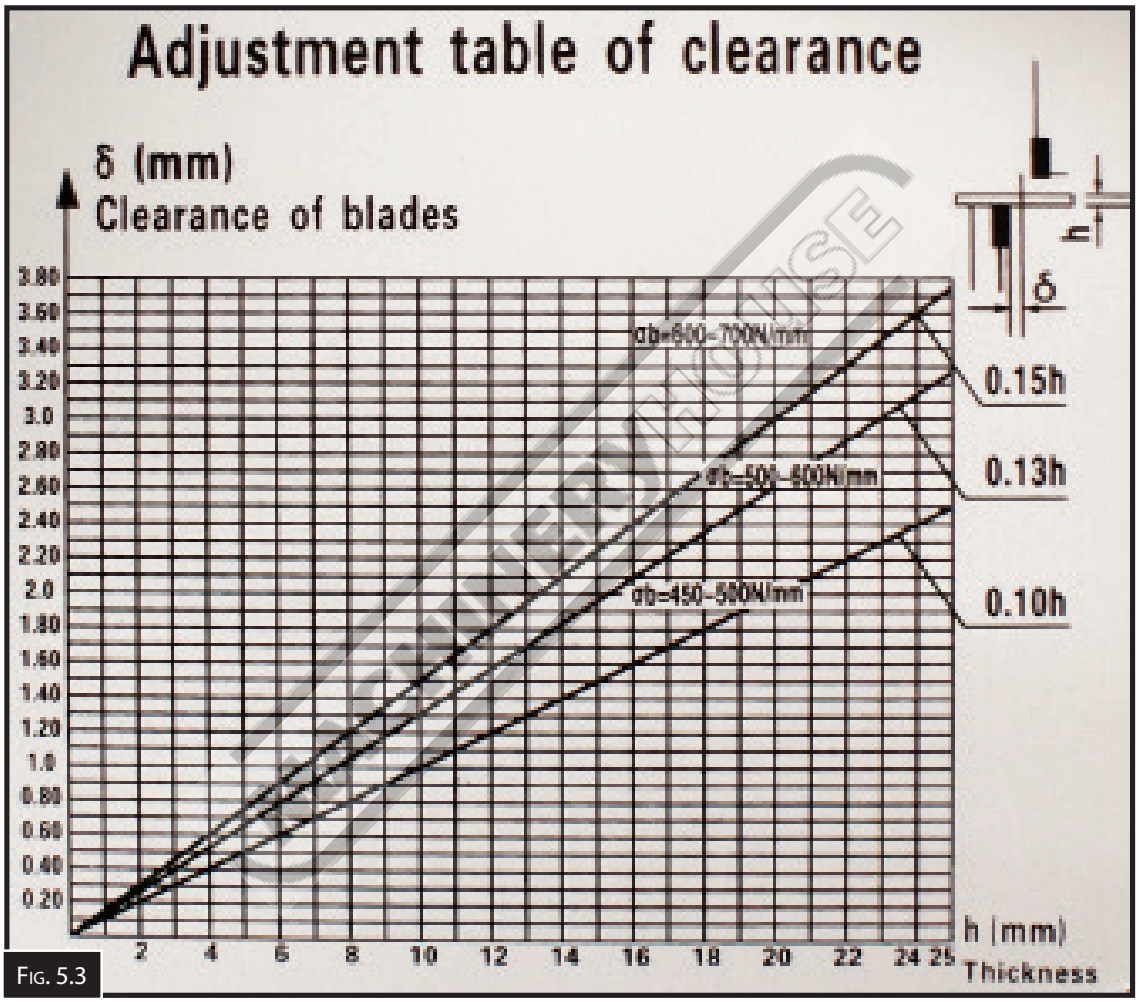


Fig. 5.3

Then adjust the hand wheel (Fig 5.4) to correct graduated setting.

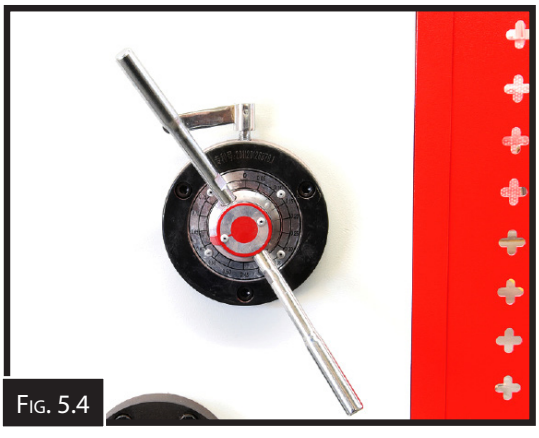


Fig. 5.4

6. MAINTENANCE AND INSPECTION

6.1 TYPE AND FREQUENCY OF INSPECTIONS

Inspection	Period	Responsibility
Lubrication of all grease points	Daily	Operator
Lubrication of slide-ways	Weekly	Operator
All Guards that protect against physical damage	Weekly	Operator
Machine fixing bolts against loosening	Weekly	Operator
Oil leakage in cylinders	Weekly	Operator
Hydraulic Oil Change and filter	1000hrs	Maintenance
Oil leakage in pipes, hoses and hydraulic elements	Weekly	Operator
Hydraulic fluid level	Weekly	Operator
Cylinder connections bolts against loosening	Weekly	Operator
Safety & limit switches against loosening, damage	Weekly	Operator
Terminal connections of the electrical installation	Annually	Electrician

6.2 LUBRICATION POINTS

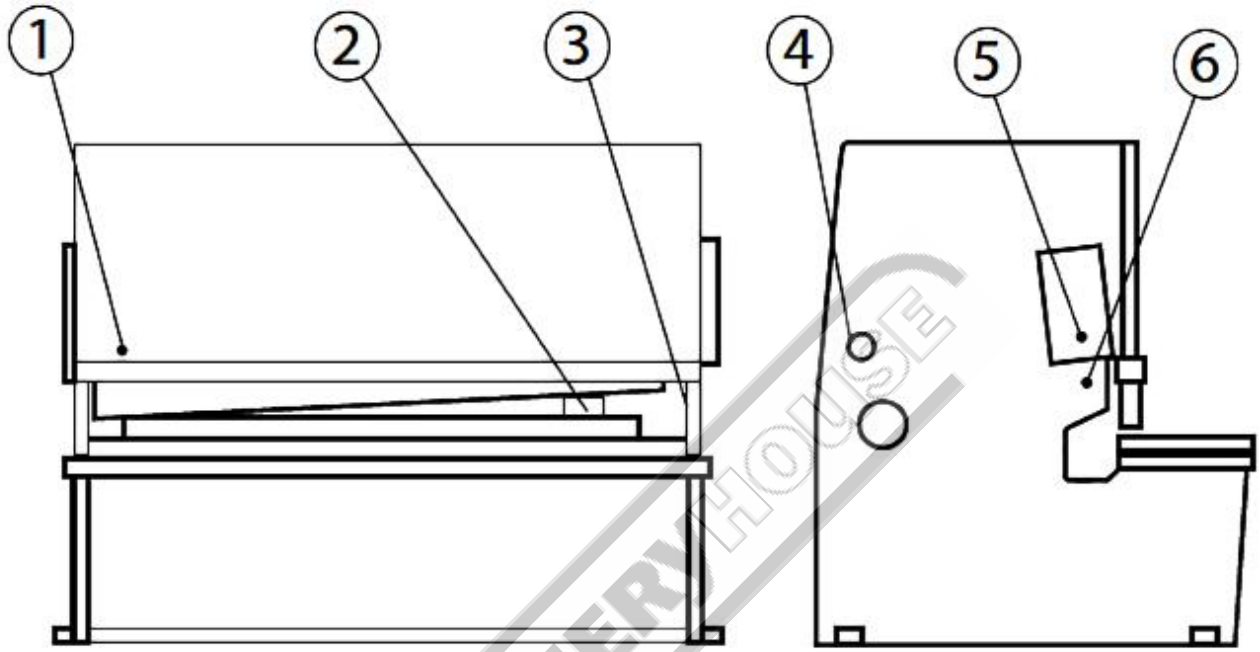


Fig. 6.1

Lubricants.

- ❑ Cylinder and main pivot points - grease.
- ❑ Back-stop: shafts, screws, nuts - grease.
- ❑ Shear beam slides - grease.
- ❑ Hydraulic oil #46.

6.3 CHANGING THE HYDRAULIC OIL

All precautions must be taken to keep the hydraulic system clean at all times
When changing oil, make sure that the top of the oil tank is clean and free from dust and dirt.

- ❑ Remove the oil in the tank using the drain tap at the bottom of the tank. (Fig 6.2)
- ❑ Remove the oil tank cover and make sure that all the oil has been removed.
- ❑ Clean out the bottom of the tank with clean rags to remove all dirt and foreign objects
- ❑ Replace the cover, remove the filler cap (Fig. 6.4) and using a pump, add the new oil into the tank.
- ❑ Oil level must be filled until the oil reaches the centre mark of the oil indicator. (Fig. 6.3)
- ❑ Always keep the oil at the same level.
- ❑ Oil must be changed after the first 200 working hours of use, and then after every 1000 working hours. (See: Lubrication Diagram Fig. 6.1).

Drain Tap

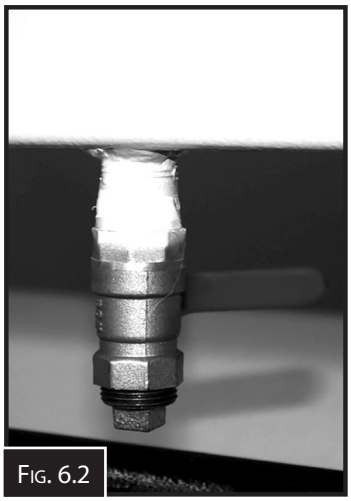


Fig. 6.2

Sight Glass

Fig. 6.3

Filler Cap

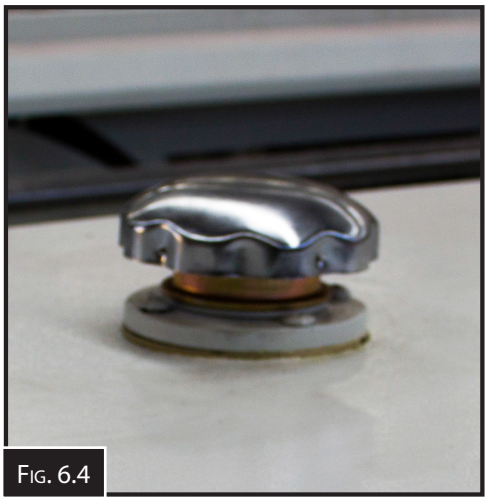


Fig. 6.4

6.4 CHANGING THE FILTER

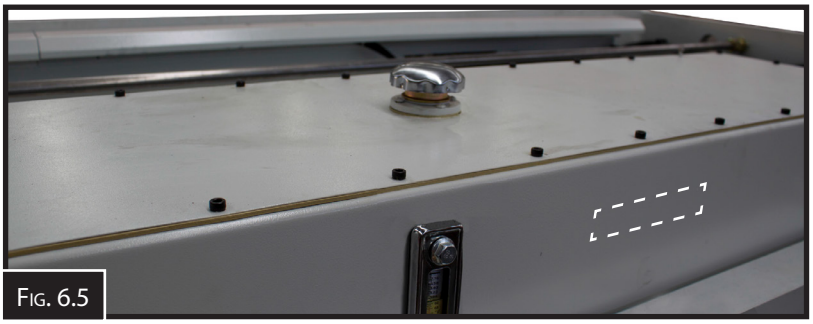


FIG. 6.5


FIG.6.6

- ❑ Drain the oil from the tank using the drain tap on the bottom of the tank. (See Section 6.3)
- ❑ Remove the cover on the oil tank. (Fig.6.5)
- ❑ Unscrew the old filter from its place inside the oil tank. (Fig. 6.6)
- ❑ Screw the new filter into its place in the tank.
- ❑ Clean the bottom of the tank and replace the cover.
- ❑ Refill the tank until the oil is in the middle of the oil sight gauge.

NOTE: The suction filter element must be cleaned after the first 200 hours of use, and then after every 1000 working hours. Replace if damaged or un-serviceable.

6.5 NITROGEN TANK

The machine is fitted with a nitrogen bottle used to lift the beam on the return stroke. (Fig. 6.7)
NOTE: Any maintenance requirements should be carried out by a service engineer.

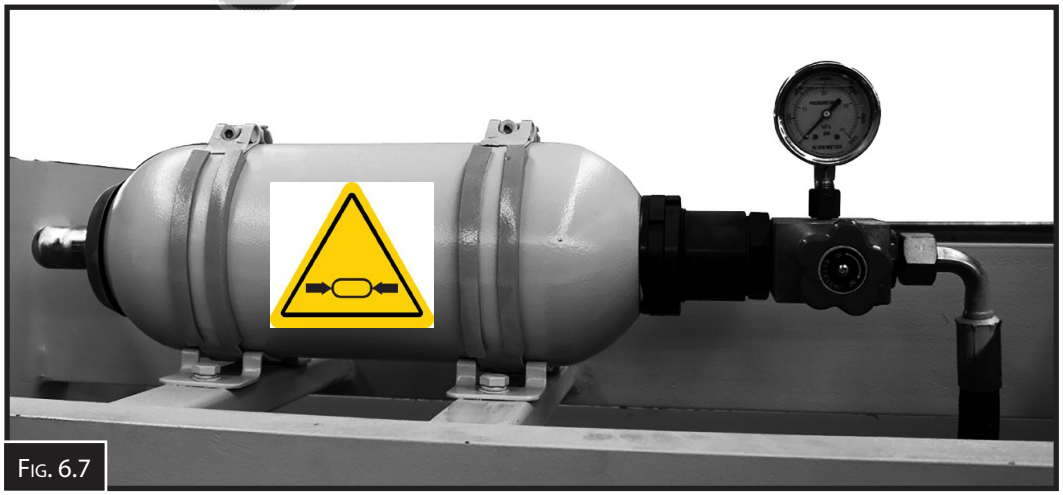


FIG. 6.7

6.5 BLADE PARALLEL ADJUSTMENT.

The following information also applies when fitting new or sharpened blades.
The blade clearance will need to check with a feeler gauge (Fig 6.8) by removing the front guard of the machine to access the blade.

- ❑ The clearance is checked across the full length of the blades.
- ❑ Use feeler gauges, to test the clearance.
- ❑ According to the test adjust the clearance.

⚠ WARNING This operation is dangerous and if done incorrectly could damage the blades, and may require the blades to be replaced. Metalmaster recommends that it should be done by a trained service engineer.

TO CHECK THE CLEARANCE AT SET INTERVALS ON THE BLADE.

- ❑ Set the selector control on the control box to normal operation function.
- ❑ Depress the foot pedal and move the blade to the maximum down stroke position then shut off the ball valve in Fig 6.9 to hold the down stroke position.
- ❑ Release the ball valve slowly to allow the upward movement of the blades to check the clearance at set intersecting intervals of the blades. (Fig. 6.8)
- ❑ Once the clearances are equal and parallel tighten all fasteners and locknut's and release the ball valve fully.
- ❑ This operation may be required to be repeated until clearances are correct and equal.

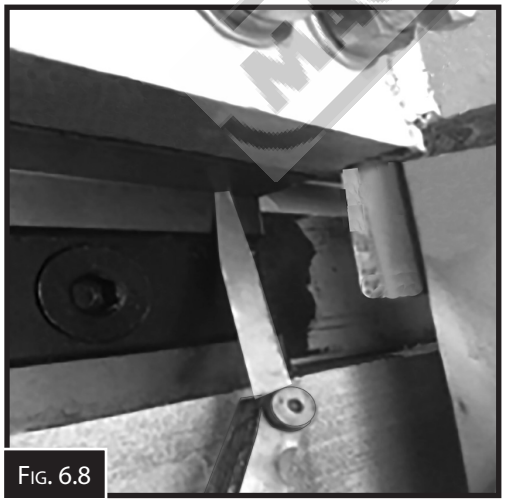


Fig. 6.8

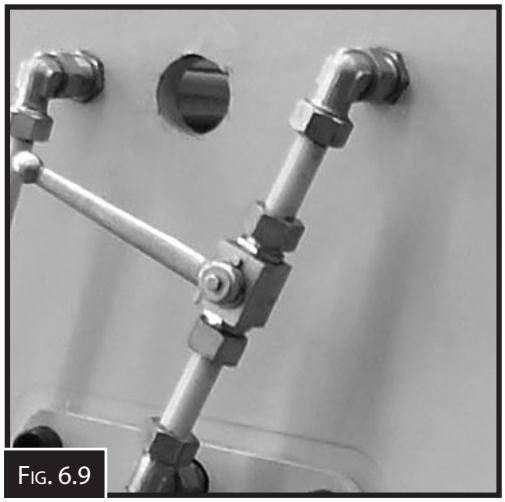


Fig. 6.9

On completion of the blade setting, replace and secure all covers on the machine.
Set the blade gap and take a test cut at the maximum rated capacity. An optimum blade setting will allow the material to fracture cleanly.

6.6 TROUBLESHOOTING

Problem	Possible Cause	Action
Machine shudder on the down stroke.	• Incorrect relief valve setting	• Re-adjust relief valve Adjust the relief valve by unlocking the hexagon head grub screw on the side of the body of the valve. Turn in a clockwise direction closing the valve while cycling the machine
Machine will not cut.	• Low system oil pressure • Check the blades for excessive clearance or damage to the cutting edges	1. Check the system pressure. 2. Check the oil level (See page 24). 3. Check the blade gap (See page 21). 4. Check the blade clearance 5. Reset or regrind the blades as required
Machine will not stop in the neutral position	• Check limit switch /relay • Check directional control valve	• Replace if necessary. • Remove valve, check and replace if necessary
Clamping does not work	• No clamping pressure	1. Check the system pressure. 2. Check electrical circuit
Oil leaking from cylinder	• Gland seal is damaged	• Change seal
Oil leaking from fittings	• Fittings are loose	• Tighten fittings

⚠ WARNING The machine must be disconnected from the power supply before servicing the machine. Failure to do so can cause serious injury and even death. Before operating the machine, ensure that all the tools have been removed and personnel are clear of the moving parts.

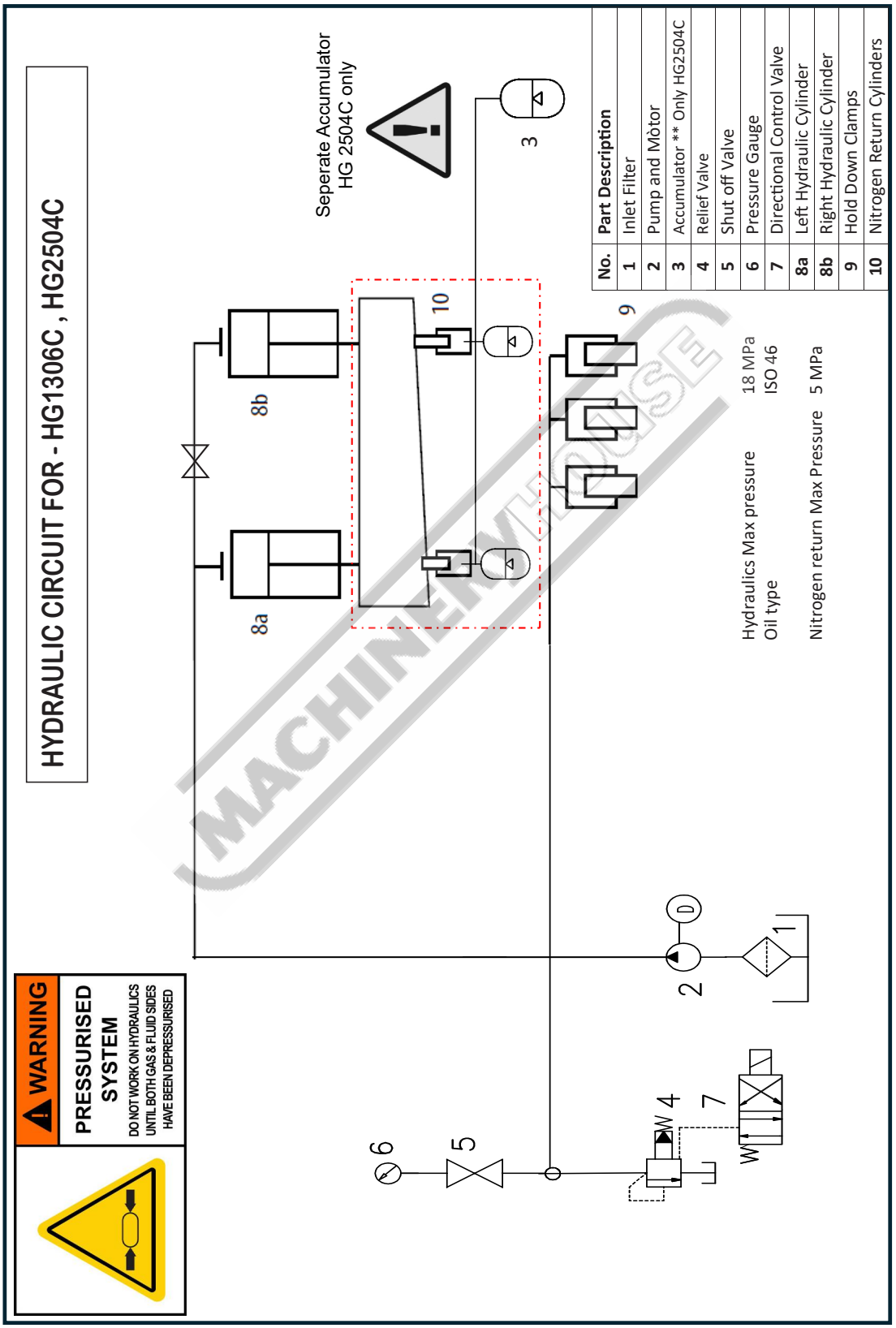
SPARE PARTS SECTION

The following section covers the spare parts diagrams and lists that were current at the time this manual was originally printed. Due to continuous improvements of the machine, changes may be made at any time without notification.

HOW TO ORDER SPARE PARTS

1. Have your machines **model number, serial number & date of manufacture** on hand, these can be found on the specification plate mounted on the machine
2. A scanned copy of your parts list/diagram with required spare part/s identified
3. Go to www.machineryhouse.com.au/contactus and fill out the inquiry form attaching a copy of scanned parts list.

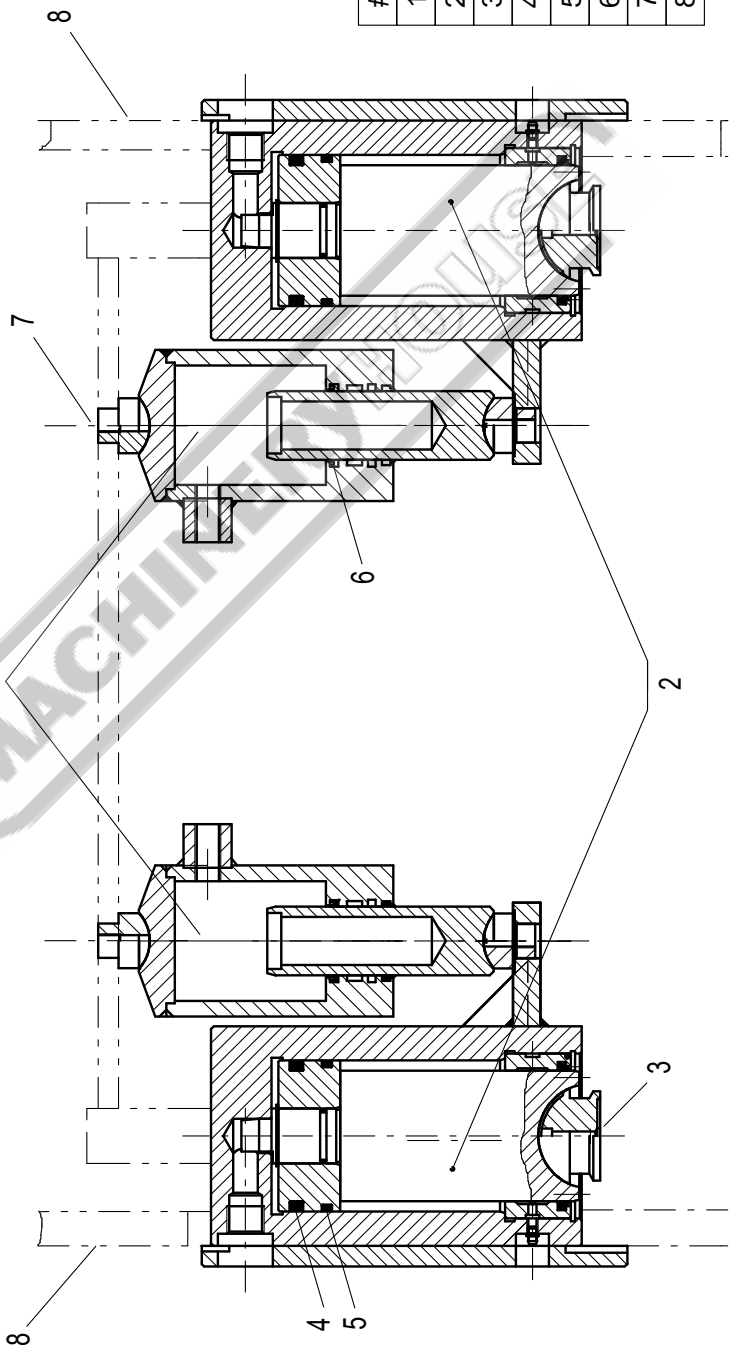
A. HYDRAULIC CIRCUIT FOR SG-2504E



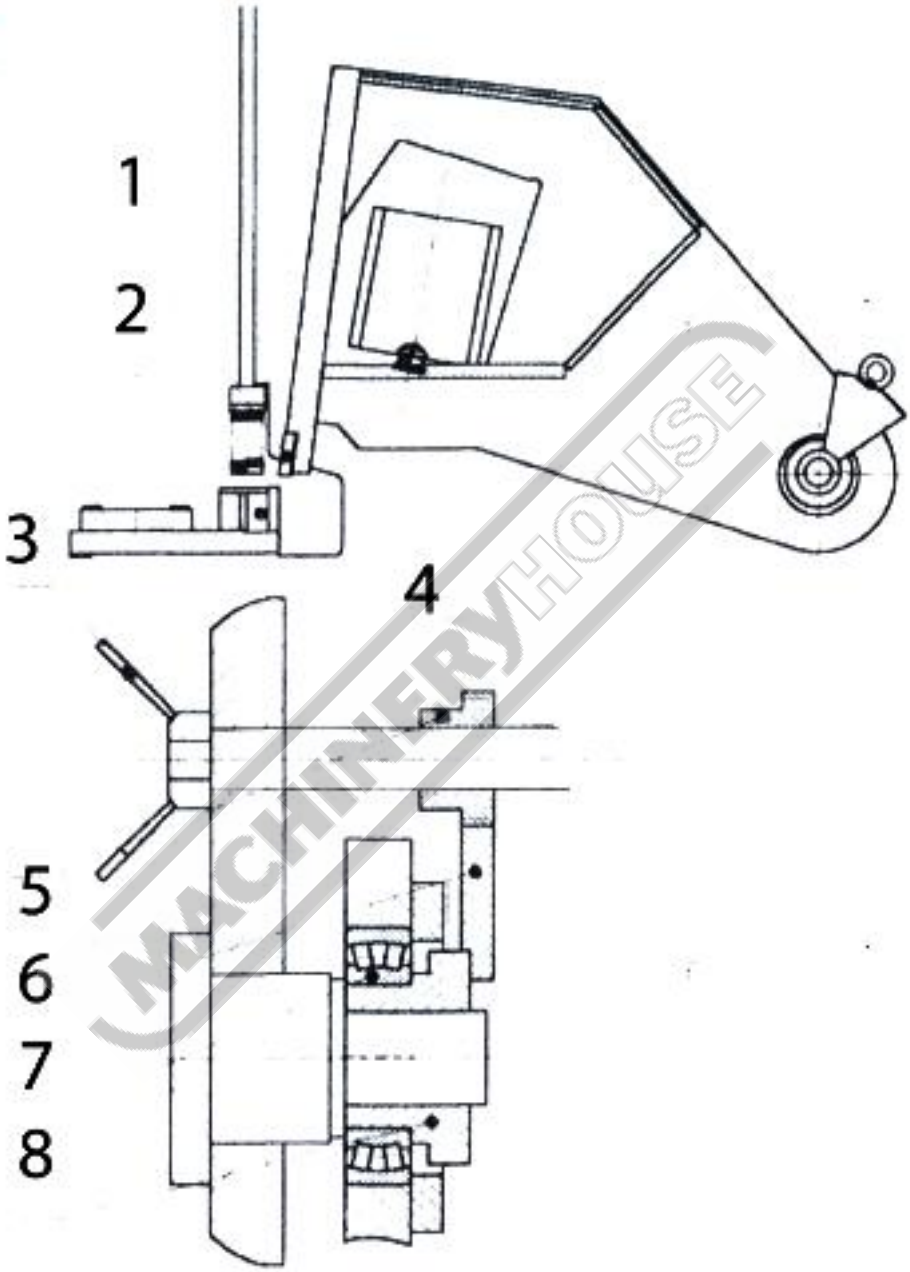
Hydraulic Cylinder & Nitrogen return cylinder identification

Maintanence of Hydraulic & Nitrogen cylinders should only be carried out by trained persons, please contact manufacturer for further service information.

#	DESCRIPTION
1	Nitrogen Return Cylinders
2	Hydraulic Cylinders
3	Lower Ball Joint
4	Hydraulic Piston Seal
5	Hydraulic Piston Guide Ring
6	Nitrogen Rod Seal
7	Upper Ball Joint
8	Side Frame of Machine

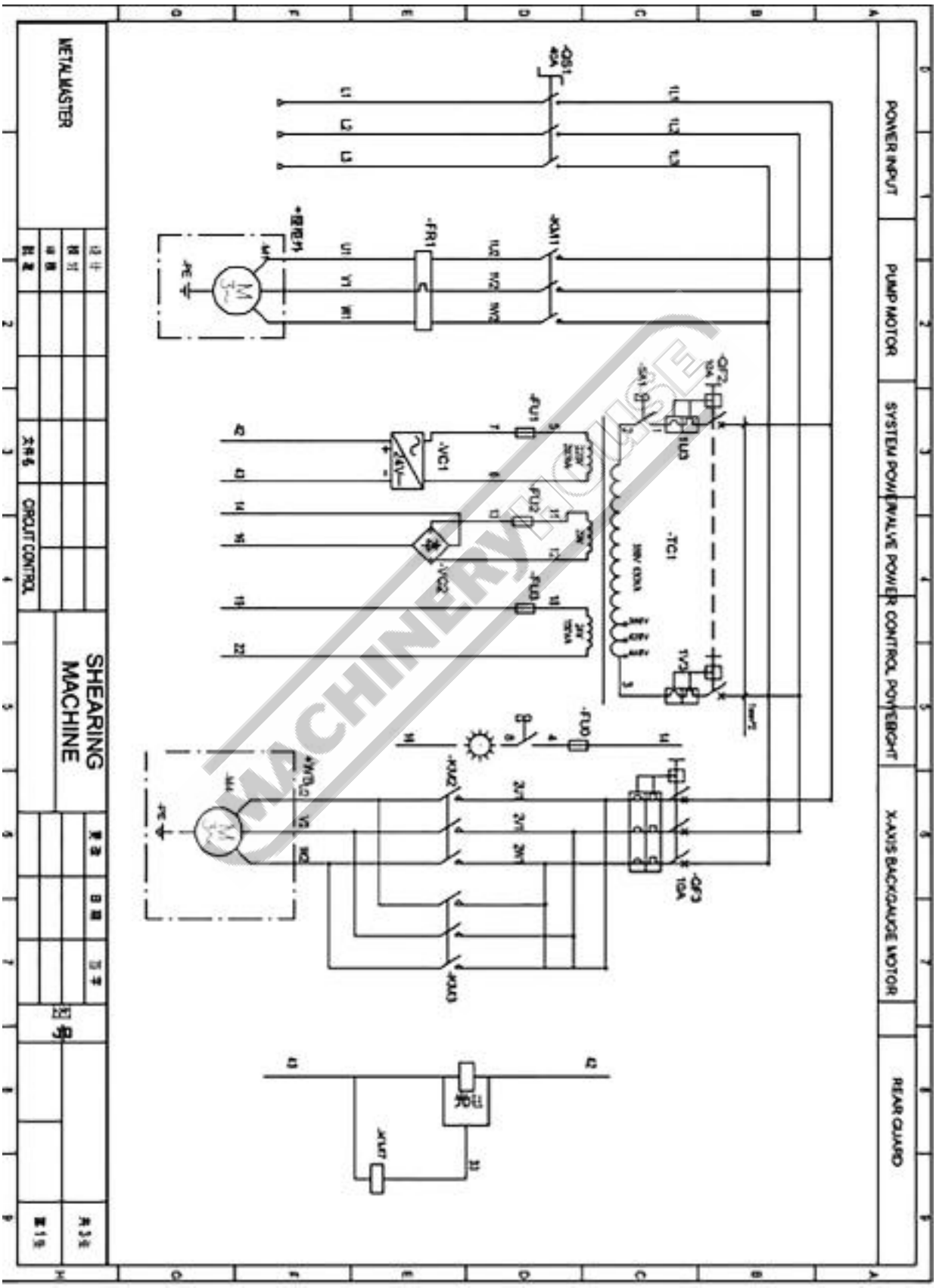


B. MATERIAL CLAMPS & BLADE GAP ADJUSTMENT

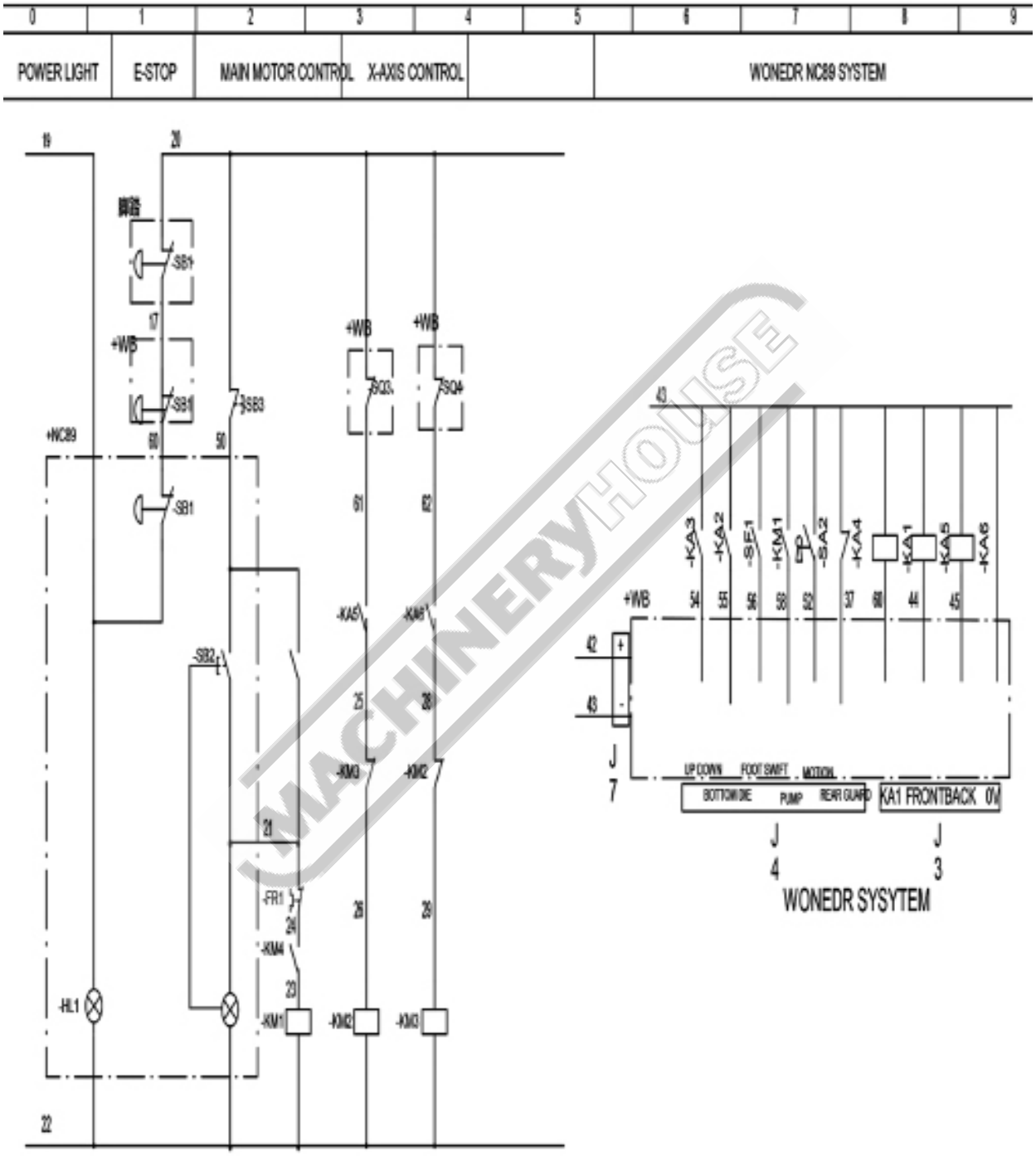


1 - Upper Blade
2 - Material Clamps
3 - Adjustment Handle
4 - Blade Movement Holder
5 - Support Cover
6 - Fan Shape Gear
7 - Bearing
8 - Adjust Bush Gear

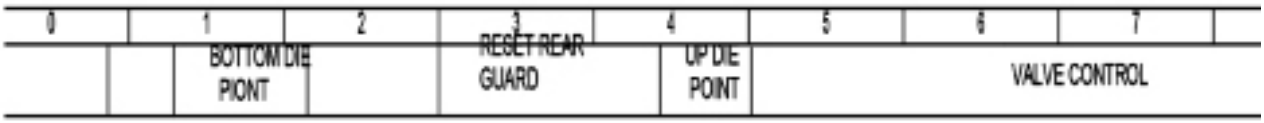
C. ELECTRIC CIRCUIT DIAGRAM

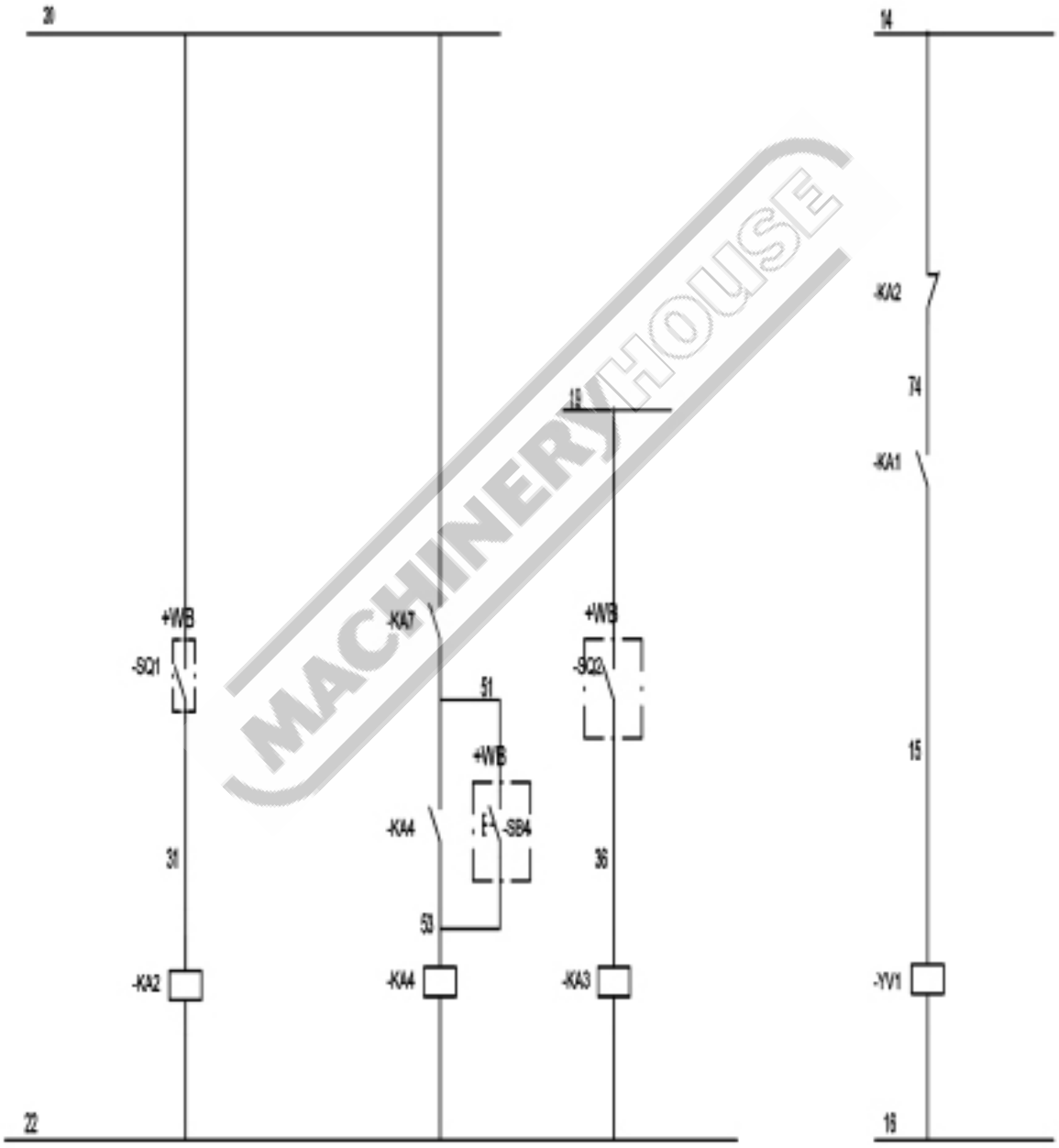


C. ELECTRIC CIRCUIT DIAGRAM



C. ELECTRIC CIRCUIT DIAGRAM





PLANT SAFETY PROGRAM

NEW MACHINERY HAZARD IDENTIFICATION, ASSESSMENT & CONTROL

Power Operated Guillotine

Developed in Co-operation Between A.W.I.S.A and Australia Chamber of Manufactures
This program is based upon the Safe Work Australia, Code of Practice - Managing Risks of Plant in the Workplace (WHSA 2011 No10)

Item No.	Hazard Identification	Hazard Assessment	Risk Control Strategies (Recommended for Purchase / Buyer / User)
B	CRUSHING	LOW	Secure & support work material on table.
C	CUTTING, STABBING, PUNCTURING	MEDIUM	Wear gloves to prevent cuts from sharp material offcuts.
D	SHEARING	MEDIUM	Hands should be kept clear of moving parts and blades. Isolate power to machine prior to any checks or maintenance. Ensure front blade guard is fitted securely. Do not adjust or clean until machine has fully stopped. Access to the rear of machine must be interlock or photoelectric guarded to prevent access when the machine is operating, (see workcover authority principles of machine guarding for guidelines).
F	STRIKING	MEDIUM	Wear safety glasses. Stand clear of falling offcuts. Ensure material hold downs are correctly adjusted. Ensure guards are secured properly.
H	ELECTRICAL	MEDIUM	Machine should be installed & checked by a Licensed Electrician. All electrical enclosures should only be opened with a tool that is not to be kept with the machine.
O	OTHER HAZARDS, NOISE.	LOW	Wear hearing protection as required.
Plant Safety Program to be read in conjunction with manufactures instructions			

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Authorised and signed by:
Safety officer: .....
Manager: .....

Revised Date: 25th Sept 2015

E21S Operation Manual

(Version: V1.05)

ESTUN AUTOMATION CO., LTD

Total Solution Supplier

Contents

Preface

This manual describes operation of E21S numerical control device and is meant for operators who are instructed for operation of the device. Operator shall read this manual and know operation requirements before using this device.

E21S device provides complete software control and has no mechanical protection device for operator or the tool machine. Therefore, in case of malfunction, machine tool must provide protection device for operator and external part of the machine tool. ESTUN is not responsible for any direct or indirect losses caused by normal or abnormal operation of the device.

ESTUN preserves the right to modifying this manual in the event of function adding or print error.

Chapter 1 Product Overview

1.1 Product introduction

This product is equipped with the shear machine dedicated numerical control device which is applicable to various users. Based on ensuring work precision, the cost of numerical control shearing machine is reduced significantly.

Features and functions of this product are as following:

- Back gauge can be controlled.
- Cut-angle can be controlled.
- Cut-gap can be controlled.
- Stroke time can be controlled.
- Intelligent positioning control.
- Unilateral and bidirectional positioning which eliminates spindle clearance effectively.
- Retract functions.
- Automatic reference searching.
- One-key parameter backup and restore.
- Fast position indexing.
- 40 programs storage space, each program has 25 steps.
- Power-off protection.

1.2 Operation panel

Operation panel is shown in Figure 1-1.

Figure 1-1 Operation panel

Functions of panel keys are described in Table 1-1.

Table 1-1 Description of key functions

Key	Function description
	Delete key: delete all data in input area on left bottom of displayer.
	Enter key: confirm the input content. If no content is input, the key has the similar function to direction key  .
	Start key: automatic start-up, top left corner of the key is operation indicator LED. When operation is started, this indicator LED is on.
	Stop key: stop operation, top left corner of the key is Stop indicator LED. When initialize normal start-up and no operation, this indicator LED is on.
	Left direction key: page forward, cursor remove
	Right direction key: page backward, cursor remove
	Down direction key: select parameter downward
	Function switch: switch over different function pages
	Symbolic key: user input symbol, or start diagnosis.
	Numeric key: when setting parameter, input value.
	Decimal point key: when set up parameter, input decimal point.
	Manual movement key: in case of manual adjustment, make adjustment object move in forward direction at low speed.
	Manual movement key: in case of manual adjustment, make adjustment object move in backward direction at low speed.
	High speed selection key: in case of manual adjustment, press this key and press  simultaneously, make adjustment object move in increasing direction at high speed, then press  , make adjustment object move in decreasing direction at high speed.

1.3 Display

E21S numerical control device adopts 160*160 dot matrix LCD display. The display area is shown in **Figure 1-2**.

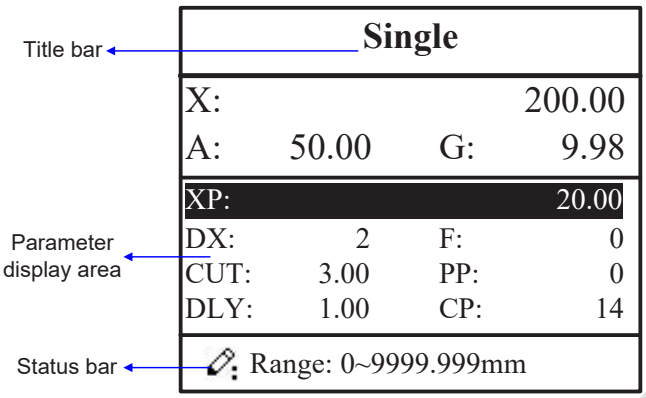

Figure 1-2 Display area

- Title bar: display relevant information of current page, such as its name, etc.
- Parameter display area: display parameter name, parameter value and system information.
- Status bar: display area of input information and prompt message, etc.

The description of Parameters used on this page are as shown in Table 1-2.

Table 1-2

Parameter	Description
X	The current backgauge position
A	The current cutting angle
G	The current gap distance
XP	The desired backgauge position
DX	Backgauge retract distance
CUT	Cutting delay
DLY	Retracting delay
F	Function output value
PP	Preset workpiece
CP	Current workpiece

Chapter 2 Operation Instruction

2.1 Basic operation procedure

Basic switch over and operation procedure of the device is shown in **Figure 2-1**.

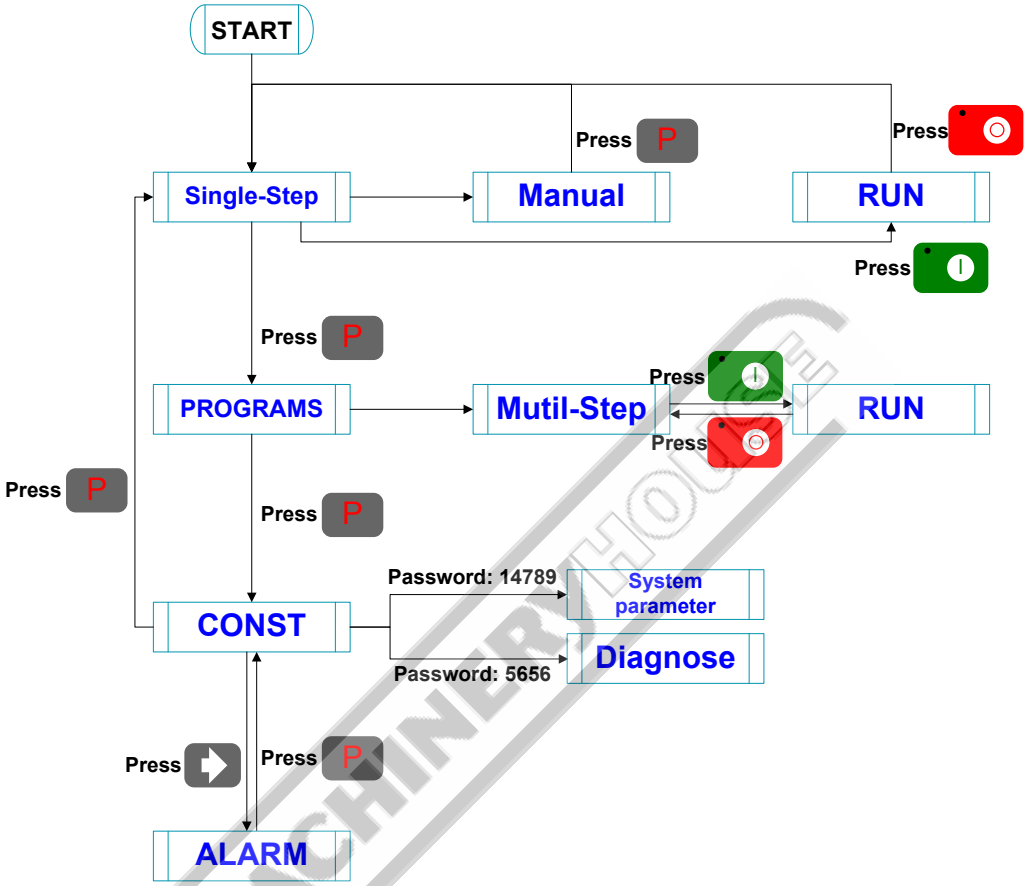

Figure 2-1 Basic Operational Flow

2.2 Programming

The device has two programming methods, which are single-step programming and multi-step programming. User can set up programming according to actual demand.

2.2.1 Single-step programming

Single-step programming is generally used for processing single step to finish work piece processing. When controller is power on, it will automatically enter single-step program page.

Operation steps

Step 1 After starting up, the device will enter setting up page of single-step program automatically, as shown in **Figure 2-2**.

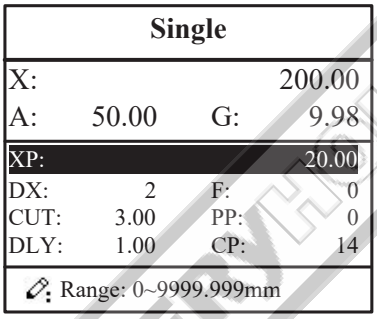

Figure 2-2 Single-step program setting page

Step 2 Click , select parameter that needs to be set up, press numerical key to input program value, press to complete input.

[Note] Parameter can only be set when Stop indicator is on.

Setting range of singe step parameter is shown in Table 2-1.

Table 2-1 Set up range of singe step parameter

Parameter name	Unit	Range	Remarks
X	mm/inch	-	Current position of X axis, unable to be modified.
A	°	-	Current position of A axis, unable to be modified.
G	mm/inch	-	Current position of G axis, unable to be modified.
XP	mm/inch	0~9999.999	Program position of X axle.
DX	mm/inch	0~9999.999	Retract distance of X axle;

Parameter name	Unit	Range	Remarks
DLY	s	0~9.99	In case of single step, delay time for X axle concession.
CUT	s	0~9.99	There is a delay time for the cutter goes to the next work-step, after it leaves the top dead center. [Note] Only the parameter **CutDelay En.** is set to **1**, displaying this parameter.
F	None	0~3	Functions configure output.
PP	None	0~9999	Number of preset work piece.
CP	None	0~9999	Number of current work piece.

Step 3 Press , system will execute according to this program, as shown in **Figure 2-3**.

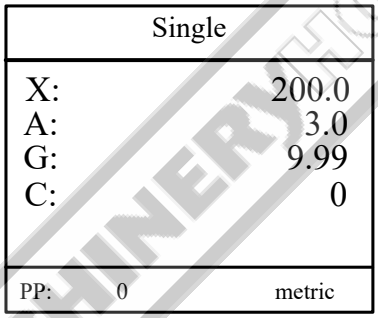

Figure 2-3 Single step operation page

----End

Operation example

On single-step program page, program back gauge position to 80.00mm, retract distance to 50mm, concession waiting time to 2s, and work piece to 10.

Operation steps are shown in Table 2-2.

Table 2-2 Operation steps of single step example

Operation steps	Operation
Step 1	Click , select “XP” parameter.
Step 2	Input 80.00 by numerical key.
Step 3	Click , confirm setting of this parameter.

Operation steps	Operation
Step 4	Click, select “DX” parameter, “DLY” parameter, “PP” parameter respectively.
Step 5	Set up parameter to 50mm, 2s, 10 by numerical key.
Step 6	Click, system execute according to this program.

2.2.2 Multi-step programming

Multi-step program is used for processing single work piece of different processing steps, realize consecutive implementation of multi-steps, and improve processing efficiency.

Operation step

Step 1 Power on, the device enters to single-step parameter set up page automatically.

Step 2 Click, switch to program manage page, as shown in Figure 2-4.

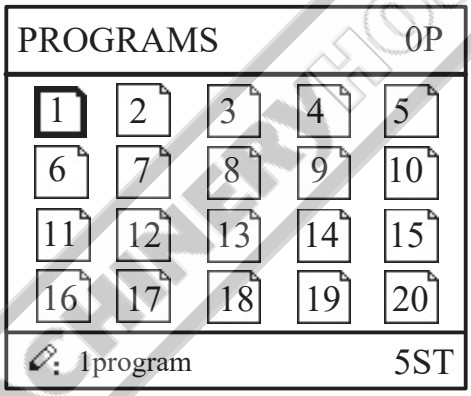

Figure 2-4 Program management page

Step 3 Click, select program serial number, or input program number directly, such as input “1”.

Step 4 Click, enter multi-step program setting page, as shown in **Figure 2-5**.

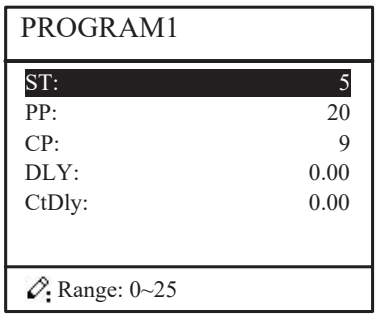

Figure 2-5 Multi-step program setting page

Step 5 Click, select multi-step programming parameter which requires set up, input setting up value, click, and the configuration takes effect.

Step 6 In completion of set up, click, enter step parameter set page, as shown in **Figure 2-6**.

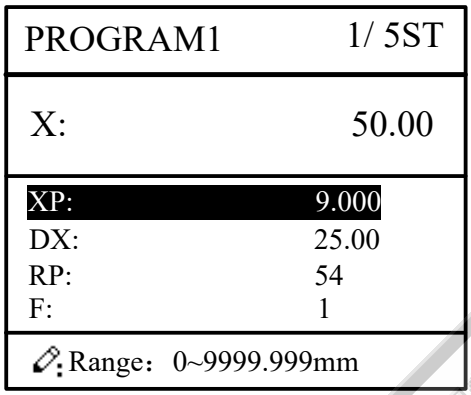

Figure 2-6 Step parameter set page

Step 7 Click, select step parameter that needs to be set up, input program value, click, and the setup takes effect.

Step 8 Click to switch over between steps. If the current step is the first step, click to enter the last page of step parameter setting; if the current step is the last one, click to enter the first page of step parameter setting.

Multi-step parameter setting range is shown in Table 2-3.

Table 2-3 Multi-step parameter setting range

Parameter name	Unit	Range	Remarks
ST	None	0-25	Set up total processing step number of this program
PP	None	0~99999	Number of work piece to be processed, decreasing piece when more than zero; negative increasing count.
CP	None	0~99999	Number of finished work piece
DLY	s	0~9.99	Time between retract signal and concession execution.

Parameter name	Unit	Range	Remarks
CtDly	s	0~9.99	There is a delay time for the cutter goes to the next work-step, after it leaves the top dead center. [Note] Only the parameter **CutDelay En.** is set to **1**, displaying this parameter.
X	mm/inch	None	Current position of X axle, can't be modified.
XP	mm/inch	0~9999.999	Program position of X axle.
DX	mm/inch	0~9999.999	Distance of X axle concession.
RP	-	1~99	Repeat times required by this step.
F	-	0~3	F function configure output

Step 9 Click , system will operate according to this program, as shown in **Figure 2-7**.

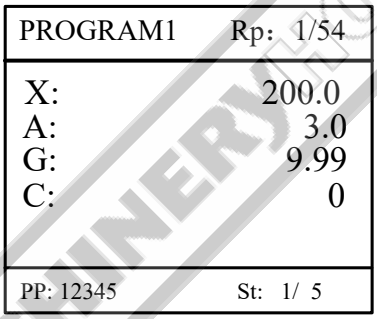

Figure 2-7 Multi-step programming operation page

----End

Operation example

[Background] One work piece requires processing 50 as shown below;

- First shear: 50mm;
- Second shear: 100mm;
- Third shear: 300mm;

[Analysis] according to work piece and technological conditions of machine tool:

- First shear: X axle position is 50.0mm, concession 50mm;
- The second shear: X axle position is 100.0mm, concession 50mm;
- The third shear: X axle position is 300.0mm, concession 50mm;

Edit processing program of this work piece on No. 2 program.

Operation procedure is shown in Table 2-4.

Table 2-4 Operation steps of multi-step programming example

Operation step	Operation
Step 1	On single step parameter setting page, press P to enter program selection page.
Step 2	Input “2”, click, enter multi-step general parameter setting page of program 2.
Step 3	Select “Program step”, input “3”, click, the setting takes effect.
Step 4	Select “PP”, input “50”, click, the setup takes effect.
Step 5	Similar to step 3 and step 4, set “DLY” to 3 respectively.
Step 6	Click to enter first step setup page of step parameter.
Step 7	Select “XP”, input 50, click, the setup takes effect.
Step 8	Similar to step 7, set up “concession distance” and “repeat times” to 50, 1 respectively.
Step 9	Click to enter second step setup page of step parameter, the setup method is similar to that of step one.
Step 10	Click again, to enter third step setup page of step parameter, the setup method is similar to that of step one and step two.
Step11	Click, return to setup page of the first step.
Step12	Click, system will operate according to this program.

[Note]

- In completion of multi-step programming, you should back to starting step before launching the system; otherwise, the program will start position processing at current step.
- Press left and right direction key to circulate page turning and browsing among all step parameters.
- Program can be called and revised again.
- In completion of processing all work pieces (50 in the example), the system stops automatically. Restart directly will start another round of processing 50 work pieces.

2.3 Parameter setting

User can setup all parameters required for normal operation of the system, including system parameter, X axle parameter.

Step 1 On program management page, click P to enter programming constant page, as shown in **Figure 2-8**. On this page, programming constant can be set.

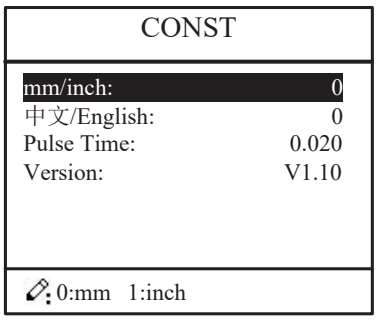

Figure 2-8 Programming constant page

Range of programming constant setup is shown in Table 2-5.

Table 2-5 Range of programming constant setup

Parameter name	Unit	Range	Default	Remarks
X-tea. in	mm	0-9999.99	0	Input current X axis position when teach enable.
mm/inch	-	0 or 1	0	• 0: mm • 1: inch
中文/English	-	0 or 1	0	• 0: 中文 • 1: English
X-tea. In	mm	0~9999.999	10	Input current X axis position when teach enable.
G-tea. In	mm	0~9.99	0	Input current G axis position when teach enable.
Pulse Time	s	0.000~1.000	0.020	The duration of the pulse signal.
Version	-	None	-	Software version information, V refers to version, 1 indicates version number, and 0 indicates version level.

Step 2 Input password “1212”, click ↵ to enter system parameter setting page, as shown in **Figure 2-9**.

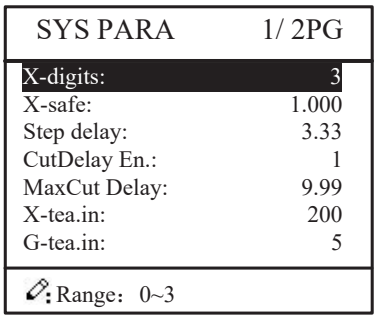

Figure 2-9 System parameter setting page

Step 3 Step up parameter, parameter setup range is shown in **Table 2-6**.

Table 2-6 System parameter description

Parameter	Unit	Range	Default	Description
X-digits	-	0-3	1	Decimal point displayed by X axis position parameter
X-safe	mm	0-9999.999	10	X axle keeps low speed in this range
Step delay	s	0-9.99	0.5	Interval between valid change step signal and change step operation executed
CutDelay En.	-	0 or 1	0	• 0: disable • 1: enable
MaxCut Delay	s	0~9.99	0	Set the maximum cut delay time.
A-Enable	-	0 or 1	1	• 0: disable • 1: enable
A-Max	°	2.50 or 3.00	3.00	The max value of the Cut-Angle.
G-Enable	-	0 or 1	1	• 0: disable • 1: enable
G-Encoder Dir.	-	0 or 1	0	• 0: Decrease • 1: Increase
GMF	-	1~99999999	40	Multiplication factor of G-axis, used for the convert between pulses and mm.
GDF	-	1~99999999	1	Division factor of G-axis, used for the convert between pulses and mm.

Step 4 Click P, return to programming constant page.

----End

2.4 Manual movement

In single-step mode, axle movement can be controlled by pressing key manually. This method helps user to adjust machine tool and work piece.

Step 1 On single step parameter setup page, click +, −, or ++ —— to enter manual page, as shown in **Figure 2-10**.

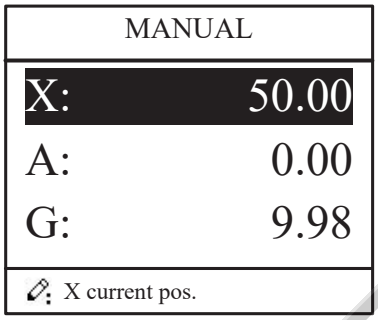

Figure 2-10 Manual page

Step 2 Click +, operate at low speed in increasing direction.

Click −, operate at low speed in decreasing direction.

Click ++ ——, click + at the same time, and operate at high speed in increasing direction (this operation is valid only when using frequency converter as the drive).

Click ++ ——, click − at the same time, and operate at high speed in decreasing direction (this operation is valid only when using frequency converter as the drive).

Step 3 Click P return to single step parameter setting page.

----End

Chapter 3 Alarm

The device can detect internal or external abnormity automatically and send out alarm prompt. Alarm message is available on alarm list.

Step 1 On programming management page, click P to enter programming constant page.

Step 2 On programming constant page, click to enter “Alarm history” page to view all alarm history.

As shown in **Figure 3-1**, the latest 6 alarms, alarm number and causes can be viewed on this page.

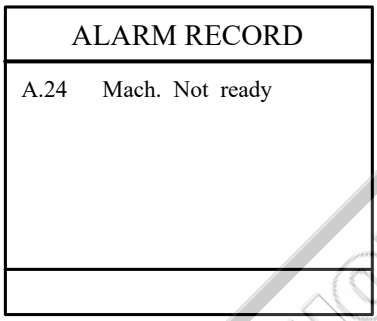

Figure 3-1 Alarm history page

Alarm history and message is shown in Table 3-1.

Table 3-1 Alarm number and alarm message

Alarm number	Alarm name	Alarm description
A.01	Pieces reached	Count reaches preset value
A.02	X.Pos < min.	X-axis current position beyond the minimum limit
A.03	X.Pos > max.	X-axis current position beyond the maximum limit
A.04	-	The current position of the X-axis beyond the soft limit
A.05	A Axis MAX	A-axis current position beyond the maximum limit
A.06	A Axis MIN	A-axis current position beyond the minimum limit
A.07	G Axis MAX	G-axis current position beyond the maximum limit
A.08	G Axis MIN	G-axis current position beyond the minimum limit

Alarm number	Alarm name	Alarm description
A.11	Finished work	When count reaches preset value, system shut down automatically.
A.12	Out of UDP	In single step and multistep mode, slider is not on upper dead center.
A.22	Encoder abnor.	Encoder voltage is too low
A.24	Mach. not ready	The pump signal is invalid
A.25	Angle Abnormal	Angle input error
A.26	X Stop Err	The backgauge motor is abnormal stop.
A.28	X V2 Err	The speed of backgauge motor is abnormal on the Low-Speed Mode.
A.29	X V3 Err	The speed of backgauge motor is abnormal on the High-Speed Mode.
A.32	XPos < 0	X-axis position has exceeded the zero point in manual mode, you should turn back.
A.41	Para. error	-
A.42	Power off	-
A.43	System fault	-

Appendix Common fault and troubleshooting

Fault phenomena	Trouble shooting
When power on, the device will not display.	• The electrode of power supply terminal is connected error; please see the information of power nameplate. • Voltage is too low. • Electrical outlet is not connected.
When X axle programming is operating, back gauge motor does not move, but Y AXIS motor moves.	Two motors are reversed. Reconnect.
When program is operating, motor does not move.	• Check whether mechanical part has been locked or slider returns to upper dead center. • Check whether the motor wiring is connected well.
Motor can't switch from high speed to low speed.	• Check whether high-low speed signal has been sent or motor power is too small. • Check whether the parameter of distance conversion is correct.
When system is in multi-step programming, the program can't change step.	Check when top beam is on upper dead center, **STEP** terminal is connected to +24V or not.
When system is in multi-step programming, the program can't count.	Check when top beam is on upper dead center, **STEP** terminal is connected to +24V or not.
When programming is operating, the device loses control.	• Check whether encoder cable is connected or not. • Check whether the motor-direction wiring is correct (X+, X-, A+, A-, G+, G-).
When programming is operating, system actual position will not display or change.	Check whether encoder wiring is correct or encoder cable is connected well.