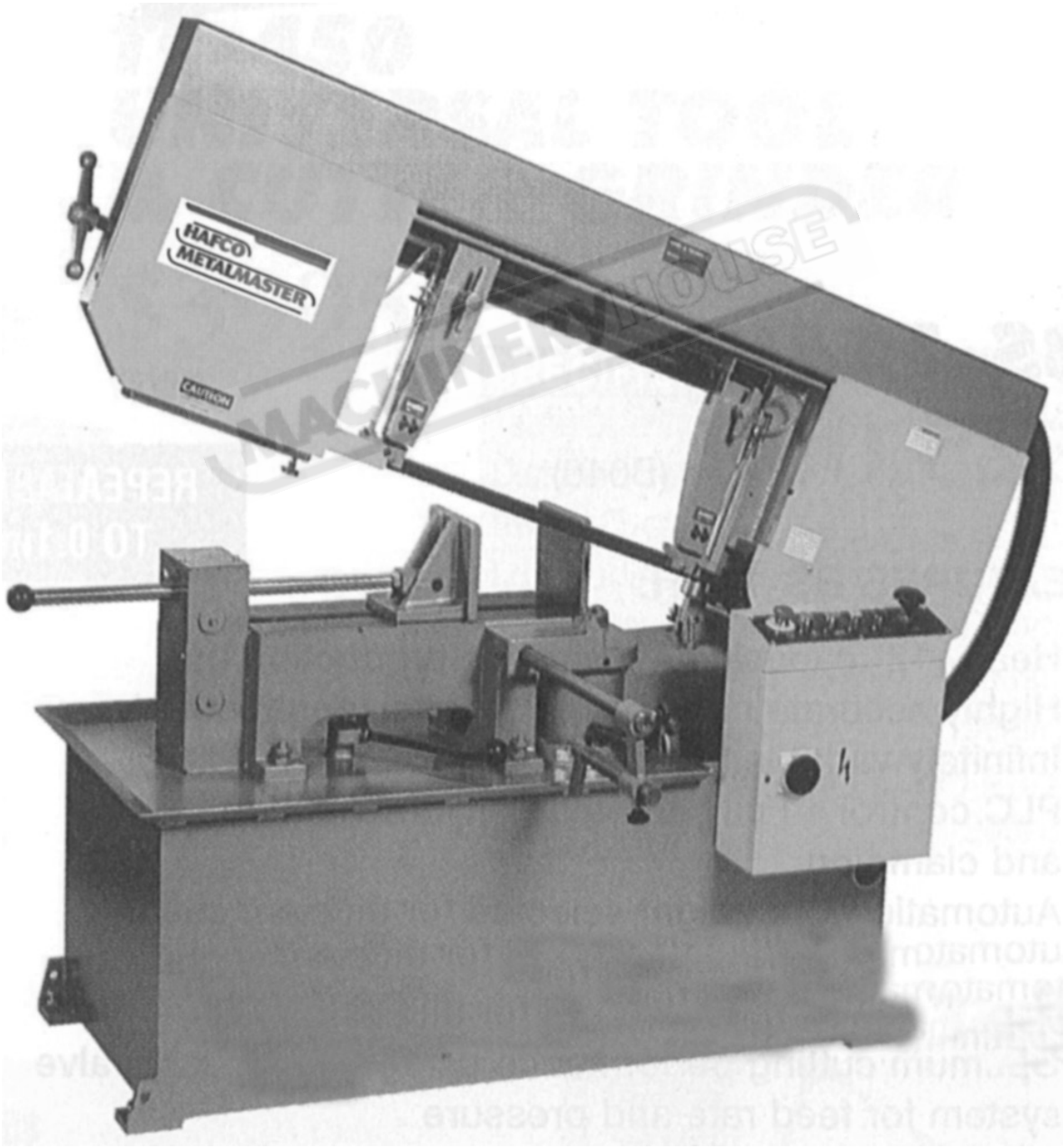
INSTRUCTION MANUAL

BS-13AS
Dual Mitre Semi - Automatic Swivel Head Metal Cutting Band Saw (415V)
460 x 280mm (W x H) Rectangle



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MACHINERY HOUSE

MACHINERYHOUSE

SECTION 1

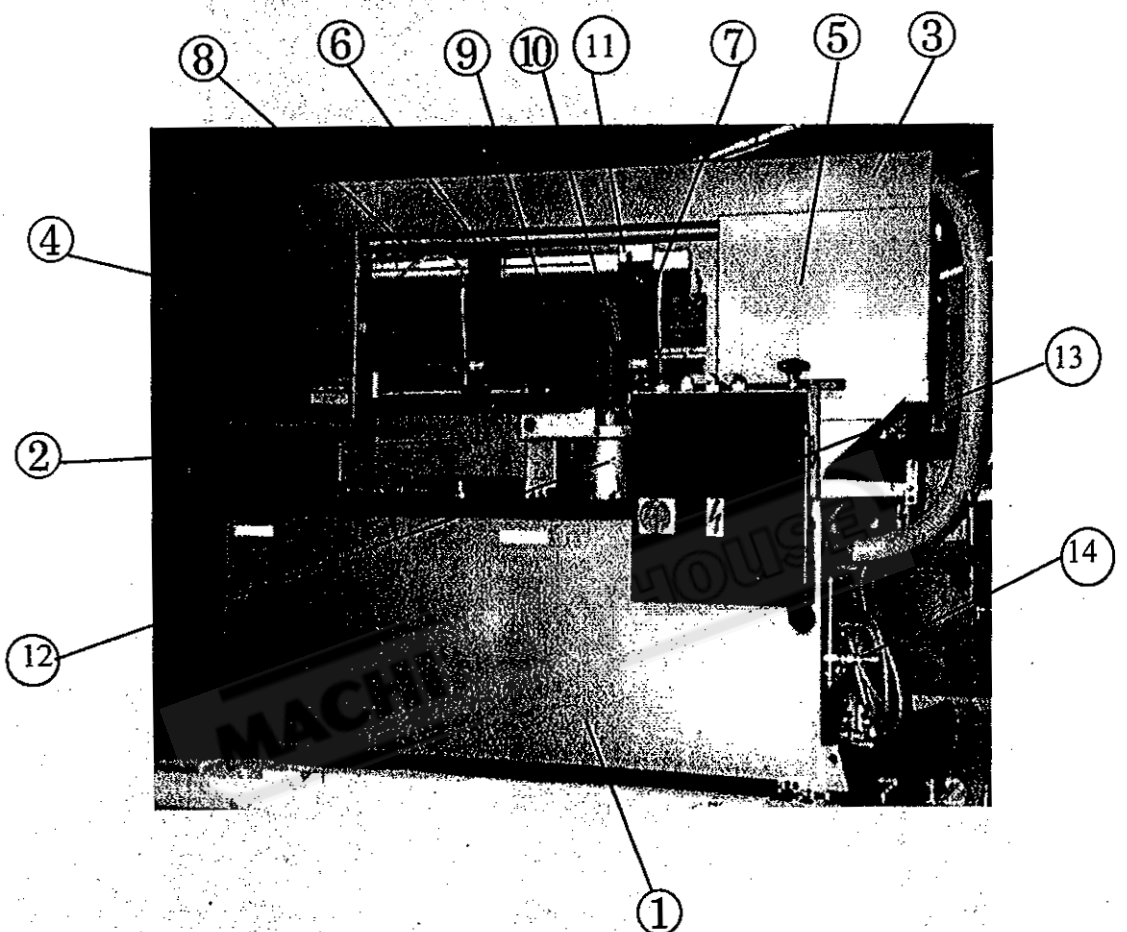
GENERAL INFORMATION

MACHINERYHOUSE

SECTION 1

GENERAL INFORMATION

1.1 NOMENCLATURE



FRONT VIEW

NO.	PARTS NAME	NO.	PARTS NAME
1	BASE	8	SLIDE PLATE
2	WORK BED	9	MOVABLE VISE JAW
3	SAW BOW	10	FIXED VISE JAW
4	IDLE WHEEL COVER	11	ARM FIXING HANDLE
5	DRIVE WHEEL COVER	12	ROTATING PIVOT SEAT
6	LEFT GUIDE ARM	13	ELECTRIC BOX
7	RIGHT GUIDE ARM	14	COOLANT HOSE

1.2 SPECIFICATIONS

SPECIFICATIONS

MODEL	Semi-Automatic Bandsaw		
MAX. CAPACITY	CROSS SECTION	90°	60°
	 Round section	330 mm	220 mm
	 Square section	270 X 270 mm	220 X 220 mm
	 Rectangular section	270 X 470 mm	220 X 220 mm
SAW BLADE	Speed	20,34,49,76 (m/min)	
	Size	4150 X 25 X 0.9 mm	
	Tension	Manually controlled	
	Guide	CARBIDE	
	Cleaning	wire brush	
MOTOR OUTPUT	Saw blade	1.5 KW (2.0 HP)	
	Hydraulic	0.1875 KW (0.25 HP)	
	Coolant	0.1 KW (0.125 HP)	
TANK CAPACITY	Hydraulic Oil	8 LITER (2 GAL.)	
	Coolant	30 LITER (7.8 GAL)	
FEEDING	Control method	Manually controlled	
VISE	Control method	Manually controlled	
WORKBED HEIGHT	820 mm		
NET WEIGHT	650 kg		
GROSS WEIGHT	850 kg		
FLOOR SPACE	1896 (L) X 865 (W) X 1410 (H) mm		
SHIPPING SPACE	2120 X 1180 X 1520 mm		

*** Design and specifications are subjected to change without notice.**

1.3 SAFETY CONSIDERATION

A. INSTRUCTION MANUAL

Please read through the instruction manual carefully before operating the machine.

B. ENVIRONMENT

1) Keep work area well illuminated and unnecessary people away.
2) Do not install the machine in damp or wet locations.
3) Cluttered and slippery floors invite accidents.

C. POWER CONNECTION

1) Always disconnect power cord before performing any maintenance and inspection.
2) Make sure all of the switches are off before plugging in power cord.
3) Always remember to switch off the machine when the work is completed.
4) Remove adjusting keys and wrenches from the machine before turning on the power switch.

D. MATERIAL

1) Never hand hold the material with saw in horizontal position, always use the vise clamp securely.
2) Use rubust roller table to support the material if needed.

E. BLADE

1) Choose a proper blade to cut the material.
2) Always keep the blade sharp and clean.
3) Do not apply the extra forces to the saw blade.

F. SAFETY GUARDS

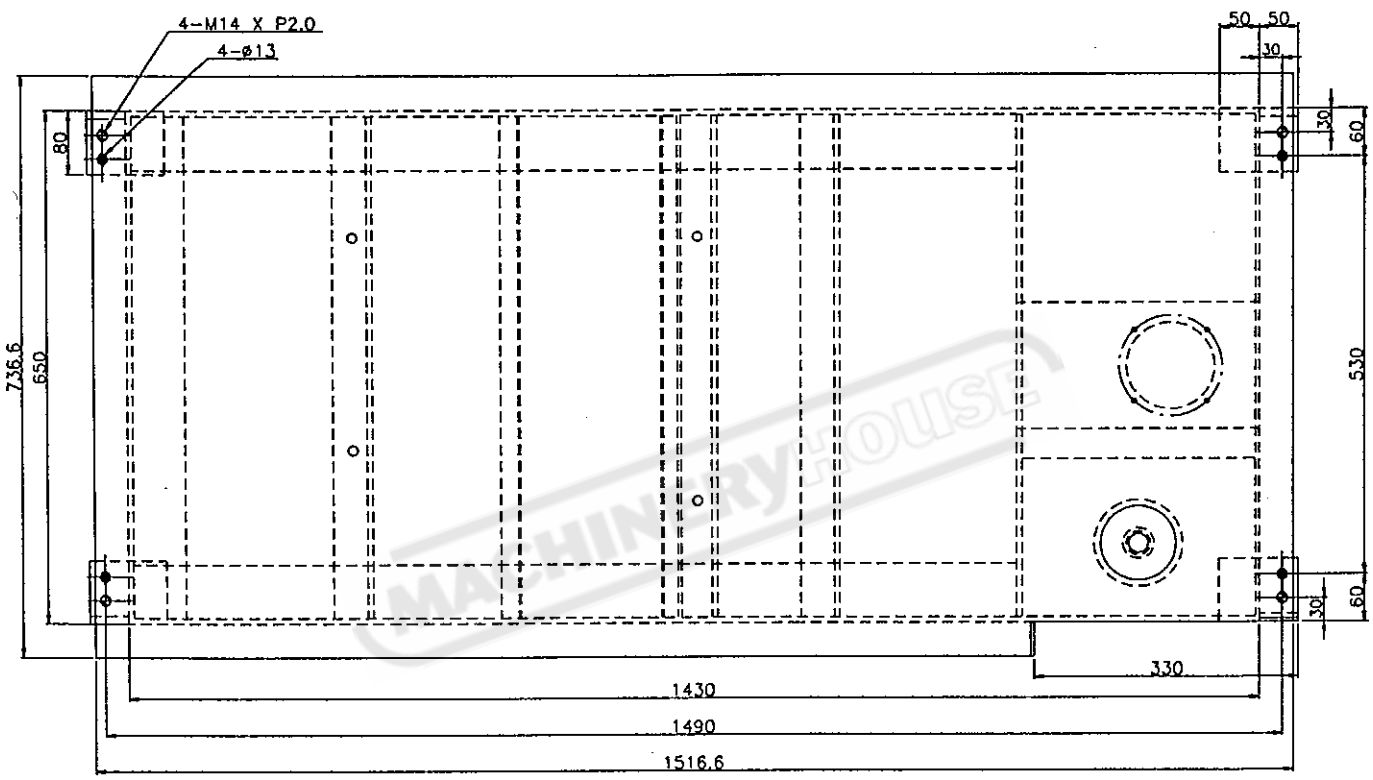
Keep all the safety guards in their places when operating the machine.

G. COMPONENTS REPLACEMENT

1) Check damaged parts and replace them.
2) Moving parts should keep in a alignment and binding. Check for breakage, mounting and any other conditions that may affect its operation.

1.5 FOUNDATION

The machine should be installed on a firm concrete floor. Use the anchor bolts to fix the machine if the vibration condition occurs.



unit : mm

● ANCHOR BOLT

○ LEVELLING BOLT

SECTION 2

MOVING AND INSTALLATION

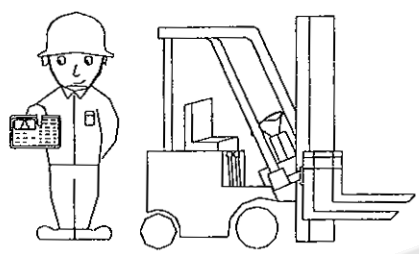
MACHINERYHOUSE

SECTION 2

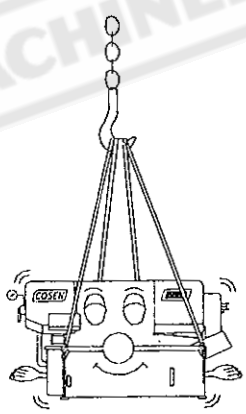
MOVING AND INSTALLATION

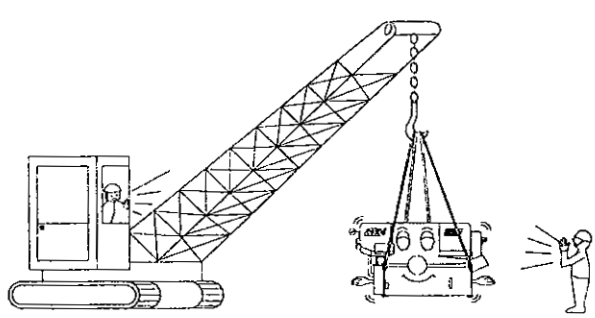
2.1 MOVING OF THE MACHINE

1. Your machine weighs about 700 Kg.
2. You must have a qualification license to forklift your machine.



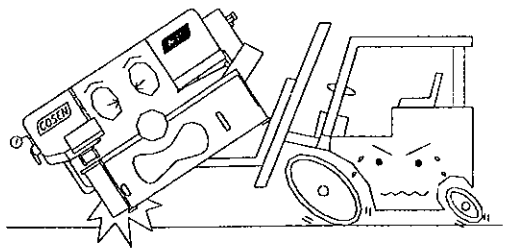
3. You have to lift the machine by crane before using the forklift since there is no space to insert the fork at the bottom of the machine. Alternatively, you can insert the fork rods into the space between the workbed and the base and then move the machine on a wooden pallet.

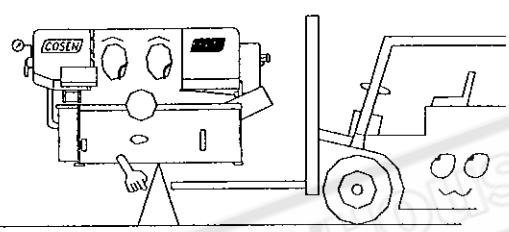




4. Insert the folk rods into the space of the wooden pallet and carefully move the machine to the working area.

NOTE : a. Use robust forklift to avoid fork rods breaking.
b. Carefully balance the machine on the forklift.





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2.2 INSTALLATION OF THE MACHINE

Furnished Tools

Tool box	1 pc
Hexagon wrench	1 set
Spanner	2 pcs
Chip shovel	1 pc
Grease gun	1 pc
Screw driver (+, -)	2 pcs

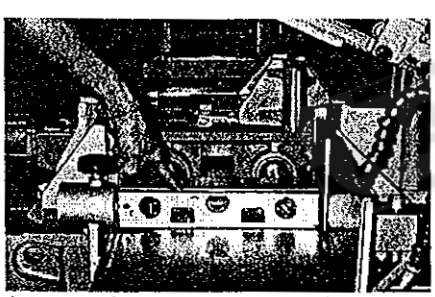
① Fixing the machine on the floor

1. For best performance, the band saw have to be placed on a solid and level foundation. This foundation should at least have a carrying capacity of approximately 7.0 ton.
2. The machine must be fastened on the floor by the anchor bolts.
3. Keep sufficient space for working and large material.

② Machine levelling

- Place spirit levels on the vise slide plates and the work feed table, and adjust the left-and-right and fore-and-aft level of the machine with leveling bolts.
- The fore-and-aft level should be adjusted rightly. The level of the rear for the machine is approximately 25 mm(1 in.) higher than the level of the front end. This will allow the proper return of the cutting fluid for working. The illustration as show as Following:

☛ Be sure to ascertain that all leveling bolts evenly support the weight of the machine.



* Use a level gage to make sure that the platform is flat and even at all angles.

③ Cutting fluid supply

Fill the cutting fluid tank with the proper cutting fluid mixture. If Shell Dromus BS or Shell Lubricool Yellow Cutting Fluid is used, the ratio of cutting fluid to water should be approximately 1:15~1:20. Check the sight gauge to ascertain the fluid level in the tank. Tank capacity: 30 liters.

④ Hydraulic oil supply

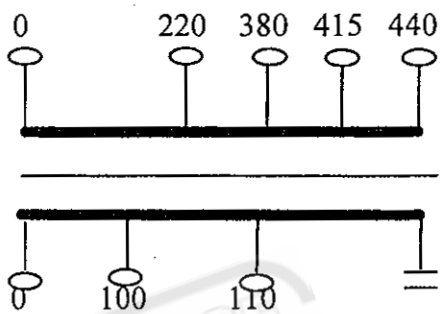
Fill the hydraulic oil tank with the hydraulic oil furnished with the machine. Check the sight gauge to ascertain the oil level in the tank. (Oil tank filling full already)

Recommended Oil : Esso Teresso 32
Mobil DTE Oil Light

⑤. Electrical Connections (Power Requirement)

- Open the electrical enclosure door and connect the power supply cable to the circuit breaker (N.F.B.) terminals.
- Be sure to connect the ground cable to the ground terminal. The power supply to your machine should agree with the wiring voltage that is indicated on the label attached to the electrical enclosure.
- If the power line voltage is changed, change the wiring of the transformer and motors, and reset or replace the thermal relays as shown as following:

☛ 220V- 50Hz
380V- 50Hz
415V- 50Hz
440V- 50Hz



MACHINERYHOUSE

SECTION 3

OPERATING INSTRUCTION

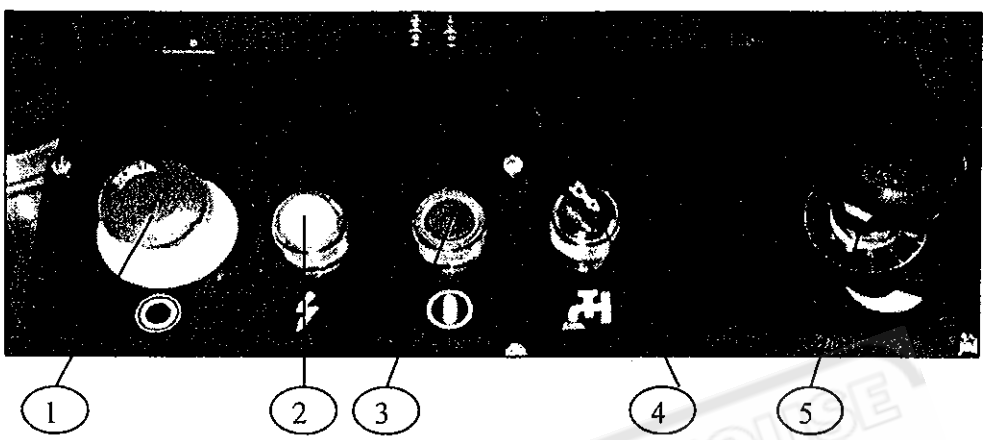
MACHINERY HOUSE

SECTION 3

OPERATING INSTRUCTION

3.1 CONTROL PANEL

The illustration of the control panel is shown in the following figure,



CONTROL PANEL

Following is the detailed description of these functional gears for MH-330ER,

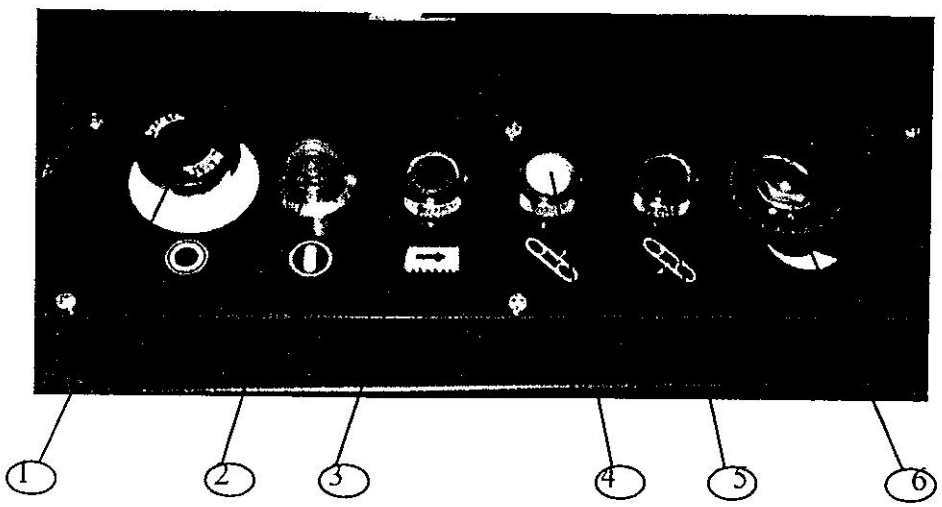
1. **EMERGENCY STOP button**
   When this button is depressed, the machine operation stops immediately.

2. **POWER light**
   This light comes on when the power cord is connected to the electric power of the working shop.

3. **BLADE DRIVE button**
   When this button is depressed, the blade motor operates.

4. **COOLANT PUMP selector**
   This selector is used to control the coolant supply.

5. **FLOW CONTROL dial**
   This dial is used to adjust the downfeed speed of the saw blade for cutting. The downfeed speed will increase when the dial is turned counterclockwise.



CONTROL PANEL

Following is the detailed description of these functional gears for SH-330ER,

1. **EMERGENCY STOP button**
   When this button is depressed, the machine operation stops immediately.

2. **HYDRAULIC "ON" button**
   When this button is depressed, the hydarulic motor and the coolant pump motor operate, meanwhile,the built-in light comes on.

3. **BLADE DRIVE button**
   When this button is depressed, the blade motor operates.

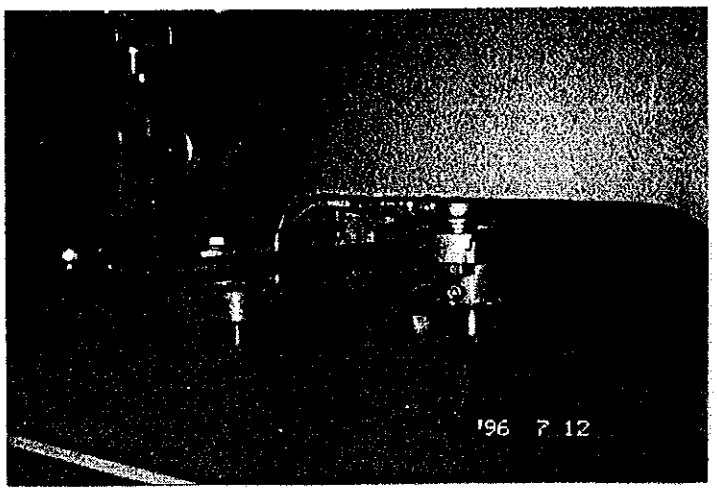
4. **SAWHEAD RAISE button**
   When this button is depressed and held, the sawhead raises; the sawhead stops at a position when the button is released.

5. **SAWHEAD DESCEND button**
   When this button is depressed, the sawhead descends.

6. **FLOW CONTROL dial**
   This dial is used to adjust the downfeed speed of the saw blade for cutting. The downfeed speed will increase when the dial is turned counterclockwise.

3.2 LOCK HANDLE OF THE VISE CLAMPING MECHANISM

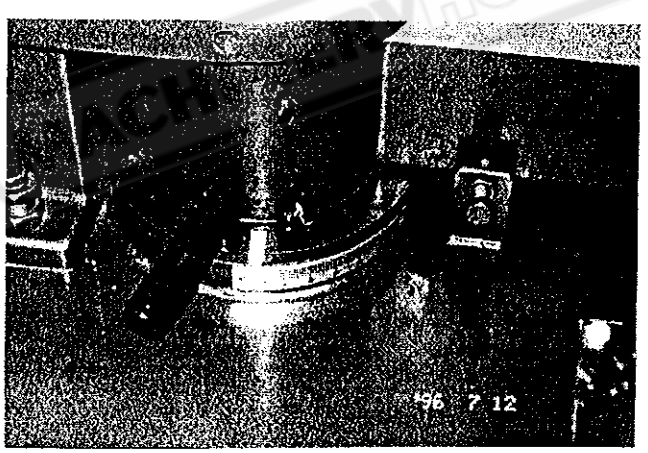
The lock handle of the vise clamping mechanism is shown as below,



LOCK HANDLE OF THE VISE CLAMPING MECHANISM

Turn this handle bar clockwise to lock the vise clamping mechanism tightly after the material is loaded properly and the movable vise is moved closely to the material.

3.3 SWIVEL LOCK HANDLE

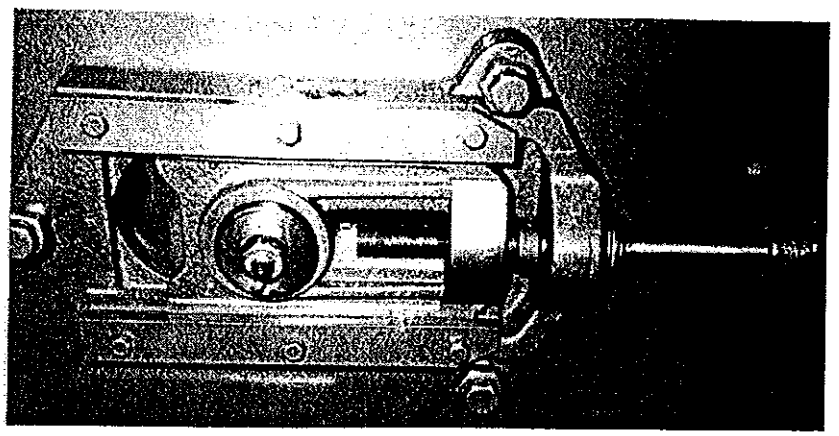


SWIVEL LOCK HANDLE

This lock handle is used to lock the sawhead when it is settled at the designated angle before doing the miter cutting.

3.4 BLADE TENSION DEVICE

This device is used to keep the saw blade tension at a constant value. Turn the blade tension handle bar clockwise to tighten the blade.



BLADE TENSION DEVICE

MACHINERYHOUSE

3.5 PRACTICAL GUIDE OF BANDSAW CUTTING

The band sawing machines are designed to be installed with high quality, high speed saw blades for maximizing the productivity. For being able to use this kind of high performance band saw blades, the machine has to be of rugged design, has the high quality saw blade guides, has sufficient motor horse power for high saw band speed, and has to be able to apply necessary tension to the saw bands. Your machines has all these features to provide better service for you.

The saw blade is guided through the cutting area by roller guides to keep it straight as it comes off the driving wheels. The precision carbide inserted guides then holds the blade securely and accurately throughout the sawing process. The tension of the saw blade is adjusted through the tensioning device on the strong saw bow. The cutting feed and down feed pressure of the blade is regulated automatically by the hydraulic regulation.

3.5.1 BAND SAW BLADE SELECTION

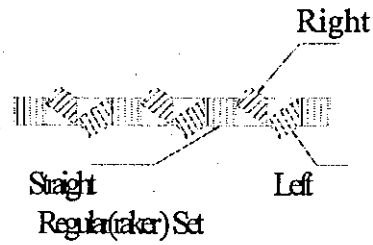
The factors affecting cutting performance are:

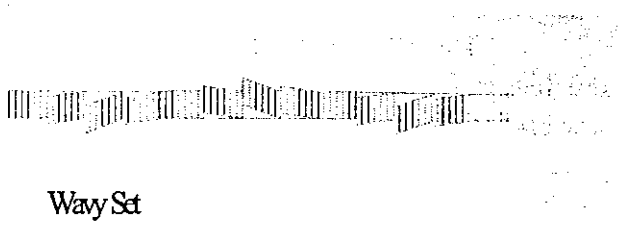
- Type of material
- Material size and shape
- Guide spacing
- Blade selection
- Blade speed and feed
- Blade tension
- Blade vibration
- Coolant

Material and its relation to the cutting rate:

- As the material machine ability lowers, so does the cutting rate. For example, stainless steel is slower to cut than cast iron.
- The surface conditions will also affect the cutting rate. If there are places on the surface or in the material which are hard, a slower blade speed will be required or blade damage may result.
- Tubing will be slower to cut than solids, because the blade much enter the material twice, and because coolant will not follow the blade as well.
- Tough or abrasive materials are much harder to cut than their machinability rating would indicate.
- Tooth spacing is determined by the hardness of the material and its thickness in cross section.
- Tooth set prevents the blade from binding in the cut. It may be either a "regular set" (Also called a "Raker Set") or a "Wavy Set".
- The regular or raker set is most common and consists of a pattern of one tooth to the left. On to the right and on (the "Raker") which is straight, or unset. This type of set is generally used where the material to be cut is uniform in size and for contour cutting.
- Wavy set has groups of teeth set alternately to right and left. Forming a wave-like pattern.

This reduces the stress on each individual tooth. Making is suitable for cutting thin material or a variety of materials where blade changing is impractical. Wavy set is often used where tooth breakage is a problem. The figure is shown as following:





Blade Speed and Feed:

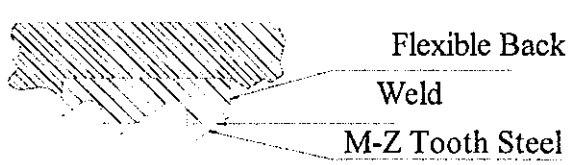
Blade speed is generally limited by vibration and the ability to keep the blade sufficiently cool to avoid dulling the teeth. A blade which is running fast and taking a very light cut will dill quickly because the tips of the teeth will overheat from the rubbing action. If, however, we force the blade teeth deeper into the material. The blade will be less sensitive to heat, because the teeth are cutting more and rubbing less.

Blade selection:

There are five types of blade material generally used:

- Hard-back carbon
- Semi-high speed
- High speed
- Carbon
- Electron-welded blade

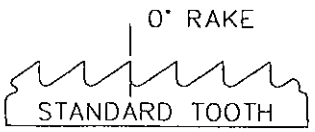
In most high speed production cutting either the semi-high speed or the electron-welded band are used. Electron welded blade is the best blade. But it is also the most expensive. To construct the electron-welded blade, M-2 tool steel is welded to the blade back. Therefore the blade is capable of very high surface speed. The semi-high speed is used more in structural because it is capable of taking a great deal more abuse. The hard-back carbon blade's teeth don not have red-hardness but if the blade is run slowly it can be very economical. We do not recommend carbon blades because the back of the blade is not sufficiently strong to stand adequate tension and because it has poor resistance to heat and abrasion. Usually, the coarse hook tooth blade will give better results, but accurate feed control is a must with a coarse tooth blade.

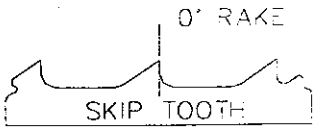


A particular blade may have teeth which are too hard at the tips. Causing them to break off in the material. This is most likely to happen as a result of chips wedging together in the cut. A broken tooth in the material can easily dulling one side of the entire blade before it is dislodged from the cut.

Tooth Form and Spacing:

The selection of a tooth form generally is determined by the material to be cut. There are three general factors to consider: Tooth form, the style or shape of the teeth; Tooth spacing, The number of teeth to the inch; and tooth set, which provides clearance for the body of the blade. Three styles of tooth are shown in the following figure,





Material Size and Shape:

The optimum material width for a band saw blade 1 inch wide by 0.35 thick is about 5 inches. Below this width tooth loading may become excessively and the cutting rate must be reduced. Above this width blade control begins to be lost. as discussed below. Since the blade "sees" only that material it is cutting. The shape of the stock being cut will also affect cutting speeds, Particularly if the piece is excessively wide or if it varies in the dimensions being cut.

Guide Spacing:

The rigidity of the blade is a function of guide spacing, with rigidity being reduced to the third power as the distance between the guides increases. For example, with guides spaced 2 inches apart, blade deflection might be approximately .2 . Under the same conditions, but with the guides spaced at 4 inches apart, blade deflection would be approximately 0.8.

This is a much simplified version of the formula, because it does not consider band tension or guide design, It is important to recognize, for example that rollers are condered as a pivotal contact. Whereas carbide faces could be considered as anchored supports. A more complete deviation, including band tension and guide design, is included in Roark's handbook, "Formula for stress and strain".

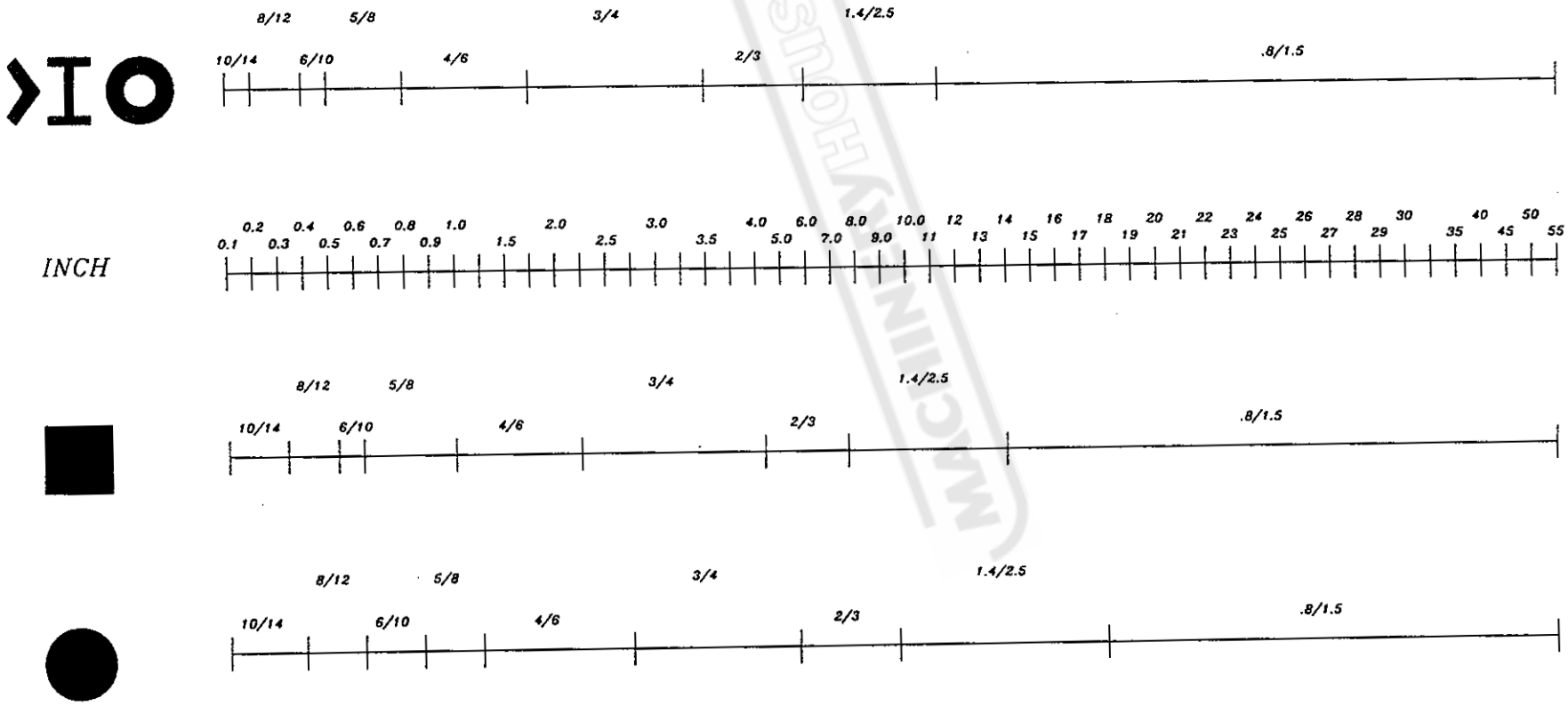
It is very important to select a right number of teeth per inch (TPI) in order to achieve the maximum cutting efficiency and lowest cost. The material size and shape dictate tooth selection. Use the enclosed TOOTH SELECTION CHART to find the proper TPI, some examples are shown as follows,

EXAMPLE 1 : 6“ square, use a 2/3 variable tooth

EXAMPLE 2 : 4“ round, use a 3/4 variable tooth

EXAMPLE 3 : 4“ OD, 3” ID TUBE, CROSS SECTION AREA = 5.5 in^2, DISTANCE OF CUT = 4 in, average width of cut = 5.5 /4 = 1.37, use a 4/6 variable tooth.

TOOTH SELECTION CHART



MACHINERYHOUSE

3.5.2 Some Sawing Practices

Selection of Saw Pitch :

Rule of the Thumb of Sawing:

1. The thinner the stock, the finer the saw pitch
2. The thicker the stock, the coarser the saw pitch
3. The more difficult the stock, the finer the saw pitch
4. The softer the material , the coarser the saw pitch

At least three teeth always must be in contact with the material being cut

Material Size and Saw Pitch :

Anytime during the cutting operation, at least three teeth must be in contact with the material being cut. Following shows some sawing practices:

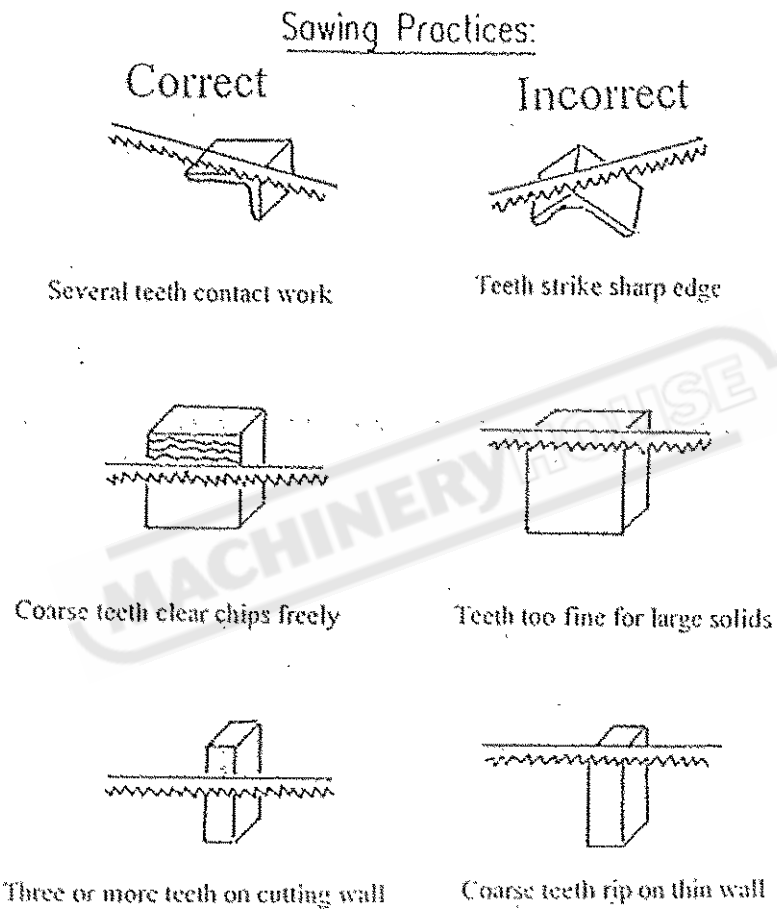


Fig. 6.4 Some sawing practices

The standard performance of the cutting data is shown on the next page.

STANDARD PERFORMANCE

MATERIAL COMPARISON				MATERIAL / DATA / DIA	25Ø x 36	50Ø x 9	75Ø x 4	100Ø	150Ø	200Ø	250Ø
SI	BS	DIN	GOST								
	040A22	CK22	20	Blade Pitch	3. 4	3. 4	3. 4	3. 4	3. 4	3	2
	060A25	CK25	25	Blade speed M/min	68. 80	68. 80	68. 80	68. 80	68. 80	68. 80	68. 80
	060A30	CK30	30	Cut rate CM² /min	30 - 45	35 - 55	37 - 58	40 - 60	50 - 70	35 - 55	35 - 50
	060A35	CK35	35	Cutting time	5'50"-3'50"	5'00"-3'10"	4'45"-3'00"	1'50"	3'30"	9'00"	14'00"
	060A40	CK40	40	Cutting time/1 pc	9"-6"	33"-21"	1'10"-45"	-1'20"	-2'30"	-5'40"	-8'50"
	080M46	CK45	45	Blade life CM²	31000-46000	37000-54000	44000-64000	52000-65000	55000-80000	50000-65000	38000-56000
	080M50	--	50	Cut. Q'ty/1 blade	6326-9387	1888-2755	997-1450	662-828	311-453	159-207	77-114
	040A10	CK10	10	Blade Pitch	3. 4	3. 4	3. 4	3. 4	3. 4	3	2
	040A15	CK15	15	Blade speed M/min	68. 80.	68. 80.	68. 80.	68. 80.	68. 80.	68. 80.	68. 80.
	040A20	CK22	20	Cut rate CM² /min	30 - 42	32 - 47	35 - 50	40 - 60	40 - 60	35 - 55	30 - 50
	040A10	CK10	10	Cutting time	5'50" - 4' 10"	5'30" - 3' 45"	5'00" - 3' 30"	2'00"	4'25"	9'00"	16'20"
	050A15	CK15	15	Cutting time/1 pc	9" - 7"	31" - 25"	1'15" - 52"	-1'18"	-3"00"	-5'40"	9'50"
	040A20	CK20	20	Blade life CM²	27000 - 35000	32000 - 40000	37000 - 48000	45000 - 60000	47000 - 60000	42000 - 55000	33000 - 42000
	--	--	--	Cut. Q'ty/1 blade	5510 - 7143	1633 - 2040	838 - 1087	573 - 764	266 - 340	134 - 175	67-86
	060A52	CK53	50	Blade Pitch	3. 4	3. 4	3. 4	3. 4	3. 4	3	2
	060A57	Cm60	60	Blade speed M/min	54. 68.	54. 68.	54. 68.	54. 68.	54. 68.	54. 68.	54. 68.
	708A37	34CrMo4	35XM	Cut rate CM² /min	25 - 32	25 - 35	30 - 37	35 - 50	35 - 50	35 - 45	28 - 37
	708M40	42CrMo4		Cutting time	7'00" - 5' 30"	7'00" - 5' 00"	5'50" - 4'45"	2'15"	5'00"	9'00"	17'00"
	665M13	14NiCr14	20X2H4A	Cutting time/1 pc	11" - 9"	47" - 33"	1'25" - 1'15"	-1'15"	-3'30"	-7'00"	-13'15"
	--	--	--	Blade life CM²	25000 - 32000	29000 - 37000	34000 - 44000	40000 - 55000	43000 - 55000	39000 - 50000	30000 - 38000
	530A36	34Cr4	35X	Cut. Q'ty/1 blade	5102 - 6531	1480 - 1888	770 - 997	510 - 700	243 - 311	124 - 159	61-77
	--	36NiCr6	40XH	Blade Pitch	3. 4	3. 4	3. 4	3. 4	3. 4	3	2
	--	--	--	Blade speed M/min	40. 54. 68.	40. 54. 68.	40. 54. 68.	40. 54. 68.	40. 54. 68.	40. 54. 68.	40. 54. 68.
	BW1A	--	Y10	Cut rate CM² /min	17 - 25	20 - 30	25 - 35	30 - 45	30 - 45	25 - 40	20 - 30
	--	--	--	Cutting time	10'10" - 7' 00"	8'40" - 5' 50"	7'00" - 5' 00"	2'35"	5'50"	12'30"	19'40"
				Cutting time/1 pc	17" - 12"	58" - 39"	1'45" - 1'15"	-1'45"	-3'55"	-7'45"	-14'00"
				Blade life CM²	20000 - 26000	23500 - 30000	28000 - 36000	35000 - 45000	35000 - 45000	32000 - 40000	24000 -31000
				Cut. Q'ty/1 blade	4081 - 5306	1200 - 1530	634 - 815	446 - 573	198 - 255	102 - 127	49-63
	534A99	105Cr5	X15	Blade Pitch	3. 4	3. 4	3. 4	3. 4	3. 4	3	2
	BT1	S18-10-1	P18	Blade speed M/min	27. 40. 54	27. 40. 54	27. 40. 54	27. 40. 54	27. 40. 54	27. 40. 54	27. 40. 54
	BH13	X16CrMoVS1	--	Cut rate CM² /min	10 - 20	12 - 22	12 - 27	25 - 35	25 - 35	15 - 35	12 - 25
				Cutting time	17'40" - 8' 50"	14'40" - 8' 00"	14'40" - 6' 30"	3'10"	7'00"	21'00"	46'00"
				Cutting time/1 pc	30" - 15"	1'37" - 53"	3'30" - 1'35"	-2'15"	-5'00"	-10'30"	-19'40"
				Blade life CM²	14000 - 20000	17000 - 24000	20000 - 28000	25000 - 35000	25000 - 35000	23000 - 30000	18000 -24500
				Cut. Q'ty/1 blade	2854 - 4081	867 - 1224	453 - 634	318 - 446	142 - 198	73 - 111	37-50
	BD1	X210Cr12	X12	Blade Pitch	3. 4	3. 4	3. 4	3	3	2. 3	2
	BD2	X166CrMoV12	XM12	Blade speed M/min	27. 40.	27. 40.	27. 40.	27. 40.	27. 40.	27. 40.	27. 40.
	410S12	X10Cr13	12X13	Cut rate CM² /min	6 - 12	6 - 14	8 - 16	10 - 20	10 - 20	8 - 18	8 - 15
	--	55NiCrMoV6	5XGM	Cutting time	29'30" - 14' 40"	29'20" - 12' 35"	22'00" - 11'00"	7'45"	17'40"	39'00"	61'00"
				Cutting time/1 pc	49" - 24"	2'15" - 1'24"	5'30" - 2'45"	-3'55"	-8"50"	-17'30"	-32'40"
				Blade life CM²	9500 - 15500	12000 - 20000	13000 - 23000	17000 - 30000	16000 - 25000	15000 - 25000	11500 - 18500
				Cut. Q'ty/1 blade	1939 - 3163	612 - 1020	294 - 520	217 - 382	91 - 142	48 - 80	23-38
	304S15	X5CrNi189	08X18H10	Blade Pitch	3. 4	3. 4	3. 4	3	3	2. 3	2
	316S16	X5CrNiMo1810	--	Blade speed M/min	27. 40.	27. 40.	27. 40.	27. 40.	27. 40	27	27
	310S24	CrNi2520									

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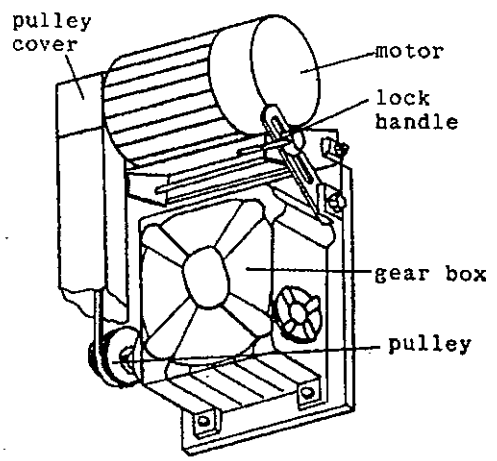
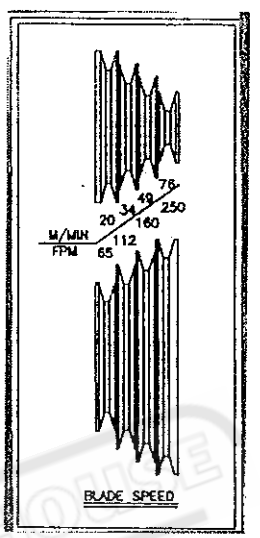
3.6 BLADE SPEED INTERCHANGE

1. Remove pulley cover.
2. Loosen the lock screw located underneath the motor and above the gear reducer.
3. Pull the motor up to loosen the belt.
4. Position belt in designated groove (refer to the speed chart on the pulley cover)
5. Push the motor downward to tighten the belt.
6. Fasten the lock screw.





3.7 DOWNFEED RATE ADJUSTMENT

a. Proper rate of cutting feed is important. Excessive pressure can break the blade or stall the saw,on the contrary, insufficient pressure rapidly dulls the blade. The hydraluic cylinder regulates the rate at which the blade is lowered into the material being cut. Adjusting the "Flow Control Valve" provides an infinite choice for rate of cutting feed.

b. If the workpiece thickness is smaller than 2mm , please turn the knob of the flow control valve to 1-2; if the workpiece thickness is bigger than 3 mm, set the knob to 3-4.

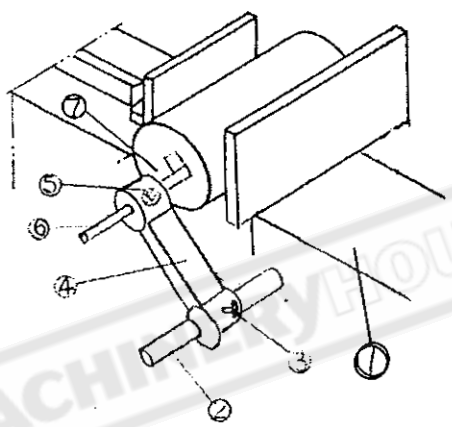
c. If the sawhead is forced downward by manually extra force while doing the adjusting or setting up work, the hydraulic cylinder will be damaged.

d. While settling the cutting material, the sawhead can be held at the middle position of the whole rising distance by turning the flow control valve to the zero position.

3.8 STOPPER BRACKET FOR THE CUTTING LENGTH SETTING

This bracket is not installed on the machine for the duration of shipping. Please follow the procedure to set up this stopper bracket,

a. Set up the ②depth bar and tighten the set screw on the ①workbed.
b. Lower the sawhead to the position 1 mm above the top of the material and measure the designated cutting length
c. Loosen the ③fastening bolt
d. Move the ⑥stopper to a position where the end of the stopper will face against the front end of the material.
e. Tighten the ⑥stopper in ④stopper bracket by ⑤stopper handle.
f. Move the ④stopper bracket toward the workpiece and contact the ⑦front end of the material.
g. Tighten the ③fastening bolt.



STOPPER BRACKET FOR THE CUTTING LENGTH SETTING

SECTION 4

MAINTENANCE

MACHINERY HOUSE

SECTION 4

MAINTENANCE

4.1 DAILY WORK

Before each day's operation begins, please perform the following maintenance procedures,

1. Check the hydraulic oil level, adding oil as necessary.

2. Check the cutting fluid level, adding fluid as necessary. If the fluid appears contaminated or deteriorated, drain and replace it.

3. Check the saw blade to ensure that it is properly positioned on both the drive and driven wheels, and in the left and right inserts.

4. Check the wire brush to ensure if it contacts with the saw blade prpperly. If it is worn out, replace it.

5. Lubricate the following points,

   * Workbed surface
   * Dovetail guide
   * Roller bearing, needle bearing
   * Blade tension device slide plate

MACHINERYHOUSE

4.2 ONCE EVERY SIX MONTHS

Perform the following maintenance procedures once every six months,

1. Clean the cutting fluid tank.

2. Replace the transmission oil after the first three months or 600 hours of operation and, thereafter, every six months or every 1200 hours of operation, whichever occurs first.

3. Recommended Oil : Shell Tellus 75
   Mobil DTE Oil AA

4.3 ONCE EVERY YEAR

Perform the following procedure once every year,

Apply the recommended grease (or its equivalent) to the following points,

* Drive wheel
* Driven wheel
* Blade tension device
* Rear fixed vise

Recommended Grease : Shell Alvania EP Grease 2 Mobil Mobilplex 48

MACHINERYHOUSE

SECTION 5

TROUBLE SHOOTING

MACHINERY HOUSE

SECTION 5

TROUBLE SHOOTING

5.1 GENERAL TROUBLE SHOOTING

Vibration during cutting	Failure to cut	Short life of saw blade	Curved cutting	Broken blade		
•	•	•	•	•	Use of blade with incorrect pitch	Use blade with correct pitch, suited to workpiece width
•	•	•	•	•	Failure to break-in saw blade	Perform break-in operation
•	•	•			Excessive saw blade speed	Reduce speed
			•	•	Insufficient saw blade speed	Increase speed
•		•	•	•	Excessive load	Reduce load
•		•	•		Insufficient load	Increase load
		•	•		Insufficient saw blade tension	Increase tension
•		•	•	•	Wire brush improperly positioned	Relocate or replace
•		•	•		Blade improperly clamped by insert	Check and correct
•	•	•	•	•	Improperly clamped workpiece	Check and correct
	•	•	•		Excessively hard material surface	Soften material surface
		•	•	•	Excessive cutting rate	Reduce cutting rate
	•	•			Non-annealed workpiece	Replace with suitable workpiece
•		•	•	•	Insufficient or lean cutting fluid	Add fluid or replace
•		•	•	•	Vibration near machine	Relocate machine
		•	•		Non-water soluble cutting fluid used	Replace
•		•	•		Air in cylinder	Bleed air

Vibration during cutting	Failure to cut	Short life of saw blade	Curved cutting	Broken blade		
•		•		•	Broken back-up tip	Replace
•	•	•	•	•	Use of non-specified saw blade	Replace
•	•	•	•	•	Fluctuation of linevoltage	Stabilize
•		•	•		Adjustable blade guide too far from workpiece	Bring blade guide close to workpiece
•		•	•	•	Loose blade guide	Tighten
		•		•	Blue or purple saw chips	Reduce cutting rate
•		•		•	Accumulation of chips at inserts	Clean
•		•	•		Back-up tip rubber deteriorated	Replace
	•				Reverse positioning of blade on machine	Re-install
•		•	•		Workpieces not bundled properly	Re-bundle
•		•		•	Back edge of blade touching wheel flange	Adjust wheel to obtain clearance
•	•	•			Workpiece of insufficient dia.	Use other machine, suited for diameter of workpiece
	•	•	•		Saw blade teeth worn	Replace

5.2 BLADE TROUBLE SHOOTING

WARINING DISCONNECT POWER CORD TO MOTOR BEFORE ATTEMPTING ANY REPAIR OR INSPECTION

TROUBLE	PROBABLE CAUSE	SUGGESTED REMEDY
Teeth strippage	Too few teeth per inch	Use finer tooth blade.
	Loading of gullets	Use coarse tooth blade or cutting lubricant.
	Excessive feed	Decrease feed.
	Work not secured in vise	Clamp material securely.
Blade breakage	Teeth too coarse	Use a finer tooth blade.
	Misalignment of guides	Adjust saw guides.
	Dry cutting	Use cutting lubricant.
	Excessive speed	Lower speed. See Operating Instructions "Speed selection."
	Excessive speed	Reduce feed pressure. Refer to Operating Instructions "Adjusting Feed."
	Excessive tension	Tension blade to prevent slippage on drive wheel while cutting.
Run-out and Run-in	Wheels out of line	Adjust wheels.
	Guides out of line	For a straight and true cut, realign guides, check bearings for wear.
	Excessive pressure	Conservative pressure assures long blade life and clean straight cuts.
	Support of blade insufficient	Move saw guides as close to work as possible.
	Material not properly secured in vise	Clamp material in vise, level and securely.
	Blade tension improper	Loosen or tighten tension on blade.
Blade twisting	Blade not in line with guide bearings	Check bearings for wear and alignment.
	Excessive blade pressure	Decrease pressure and blade tension.
	Blade binding in cut	Decrease feed pressure.
Premature tooth wear	Dry cutting	Use lubricant on all materials, except cast iron.
	Blade too coarse	Use finer tooth blade.
	Not enough feed	Increase feed so that blade does not ride in cut.
	Excessive speed	Decrease speed.

5.3 MOTOR TROUBLE SHOOTING

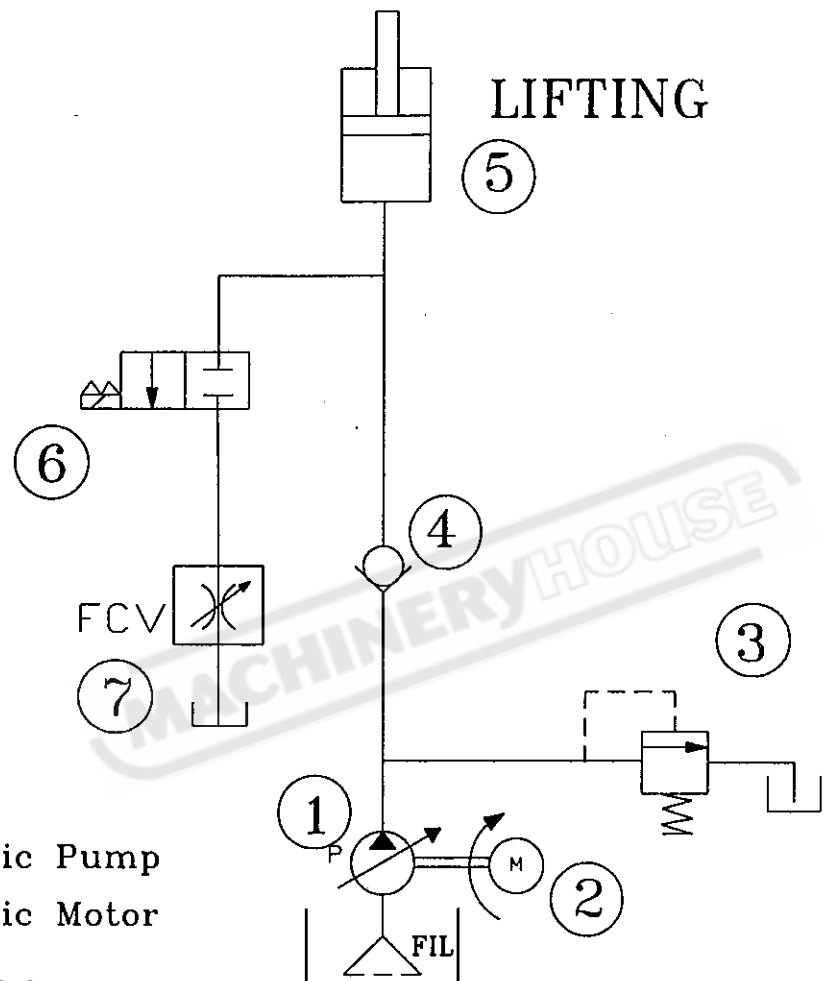
TROUBLE	PROBABLE CAUSE	SUGGESTED REMEDY
Motor will not start	Magnetic switch open, or protector open.	Reset protector by pushing red button (inside electric box.)
	Low voltage	Check power line for proper voltage.
	Open circuit in motor or loose conncetions.	Inspect all lead terminations on motor for loose or open connections.
Motor will not start, fuse or circuit breakers "blow".	Short circuit in line, cord or plug.	Inspect line, cord and plug for damaged insulation and shorted wire.
	Short circuit in motor or loose connections	Inspect all lead terminations on motor for loose or shorted terminals or worn insulation on wires.
	Incorrect fuses or circuit breakers in power line.	Install correct fuses or circuit breakers.
Motor fail to develop full power. (Power output of motor decreases rapidly w/decrease in voltage at motor terminals.)	Power line overloaded with lights, appliances and other motors.	Reduce the load on the power line.
	Undersize wires or circuit too long.	Increase wire sizes, or reduce length of wiring
	General overloading of power company's facilities.	Request a voltage check from the power company
Motor overheat	Motor overloaded.	Reduce load on motor
	Air circulation through the motor restricted.	Clean out motor to provide normal air circulation through motor.
Motor stalls (Resulting in blown fuses or tripped circuit breakers)	Short circuit in motor or loose connections.	Inspect terminals in motor for loose or shorted terminals or worn insulation on lead wires.
	Low voltage	Correct the low line voltage conditions.
	Incorrect fuses or circuit breakers in power line.	Install correct fuses circuit breakers.
	Motor overloaded	Reduce motor load.
Frequent opening of fuses or circuit breakers.	Motor overloaded	Reduce motor load
	Incorrect fuses or circuit breakers.	Install correct fuses or circuit breakers.

MACHINERYHOUSE

APPENDIX

MACHINERYHOUSE

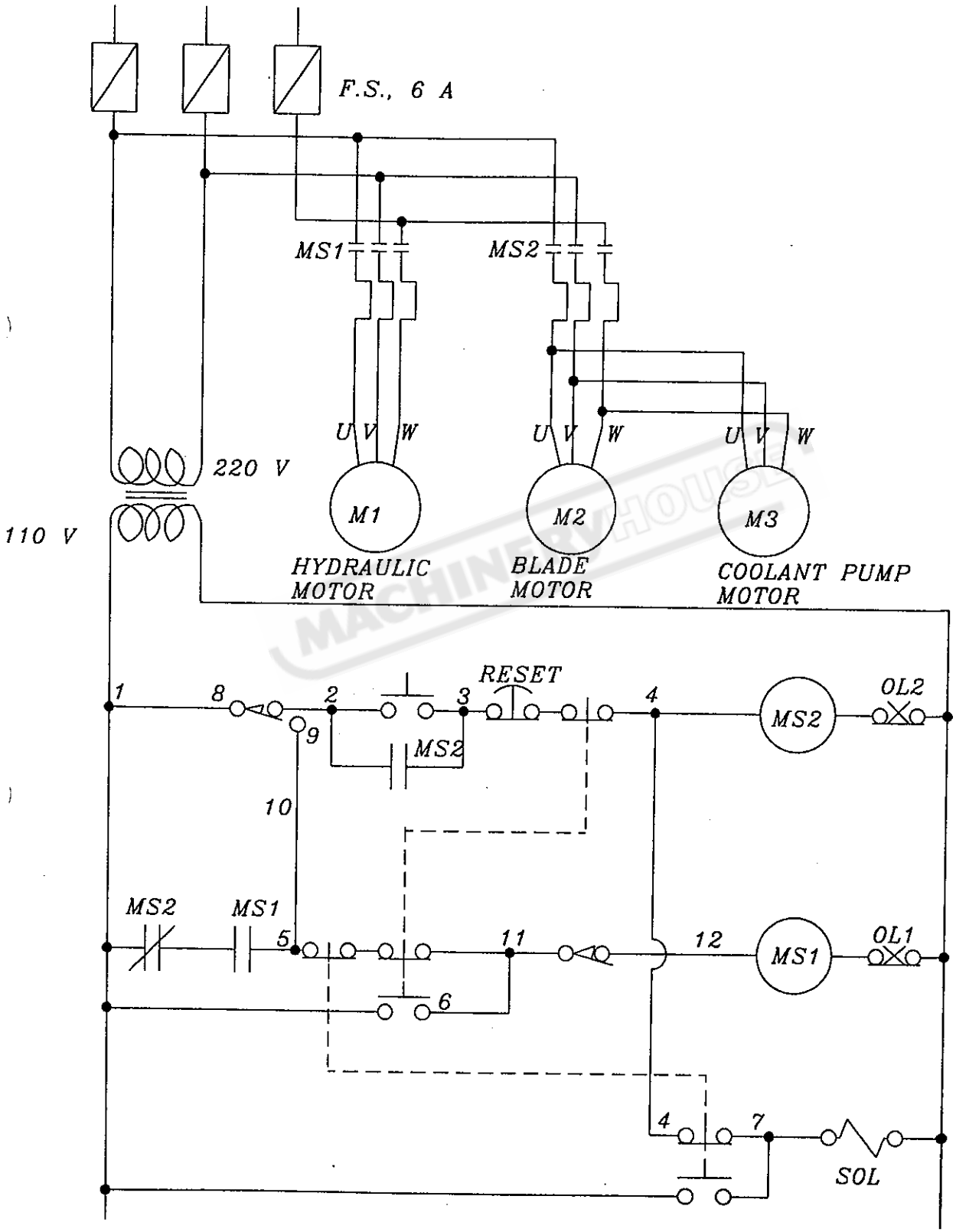
HYDRAULIC CIRCUIT



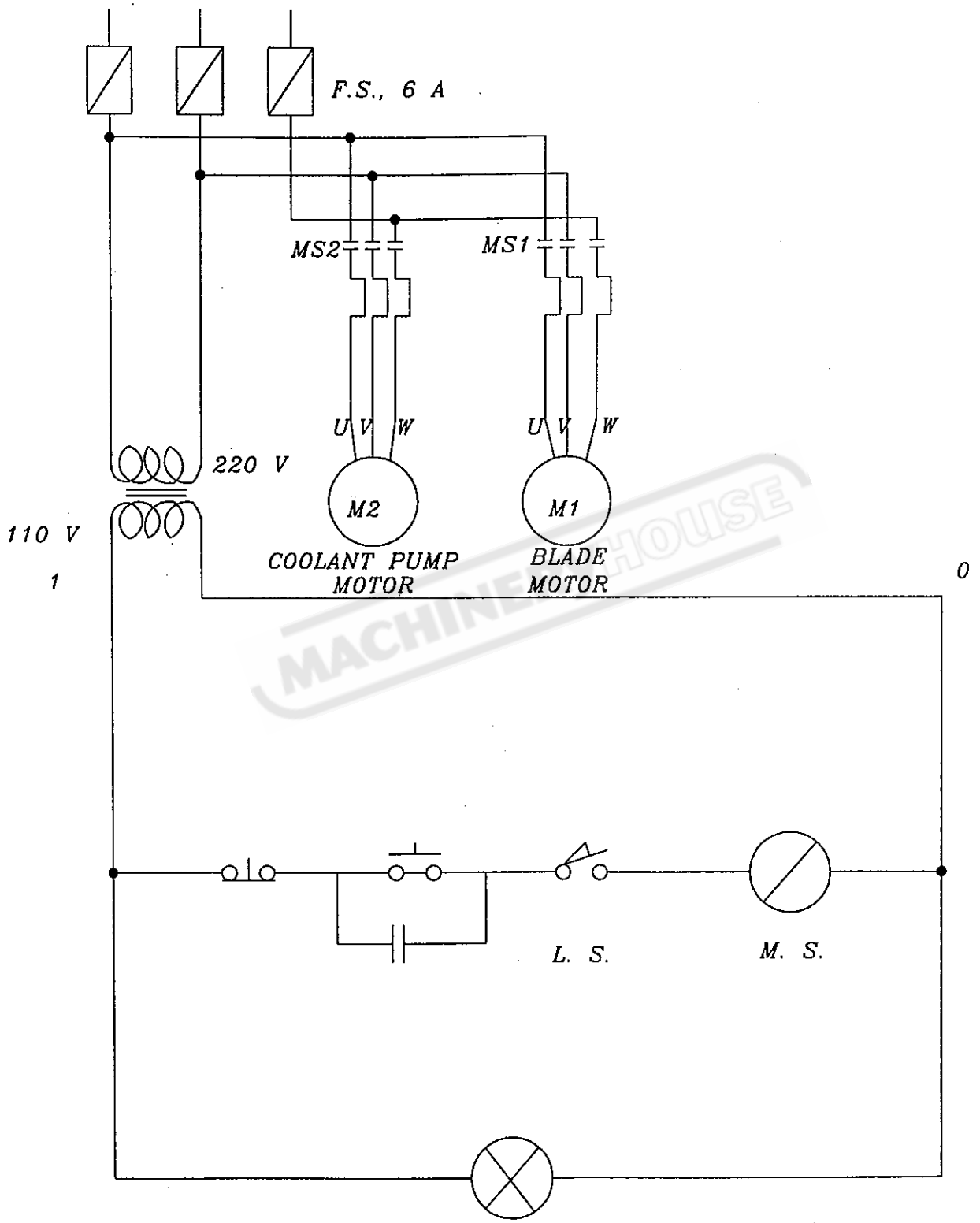
1. Hydraulic Pump
2. Hydraulic Motor
3. Relief Valve
4. Check Valve
5. Hydraulic Cylinder
6. CKD Solenoid Valve
7. Flow Control Valve

MACHINERYHOUSE

ELECTRIC SCHEMATIC



ELECTRIC SCHEMATIC



MACHINEHOUSE

PARTS LIST

MACHINERY HOUSE

CHART 1 SAW BOW

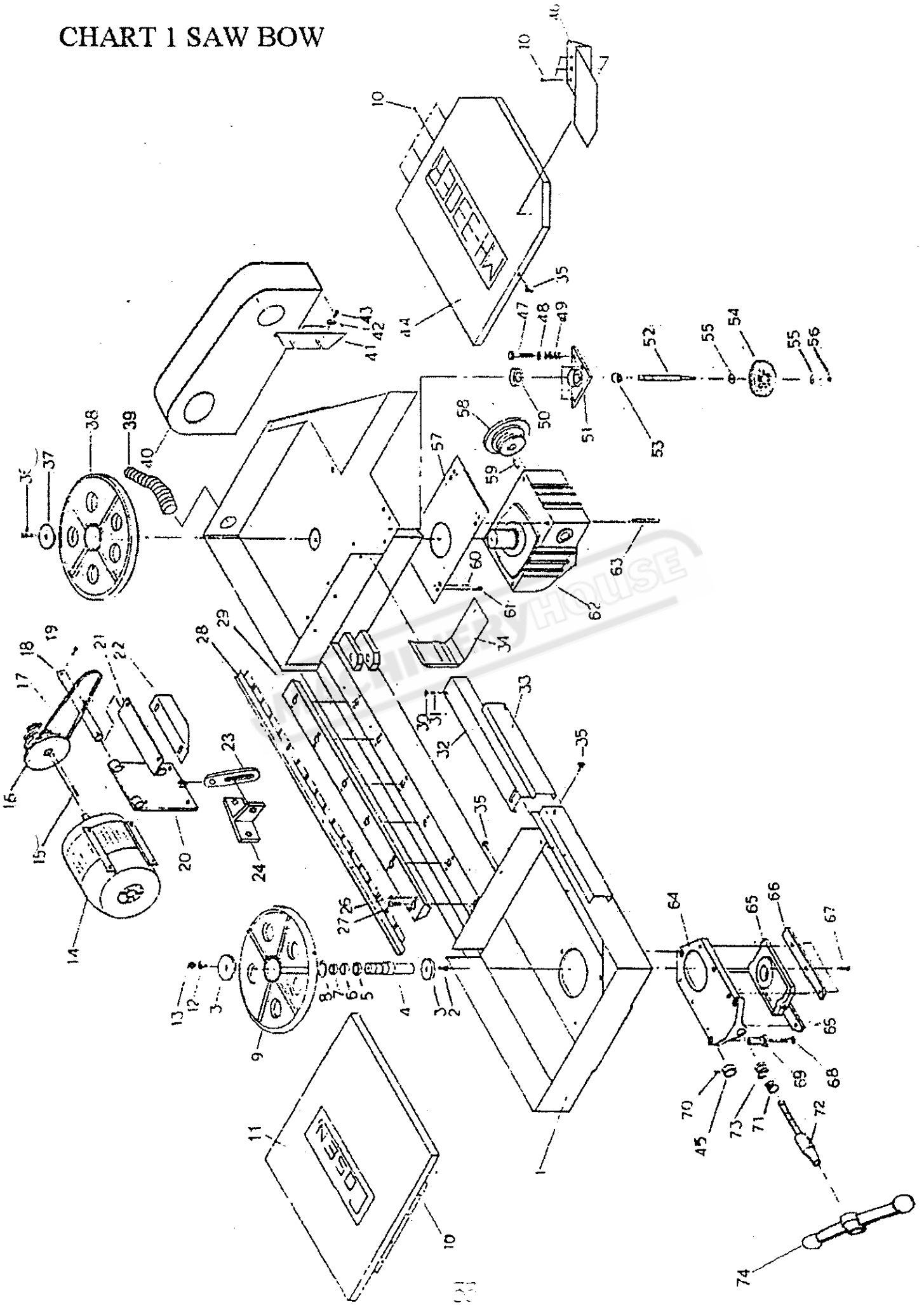


CHART 1 SAW BOW

NO.	PART NO.	PART NAME	PART SPEC.	Q'TY
1	MER-3001	SAW BOW		1
2		SCREW	M12 X 25	1
3	MBR-9127	WASHER		2
4	MER-3102	IDLE WHEEL SHAFT		1
5	PP-14255	BEARING	6007Z	1
6	MER-3103	BEARING WASHER		1
7	PP-14255	BEARING	6007Z	1
8		SNAP RING		1
9	MER-3101	IDLE WHEEL		1
10		SCREW	M4 X 10L	14
11	MER-3104	WHEEL COVER		1
12		SCREW	M12 X 20L	1
13		NIPPLE		1
14	PP-31041	MOTOR	2HP,4P,60HZ,230/460V	1
15		KEY	8 X 8 X 50	1
16	SJY-1119	MOTOR PULLEY		1
17	PP-56131	BELT	A-43	1
18	MER-3011	SET PIPE		1
19		SPLITE PIN		2
20	MER-3007	MOTOR BASE PLATE		1
21		SET PLATE		1
22		SUPPORT PLATE		1
23	MER-3008	ADJUSTING PLATE		2
24	MER-3009	FASTENING BRACKET	M6 X 25L	2
25				
26		SET SCREW	M8 X 20L	12
27		SCREW	M10 X 35L	6
28		BLADE SAFE COVER		1
29	MER-3201	SLIDE PLATE		1
30		WING NUT	M6	1
31		SET SCREW	M6 X 20L	1
32	MBR-9105	SAW BLADE COVER		1
33	MBR-9104	U SLOT		1
34		WIRE BRUSH COVER B		1
35		SCREW	1/4 UNC - 1/2	4
36		SCREW	M12 X 35L	1
37	MER-3107	WASHER		1
38	MER-3105	DRIVE WHEEL		1
39		ELECTRIC CONDUIT		1
40	MER-3005	PULLEY COVER		1
41		PULLEY COVER SET PLATE		1
42		WASHER	M10	2
43		SCREW		2
44	MER-3106	WHEEL COVER		1
45		SCREW COLLAR		1

CHART 1 SAW BOW

NO.	PART NO.	PART NAME	PART SPEC.	Q'TY
46	MBR-9133	WIRE BRUSH COVER A		1
47		SCREW	M8 X 80L	3
48		WASHER		3
49		SPRING		3
50	MBR-9131	BRUSH DRIVE WHEEL		1
51	MBR-9132	BEARING BASE		1
52	MBR-9129	BRUSH SHAFT		1
53	PP-14289	BEARING	6902 ZZ	1
54	PP-58002	WIRE BRUSH	90MM * 8MM #0.3	1
55		WASHER		2
56		NUT	M8	1
57		REDUCER PLATE		1
58	MER-3004	REDUCER PULLEY		1
59		KEY	7 X 7 X 50	1
60		ADJUSTING SCREW	M8 X 20L	4
61		SCREW	M10 X 20L	4
62	PP-16045A	REDUCER	#80, 1/30	1
63		SET SCREW	M10 X 40L	4
64	MBR-91819	TENSION PLATE SET		1
65		ADJUSTING SLIDE		DELETED
66		GUIDE PLATE		DELETED
67		SCREW	1/4 UNC -3/4	6
68		SCREW	M12 X 70L	3
69	MJA-2056	ADJUSTING SCREW	5/8	3
70		SPRING PIN	M3	2
71	PP-14812	BEARING	51103	4
72	MBR-9128A	BLADE TENISON SCREW		1
73		SPRING WASHER		1
74	MER-3002	HANDLE BAR		
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MACHINERYHOUSE

CHART 2 BLADE GUIDE ARMS

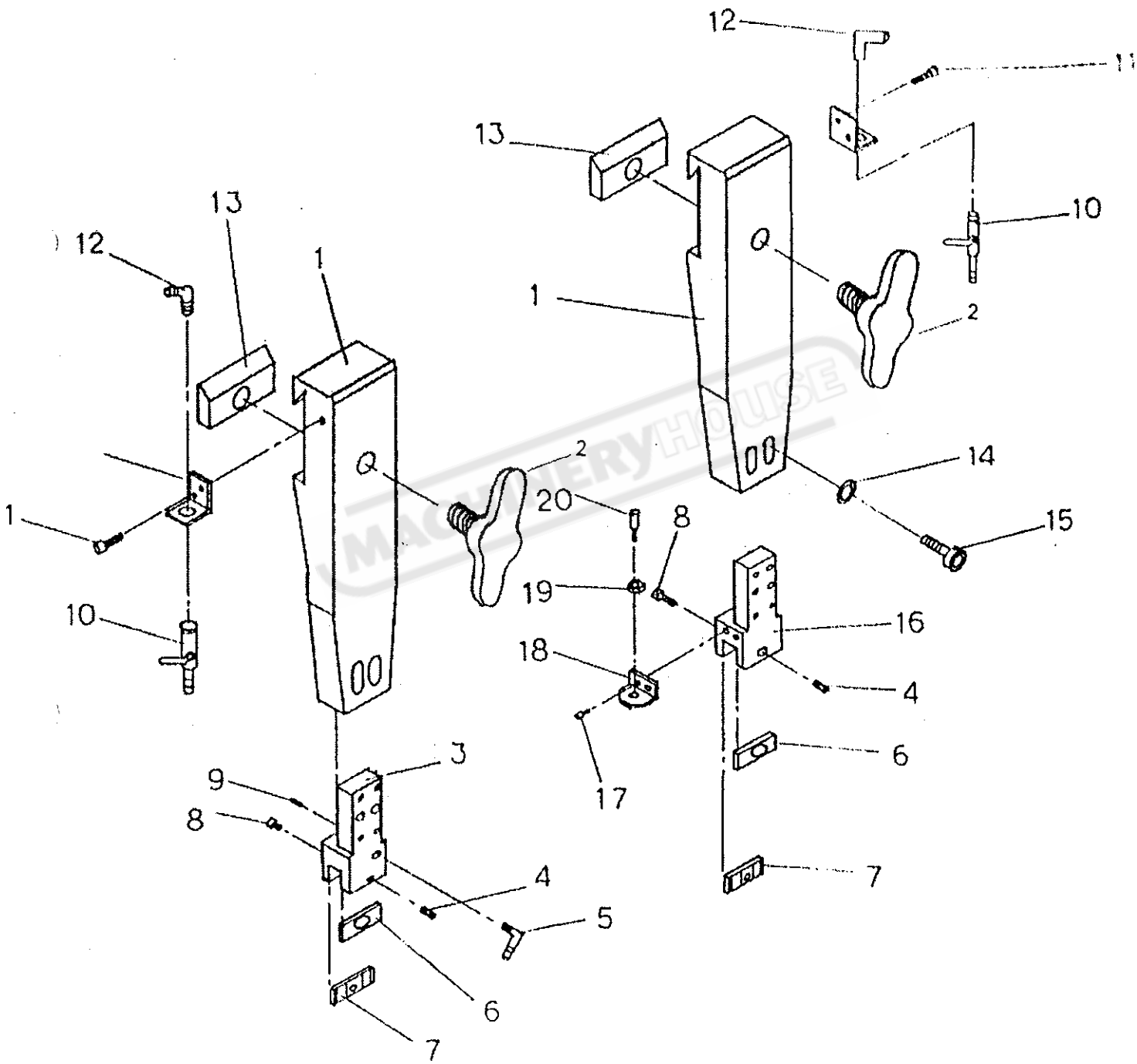

CHART 2 BLADE GUIDE ARMS

NO.	PART NO.	PART NAME	PART SPEC.	Q'TY
1	MER-3202,3203	GUIDE ARM(LEFT, RIGHT)		2
2	MJA-2031	BOLT		2
3	MER-3205	LEFT GUIDE HOUSING		1
4		SET SCREW	M6 X 20L	2
5		FITTING		1
6	MBR-9107	MOVABLE CARBIDE PAD		2
7	MBR-9106	FIXED CARBIDE PAD		2
8		SCREW	M8 X 10L	2
9		SET SCREW	M5 X 20L	8
10	PP-43132	COOLANT VALVE	1/8"	2
11		SCREW	M5 X 10L	4
12		FITTING	1/8PT	
13	MJA-2032	CLAMP BLOCK		2
14		WASHER		
15		SCREW	M8 X 15L	4
16	MER-3204	RIGHT GUIDE HOUSING		
17		SCREW	M4 X 10L	2
18		HOSE HOLDER		
19		NUT		
20	MAB-6014	COOLANT NOZZLE		
21	MER-3206	NAME PLATE OF GUIDE ARMS		
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MACHINERY HOUSE

CHART 3 BASE ASSEMBLY AND BED

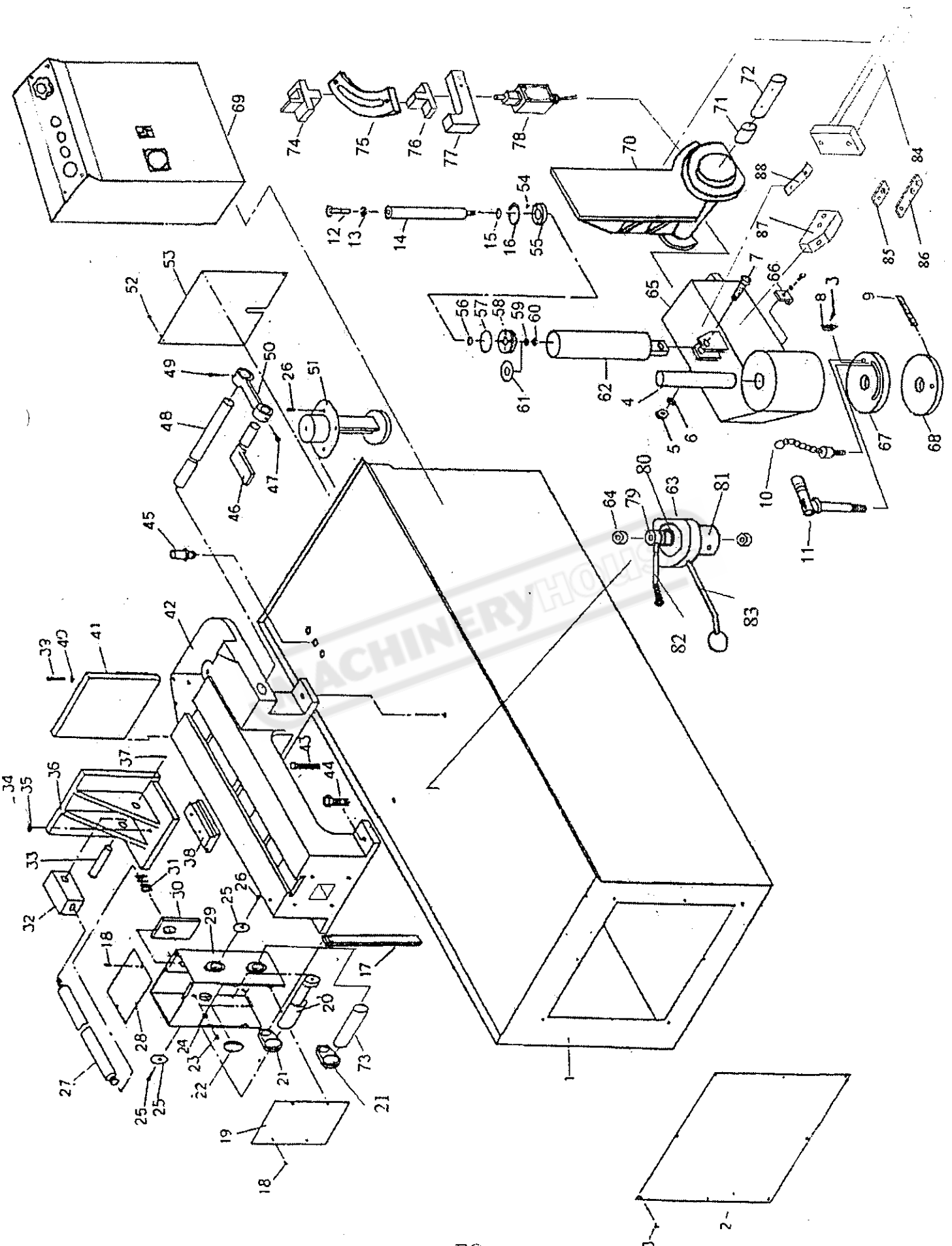

CHART 3 BASE ASSEMBLY AND BED

NO.	PART NO.	PART NAME	PART SPEC.	Q'TY
1	MER-1001	BASE		1
2	MER-1002	COVER		1
3		SCREW	M5 X 10L	14
4	MER-2103	TURNING AXIS		1
5		SET SCREW	M6 X 20L	2
6		WASHER		1
7		SCREW	M12 X 60L	1
8	MAJ-4007	POINTER		1
9	MER-2002	ANGLE SCALE		1
10		FASTENING PIN		1
11	MER-2003,2003-3	ANGLE LOCKING HANDLE BAR		1
12	PP-14483	LINK LEVER BEARING		1
13		NUT		1
14	MBR-9163	PISTON ROD		1
15	PP-51150	DUST SEAL	UHS-28	1
16		RETAINER	R63	1
17	MER-2202	PULL LEVER		1
18		SCREW	M5 X 10L	6
19	MER-2210	SIDE COVER		1
20	MER-2207	CLAMPING SHAFT		1
21	MER-2208	CLAMPING RADIAL ARM		2
22		KNOB	#50	1
23		SCREW	M12 X 70L	1
24		NUT		4
25		WASHER		1
26		SCREW	M6 X 10L	2
27	MBR-9030A	SLIDING VISE JAW SHAFT		1
28	MER-2209	COVER		1
29	MER-2201	CLAMPING POST WELDMENT		1
30	MER-2205	PUSH PLATE		1
31	MBR-9025	SPRING		1
32	MBR-9049	RAPID DRAW LEVER LINK PLATE		1
33				
34				
35				
36				
37				
38	MBR-9028	SLIDING BRACKET		1
39		SCREW	M14 X 40L	2
40		WASHER		2
41	MBR-9032	FIXED VISE JAW		1
42	MER-2001	BED		1
43		SCREW	M12 X 70L	4
44		SCREW	M22 X 50L	4
45		FITTING		3

CHART 3 BASE ASSEMBLY AND BED

NO.	PART NO.	PART NAME	PART SPEC.	Q'TY
46	MBR-9037	STOPPER		1
47		SCREW	M10 X 20L	1
48	MBR-9039	DEPTH BAR		1
49		SCREW	M10 X 20L	1
50	MBR-9036	STOPPER BRACKET		1
51	PP-32041	COOLANT PUMP	1/8 HP,150L,220/440 V	1
52		SCREW		4
53		PUMP COVER		1
54		SCREW	M8 X 10L	1
55	MBR-9159	UPPER CYLINDER CAP		1
56		O-RING	P-12	1
57	PP-51151	U-PACKING	UHS53	1
58	MBR-9168	PISTON		1
59		WASHER		1
60		NUT		1
61		PISTON RUBBER		1
62	MBR-9164	CYLINDER		1
63	MER-2203	HANDLE BAR SET		1
64		NUT		2
65	MER-2101	TURNING JOINT BASE		1
66		FIXING BRACKET		1
67	MER-2105	CLAMPING RING		1
68	MER-2104	TURNING BASE		1
69	MER-5001	CONTROL BOX		1
70	MER-2107	JOINT BASE		1
71		DU BUSHING		1
72	MER-2102	JOINT AXIS		1
73	MER-2206	CLAMPING SHAFT		1
74	MER-3214	LIMIT STOPPER	SH-330ER only	1
75	SER-3210	UPPER LIMIT SLIDE PLATE	SH-330ER only	1
76	MER-3212	LIMIT NUT BLOCK	SH-330ER only	1
77	SER-3213	LIMIT SWITCH CARRIAGE	SH-330ER only	1
78	PP-90020	LIMIT SWITCH	SH-330ER only	1
79	MER-2211	TURNING AXIS		1
80	MER-2213	COLLAR		1
81	MER-2212	HANDLE BAR SEAT SUPPORT		1
82	MER-2204	PUSH LEVER		1
83	MBR-9019	HANDLE LEVER		1
84	MER-2004	SPRING HANGING BRACKET		1
85	MER-2006	SPRING HANGING PLATE (1)		1
86	MER-2006	SPRING HANGING PLATE (2)		1
87	MER-3211	SAWHEAD STOPPER		1
88	MER-3215	LOWER LIMIT STOPPER		1
89				
90				

BANDSAWS
CAUSES OF FAILURE AND CORRECTION

FAILURE	CAUSES	ADJUSTMENT
TEETH CHIPPING OR STRIPPING	a. Tooth Pitch too coarse for section b. Too much pressure c. Material insecurely held causing vibration d. Too few teeth engaged at start of cut e. Swarf choking gullets	a. Select finer Pitch b. Reduce feed c. Eliminate vibration by securing work piece d. Start cut where several teeth are in contact at the same time e. Use coolant effectively to flush out swarf
BAND BREAKAGE	a. Saw guides set too far apart b. Band tension too great c. Too much feed pressure d. Band too thick e. Band speed too fast	a. Set saw guides as close as possible to each other b. Regulate tension to maintain band just sufficiently firmly on pulleys and relax tension of band if machine is kept idle c. Reduce feed pressure d. Thickness of band must not be too great relative to diameter of drive pulleys e. Reduce band speed
PREMATURE WEAR ON TEETH	a. Band speed too fast b. Band teeth not positively engaging work and merely rubbing c. Incorrect band in use d. Band set incorrectly	a. Reduce speed b. Increase feed pressure c. Check for correct band for material. If contouring band too wide for radius being cut d. Check that band teeth project beyond guides, that teeth project over edge of wheels and that band teeth are running in right direction
BAND NOT CUTTING STRAIGHT	a. Unequal wear b. Speed too great c. Teeth introduced into workpiece d. Incorrect blade in use	a. Adjust guides to correct unequal wear check if guides are worn and adjust guides as close as possible to work b. Reduce speed c. Care to be taken in starting (use lightest possible feed) d. If contouring use correct band width for radius being cut
BURR ON BACK OR GROOVES IN SIDE OF BLADE	a. Pressure on band unequally distributed	a. Adjust rollers so that pressure on band is equally distributed
BAND VIBRATION DURING SAWING	a. Incorrect band in use b. Workpiece moving c. Unsuitable band speed d. Insufficient band tension e. Unsuitable cutting pressure being used	a. Replace with suitable band b. Secure workpiece c. Adjust band speed d. Adjust band tension e. Adjust feed rate
GULLETS CHOKED	a. Tooth pitch too fine b. Band speed too fast c. Lack of coolant	a. Choose coarser pitch band b. Reduce speed c. Apply suitable coolant
POOR FINISH	a. Too coarse tooth pitch used b. Feed rate too great c. Band speed too slow	a. Use finer tooth band b. Reduce feed c. Increase band feed
SLOW CUTTING	a. Tooth pitch too fine b. Feed too slow c. Band speed to slow	a. Use coarser tooth band b. Increase feed c. Increase speed
BAND TWISTING	a. Feed pressure too great b. Insufficient band tension c. Incorrect band width for radii being cut d. Bandsaw guides set too far apart	a. Decrease feed pressure b. Increase band tension c. Use narrower band d. Adjust correctly

MACHINERYHOUSE