



HYDRAULIC IRONWORKER

MHM 70

Operation Manual



MIHO HYDRAULIC IRONWORKER

This MIHO Ironworker has been developed to give you, the user, a reliable long service- low maintenance machine tool.

These machines are of performing five basic functions, with the facility to add various additional tooling arrangements to complement the fully universal aspects of the Ironworker.

These instructions give general guide lines for the use of the Ironworker

Commissioning, operating and maintenance, and should be carefully studied by the installation engineer and operator before the machine is put into operation. Any assistance regarding the machines, should first be sought from the supplier, or alternatively from the manufacturer.

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1. SAFETY NOTES FOR MIHO IRONWORKER

- In this manual particular references are made regarding aspects of safety and the notes below are intended as a summary to highlight the main areas for your attention.
- The machine should be positioned so that the operator has sufficient room to work having regard for the long lengths of material which may be punched or cropped. Electrical supply should be by overhead cable to avoid possible damage.
- It should be considered if additional equipment will be required to safely handle long or heavy items being processed.
- Any person who will use the machine should be given adequate instruction on the operation and safety aspects of the machine. Extra copies of this manual are available from the manufacturer.
- In addition it should be established which persons shall be responsible for the changing and setting of tools and blades and these persons given a more detailed instruction.
- MIHO machines are supplied complete with various guards and barriers as standard equipment which provide a generally accepted level of guarding when the machine is used for the purpose for which it was designed.
- The main areas of deviation from design criteria would probably be:
 - The use of materials other than mild steel (45 kg/mm²)
 - The incorrect use of material hold-downs
 - The punching, cropping or notching of small items(as this would encourage the operator place fingers or hands into danger area).
- If at any time additional tooling or equipment is fitted to the machine the question of adequate guarding must be reviewed and the advice of the manufacturer sought if necessary.
- All maintenance should be carried out by suitably qualified personnel and particular attention must be paid to the correct setting and alignment of punches and dies, blades and other tools.

2. BRIEF SPECIFICATION

- The machine has been developed to perform one basic functions:
Punching, Flat Bar Shearing, Notching, Angle and Section Cutting.

2.1 MEASUREMENTS

- Length x Width x Height: 64-9/16" x 27-61/64" x 70-55/64" (+4" lifting eye)
1640 x 710 x 1800mm (+10cm lifting eye)

2.2 CAPACITIES

- Punching 1" dia. x 25/32" (26 x 20mm) or 2-1/4" dia. x 11/32" (57 x 9mm)
- Shearing 11-13/16" x 25/32" (300 x 20mm) or 14-49/64" x 19/32" (375 x 15mm)
- Angle Cutting 5-1/8" x 1/2" (130 x 13mm)
- Section Cutting 1-3/4" (45mm) Round, 1-3/4" (45mm) Square
- Notching 3/8" Thickness x 1-3/4" Wide x 3-17/32" Depth (10 x 45 x 90mm)
(All capacities are based on materials of 45 kg/mm² Tensile Strength.)
- Punch Pressure 700KN – 70Ton
- Standard Size Fitment Punch & Die 9/16", 11/16", 13/16", 15/16", 1-1/16"

2.3 STANDARD EQUIPMENT SUPPLIED WITH MACHINE

- Punch Retaining Ring
- Punch Adaptor
- Punch & Die (5 sets)
- Punch Bolster
- Notch Bolster
- Shear Blades
- Angle Blades
- Section Blades
- Notch Blades
- Die retaining ring

- Tool Kit comprising:
 - L220/2005 ' C ' spanner 80/990
 - Allen Key 3,4,5,6,8,10,12,14mm
 - Punch Adaptor 20mm small punches
 - 17 and 19mm Open-Ended Spanner
 - 24 and 27mm Open-Ended Spanner
 - Die Spacer
 - Fuse

3. BRIEF DESCRIPTION OF MACHINE

3.1 PUNCHING

- The large punch bed area - which has the removable front block - is designed to give a very wide range of punching applications; with the available optional tooling - large holes of any shape up to diameter/square as shown in the capacity chart can be punched; or in the overhang position, with the block removed, flanges of channel or joist can be punched up to diameter/diagonal of 1-17/64" in maximum capacity
- Additional tooling in this versatile work station can provide bending (max. length 27-9/16"), corner notching, tube notching and general die-set work.

3.2 SHEARING

- The shearing unit is fitted with a simple robust hold-down which is adjustable to any thickness of material within the cutting capacity of the machine. A shear feed table with adjustable guides is fitted to allow the accurate feeding of materials. The guide can be adjusted to allow mitre cutting up to 45 degrees for flat bars or to trim the flanges of angle sections previously cut at the angle cutting station.

3.3 ANGLE CUTTING

- This station provides large capacity angle cutting at 90 degrees and lighter angle cutting at 45 degrees. Angles between 45 and 90 degrees can be achieved by first cutting at 90 degrees and then flange trimming to the required angle in the shearing station
- The hold-down supports the material thus ensuring a true cut.

3.4 SECTION CUTTING

- The machines are fitted as standard with blades for cutting round and square bars. With extra equipment, the machines are able to cut, in this aperture, Channels, Joists and Tee Sections. The blades are retained by simple clamps, allowing easy changes without the need for elaborate setting.

3.5 NOTCHING

- The notching station is fitted as standard with a rectangular unit and notch table with adjustable back stops allowing repetitive positioning. Extra equipment is available for narrow widths or vee notching of angles up to 90 degrees vee; units are also available for bar end shaping applications.

3.6 FURTHER INFORMATION

3.6.1 System Pressure

- To check any operational loadings, a pressure gauge can be fitted at the manifold position. The max. system pressure has been set at the works to 225 bar (3,200 P. S. I.) which is below the max. continuous working pressure of the pump, thereby giving increased reliability.

3.6.2 Cleaning

- On arrival, all anti-corrosion lacquer should be removed from the machined bright parts with petroleum solvent. When the machine is operational, all visible working parts should be regularly cleaned of foreign matter, thus preventing excessive wear and possible failure.

3.6.3 Lifting

- The machine is supplied with a lifting eye, mounted on top of the machine. All lifting and manoeuvring should be carried out using this eye along with a suitably rated chain or sling. The eye can be removed if desired after final siting of the machine but hole should be blanked off

- **DO NOT USE SLINGS UNDER MACHINE!**

3.6.4 Installing

- Locate the machine on a solid foundation allowing sufficient area all round for easy working and maintenance. The machine may be used free standing, but bolting to the foundation is recommended. With the machine mounted directly on the floor - this gives a comfortable working height.

3.6.5 Electrical Supply

- Input wires should arrive at the machine via suitably protected underground supply directly into the electric's box in the base of the machine. As an alternative by overhead supply to the top of the machine and routed inside the top guard and hydraulic pipe trunking to the electric's box. A 30 amp isolating switch, fuse and appropriate cable should be used for mains supply connection. The circuit provides protection against sustained over-load and phase failure.

Should the machine cut out during an operation or whilst running, the cause of the problem should be investigated to prevent re-occurrence.

3.6.6 IMPORTANT

- **Motor rotation MUST be as arrow on motor fan end cover.**
- **This machine will not operate if the motor is running in the wrong direction. It must be stressed however that the motor must not be allowed to run in the wrong direction for more than a few seconds, as this will cause seizure of the pump. To check motor direction start and stop motor with foot on footswitch if machine does not operate reverse two of the incoming 3 phase connections.**

3.7 SAEFTY POINTS

- All adjustments, setting, change of tooling and maintenance must be carried out by a suitable qualified engineer in accordance with the manufacturer instructions.
- Remove off-cuts, slugs and any other waste from around the machine before leaving the work station.
- The operator should check all tooling is in good condition before operating machine.
- All stations should be checked for obstructions.
- Heavy work should be supported by a sound work steady.
- The machine should never be left running while unattended.
- When leaving, the machine **MUST** be switched off.

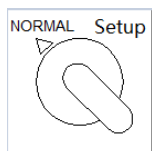
3.8 OVERLOADING

- In the event of an accidental overload to the hydraulic circuit, the oil will be diverted direct back to the tank via a relief valve, until the overload condition is removed.
- **IT MUST BE STRESSED HOWEVER IT IS NOT ADVISABLE TO EXCEED THE CAPACITY OF THE MACHINE USING RELIEF VALVE AS A SAFETY VALVE.**

3.9 WARNINGS AND DANGERS

- Any point of the machine painted **YELLOW** should be treated as a danger area. Operators should be instructed not to extend any finger or limbs into or beyond the vicinity of the warning labels. Any guards or hold downs removed for maintenance or adjustments **MUST** be replaced before the machine is put back in service.

3.10 OPERATING MODE SWITCH



- The Operating Mode Switch has two positions - **NORMAL** and **SETUP**. With the switch set to **SETUP** all work stations are in the slow speed setuping Mode.
- **SETUP Position**
In **SETUP** position the punch (for punch also read shear end) will travel down slowly when

footswitch is fully depressed. The punch will remain in any position when foot is removed. Turn switch to **NORMAL** to return punch to top of stroke. All tool setting and adjusting and setting of stroke limit switches should be done in the setup position.

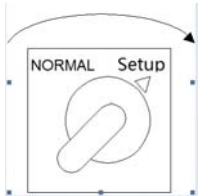
- **NORMAL Operating**

With Selector Switch to **NORMAL** the punch will travel down at operating speed when footswitch is fully depressed and will return to top of stroke when foot is completely removed.

The footswitch does however have three “positions” giving the very useful facility that after bringing the punch down by full depression of switch, the punch may be held in any position of the stroke by raising the foot to the mid-position. Remove foot and punch will return to top position.

- **Punch and Die Alignment**

Should be checked before using, and **MUST** be checked after punch and die changes have been made



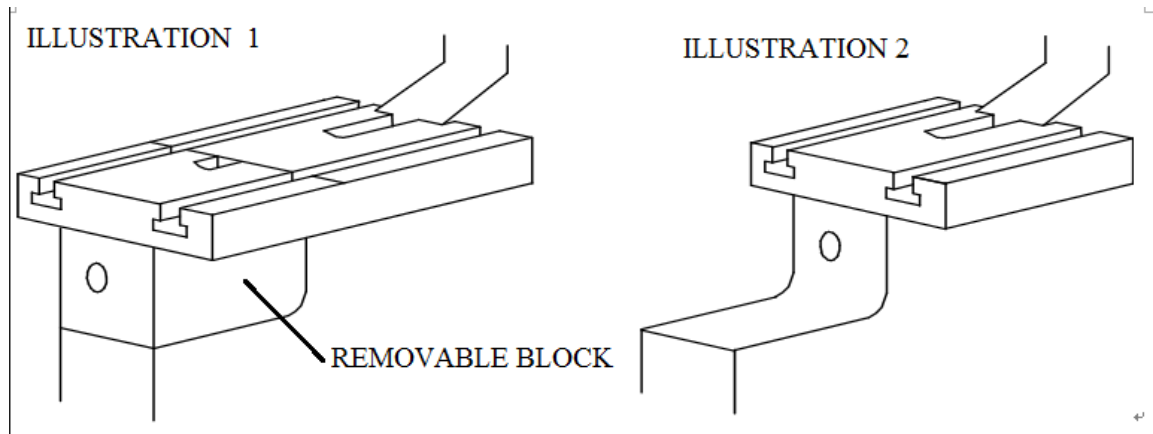
To check alignment switch mode of operation **SETUP**, then setup the punch down by fully depressing the footswitch. Care must be taken as the punch approaches the die, if misalignment is apparent remove foot from switch.

To align punch and die release bolster fixing screws, operate the foot switch with care, aligning the bolster containing the die to the punch, the punch will stay in the down position. Centralise the die clearance around the punch, clamp the bolster in position, tighten die retaining screw, check die maintains in the central position after clamping. Return punch to top position by switching back to run position.

4. PUNCHING WORK STATION

4.1 GENERAL DESCRIPTION

- The large punch bed area (illustration 1) - which has the removable front block (illustration 2) - is designed to give a very wide range of punching applications: with the available optional tooling - large holes of any shape up to diameter/square as shown in the capacity chart can be punched; or in the overhang position, with the block removed, flanges of channel or joist can be punched up to diameter/diagonal of 1-1/2" (38mm) in maximum capacity



- The punch is retained by means of locking ring part 2557, the punch depending on its size may use one of the two adaptors supplied. The die is retained in the bolster by a set screw, ensure the screw locates correctly on the machined flat on the die when shaped punches and dies are being aligned
- The punch stripper plate must be correctly adjusted allowing sufficient clearance for placing and removal of material, but must NOT restrict the punch stroke, ensure the bottom stroke limit switch is correctly adjusted. Punch holes with sufficient material around the hole so that contact will be made on both sides of the stripper plate. Stripping forces can be severe and unbalanced stripping forces, due to contact on one side stripper, may cause punch breakages.
- When using stripper fingers for oversize holes or irregular shapes position and adjust fingers equally so as to avoid unbalanced stripping loads.
- Additional tooling in this versatile work station can provide bar and plate bending, corner notching, tube notching and general die-set work.
- WHEN ORDERING REPLACEMENT PUNCHES AND DIES, ALWAYS QUOTE - MODEL, TYPE AND SERIAL NUMBER OF MACHINE.

4.2 PUNCH TOOLING

- The Punch and Die should be checked for alignment, prior to punching any material. Standard size fitment 9/16", 11/16", 13/16", 15/16", 1-1/16", unless specifically ordered otherwise.
- **Tooling Changes**
- **Punch:** To change punch, unscrew locking ring using 'C' Spanner from tool kit, replace punch and retighten locking ring. Adaptors are supplied to suit various punch head sizes.
- **Die:** To change die, slacken set screw in side of bolster, remove die and replace with new die, retighten set screw.
- After replacing punches and dies, it is important that they are correctly aligned. See page 4 for alignment procedure under the heading 'Safety Points'. Extra care must be taken when fitting square or shaped punches that they are correctly aligned before operating machine.

4.3 PUNCH TOOLING – GENERAL GUIDES

- The punch stripper plate must be adjusted correctly with sufficient clearance to allow positioning and removal of the material being punched.
- Punch holes with sufficient material around the hole so contact is made on both sides of the

stripper plate. Stripping forces can be severe. Unbalanced stripping forces may cause punch breakage.

- Liberal oiling of the punch will considerably lengthen the life of the punch and die and also help reduce the stripping forces.
- The quality of the hole /or blank/ is an immediate indication of the condition of the punch and die.
- Do not punch material thicker than the punch diameter, this overloads the punch and can result in breakage.
- Punch full and complete holes, do not punch partial holes /unless tooling is specifically designed to do so.
- When punching small items (i.e. small pieces of plate, bar etc) these items MUST be placed and extracted with suitable handling aids, extra guarding may be required too ensure operator safety
- Stay within the rated capacity of the machine.

4.4 PUNCH AND DIE LUBRICATION

- It is recommended that one of the following oils is applied by brush to the punch and die on both sides of the material being punched.

SHEL- GARIA 927

B. P.- SERVORA 68

CASTROL- ILOBROACH 219

DUCKHAMS- ADFORNOL EP7

- When punching aluminium it is recommended that Paraffin is used as a lubricant
- Die clearance: It is normal practice to aim for a clearance of 10% material thickness.
- Whether clearance is added to the size of the die or deducted from the size of the punch, depends on the nature of the work. When holes of a given size are required the punch is made to size and the die is made larger. Conversely, when blanks of a given size are required the die is made to size and the punch smaller.
- Special clearance dies for thin sheet and plate punching, or size dies and special clearance punches can be supplied to order.

4.5 PUNCHING CAPACITY

- To keep within the rated capacity of the machine, the following example is intended as a guide for calculating punching pressures.

- Punching pressure = shear area x tensile strength of material

- Where shear area = circumference of punch x thickness of material.

- Example:

- A 25/35" (20mm) hole is required in a piece of 15/32" (12mm) thick mild steel plate at 45 kg/sq.mm tensile strength.

- Punching Pressure = Shear area x tensile strength x 0.0098

- Shear Area = Circumference of punch x thickness of material.

- Tensile Strength = 45 kg / mm²

- 0.0098 = Constant to convert kg/mm² to KN.

- Therefore: 20 x 3.142 x 12 x 45 x 0.0098 = 33.3Tons

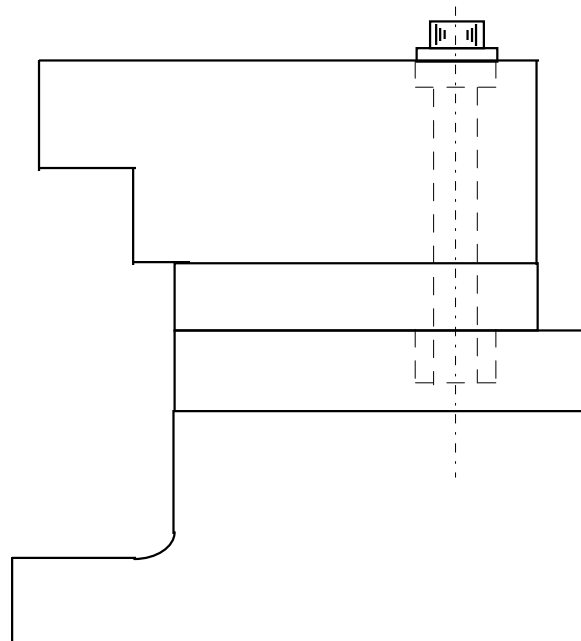
4.6 BAR AND SHEET BENDING FACILITY

- Press Brake attachments/tooling is available for fitting at the Punching Station giving press brake capacity of 9-27/32" x 1/2" (250 x 13mm) up to Max. width 19-11/16" x 1/8"(500 x 3mm).
- **IMPORTANT NOTICE - HEALTH & SAFETY AT WORK ACT, SECTION 6**
 1. Bending tools must not be fitted to this machine until adequate safety measures have been implemented. It is normally permitted to use the bending tools without additional fixed guarding provided the following steps have been taken;
 2. The clearance between the top tool and the work piece is kept to a minimum and must not exceed 1/4" (6mm) at any time, and the limit switches must be set and adjusted to ensure this. The bending tool is set by a skilled and competent person.
 3. A locked cover must be fitted to prevent subsequent alteration of limit switch. The key should be retained by the setter.
Bending Tools are supplied with suitable cover and lock as standard.

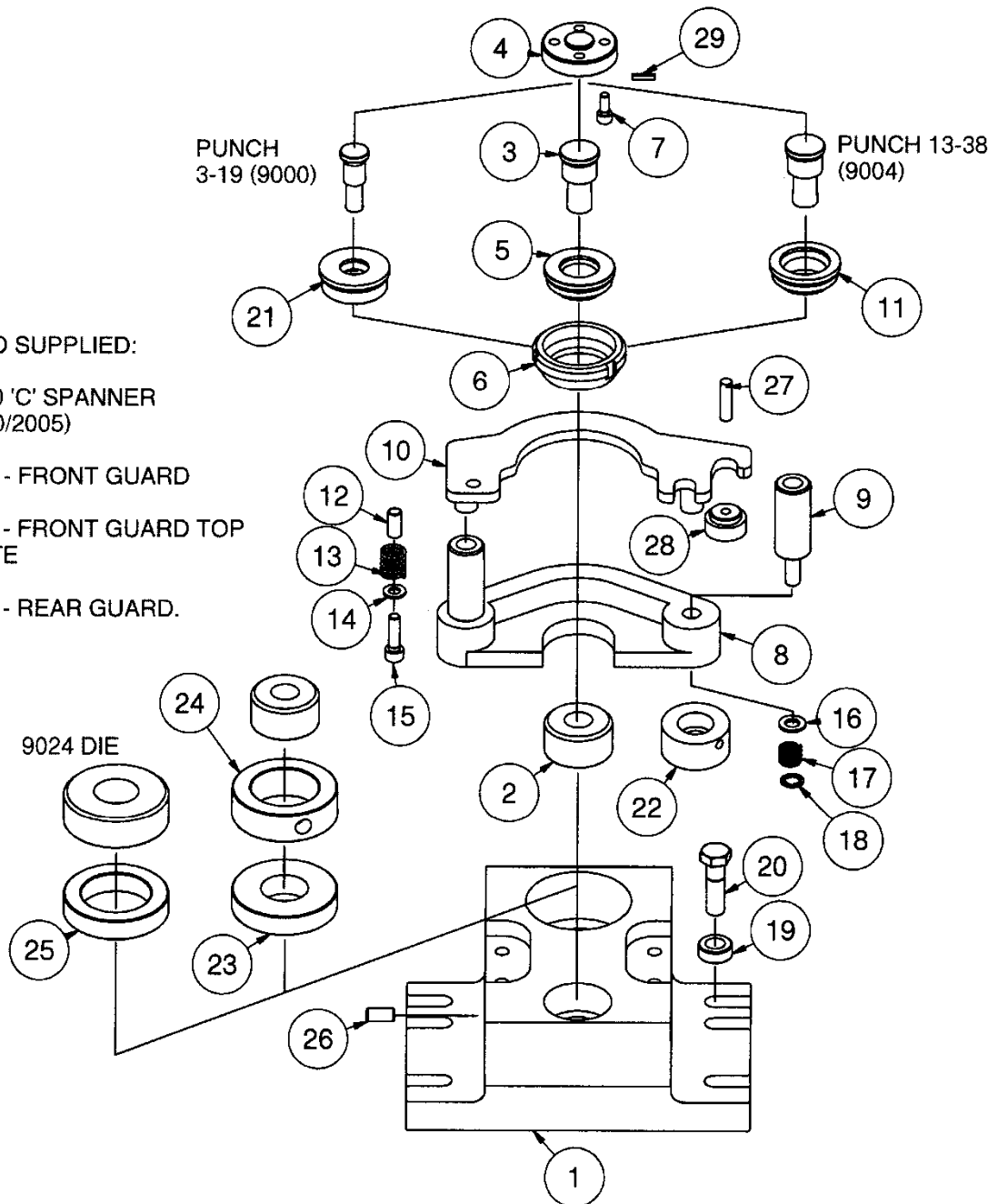
- **IMPORTANT NOTICE:**

Punching with bolster in overhang position

The back securing bolt must be used!



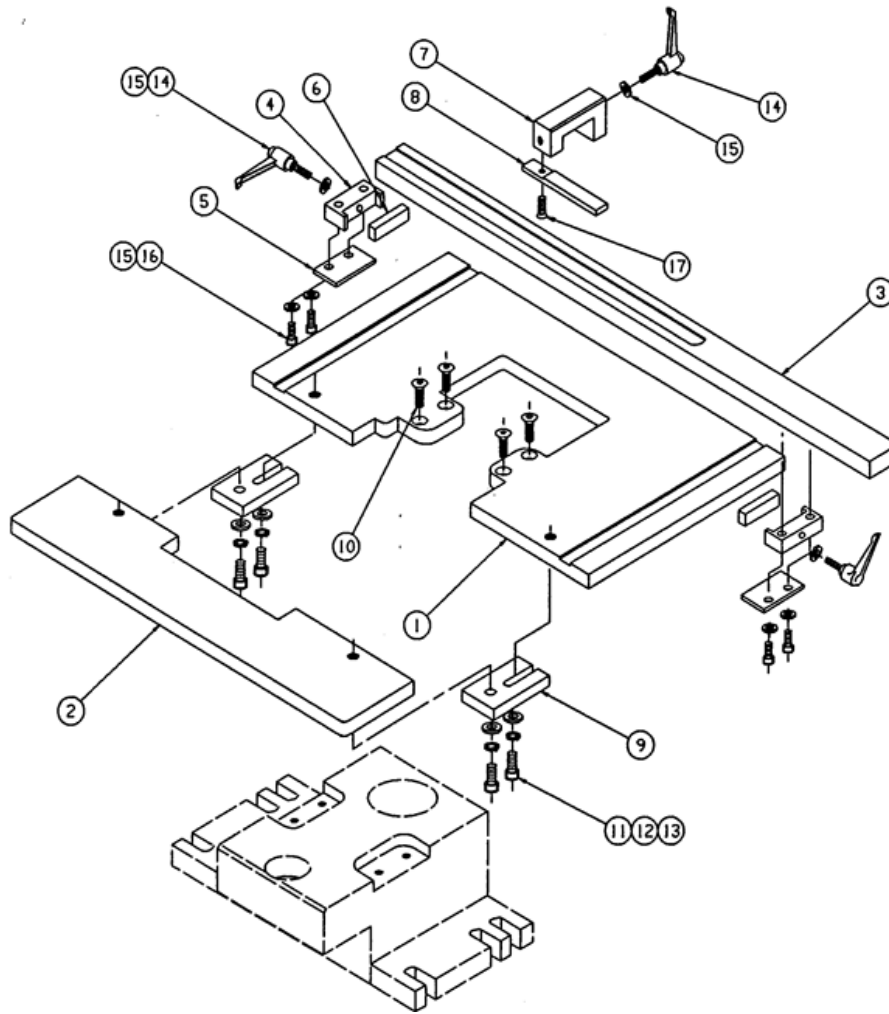
4.7 STANDARD PUNCH TOOLING



- In the following table you can find a list of the standard punch tooling.
- It includes which equipment is supplied with the machine.
- The standard punch tooling includes punch(9001) and die(9023)
- Other punches and dies are available on request.

No.	Part No.	Description	No Off
1	4256	Bolster	1
2	9023	Die	1
3	9001	Punch	1
4	2093	Pressure	1
5	9035	Adaptor for punch up to 1-3/16" (30mm)	1
6	2557	Retaining Ring	1
7	K605/5323	M8×20Cap Screws	4
8	2259	Stripper Head	1
9	2260	Stripper Pillar	2
10	2257	Stripper Top Plate	1
11	9036	Adaptor for punch up to 1-1/2" (38mm)	1
12	2887	Spacer	1
13	K705/3006	Spring	1
14	K605/7310	Washer 10mm	1
15	K605/5336	M10×35Cap Screws	1
16	K605/7312	Washer 12mm	2
17	K705/3009	Spring	2
18	K605/7905	12mm Starlock Washer	2
19	2999	Bolster Washer	6
20	K605/37521	M16×55 HT Bolt	6
21	81031	Adaptor for punch up to 19mm	1
22	81029	Adaptor for die up to 20mm	1
23	81100	Die Spacer for 9023 die	1
24	81101	Die Shoe for 9023 die	1
25	81102	Die Spacer for 9024 die	1
26	K605/5613	Die Locking screw	1
27	K605/0020	Stud	1
28	K605/1005	Knurled Nut	1
29	L805/2700	Punch Location Key	1

4.8 STANDARD PUNCH TABLE ASSEMBLY

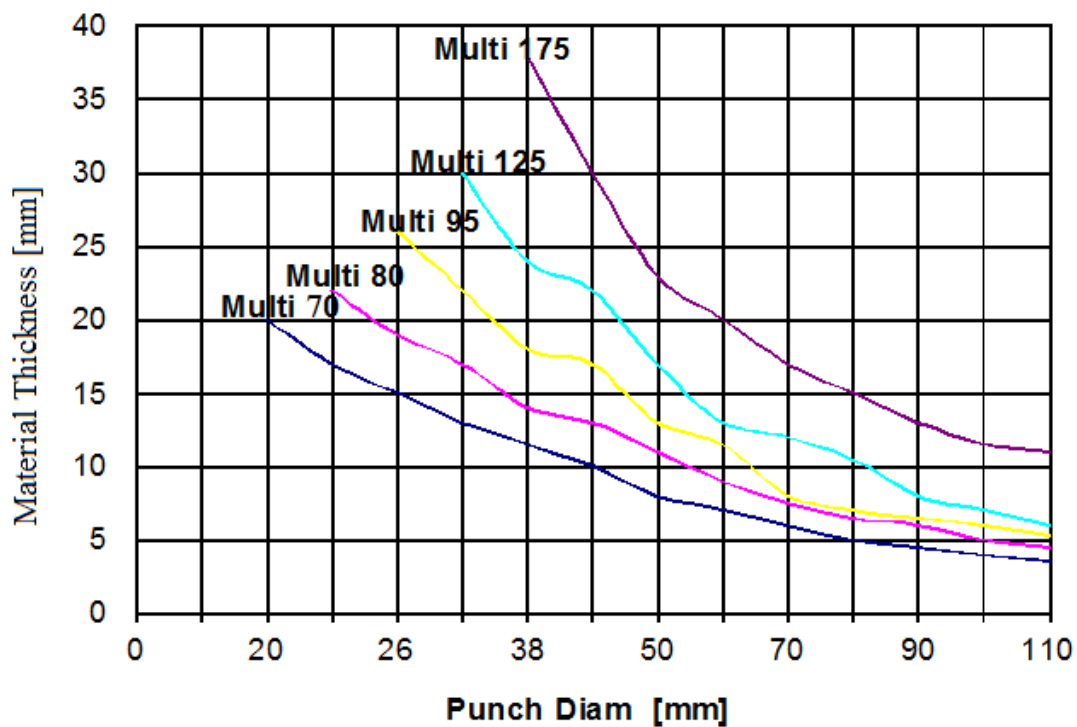


1	4258	PUNCH TABLE	1
2	4258	PUNCH TABLE EXTENSION	1
3	87078	PUNCH TABLE BEAM	1
4	87060	TABLE GUIDE BLOCK	2
5	87061	GUIDE BLOCK RETAINING PLT	2
6	87063	GUIDE BLOCK PAD	2
7	87059	MATERIAL STOP	1
8	87096	MATERIAL STOP EXTENDING BAR	1
9	87081	FRONT TABLE FIXING PLATE	2
10	K605/3530	M12×25CSK SOCKET SCREW	4
11	K605/5344	M12×30CAP HEAD SCREW	4
12	K605/7512	12mm SPRING WASHER	4
13	K605/7312	12mm WASHER	4
14	K705/1908	M8 KIPP HANDLE	3
15	K605/7308	8mm WASHER	7
16	K605/5328	M8×50 CAP HEAD SCREW	4
17	K605/3490	M8×20 CSK SOCKET SCREW	1

4.9 LARGE HOLE PUNCHING

- Extra equipment available for punching up to 110mm dia.
- This unit comprises:
 - Special ram pressure plate
 - Adaptors
 - Retaining Ring
 - Bolster with die holder plates
 - Large hole stripper head
- Punch and die sets available for this unit
- For hole sizes up to -
 - 2-1/4" (57mm) dia.
 - 3-11/32" (85mm) dia.
 - 4-21/64" (110mm) dia.
- Also available for hole sizes up to 6-19/64" (160mm) dia.

4.10 MATERIAL THICKNESS/MAX.HOLE SIZE

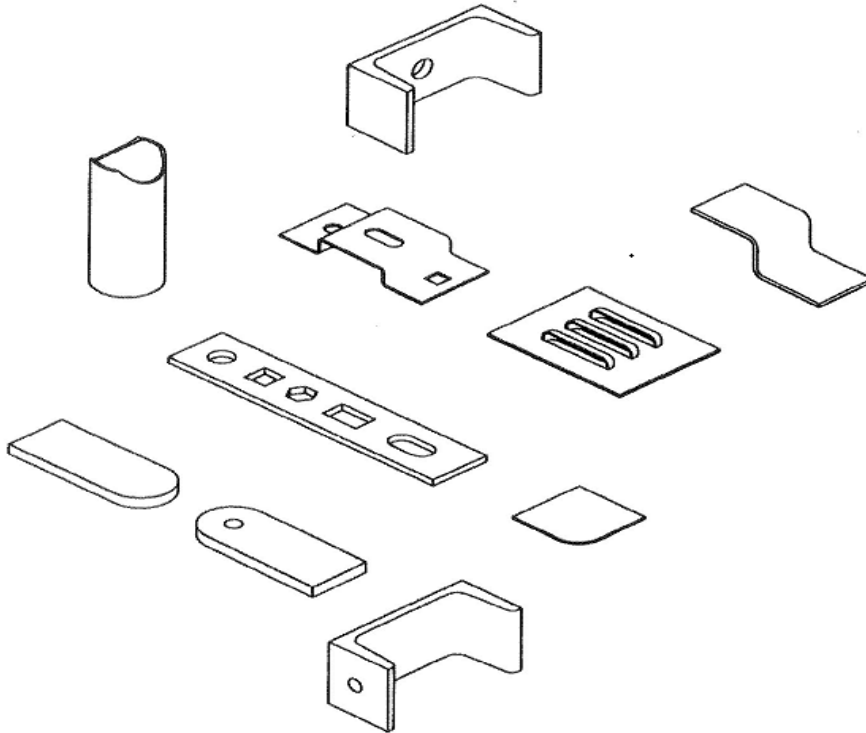


- (all Capacities based on Material Strength of 45 Kg/mm²)
- Please Note:
- **DANGEROUS PRACTICE:**

**DO NOT ATTEMPT TO PUNCH MATERIAL
THICKER THAN THE PUNCH DIAMETER!**

4.11 TYPICAL APPLICATIONS

- (achieved with special tooling at punch station)



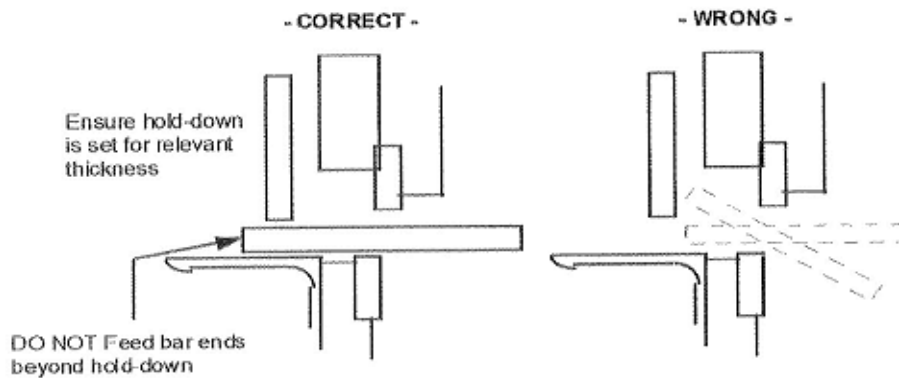
5. SHEARING STATION

5.1 DESCRIPTION

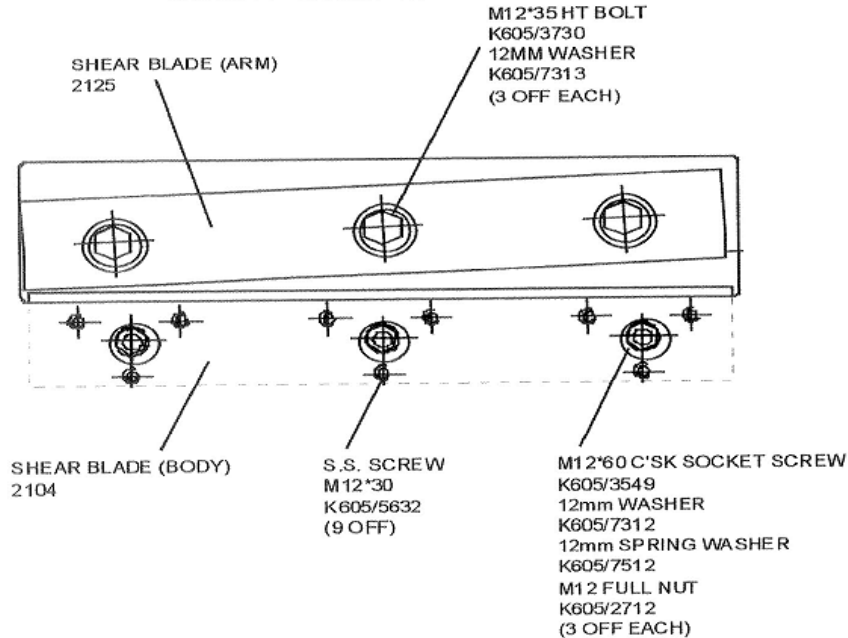
- The shearing unit is fitted with a simple robust hold-down which is adjustable to any thickness of material within the cutting capacity of the machine. A shear feed table with adjustable guides is fitted to allow the accurate feeding of materials. The guide can be adjusted to allow mitre cutting up to 45 degrees for flat bars or to trim the flanges of angle sections previously cut at the angle cutting station.
- The standard shear blades as fitted; permit the bottom blade to be turned four times giving new cutting edges, whilst the top blade must be ground to sharpen the cutting edge. These blades give minimum distortion from full capacity down to as light as 5/64" (2mm) thickness.
- When the shear blades require sharpening, grind only on the cutting faces - max. regrinding 1/32" (0.80mm), after grinding the blades must be adjusted to a clearance of 0.0039" (0.10mm). Adjusting screws have been provided to reset the shear blades, the adjusting screws are positioned around blade fixing screws, accessible when shear table has been removed. Even clearance between top and bottom blades is important along the entire blade length and care should be taken to ensure that the bottom blade is in a vertical plane, parallel to top blade.
- **WHEN ORDERING SPARE BLADES, ALWAYS QUOTE -
MODEL, TYPE AND SERIAL NUMBER OF MACHINE.**

5.2 SHEAR TOOLING – GENERAL GUIDES

- The quality of the cut is an immediate indication of the condition of the blades.
- Ensure hold-down is always set for relevant thickness of material being sheared.
DO NOT allow ends of bars to be fed beyond the hold down, because bar would tend to twist between blades and cause body distortion.
- Always feed material between blades from the hold down side.
- Keep the blade area clean. Do not allow 'build up' of mill scale.
- Stay within the rated capacity of the machine.
- (Note: All capacities are based on 45 kg/mm² tensile strength.)



• SHEAR BLADES AND FIXING MATERIALS



6. ANGLE CUTTING

6.1 DESCRIPTION

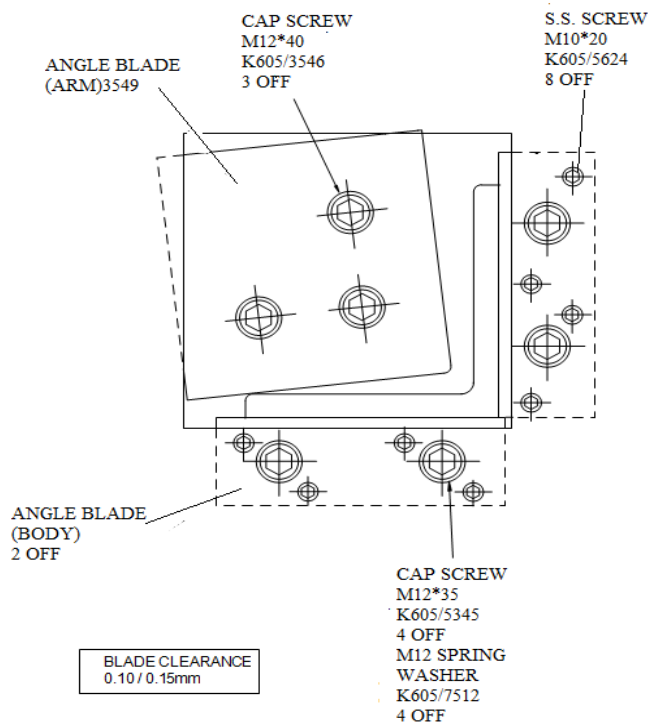
- This working station provides large capacity angle cutting at 90 degrees and lighter angle cutting at 45 degrees.
- To cut angle section place the material through the hold down into the cutting area, adjust the

support screw to the material but leave sufficient clearance to enable the section to be fed on for progressive cutting.

- To mitre cut at 45 degrees:
 1. firstly cut the angles to length allowing approx. 1/2" (12mm) oversize for end trimming.
 2. Place the first end into the blade using the higher support position, trim approx. 1/4" (6mm) off the end of the section whilst maintaining 45 degrees to vertical position.
 3. Place the other end into the blade using the left hand support position, trim section to length whilst maintaining 45 degrees to face of machine position.
 4. To achieve other angles of cut between 45 degrees and 90 degrees, first cut the angle section to length and then trim the flange to required angle in the shear station.
 5. The slot in the shear hold down allows angle sections to be positioned for left hand on right hand trimming, ensure hold down is set for relevant thickness.
 6. Each cutting blade has four cutting edges and is retained by simple fixing screws.
 7. DO NOT sharpen these blades, after turning four times replace with new blades.
- **WHEN ORDERING REPLACEMENT BLADES, ALWAYS QUOTE - MODEL, TYPE AND SERIAL NUMBER OF MACHINE.**

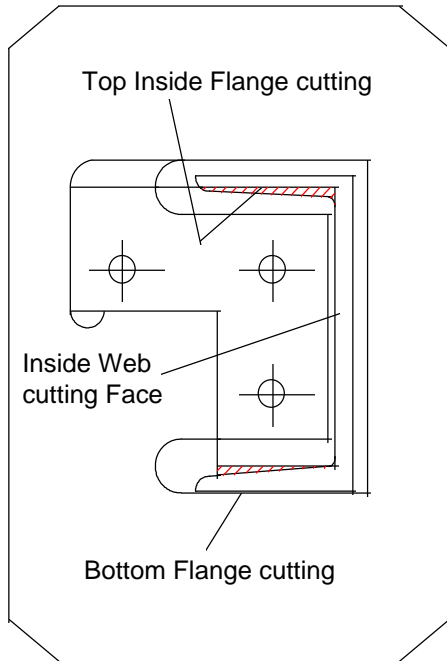
6.2 ANGLE TOOLING – GENERAL GUIDES

- The quality of cut is an immediate indication of the condition of the blades. Keep sharp, keen cutting edges.
- Ensure support screw is set for relevant thickness of material being cut.
- Always feed material between blades from hold down side.
- Keep cutting aperture clean, small slivers, short cuts and any other pieces should be removed from the blade area. DO NOT allow mill scale to 'build up' in the blade area.
- Stay within the rated capacity of the machine.



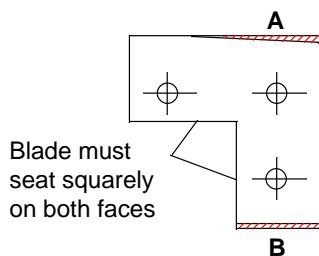
6.3 GRINDING OF CHANNEL INSERT BLADES

- **Body Blade**



Fit blade to carrier, retain position with three screws, ensure blade is seating on both faces, see sketch. Mount a sample of channel, with a cleanly cut end, on to the blade with the bottom flange in line with bottom cutting face and the inside of the web square and in line with the inside web cutting face, as shown in sketch.

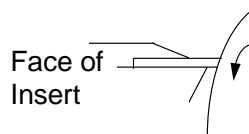
- Having mounted channel correctly, scribe round inside of channel flanges.



- Remove blade from carrier.
- With 'mark out' A continue inner flange line as shown.
- With 'mark out' B continue line from radius square to cutting face. Allow a small clearance when grinding to permit easy passage of channel.

- **Grinding**

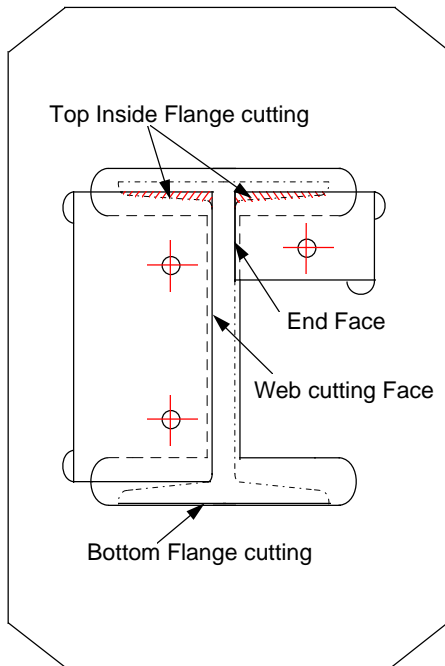
- Grind insert blades to lines scribed, shown shaded in sketch.



When hand grinding, if using face of grinding wheel, ensure angle between face of insert and cutting face does not exceed 90 degrees.

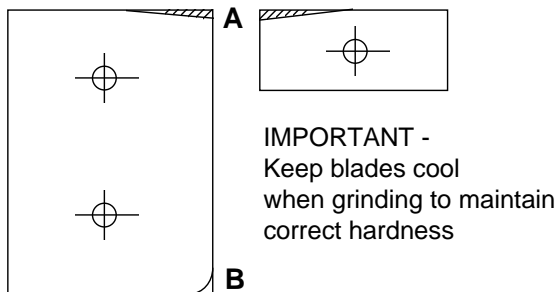
6.4 GRINDING OF JOIST INSERT BALDE

- **Body Blade**



Fit blades to carrier, retain positions with fixing screws, ensure blades are seating correctly. Mount a sample of joist, with a cleanly cut end, on to the blade with the bottom flange in line with **BOTTOM CUTTING FACE** and the web square and in line with **WEB CUTTING FACE**, as shown in sketch.

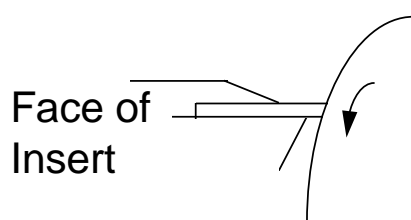
- Having mounted joist correctly, scribe round inside of joist flanges.



1. Remove blades from carrier.
2. with 'mark out' A continue inner flange line of required.
3. with 'mark out' B radius to suit that of sample joist.
4. The **END FACE** may require clearance to permit easy passage of joist for heavy or light sections, when blades are in cutting position.

- **Grinding**

- Grind insert blades to lines scribed, shown shaded in sketch.

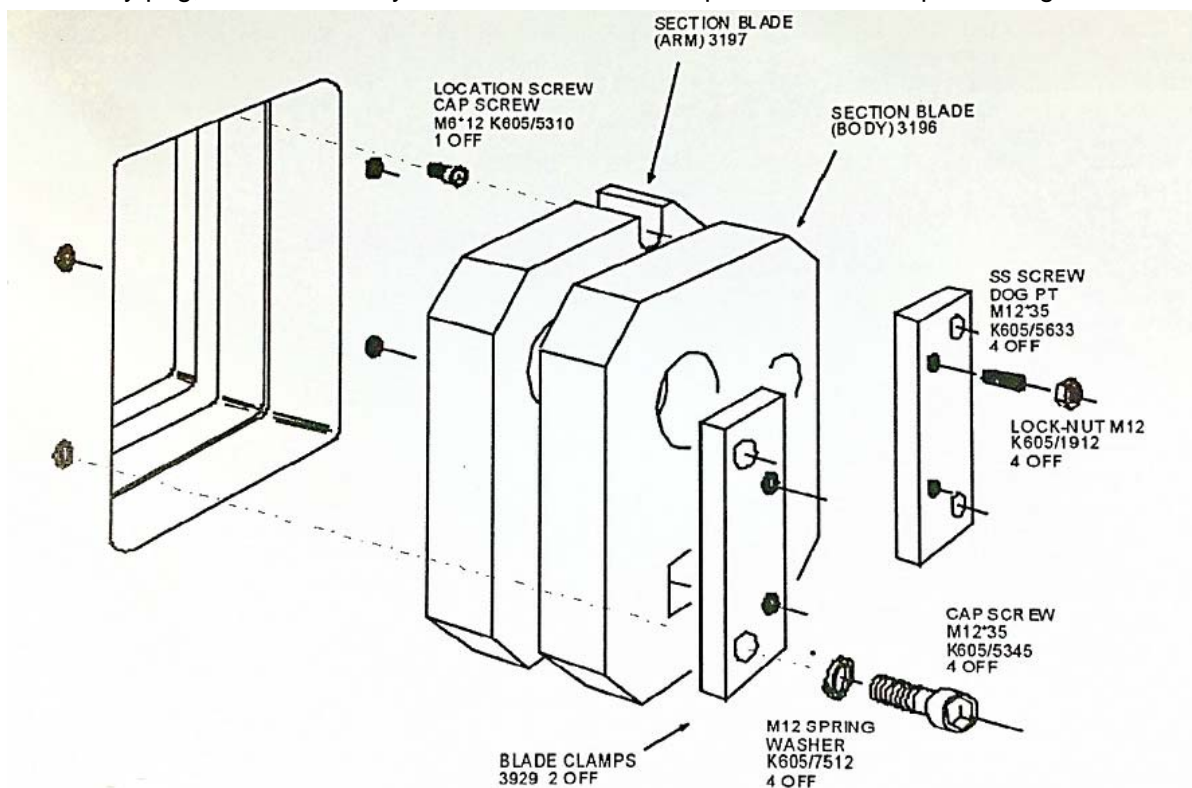


When hand grinding, if using face of grinding wheel, ensure angle between face of insert and cutting face does not exceed 90 degrees.

7. SECTION CUTTING

7.1 DESCRIPTION

- A variety of sections can be cropped at this aperture - round and square sections, unequal angle, channel, joist etc.
- Blades for round and square section cropping are fitted as standard equipment and have apertures of varying sizes. The smallest aperture should be chosen, which will accept the material, thus ensuring a complete and well supported cut.
- To change the blades, the material support must be removed. Release the four screws securing the blade clamps, remove blade clamps then withdraw the blades.
- It will be noticed that the arm blade is smaller than the body blade.
- This safeguards incorrect assembly when inserted carrier blades are used. Also notice the safety peg, there is a safety slot in the arm blade to prevent incorrect positioning.



- **To set blade clearance:**

1. Ensure arm blade is properly seated in shear arm
2. Position body blade in frame firmly pushed against arm blade
3. Secure blade clamps to frame
4. Tighten the 4 SS screws, then release each one 0.2 of a turn
5. Tighten locknut whilst holding the SS screw with a key

- **IMPORTANT:**

- Never remove screw fitted as safety peg in the arm blade milled recess.
- In the case of worn solid blades, new blades must be fitted.
- DO NOT attempt to regrind faces; this makes blades undersize for secure fitting.
- In the case of worn insert blades, new inserts can be supplied for grinding to worn sample.

- When fitting new blades reverse the removal procedure.
- To cut sections place the material through the hold down into the cutting area, adjust the hold down screw (if fitted) to achieve square cut.

**WHEN ORDERING SPARE BLADES, ALWAYS QUOTE-
MODEL, TYPE AND SERIAL NUMBER OF MACHINE.**

7.2 SECTION TOOLING – GENERAL GUIDES

- The quality of the cut is an immediate indication of the condition of the blades. Keep sharp, keen cutting edges.
- Ensure bar sizes are used in smallest aperture that will accept them, ensuring well supported cut.
- Always feed material between blades from hold down side.
- Keep cutting aperture clean, small slivers, short ends and any other pieces should be removed from the blade area. DO NOT allow mill scale to 'build up' in the blade area.
- Stay within the rated capacity of the machine.
- (All capacities are based on material of 45 kg/mm² Tensile Strength.)

8. NOTCHING STATION

8.1 DESCRIPTION

- The notching station has a rectangular punch as standard fitting and is supplied with a notch table complete with adjustable side and back stops which allow repetitive material positioning.
- Vee notch tooling can be fitted at this work station, or alternatively units can be supplied for narrow widths of rectangular or vee shapes; units also available for bar end shaping.
- When notch punch requires sharpening, grind side and front faces of punch only.
- The dies have four cutting edges and should be turned to present new cutting edge.
- To adjust dies after punch grinding:
 1. Slacken bolster fixing screws and position locking screws.
 2. Move bolster into new side and front position on punch; one side of bolster is adjustable on the die.
 3. Clearances between punch and die faces should be maintained as follows:
 -at sides of punch 0.0039" (0.1mm)
 -at front of punch 0.0118" (0.3mm)
 Adjust bolster on the two faces accordingly and retighten fixing screws -check clearances.
 4. Release adjustable die blade fixing screws and adjust blade to punch, tighten fixing screws and check clearances.
 5. Ensure fixing screws are tight and heating the positioning locking screws have been reset.

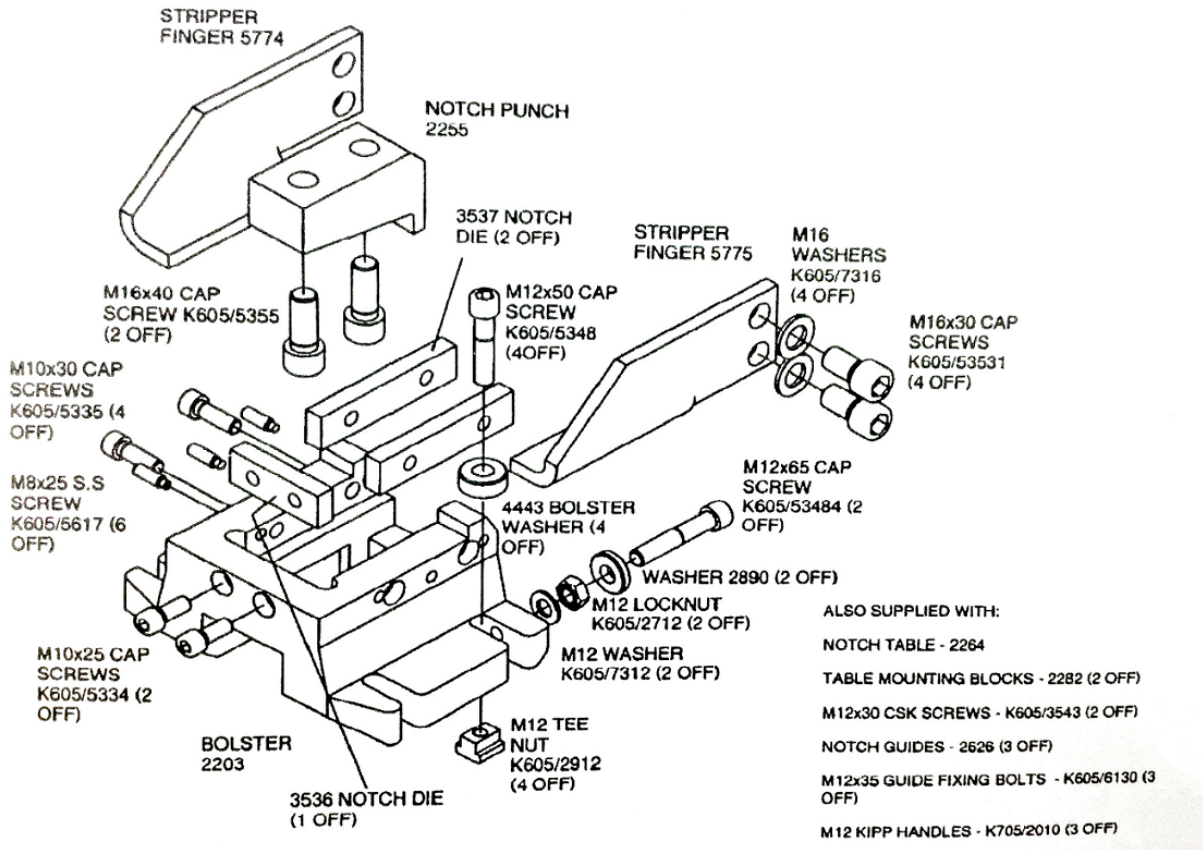
**WHEN ORDERING SPARE PUNCHES AND DIES, ALWAYS QUOTE -
MODEL, TYPE AND SERIAL NUMBER OF MACHINE.**

8.2 NOTCHING TOOLING – GENERAL GUIDES

- The quality of cut is an immediate indication of the condition of the tooling. Keep sharp, keen cutting edges.

- Check that the notched blank ejects after notching operation, thus avoiding any 'build up' of slugs.
- Stay within the rated capacity of the machine.
- (All capacities based on 45 kg/mm² Tensile Strength.)

8.3 RECTANGULAR NOTCH TOOLING ARRANGEMENT



9. FURTHER INFORMATION

9.1 CAPACITIES – MULTI

9.1.1 Punching

• Max. Capacities	1" x 25/32"	26 x 20mm
• Dia. × Thickness	2-1/4" × 11/32"	57 x 9mm
• Max. Stroke Length	2-5/32"	55mm
• Throat Depth Standard	12"	305mm
• Throat Depth Multi-D Model	25"	625mm
• Largest Hole	6-3/8"	160mm
• Working Height	43-5/16"	1100mm
• Max. Section Flange Punch	12"	305mm

9.1.2 Shearing

• Flat Bar	11-13/16" x 25/32"	300 x 20mm
• Alternative	14-3/4" x 5/8"	375 x 15mm
• Blade Length	15"	380mm
• Angle Flange Trim	4" x 5/8"	100 x 15mm
• Working Height	35-7/16"	900mm

9.1.3 Angle Cutting

• At 90° with non-deforming multi-edged blades	5-1/8" x 1/2"	130 x 13mm
• At 45° Mitre	2-3/4" x 3/8"	70 x 10mm
• Working Height	44-5/16"	1125mm

9.1.4 Section Cutting

• Round/Square Bar	1-3/4" dia.	45mm dia.
• Channel Beam	5-3/16" x 2-9/16"	130 x 65mm
• Tee	3-1/2" x 1/2"	90 x 12mm

9.1.5 Notching

• Material Thickness	3/8"	10mm
• Width	1-3/4"	45mm
• Depth: Vee / Rect.	2-3/8" / 3-1/2"	60 / 90mm
• Angle Flange	3-15/16" x 3/8"	100 x 10mm
• Working Height	35-7/16"	900mm

9.2 SPECIFICATION

• Motor	7-1/2HP	5.5Kw
• Nett Weight	4400 lbs	1995 Kg
• Gross Weight	4553 lbs	2065 Kg
• Machine Dims.	64-9/16" x 27-61/64" x 70-55/64"	1640 x 710 x 1800mm
• Packed Dims	79-17/32" x 29-15/16" x 69-11/16"	2020 x 760 x 1770mm

9.3 ADDITIONAL TOOLING

• Bending		
• Max. Bar Size	10" x 1/2"	250 x 13mm
• Sheet	24" x 1/4"	500 x 3mm

Punching at Notch Station

• Max. Capacity	1-1/2" x 1/4"	38 x 8mm
• Throat Depth	5"	125mm

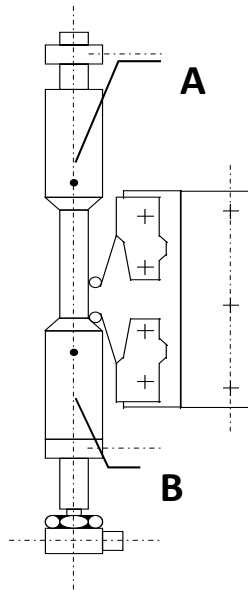
Corner Notch

• Max.	10" sq. x 1/4"	250sq. x 6
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Tube Notch

- Max. Diam. 3-1/4" 83mm

9.4 STROKE ADJUSTMENT



To reduce the down stroke
(i.e. repetitive bending etc.)
Lower stop position (A).

- To reduce the up stroke, operate the punch with the foot switch and hold in down position, adjust the stop position (B). Release foot switch to check position, re-adjust as necessary.
- Note: Adjustments to stroke limiters can be arranged by switching to the SETUP mode of operation; the punch position and/or shear-cutting position is then set by operating the foot pedal to achieve position required. Adjust appropriate stop position, tighten stop screw; then re-check setting under normal RUN condition.

9.5 HYDRAULIC SYSTEM

- A 7-1/2hp Motor drives a hydraulic pump, which through control valves feed the power cylinders at each end of the machine. The punch cylinder directly loads the punching unit whereas the shear cylinder is connected to a pivoted arm.
- Hydraulic Oil - refer to the recommended oils label. The oil filler/breather is positioned on the tank accessible by removing the louvred cover at base of the machine.
- Suction Strainer - inspect oil strainer every twelve months. The strainer is accessible, having released the screws in tank cover, if necessary wash in paraffin (Replacement L820/5020).
- Sludge Tray - whilst lower cover is removed, check tray located under main frame once every 12 months.

9.6 CLEANING

- Under normal operation, all visible working parts should be regularly cleaned of foreign matter, thus preventing excessive wear and possible failure.

9.7 REGULAR MAINTENANCE

- Daily** - Before starting machine –

Check fluid level in tank - top up as necessary.
Check oil level in oil pump - top up as necessary.
Check condition of all blades, punch and die.
Check surrounding work area is tidy, remove any off-cuts, slugs from floor area.
Clean off any mill scale which may have collected around the cutting apertures.

- Weekly - But depending on work load.
Examine power cable and foot pedal cable for damage or chafing.
Check movement of machine is smooth when running under no load condition.
- Monthly - Check arm adjustment for any slackness.
- Yearly - Change hydraulic fluid, inspect oil suction strainer.

9.8 HYDRAULIC FLUID

- Fill to top level of inspection glass. Use only mineral oil as recommended or equivalent.

Castrol	Hyspin AWS32-6018
B. P.	Energol HLP32
Shell	Pollus 37
Mobil	DTE 24
Esso	Nuto H32

9.9 OILING LUBRICANT

- Check oil level in pump reservoir daily, operate pump 2/3 times daily.

Castrol	Magna DR 220
Shell	Tomma T220
B.P.	Energol GHI 220
Mobil	Vactra Oil No. 4
Esso	Febis K220

Note: Oiling system applicable to 'shear End' of machine only.
'Punch End' lubrication - only requires an occasional application of light grease to the flat on the punch ram.

9.9.1 Lubricant Check

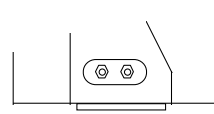
- Before operating machine, the following important checks should be made.
- The Hydraulic fluid is at top level of inspection glass.
- The oil pump has been operated, and that there is oil pressure indicated, check oil level in pump.

9.10 MACHINE RAM & ARM ADJUSTMENT

- Following an initial working in period (say 5/6 days) the machine may require settlement adjustment to be carried out.

9.10.1 Punch Ram

- The alignment of the ram is guided by a 'Ram Guide Pad'; this pad may require attention to adjustment.
- Adjusting screws are located at the left - hand side of the punch end.

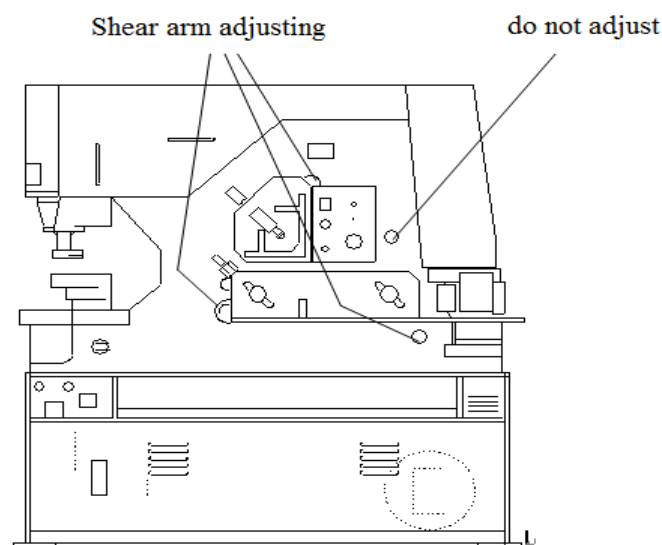
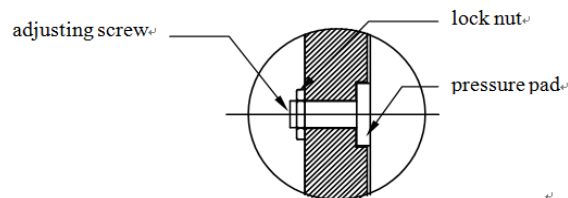


9.10.2 Adjusting Ram

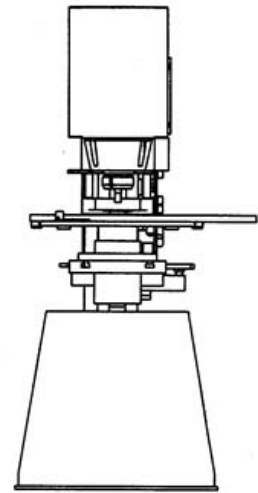
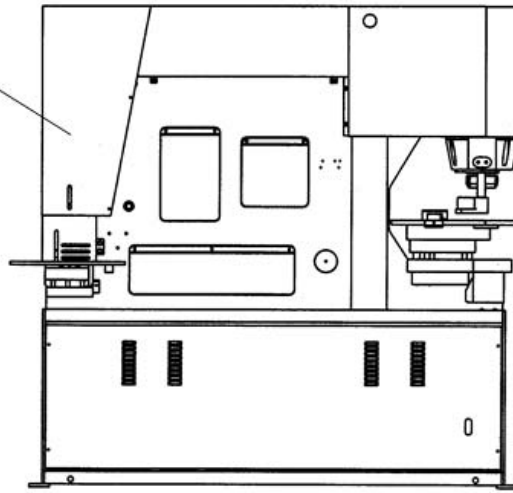
- Firstly remove punch, then ensure equal adjustment to both screws
- lock nuts after adjustment; test by working ram (say 6 times). DO NOT over-adjust the screws, check pad side loading by operating in the "SETUP" mode, if ram does not advance, pad has been over-adjusted.

9.10.3 Adjusting Shear Arm

- Isolate machine before making any adjustments.
- Adjustment to pressure pads are made from the cutting side of the arm (i.e. the feed side of the machine).
 1. Slacken locking nuts at the three pad positions only (M24 lock nuts).
 2. Turn adjusting screws clockwise until slight resistance is felt
 3. Tighten lock nuts and test movement of arm.
 4. Re-adjust blades before use.
- N. B. The arm should be adjusted prior to any adjustment of the shear blade.



NOTCH END

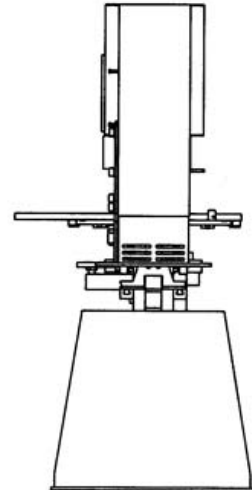
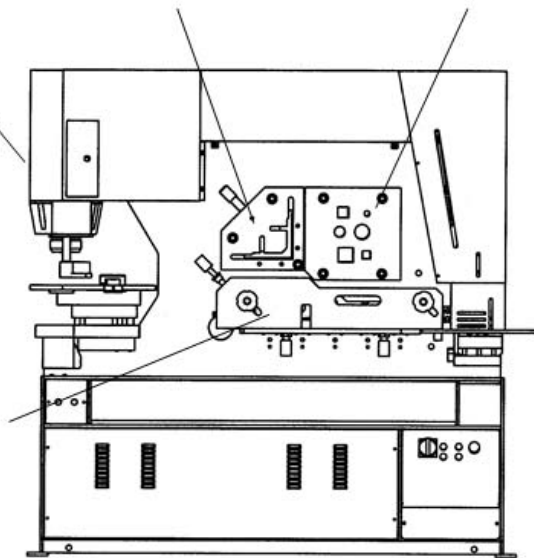


ANGLE CROPPING

SECTION CROPPING

PUNCH END

SHEAR STATION



9.11 PARTS LIST

When ordering spares always quote model, type and Serial Number of Machine.

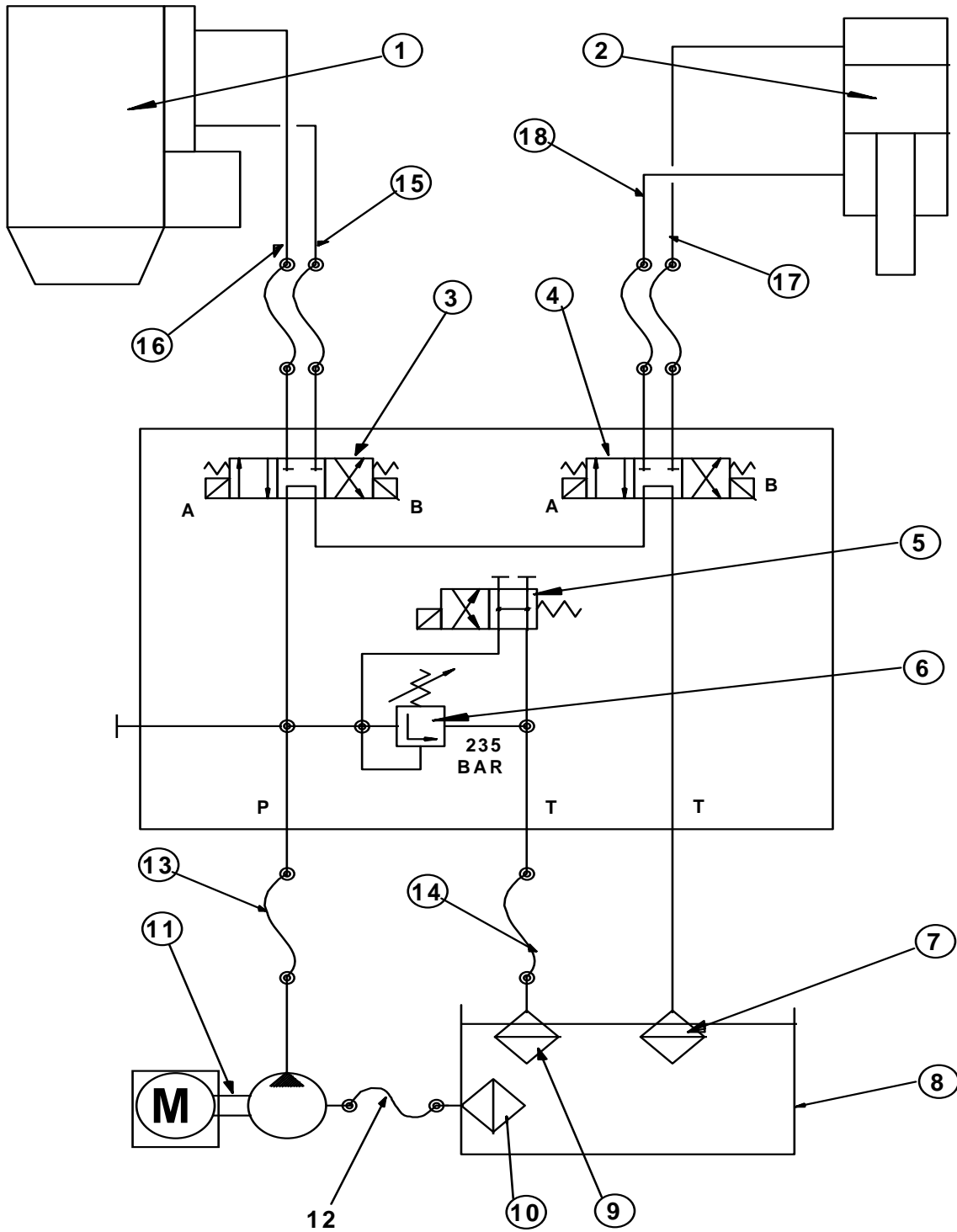
No.	Part No.	Description	No.Off
1	2175	Clevis U	1
2	2258	Pressure pad	3
3	2285	Main pivot bush	1
4	2333	Cylinder pin	1
5	2334	Clevis pin U	1
6	2461	Clevis packing U	1
7	2865	Punch cylinder washer	10
8	4103	Pivot locator	1
9	2903	Main pivot	1
10	3343	Front louvre cover	1
11	3344	Rear louvre cover	1
12	5096	Shear actuator brkt	1
13	K205/0530	Bush	1
14	L815/7505	Punch cylinder	1
15	L815/7510	Shear cylinder	1
16	2078	Shear hold down block	1
17	2079	Hold down adj. screw	1
18	2093	Ram pressure plate	1
19	2097	Notch/shear guide	1
20	3970	Shear apert cover	1
21	2104	Shear blade(body)	1
22	2125	Shear blade(arm)	1
23	2203	Rect notch bolster	1
24	2255	Rect notch punch	1
25	2256-1	Ram guide HSG	1
26	2257	Stripper top plate	1
27	2259	Stripper head	1
28	2260	Stripper pillar	2
29	2263	RAM guide pad RAM	1
30	2264	Notch table plate	1
31	5774	Notch Stripper Finger(left hand)	1
32	2276	Manifold	1
33	2278	Punch bolster	1
34	2282	Table support block	2
35	L515/3834/5	Tanks	1

No.	Part No.	Description	No.Off
36	3968	Angle cut cover	1
37	3969	Section cut cover	1
38	5775	Notch stripper finger(right hand)	1
39	4238	Angle hold down	1
40	2310	Notch bolster clamp	2
41	2999	Punch bolster washer	6
42	4939	P/E cover(body)	1
43	4942	P/E cover(S/P)	1
44	4973	Side Top Cover	1
45	4974	Body Top Cover	1
46	4952	Notch end cover	1
47	2433	Limit switch actuator	3
48	2435	Rod fixed stop	3
49	4953	Notch end guard	1
50	2557	Punch retaining ring	1
51	L830/2618	Flex Pipe(Tank-Pump)	1
52	L830/2617	Flex Pipe(Pump-Valves)	1
53	L830/2616	Flex Pipe(Reliet return)	1
54	L830/2614	Flex Pipe(A-Punch cylinder)	1
55	L830/2615	Flex Pipe(B-Punch cylinder)	1
56	L830/2612	Flex Pipe(B-Shear cylinder)	1
57	L830/2613	Flex Pipe(A- Shear cylinder)	1
58	2732	Shear support adj. screw	4
59	2835	Angle wear bar	2
60	4972	Trunking	1
61	2887	Stripper pivot sleeve	1
62	2890	Bolster washer	2
63	3196	R&SQ blade(body)	1
64	3197	R&SQ blade(arm)	1
65	3531	Shear table	1
66	3536	Notch die	1
67	3537	Notch die	2
68	3548	Angle blade(body)	2
69	3549	Angle blade(arm)	1
70	4164	Punch front makralon cover	1
71	3659	PE cover rear	1
72	3929	Sect blade clamp	2
73	87059	Material stop	1

No.	Part No.	Description	No.Off
74	87060	Table guide block	2
75	87061	Guide block retaining plate	2
76	87062	Material stop pad	1
77	87063	Guide block pad	2
78	87077	Punch table plate	1
79	87078	Punch table beam	1
80	L605/87079	Punch table brkt LH	1
81	L605/87080	Punch table brkt RH	1
82	87081	Front table fix plate	2
83	87096	Material stop extension bar	1
84	88051	Punch table spacer	4
85	88052	Punch table brkt clamp plate	2
86	9001-22	Round Punch 22mm	1
87	9023-22	Round die 22mm	1
88	9036	Punch adaptor	1
89	K405/5530	5.5KW 230/400 Euro Volt	1
90	K410/1045	24V Elec. Box	1
91	K410/4750	Lamp	1
92	K410/7009	Foot switch	2
93	K411/319938	Micro switch cover	4
94	K411/338282	Micro switch	4
95	K705/1908	Kipp handle	2
96	K705/3006	Punch stripper securing spring	1
97	K715/6510	Pressure gauge	1
98	K715/7040	Oil pump	1
99	L605/2236	Shear hold down	1
100	L605/2626	Notch/shear guide	3
101	L605/3198	Section hold down	1
102	L605/4163	Punch front guard	1
103	L820/1505	Bell housing	1
104	L820/2020	Coupling	1
105	L820/4530DC	By-pass control valve	1
106	L820/4510DC	Punch/shear control valve	2
107	L820/45350	Relief valve	1
108	L820/5020	Suction strainer	1
109	L820/5030	Diffuser	2
110	L820/5041	Filler	1
111	L910/55000	Pump	1

10.Circuits

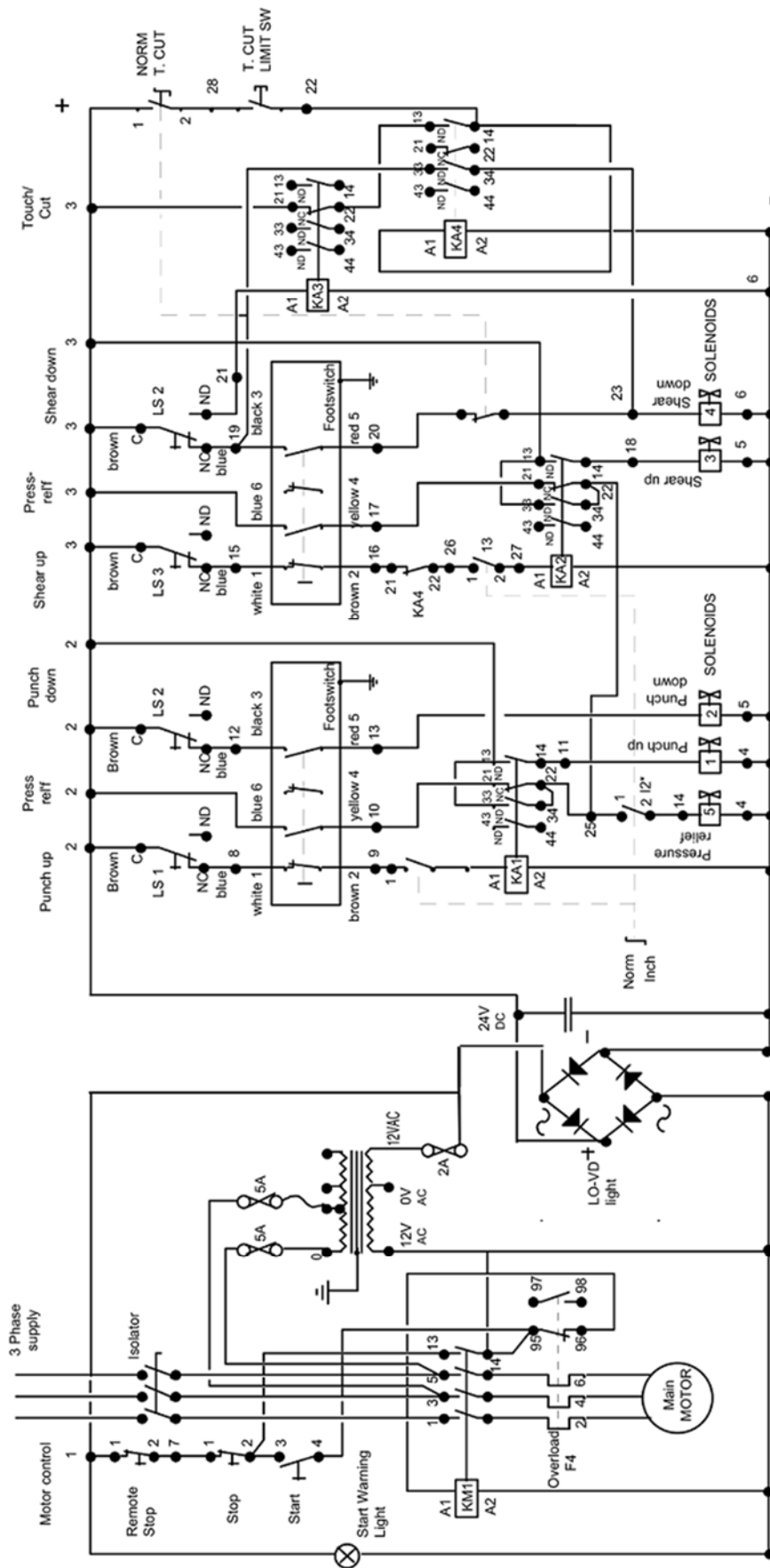
10.1Hydraulic Circuit



Parts of the Hydraulic Circuit:

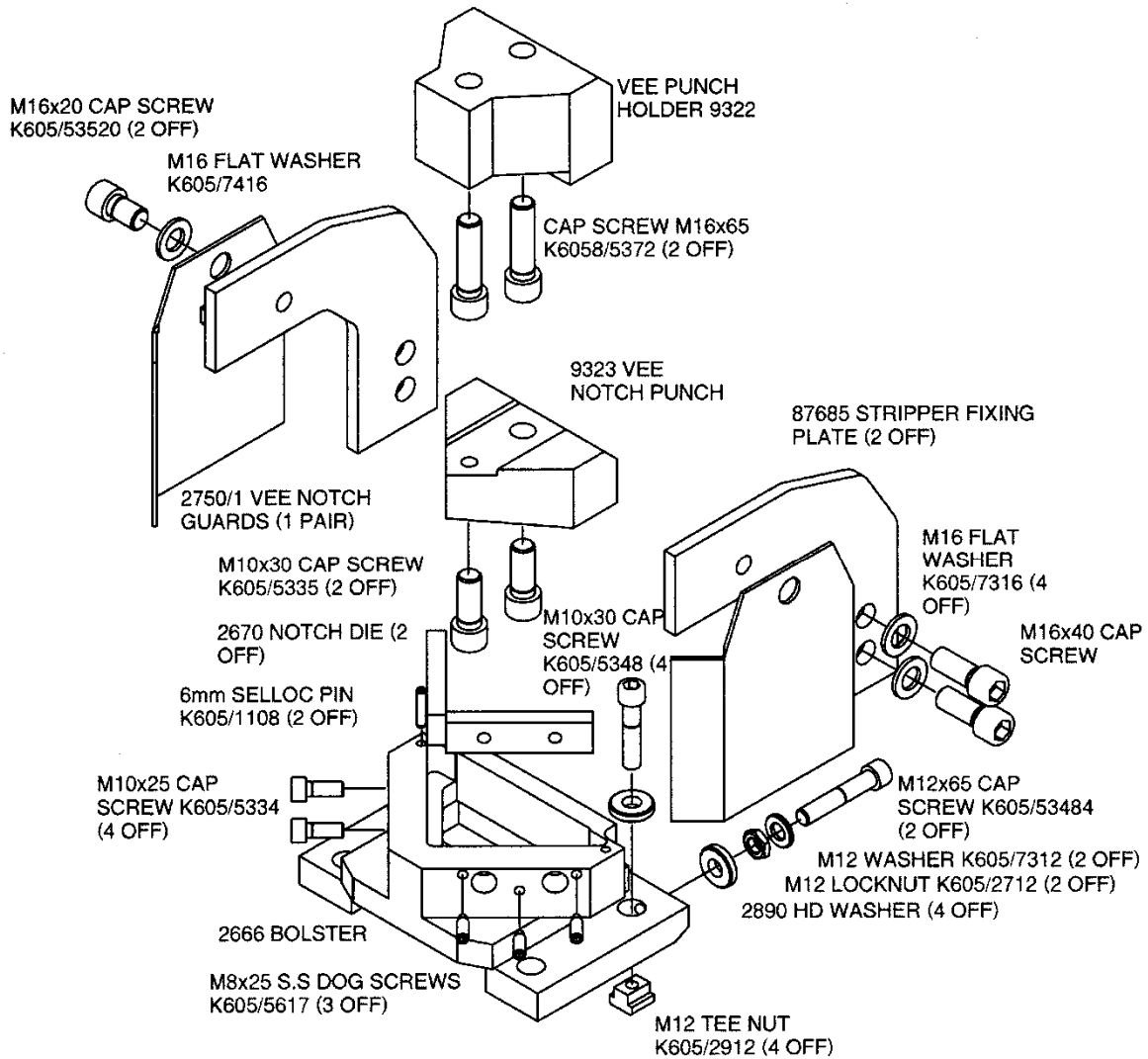
No.	Part No.	Description	No.Off
1	L815/7005	Punch cylinder	1
2	L815/7010M	Shear cylinder	1
3	L820/4510DC	Punch control valve	1
4	L820/4510DC	Shear control valve	1
5	L820/4530DC	By-pass control valve	1
6	L820/45350	Relief valve	1
7	L820/5030	Diffuser	1
8	L515/3834/5	Tank	1
9	L820/5030	Diffuser	1
10	L820/5020	Suction strainer	1
11	K815/55000	Pump	1
12	L830/2618	Flex Pipe (Tank - Pump)	1
13	L830/2617	Flex Pipe (Pump - Valves)	1
14	L830/2616	Flex Pipe (Relief return)	1
15	L830/2614	Flex Pipe (A - Punch cylinder)	1
16	L830/2615	Flex Pipe (B - Punch cylinder)	1
17	L830/2612	Flex Pipe (B - Shear cylinder)	1
18	L830/2613	Flex Pipe (A - Shear cylinder)	1

10.2 Electrical Circuit



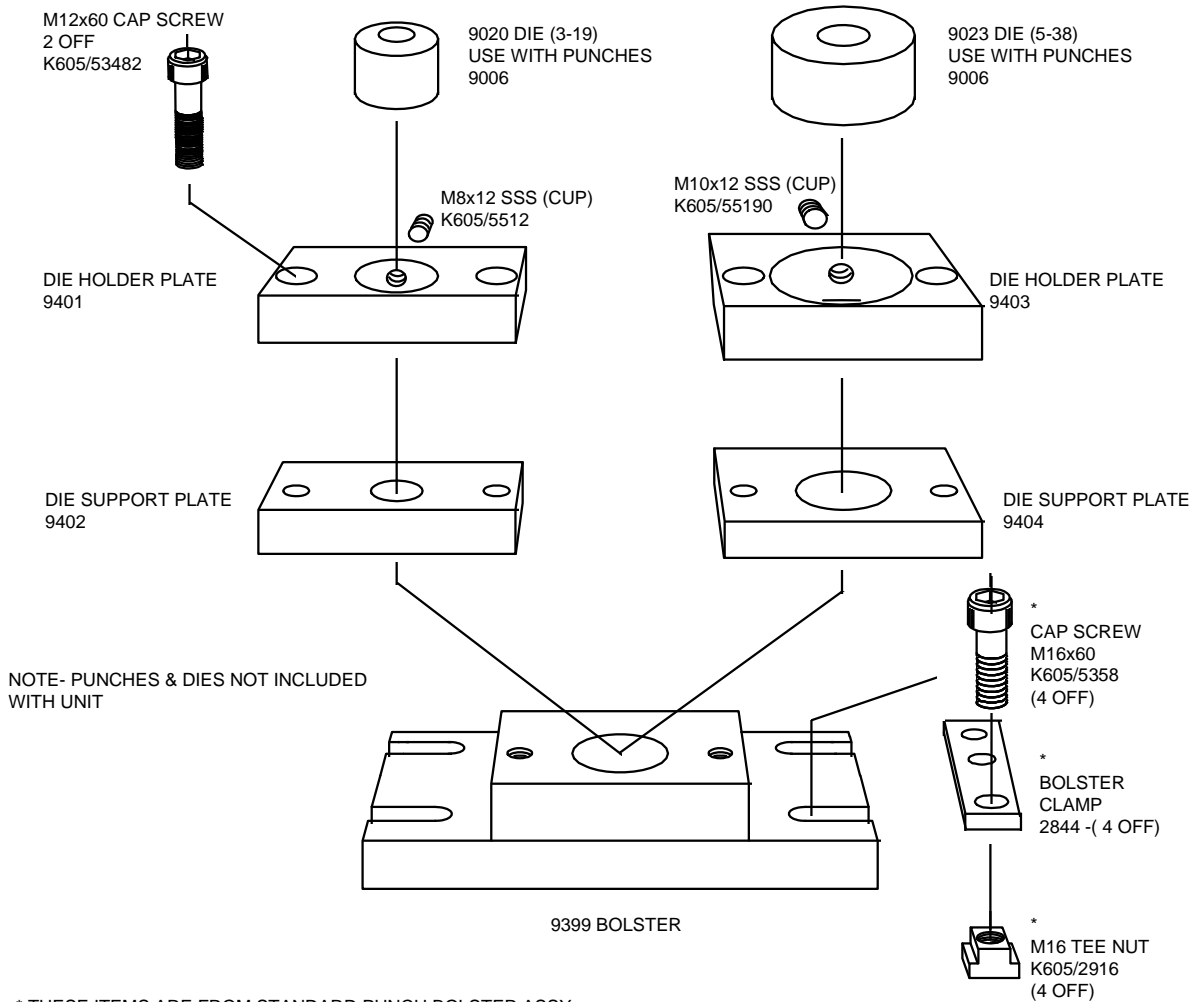
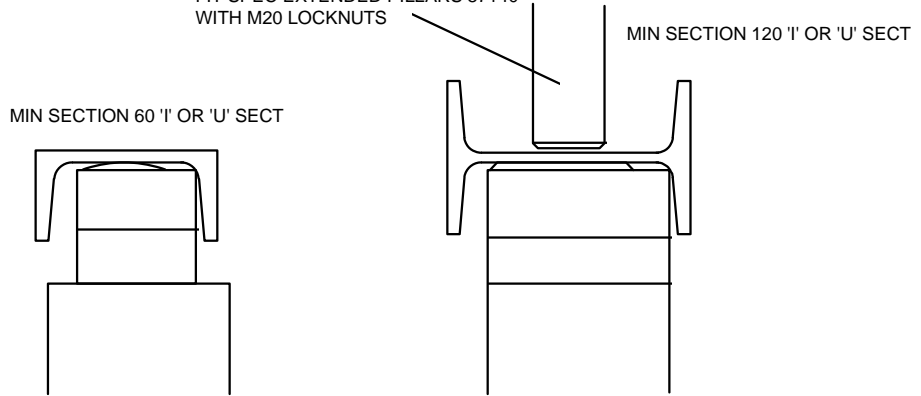
11 Special Tooling

11.1 90° Vee Notch tooling arrangement



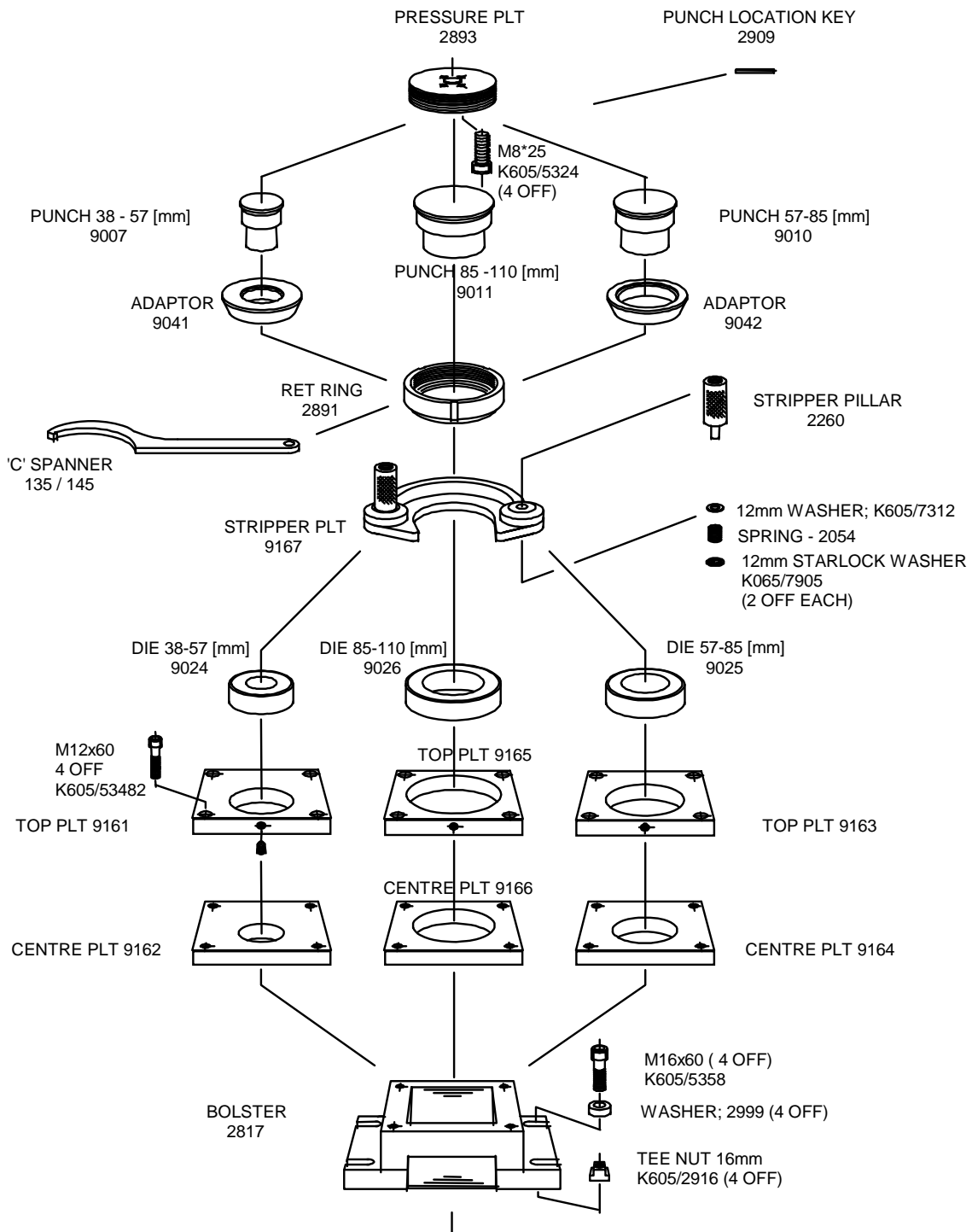
11.2 Web Punching arrangement for 'I' & 'U' Sections

WHEN PUNCHING 'I' SECTION
 REMOVE STD STRIPPER HEAD ASSY
 FIT SPEC EXTENDED PILLARS 87140
 WITH M20 LOCKNUTS

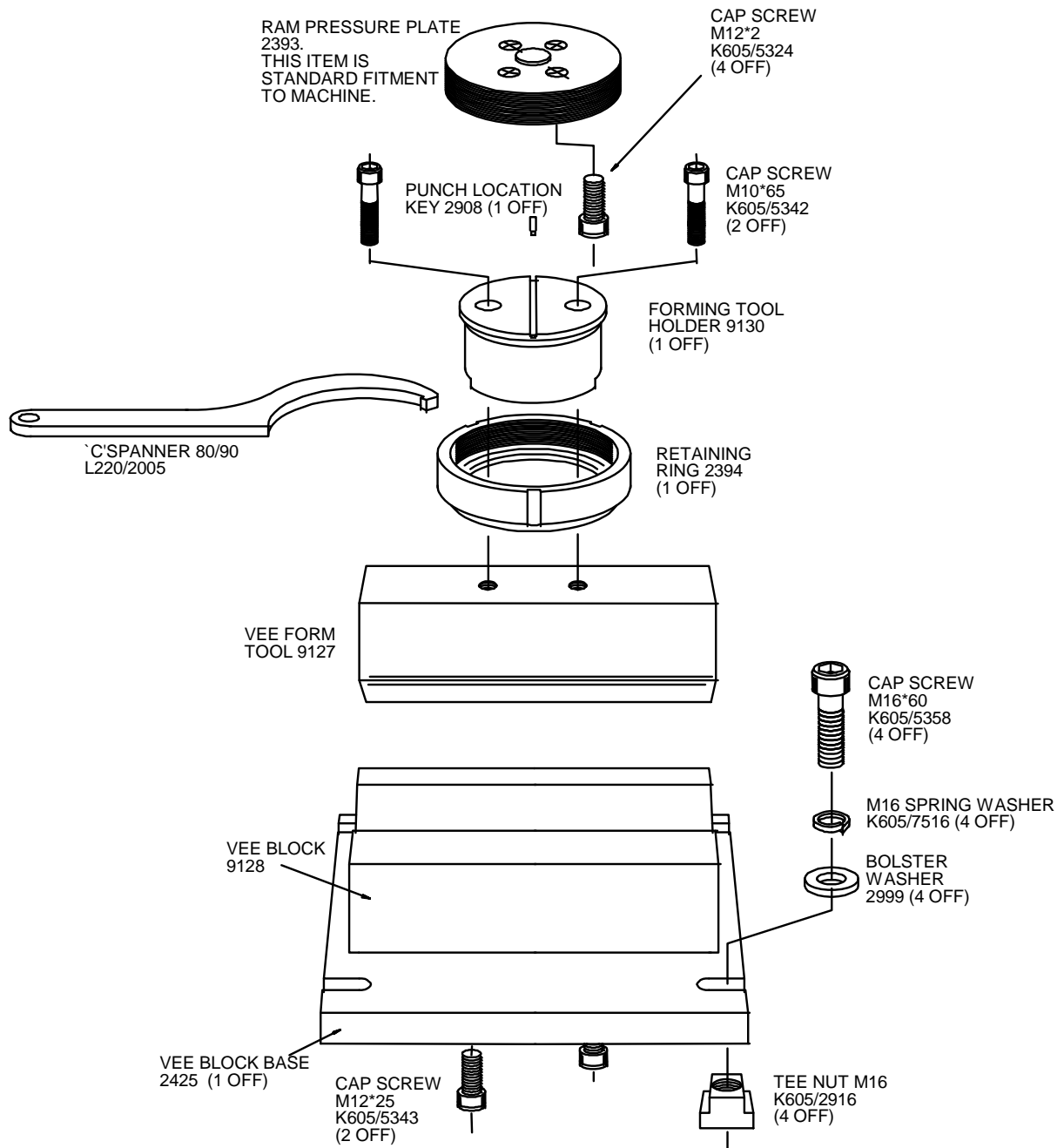


* THESE ITEMS ARE FROM STANDARD PUNCH BOLSTER ASSY

11.3 Large Hole Punching



11.4 Bar Bending Unit



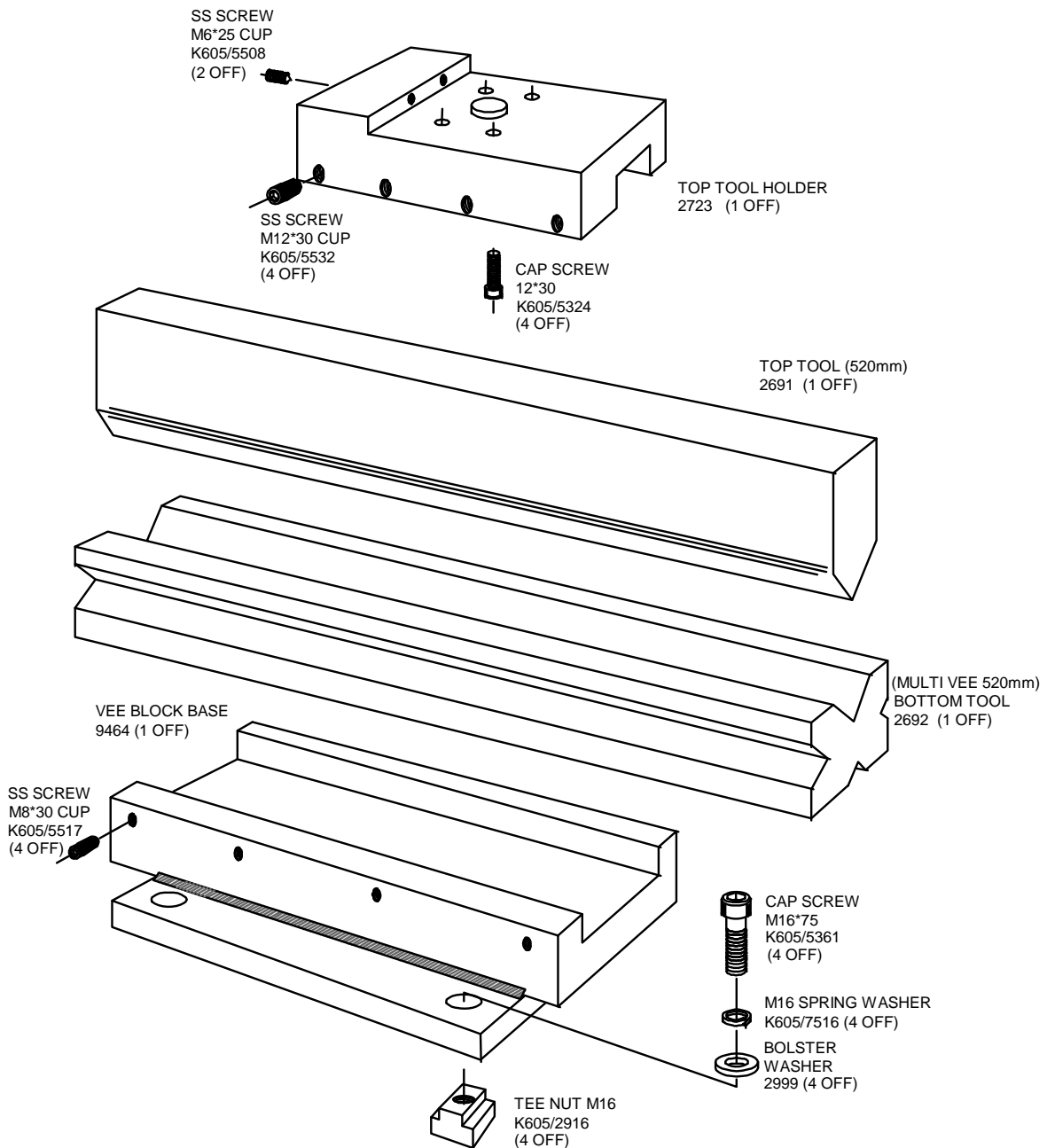
To calculate the tonnage required for bending use the following formula:

$$\text{Tonnage} = \frac{\text{plate thickness}^2 \times 1.42 \times 45 \times \text{plate length}}{1000 \times \text{vee gap}}$$

When bending always ensure work-piece is positioned central on VEE Block to avoid side loading ram. Air bending only. Adjust down stroke limit switch to avoid unnecessary pressuring of machine.

Capacity: 7-7/8" x 19/32" (200 x 15mm)

11.5 Sheet Bending Unit

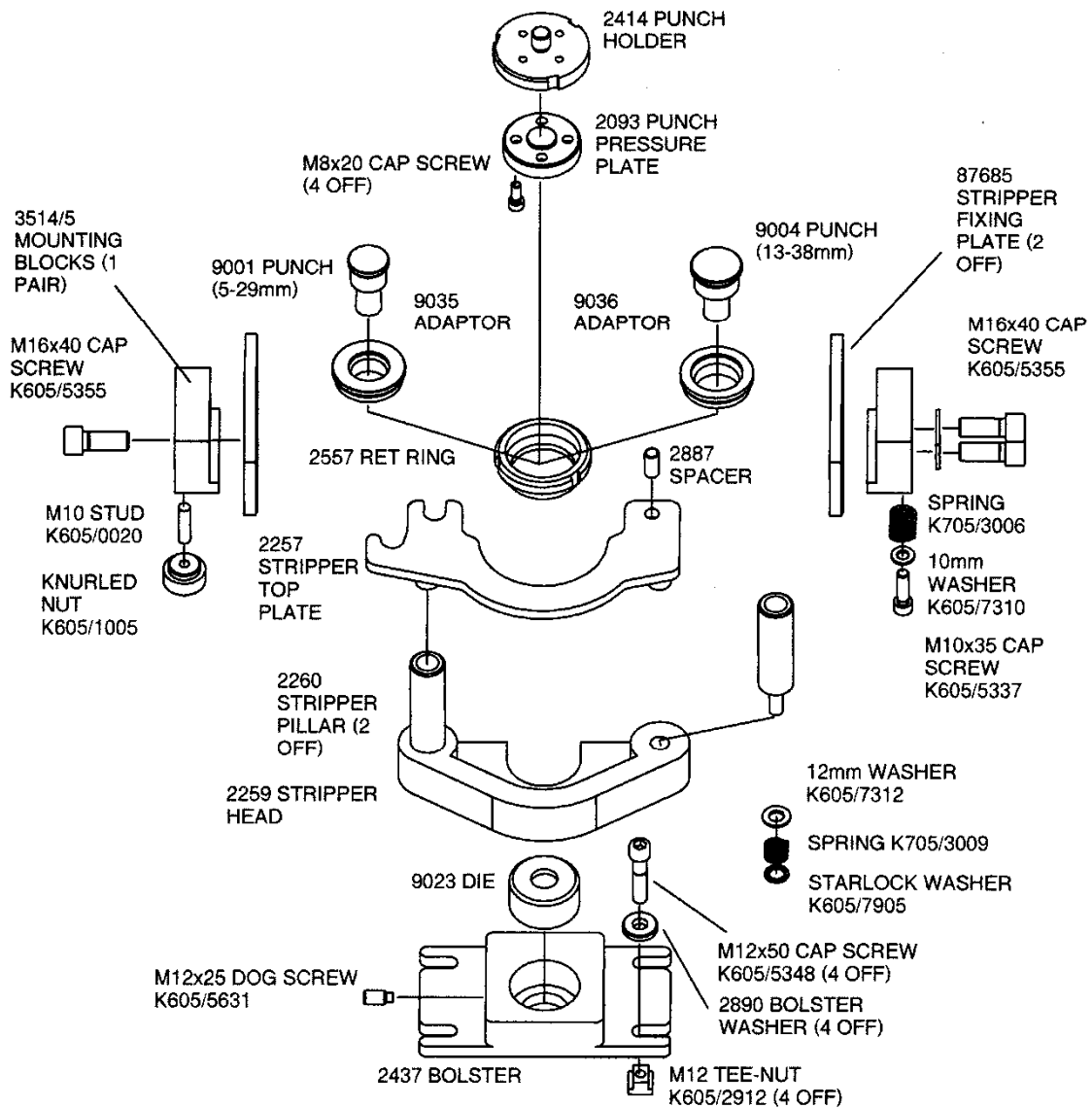


When bending always ensure work-piece is positioned central on VEE Block to avoid side loading ram. Air bending only. Adjust down stroke limit switch to avoid unnecessary pressuring of machine. To calculate the tonnage required for bending use the following formula:

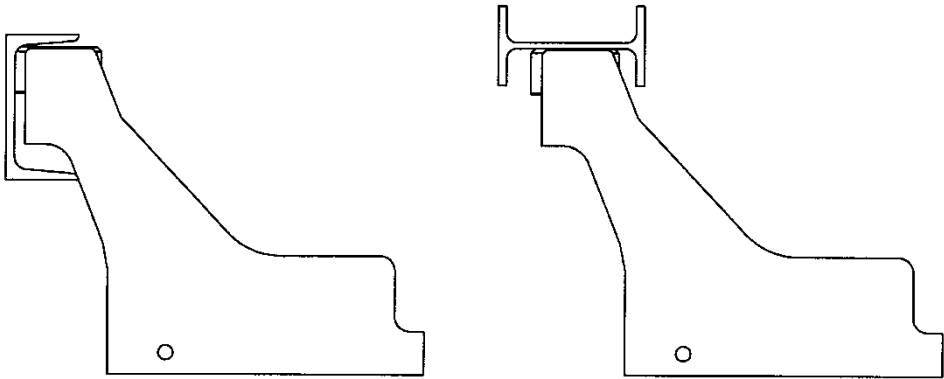
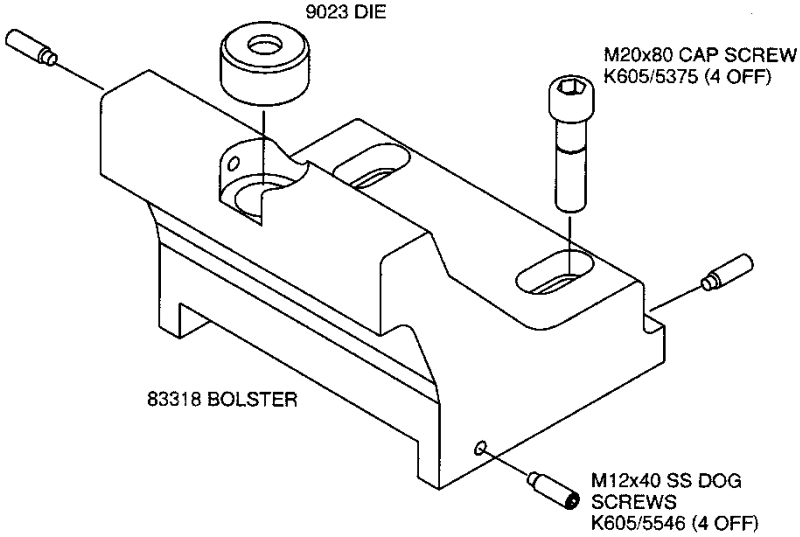
$$\text{Tonnage} = \frac{\text{thickness of plate}^2 \times 1.42 \times 45 \times \text{width of material}}{1000 \times \text{vee gap}}$$

Capacity: 19-11/16" x 1/8" (500 x 3mm)

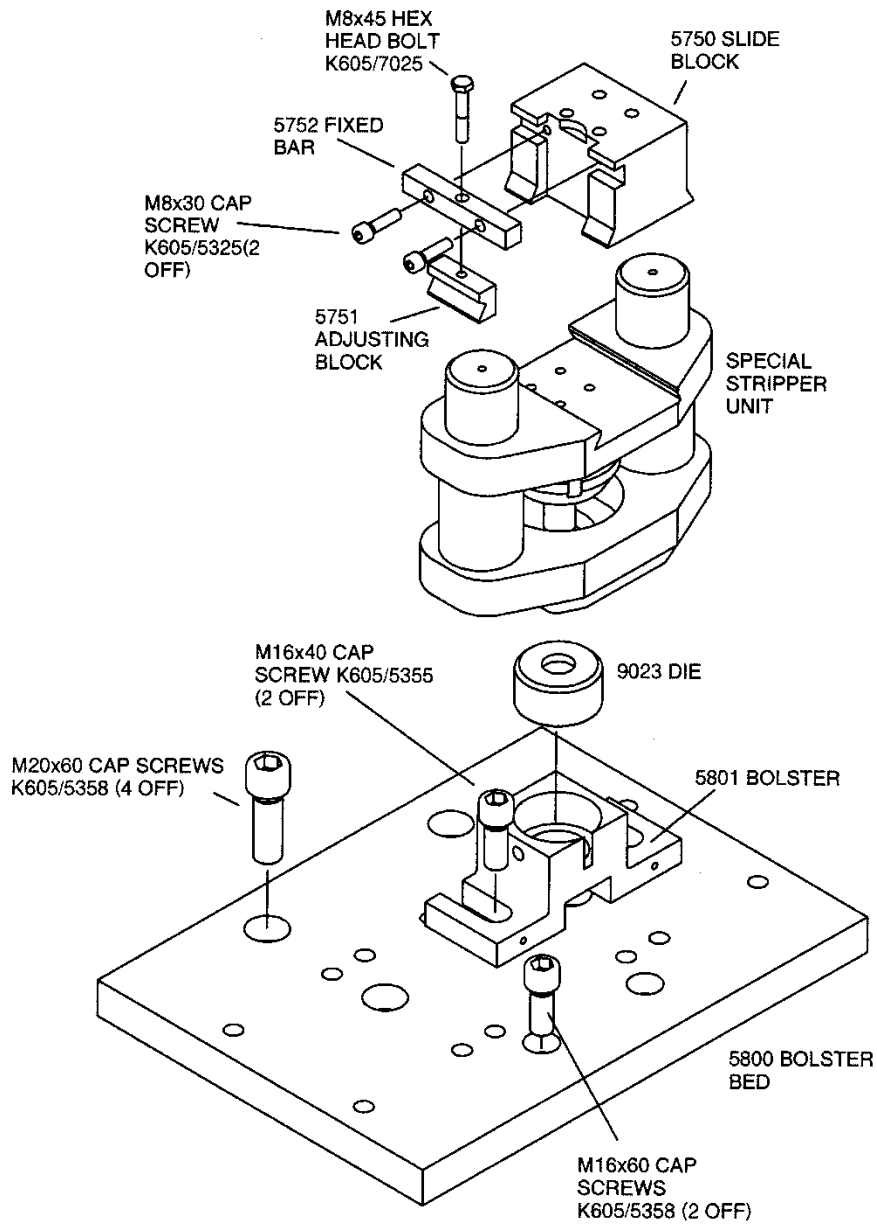
11.6 Notch End Punching



11.7 Swan neck bolster



11.8 Dovetail quick change attachment



12 Sound level test

12.1 Max. sound pressure level

Result sheet

Site: MIHO Engineering

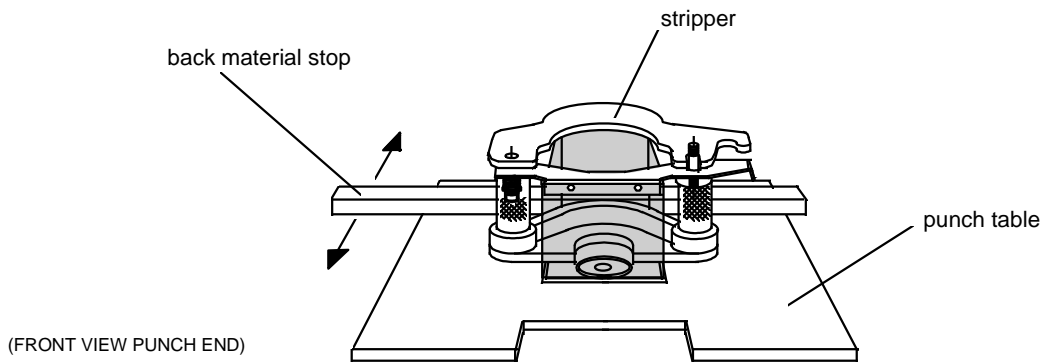
Date: 2012-1

Monitoring Equipment: RS 292+RS 294

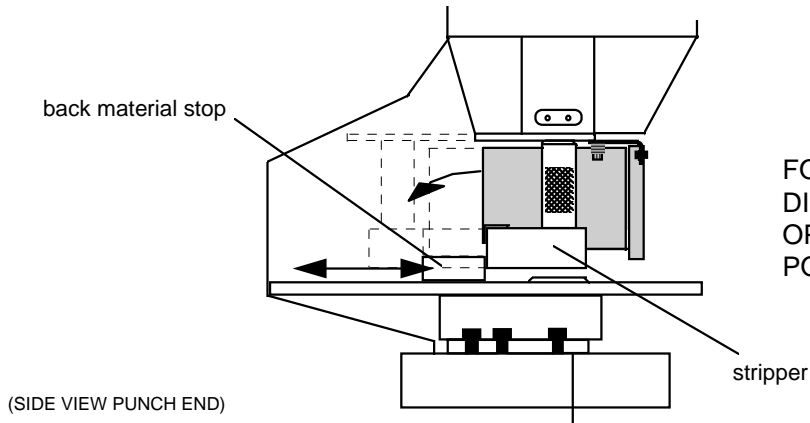
MACHINE UNDER TEST	MIHO Multi 70	MIHO Multi 70D	MIHO 70P
MONITORING POSITION	1m	1m	1m
TIME IN USE			
5 min. LEQ			
MAX SPL	76.5 dB	76.5 dB	76.5 dB
MIN SPL			
AV G SPL			
COMMENTS			

13 manual appendix

13.1 Positioning of the Punch Stripper

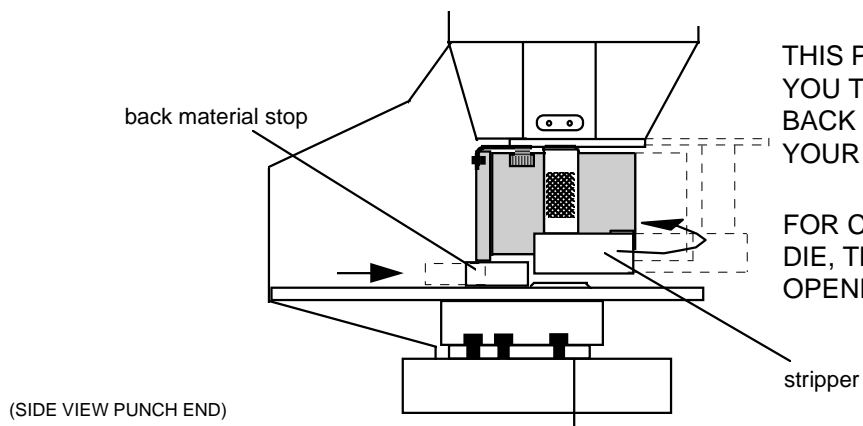


NORMAL STRIPPER POSITION



FOR CHANGING PUNCH AND DIE, THE STRIPPER CAN BE OPENED AWAY FROM FIX POSITION TO CLEAR ACCESS!

REVERSED STRIPPER POSITION

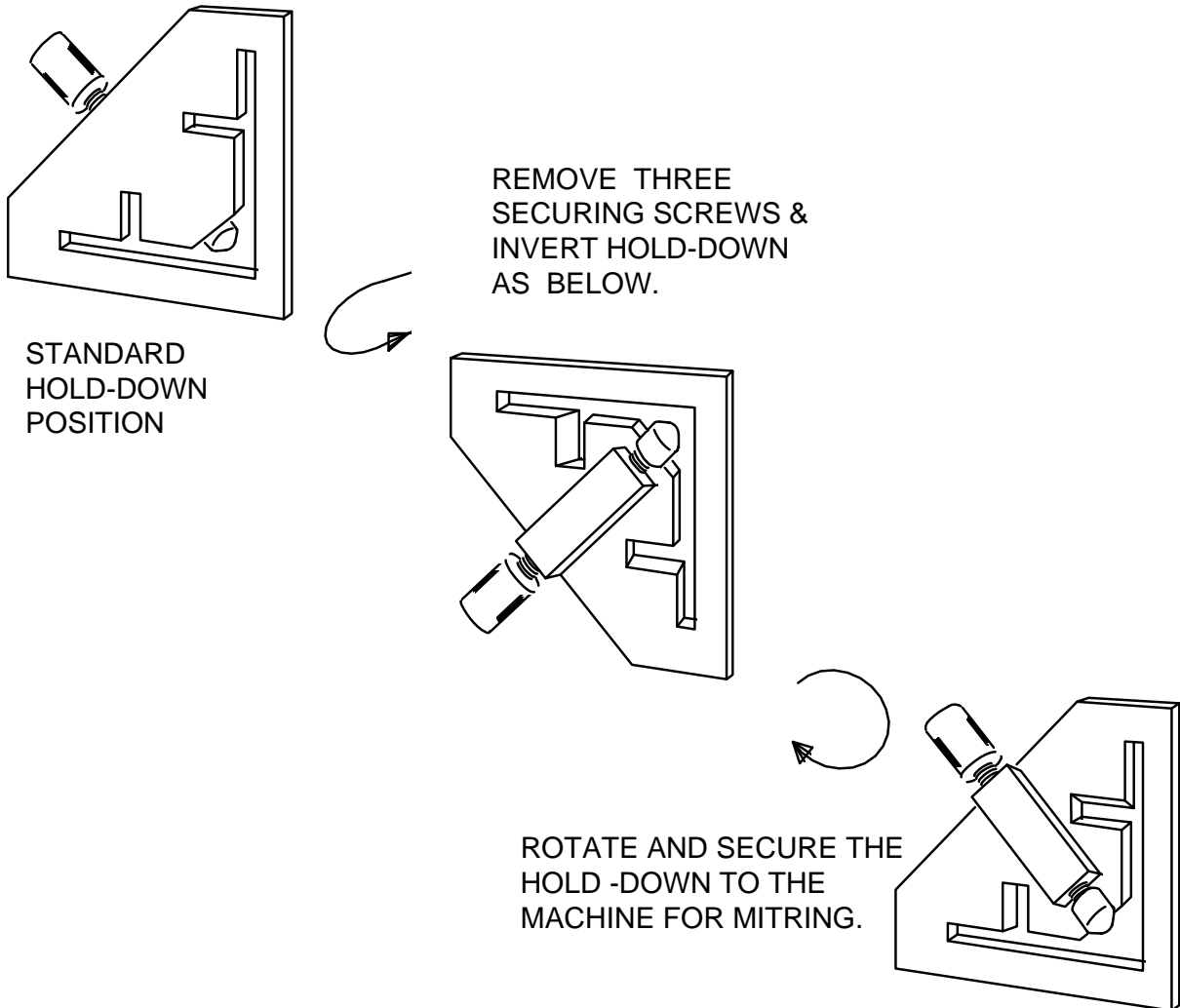


THIS POSITION ALLOWS YOU TO GET THE BACK STOP CLOSER TO YOUR PUNCH / DIE.

FOR CHANGING PUNCH AND DIE, THE STRIPPER CAN BE OPENED TOWARDS YOU!

13.2 MITRING ANGLE 45 DEGREES ON MULTI MACHINES

- Since the introduction of the requirements for health and safety. The accessibility and distance between hold-downs and blades have been amended.
- To this effect the operation of mitring angle in the angle cutting station requires the following simple hold-down adjustment.



Once the hold-down is secured for mitring as position 3, it is also possible to use the hold-down for cutting angle at 90 degrees if required.