

## CONTENTS

PAGE	SUBJECT
1	Contents
2	Health & Safety Notice
3	Operating instructions
3	Extracting Old Rivets & Hints of Extracting
4	“ “ “ “ “ “
5	Clinching New Rivets & tooling selection
6	Anvil Height Adjustment
7	Description of Mechanical Components
8	Description of Mechanical Components - continued
8	Maintenance
9	Pneumatic circuit description
10	Slow operation
11	Parts list
12	Parts list
13	Rivet & Tooling Table
14	Tooling – Fully Tubular Rivets
15	Chart showing Input Pressure related to Output Force

## HEALTH & SAFETY AT WORK ETC. ACT 1974 FACTORIES ACT 1961

### CL2-B

This machine was specifically developed for the de-rivetting and rivetting of brake shoes, brake bands and clutch plates and that when used for these applications in the correct manner there should be no danger to the operator, as both hands are required to hold the components during the de-rivetting or rivetting process which ensures that due to the weight and bulk of the shoes, the operator's hands are well clear of the tooling.

Should the machine be employed on other classes of work it is advisable to consult the makers with regard to suitable safety guards.

It is recommended that when the machine is not in use, or adjustments and tool changes are being made, that the air line should be disconnected, or turned off at the source.

Although it has been confirmed by large users of these machines that there is no appreciable contamination of the surrounding atmosphere from asbestos dust when shoes are cleaned before de-rivetting / rivetting, it may be a requirement of the local H.M. Factories Inspector that dust extraction equipment be installed.

#### SAFETY

- Persons carrying out work within the workshop environment should be fully trained in the use of all machinery at their disposal.
- As an added safety factor and also time saver, it is recommended that the rivets be inserted in each shoe prior to clinching and retained in place using masking tape to cover the heads of each row of rivets. Alternatively, prior to inserting each rivet in place, the end of the rivet is lightly dipped in an adhesive, normally 'Contact' adhesive. Both of these methods are in use extensively throughout the country,
- Never use tooling other than that supplied by the manufacturer as if the tooling is overloaded, it will fail in a controlled manner to avoid 'airborne' fragments.
- When a change of tooling is required, disconnect compressed air supply by removal of the quick release fitting at the filter/regulator inlet. Never change tooling with the foot pedal operated and compressed air connected.
- **Never** replace the grub screw that retains the tooling with a bolt or set screw that protrudes beyond the surface of the tool holder.
- Ensure the machine is secured to the floor by suitable means using the drilled holes in the base.
- To conform to the 'Supply of machinery (Safety) Regulations 1992' the closing speed of the rivetter does not exceed 30mm/sec. No adjustments are to be made that will increase this operating speed.
- When carrying out repairs or maintenance always disconnect the compressed air supply.
- Never operate the rivetter whilst the top cover is removed.

## **BASIC OPERATING INSTRUCTIONS**

This machine will operate at a line pressure of approximately 7 to 140 P.S.I. (0.5-10 bar). The actual setting will be determined by the size of rivet to be used and the type of work to be carried out. The working air pressure can be varied by adjusting the Pressure Regulator which is the unit with the black knob (to the right of the Rivetter). The black knob should be turned clockwise to increase pressure, and anti-clockwise to reduce pressure. The pressure setting is indicated on the Pressure Gauge. This setting is referred to as the Working Pressure.

The machine is activated by operating the foot pedal which is of the spring return type therefore the machine will operate with light foot pressure on the pedal and automatically reset if the foot is removed from the pedal. The position of the Foot Control Valve can be changed from right to left if desired as holes are pre-drilled and threaded to take the mounting screws.

## **A GUIDE TO THE REMOVAL AND FITTING OF BRAKE LININGS TO SHOES - WHEN USING THE CL2-B RIVETTING MACHINERY**

### **HINTS ON EXTRACTING**

1. Whenever possible, offer the work up to the punch to ensure correct alignment
2. Ensure the work is held square to the operation of the punch,
3. Do not attempt to extract the 2 or 3 rivets along the shoe edge on linings with bevelled edges to avoid punch breakages.
4. Only use the No.1 Extractor Punch on rivets up to 7.3" shank and No.2 Extractor Punch on rivets of 1/4" shank diameter and above.

### **PRESSURE**

Before commencing, ensure the working pressure (the reading on the pressure gauge) is set at 80-100 p.s.i. for the CL2-B. Depending upon individual rivet size, type, material and condition, this pressure can be raised to accommodate more 'difficult' rivets.

## LINING REMOVAL

### **EXTRACTING OLD RIVETS**

The EXTRACTOR punches supplied with the CL2-B machine are for use on SEMI-TUBULAR rivets (Solid shank rivet with partially drilled end to shank). If the HOLLOW type of rivet is encountered (as found on the 'MERCEDES' shoes) an extractor punch for hollow rivets is required. There is one size of punch for each size of rivet diameter, (see illustration at the end of the booklet).

There are two sizes of Extractor Punch supplied with the machine, the small one is the No.1 and is suitable for rivets of shank diameter up to  $7/32$ " (5.6mm) and the large one is the No.2 which is suitable for rivets of shank diameter  $1/4$ " (6.4mm) and above. The extractor punch is secured in the Top Tool Holder by means of a Grub Screw which should be tightened using the Hexagon Wrench supplied.

Inspect shoes and determine the type of rivet and its size. If the rivets are fully tubular, an extractor punch suitable for hollow rivets should be selected. If semi-tubular, an extractor punch from our standard or heavy duty range should be selected.

The lower tool holder/extractor anvil should have no anvils fitted. The height of the adjuster should be set to a position where the selected extractor punch stops approximately 10mm above the surface of the adjuster when the rivetter is operated.

The shoe to be stripped should be placed on the adjuster with the head of the rivet facing downwards. To ensure correct alignment of extractor punch to rivet it is recommended that the shoe be lined up to locate the extractor punch in the rivet. The foot pedal is now operated so the punch and shoe travel down until the shoe rests on the adjuster and the extractor continues to enter the shoe forcing the rivet down through the hole. If the rivet does not travel down sufficiently to clear the shoe then raise the adjuster height.

Take care not to raise the height to a point where the taper section of the extractor is fouling the hole of the shoe as this will cause serious damage to the shoe and/or punch. Once the setting has been achieved extraction can be carried out on the remaining rivets. Care must be taken with tapered shoes/linings as adjustment may be required for different rivet positions.

The circular rim of the rivet usually breaks away in the form of a washer and these washers build up on the punch being pushed further up the punch with each successive operation until the form of the punch taper causes them to split and drop off. If the rivet waste does not drop off it will be necessary to remove the punch and clamp the waste in a vice which should allow the punch to be separated from the waste.

The head and shank section of the rivets will drop through the hole in the Threaded Anvil Holder.

## NEW LINING FITTING

### **CLENCHING NEW RIVETS**

**Pressure:-** It is often thought that the working pressure has to be adjusted with varying sizes of rivets, This basically is not necessary, Providing there is sufficient pressure to clinch rivets there is no need to reduce pressure for smaller rivets. E.g. if the rivetter was set at 80 p.s.i, when clinching 'L' rivets there is no need to reduce pressure when commencing rivetting 'G' rivets. It is common practice to reduce pressure in an attempt to avoid damage to the friction material, Damage to Friction Material will not occur if the correct procedure for setting the Anvil height is followed (see para. Anvil Height adjustment).

The pressure gauge of the rive(ting machine indicates when full pressure has been applied to the rivetting process.

Example: Before commencing relining the Rivetter may be set at 80p.s.i, When the foot pedal is operated the needle of the pressure gauge will have drop to say, 50 p.s.i, When the punch makes contact with the rivet the pressure win quickly increase to, say, 65 p.s.i. but the pedal must remain depressed until the gauge reads the original setting of 80 p.s.i. which takes maybe 2-3 seconds longer,

This will ensure full pressure is applied to the rivet, producing a sound clinch which will help avoid the Friction Lining coming loose in operation,

If the Foot Pedal is released too early then the resulting clinching pressure can be significantly reduced e.g. at 80 p.s.i. the CL2-B riveter will develop at the rivet approx 2.25 tons force, by releasing the foot pedal when the gauge is reading only 60 p.s.i. the resulting force at the rivet will be 1.70 tons!

## TOOLING SECTION

From the rivet table, select the correct size of Rivetting Punch & Anvil to be used with the Selected Rivets. The only factors in determining the correct Rivetting Punch and Anvil are the shank diameter and the head diameter respectfully.

The Rivetting Punches are a push fit into the Top Tool Holder being located and held in position by a spring loaded ball.

## ANVIL HEIGHT ADJUSTMENT

When the appropriate tooling has been fitted into the rivetter, the anvil height must be adjusted to avoid damaged to the friction lining - To determine the correct setting:-

- (1)When the foot pedal is operated i.e. the punch is down to its lowest position , lower the anvil adjuster to a point where the surface of the anvil is approx 3/4" lower than the rivetting punch then release the foot pedal.
- (2)Hold the Shoe & Lining together, Do not insert a rivet at this stage , and place the lining onto the Anvil ensuring that the counterbore for the Rivet head is located over the anvil.
- (3)Operate the rivetter so the Rivetting Punch comes close to the surface of the shoe, With shoe & lining in place raise the height of the anvil adjuster until the surface of the shoe is in contact with the tip of the rivetting punch. The shoe should now be lightly clamped between the punch and anvil with the Rivetter pedal operated.
- (4) Release the pedal.

The height is now set at a point where after insertion and clinching of the rivet the shoe should be clamped tightly between the punch & anvil, resistance should be felt when rotation about the punch is attempted. A further slight adjustment of about 1/2 turn upwards of the anvil adjuster may be necessary until resistance is felt.

It must be noted that this setting is correct for the complete shoe only where the shoe is of even thickness throughout if variation in thickness is evident, re-adjustment will be necessary.

Rivetting Sequence:- Generally, the rivetting sequence should be started in the centre of the lining and work out to the ends and edges.

Particular sequences may be recommended by the Friction Material Suppliers.

Rivetting of the shoe can now be completed.

Safety :- Care must be taken when inserting rivets that fingers are clear of the anvil and punch before operating the foot pedal.

## DESCRIPTION OF MECHANICAL COMPONENTS

### HEAD & COLUMN

Comprises basically, three components formed of plate steel and welded construction which creates an extremely strong design of which there are no castings used. There are no customer serviceable parts on the HEAD.

### TOP COVER

The TOP COVER is fitted to the machine to provide guarding of the moving parts in the head of the machine. Its secondary purpose is to act as a dust cover. The TOP COVER should be fitted to the machine at all times and should only be removed for maintenance purposes.

### PEDAL GUARD

The PEDAL GUARD is fitted over the FOOT VALVE & PEDAL to avoid accidental operation of the machine.

### TOP TOOL HOLDER

The TOP TOOL HOLDER is located to the front of the HEAD. The punches fit into the TOP TOOL HOLDER and the RIVETTING punches are retained by a spring loaded ball within the TOP TOOL HOLDER, The EXTRACTOR punches should be held in place using the grub screw located to the right side of the TOP TOOL HOLDER.

### CENTRE LEVER ARM

The CENTRE LEVER ARM is located under the TOP COVER and its purpose is to convert the relatively long power stroke of the cylinder to a shorter, more powerful stroke of the TOP TOOL HOLDER at a ratio of approximately 5:1.

### CLEVIS FORK

The CLEVIS FORK is screwed to the end of the piston rod and secured to the CENTRE LEVER ARM by the CLEVIS PIN.

### ANVIL ADJUSTER

The ANVIL ADJUSTER when used without the anvil holder acts as a shoe support when extracting but if preferred it can be reversed so the handwheel is underneath the lower jaw.

### ANVIL HOLDER

The ANVIL HOLDER which fits in the ADJUSTER is designed to take the rivetting anvils. The purpose of this component is to raise the shoe above the handwheel face so fingers cannot be trapped between lining and handwheel. If the optional brake shoe cradle is fitted it is necessary to reverse the ADJUSTER so the handwheel is underneath the lower jaw, The adjuster is hollow, allowing the wasted rivets to fall through and collect in the rivet waste bin (provided).

## **MAINTENANCE**

The CL2-B requires little maintenance as all pneumatic components fitted do not require internal lubrication therefore no pneumatic oil lubricator is fitted but it is strongly recommended that the following be carried out.

**TO CARRY OUT THE FOLLOWING CHECKS THE AIR SUPPLY TO THE MACHINE SHOULD BE DISCONNECTED OR THE PRESSURE REDUCED TO ZERO BY MEANS OF THE PRESSURE REGULATOR:-**

Removal of the top cover will provide access to the Centrelever Arm and the Top Tool Holder, Regular oiling once a month of all moving parts should be carried out along with a general check of the condition of all the moving parts.

Check that the TOP TOOL HOLDER is free in the bore of the Rivet. Head by rotating and lining it by hand, there may be little movement but there should be sufficient to confirm free movement. If the TOP TOOL HOLDER is tight it should be removed and freed.

Once the above has been carried out and all covers re-fitted, the air supply can be reconnected.

## **PNEUMATIC CIRCUIT**

### **BASIC OPERATION OF THE CL2-B RIVETTER**

As the machine is stood idle i.e. Air supply to the machine with the pressure gauge set to 5.5 bar (80lbs), and the foot valve not operated, there should be no air leaks anywhere.

The operation and release of the FOOT PEDAL will cause the TOP TOOL HOLDER to move downward or upward, whilst moving, and ONLY whilst moving, air will exhaust from the silencers mounted in the foot valve. Once the TOP TOOL HOLDER has reached either the top or bottom of its stroke there should be no air leaks.

### **FILTER REGULATOR**

From the airline connection on the Filter Regulator Unit the compressed air flows through the FILTER/REGULATOR. This unit removes the water which is present in all compressed air and any particles of dirt, metal etc. Its allows the regulation of the working pressure in the range of zero up to the maximum input pressure, This is achieved by turning the black knob on top of the unit clockwise to increase pressure, anti-clockwise to reduce pressure. The PRESSURE GAUGE indicates the pressure that has been set by adjustment of the regulator knob.

This unit is of the 'semi-automatic' drain type which means the water that often collects in the .bowl will be drained out automatically if the air supply to the Rivetter is removed or the pressure allowed to fall to zero. It can be manually drained by pressing upwards the small brass button under the bowl.

It is important to ensure that the water level is never allowed to rise to the top of the bowl or water will contaminate the rest of the pneumatic equipment.

### **FOOT VALVE**

The 'treated' compressed air now passes along to the foot valve. The FOOT VALVE is a form of switch which changes the direction of flow of the compressed air. There are three pipe connections to the FOOT VALVE, all at the rear of the valve. The contra pipe is the main air supply from the FILTER REGULATOR and (looking from the front) the right hand pipe connection goes to the top pneumatic cylinder connection and the left hand pipe connection goes to the bottom cylinder connection. These pipes feed compressed air to the top of the cylinder or the bottom depending on the position of the

### **FOOT VALVE PEDAL.**

Fitted to the FOOT VALVE are two silencers. During the operation of the CL2-B RIVETTER air is exhausted from these ports

### **SLOW OPERATION OF THE CL2-B RIVETER:-**

If the CL2-B Pneumatic Riveter is slow in operation, it is normally caused by the silencers fitted to the Foot Valve Assembly being blocked with dirt etc, they cannot normally be cleaned successfully and therefore require replacing

CL2-B INSTRUCTION BOOKLET

CL2-B INSTRUCTION BOOKLET

## RIVET & TOOLING TABLE

### RIVET PUNCH & ANVIL SELECTION

RIVET CODE	SHANK DIAMETER	HEAD DIAMETER	RIVET PUNCH	ANVIL NO	ANVIL FACE DIA	CLINCH ALLOWANCE
E	1/8"	7/32"	0	1	1/4"	1/16"
F	9/64"	19/64"	0	1	1/4"	3/32"
G	5/32"	5/16"	0	2	5/16"	3/32"
H	11/64"	5/16"	X1	2	5/16"	1/8"
J	3/16"	3/8"	1	2	5/16"	1/8"
K	7/32"	27/64"	1	3	3/8"	9/64"
L	1/4"	15/32"	2	4	1/2"	5/32"
M	5/16"	9/16"	3	4	1/2"	3/16"
N	3/8"	5/8"	4	5	9/16"	7/32"
			*6	3/4"		

\*Note:- If linings have a large counterbore for the 'M' & 'N' rivets, this larger anvil may be required.

RIVETTING PUNCHES FOR FULLY TUBULAR RIVETS :-

SHANK DIAMETERS

- 4mm - NO.'0' OR 'X1' RIVETTING PUNCH
- 5mm - NO.1 RIVETTING PUNCH
- 6mm - NO.2 RIVETTING PUNCH
- 8mm - NO.3 RIVETTING PUNCH
- 10mm - NO.4 RIVETTING PUNCH

IMPORTANT NOTE:- WHEN RIVETTING FULLY TUBULAR RIVETS THE 'CLINCH ALLOWANCE' MAY HAVE TO BE INCREASED AS MORE OF THE RIVET SHANK IS COMPRESSED WHILST FORMING THE CLINCH.

EXTRACTOR PUNCH SELECTION:-

STANDARD EXTRACTORS:-

RIVETS 'E' TO 'K' – NO.1

RIVETS 'L' TO 'N' - NO.2

NO.2A & 2B ALTERNATIVE HEAVY DUTY EXTRACTORS

FULLY TUBULAR (HOLLOW) RIVETS:-

- |                 |        |                               |
|-----------------|--------|-------------------------------|
| SHANK DIAMETERS | - 4mm  | - 4mm HOLLOW RIVET EXTRACTOR  |
|                 | - 5mm  | - 5mm HOLLOW RIVET EXTRACTOR  |
|                 | - 6mm  | - 6mm HOLLOW RIVET EXTRACTOR  |
|                 | - 8mm  | - 8mm HOLLOW RIVET EXTRACTOR  |
|                 | - 10mm | - 10mm HOLLOW RIVET EXTRACTOR |