



PNEUMATIC BENCH RIVETING MACHINE

Ref. No 99503



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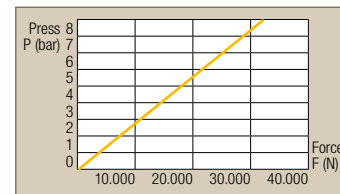
Compact Design, practical tool holder, foot pedal control and damped working stroke gives smooth riveting force. It can be mounted on any workbench with four bolts.

TECHNICAL DATA:

Max. air pressure	8 Bar
Max. Riveting force	40,000 N
Stroke	20 mm
Depth of riveting anvil	Ø20 mm
Height of machine	750 mm
Width of machine	250 mm
Depth of machine	620 mm
Crate size	850 x 660 x 260 mm inner
	920 x 695 x 360 mm outer
Net	65 Kg
Gross	82 Kg

PRESSURE TABLE

This table illustrates the relationship between the input pressure and the output riveting force.



OPERATING INSTRUCTIONS

The Beral bench riveting machine, powered by compressed air, has been specially developed for riveting brake linings and for removing old rivets. Although this machine is very simple to use, we suggest that you read the following instructions in order to obtain maximum benefit from its use.

HOW THE MACHINE WORKS AND INSTALLATION

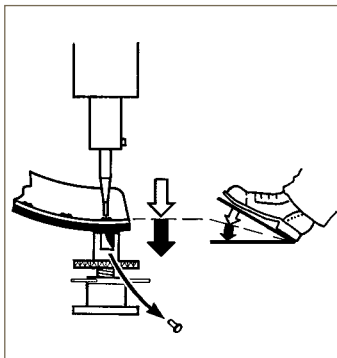
The machine is delivered ready to use, with a foot pedal control valve which should be placed on the floor beneath the machine. **1** Fasten the machine to a work bench with four M12 (12 mm metric) bolts. **2** Connect the compressed air-supply line (A) to the inlet connection. **3** Please note that the compressed air supply must be at least at bar pressure (6 atm.), otherwise the machine will not perform heavy operations. The maximum permissible operating pressure is 8 bar. This must not be exceeded, and this can be readily ensured by adjusting the pressure reducing valve. **4** Using the table "Riveting tools" on page 9, select the correct tool for the work to be performed, and fit it into the plunger or into the work table as appropriate. The tool must feed easily into the plunger. Do not use force, as this may cause difficulty in changing tools. When fitting the extractor tooling, secure with the M10 grub screw. When fitting the riveting tooling, do not use the M10 grub screw as the tool is held in place with a spring loaded steel ball within the plunger. This will allow the riveting tool to move slightly and locate into the rivet correctly. Adjust the anvil height at the adjustment wheel via the spindle and fix with the locking ring. According to the section in this booklet "Anvil Height Adjustment" (Page 5) you are now ready to rivet. **5** When the foot pedal is pressed, the machine cylinder operates a lever which moves the riveting plunger vertically downwards. The plunger goes back upwards when the foot pedal is released.

REPLACING BRAKE LININGS

PREPARATIONS

Brake linings which are contaminated with oil or which are worn down to minimum thickness must be replaced.

6 Inspect the brake drums for heat cracks, scoring and wear. If necessary, the brake drum must be machined out or replaced. Select the brake lining thickness according to whether the brake drum has been machined out once, twice, or not at all. Comply with specified limits for minimum lining thickness and maximum drum wear. 7 Never machine a brake drum out beyond the permitted maximum dimension. Both brake drums on any axle must be machined out to the same diameter. Both drums on the same axle must be fitted with the same grade of brake lining.



DE-RIVETING AND RIVETING

Drill out the old brake lining rivets or press them out using the Beral bench riveting machine.

The table "Riveting Tools" (page 9) shows the tools to use for removing old rivets. The tool diameter must be smaller than the rivet hole. Fit the de-riveting tool into the plunger and secure it by tightening the clamping screw. Insert the de-riveting anvil (one anvil is suitable for all rivet sizes) into the work table. 8 Hold the brake shoe and old lining on the de-riveting anvil in such a position that light pressure on the foot pedal moves the de-riveting tool exactly central on the rivet hole. Then press the pedal firmly to push out the rivet. The de-riveting tool should travel about 5 mm into the slot of the anvil. The rings of the destroyed rivet head are pushed up the conical shaft of the riveting tool, where they break open and fall off. 9 For solid rivets, the heads must first be chiselled off. 10 Because it can damage the clutch plate, we do not recommend using the Federal-Mogul bench riveting machine for de-riveting clutch linings. Clutch lining rivets should be drilled out instead. 11 Also, the machine should not be used if rivet heads are skewed or distorted in such a manner that the de-riveting tool cannot be exactly centred, as this may cause the de-riveting tool to break. Such rivets should be drilled out also.

RIVETING MACHINERY

The operator should be fully trained in the use of the riveting machinery. The machine should be free of all air leaks as relatively small air leaks result in a much greater loss in clinching/extraction pressure.

PRESSURE

It is often thought that the working pressure has to be adjusted with varying sizes of rivets: this 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 riveter was set at 7 bar when clinching 8mm rivets there is no need to reduce pressure when commencing riveting 5mm 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 'Anvil Height adjustment' section)

The pressure gauge of the riveting machines indicates when full pressure has been applied to the riveting process.

EXAMPLE:

Before commencing relining the riveter may be set at 7 bar, when the foot pedal is operated the pressure indicator at the gauge will drop to maybe 4 bar while the riveting punch is moving down. When the punch makes contact with the rivet the pressure will then increase quickly to maybe 5.5 bar but the pedal must remain depressed until the gauge reads the original setting of 7 bar. This will ensure full pressure is applied to the rivet, producing a sound clench and secure lining.

If the foot pedal is released too early then the resulting clinching pressure can be significantly reduced eg. at 7 bar riveting machine may develop at the rivet approx 27,000 Newtons force. Releasing the foot pedal too early, e.g. when the gauge is reading 6 bar the resulting force at the rivet will be 23,110 Newtons force!

SELECTION OF TOOLING :

From the rivet tool table, select the correct size of riveting punch & anvil to be used with the selected rivets. The only factors in determining the correct riveting punch and anvil are the shank diameter and the head diameter respectfully.

ANVIL HEIGHT ADJUSTMENT

When the appropriate tooling has been fitted into the riveter, the anvil height must be adjusted to avoid damaged to the friction lining.

TO DETERMINE THE CORRECT SETTING:

(a) Lower anvil adjuster to a point where the surface of the anvil is approx 20mm lower than the riveting punch when the foot pedal is operated i.e. the punch is down to its lowest position then release the foot pedal.

(b) Hold the Shoe & Lining together and place the lining onto the Anvil ensuring that the counter bore for the Rivet head is located over the anvil. **Do not insert a rivet at this stage.**

(c) Operate the riveter so the Riveting Punch comes close to the surface on the shoe. With shoe & lining in place and the foot pedal still operated, raise the height of the anvil adjuster until the surface of the shoe is in contact with the tip of the riveting punch. The shoe should now be lightly clamped between the punch and anvil with the riveter pedal operated.

(d) 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 for the punch is attempted. A further slight adjustment of about 1/4 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 is necessary.

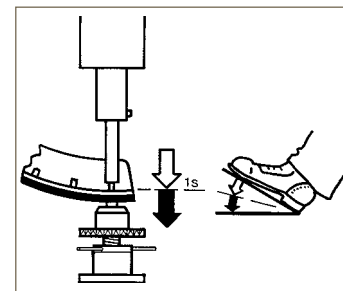
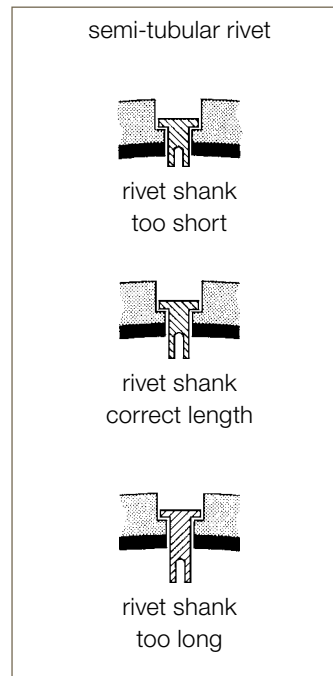
RIVETING SEQUENCE

Generally, the riveting sequence should be started in the centre of the lining and work out to the ends. Particular sequences may be recommended by the friction material suppliers.

Riveting 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.

WHAT TYPE OF RIVET TO USE?

Since there is unfortunately no international standardisation of rivet shapes and materials, we strongly advise using only those rivets recommended by the brake manufacturer. German brake manufacturers usually use rivets which meet DIN 7338 C; please note that this standard covers different types. The rivets basically suitable for riveting brake linings are semi-tubular, tubular, and stepped tubular rivets of galvanized steel, brass or copper. For the rivet to hold properly, it is also essential to use the right length of rivet. If the brake shoe thickness or lining thickness are not uniform, then use different lengths of rivet so suit. For larger brake drums



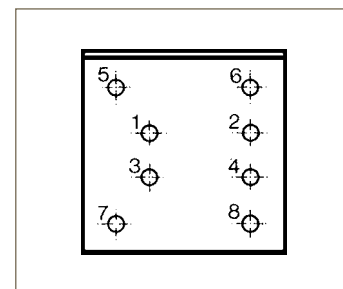
on commercial vehicles taking rivets of 8 mm shank diameter, a rough guide is that the free end of the rivet before riveting should project about 5 to 5.5 mm from the surface of the brake shoe.

RULE OF THUMB: FREE END OF RIVET = 0.7 X SHANK DIAMETER.

RIVETING

Fit the right size riveting anvil (see table "Riveting Tools", page 9) into the work table, **12** fit the riveting tool to the plunger and do not secure it with the clamp screw as the riveting punches are held in place by a spring loaded steel ball within the tool holder. **13** Read off the required riveting force from the diagram plate affixed to the machine. **14** Insert the rivets. These must go in easily, with no resistance. Place the brake lining and shoe with inserted rivets vertically onto the riveting anvil, so that the rivet head is supported level on the anvil.

15 Greasing the riveting tool very lightly helps give a properly formed rivet joint. However, it is essential that only the slightest trace of grease is used, taking great care that absolutely no grease gets onto the brake lining. **16** Start with the inside rivets and work outwards, in the order shown in the illustration.



MINIMUM RIVETING FORCE REQUIRED BY BERAL FOR VARIOUS DRUM BRAKES

	MERCEDES-BENZ, MAN	IVECO	SAF	BPW
AXLE OR BRAKE MODEL	Cam brakes for AP axles	Rockwell-expanding wedge brake	Cam brakes	Cam brakes
LINING SIZE	17 238, 19 494, 19 713, 19 495, 19 496	19 384	17 399, 19 283, 19 032, 19 515, 19 477	17 377, 19 032, 19 902, 19 094, 19 574
LINING MATERIAL	BERAL 1549 BERAL 1561	FERODO 3652	BERAL 1541 BERAL 1561	BERAL 1517
RIVETS	Stepped tubular rivets galvanized steel 8 x 15 mm, 18 or 20 (rivet length 15 mm applies for brake shoes 6 mm thick. For thicker brake shoes, use longer rivets)	Semi-tubular rivets, galvanized steel, 6.3 x 14.3 mm (L9) meeting British Standard 3575	Semi-tubular rivets, galvanized steel, 8 x 15 mm meeting DIN 7338 B	Semi-tubular rivets galvanized steel, 8 x 15 mm meeting DIN 7338 BB
RIVETING FORCE TOLERANCE	24.000N +/- 1000N = 4.2 bar	18.000N +/- 1000N = 3.2 bar	24.000N +/- 1000N = 4.2 bar	24.000N +/- 1000N = 4.2 bar

Do not apply the riveting force suddenly, but increase it gently. When maximum force is reached, hold this force for about one second. Finally, inspect the finished riveted joints. Check for the proper shape of the closed head. No visible changes to the lining, cracks or gaps between the lining and the shoe are permissible, as well as no irregularities or long tears in the closed rivet heads

CARE AND MAINTENANCE

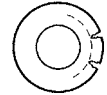
17 All moving parts of the machine must be lubricated every 12 service hours.



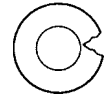
inadequately closed head



properly closed head

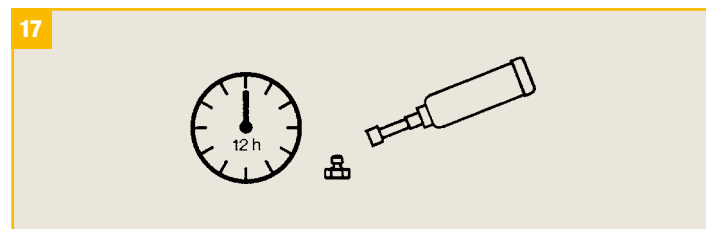
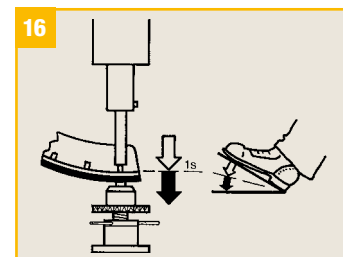
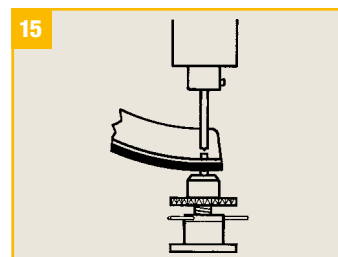
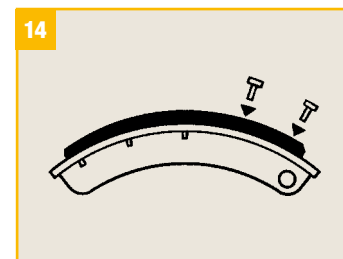
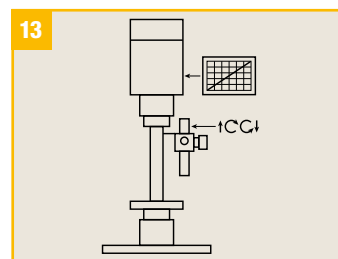
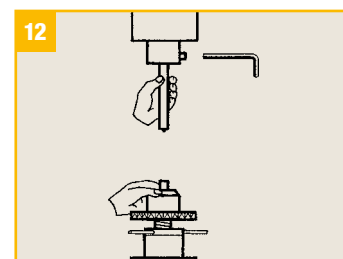
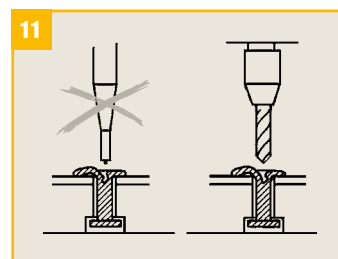
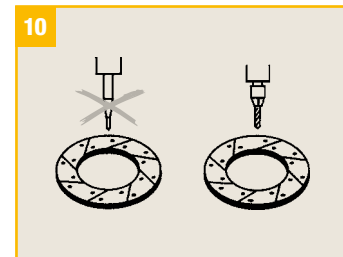
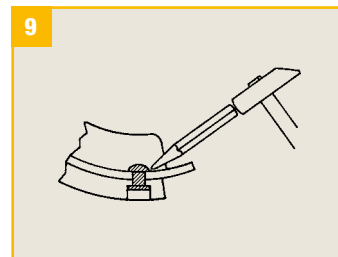
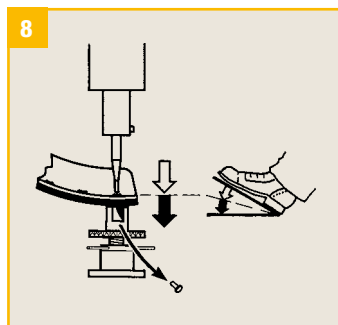
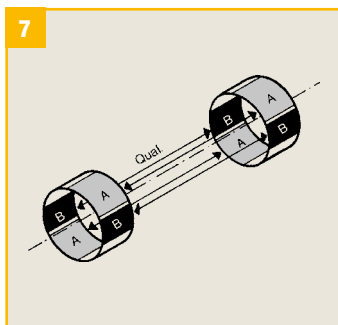
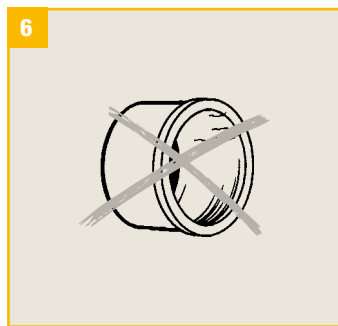
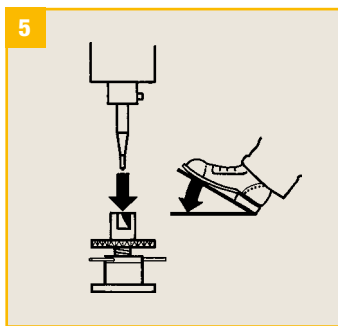
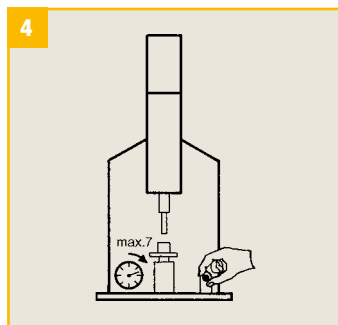
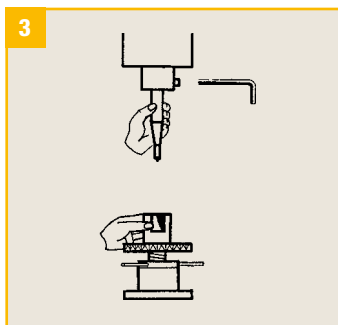
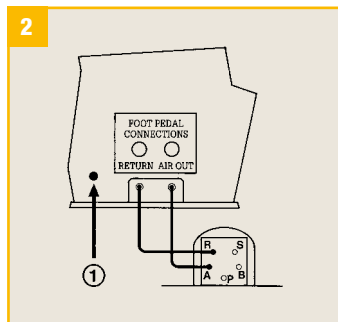
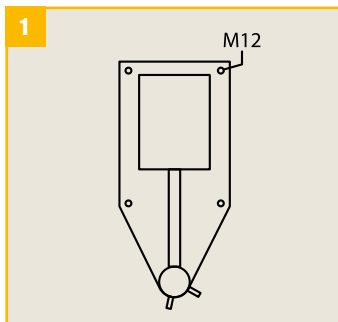


acceptable:
2 cracks per rivet



not acceptable

Part Number	Description	BERAL PRE 1995	Description
ANVILS ARE 20mm SHANK		THESE TOOLS HAVE 12mm DIAMETER SHANK	
ZF047	FOOT VALVE ASSEMBLY (SAME AS CURRENT RIVETTER)	99582050090	DERIVETTER 5MM/12MM SHANK
Z519	SLEEVE - PHOSPHOR BRONZE- FOR TOP BUSH	99582060090	DERIVETER 6mm/12mm SHANK
Z419	SLEEVE IN NYLON	99582080090	DERIVETER 8MM/12MM SHANK
99583000093	BENCH RIVETTER EXTRACTOR ANVIL	99582100090	DERIVETER 10MM/12MM SHANK
99583000096	BENCH RIVETTER HEXAGON WRENCH	99582050091	RIVETTER 5MM/12MM SHANK
99583000999005	SET OF TOOLS - BENCH RIVETTER	99582060091	RIVETTER 6mm/12mm SHANK
99583050090	BENCH RIVETTER 5mm EXT. PUNCH	99582080091	RIVETTER 8MM/12MM SHANK
99583050091	BENCH RIVETTER 5mm RIVET PUNCH	99582100091	RIVETTER 10MM/12MM SHANK
99583050092	BENCH RIVETTER 5mm RIVET ANVIL		
99583060090	BENCH RIVETTER 6mm EXT. PUNCH		
99583060091	BENCH RIVETTER 6mm RIVET PUNCH		
99583060092	BENCH RIVETTER 6mm RIVET ANVIL		
99583080090	BENCH RIVETTER 8mm EXT. PUNCH		
99583080091	BENCH RIVETTER 8mm RIVET PUNCH		
99583080092	BENCH RIVETTER 8mm RIVET ANVIL		
99583100090	BENCH RIVETTER 10mm EXT. PUNCH		
99583100091	BENCH RIVETTER 10mm RIVET PUNCH		
99583100092	BENCH RIVETTER 10mm RIVET ANVIL		



Federal-Mogul Global Aftermarket EMEA BV

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