



Proa-90
road capability
built-in use

BIG•MACH™ KIT

Vacuum Bed Construction Kit



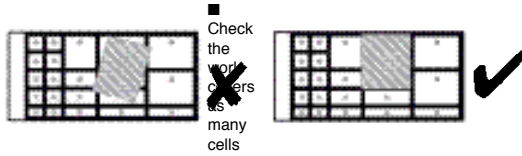
trend
routing technology

6. Drill an 8mm air extraction hole through the template.
7. Position the template on the workpiece, draw round the template and rough cut your workpiece to within 3 - 5mm of your template line. A bandsaw or jigsaw is ideal for this purpose.
8. Position the template on the BIG-MACH™ completely covering as many cells as possible and ensuring that the air extraction hole is directly over an activated cell. This allows the BIG-MACH™ (when switched on) to remove the air from between the template and the workpiece, locking them together (this grip may be stronger than the grip between the template and the BIG-MACH™, this is entirely normal). Check that the workpiece allows and even overhang around the template.
9. Turn the vacuum extractor on and the control tap on and press the two down together holding them for approx. 2 seconds to allow the vacuum seal to form between the components.
10. Prepare your router - fitting a bottom bearing trimmer cutter and set the depth stop to allow the bearing to run in the centre of the template edge.
11. Before starting your cutting pass re-check that the template and workpiece are securely locked down.
12. Slowly rout around the workpiece, a single cutting pass should be sufficient, only if the workpiece overhang exceeds 3mm might a second cutting pass be necessary.
13. Your copy should now be finished.

vacuum extractor motor.

Trouble Shooting

The BIG-MACH™ will not hold down work:-

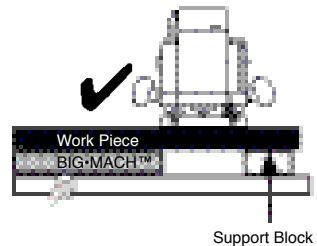


completely as possible.

- Check that your work is flat by resting it on a known flat surface, if it rocks from corner to corner, it may not form a seal with the BIG-MACH™ rubber gasket.

How do I know its working?

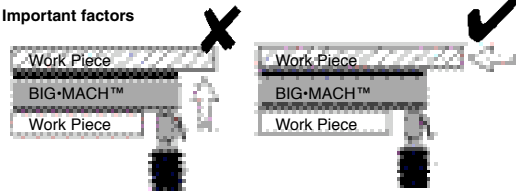
- Always check the workpiece is secure before starting to machine it. Push against it to test it is held firm.
- Do not lift the work as this will break the vacuum seal.



Working on workpieces with an overhang:-

- Always support the when it overhangs the BIG-MACH™. This will prevent the weight of the machine tipping the work-piece and breaking the vacuum seal.

Important factors



The BIG-MACH™ generates a high force resistant to a lateral or sideways movement, perfect for holding work when routing, belt sanding etc. However, components cannot be held effectively on edge and workpiece overhangs must be supported.

The strength of the holding force corresponds directly to and increases with, the number and size of cell(s) activated and sealed under the workpiece. 100 x 100mm (4" x 4") or an equivalent size is the smallest component that is recommended to be safely held for light routing and sanding purposes.

Power Sources

The BIG-MACH™ can be driven by a vacuum pump or a compressed

Introduction

The BIG-MACH™ KIT provides all the essential components for the construction of an industrial sized vacuum hold down system. The plans enclosed detail a sealed cavity unit of 1120 x 520 x 48mm. However, using multiple BIG-MACH™ KITS, larger beds can be made.

The BIG-MACH™ can be powered by your workshop, or domestic vacuum extractor. The BIG-MACH™ enables you to hold workpieces for hand held machining processes, leaving the top surface clamp free. The BIG-MACH™ is dependent on one single item, a cylinder vacuum extractor.

Please read these instructions carefully before starting this project.

The BIG-MACH™ can be used to hold components whilst, routing, templating, biscuiting/Joining, sanding, hand planing, circular sawing

Your vacuum extractor should be:

- Minimum 1000 watts.
- Fitted with detachable nozzle and hose. (Size 27mm - 34mm internal diameter).
- Fitted with a clean dust bag.

Please Note:

The BIG-MACH™ is not suitable for cyclone extractors such as a Dyson®. The BIG-MACH™ will not hold rough sawn timber or material, which is seriously cupped or twisted.

Holding Specifications

- Min. component size 95 x 95mm
- Max. component size 2240 x 1220mm

Items Enclosed

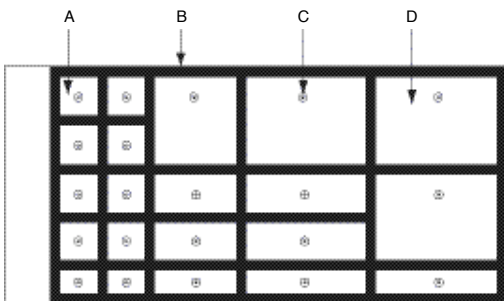
- 2 x 2.3 Metres of Bottom Gasket
- 4 x 2.3 Metres of Top Gasket
- 1 x Tapered Adapter
- 1 x Control Tap and Hex Nut
- 21 x Pressure Activated Ball Valves
- 1 x Control Tap Plate
- 4 x Screws
- 1 x Control Tap Plate Gasket
- 1 x Cutting & Fitting Guide
- 1 x Instruction



Anatomy of the BIG-MACH™

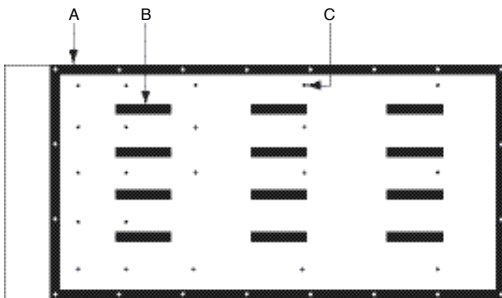
Top view of Top Board

- A. Small cell - small area within top gasket with ball valve.
- B. Top gasket - provides the seal between the workpiece and the BIG-MACH™.
- C. Ball valve steel ball with spring that activates the vacuum supply when a workpiece is pushed onto it.
- D. Large cell - large area within top gasket with ball valve.



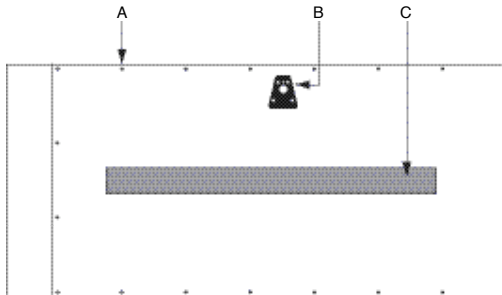
Underside view of Top Board

- A. Centre sealing gasket - seals the internal cavity when the top and base boards are assembled, this is the evacuation chamber.
- B. Internal support gasket - provides support when the air is drawn from the evacuation chamber.
- C. Ball valve holes - these holes link the ball valves on the top board to the evacuation chamber.



Underside view of Base Board

- A. Screws - fixes the top and base boards together (not supplied).
- B. Control tap plate - the mounting plate for the control tap.
- C. Cramping bar - allows the BIG-MACH™ to be held in a portable workbench.



Materials Required

MDF or marine multiply board:

Top board size: 1120 x 520 x 25mm* (*recommended)

Base board size: 1120 x 520 x 18mm* (*recommended)

The recommended board thickness should be used because thinner sections of board will distort under pressure. Both boards must be totally flat. To test whether the boards are flat, check corner to corner with a guaranteed straight edge. This is an essential requirement as any cup or twist in the board will prevent the BIG-MACH™ from working.

Constructing the BIG-MACH™

From the Cutting & Fitting Guide mark and cut out the top and base boards. Mark out the ball valve positions on the top surface of the top board and the tap plate position on the underside of the base board using the tap plate as a template.

Cutting List for Top Gasket

Part	Qty	Length	Width	Thickness
G	2	1020mm (40 1/8")	20mm (3/4")	3mm (1/8")
H	2	480mm (18 7/8")	20mm (3/4")	3mm (1/8")
J	2	980mm (8 9/16")	20mm (3/4")	3mm (1/8")
K	1	710mm (27 5/16")	20mm (3/4")	3mm (1/8")
L	2	200mm (7 7/8")	20mm (3/4")	3mm (1/8")
M	1	220mm (8 11/16")	20mm (3/4")	3mm (1/8")
N	12	90mm (3 1/2")	20mm (3/4")	3mm (1/8")
P	4	40mm (1 9/16")	20mm (3/4")	3mm (1/8")

Cutting List for Bottom Gasket

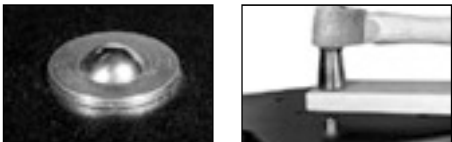
Part	Qty	Length	Width	Thickness
Q	2	1020mm (40 1/8")	25mm (1")	6mm (1/4")
R	2	480mm (18 7/8")	25mm (1")	6mm (1/4")
S	12	120mm (4 3/4")	25mm (1")	6mm (1/4")

Fitting the Ball Valves

Drill the marked positions using a 12.7mm (1/2") drill bit.

Drive the 21 ball valves into the top surface of the top board.

Use a hammer and a block of wood, this will protect the finish of the ball valve. Ensure that the ball valves sits level on the surface of the



top board.

Fitting the Top Gasket

1. Lay out the top gasket strips as per the Cutting & Fitting Guide to check that all the components fit.

2. Check that the surface is clean and clear of dust.

Important: Ensure that you only remove the backing paper of the strip that you are about to lay to avoid dust and debris.

3. Do not press the strips down firmly until they are all laid and you are entirely satisfied with their location.

4. Do not attempt to stretch the gasket strips into position or try to fill gaps as over time the gasket will return to its original length and the gaps will reappear.

5. Starting at the bottom right hand side of the top view diagram (Cutting & Fitting Guide), start to lay the strips of gasket.



6. Check that all the strips are carefully butted up together, any gaps will reduce the efficiency of the BIG-MACH™ when in operation.

7. If you have to re-lift any of the gasket strips to reposition them, do so slowly as if rushed the material can rip.

8. When satisfied that the gasket matrix is complete with no gaps, turn the top board over onto a flat clean surface, (any surface debris will distort the gasket). This will apply an even pressure and help the top gasket set in position. It will also allow access to the underside of the top board for the next stage.

Fitting Centre Sealing Gasket and Support Gasket Strips

■ Once again care needs to be taken with the bottom gasket strips, see above under the section (Important).

■ Starting at the bottom right hand side of the underside view of top board (Cutting & Fitting Guide) lay bottom strip Q first followed by right hand strip R - left hand strip R and last top strip Q.

■ Firmly press the strips down once in position.

■ Fit the internal support gasket strips, without them the boards may distort when under vacuum.



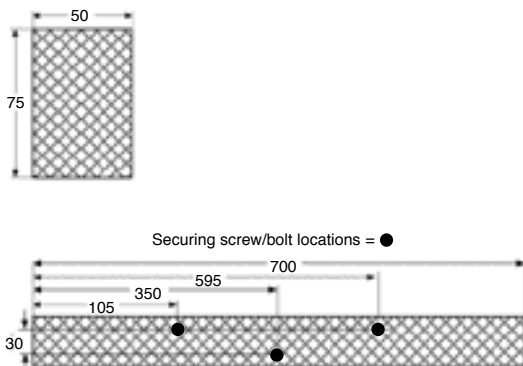
Fitting the Control Tap to the Base Board

1. Mark and cut out the control tap plate gasket and two holes. Tap hole - 25mm (1"), bleed hole - 3mm using the control tap plate as a template.
2. Put the control tap plate gasket to one side and position the control tap plate a minimum of 20mm from the edge of the base board as per the bottom view of base board (Cutting & Fitting Guide).
3. Drill one - 25mm Tap hole and one 3mm bleed hole through the base board using the control tap plate as a template.
4. Push the threaded section of the control tap through the control tap plate.
5. Screw the brass lock nut on, pinching it up tightly with the tap, square to the narrow section of the control tap plate.
6. Remove the backing paper from the control tap plate gasket and stick it to the underside of the control tap plate (non chamfered edge side).
7. Fit the control tap and control tap plate to the underside of the base board ensuring that the control tap plate gasket lies flat between the two, then screw the control tap plate into position using the four domed headed screws. Avoid over compressing the control tap plate gasket.

Assembling the Bed

1. Locate the screw positions central to the width of the centre sealing gasket around the peripheral edge of the underside of the base board.
2. Pilot drill and countersink the screw holes through the underside of the base board and into the gasket before putting the top and base board together.
3. Once all the holes have been piloted and countersunk, gently position the base board onto the top board taking care to align the two boards correctly.
4. When screwing the boards together use No. 6 screws at approximately 160mm spacing.
5. Do not over tighten the screws, as this will crush the centre sealing gasket. Both sections of board should be in direct contact with the centre sealing gasket.

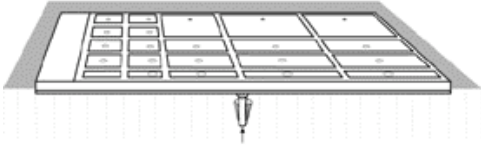
Suggested Portable Workbench Cramping Bar Dimensions



To mount the BIG-MACH™ in a portable workbench it is necessary to make a cramping bar, 75mm x 50mm pine is sufficient.

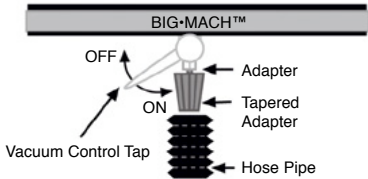
Assembly and Setup

1. Fit the tapered adapter by screwing the adapter thread into the socket in the vacuum control tap. Ensure the pipe is tight.
2. Place your BIG-MACH™ on your work surface with the ball valves



facing up and with the vacuum control tap overhanging one end of the surface. The BIG-MACH™ can be mounted for either left or right handed users.

3. Check the vacuum control tap is in the OFF position - at a right angle to the tapered adapter
4. Gently push the open hose end of the vacuum extractor onto the tapered adapter. If it does not fit, use one of the extension pipes that comes with the extractor which should have an approx. sized bore of (27-34mm). Ensure that the tapered adapter is kept clean and clear of dust and debris. Failure to do so can lead to overheating and damage to your vacuum extractor.



Operation

1. Switch on the vacuum extractor. Check the position of the BIG-MACH™ and turn the vacuum control tap ON - in line with the tapered adapter. The BIG-MACH™ is now ready to hold your work.
2. Your workpiece must:
 - Be relatively flat and impermeable.
 - Cover a minimum of one cell completely (the holding capacity of the BIG-MACH™ is directly determined by the capacity or strength of your vacuum extractor).
 - Cover the maximum number of cells completely.
3. Once in position, press down on your work-piece to secure it. This action opens the ball valves and creates a vacuum just under your work-piece.
4. Always check that your work is held firmly before you start work and that the holding force is appropriate for the operation you wish to undertake. The BIG-MACH™ is capable of supporting the weight of an overhang (up to 1m depending on the weight and porosity of the board). However the vacuum seal and the grip may be broken by either lifting or pressing down on an unsupported overhang, so ensure that the BIG-MACH™ is directly under the area of the workpiece you are currently working on.
5. To remove your workpiece, turn the vacuum control tap to OFF position. This will cut the supply of vacuum and the board will be released. Particular care should be taken when releasing the vacuum if you are holding a piece of work with a large overhang.
6. Do not drag or wrench your workpiece from the BIG-MACH™ as this can damage the rubber gasket.
7. Keep your BIG-MACH™ free from dust and debris to optimise its performance.
8. Run your vacuum extractor only when using the BIG-MACH™. We recommend a maximum continuous running time of 30 minutes with a 10 minute break to ensure the optimum life of your

air venturi.

- Remove the tapered adapter and using 1/4" BSP fittings to attach your chosen vacuum source to the BIG-MACH™.
- Both vacuum sources produce high pressures and low volumes of vacuum so it is essential that the 2mm bleed hole in the vacuum control tap plate be sealed off and that the workpiece being held does not activate ball valves without sealing the cell off completely.

Permanent Bench Top

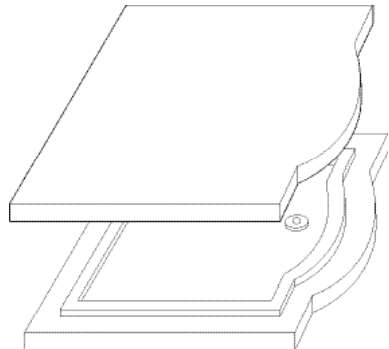
The BIG-MACH™ can be permanently mounted as a bench top on a standard workbench or on top of a storage cabinet for powertools. Alternatively, with the addition of a cramping bar on the underside it can be held effectively in a portable workbench.

Securing the BIG-MACH™

Ensure any fixing screws for mounting brackets, glass plates, bolts etc. do not penetrate the central vacuum cavity.

It is advisable to make a drop on cover to protect the BIG-MACH™ when not in use. Do not leave tools or other heavy objects on the top surface of the BIG-MACH™ as the gasket material can be permanently damaged.

How to Template and Shape Copy



with the BIG-MACH™

To repeat a shape or a component accurately is traditionally a very time consuming business - usually involving pinning the workpiece to the template or double side taping the two together, then holding the two components down to your bench before routing. This method also means unnecessary time spent cleaning up or even filling the holes in the component.

A process has been developed using the BIG-MACH™, which greatly simplifies this process.

1. Using the remaining top gasket material, cut 20mm (3/4") width section into two 10mm (3/8") strips.
2. Using the remaining top gasket material, cut - 20mm (3/4") width section into 10mm (3/8") strips.
3. Mark and cut out the component or shape you wish to copy, from a non-porous material i.e. melamine chipboard, blockboard, veneered/sealed M.D.F or plywood. The ideal thickness is 18mm (3/4").
4. Ensure that the edge of the template is smooth for the cutter bearing to run on, as any irregularity will be copied into the workpiece. Time spent on preparation of your template is a wise investment.
5. Apply a single strip of gasket material round the edge of the template 3-5mm from the edge, cut the gasket ends at a slant as this helps the two ends meet and seal.

Safety Steps

1. Always wear eye protection such as goggles, ear protection and use effective respiratory protection.
2. Before making adjustments to the router, like changing the cutter, make sure the power is isolated correctly.
3. Before re-connecting to the mains supply, make sure the power switch on the router is in the 'off' position.
4. Do not switch on the router with the cutter in contact with the workpiece.
5. Before making adjustments always allow the cutter to stop rotating.
6. When routing keep your hands, hair and clothing clear of the cutter.
7. Make sure you follow the instructions which came with your router.
8. Ensure all visors, guards and dust extraction are fitted.
9. Trial cuts should be made in waste material before starting any project.
10. Always support overhangs when working on them.
11. Always test your workpiece is being held to a sufficient level before proceeding to work on it.
12. Make sure your work area is free from hazardous obstacles and trailing cables.

Our policy of continuous improvements mean that specifications may change without notice. Trend Machinery & Cutting Tools Ltd. cannot be held liable for any material rendered unusable, or for any form of consequential loss.



Trend Machinery & Cutting Tools Ltd
Odhams Trading Estate St Albans Road
Watford WD24 7TR
Technical Support: 01923 224681
Fax: 01923 236879
Email: mailserver@trendm.co.uk
www.trendmachinery.co.uk

