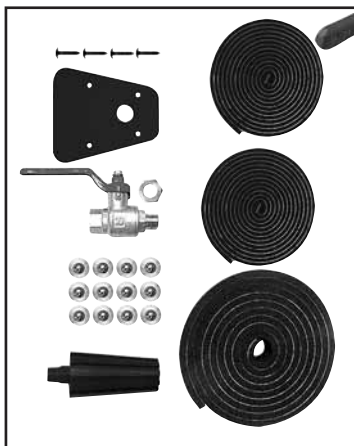




Please  
read carefully  
before use

# U·MACH™ KIT

Vacuum Bed Construction Kit



**trend**<sup>®</sup>  
routing technology

INST/MM/KIT v1.0

# Introduction

The U•MACH™ KIT provides all the essential components for the construction of your own U•MACH™ vacuum hold down system. (The M.D.F Board must be supplied by the user). Jig making experience is recommended.

The U•MACH™ can be used to hold components whilst routing, templating, biscuiting/jointing, 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 U•MACH™ is not suitable for cyclone cleaners such as a Dyson®. The U•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 1220 x 1220mm

# Items Enclosed

- 1 x 2.3 Metres of Bottom Gasket
- 2 x 2.3 Metres of Top Gasket
- 1 x Tapered Adapter
- 12 x Pressure activated Ball Valves
- 1 x Control Tap and Hex Nut
- 1 x Control Tap Plate and 4 x Screws
- 1 x Technical Plan (3 diagrams)
- 1 x Instruction



# Tools Required

## General tool kit including:

Jigsaw, rip saw, router, straight flute cutter max. 9.5mm (3/8"), rounding over cutter max. 12.7mm (1/2") radius, drill, 12.7mm (1/2") drill bit, 3/4" spanner, hammer, craft knife, steel rule, painting equipment, finishing abrasives.

# Materials Required

## M.D.F or marine multiply board:

Size: 610 x 342 x 25mm (24 x 13 x 1")

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 U•MACH™ from working.

**Under coat/Primer, Paint, varnish or Danish Oil.**

# Constructing the Bed

(see enclosed Plans)

1. The technical plan is drawn actual size, it comprises of three A3 size sheets that can be cut out and taped together with clear sticky tape to create the U•MACH™ outline. From the plans, mark out the outside edge and valve positions on the top side of the body and valve plate recess on the bottom of the body using the valve plate as a template.
2. To rout out the stepped recess that takes the valve plate see the recess section on the plans to set the router cutter depth. A batten can be clamped to the component to act as a guide or preferably two templates can be made to create the recess. Page 1 of the plans shows the outline of the two templates. These templates have been made larger to allow a 20mmØ guide bush and 10mmØ router cutter to be used. Cut out the plan and glue to a piece of 6mm MDF or plywood and cut out the template outline with a jigsaw and clean up. Place the template on the component and using a 20mm guide bush and 10mm cutter, rout out the recess using the templates as a guide.
3. Clean up and check that the plate fits tightly.
4. Jigsaw out the outside shape and handle cut out.
5. Prepare all the cut edges carefully in order that the bearing on the rounding over cutter runs smoothly in the middle of the board.
6. Rout the edge and handle cut out on both sides of the board.

7. Drill the valve holes from the top surface and ensure that the drill passes into a waste board below to avoid break out when the drill bit exits the board.

8. The body of the U•MACH™ can now be finished with abrasive ready for sealing.

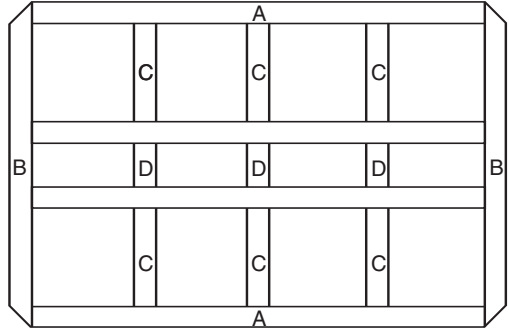
**Note: This template material must be removed before the top gasket strips can be fitted.**

# Sealing the Bed

M.D.F is porous and must be sealed; otherwise the performance of the U•MACH™ will be badly effected. The edges are particularly porous and will require two primer/under coats plus rubbing down between coats before a top coat can be applied. Birch Marine Ply can be sealed with any suitable finish, as its level of porosity does not cause a problem.

# Cutting out the Gaskets

Cut all the lengths of gasket strip to make up the top and bottom gaskets. Use a sharp craft knife and a steel rule. All cuts should be made at right angles to the edge of the strip. It is critical that the gasket material is of a consistent thickness. Slight variations in thickness may occur at the beginning and end of the rolls. If this occurs cut out the faulty section. Sufficient gasket material is provided. The surplus top gasket can be used for the templating



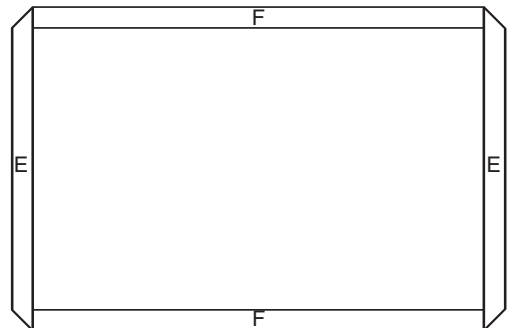
facility.

## Cutting List for Top Gasket

Part	Qty	Length	Width	Thickness
A	4	410mm (16 1/8")	20mm (3/4")	3mm (1/8")
B	2	295mm (11 3/4")	20mm (3/4")	3mm (1/8")
C	6	90mm (3 9/16")	20mm (3/4")	3mm (1/8")
D	3	39mm (1 1/2")	20mm (3/4")	3mm (1/8")

## Cutting List for Bottom Gasket

Part	Qty	Length	Width	Thickness
E	2	452mm (17 7/8")	25mm (1")	6mm (1/4")
F	2	295mm (11 3/4")	25mm (1")	6mm (1/4")



Where the outer top and bottom gaskets meet in the four corners of the board, trim at a 45 degree angle parallel to the board edge.

## Control Tap Assembly

1. Push the threaded section of the tap through the vacuum control tap plate.
2. Screw the brass lock nut on, pinching it up with the tap square to the narrow section of the control tap plate. A torque setting of 0.63 Nm (15lbs) is adequate.



## Fitting the Ball Valves

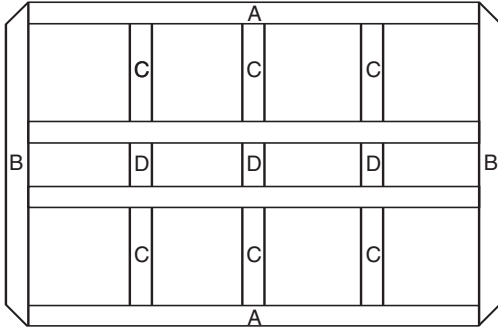
1. Drive the twelve ball valves into the top surface of the top board (opposite side to the control tap plate recess).



2. Use a hammer and a block of wood, this will protect the finish of the ball valve.
3. Ensure that the ball valves sit level on the surface of the top board.

## Fitting the Top Gasket

1. Lay out all the top gasket strips 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.**
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. Start at the handle end of the body, removing the backing strip of section B and gently lay it in position.
6. Ensure it is straight and lying parallel with the edge of the Board.
7. Lay sections A at right angles to section B and parallel to each other.
8. Check that all the strips are carefully butted up together, any gaps will reduce the efficiency of the U•MACH™ KIT when in operation.
9. Complete the matrix with the remaining section B at the tap end.
10. Fill in the sections creating the vacuum cells with sections C and D.
11. Trim the four outside corners to fit within the perimeter of the board.
12. If you have to re-lift any of the gasket strips to reposition them, do so slowly as if rushed the material can rip. When satisfied that the gasket matrix is complete with no gaps, turn the 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 control tap plate recess for the next stage.

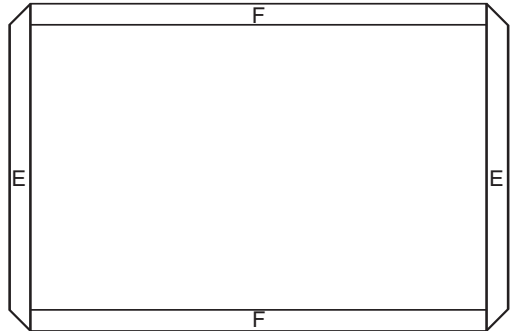


## Fitting the Control Tap

1. Fit the control tap plate into the recess.
2. Using the control tap plate as a template for their location, drill four 2.5mm (3/32") diameter pilot holes 9.5mm (3/8") deep.
3. Ensure the control tap plate is accurately lined up with the recess, then screw the plate down into position.
4. When fixed down the control tap plate should lie flush with the body of the U•MACH™ KIT, this is important as the U•MACH™ KIT bottom gasket needs to lie flat on a surface when in operation.
5. If you are using M.D.F as the material, drive the screws in by hand to ensure they bite up securely.

## Fitting the Bottom Gasket

1. Layout the four strips in position.
2. Remove the backing paper from section F and position it along the edge of the wide section of the control tap plate parallel with



## Assembly

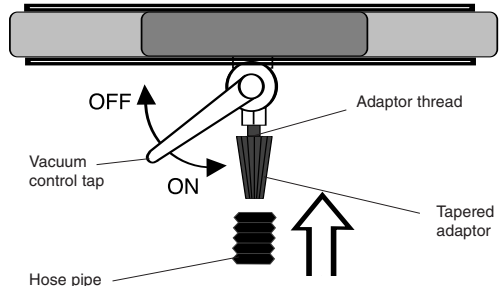
Fit the tapered adaptor by screwing the adaptor thread into the socket in the vacuum control tap. Ensure the pipe is tight.

Your U•MACH™ is now ready to be used.

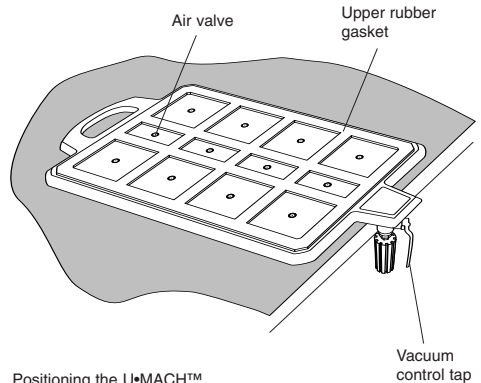
- Place your U•MACH™ with the lower gasket sitting fully on your work surface with the air valves facing up and with the vacuum control tap overhanging one end of the surface. It can be mounted for either left or right handed users.
- Check the vacuum control tap is in the 'OFF' position - at right angles to the tapered adaptor.
- Gently push the open hose end of the vacuum cleaner onto the tapered adaptor. If it does not fit, use one of the extension pipes that comes with the cleaner which should have an appropriate sized bore (27-34mm). Ensure that the tapered adaptor is kept clean and clear of dust and debris. Failure to do so can lead to the overheating and damaging of your vacuum cleaner.

## Operation

- Switch on the vacuum cleaner. Check the position of the U•MACH™ and turn the vacuum control tap ON - in line with the tapered adaptor. If your worksurface is sufficiently flat the U•MACH™ will grip on to it. Make sure your fingers are well clear of the handle before doing this. The vacuum bed is now ready to hold your work.
- Your workpiece MUST:
  1. Be relatively flat and impermeable.
  2. Cover a minimum of one large cell completely (the holding capacity is directly determined by the capacity or strength of your vacuum cleaner).
  3. Cover the maximum number of cells completely.
- Once in position, to secure your workpiece, gently press down on it. This action opens the ball valves and creates a vacuum just under your work.
- 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 vacuum bed 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 therefore the grip may be broken by either lifting or pressing down on the overhang, so ensure that the vacuum bed is directly under the area of the workpiece you are currently working on.
- To remove your workpiece, turn the vacuum control tap to OFF position. This will cut the supply of the vacuum and the board will be released. Remember this action will also break the vacuum seal between vacuum bed and the work surface. Particular care should be taken when releasing the vacuum if you are holding a piece of work with a large overhang.
- Keep your vacuum bed free from dust and debris to optimise its performance.
- Run your vacuum extractor only when using the vacuum bed. We recommend a maximum continuous running time of 30 minutes with a 10 minute break to ensure the optimum life of your vacuum cleaner motor.



Fitting the tapered adaptor and vacuum cleaner hose



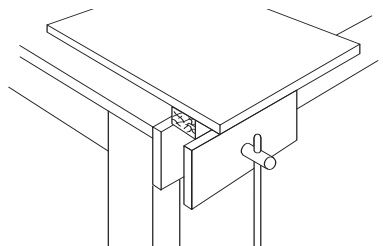
Positioning the U•MACH™



**Do not drag your workpiece from the vacuum bed as this can damage the rubber gasket.**

## Mounting Board

If your bench is very uneven and your vacuum bed has trouble gripping it, a simple solution is to make a mounting board. Cut out a section 500mm x 330mm of ply, MDF or chipboard at least 18mm thick. Screw and glue a cramping batten (50mm x 50mm x the length of your bench vice jaws) approximately 130mm in from one end of your panel. Cramp the batten in the vice and let the vacuum bed grip the mounting board. Alternatively you might want to resurface your bench.

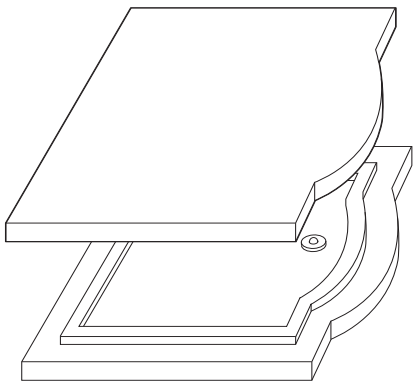


the edge of the body.

- Fit two of section E at right angles to section F and then finish the matrix with the other section F. Firmly press down when in position. The U•MACH™ is now finished and ready for use.

## How to template and shape copy with the U•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. The U•MACH™ KIT greatly simplifies this



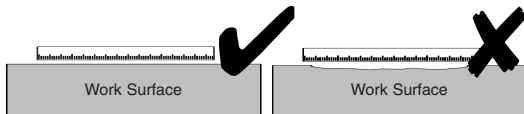
process. Using the remaining top gasket material, cut 20mm (3/4") width section into two 10mm (3/8") strips. Mark and cut out the component or shape you wish to copy, from a non-porous material i.e. melamine chipboard, block board, veneered/sealed M.D.F or plywood. The ideal thickness is 19mm (3/4").

- 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.
- 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.
- Drill an 8mm air extraction hole through the template.
- 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.
- Position the template on the U•MACH™ KIT completely covering as many cells as possible and ensuring that the air extraction hole is directly over an activated cell. This allows the U•MACH™ KIT (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 U•MACH™ KIT, this is entirely normal).
- Check that the workpiece allows an even overhang around the template.
- 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.
- 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.
- Before starting your cutting pass re-check that the template and workpiece are securely locked down.
- 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.

## Trouble Shooting

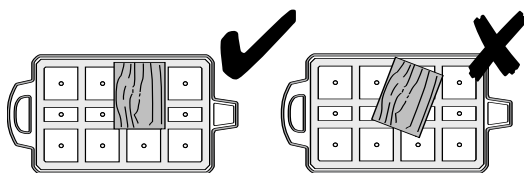
The U•MACH™ does not grip the surface

- Check your work surface is flat - check with a straight edge in both directions from back to back and side to side.
- Check your surface is not porous or has holes in it - MDF is porous, seal the area with paint, varnish or Danish oil.
- Check your vacuum cleaner bag is not full or that the hose is not blocked.
- Check the lower gasket is level all round and undamaged.



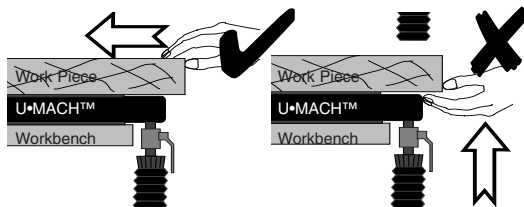
The U•MACH™ grips surface but will not hold the work

- Check the work covers as many cells completely.
- 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 to the rubber gasket.



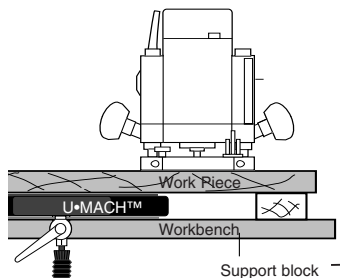
How do I know it is working?

- Always check the work piece 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 with large workpieces

- Always support the workpiece when it overhangs the vacuum bed. This will prevent the weight of the machine tipping the workpiece and breaking the vacuum 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.

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