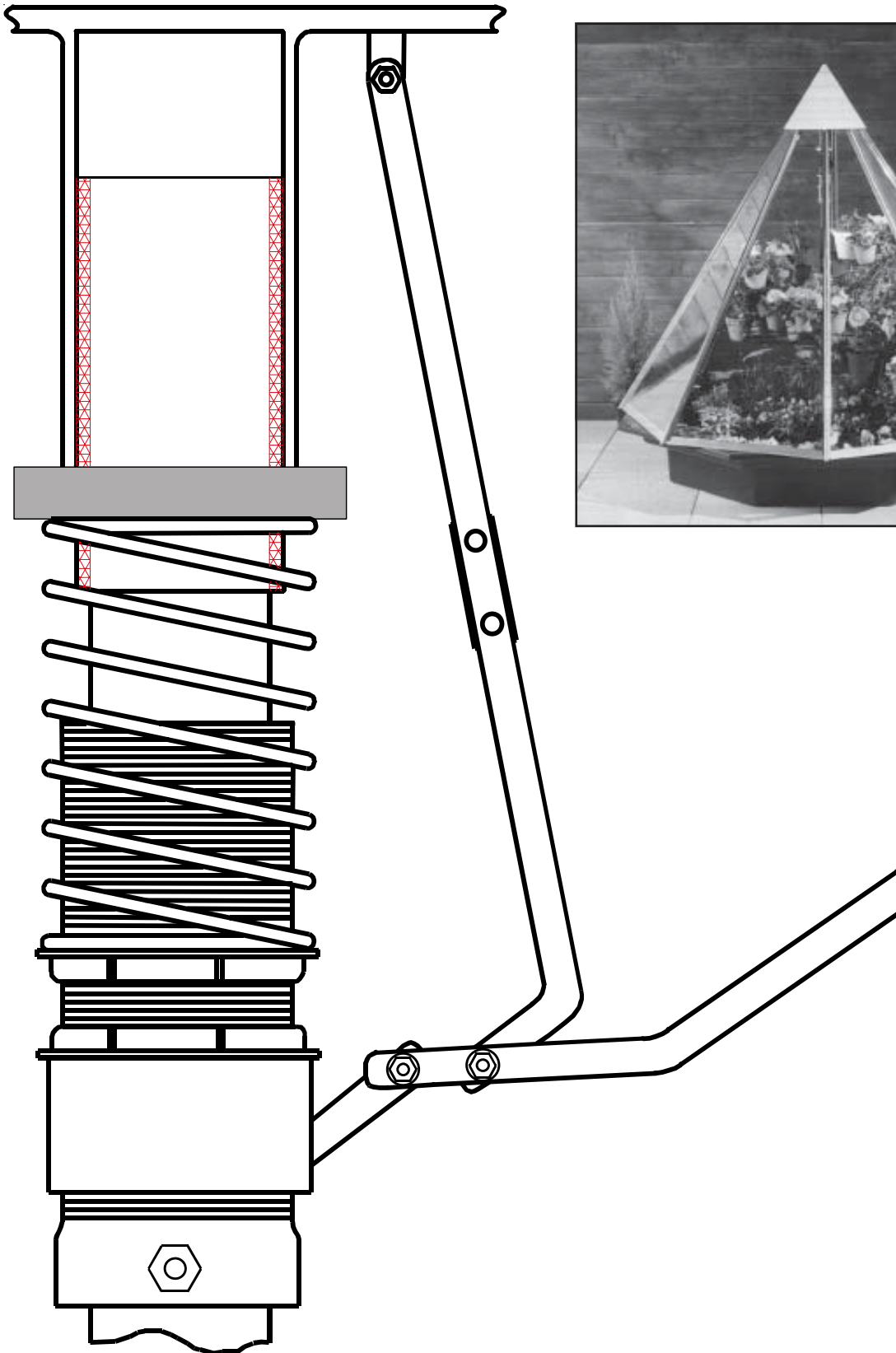


GrowMate

Manual

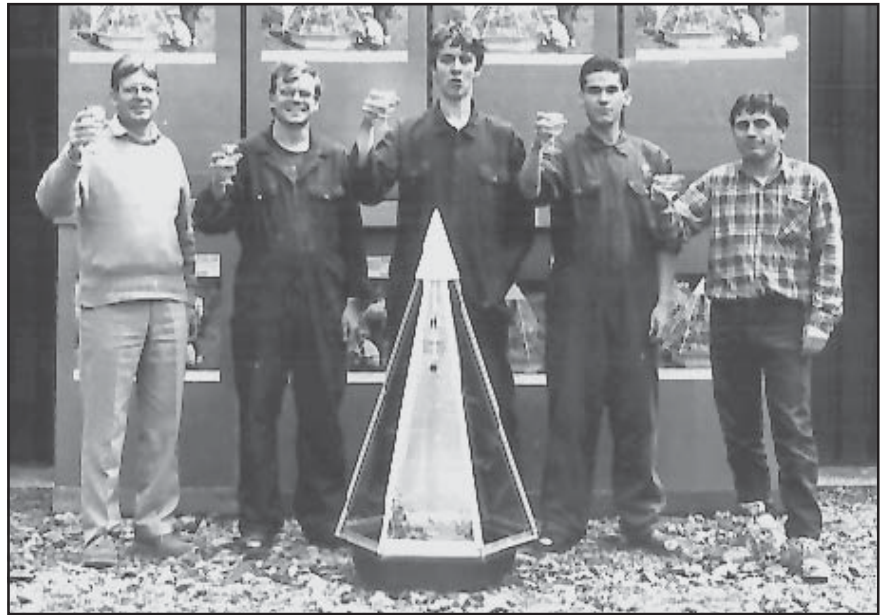


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★ **IMPORTANT.** Take a look at pages 5 & 6 before you begin assembly of your GrowMate. They contain useful information on siting and safety – and the components diagram identifies all parts and shows you where they go.

Should you encounter difficulties at any time, refer to “Trouble Shooting” on p.13.



The Micro is launched at the GrowMate factory in Argyll, Scotland.

THOUSANDS OF GROWMATES are now in use, and their fame is spreading abroad – so far to the United States, Japan, France and Germany but with many other countries also showing an interest.

The design generates curiosity and attention wherever it goes, but its unusual appearance has nothing to do with whim or fashion; it is a synthesis of two designs that have evolved over many generations.

The base section utilises “raised-bed” principles developed world wide for high productivity, excellent drainage and freedom from weeds and ground pests.

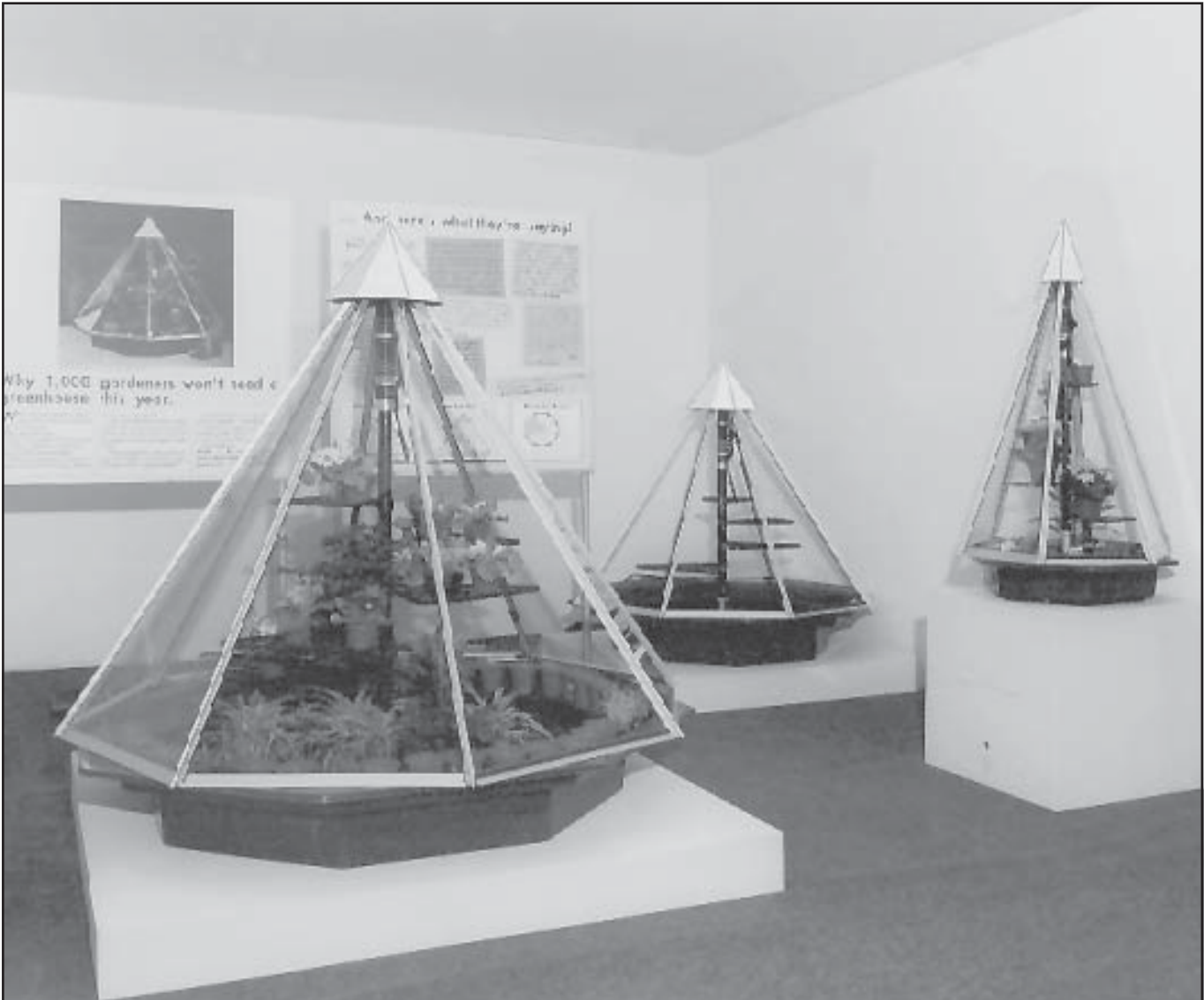
The glazed canopy echoes the profile of a tipi – home of the famous warrior races of North America. Tipis have remarkable properties; they are habitable in near arctic weather conditions, yet stay cool in the searing heat of a plains summer. In addition they are practically impervious to wind damage.

By combining the principles of a raised-bed and a tipi, GrowMates add something extra of their own. Something that plants respond to, and which results in high yields of vigorous disease-free stock. They offer perhaps the best introduction yet for those new to “growing under glass” – yet experienced gardeners use them too and have been quick to endorse their remarkable properties.

You can have fun with a GrowMate and save a lot of money by raising all your own plants from seed. For the cost of running a light bulb you can heat it all through the winter months. You can experiment with cacti, herbs, and winter salads, and you can do all this in an odd space that would normally be overlooked for productive use.

So now, get growing – and good luck!

Andrew McIntyre
(GrowMate's Designer)



GrowMate Mk III Standard, Mini and Micro (left to right) seen here at the Ideal Homes Exhibition at Earls Court, London (Spring 1995).

THE GROWMATES COVERED IN THIS MANUAL are the Standard & Mini. They are identical in construction and appearance, with the Standard having an enclosed volume roughly double that of the Mini.

Limited production of early models commenced in 1989, and after a period of further product and process development, new versions were launched at the Chelsea Flower Show (London) in May 1992. Volume production began at about the same time in a purpose built factory near Oban, in Argyll, Scotland.

The assembly procedures that follow are for the “Mk III” GrowMates, which can be identified as having all aluminium canopy frames (in early models, the canopy “hoop” was fabricated in mild steel and hot-dip galvanised). The “Mk IIIs” also have a green moulded glass-fibre base with a turned edge flange and all plant trays are edged with a raised 13mm x 3mm steel-strip. In addition,

the door panel has an aluminium trim on the three longest edges.

All models share the same geometry and many components are interchangeable, allowing early models to be upgraded to more recent versions.

A range of GrowMate accessories is planned, to increase the versatility of the original design. Drop-in compost containers were introduced in 1993 and are now a popular “optional extra”.

Third-party accessories include bubble plastic insulation, soil-warming and space-heating elements, and irrigation kits – all developed by Simply Control of Andover, and available direct from them. (See p.21).

Staff at the GrowMate factory are highly responsive to “front-line” comment, and the company is always glad to receive suggestions for improvement.

CHOOSING A SITE

KEEP IT LIGHT

The object of any glasshouse is to capture as much natural warmth and light from the sun as possible. With this in mind, it is always best to put a GrowMate in an open sunny site facing south and away from the shadows cast by your home or by other buildings and trees etc. Do not despair though if you are unable to find a “perfect” location – compromise is always possible.

Try brightening up a dark corner by adding a splash of white or light pastel paint to surrounding surfaces. It is amazing how much extra light can be reflected by this means. You can also experiment with a wide variety of plants that prefer lower levels of light and warmth.

GROUND

The GrowMate has been designed for use without foundations provided it is adequately weighed down. This means filling the base with compost to within 1/2" (12mm) of the peripheral ledge. **USE COMPOST NOT GRAVEL, AND IN HOT WEATHER KEEP THE COMPOST MOIST AT ALL TIMES BY WATERING IT AT LEAST ONCE EACH DAY.**

If you use this technique, you can place the module straight onto any firm level surface – patio, flat roof, lawn, or a patch of waste ground. You can also move it around and experiment with different locations by simply removing the compost. An alternative is to prepare a conventional fixed foundation to which the GrowMate is bolted (a small concrete pad will do). This has the advantage that you can stand large pots straight onto the ground in an open base – a useful feature if you are starting off tomatoes. The disadvantage is that a fixed foundation involves greater site preparation and expense, and you may have to shade the structure in hot weather since it will rise to a significantly higher temperature when there is no moist compost in the base.

For added convenience, several users have opted to raise the module a few inches on a plinth made of natural stone or wood. This may be a particular help to those who are handicapped or unable to stoop – or to wheelchair gardeners.

Whichever arrangement you adopt, you can choose to limit your compost depth to the 6" (150mm) of the moulded base or, if the site allows, you can grow right through the base into much deeper soil.

ORNAMENT OR WORKHORSE?

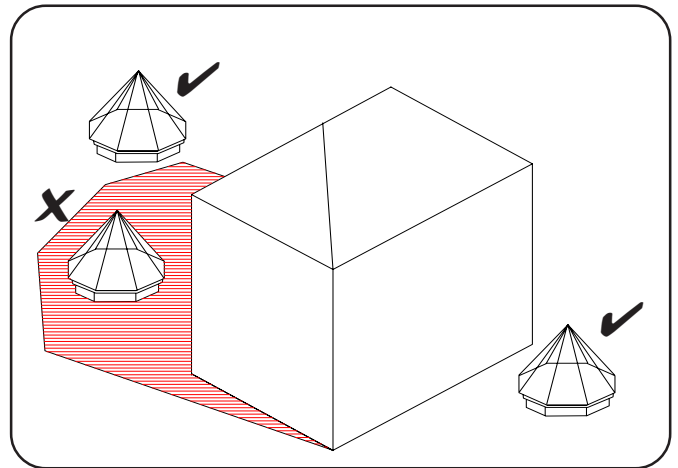
Many GrowMates are bought as a garden feature, since they can be a stunning focal point when filled with attractive blooms. This also allows them to be used in areas where you would not site a conventional structure – for instance in a front garden or on a patio.

There may on the other hand be an equal or greater demand for a GrowMate to “earn its keep” – perhaps by raising a large volume of bedding plants each spring, or by providing a steady supply of herbs for the kitchen.

Whatever your intentions, give some thought as to HOW you intend to use your GrowMate, since this will inevitably have some bearing on WHERE you site it!

LOOKING AFTER YOUR PLANTS

In summer your plants will need plenty of water; in winter they may well need some heat. How you meet these requirements will depend on personal choice. If you are at home each day and



It is best to put a GrowMate in an open sunny site away from shadows cast by your home – but compromise is always possible.

like to keep things simple, you may be happiest checking and watering each plant daily with a can or hand-sprayer and heating the module in winter with an oil-lamp. You can be completely self sufficient at little cost.

If you are away from home for long periods, you may want to automate things by laying on programmed irrigation, and thermostatically controlled electric heating. Technology can now take care of your plants for days at a time, but it all costs money and the facilities must be available on-site. A single trench can carry the power and water supplies to a distant GrowMate, but you will need to check feasibility before proceeding or you may find yourself with a major civil-engineering project on your hands – and a bill to match!

SAFETY

Assembling a GrowMate is a simple, enjoyable task involving only hand tools – principally the single 10mm x 8mm spanner provided. However, accidents can happen in any DIY project, and in the interest of safety we recommend that you observe the following points:-

- Choose a well-lit open space in which to assemble the kit. Pay particular attention to the ground or floor area which should be sound, level and free from clutter.
- Keep infants and pets out of the work area – for their safety and yours.
- Stick to the order of assembly detailed in this manual.
- Use only a protected power supply, (one fitted with a Residual Current Device or RCD) when working with power tools. This applies to *all* garden devices powered by mains electricity, including soil-warming cables and lamps etc.
- Get help if you want to move the assembly from one location to another. It is not heavy, but it is awkward and if you try to man-handle it on your own you could break something – and/or injure yourself.
- Wear gloves when handling glass and never try to lift more than one pane at a time.
- Wear light eye protection when fitting or removing glazing clips, since they can flick out unexpectedly. Ordinary spectacles or sunglasses should be fine.

GrowMate Assembly

MAIN COMPONENTS

- 1 vent
- 2 vent-spring
- 3 hub
- 4 vertical glazing bar
- 5 hoop-bar
- 6 door panel
- 7 thrust washer
- 8 suspension spring
- 9 bush
- 10 adjuster
- 11 control arm assembly
- 12 trays
- 13 base assembly
- 14 base

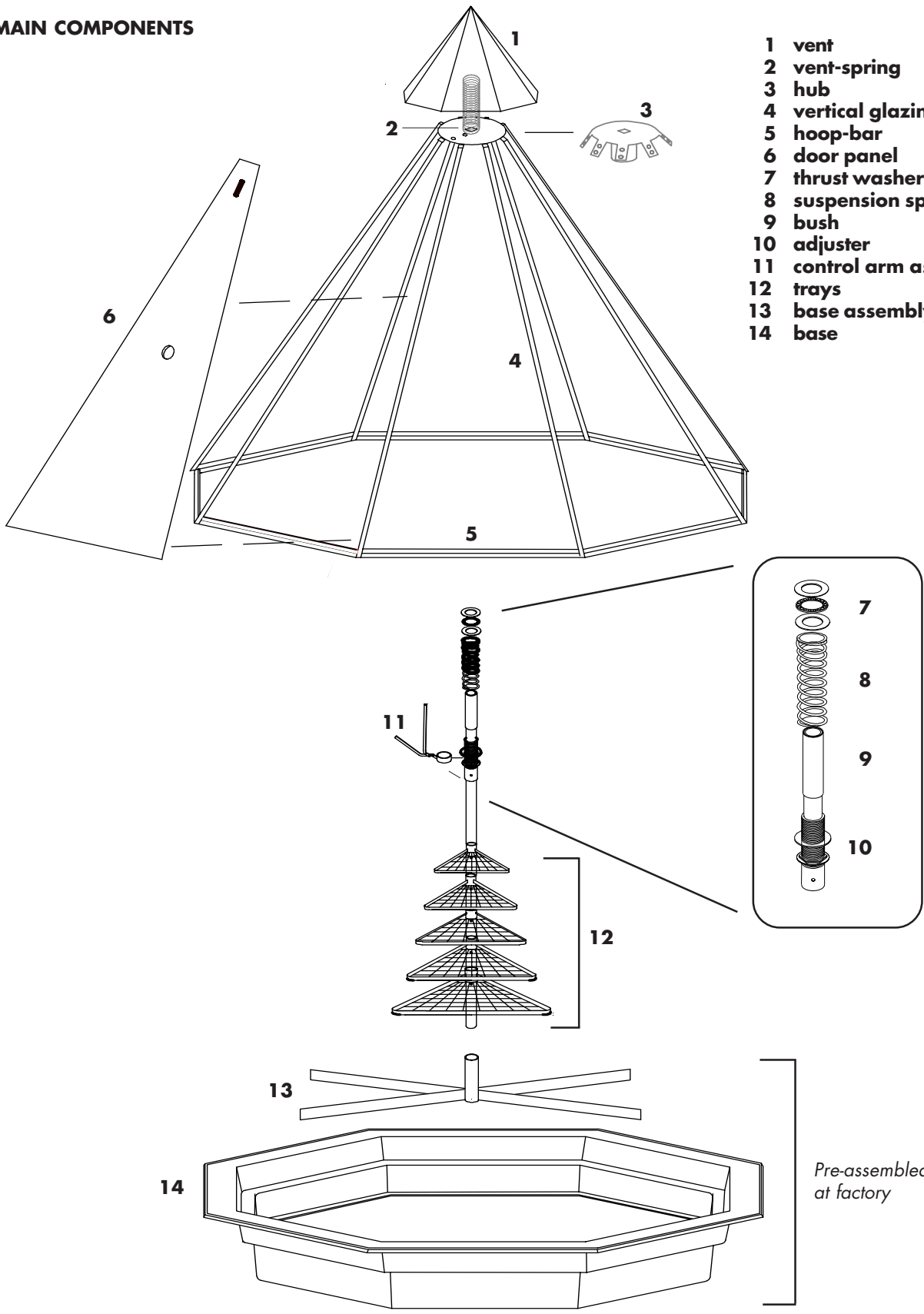
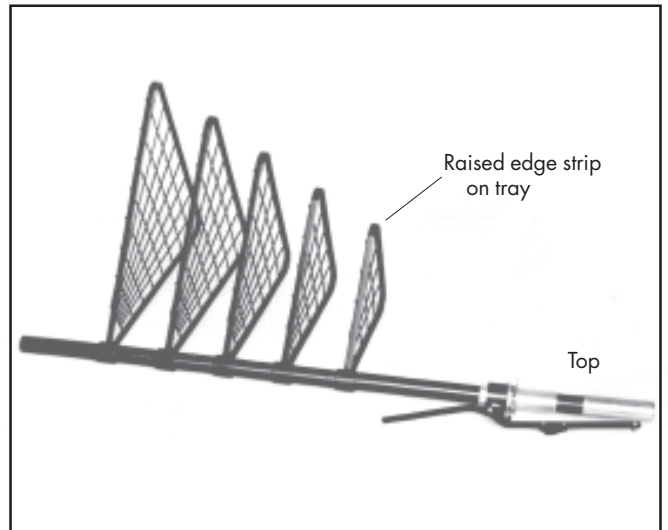


Fig A1

1 MAST & BASE

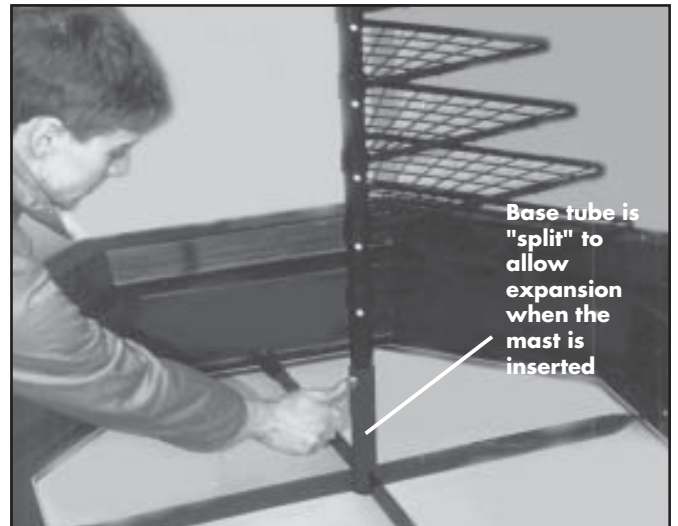
- 1** Slip the five wire mesh trays onto the mast. Check that they are right way up – the raised edge strip goes to the top. The trays are fitted in order of size, smallest on first and largest last.
- 2** Position each tray above its peg hole, then push in the black plastic support peg.
- 3** Fit the mast assembly to the moulded glass-fibre base. Slide the mast down into the base tube, line up the drilled holes, then push the stainless-steel bolt through, fit the washer & nut and tighten fully.
- 4** Apply waterproof grease from the sachet to the top bush.
- 5** Wipe off surplus grease, then refit the spring & thrust washer. (See also Fig A2, p11).



1.1 Slip trays onto mast in order of size. Ensure that the raised edge strips go to the top (ie, towards the control arm at right).



1.2 Push in black support-pegs below each tray.



1.3 Fit the mast assembly to the moulded base. Push the mast down into the base tube, line up the holes, fit the bolt, washer & nut. Tighten fully.



1.4 Apply waterproof grease from the sachet to the bush.



1.5 Wipe off surplus grease, then fit spring & thrust washer. (See also Fig A2, p11).

2 CANOPY

1 Pre-fit alloy nuts & bolts to the hub. Square bolt-heads face outwards. Leave the nuts slack.

2 Fit a glazing bar to the hub. The square heads of the two bolts slip into the channel at the back of the glazing bar and the bar is then pushed gently up into firm contact with the disc. Check that the bar aligns with the bracket then tighten nuts fully. *Do not over-tighten, or damage may occur; these components are manufactured in a special soft alloy material in order to be chemically compatible with the aluminium sections. It is easy to over-tighten if you use a spanner other than the one provided.*

3 Fit, align and tighten two further lengths to make the assembly self-supporting, like a 3-legged stool.

4 Fit all remaining glazing bars.

5 Tie the door-cord loosely around the two nearest glazing bars to identify them as door-frame members and to remind yourself not to fit glass to this section!

6 Fit the partly assembled canopy to the mast. At this stage you may find it convenient to raise the GrowMate up a few inches on some blocks to make low-level assembly work more comfortable.

7 Pre-fit alloy bolts and nuts to all curved 3-hole brackets. Square heads go to the *outside* of the curve. Leave the nuts loose.

8 Fit the 3-hole brackets to the lower end of the glazing-bars. The square head of the centre bolt slips into the channel at the back of the bar. Align the bracket at right angles to the glazing bar, close to the end. Tighten the nuts to finger tension only.

9 Slip the hoop-bars onto the 3-hole brackets. Butt the bar-ends into firm contact with the upright bar, then finger-tighten the nuts. (Note; if the bolts appear to be too short, you are assembling incorrectly – check that all three aluminium bars lie **flat** to the 3-hole brackets.

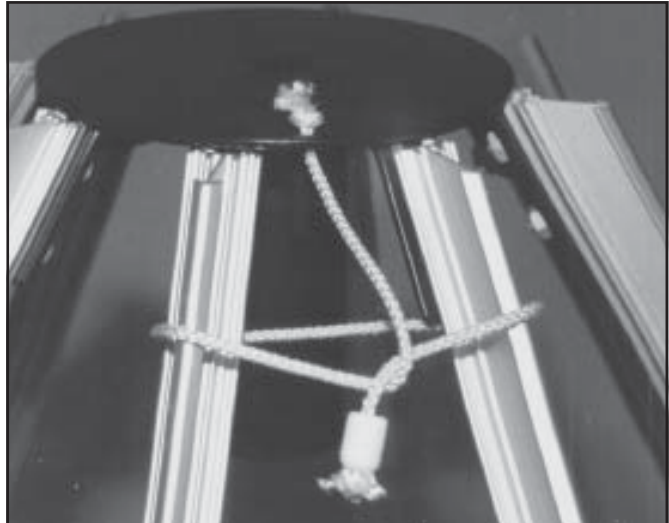
10 Tighten the nuts fully, but as you do so take special care to ensure that the vertical glazing bar and the two horizontal bars come into perfect alignment on their lower surfaces. The best way to check this is to brush your finger-tips lightly across the under side of the hoop as you tighten up with the spanner. At the same time, make sure that the horizontal bars continue to butt firmly against the upright glazing bar. If you are unsure about this procedure, practice with one bracket, while referring to photographs 2.9, 2.10 and 2.11, then complete the other brackets. *It is important to get this part of the assembly right, since mistakes at this stage can cause damage to the fibreglass base, and make the glass difficult to fit.*

11 Move the GrowMate to its final site, and carry out a final check on all alloy nuts to make sure that none have been missed, and that all are fully but not over-tightened.

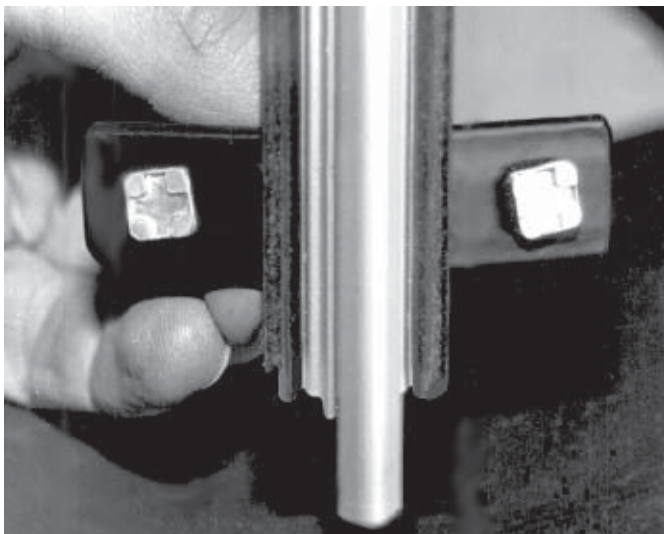
12 Put on a pair of gloves, then fit a glass panel to one of the frames next to the door frame. Lower the glass gently into the channel at the base,



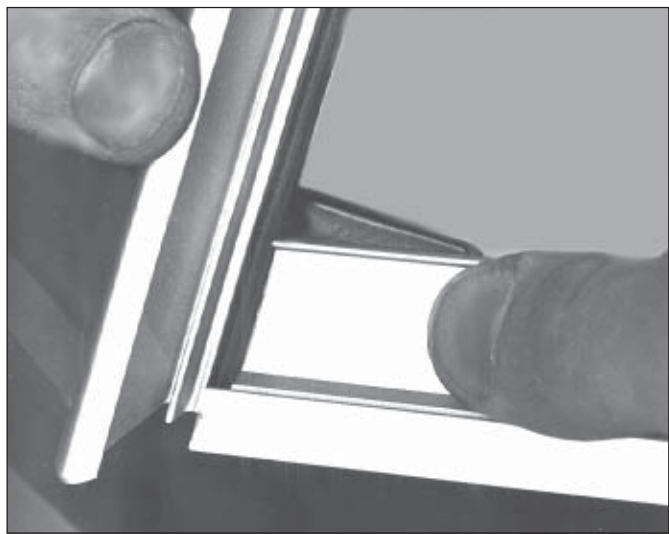
2.1 Pre-fit alloy nuts and bolts to the hub. Square heads face outwards. Leave the nuts slack.



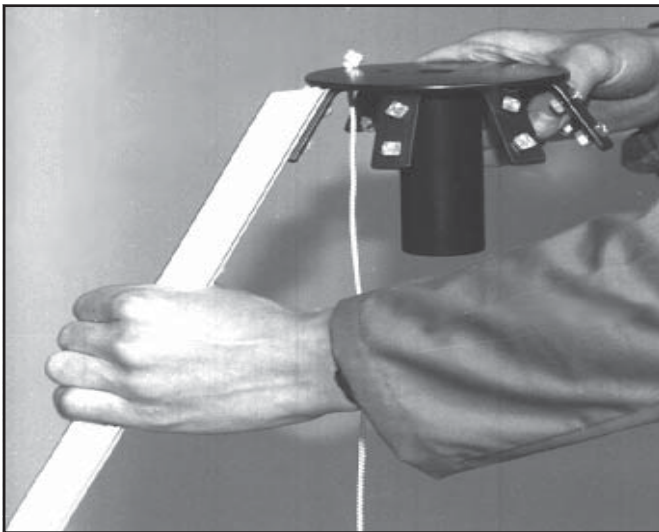
2.5 Tie the draw-cord loosely as illustrated in order to identify the two sections forming the door-frame.



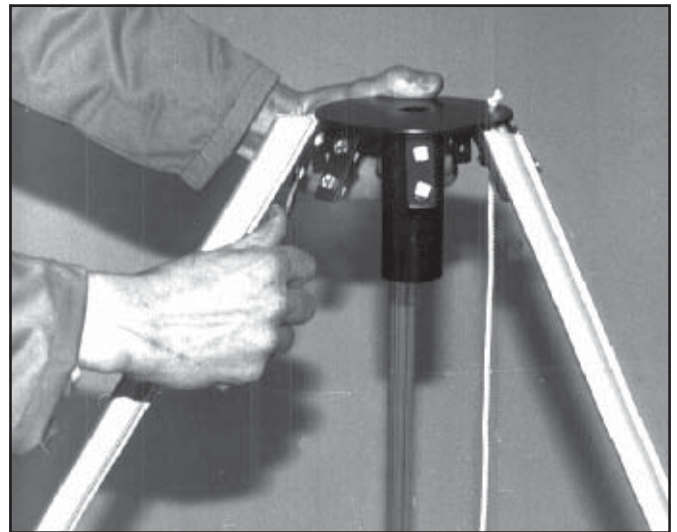
2.8 Fit 3-hole brackets to the lower end of the glazing bars and align at right-angles. Tighten nuts to finger tension only.



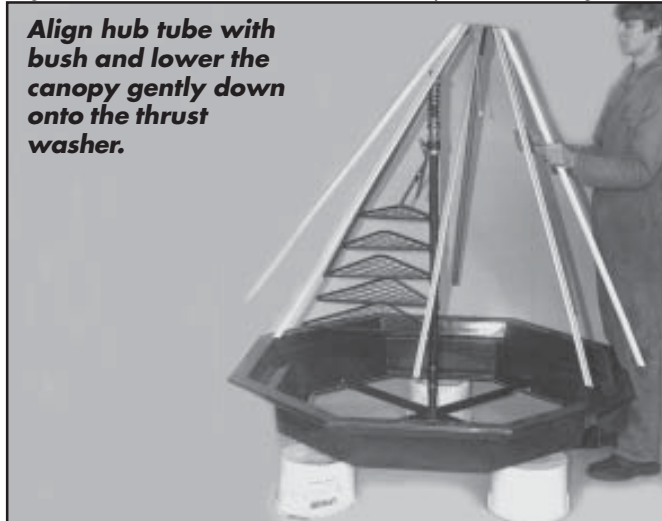
2.9 Slip hoop-bars onto 3-hole brackets. Butt the bar-ends into firm contact with the upright bar, then finger-tighten the nuts.



2.2 Fit a glazing bar to the hub. Push home into firm contact with the disk, then tighten nuts fully, checking as you do so that the bar remains aligned with the bracket. The fasteners are alloy – do not overtighten!

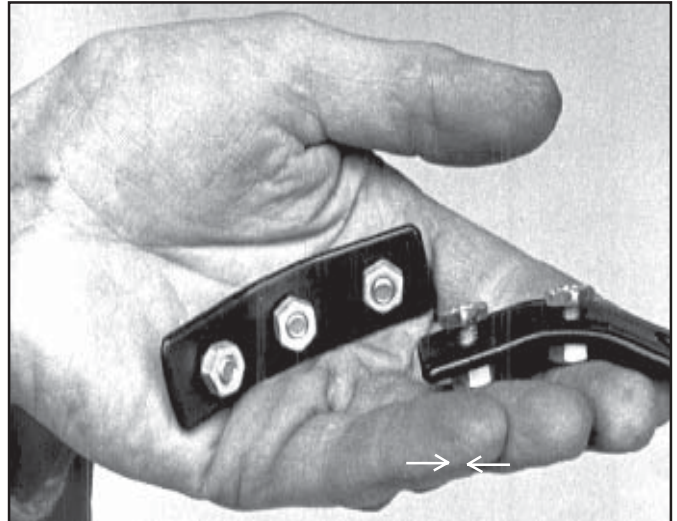


2.3 Fit, align and tighten two further lengths to make the assembly self-supporting, like a 3-legged stool.

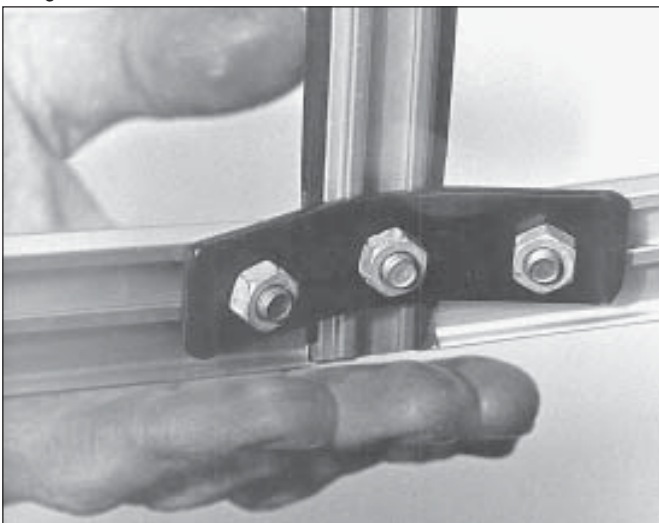


Align hub tube with bush and lower the canopy gently down onto the thrust washer.

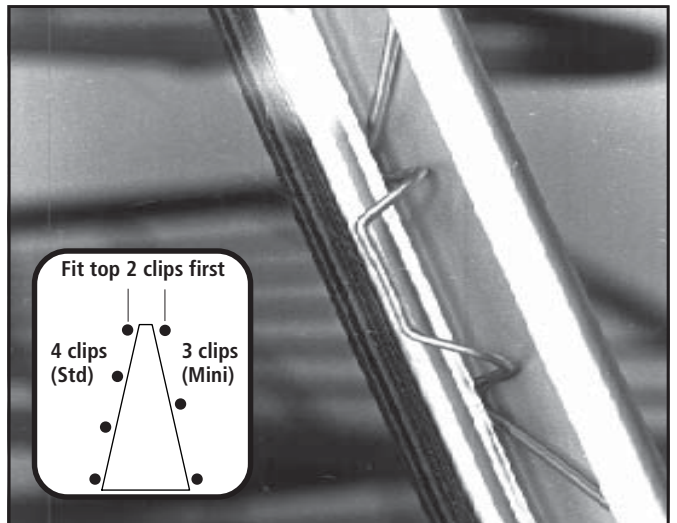
2.6 Fit the partially assembled canopy to the mast. For comfort you may like to raise the assembly on blocks at this stage and work at it while sitting on a stool.



2.7 Pre-fit alloy nuts and bolts to all curved 3-hole brackets. Square heads go to the *outside* of the curve. Leave nuts loose.



2.10 Align the three members carefully so that the under-surface forms a smooth, straight line (Check alignment by brushing your finger-tips lightly across the 3 sections), then tighten nuts fully.



2.14 Fit glazing clips, checking as you do so that they are right way round. (Refer to **6.9** p.13 if you encounter difficulty).



2.13 Fit a glass panel to a frame adjacent to the door frame. (Take care not to glaze the door-frame itself since it is fitted with the removable polycarbonate panel).

centre the top of the pane in the frame and fit the top two clips first.

13 Fit the remaining clips. Adjust the gap between the glass and frame if necessary. (Refer to **6.9** on page 13 if you encounter difficulties). Then fit 4 clips down each edge for a GrowMate Std, and 3 for a Mini. Space them close to the ends of the panes, then at equal intervals (see inset).

14 Continue fitting and clipping glass to each adjacent frame until you have worked your way round the canopy to the other side of the door frame. This way, there is always an empty frame to one side so you can reach inside the canopy with one arm to steady the glass – and to clean off any smears.



2.15 Now is a good time to reach in and clean off any smears on the internal surfaces of the glass panels. You can do this with each pane if you keep going without “skipping” frames.

3 ADJUSTMENT OF ROTATION & CLAMP ACTION

Operating Description.

Refer to figure **A2**. When the control-arm is raised, the suspension spring pushes the canopy up out of contact with the moulded base so that it may be rotated freely. When the control-arm is locked down, the spring is compressed and the canopy is clamped into firm contact with the base.

Both actions require adjustment which must be carried out with the canopy fully glazed, and the door-panel removed. Proceed as under:-

FIRST ADJUSTMENT – CLEARANCE BETWEEN CANOPY & BASE

Before commencing, check that the top end of the link-arm is disconnected from the hub. (To disconnect, raise the control-arm first to relieve pressure on the bolt, so that it can be removed without force).

The canopy should rotate so that it *just clears* the base during a full rotation.

To achieve this, turn the main spring adjuster nut in the appropriate direction to raise or lower the canopy. Use trial and error until you have positioned the nut such that the canopy *just clears* the base when it rotates.

(NOTE; if you create too much clearance between the base and canopy by positioning the nut too high, the second (lock-down) adjustment will become difficult or impossible).

SECOND ADJUSTMENT – CLAMP ACTION

Reconnect the link-arm. (Again, to do this, raise the control-arm first so that the bolt can be fitted without force).

Check the diagram to make sure that all components are correctly assembled. The link-arm goes to the right of the hub anchor-bracket at the top and to the right of the control-arm at the bottom. The control-arm goes to the left of both the anchor-ring and the link-arm.

The clamp action brings the canopy down into firm contact with the base when the control-arm is pushed down fully.

Turn the Clamp Adjuster Nut in the appropriate direction to

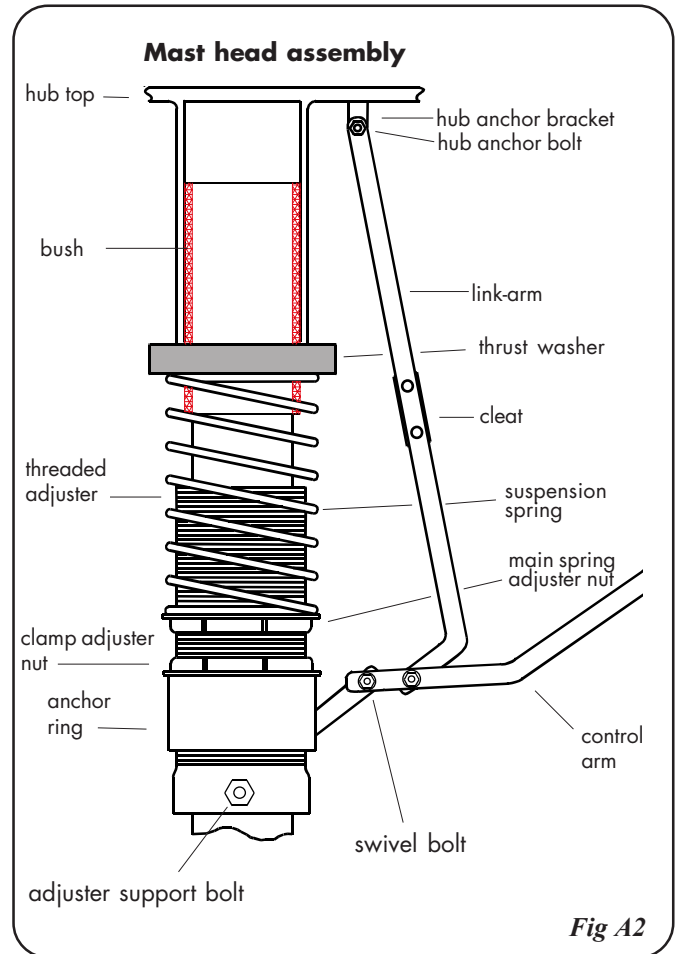


Fig A2

adjust the clamp action. Moving the nut down increases the clamp-action; moving it up has the reverse effect. A slight "springy" resistance should be felt as the control-arm snaps home, but no undue force should be necessary.

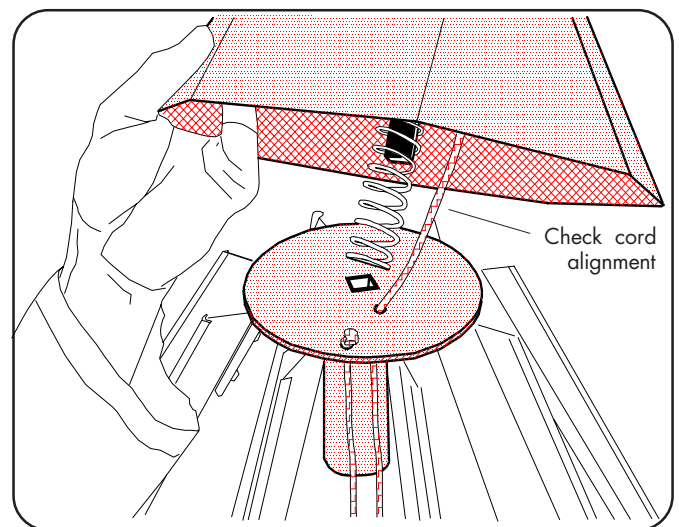
4 FITTING THE VENT

1. Apply a generous smear of the waterproof grease to the outer surface of the vent spindle, then fit the vent. The square vent-tube passes through the vent-spring, and the draw-cord passes through the small hole adjacent to the door-cord. Before lowering the cone into position, turn it so that the cord falls down in a straight line to the hole.

2. Now move down to the lower end of the draw-cord; slip the end-bead on and secure it with a knot.

3. Test the action of the vent. It operates telescopically and can be adjusted by pulling down on the cord and securing it at any point to the cleat on the control-arm. When fully down, the cone overlaps the top edge of the glass so that even in cold weather a small but vital amount of ventilation takes place.

(TIP; should you forget to cleat the vent, it might blow off in stormy weather and beat against the glass panes on the end of its cord. To prevent this happening, tie a knot in the draw-cord so that it bears gently against the under side of the hub when the vent is in the fully "up" position. This will act as a positive and gale-proof stop).



4.1 Fit the vent. The spindle passes through the vent-spring and the draw-cord passes through the small hole adjacent to the door-cord. Before lowering the vent, check the cord alignment.

5 FITTING THE DOOR PANEL

The door panel is constructed in clear plastic for lightness and safety and is edged with aluminium on three sides. The door is closed by placing the panel into the frame and raising it about 1" (25mm) so that it locks into place by virtue of its tapered shape. The panel is then secured in the fully "up" position with the cleat and cord. Removal of the panel is achieved by reversing this sequence – ie, the cord is uncleated and the panel lowered and removed from the frame. A fingerhole is provided in the panel to facilitate fitting and removal. (Do not worry about heatloss through the hole in cold weather – it is insignificant!).

1. Fit the cleat **Fig A3**. It is bolted to the outside of the panel (same side as the green logo), and with the finely tapered section to the top. Fit a washer under each nut and take care not to overtighten, since it is possible to overstress the plastic.

2. Refer to **Fig A4** and check the door frame for correct fit. Place the door panel into the frame, and raise it a few mm. If it fits too tightly in the frame you can correct this by adjusting the width at the bottom. Slacken off the alloy nuts at bottom left and right and pull the hoop bar away from the upright bar to create a gap of a millimetre or two. The object is to find an adjustment by trial and error that results in the panel fitting securely into the frame from top to bottom. When this is achieved, retighten the alloy nuts fully.

TIP – always try to have the same amount of gap at either end of the bar, so that the door-frame remains symmetrical.

3. Once the door fits correctly, raise and lock it fully into the frame and cleat it up as shown in **Fig A4** (inset). Check that the panel has locked correctly by tugging it towards you by the finger-hole.

4. To remove the door panel, uncleat the cord, lower the panel and withdraw it from the frame.

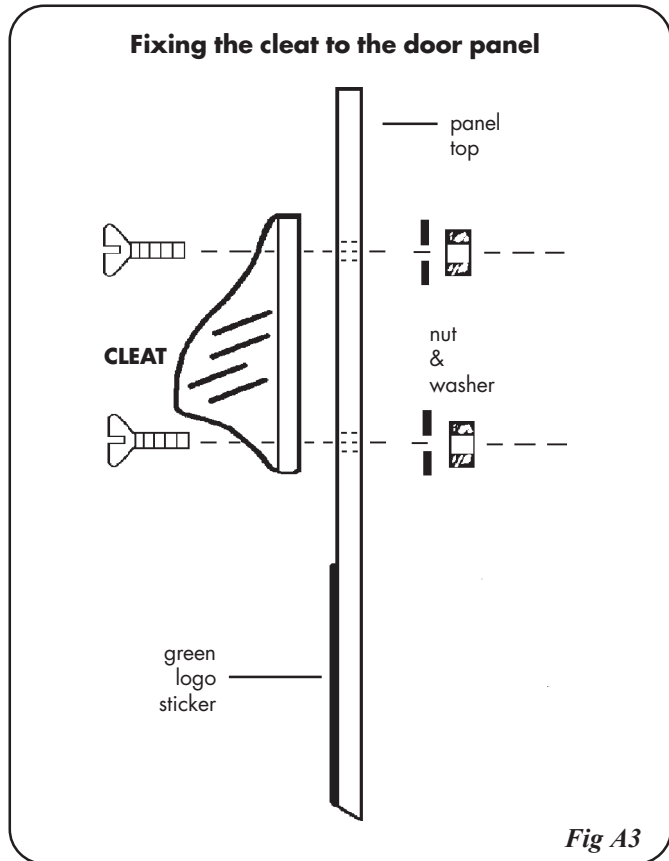


Fig A3

5.1 Fit the cleat. It goes on the same side of the panel as the green logo with the fine end to the top. Fit washers as shown and take care not to overtighten, since you may stress the plastic.

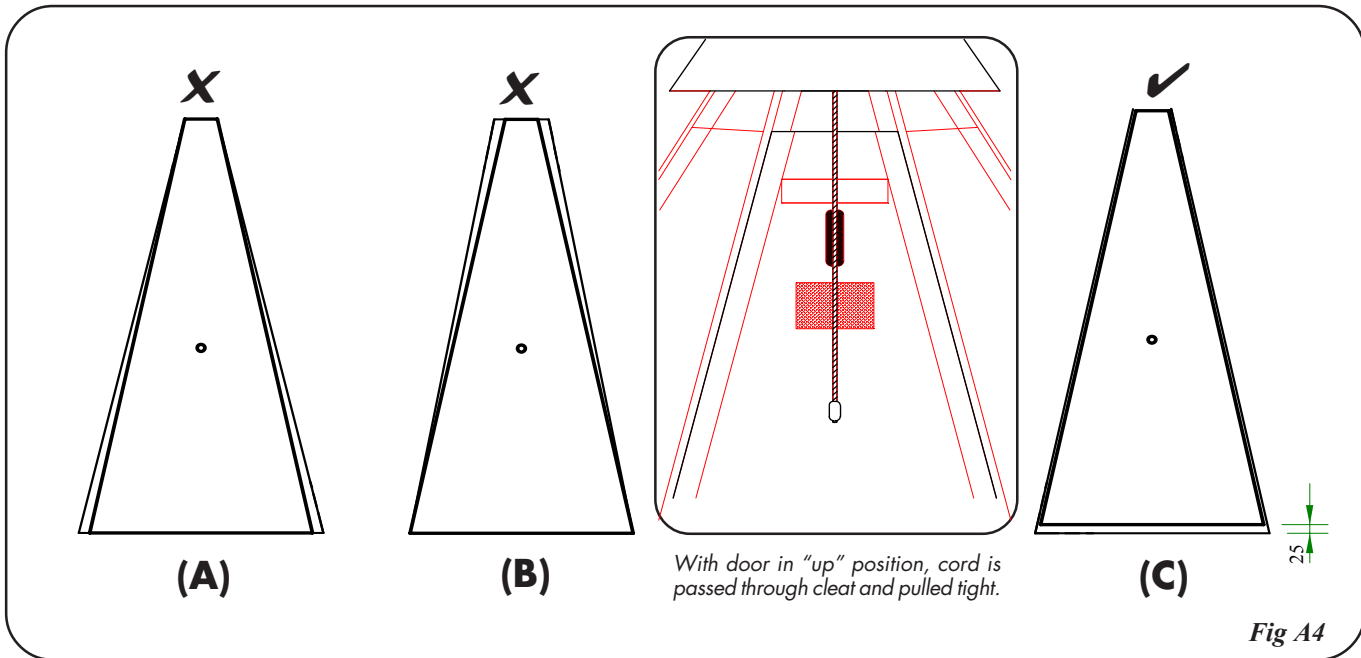


Fig A4

5.2 Place the door into the frame and raise it a few mm. Refer to photo **2.12** on p.10 and slacken the alloy nuts at bottom left and right. Now adjust the gaps. If the door jams at top **(A)**, REDUCE the gaps. If door jams at base **(B)**, INCREASE the gaps. By trial and error you can achieve a perfect fit **(C)** in which the panel fits securely into the frame from top to bottom when raised about 1" (25mm). Check that you have the same amount of gap at each end of the bar so that the door-frame remain symmetrical. To check that the door fits securely, cleat it in the "up" position and tug it towards you on the finger hole. To regain access, uncleat the cord, lower the panel and withdraw it from the frame.

6 TROUBLE SHOOTING

1. Canopy drags during rotation.

- Check that the GrowMate is level.
- Repeat the adjustment detailed in **3.** (p.11). The main spring adjuster nut may require to be raised.

2. Clamp is not locking the canopy down into firm contact with the base

- Check that the GrowMate is level.
- Repeat the full adjustment detailed in **3.** (p.11).

3. Canopy is misaligned with base.

- Some slight misalignment can be due to the fact that the door panel is lighter than the opposite frame which is glazed. This may produce a slight tilt, which is easily corrected by aligning the canopy with one hand as you clamp down with the other.
- Check that all glazing bars have been pushed into firm contact with the disk on the hub (**2.2** p.9).
- Check that the horizontal hoop-bars at the base of the canopy are correctly aligned with the vertical bars (**2.10** p.9)

4. Door panel is difficult or impossible to fit and remove

- Read Section 5 (p.12) and readjust the door-frame in accordance with the procedures detailed. It is particularly important to get this right, since detachment of the door panel in gale-force winds could result in severe damage to your module – and loss of plants.

5. Glass does not fit

- Check glass dimensions (p.15).
- Check glazing bar alignment **2.2/2.10/2.11** (p.9).
- Raise the glass in the frame if necessary. The channel in the hoop bar is intended to stop the glass from coming into contact with the fibreglass base rather than to act as a permanent support for the glass. If it is necessary to raise the glass it is helpful to have a second pair of hands to support it while you fit the first few clips.
- Check that the glazing clips are correctly fitted and spaced the correct distance apart (**2.15** p.10).

7. Ventilator fails to raise and lower correctly.

- Refer to Section **4.** (p.11). Check that the spindle is running free, and is well lubricated with grease or thick oil.
- Check that the vent spring is correctly fitted.
- Check that the cord is correctly aligned with the hole and cleat.

8. Alloy bolts & nuts fail when tightened.

- These components have to be chemically compatible with aluminium and are therefore made from soft alloy. Use only the spanner supplied and take care not to over-tighten them. In case of accidents we include a few extra of each in the kit.

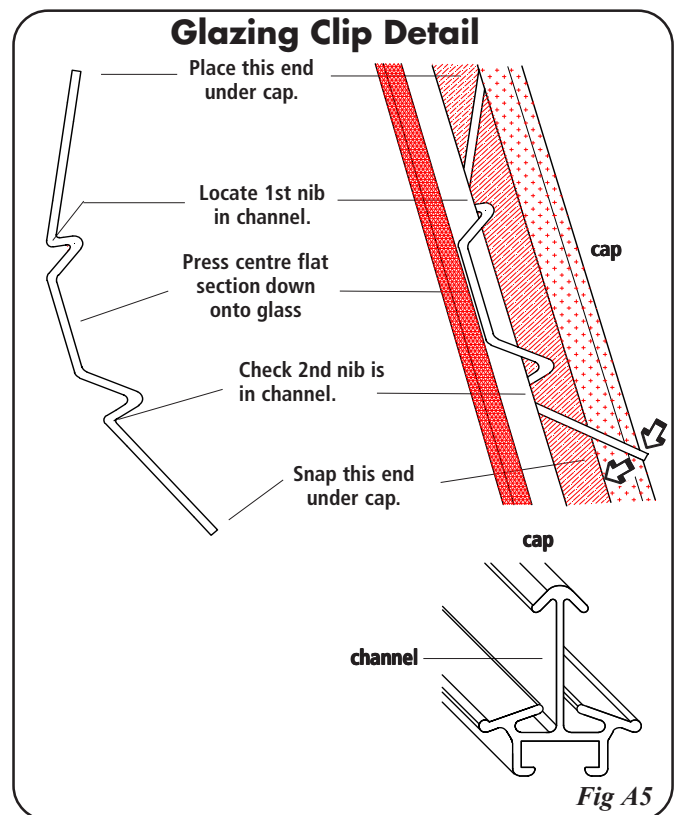
9. Glazing clips are difficult to fit.

Wear light eye protection (spectacles or sunglasses will do), refer to Fig A5 (below) and read through **all** of the

following points before commencing:-

- Ensure that the clips are right way round. To check this, hold them between your thumb and forefinger so that the flat section in the middle is *towards* you. This flat section presses down on the glass to hold it into firm contact with the glazing bar..
- Manipulate the spring such that the top end is trapped under the cap of the glazing bar and the two nibs are located in the channel while the flat middle section is pressing into firm contact with the glass. Now snap the bottom end of the spring under the cap of the glazing bar. If you find it difficult to snap in by hand, try levering the end in with a flat bladed screwdriver.
- It is easiest to fit the clips securely when the gap between the edge of the glass and the aluminium frame is just sufficient to allow the clip through. (You can reduce the gap by raising the glass up in the frame a little – it does not have to sit down into the channel at the bottom).
- Fit the top two clips first at left and right, since they will then keep the pane centred as you add further clips.

★ *Note – the clips supplied with your kit are “industry standard” components, sold by every garden centre. If you find it difficult to follow the written instructions provided here, you may be able to get your local garden-centre (or a friendly neighbour!) to give you a “live demonstration” on fitting clips.*



IS YOUR GROWMATE GALEPROOF?

If you have installed on an exposed site, check that;-

- The module in on a firm, even surface.
- The base of the unit has been adequately weighed down with compost or gravel, or is bolted to a foundation pad.
- The clamp mechanism is correctly assembled, and adjusted (**Section 3** p.11) so that the canopy locks down into full and firm contact with the moulded base.
- The glazing clips are correctly fitted. (**2.15** p.10 and **6.9** p.13)
- The vent cord is knotted to prevent the cone from coming free in high winds. (**4.3** p.11)
- The door frame is correctly adjusted so that the panel locks “home” securely. (**5.2** and **5.3** p.12)
- The module is protected from flying debris during winter months and/or is fitted with 4mm toughened glass.

Additional to the above, make sure that in blustery weather;

- The module is always clamped down after use.
- The door is always fitted, cleated and checked after use.

(These last two points may be dispensed with during settled weather conditions in the summer months).

GrowMate Mk 3 Glass sizes – valid from 10th Oct 1994

You can cut a pair of triangles for a GrowMate Standard from a "Dutchlight" with very little waste [see Diagram (iii)]. The same procedure is used for a GrowMate Mini except that 305mm is trimmed off the base of the triangles.

Dutchlight is "Industry Standard" material. It is used all over the country by commercial growers and by the manufacturers of most domestic greenhouses so it is widely available.

The sheet is 56" x 28¾" x ⅛" [1422mm x 730mm x 3mm], and sells for £8 – £10 per sheet, so replacement triangles generally cost £4 – £5 each.

CUTTING INSTRUCTIONS - GrowMate Standard

Refer to diagram (i) at right.

1. Draw line A, B & C from the measurements detailed.
2. Cut the pane diagonally along A.
3. Trim off waste (ie, hatched areas).
4. Check that the finished panel is symetrical and has the same dimensions as are shown in diagram (ii).
5. Invert the finished panel over X and use it as a template to produce a second panel of identical dimensions as shown in A & B [diagram (iii)].

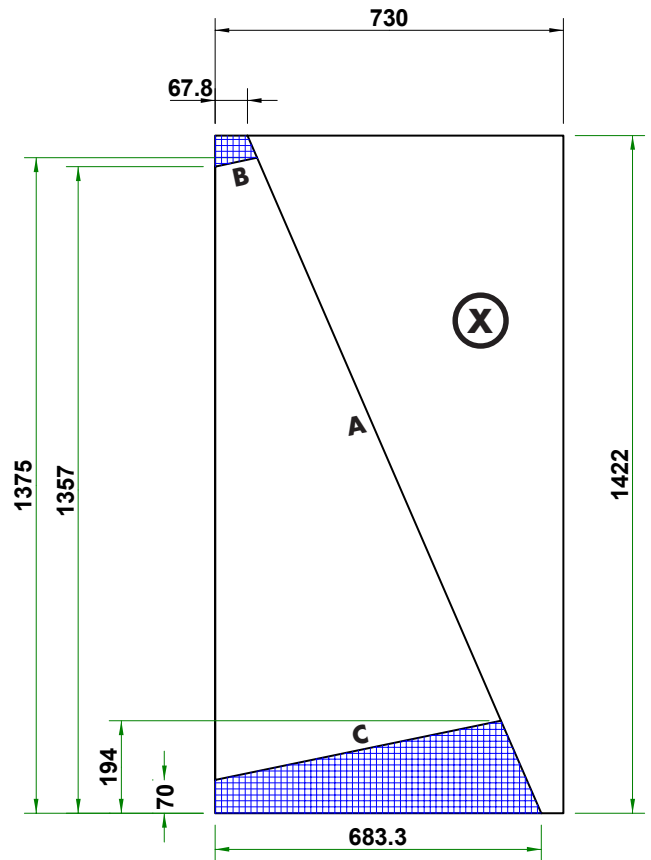


Diagram (i).

CUTTING INSTRUCTIONS - GrowMate Mini

Mini triangles are cut as for the Standard (above) but 305mm is trimmed from the base. The diagram below shows the finished dimensions required.

Remove 305mm waste from base.

The diagram shows a trapezoidal shape representing a finished GrowMate Mini triangle. The top width is 90mm and the bottom width is 485mm. The total height is 955mm. A hatched section at the bottom indicates a 305mm wide base that has been removed. The text 'Remove 305mm waste from base.' is written to the left of the diagram.

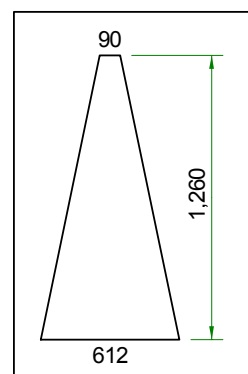


Diagram (ii).

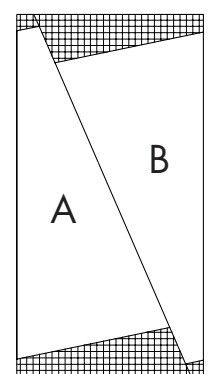


Diagram (iii).

INTRODUCTION

GROWING WITH A GROWMATE is very similar to growing with a conventional small greenhouse, but there are differences which we will explain in these notes. Once you are comfortable with the GrowMate operating procedures and are thoroughly familiar with the principles of the design it's time to consult a standard greenhouse text-book since it will provide you with far more information than is possible here.

It is assumed that your module has been correctly assembled and adjusted in accordance with the assembly instructions. If any mechanical problems arise that prevent you from following these notes you should refer to the section on "trouble shooting" (p.13) and take whatever action is required.

GETTING ACQUAINTED.

Practise the following:-

Door panel

Remove and replace the door panel several times to make sure you know how it operates. When fitting the panel always lock it securely in position. This is done by raising it up about 1" (25mm) in the door-frame until it locks fully, then cleating it with the cord at the top. Now check that the panel is properly locked by pulling it smartly towards you (pull on the finger-hole with your index finger). A correctly fitted panel will remain secure and will resist even the most severe storms.

Taking out the panel is the reverse. Remove the cord from the cleat, lower the panel and lift it clear of the frame.

There is a slight knack to this, but after you have done it correctly once or twice you will have no further problems! Do remember though that the door will not operate properly unless the frame has been adjusted correctly (p.12) prior to commissioning.

Canopy

With the door panel removed, reach in and release the control arm by pulling it towards you and up. As the canopy rises, practise rotating it gently in either direction so that you can achieve access to all growing areas. (TIP; always push the door frame in the direction of rotation required. If you pull on the frame you may distort it and loosen the glazing clips on the adjacent glass panel).

Now practise clamping the canopy back onto the base. Grasp the operating lever firmly with your fist over the top and press down and in towards the pole until it snaps home. Check alignment of the canopy and the base. In cold weather you will want the two to align in order to eliminate draughts. In warmer weather you will want to lock the canopy off-set to create the largest possible peripheral vents Fig A6.

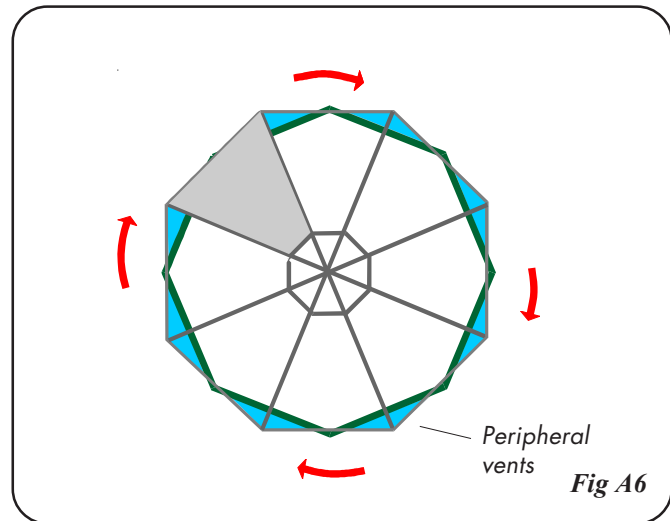
Vent Cone

Practise raising and lowering the vent cone. To RAISE the cone, release the vent-cord from the cleat (pull the cord out to the right). The cone will now rise on its spring to

the fully "UP" position.

To close or adjust the cone, pull the cord through the cleat to the point required.

That's it! You can now operate all the controls. Next, find a comfortable seat and read on.

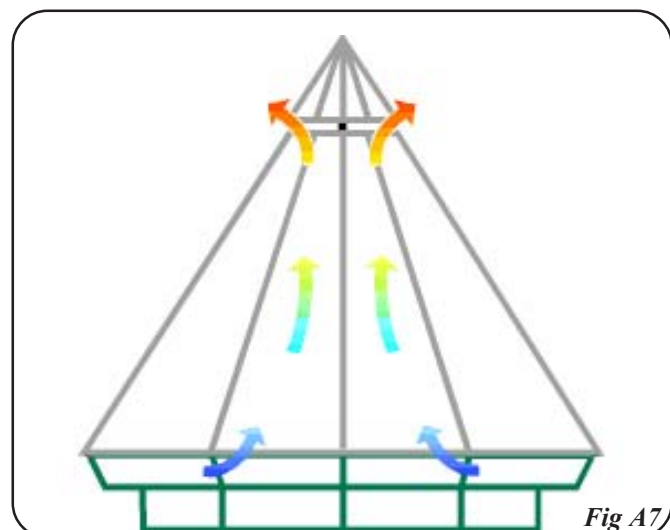


PRINCIPLES OF OPERATION

The Canopy

The canopy sits on a spring, and to get to your plants, you remove the door panel, raise the operating lever and rotate the canopy. This gives complete access to all work areas.

To ventilate, you lock the canopy off-set in relation to the base so as to create peripheral vents. At the same time the vent at the top of the canopy can be raised. These settings convert the canopy into a "convection chamber" so that when the sun heats up the structure it generates a chimney draught Fig A7. Cool air is drawn in through the base and warm air flows out through the top. The higher the temperature gets, the more pronounced the airflow, so that the structure is to a useful degree "passively self-regulating". In other words it does not rely on artificial devices



(thermostats and fans etc) in order to keep within a manageable temperature range. In warm weather, a great deal of extra ventilation can be achieved by simply removing the door panel during daylight hours and replacing it at night.

It is important to realise that ventilation alone will not keep your plants cool. The second and equally vital ingredient required is moisture, which like sweat in the human body evaporates to provide a cooling effect. In a GrowMate up to two-thirds of the cooling load is taken by moisture evaporation from compost and plants. Therefore in hot weather it is extremely important not just to ventilate adequately, but also to ensure that there is plenty of moisture to evaporate within the module at all times.

In most parts of the UK, the cooling effect that develops in a GrowMate is such that no shading is required. However in extreme conditions, or when the module is being left unattended for long periods (as when you are on holiday), a good tip is to drop a light "tipi" made of netting over the canopy. You can make this very simply by using the door-panel as a template and laying it onto some netting material that can then be cut out and run through a sewing machine.

When temperatures plunge in the winter months, you can protect your plants in a similar way by cutting out and taping together some triangles of bubble-plastic to form a neat and efficient insulating cover.

The pyramid shape of the canopy is very effective at gathering light since one of its 8 facets is nearly always facing the sun at close to the optimum angle, and further internal re-reflections take place. Another advantage of the shape is that it is "slippery" and highly resistant to storm damage since there is nothing for the wind to grab at.

GENERAL INFORMATION

Plant Accomodation

There is room for around four dozen 4" (100mm) pots on the peripheral ledge, and the same again on the 5 swivel trays (Standard 5'0" model). In addition, the whole of the "raised bed" area within the base can be planted up.

Compost

The compost in the base does four things;-

1. Ballasts the structure, so removing any need for foundations.
2. Grows plants directly, or acts as a medium into which potted plants can be plunged.
3. Evaporates a significant amount of moisture in hot weather, thereby contributing up to two thirds of the cooling load.
4. Absorbs warmth from the sun during clear cold weather which is then re-radiated at night - to provide some protection against light frosts and extreme fluctuations in temperature.

Base

The moulded base of the structure is open to allow deep-rooting plants to be grown down to any depth you want. If you plan to install your GrowMate onto a patio, balcony or roof-garden you can close off the base with a piece of polythene sheet in the manner of a pond-liner. A few holes snipped through the material will allow any excess moisture to drain out.

Typical Uses

You can raise bedding plants in a GrowMate, and grow cuttings. In the summer months it makes a most attractive feature when stocked with colourful plants. Later in the season you can winter geraniums and fuchsias, keep bulbs in them, and with a small amount of heat you can grow winter salads.

Light-loving plants do particularly well. Pelargoniums, cacti and alpines flourish, as of course do tomatoes and strawberries.

Heating

Heating is cheap and efficient. A 150 watt soil-warming cable works well and is particularly effective for cuttings. Alternatively you can use a tube heater (similar in principle to a small towel rail). Either of these will cost around £18 to run for an entire winter period (1995 prices). As an alternative, you can use paraffin. Extra ventilation will be required in order to dissipate the fumes and water-vapour produced, but with practice excellent results can be achieved.

Mobility

Unlike fixed structures, a GrowMate can be moved around to different parts of the garden, so if you are unhappy with your first choice of site and want to try somewhere else you are free to do so. Similarly, you can move it from one part of the garden to another on a seasonal basis - or if you move house you can take it with you.

Maintenance

All modules are virtually maintenance free. They are made from durable exterior-quality materials and can be wiped clean with a damp sponge.

GET READY TO GROW

Before final commissioning ask yourself three questions;-

1. How is the GrowMate to be stabilised?

Filling the base up with compost works best for the reasons noted above. However some users prefer to use gravel rather than compost while others prefer to keep the base empty so that a greater amount of space is available in which to stand seed-trays and terracotta pots. If you keep the base empty, you should bolt it to a concrete slab for stability. Remember that ANY alternative to a porous compost will mean that summer temperatures within the canopy may rise higher than is desirable, since there will be much less moisture to evaporate in the base area.

2. Is the GrowMate to be placed onto a solid surface (ie, slabs or concrete), or straight onto some cultivable ground?

A solid surface requires that you close off the open base if you are filling it with “loose” materials (compost or gravel). This is to prevent leakage out from below. Polythene sheet can be fitted in the manner of a pond-liner – but remember to snip out some holes for drainage. If you

place the module straight onto the ground you can leave the base open and grow plants right through it into the subsoil – in the manner of a giant cloche. Be sure though that the ground is level and firm.

3. Is a soil warming cable to be fitted?

The normal convention is to lay the cable before you add compost to the base. (Make sure you read and comply fully with the cable instructions).

NOTES BY GROWMATE USERS

THIS IS AN APPROPRIATE TIME to introduce you to some GrowMate users who have gained experience over a period of several years. We'll start with Marilyn Piller who deals with sterilising the compost – one of the first chores you will want to tackle if you are to get more enjoyment from your efforts than the bugs that might otherwise take over!

★ JEYES THE JOB

One of the most frustrating – and of course exciting – things about gardening in my experience is that many of our successes (and failures) come about by sheer accident and not because we are expert horticulturists!

Take the case of pests in my GrowMate. I must confess that I was plagued with every imaginable “creepy-crawley” last year; whitefly, red spider mite, blackfly, vine weevil, leaf hopper and some pests I couldn't even identify.

Although I am not a totally organic gardener, I don't really like using chemical sprays too often. In my experience, they only eradicate the problem in the short term and many of them return within a few weeks in increased numbers. So I am absolutely delighted this year to report that both my GrowMates have been completely pest-free this summer.

So what's the secret? What magical solution have I discovered that has repelled all attacks this year? Well, much as I would like to take credit for having discovered, through intelligence and ingenuity, a formula set to make me a rich woman, I can't. Because the solution is nothing more exciting than a watering can of good old Jeyes Fluid!

My two GrowMates have been lined in the bottom with sharp sand which, during the course of a busy growing season, does get a little sour. So in January this year, while preparing the GrowMates for my annual seed-sowing exercise, I decided to clean the sand by pouring a good 2-gallon watering can full of a solution of Jeyes Fluid over it. I have to say I was very surprised at the strength of the smell which lingered in the GrowMate for several weeks, despite plenty of ventilation. But this certainly didn't seem to harm the seed trays, which were placed directly onto the sand under which I have laid a soil-warming cable.

The good news for me, however, has been the total lack of pests in the GrowMate all year. Obviously, the Jeyes fluid instantly killed off any lingering eggs, larvae and hibernating adult pests in the sand but in addition has continued to repel pests, even though I can no longer smell the

disinfectant.

So I can now confidently recommend to all GrowMate users that they try this themselves; mix the Jeyes Fluid solution according to the manufacturer's instructions and thoroughly soak the peat, soil or sand in the bottom of your GrowMate. I also ran some of the solution over the ledge at the bottom of the GrowMate just to make sure it was thoroughly clean. Make sure that you have emptied the GrowMate before applying the Jeyes and then keep it tightly closed for at least two days afterwards so that the fumes linger for as long as possible. Then ventilate well for at least a week, after which you can safely put back any plants or seed trays, even standing them directly onto the base medium you have treated. The only special care needed is to ensure that the Jeyes Fluid does not come into direct contact with any plant material as it has the same effect as creosote.

Marilyn Piller, Suffolk

★ SHADING.

Although the summer last year was a bad one, we had a few very hot days when plants in a GrowMate could suffer scorching. I thought you might like to see the enclosed which I made to fit in 8 panels from old net curtains. It has been 100% effective especially if we go out for the day or leave the GrowMate in the care of a neighbour while we are on holiday. Weather conditions change so quickly.

Audrey Kite, Sussex

★ COOLING

It's often forgotten that plants are just as competent at keeping themselves cool as human beings, and that they do so by using exactly the same principles. A breeze is heaven when temperatures start to soar – and so too is a long drink, to replace the evaporative losses that occur under a blazing sun.

In most greenhouses one third of the cooling load is taken by ventilation – in other words by chucking out the air that has become overheated, and replacing it with fresh air.

On the other hand two thirds of the cooling load is taken by moisture evaporation, from the compost and plant foliage.

In our working GrowMates we try to use a moisture absorbent compost in the base during summer months, and we drench it with a large volume of water last thing at night. We also keep the plant cover up to a fairly high density, and ensure that all plants carrying a large amount of foliage are kept moist at all times.

To encourage maximum evaporation of this moisture, we open the canopy up fully, first thing each morning. That means raising the top-vent, locking the canopy off-set, and removing the door panel completely.

Having said this, there may still be occasions when temperatures get uncomfortably high, and if you feel concerned about this, Audrey Kite's ingenious shade might well give you peace of mind – as well as reviving our flagging lace industry!

Andrew McIntyre, ARGYLL.

★ BONSAI

As well as a keen gardener, I am also a Bonsai enthusiast and now own a good collection of mature and seedling trees. For most of the year, these specimens remain out of doors but when a really severe bout of weather is forecast I take the precaution of putting some of the more delicate trees into my unheated GrowMate.

Like alpine, these plants do not require any heat during the winter (unless of course they are indoor varieties) but because they are grown in very small pots and because they tend to have very thin fibrous roots, there is always the danger of root-freeze when the weather is really bad.

I am now about to embark on a new Bonsai project - that of growing Mame Bonsai. These are hardy tree and shrub specimens that are miniaturised to the smallest possible size – some grown in pots less than half an inch in diameter. However, the problem of freezing in winter is even more acute with these tiny plants and so I can see that the new Micro GrowMate would make the perfect display unit for my new Mame collection. Wish me luck!

Marilyn Piller, SUSSEX

★ TOMATOES

We are often asked if it is possible to grow tomatoes in a GrowMate, and the answer is very definitely “yes”.

If you wish to raise a large number of plants you can use the GrowMate during the nursery stage and transfer most of the plants to a larger greenhouse or outside in the beginning of June when they are about 6" – 8" (150-200mm) tall.

If you simply wish to grow a few tomatoes in the GrowMate along with a range of other plants, then I suggest about 3 cordon plants – Gardener's Delight or Cherry Sweet 100 have delicious small fruits – and perhaps three or four of a miniature bush variety such as Minibel which

can sit on the trays.

Before commissioning my GrowMate I had several years of disappointing results with tomatoes grown from seed. The small plants started in the house in early Spring grew straggly because of insufficient light and if they were transferred too soon to our polythene tunnel they simply stopped growing altogether! As we have a short growing season in Scotland it is important to get the plants going nice and early to take advantage of all the sunlight and warmth available, and the GrowMate with a little heat has made it possible for me to turn failure into satisfying success.

The routine which seems to work for me is as follows;-

At the beginning of February I sow seeds in small trays of seed compost and germinate them in a heated propagator in the house. Alternatively you can cover the trays in cling-film and keep at 65 - 70 deg F. (18 - 21 deg C.) in an airing cupboard, or over a radiator until they germinate – usually within 7 - 10 days.

As soon as they have begun to grow, I transfer them to the GrowMate which is heated with a soil-warming cable, and place the trays on the soil in the base where they are kept at a temperature of about 55 deg F. (13 deg C.)

When they show two true leaves and are about 1" - 2" (25 - 50mm) high I choose about 20 of the sturdiest and plant them individually in 3" (75mm) pots which I keep in the GrowMate.

As they get bigger I pot them on into 6" (150mm) pots and at the end of May I transfer most of them into the polythene tunnel in 10" (250mm) pots. If you live further South these varieties should grow successfully outside.

The plants I select for the GrowMate go into 8" (200mm) pots which I plunge into the base soil – the Minibel bush variety I keep in 6" (150mm) pots.

I turn the heat off at the end of May.

When the plants are in their final pots I use compost from Growbags and at the bottom I put a couple of inches (50mm) of well rotted manure or garden compost mixed with seaweed and a sprinkle of bonemeal. This is a treat rather than a necessity and I like to think the seaweed helps to impart a tangy flavour to the tomatoes.

When the first truss has set I start to feed the plants weekly with Maxicrop tomato fertiliser which is seaweed based.

Throughout the growing season it is necessary to keep removing all side shoots which form on the cordon plants (not done with the bush varieties). And as the plants in the GrowMate develop I tie them to the centre trays and nip off the leading shoot when three trusses have formed. As the flowers open I mist the GrowMate daily as this helps pollination. At this stage, the maturing plants also require plenty of water and ventilation.

With a good spell of sunshine we can expect tomatoes to start ripening towards the end of July in this part of the

country, but the main crop occurs in Augusts/September. The flavour of these tomatoes is unbelievably better than anything we can buy locally, whether Dutch, Scottish or English grown, so I would really like to try and extend the cropping season.

Susan McIntyre, ARGYLL.

★ TOMATOES & MELONS

As well as growing tomatoes for the first time in one of my GrowMates this year, I have also been using up the available space in my second GrowMate by trying my hand at melons.

In the first GrowMate I have installed two ordinary growbags into which I planted three tomatoes each. One is a good old favourite variety – Ailsa Craig – which has produced an abundant crop of fat, juicy tomatoes and the second is a smaller, cherry-type tomato with a lovely golden skin called Sungold.

There isn't too much room in the GrowMate for six tomato plants but I deliberately chose plants on which the first trusses had developed very low down the stem so that I could stop them at the third or fourth truss (before they grew out of the top of the GrowMate!) and still have a plentiful crop. Having never grown tomatoes before, I was a little concerned about whether the trusses would set and considered buying aerosol fruit-setting solution to help. But in the end this wasn't needed as the trusses set very well without any intervention from me.

I'm already picking Sungold on a daily basis now and I estimate that my three plants, despite only being 2'0" (600mm) tall have produced around 500 bite-size tomatoes. And the Ailsa Craig is doing equally well, although it looks as if it will be some weeks yet before the large fruits have ripened. In the meantime, according to the gardening manual instructions, I am keeping watering to a minimum and feeding with a tomato feed at every watering, to make sure the fruits become sweet and juicy.

More challenging however, have been the melons. I selected three plants of an old variety called "Sweetheart" and again planted them into an ordinary Growbag. Actually, it is probably better to restrict the number of plants to two, since they are vigorous growers and produce very large leaves and curling tendrils that cling to any surface they touch!

Melons have to be pollinated by hand (or small paintbrush in my case) and it can be difficult to distinguish between the male and female flowers. This is made even more difficult by the fact that, in my case, all the male flowers seem to open just when the female flowers were closed and vice versa! In the end, I decided to run the paintbrush over every flower I could see, repeating this every other day, regardless as to whether they were male or female.

This rather haphazard approach has seemed to work, however, and I found that nearly all the female flowers on the plants were in the end pollinated. In fact, I had to do some fairly strict "culling" to make sure that I only had two fruits per plant (the maximum number the plant can sustain in a growbag).

Once set, the fruits develop at an alarming rate, increasing in diameter by about an inch (25mm) a day. The GrowMate has proved to be an ideal growing medium for melons, since the wire trays are now being used to gently support the developing fruits which become very heavy and can break the plant if left unsupported. As I write, the melons are now about 8" (200mm) long, and the skins, although still very hard, are beginning to turn a rich yellow colour. I expect to be harvesting my six melons in about six weeks time!

Going back to the tomatoes however, I would like to pass on one tip given to me by my eighty-year-old gardening neighbour. He suggested planting one *Tagetes* into each corner of the growbag at the same time as planting the tomatoes, since it is thought that the smell of that particular plant repels whitefly from tomatoes. And it has seemed to work very well, since I have not been troubled with this pest at all this year. Besides which, now that the *Tagetes* plants are in full bloom, they make an excellent show in the GrowMate in their own right!

Marilyn Piller SUSSEX

★ GIVE YOUR ANNUALS A BREAK

Raising summer annuals from seed in a GrowMate is one of the delights of early spring gardening and the results are very rewarding – hundreds of healthy little plants to go out in the garden in May, once the soil has warmed up and the threat of frost is past. However, if you live in one of the wetter, windier parts of the country you need a special brand of optimism with outdoor annuals, because the likelihood of sadly battered and rain-spoiled blossoms is high and all you can do is cross your fingers and pray for the sun.

Last year, I am glad to say, this seemed to work and we had a glorious display of colourful annuals all summer long.

Whilst hoping for the best, each year at transplanting time I prepare for the worst by retaining a selection of the best outdoor plants and treating them as pot plants which then remain in the GrowMate. These pampered individuals provide a stunning display of colour whatever the weather and their blossoms grow larger and remain perfectly unspoiled by the elements. I have grown a wide variety of plants this way, choosing dwarf form wherever possible, and have found it very worthwhile.

It is particularly pleasing if you can mix large bloomed plants such as *Petunias* which can be grown quite tall in the case of the GrowMate and on lower shelves, with lighter

“lacier” plants such as lobelias and schizanthus. I always include pots or bowls of pansies (Joker and Watercolour are my favourites), because as well as looking wonderful they also fill the GrowMate with characteristic scents.

Other annuals which I find provide a good display under glass are; Tagetes Lemon Gem, which has daintily scented flowers set above lace-like foliage 6" (150mm) high; Mimulus, Dwarf Asters – and of course Busy Lizzies which do best in the shade of the more sun-loving plants.

Plants such as these kept in the GrowMate will repay careful tending with brilliant colour and scent. They will need to be watered regularly and dead-headed to keep them flowering and given a liquid feed throughout their flowering period.

Petunias, schizanthus, tagetes etc can be encouraged to make compact bushy growth by pinching out the growing tips when the plants are small and I usually end up with individual plants in 5"-6" (125 - 150mm) pots. If you have a prolonged sunny spell they can all be given a period outside and put in again when the rain starts. All the other plants in the garden will envy them for their lucky break!

Susan McIntyre, ARGYLL

★ PLINTHS

Whether you're fixing a puncture, hanging up clothes, or servicing a mower, it makes things so much easier if you can stand or sit comfortably for as long as it takes to do the job properly.

And the same goes for looking after plants.

In a conventional greenhouse, you can always position benches so that most plants are at a comfortable height – but then you waste an awful lot of space at ground-level, and increase your relative heating costs.

GrowMate users have a better option. Simply by using a plinth, you can choose what height to keep your plants at for ease of access. And if you build with care, your plinth can form part of a highly attractive feature in the garden as well.

Wood and stone are the two obvious materials to use. Plywood is quite adequate if supported by internal battens, but choose a board that is at least 3/8" (9mm) thick, and of exterior – or better still marine-grade quality. Galvanised bolts or screws are better than nails, and you should finish off with a good exterior-quality paint.

Andrew McIntyre,, ARGYLL

★ HOW MUCH HEAT?

It pays to protect your plants against frost by using some form of artificial heat source. But what kind of heat – and what temperature should you aim for?

In our trials with GrowMates we have always favoured soil-warming cables because they provide a very even warmth and are virtually invisible and maintenance-free.

These cables are slow-acting when you bury them in the bottom of the base, and may take three days or more to produce a noticeable rise in temperature under the canopy.

In effect they heat the module a bit like a night-storage heater – pushing up the compost temperature during the warmer daylight hours, and then gently dissipating heat to the canopy during the long dark hours. This is good for plants, since it avoids sudden temperature change or “thermal shock” – but it is also to some extent wasteful of heat. (Plants derive no real benefit from being kept warm in the dark, since under these conditions no growth or “photosynthesis” takes place).

Is there a compromise? Well, in a sense you can afford to be a little bit wasteful with your energy inputs because a GrowMate's requirements are so modest in the first place. After all most people find that a 150 watt cable provides more than enough heat, and at that level of consumption you're only using the equivalent of a couple of light bulbs in electricity.

A problem could arise though in areas where there are extremes of low temperature – or wind exposure. Under these conditions the compost may simply fail to re-radiate sufficient heat into the canopy to protect your plants from frost damage. What's needed here is something that heats the air directly, and an electric tube heater (like a towel-rail), or a small oil heater might be the best answer. A customer of ours with a vintage '89 GrowMate swears by an old paraffin storm lantern inherited from his grandfather. He hangs it from a swivel-tray, and as he says “If I can see the light from the kitchen window when I'm doing the washing-up, I know my plants are safe!”

Andrew McIntyre, ARGYLL

★ GETTING AUTOMATED

A great many GrowMate users use only very basic equipment (typically a watering can and soil-warming cable), and find they need nothing else at all in order to get first-class results.

Others are more ambitious and start yearning for more control and more automation. State of the art technology now allows you to create and maintain almost any micro-climate you want in a greenhouse. There are capillary mats, time-clocks, atomising sprays, humidistats, heaters of all types, shades, insulating kits, solar-powered fans . . . you name it!

This is a specialist field requiring specialist knowledge and the resources to test and evaluate new equipment, as well as to provide advice and support.

Simply Control of Pitlochry offer a comprehensive mail-order service that caters for all GrowMate requirements. Several kits are available for the various GrowMate modules and a descriptive leaflet is available. Contact:-

Simply Control, 91 Atholl Road, PITLOCHRY,
Perthshire, PH16 5AB

Tel (01796) 482128. Fax (01796) 482111

KEEPING PACE WITH THE SEASONS



D ECEMBER. Darkest month of the year, and a time when damp and decay can undo all your efforts. Ventilate your GrowMate at every opportunity during the brighter days in order to drive out moisture – aim always to keep the soil on the dry side.

If you intend to insulate do it NOW, before the onset of the severest winter weather. If you are using heating, keep temperatures low in order to discourage the soft, lanky

growth that can otherwise develop. At night, 42 - 45°F is fine. Keep day time temperatures below 60°F.

Any bowls of forced bulbs in the GrowMate can come into the house in time for Christmas.

Continue to sow winter salads and carrots and hopefully, if you sowed some earlier in the autumn you should also be reaping the harvest from these efforts, (and also perhaps your very own new potatoes for Christmas !)



J ANUARY. Check over-wintered plants and cuttings like Fuchsia and Pelargonium. - especially for wet rot. Take care to keep plants frost-free but at the same time open the top vent a little in sunny weather. Guard against over-heating and over-stimulating those plants and cuttings that are meant to “rest” at this time of year. A covering of horticultural fleece may be all they require - or a cover of bubble-plastic (P 2.)

Remove any diseased leaves and throw away plants with black stems. During extreme cold remove plants from the outer ledge – they may get frost damaged if they are too close to the glass.

This is a good time to start raising half-hardy annuals in a heated GrowMate but first sterilise the compost. (Use Jeyes Fluid or check alternatives with your garden centre).

Sow sweet pea, viola, and pansies and at the end of the month snapdragon, lobelia, busy-lizzie, carnation and larkspur. For an extra-quick start, use a seed-tray sized propagator and germinate seedlings indoors. As soon as they “break through” transfer them to the GrowMate and maintain the temperature at 45 - 50°F.

Don’t over water – err on keeping your plants a little too dry rather than too moist.



F EBRUARY. Slightly increase watering, avoiding leaves and crowns of plants. Continue to protect plants in an unheated GrowMate with fleece or bubble-plastic insulation. Close everything down fully at night, but during sunny days take every opportunity to ventilate the plants freely.

Pot on fuchsia, schizanthus, coleus and autumn-sown hardy annuals.

Maintain the temperature in a heated GrowMate at 42 - 60°F.

Sow tomatoes and half-hardy annuals such as alyssum, nicotiana and schizanthus. Continue sowing hardy annuals and vegetables to plant out later, eg broad bean, early pea, early lettuce, cauliflower, carrot, cabbage and parsnip.

If you have young strawberry plants, put them into the GrowMate now in 5" pots. Other plants that will remain there for the whole of their growth cycle could include lettuce, spring onions, and mustard & cress



M ARCH. If your GrowMate is unheated, start sowing some of the faster growing hardy annuals mentioned above (see January & February).

Start them in warmth in the house and put them in the GrowMate as soon as they have germinated.

Watch ventilation as temperature fluctuations can occur in March. Feed growing plants with a balanced liquid fertiliser.

Insect pests may appear now, so check for whitefly, greenfly and red spider mite and eradicate them using a smoke cone.

Pot on pelargoniums and fuchsias. Increase water and

bring them into a well-lit location, (ie as close to the glass as possible). Take cuttings and prick out any seedlings that are ready, and sow petunia, begonia, semperflorens and campanula. Sow tomatoes (temp. 65 - 70°F.) for planting in an unheated GrowMate in early May.

Prick out tomatoes sown in Jan/Feb into 3" pots in a heated GrowMate.

Many vegetables and herbs can now be sown – follow the instructions on the seed packets. Try parsley, chives, pot basil and oregano. The GrowMate makes an excellent home for herbs, especially in the winter



A PRIL. Day temperatures can now be high. Try to keep the GrowMate between 45 - 70 F if heated.

In strong sun, keep small seedlings in the base of the GrowMate where they can be shaded by larger plants higher up, but have enough light to encourage strong growth. Check regularly for watering. Feed growing plants little and often. Check the feed instructions carefully and never over feed.

There is still time to sow all the seeds listed for previous

months and to take fuchsia and pelargonium cuttings. You can also start off all sorts of vegetables to be planted out in the garden in late May/early June. Among these are marrow, courgette, runner bean, celeriac and french bean.

If you have some pansies or violas, a large pot or bowlful in your GrowMate will not only look stunning, but will also provide you with the most wonderful scent whenever you open up the door, and will flower for months if you keep them well fed and dead head them regularly.



M AY. Taper off day-heating, and heat at night only when there is danger of late frost.

You will probably have plants at different stages of growth, from small seedlings to those ready for planting

out in the garden – or potting on into their final pots.

From now on it is important to keep the GrowMate well ventilated and the base compost moist at all times. This should eliminate or at least greatly reduce the need for shad

ing. Small vulnerable seedlings can be partially shaded by larger plants and misted regularly with a spray. Don't forget regular weekly feeds of a general purpose liquid fertiliser to promote healthy plants and perfect blooms.

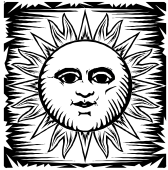
When you plant out your annuals in the garden, keep a few strong plants to display in the GrowMate. They will reward you with a riot of colour. Useful varieties include petunias, lobelia, pansies, schizanthus, nemesia and many more. Pinch out the tips of the young plants to promote bushy growth.

Sow the seed for for winter pot plants now, and take cuttings of houseplants such as azalea and coleus. Sow viola

and pansy for autumn bedding out.

Once you have removed your bedding plants from the GrowMate, hardened them off for a few days and finally planted them into their flowering positions, you can decide what you want to have in it over the summer months.

Instead of displaying annuals, you might prefer to raise tomatoes. You can plant three or four in the base or in pots plunged into the base compost. Train them up between the shelves – to which they can be tied. As well as these cordon tomatoes you can easily accommodate a few bush varieties such as Minibel in pots on the centre trays.



JUNE. The last of the summer bedding plants and vegetable seedlings should be out of doors by now and also any perennials rooted over the winter. Check plants left in the GrowMate daily to see if they need watering and also damp down (spray) the inside of the GrowMate at least once every day. Cuttings of fuchsias and pelargoniums rooted during the winter should now be in their final pots for late summer/autumn display.

If when your bedding plants are all outside, you have space in the base, you can sow some dwarf french beans in between the tomatoes and perhaps two or three bush cucumber plants. The heat loving herbs such as thyme, basil and oregano also do very well in pots in the GrowMate – and why not try a melon!

Remember, water and ventilate, feed little and often, and dead-head flowering plants for continuous display.

JULY. If you go away at this time of year, give some thought to your plants in the GrowMate. It is possible to get automatic watering systems, or a neighbour may help.

A good tip is to water your plants and the base compost thoroughly for a few days, then clamp the canopy down in the open position with the top vent open and shade with a net "wigwam" slipped over the top.

Watch out for pests and diseases. Moulds and mildew are seldom a problem in a GrowMate unless serious overcrowding and lack of ventilation occurs. Slugs & snails find it hard to enter but check that you don't introduce them by accident in a pot or tray – especially in egg form. Eradi-

cate whitefly or red spider mite with a smoke cone.

Take cuttings of regal pelargoniums and fuchsias. This is also the time to take softwood cuttings of many garden shrubs. Examples include forsythia, hydrangea and weigela. Dip the ends in rooting compound then insert in compost.

Remove side shoots on cordon tomato plants, and pinch out the top after the third or fourth truss. Water and feed regularly and spray daily.

If you want to produce new potatoes for Christmas, now is the time to chit two or three tubers, (ie, let them develop shoots). They will be ready to plant in the GrowMate next month.

AUGUST. Water, ventilate, feed & deadhead. At the end of August plant up bowls of specially prepared bulbs of hyacinth and narcissus for Christmas flowering. Buy them from a garden centre or supermarket. You will need bulb fibre specially formulated to suit their needs. Plunge these pots in soil outside, or keep them in a dark, frost-free shed until shoots appear. Sow hardy and half-hardy annuals for

a spring display in the GrowMate. Primula, nemesia and schizanthus are all worth trying. Continue to take cuttings of pelargonium, fuchsia, and outdoor shrubs. Take cuttings of alpine.

You can now also sow winter lettuce and even carrots and potatoes (for Christmas) in containers or straight into the base of the GrowMate.



SEPTEMBER. This month will see the clear out of tomato plants and cucumbers and is a good time to clean and disinfect – and check your heating system. Before placing frost-sensitive plants in the GrowMate, choose a time to fumigate the module with a smoke cone.

By now, the evenings are cool and though ventilation is

required during the day, you should close everything down at night. It is still not too late to sow seeds for spring display and by the end of the month, frost sensitive plants such as fuchsias and pelargoniums should be snugly in the GrowMate out of harm's way.

Continue sowing winter salads.

OCTOBER. Time for a thorough clean-up if it has not taken place in September. Plant up a selection of spring bulbs such as crocus, grape hyacinth and dwarf tulips for a stunning spring display. Keep these in a dark, cool, frost free place until shoots appear, then transfer to the GrowMate.

If you are over-wintering seedlings of annuals, pinch out the growing tips to encourage bushiness. Pelargoniums & fuchsias are best overwintered in a frost-free but cool GrowMate, with compost kept quite dry, so that they remain dormant.

NOVEMBER. Maintain temperature at 42 - 45°F. in a heated GrowMate if frost sensitive plants are present. If unheated, then protect these plants with a fleece or bubble-plastic if it is frosty. Ventilate on sunny days and keep the atmosphere as dry as possible. If your pots of bulbs have shoots about 1" high, transfer them to the GrowMate to induce

early flowering. All fuchsias, pelargoniums etc should now be in the GrowMate.

Should you be growing winter salads, a minimum temperature of 45°F. is necessary. Lift parsley, chives and mint from the garden and pot them up to provide a supply in your GrowMate during winter months.

