



**VMC PILOT**

# *Pilot*



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# THE PILOT – EASY TO BUILD, TRADITIONAL FLYING FUN

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The VMC Pilot is a high wing cabin sports model designed for fun flying. This is not a scale model based on a real (or what modellers call the 'prototype') aircraft, but is designed purely as a flying model. Sports models come in many guises and are often flown in competitions that are purely about flying duration, with many different sets of rules and regulations governing their size and shape. Often these models bear no resemblance to a real aircraft at all, with thin tubular fuselages,

no undercarriage and very long thin wings. A cabin sports model is one that has a 'cockpit' where a notional pilot could sit, with fewer compromises to the size and shape for duration. Therefore, it sits between a scale model and a pure duration model both in the way it looks and the way it performs. These models are much easier to build and fly than their scale model counterparts and therefore form an ideal starting point for a new modeller.

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## THIS KIT

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This kit is for building a traditionally constructed, rubber-powered, free-flight cabin sports model of an original design by the Vintage Model Company (VMC). Construction of the model from this kit uses simple balsa wood surfaces and the traditional method of 'stick and tissue' for the wings; that is to say, a built up balsa wood skeleton (framework),

covered with a tissue skin. The balsa wings are built over a plan printed at their exact scale. Power is provided by a rubber strip motor that is wound up before flight. Free-flight means just that – once the model is launched it is on its own. It must follow a predetermined flight path established when the model is initially adjusted for flight or 'trimmed'.

This type of traditional building technique and flying requires a degree of patience and skill – but is extremely rewarding. Although not a ‘serious’ sports model, if built correctly, properly ‘stretch wound’ and in the right hands, the Pilot is capable of surprisingly long flights (30 seconds plus) both indoors and outdoors on a calm day.

The Pilot is just one of a series of kits designed and manufactured by the Vintage Model Company. Aero-modelling was very popular from the 1950s until the 1980s and following a decline and the loss of UK manufacturers such as FROG, KeilKraft and Veron, a revival is now underway. The advent of modern technology such as laser-cutting of parts and the growth of the internet giving access to information on the skills and techniques required to successfully build and fly these models, means new enthusiasts are discovering the joys of aero-modelling every day.

In the spirit of the old kits, additional items required to build the model are things that can be found in the kitchen drawer or are easily available on the high street.

## KIT CONTENTS

- Three balsa sheets with precise laser cut parts and strip wood.
- PVA glue for building the wooden frames.
- Piece of P400 Sandpaper (KP1).
- Pre-formed wire main undercarriage (KP2).
- Three low friction plastic ‘nose’ bushings– one for the propeller and two for the undercarriage wheels (KP3).
- Three cocktail sticks /toothpicks to use as dowels (KP4).
- One 150mm diameter plastic propeller (KP5).
- One pre-bent motor hook and shaft (KP6).
- Coloured covering tissue (KP7).
- Piece of clear acetate for the windows and ‘trim tabs’ (KP8).
- Lightweight printed paper graphics sheet (KP9).
- 2 Rubber bands to secure the wings (KP10).
- Rubber motor strip (KP11).
- 2 Building plan sheets (A and B).
- Parts reference sheet (C).

# OTHER THINGS THAT YOU WILL NEED

## CONSUMABLES

- A 'glue stick'.
- Cling film or waxed paper to cover your plan or a wax candle to rub over it.
- Tissue sealant – if you want to fly your model outdoors (see 'Covering' for details).

## TOOLS

- A 'building board' – a flat piece of wood or cork that is large enough for the largest part of the model and soft enough for pins to be pushed into.
- Some modelling pins. If these aren't available, dress making pins or drawing pins with tall heads will suffice.
- A sharp craft knife or scalpel.
- Pliers and wire cutters.
- A small engineers square or a plastic set square from a school geometry set.
- 30cm rule (preferably steel).
- 'Blu-Tack' or plasticine.
- Brushes – one thin and fine, one flat and soft 10-12mm wide.
- An old perfume bottle or atomiser that can deliver a fine mist of tap water.
- Some sprung wooden clothes pegs to use as clamps.

# THE PLAN, GENERAL BUILDING TECHNIQUES, TERMS, HINTS AND TIPS

The building plan sheets provide most instructions for the construction of the major components. The wings are all built over the outlines on Building Plan Sheet B. *Cover this part of your plan with cling film or waxed paper or rub it all over with a wax candle to stop the parts sticking to it.*

There are some terms used in these instructions that you may not be familiar with:

- **Laminate:** This means to make a glued sandwich of various parts, often with the grain of the parts running in opposite directions to make a single thicker and stronger part. When laminating, ensure that the parts are held together or weighted down and are aligned according to the plan instructions. Make sure that you remove excess glue that squeezes out, as not doing so can make the parts harder to sand and in internal corners, may leave an undesirable glue 'fillet'.

- **Cut through section:** This is simply a way of showing parts on the plan in more detail – as if you had cut through the parts on the line shown. The parts that are 'cut' are shown 'cross hatched'.
- **Bevel:** This means to angle the edges of a part, usually by sanding.

## SAFETY

This kit is not a toy and as such is not suitable for children below the age of 14. Read and follow any instructions and warnings given on the various glues, adhesives and paints, etc. When flying your model, follow the guidelines in the section 'Trimming and flying your model'.

## TIPS TO MAKE A GOOD JOB OF YOUR MODEL

Read and follow the instructions and the plan carefully.

- A light model will fly much better than a heavy one, so use glues and adhesives sparingly. Work neatly and remove excess adhesive that squeezes out from joints – glue weighs far more than the balsa wood! A piece of stiff 1.6mm square scrap wood with the end cut at an angle makes an ideal scraper to remove excess glue from corners or slots.
- In some steps it is advised to sand some of the parts thinner to improve performance at the expense of robustness. If this is your very first model then we suggest that you build 'as stock'.
- To avoid losing the parts, remove them from the laser cut sheets only when you need them. Use the parts reference sheet to identify the required part(s). Keep what remains of the balsa sheets once the parts have been removed. This 'scrap' can be useful later to replace a broken part or to make other detailed parts of your choosing.
- Balsa wood is very delicate – a light touch is required and this is especially true when sanding. If you have not sanded balsa before, practice on the scrap edges of the balsa sheets. You will be surprised by how quickly the material is removed!
- When using glue, don't use it from the tube directly. Instead, drop some onto a non-porous disposable surface such as clean foil from a yoghurt pot lid. Alternatively, save pistachio nut shells – one held upright and firm on a piece of Blu-Tack or plasticine makes an ideal disposable glue container. You can then pick up precise amounts of glue on the end of a pin or piece of wire to apply to the parts. This saves overuse of the glue.
- All of the contact surfaces of the parts to be joined should be covered in glue.
- To remove the balsa parts, cut through the tabs that join them to the sheets with a sharp craft knife or scalpel – do not try to snap them from the sheets as they may split. Remove the remains of the tab with a light sanding.

- Some parts have a laser engraved letter 'T' on them – this means that the part should be orientated with the letter T to the top when it is correctly assembled.
- If you decide to paint your model, then use paint sparingly. It is very easy to add weight with paint and your model will not fly well if it is too heavy.
- The balsa sheets are graded. Sheet 1 is hard and strong but heavy – it is used for parts where strength is more important than weight. Sheets 2 and 3 are weaker and softer but light and are used for parts where lightness is key – obviously at the expense of strength.
- Never push pins through the balsa parts or strip, (unless specifically told to do so) – it will weaken them or cause the wood to split. Use pins each side of the parts, either angling them or using the head to hold the parts down.
- Never force a part to fit – check and adjust it until it fits snugly but without force.
- Pin parts together tightly but be careful not to crush or damage the wood – a tight joint is a strong one.
- Trial fit the parts before gluing and carefully adjust them if required. They are cut accurately, but small errors can occur between the parts and the printed plan. Wood is a natural material and its thickness may vary – it will contract and/or expand after the parts are laser cut.
- You can work on several parts at one time. For instance, you can make up the wheels and undercarriage at the same time as something else is setting. Just make sure you read through the instructions first and follow a logical sequence, and allow parts to set properly before using them in a following step.
- The internet contains a huge amount of information to help you build your model. Searching for terms such as 'free flight scale' and 'stick and tissue' will yield example builds and a lot of useful information to help you with your build.
- **Above all... take your time!**



## STEP 1

A number of steps in these instructions call for the sanding of parts. Using sand paper on a flat block offers much more control than holding it in one's fingers. Make the sanding block up as shown.

## STEP 2

Lay the two fuselage side pieces (K1) out as shown – this makes sure that two opposite-hand parts are made. Glue pieces K4 where shown, aligning the hole in each part.

## STEPS 3-9

Make up the parts as shown using the glue provided. In step 4, use clamps or clothes pegs to clamp the parts over the wire and use plenty of glue to ensure that the wire is properly trapped.

## STEPS 10-12

Make up the fuselage, ensuring that all is square and true at each stage. At step 12, pinch in the front and rear using elastic bands or a clothes peg before adding the other cross pieces.

## STEP 13

Fit the wheels and bend the wire over to retain them.

## STEPS 14-15

Make up the tail plane and fin assembly. [TIP: For a lighter flying model, sand the parts to around 1.2mm (1/22") thick before gluing them together]. Fit the tailplane assembly to the fuselage making sure all is square and true. **Note you can leave fitting the tail plane and fin assembly until after the fuselage has been covered in step 24 if preferred.**

## STEP 16

*Temporarily* fit the nose block – **DO NOT GLUE IT IN PLACE**. Sand the nose block to shape and blend it into the nose. Also bevel the top edge of K3 to match the fuselage profile. Give the entire assembly a light sanding to remove any lumps and bumps and remove the exposed burnt edges of the laser cut parts. [TIP: For a lighter flying model, sand the balsa from F3 rearwards to around 1.2mm (1/22") thick].

## STEP 17

Pass the motor hook and shaft through the nose bushing as shown. Fit the plastic propeller and make the shaft as short as possible, then bend it over to lock it in place. Cut off any excess metal from the end.

## STEPS 18-21

Build the left hand wing panel as shown, ensuring that the root rib (R1) is angled using the gauge DG – **DO NOT GLUE THE GAUGE IN PLACE**.

**Note also that the root ribs are on the harder sheet and are marked with a '1'.** Cut the square strips SQS a little longer than required leaving the excess at the R1 end. Sand away the excess flush to the R1 rib.

## STEP 22

Repeat steps 18-21, but this time for the right hand wing panel.

## STEP 23

Join the two wing panels together, propping up one end as shown using a large matchbox or similar until set. Round off the leading edges of both wings and taper the trailing edges as shown. Carefully give the entire structure a light sanding to smooth the joints, removing lumps and bumps and the burnt edges of the laser parts.

## STEP 24 – COVERING AND FINAL ASSEMBLY

The tissue in the kit is used to provide a 'skin' over the balsa wood framework of the wings. The tissue is attached to the framework and then sprayed with water and left to dry. As the tissue dries, it shrinks and tightens. For flying indoors, this can be left 'as is', however, sealing the tissue is advisable if you intend to fly your model outside as it makes the tissue more durable and stops it 'sagging' if it is damp or humid. Traditionally, cellulose dope was used for sealing the tissue (thus the process is often called 'doping'). Cellulose dope is noxious, smelly and generally frowned upon these days. Two alternatives are available:

**Clear lacquer** This is available at many DIY stores in spray cans. The wing can be given a single coat once it is built, but before the paper decals are applied. If you use this method then make sure that you only apply a light coat. It is very easy to get carried away with it and add a lot of weight!

**Eze Dope** This is a modern, water-based replacement for cellulose dope. This is thinned (30% Eze-Dope to 70% water) and then brushed on to the tissue after it has been shrunk. If you choose to use Eze-Dope, then you should shrink the tissue with a 5% solution (5% Eze-Dope to 95% water) and pin the model parts down each time you apply a coat, as you do when you shrink them following these instructions overleaf:

Cover the underside of the left wing with one piece of tissue that is cut approximately 10mm bigger all of the way round, and that runs from the R1 root rib position to the wing tip.

Apply the glue stick lightly only to the face of the parts of the structure that form the outer profile. Keep the covering smooth and avoid it gathering in blobs on the surface and in corners.

Apply the tissue then gently tug and tease it until there are no wrinkles and the tissue is nice and smooth. You do not have to make the tissue tight – the water shrinking will do that later. Give the glue a few minutes to dry.

Once the glue has set a little, cut the tissue carefully, leaving an edge about 1mm wider than the part all the way around.

Working in stretches of a couple of inches at a time, apply the thinned PVA to the tissue edge that is sticking out and carefully roll the tissue up, so that it sticks to the edge of the part. Rub all round the edge with a dampened finger to ensure that the edge is fully stuck down and nice and smooth. Do not get the PVA on the tissue anywhere other than the edges or the tissue will not shrink properly later.

Cover the top of the wing in a similar manner, this time covering it with two pieces – one that runs from the R1 root rib position to the tip rib (R6) and one piece that runs from the tip rib to the wing tip itself. At tissue to tissue joints, brush the thinned PVA through the top layer of tissue and gently rub the joint with a damp finger to ensure a good joint.

Allow the glue to go off for a few hours or preferably overnight, then spray the part with a fine mist of water on both sides. Place the 'sticky taped' spacers under the wing edges to hold it off the board and use pins set at an angle to hold it flat until it dries. Holding the wing down in this way helps prevent warps. Note that the tissue is very delicate when it is wet, so handle the wing at the edges and with care so that you don't damage it.

Repeat the above steps for the right hand wing panel, avoiding re-wetting the parts on the left hand wing panel.

The fuselage top and bottom can be covered in either of two ways. The simplest method is by using the over-sized coloured panels on the graphics sheet (KP9). On the bottom of the fuselage, the shortest piece covers from F3 to F4, the longest piece covers from F4 to the very rear. On the top of the fuselage, the middle-sized piece covers from F4 to F5. Cut the panels to the correct length and 4-5mm wider than the fuselage width, then secure with a glue stick to the edges of the fuselage and the formers. Once dry, carefully trim off the excess paper flush with the fuselage sides using a knife. Alternatively, for a lighter model, tissue can be used in lieu of the paper parts following a similar method to that used on the wings.

Cut the windscreen from the acetate provided. It can be secured with a glue stick, applying it to the fuselage.

Fit the markings and graphics for the side 'windows' from the graphics sheet. They should be cut out and glued in position with a glue stick, using the finished model picture as a guide to their positions.

Fit the motor peg made from the cocktail stick/toothpick provided. Cut it to length leaving about 5mm sticking out each side. Use the scrap ends dipped in PVA and rolled round the peg hole to harden it, trying the stick for a good 'squeaky' fit each time you add more glue. **BE CAREFUL! – Wait for the glue to dry at each stage before trial fitting the stick to avoid it being permanently bonded!**

Fit the wings to the fuselage using the rubber bands provided. Locate the trailing edge of the wing to F4, then carefully stretch the rubber band from the front left hand peg to the rear right hand peg, and then vice versa, so that the bands cross in the middle.

## STEP 25 – TO MAKE UP AND FIT THE MOTOR

The motor consists of the rubber strip provided. This strip is more refined than that used in rubber bands and is very stretchy, allowing it to hold lots of energy. A single loop should have enough power for the model if it is built lightly as per the instructions. Contrary to popular belief, the rubber motor is not designed to hold in the nose plug and motors that are much longer than the distance from the propeller hook to the rear peg are used by experienced modellers. This requires a geared winder to 'stretch wind' the rubber motor. If this is your first model and you do not have a stretch winder, tie a knot in the rubber to make a loop that is roughly the distance between the peg and the

hole in the nose. Wetting the rubber makes it easier to tie a knot, however, do not pull the knot too tight otherwise it can tear. Once knotted, apply a drop of glue to the end 'ears' of the knot, taking care to avoid putting it on the actual working part of the rubber. To make your rubber motor more efficient it can be lubricated with castor oil or spray silicone trim polish that can be bought from motor factors.

Put the rubber loop down into the nose of the model, lower it down to the peg position and trap the loop with the peg, then connect the other end to the motor hook, and fit the nose plug.

## STEP 26 – TRIMMING AND FLYING YOUR MODEL

**When flying your model, choose a large area free from any obstructions. Do not fly it towards people or property.**

To fly successfully, your model must be correctly trimmed. Trimming is a normal procedure for any aircraft, but for a free flight model it is especially significant as once the model is released, you have no control over it. Trimming takes some time and skill and the basics are outlined here. More detailed information and help is available from the many

experienced free flight modellers who have websites dedicated to the subject or post information on numerous on-line forums.

The first step involves fitting the motor and checking the balance. Short test flights should then be carried out during which the behaviour of the model can be observed. Following initial flight tests, the number of winds on the motor and thus the duration of the flights can be slowly increased.

### TO BALANCE THE MODEL

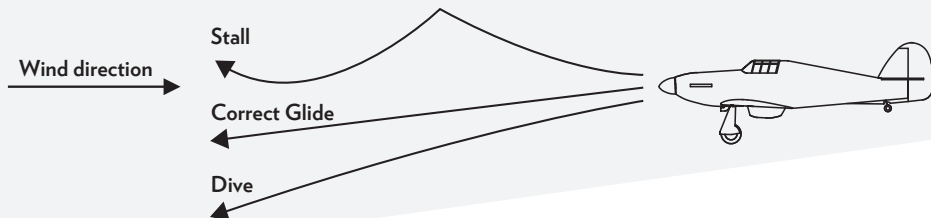
Referring to the arrow on the plan labelled 'balance', hold the model with your fingertips under the wings at that position. It is likely that the model will want to tip backwards. If it does, add Blu-Tack or plasticine to the nose of the model, adjusting the amount until the model balances at the correct position with the tail plane approximately level.

## TEST GLIDES

Choose a calm, dry day if you are trimming your model outdoors. This is a small model and slight gusts and disturbances will make it hard to judge how your model is behaving. It is useful to find a field with nice long grass to act as a gentle landing spot during these early flights.

Gently throw your model towards an imaginary point on the floor about 7-8 metres in front of you into any wind. If the model nose rises then falls, check the balance and add more nose weight

if needed. If the balance is good, then the wing trailing edge can be lifted with a 'shim' made from thin cardboard. This will help to push the nose down. If the model heads nose first downwards then again check the balance and remove nose weight if needed. If the balance is good, then the wing leading edge can be lifted with a thin cardboard shim, this time to push the nose up. Carry on test gliding, adjusting the nose weight and wing angle until the glide is nice and smooth and the model lands about halfway towards the imaginary point.





## POWERED FLIGHTS

Wind up the motor with approximately 50 turns (wind clockwise looking at the front of the model) and launch it into the direction of the wind (if present). This should achieve a gentle powered glide. Aim for a gentle left turn by adding tabs made from the clear acetate to the trailing edge of both rudders on the tail. Adjust them towards the left to make the plane turn left and to the right if the left turn is too sharp. If the left wing 'dips' and the model spirals in, then add an acetate tab to the

underside of the left hand wing trailing edge and bend it down a little. Gradually increase the turns on the motor in steps of 50 up to approximately 250 for the short simple loop. At each step, make adjustments to the tabs to control the flight pattern. If you struggle to get your model to fly well, then check for warps in the flying surfaces of the model. These can be removed by twisting them over a bowl of steaming water.

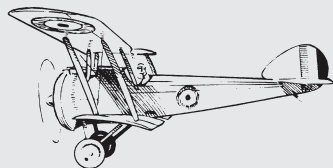
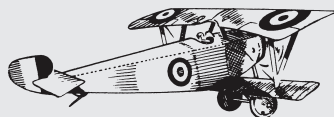
# THANK YOU FOR CHOOSING A VINTAGE MODEL COMPANY KIT

We hope that you have enjoyed building and flying your model.

Be sure to collect and build the whole range, available from many high street shops or direct from our website [www.vintagemodelcompany.com](http://www.vintagemodelcompany.com) where you will also find a wide range of modelling tools, materials, accessories and tips.

From all the team at The Vintage Model Company.

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