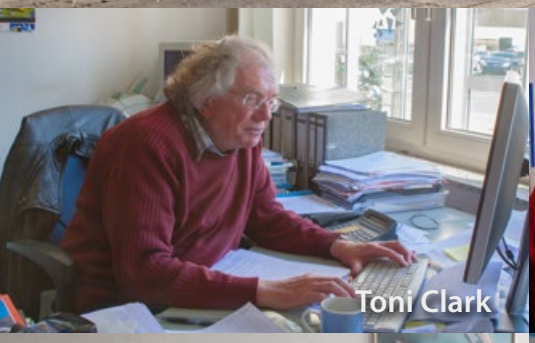
Toni Clark

PRACTICAL SCALE

2015

Your Toni Clark Team...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Catalogue 2015

1st Edition
Febuary 1st 2015

All prices in this catalogue include **19% VAT,** please divide by 1.19 when ordering from outside the EU.

40% scale, ideal for the Valach VM 120		Wing area:	3 sqm
Wingspan:	4.040 mm	Takeoff weight:	19 kg
Length:	2.750 mm	Complete Kit:	€ 5.390,–

This superb spoked wheels are used by Paolo Severin on his Fokker E.I and we use them in our Sopwith Pup kit. The one-piece solid rubber tires last much longer than tires made from foam rubber and are much lighter. The typical cracking of the bond seam on foam rubber tires is a thing of the past. The wheels have a diameter of 225 mm and weigh 310 g each. They are delivered with 10 mm adapter to fit the axle of our Sopwith Pup.

Spoked wheels 1 pair #7150 € 39,95

Toni Clark practical scale GmbH

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Ordering

When ordering please give your customer number and the order number. If you do not have a customer number when calling; make sure you give the correct Post Code.

For written orders you can use the order form at the back of this catalogue. With telephone orders have the description of the article and the order number ready to avoid any aggravating mistakes.

The prices in this catalogue are the direct selling price in Euro including the German sales tax of 19%.

Prices do not include postage and packing, these are added to total invoice price.

We do not have a minimum order; but please note the postage and packing costs that we have to charge. It can pay to order things that are regularly used such as fuel tube; spark plugs and so on, instead of ordering just a tank and then being annoyed by the despatch costs.

For packing costs we charge only the buying in price for the cartons and so on.

To customers outside Germany we send only against payment following a pro forma invoice.

We reserve the right to alter prices and products as may be required.

Luebbecke, Febuary 1st 2015

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Dear Modeller,

Our name stands for first class scale models, designed to give endless pleasure. The average modeller will be able to build and fly them without difficulty.

1970 The Practical Scale Company was started in England.

1974 Moved to West Germany.

1976 Obtained the exclusive import rights for the Quadra motor in Germany, this was the beginning of the large models era.

1980 Gerhard Reinsch became my partner. Gerhard had just obtained his degree as an Aircraft Designer, he has been consumed with the desire to build model aircraft for as long as he can remember

1984 We imported the first Titan ZG 38, and this motor was a winner from the start.

1992 Moved to our new factory.

2003 Desert Aircraft Engines added to our assortment.

2010 Valach Motors four-stroke gasoline engines, exclusive distribution and service for Westeurope.

2011 Paolo Severin super scale kits exclusive distribution for Germany

We are a direct marketing company, this is the reason we can offer the finest quality products at very competitive prices.

What is it that makes our Kits so good?

- Ribs, formers and other shaped parts are either CNC milled with a high frequency spindle running at 60,000 rpm or profile belt sanded to shape. There is no ragged die stamping with our kits, or the charred edges from a laser cutter.

CAP 21 kit

- We carefully select all Balsa and timber at the log and finished stage. Paired parts are matched for weight and hardness.
- Before we commence production the prototype is exhaustively tested.
- Our kits are really complete, spinners, tanks wheels, control linkages and so on, you need only glue and covering material.
- We use not only standard self tapping screws but expensive Hex socket machine screws with safety nuts where appropriate.
- You can of course ring us when you come up against a problem which is causing you difficulty.

DH82A Tiger Moth

Scale: 1:4.8

Span: 1.86 m

Length: 1,53 m

Wing area: 1,05 m^2

Weight: 4,5 -6 kg
depending on motor and finishing.

Wing loading:
43-57 g/dm^2

Georg Schmid built this fine Tiger Moth in 1974. With his „small" Tiger he had the largest biplane in all Bavaria at this time...

For a detailed description please read the report reprinted from the "Model" magazine on page 10.

Just a short paragraph here concerning engine power. This Tiger was originally designed for a 10 cc two stroke. Although this Tiger is fairly large for a biplane, a 10 cc engine is more than enough power. The reason being the excellent aerodynamics and the low wing loading.

Today there is a range of four stroke engines from 10-20 cc that are suitable for this model. Due to their smoother running a 15 cc engine is a good choice.

TIGER MOTH Scale 1:4.8 ..... #1000 € 499,—
Complete kit.

Bubble aircushion sleeves ..... #1490 € 39,90
For the wings and tailplane, not supplied with the kit.

The following parts are of course in the kit but can be purchased separately.

Epoxy/Glass Motor Cowl ..... #1110 € 46,90

Vac formed windscreens, pair ..... #1120 € 11,90

Vac formed instruments ..... #1130 € 12,50
set of two

Vac-formed parts ..... #1140 € 10,90
Oil tank, step, seat, carburettor intake, wheel caps etc.

Head guard cores pair ..... #1150 € 15,90
PU-foam.

Landing gear ..... #1160 € 37,50
ready silver soldered, with radius rods.

Epoxy/glass wing tank ..... #1210 € 47,50
with moulded in ali-dowels for wing fixing.

Wingribs ..... #1220 € 79,90
all ribs and riblets for both wings.

Fuselage formers, CNC-milled ..... #1280 € 37,50
all plywood and Balsa formers.

Strut fixing screws ..... #1230 € 1,20

Further parts can be supplied, please telephone for these.

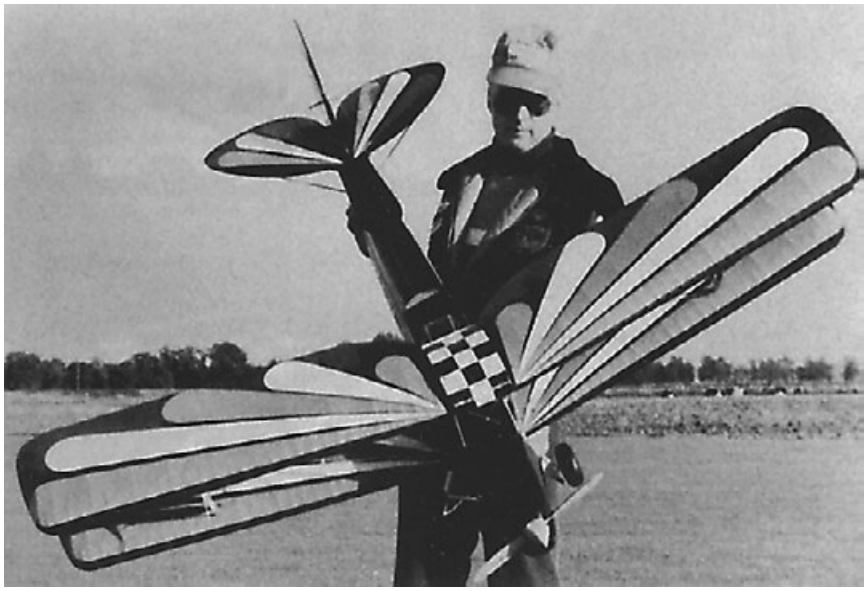
Photo Sets DH82A Tiger Moth:

①**G-ANFM** .....#1060 € 29,90
Fuselage yellow; wings, cowl and tailplane silver. 20 colour photographs 15x10 cm.

②**G-ANOH**. .....#1050 € 29,90
Fuselage and tailplane red, wings white. 20 colour photographs 15x10 cm.

③ **Camouflage**.....#1070 € 29,90
Camouflage. Green and dark earth topsides, trainer yellow undersides, this aircraft has been restored and is based in Denmark. 20 colour photographs 15x10 cm.

M.A.P. Three view scale drawing #2050 € 14,90



Kurt Borm
and
Manfred Boog

The biplane with the swept back wings and attractive rounded structure, with balanced proportions and elegant shaped tailplane, that is the Tiger Moth, the most famous trainer and sport machine in the world, 50 year oldtimer with apparently unlimited life. Toni Clark in Luebbecke sells this fully tested scale model as mainly wood kit.

Tiger - MOTH

Scale Model from the practical scale Kit

Without a doubt the De Havilland Tiger Moth has to be one of the best known aircraft in the world. She is the best known trainer this century and probably the most attractive biplane of all.... Several more superlatives are relevant when one considers club flying and glider towing, the length of time the Tiger was in service, how popular she was with most pilots, as well with spectators at airshows, the many great names in flying that were connected with the Tiger.

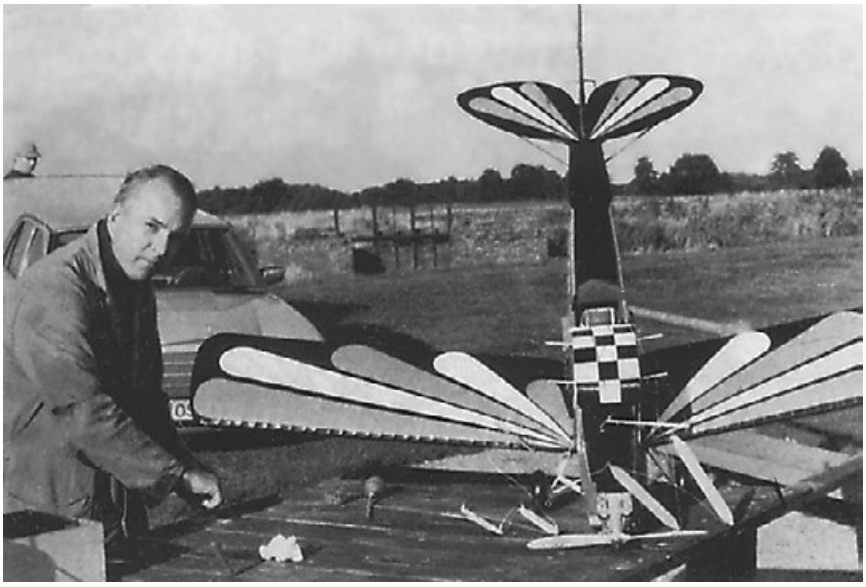
The Tiger was designed by Sir Geoffry de Havilland as the last in the line of a number of very famous light planes beginning with the DH 53 Humming Bird. The DH 60 Moth was the first step towards the so successful DH 82 that made its maiden flight on the 26th October 1931.

The powerplant was the Gipsy III four cylinder inline air-cooled engine producing 120 hp, this engine was later up rated to 130 hp and known as the Gipsy Major. The Royal Air Force immediately ordered a large number of DH 82's for training purposes, this meant that most RAF pilots from the years 1939-45 began their training in the Tiger Moth. Several European and South American airforces purchased the Tiger for training purposes. The military demand for the Tiger was such that the first Tiger that became available for civilian was in 1938. By 1945 7,000 Tiger were produced.

The second epoch for the Tiger came in 1950 as a large number of these machines were declared redundant and were sold off for civilian use. They were used as club machines and glider tugs, as maid of all work and earned a well deserved reputation as a really fine 'plane. Today a large number of Tigers are still flying in many parts of the world, many examples have passed their fiftieth birthday, something that in this modern world of aircraft will probably never happen again.

As a radio controlled scale model our first contact was in the 1976 German DMFV Semiscale nationals in Artland, a number of pilots from the Westfalian club Libelle Enger entered Tigers and achieved very high scores. The high point of these nationals was a formation fly around as the Enger crowd Reinhold Gerner, Frank Schulz, Heinz Ostermeier and Hans Friedenstab with their respective Tigers. Our clubkamerad Kurt Borm, as were the rest of the scale fans, was so enthused that for Kurt the decision to build one of these Tigers was a must.

Assembling the Tiger Moth. The lower wing is screwed into place, now the top two wing panels are plugged onto the wing tank, the wing struts are fixed to the wings with the attached wing bracing wires. A well thought out simple system that really function without trouble.



Several things that indicate the quality of the Toni Clark kit that say more than a long report, the rigging wires are permanently fixed at both ends so the struts and wires are permanently attached to the fuselage, with this method it does not take long to assemble the Tiger.

Shortly before the winter pause Matze received the long awaited Tiger kit produced by the company Toni Clark practical scale GmbH, Zeiss Str. 10, 3231 Luebbecke, this kit has the scale size of 1:4.8 with 1.86 m span. This model is scale and can be used in competition. All measurements from the original have been reduced exactly and has many small scale details which sets it apart from an average semi-scale model.

Even so the Tiger should not be considered solely as a competition model, for club exhibitions the scale details cause a great deal of interest, the unmistakable shape in the air and ease of flying also cause considerable interest whenever the Tiger is flown.

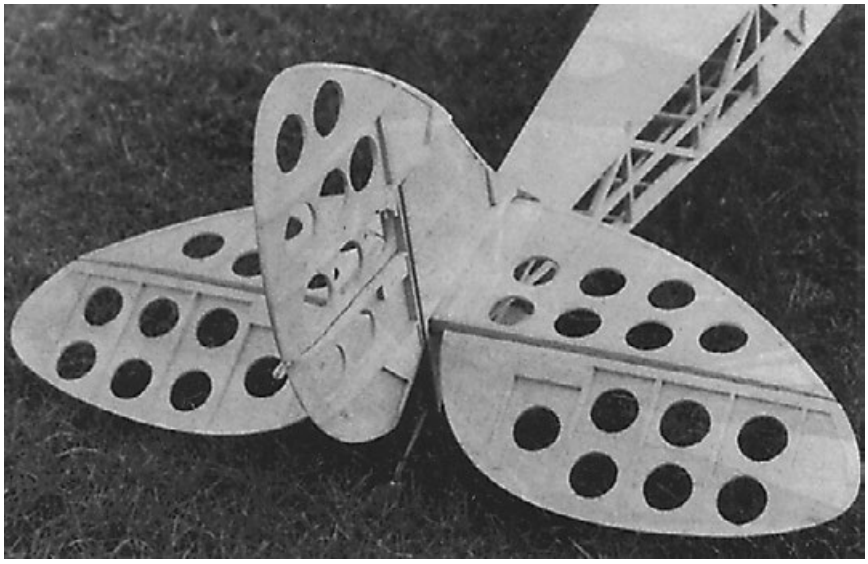
The kit is unusually complete, there are two sheets of plans, the Balsawood and plywood is carefully selected, the engine cowl and imitation wing tank is epoxy/glass fiber, aluminium wing dowels are glassed into the wing tank ensuring accurate dihedral and sweep back and accurate wing incidence, wire cabane struts is preformed, undercarriage part silver soldered together, a special scale silencer made from aluminium, rigging wires, turnbuckles, instruments, oil tank, hub covers, windscreens, building instructions and parts list for the 557 separate pieces.

Scale details are well covered with a three view drawing of the full size with a sketch page of details, with this information an accurate scale model can be built. For those who wish for more can purchase from Toni Clark a detailed colour photo set of twenty pictures 15x10 of G-ANOH and G_ANFM showing every detail possible. Building the model is fairly straight forward and is not at all difficult, every construction stage is defined and is as simple as possible. The modeller is taken step by step by a very comprehensive set of instructions surely to the finished model.

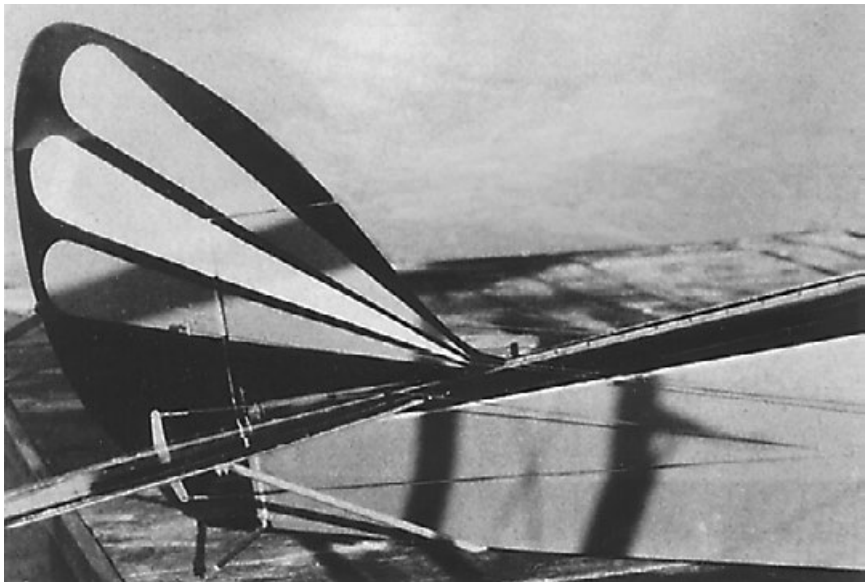
This Tiger Moth is ideally suited for an average modeller who wishes for the first time to have a scale model. A big help are the finished parts supplied in the kit which ensure the model is correctly built.

It is clear that the designer has done everything possible to keep the weight within reasonable limits without affecting the scale outline or shape, but at the same time ensuring the strength of the model is fully adequate. The best example of this design concept is the fuselage. It is basically a Balsa and spruce strip open construction, the fuselage top decking is plywood which gives enormous strength to the fuselage, making it almost indestructible. The

As light as possible but with the necessary stability clearly demonstrated here. The lightweight longerons, vertical and diagonal braces is with the plywood fuselage decking is absolutely free from twisting and able to be fairly heavily loaded.



Lightening holes in the tailplane to reduce as much as possible the need for lead in the nose. Small reinforcing pieces, tips and ribs give the necessary strength. After covering, the surface is just like any aircraft from the thirties.



Scale rudder, closed loop controls with wire and guides that must cause any serious scale modelers heart beat to quicken.

rudder and elevators have lightening holes cut in them to keep the tail as light as possible. Stripwood ribs are glued to the both sides of the tailplane to make these parts stiff and when covered simulate the typical open construction of aircraft built in the 1930's with ribs leading and trailing edges showing under the covering.

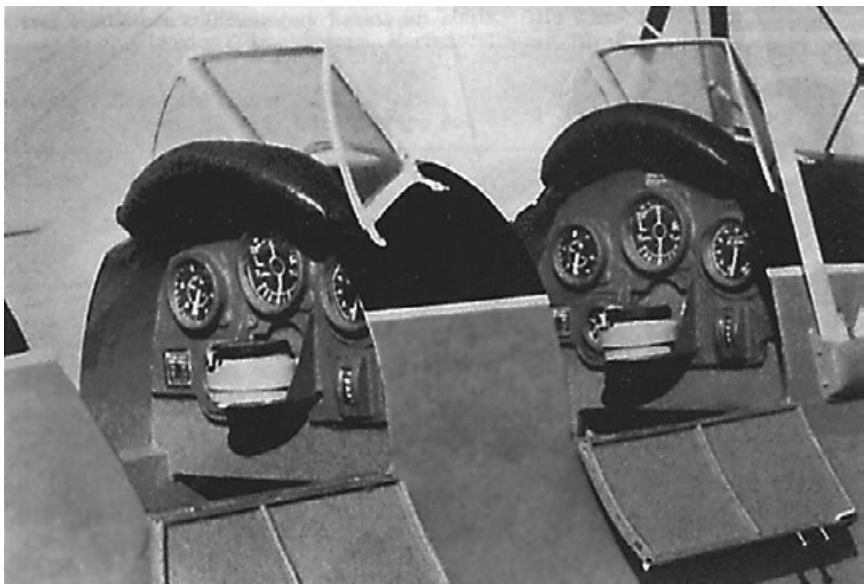
The wing section is fairly close to scale, this means the wing are rather thin and therefore are not self supporting, so the rigging wire is supplied not only for the scale effect. The rudder and elevators are hooked up with lighter wire, the closed loop system duplicating exactly the full size machine. When building the wings one thing we found was not correct and this was the length of the rear wing struts, other builders of this model had also found this mistake, this means the rear struts must be 15 mm longer than the front ones, this of course is due to the wing section being thinner the farther back one goes towards the trailing edge. It must be mentioned that this test model was not fitted with wing slats as is so with the full-size Tiger Moth.

Kurt fitted a Webra Speed 10 cc, with this engine fitted he had to put 200 grams of lead in the nose. There is room enough for the radio and servos and so on in the fuselage, the model was ready for the first test flight after six months work.

All the Tiger Moth kits are supplied with sufficient paint scheme details but most modellers do not seem so very interested, especially with the Tiger Moth there is almost an unlimited range of colour schemes to chose from. In this case Matze used a very unusual scheme. He watched a television series called "Die Erben Lilenthals", Our friend Kurt suffered something akin to a shock at the beginning of the first episode as he later said a Tiger Moth fluttered across his television screen with a very attractive red white and black scheme with the Danish registra-

The Tiger Moth fuselage center section is neat and pleasing with the wing fixings. Struts, rigging wires and cabanes are very close to scale.

Toni Clarks prefabricated parts are a considerable help to the average modeler in achieving a successful scale model. The very important top wing center section is a ribbed section epoxy/glass forming with the aluminium dowels glassed in and with the cut out in the fuselage sides it is almost impossible therefore to have an incorrect wing fitting. Even the silencer is included in the kit.



The cockpit details, with the doors opened, are without doubt a modelmakers dream. All parts for the cockpit are supplied with the kit. For the trained eye it is difficult at first glance to differentiate full-size from the model. One can take a closer look, everything is there, from the top row (from left to right) airspeed indicator, turn and bank indicator, and rev counter. Bottom row clock, altimeter, compass, oil pressure gauge, instrument panel lighting switch (not visible) the working clap down doors and headguards. Visitors to model exhibitions find such a detailed model far more interesting than ten other "normal" models.

tion lettering OY-DYJ. How Kurt came to obtain the name and address of the owner and subsequent photographs is a story in itself. Matze's paint scheme is not only very striking it is the first model so.

Flying the model? This was a cakewalk. In the German semi scale nationals in 1977 there were nine (!) Tigers, and later Kurt Borms model flew just as good as all these predecessors. The Tiger, due to the dihedral and sweep back of the wings makes for very stable flight and especially very slow flying.

Toni Clark's Tiger Moth can be recommended without fear of contradiction. For those who really like building, the extra time spent on the Tiger will be rewarded with an unusually interesting model that has most of the details of the full size as well as a superlative flying characteristic. Matze wrote on finishing his Tiger he was proud to be a member of the Tiger Moth Club.

Reprinted from the German magazine "Modell" with kind permission of Neckar-Verlag GmbH.

DH82A Tiger Moth

Scale 1:3,3

Louis Lamezan with his big Tiger in front ot the fullsize.

D.H.82A Tiger Moth Scale 1 : 3,3

Wingspan: 2700 mm
Fuselage length: 2190 mm
Wing area: 2,20 m^2
All up weight: 12-15 kg
Wing loading: 55-70 g/dm^2

The construction of the big Tiger is almost identical to the small Tiger. The Big Tiger has both wings split, the landing gear is fully sprung and entails a fair amount of metal work. The carefully thought out rigging method allows the Big Tiger to be put together in a matter of minutes. It only requires the servo cables to be plugged in and the wings pushed onto the dowels, the bottom wings first and four screws, top wings and another four screws and she is ready. The struts always stay attached to the wing rigging wires and these wires to the fuselage. No need for turnbuckles to be unscrewed or cables unclipped. This method has the advantage the trim settings do not alter.

The flying characteristics of the Big Tiger are absolutely scale. Like the fullsize she is easy, but not boring to fly. The Big Tiger has the size, weight and inertia to allow an inexperienced pilot to fly with ease and at the same time allow a really scale like flight pattern. With the Titan ZG 45SL fitted you will be able to perform loops, rolls and stall turns without effort. Fit the Titan ZG 38SC with the 1:2,8 reduction gear, tuned stainless steel silencer #5770 and carburettor bend #3878 and you will find the performance is unlimited, the stall turns and hammerheads are breathtaking. Landing with that 32" prop turning at a mere 500 rpm is an unforgettable experience for the pilot and spectators. Best of all is the wonderful sound, which can only be obtained with this combination of engine, gear ratio and propeller! Fit the ZG 62SL and you will be able to perform almost the same type of flying, but the 62, like the 45 requires that you make a silencer with a very close fitting header pipe (can be built from the parts kit #6649), also you must fit the 60 mm propeller hub so that the motor stays inside the cowl. But be warned, the first time you see and hear a Tiger Moth with the ZG 38 and reduction gear flying, you will be disappointed with your choice for the 62!

We have not compromised on our Tiger kit contents, this kit is complete down to the last nut and screw. You only have to buy the glue and covering to complete the airframe. The wood parts such as ribs and formers are CNC milled, fuselage sides are sanded to shape. All strip wood is carefully checked for quality. All metal and plastic parts are there in the box, rudder horns, fuel tank, wheels, instruments, oil tank, headguards in PU foam, formed windscreens. Epoxy/Glass motor cowl and top wing tank, preformed wire parts, Nylon covered rigging wire and wire for control surfaces, the fullsize rolled plans and three view scale drawing.

Tiger Moth kit.....#1997 € 799,—

The kit is supplied without motor mount and spinner, the motor mount is part of the reduction gear.

The following parts are of course in the kit but obtainable separately:

Plans ..... #2010 € 63,90
with part list and building instructions.

Epoxy/glass motor cowl ..... #2110 € 64,90
white gelcoat.

Vac formed windscreens,1 pair ..... #2120 € 14,90

Vac formed instruments ..... #2130 € 14,90
set of two

Vac-formed parts ..... #2140 € 11,90
Oil tank, step, carburettor intake, wheel caps, strut fairings.

Head guard cores pair ..... #2150 € 17,90
PU-foam.

Wing kit ..... #2200 € 289 ,—
CNC milled ribs, all wood parts for both wings, including riblets.

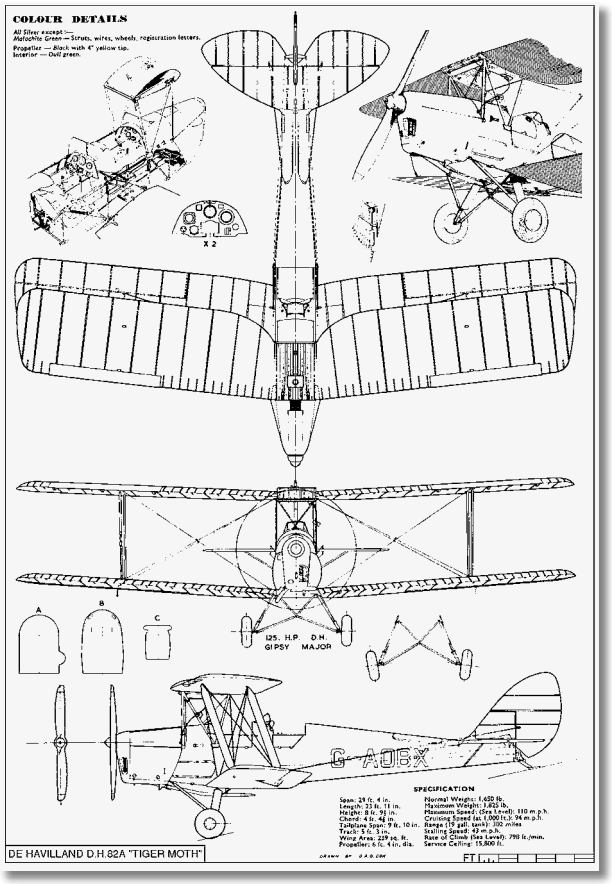
Epoxy/glass wing tank ..... #2210 € 74,90
with moulded in aluminium-dowels for wing fixing.

Wingribs, CNC-milled ..... #2220 € 149 ,—
all ribs and riblets for both wings.

Fuselage formers, CNC-milled ..... #2230 € 49,90 all plywood and Balsa formers.

Landing gear kit ..... #2260 € 53,90 all parts excepting wheels.

Wing strut fixing screws 8 pcs. ..... #2250 € 1,20



Tiger Club mylar transfer, 1 pair...#2160 € 4,90

This is the logo of the British Tiger Club and is correct scale size for our Tiger Moth scale 1:3,3. Yellow, black and white. Supplied with the kit.

The Tiger Club

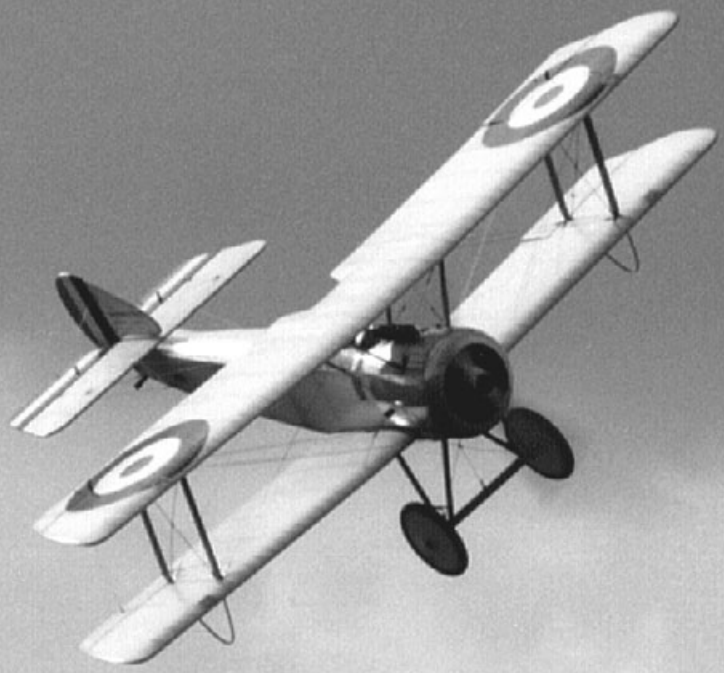
Air bubble plastic sleeves..... #2490 € 59,90
For wings and tailplane. Not supplied with the kit.

Anti spin strakes, 1 pair ..... #2300 € 44,90

Made from lightweight epoxy/glass. A large number of Tiger Moths were fitted with these strakes. They were not intended to prevent spinning, but to increase the rate of spinning, thereby speeding up recovery. The effect was pretty doubtful which often led to these strakes being removed later. It is for this reason, that we do not supply these epoxy anti spin strakes in the kit, so if the full size Tiger of your choice is fitted with these, you have to order them as an extra. By the way we have not been able to notice any difference caused by these strakes when fitted to our model.

Photo sets of the full-size Tiger Moth see page 9.

Sopwith Pup



Scale:	1:3,3
Wingspan:	2450 mm
Length:	1840 mm
Wingarea:	2,3 m^2
Wingloading:	60 g/dm^2
All up weight:	14 kg

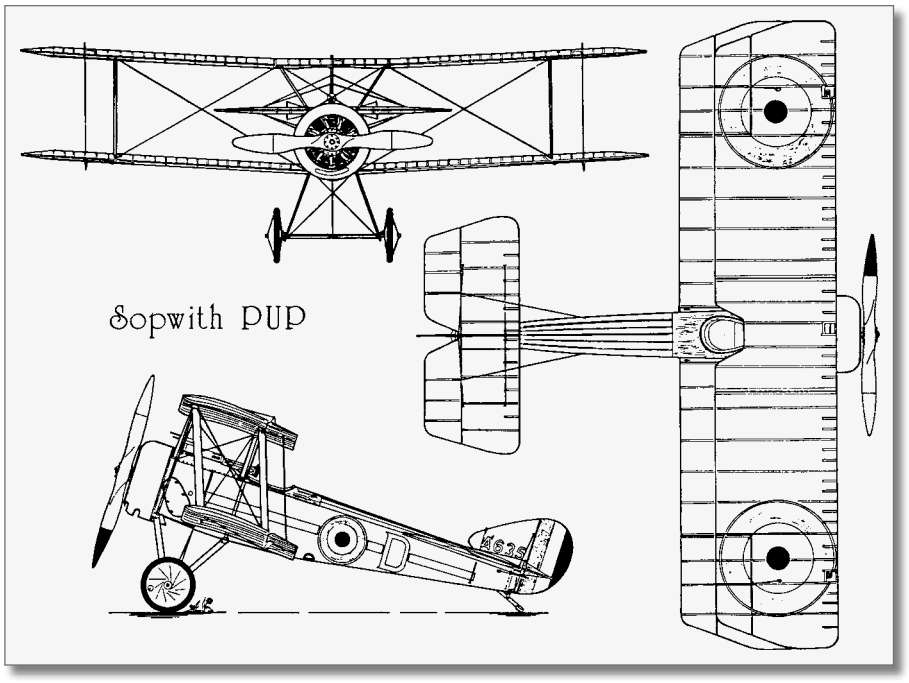
with ZG 38SC, reduction gear 2,8:1 and tuned stainless steel silencer #5770.

After a flight with a captured Pup, Manfred von Richthofen is supposed to have said, this is the nicest plane I have flown. Certainly one can read in many books and articles about the Pup and there is only praise. This attractive biplane was very manoeuvrable and what is more, very stable and without vicious tendencies.

We have succeeded in reproducing these characteristics in our model. The wing section we have used is the RAF 15 with slightly more radius to the nose. This RAF 15 section was used extensively during and after the 14-18 war. This legendary section is very thin, it is lightly undercambered and has a reflex trailing edge. The two spars are either side of the undercamber and lay flat onto the building board. Our Pup flies inverted with practically no down elevator! Rolls require the minimum of correction from the rudder and elevators. Side slipping with our Pup can only be described as fantastic, the wing loading is so light that take off and landing is so very easy.

The best power unit is without a doubt the ZG 38SC and the 2,8:1 reduction gear. I had a constant dream

for many years, this was to fly a model with a scale size prop, especially a model from the Biplane era. This obsession led to our reduction gear, first for the Quadra and now the ZG 38SC You can fit a ZG 62SL, but of course you do not have the marvellous sound of that scale size 32x18" propeller turning at a mere 2,800 rpm. For such a model this clearly visible propeller at full throttle, the realism is perfect.The Titan ZG 38SC and the Quadra tuned pipe is shown on the plan, the latter is no longer available, but our tuned stainless silencer #5770 is a good alternative. With the tuned pipe and reduction gear the prototype Pup required no lead in the nose. The firewall can be positioned to suit the length of the engine so that it will fit inside the spun aluminium cowl.



There are 14 meters of plans and every detail is shown. With the extensive building instructions the Pup goes together in a very short time. The construction is similar to that of our Tiger Moths, but has various refinements and a more detailed instruction manual. The fuselage is put together with the aid of a jig to enable you to end with a accurately aligned fuselage. The Ash tailskid is fully working and rubber sprung, the main wheels also use Bungee rubber cord for suspension as the full-size Pup did. The Pup is assembled on the flying field using the same system we use for our Tiger Moth. Push the four wing panels onto the dowels, plug in the servos, eight socket screws on the strut ends and she is ready to fly. The assembly is considerably helped by the specially made screw bushes and the ball joint screw driver supplied. The struts are fixed permanently to the landing and flying wires. When transporting the model, the struts are simply fixed to the fuselage with rubber bands. There is no time consuming work undoing turnbuckles or similar.

It took almost five years from the time the first prototype flew until the first kit was delivered. This length of time was due to production hindering our new project, but we are sure that with our Sopwith Pup, we have produced a kit that is nowhere else to be had in this form.

SOPWITH PUP ..... #7000 € 899,— complete kit

The unusually complete kit contains all ribs, formers and all other shaped Balsa and plywood parts ready notched and sanded. All wood is carefully selected. Spindle moulded landing gear spruce covering, spun aluminium cowl, all wire preformed, the landing gear axle carriers are ready silver soldered together. Nylon covered wire for the rigging and control surfaces, all turnbuckles and shackles. All parts to make the radio installation easy, there is every nut screw and washer, the hardware pack for the numerous small metal pieces weighs a kilo. The spoked wheels as well as the tank with felt clunk filter and nipples, instruments with mahogany veneered plywood panel, leather for cockpit coaming with miniature eyelets. Epoxy/Glass Vickers MG, all parts for the imitation Le Rhone rotary engine, including copper induction pipes. Rolled plans, instructions, parts lists and the Albatross Publications profile.

Air bubble plastic sheet sleeves for the wings ..... #7490 € 59,90

To cover the Sopwith Pup you need 8 m *ProfiCover*.

The following parts are in the kit but are obtainable separately:

PLANS, instructions and parts list ..... #7010 € 79,90
The plans show many sections and details, all is full-size, plans are 14 meters long. Very detailed instructions.

NEW SCALE DOCUMENTATION ..... #7090 € 26,95
44 pages. English description of the Sopwith PUP, clear drawings, many first class black and white photo's showing many details as well as 12 different paint schemes shown in colored views.

ALUMINIUM COWL ..... #7111 € 49,90

DUMMY ENGINE ..... #7120 € 49,90
Vacuum formed cylinders, crankcase, copper induction tubes, all screws nuts and washers and brass fittings.

COCKPIT INSTRUMENTS ..... #7130 € 19,90
Vacuum formed bezels and printed dials.

LEATHER COCKPIT COAMING ..... #7132 € 24,95

VICKERS MACHINE GUN ..... #7140 € 59,90
Epoxy/glass body, vacuum formed windscreen with leather strip for head guard, end cap and dust cover.

SET OF WINGRIBS ..... #7220 € 159,90
All ribs and riblets for the four wing panels.

SPOKED WHEELS, 1 pair ..... #7150 € 39,95
Foam rubber tires, 225 mm dia. with adapter for 10 mm axles.

The tailplane assembly from Wolf-Dieter Banke´s Pup as are the photographs on preceding pages.

Photo Sets
Sopwith Pup

Basic photo set ..... #7060 € 19,90

16 color pictures 15 x 10 cm. general views of the Shuttleworth's collection N5180. This Pup is regularly flown, top sides Khakigreen (PC 10), the underside is a pale straw cream.

Detailed photo set ..... #7070 € 29,90

24 color pictures 15 x 10 cm. This set includes mainly details from the same machine. These are complementary to the Basic set #7060.

Reminiscence of a Piper J3 Cub

I do not know about you but I find catalogues, no matter how well laid out, are dust dry and tend to go on a little too much with sales pitches. To provide a little relief, we asked our very good friend Lars Waegner to write something interesting. We asked Lars, because apart from editing a magazine for model helicopters, he has made and flown just about every type of model. He was for many years a full size pilot and instructor with the military, having flown many different types in Europe and America:

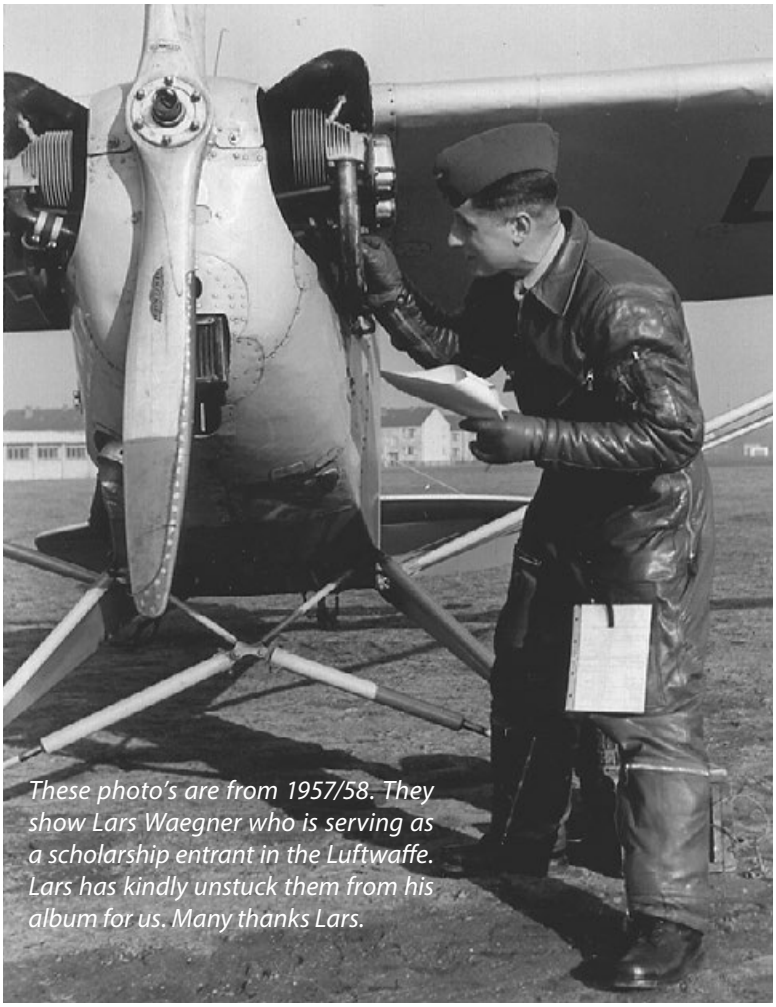
Reminiscence of a J3 Cub

What a yawning gap in front of me, left in the lurch somehow as I sit cowering and strapped into the rear seat of this Piper J3 Cub, sitting there as I have for the past days as a pupil pilot. The seat in front of me is empty, I can now see all of the sparsely equipped instrument panel. But really one does not need anything more complicated in the small and simple Cub. This Cub, among many, was built at the beginning of the forties for the American military, hence the wide expanse of perspex behind me in this Grasshopper. For some years now D-EDYS with Cub yellow and the black lightning stripe on both sides doing service with the Motorflug G.m.b.H (Ltd,) in Karthaus, a small place on the fringe of Koblenz. Today, sadly a high rise estate, but in January 1958 a well used grass airfield with many airplane wheel tracks clearly evident.

The wooden propeller turns rather lazily, the clinking chatter of the tappets can just be made out above the burbling exhaust from the Continental with its 65 horses. Right, make a good job of it, and do nothing to embarrass me, Trapp's words, as he stands by the open door flap, the last few words before my solo. I must not bend the reliable Piper, keep my eyes skinned. Shall I, now absolutely alone, fly her, me, for the past days the rather daft and helpless novice. Alright, he must know as a pre war and wartime pilot, and now an instructor, he is one of the old school. Spending most of day in the cockpit only climbing out to tank and swing the prop. No, the Piper does not have a starter, or battery and cable harness. The sole electrics are in the shape of the two magnetos firmly bolted to the motor. We

novices are not allowed to attempt the dangerous business of swinging the prop. This today is a thing of the past all „real“ aircraft today have starters.

Midday, Trapp always has his lunch brought over to the plane. He is sitting in front of me spooning away while I am at the back doing my best to keep the Piper straight and level over the Mosel river valley, past Koblenz on up to the Neuwieder Becken. Flying turns with 20 degrees bank then 40 degrees bank. Practising climbing, gently diving. Not at all easy for the novice to correct the Piper with its very light wing loading; The terrain under us is very hilly, causes turbulence. I must keep correcting. The Piper can fly itself quite well should I leave it alone to sort things out, but then I must continually correct the plane to develop my feeling for flying. Using the cowl and wings against the horizon to keep her level. Misty weather has a rather negative effect on the rapport between the instructor and pupil pilot! To fly towards a turning point, the bicycle spoke that sticks up out of the fuel tank is used as sight. The other end of this spoke going down into the tank ending in a cork, this is the fuel gauge. When the spoke is down, taxi over to the pumps. The pupil must crank the manual pump to replace the missing 40 to 50 litres in the fuselage tank right in front of the cockpit. The pupil must look after the aircraft, evenings washing off the spattered earth. The Piper has no mudguards and the wings undersides above the wheels are invariably muddy. It is really fun washing this muck off above your head, the ice cold water runs down your bare arm, right to the arm pits, the thick winter clothing does not help at all.



These photo's are from 1957/58. They show Lars Waegner who is serving as a scholarship entrant in the Luftwaffe. Lars has kindly unstuck them from his album for us. Many thanks Lars.

Oh well, I must go up alone. A couple of days ago a soloist, in D-ECIN shortly after take off and over the brow of the steep sided Mosel river valley the motor began to die, shortly before the emergency landing it picked up again. Recently the motor of our EDYS faded away during take off, in front of us was a telephone cable and a market gardeners Glasshouse. Trapp worked the throttle lever frantically, this was naturally accompanied by a great deal of bad language, suddenly the C65 got over its little crisis, or the air bubble in the fuel line.

Put these thoughts out of my mind, pull the door flaps together, a little more throttle and the Piper is bumping over the rough ground, now she's my Piper, who will deny me that? I roll up to the start using S turns as I cannot see over the cowl yet. The Piper is easy to steer while taxying. The tailwheel is coupled to the rudder with coil springs, reacts directly with rudder movement. The tailwheel has a slipping clutch to cope with overloading when turning sharply on the spot and by parking. One can turn the Piper on one wheel when you tread on the appropriate brake and give a short burst on the throttle. Very simple but all the same the Piper has hydraulic brakes, these are operated from heel pedals under the rudder bar.

I carefully go through the pre take off checks, a mistake here can have very unpleasant consequences. Full throttle and the small plane is vibrating and jerking. Right mag off and on, left mag off and on no drop in RPM by switching out the mags. Good! Elevator trimmer (car door window crank handle) set to take off position. Carburettor heating nob pulled out. Oil pres

sure OK. Seat belt tightened, runway free, I roll out to the marked off airstrip, set the planes nose into wind. A deep breath, stick back a little, push the throttle fully against the stop. Correct that left swing with a dab of right rudder. The motor appears to be even louder with the half empty cockpit. A short stretch of bouncing over the grass and she is now very light then she's off and we are flying, me alone in the Piper. Then everything is routine, all been practised a hundred times in the last weeks over the now very familiar landscape. 150 meters on the altimeter, downwind leg by the airfield, reduce the power a little, pull back a little on the trim lever. The motor with a comfortable 2100 rpm, rumbling away, with 60 miles per hour on the ASI (97 km/h) the Piper gently rocks, I have time to collect my thoughts. It is all now solely up to me, I must pull off this first solo landing. The covering material over the cabin drums in synchronization with the propeller, the stick in front of the empty seat moves around as if controlled by an unseen hand. Never again have I had such a feeling after a first flight in a new aircraft as now. Later I have always sat at the front, and even with a flight instructor wringing his hand in despair I have since had a feeling of indifference.

Back to business, time to turn into the cross wind leg and then the finals, now gliding. Must not forget the carburettor heat, or the motor will not pick up in the event of having to give full throttle to go round again. The engine noise dies down as I pull back the throttle lever. Trim lever three turns back. Gently curving down to the landing, keep the speed up, line her up with the runway, there a light cross wind, a slight bank and rudder to correct. The roofs of the houses, the boundary slip by underneath. The folks in the houses down there, have they an idea what is going on just above their homes? The ground comes nearer, slowly flair her out. Don't let the wheels touch too soon as the half empty Piper will start to behave like a mountain Goat and I begin to imagine the critical watchers saying Monday after the first bounce, Tuesday...The Bungee cord shockers take up the landing loads quite well but do nothing much to dampen things out. I will experience Hydraulic shock absorbers later with my next type. But I must keep the Piper flying about a foot off the ground, slowly back with the stick and then full back against the stomach. „You must not want to land but fly as far as possible until she cannot go any more, then set her down!" One of the most valuable pieces of advice from my instructor, the unforgettable Trapp. Years later, after becoming an instructor myself, I was to pass this on to numerous pupils. Now I carry this out for the first time alone, all three wheels at the same time rumble on the ground. I taxi around for the next take off. Trapp is there waving his fist and laughing, „Du Hund, du kannst es ja!" (You dog, you really can do it).

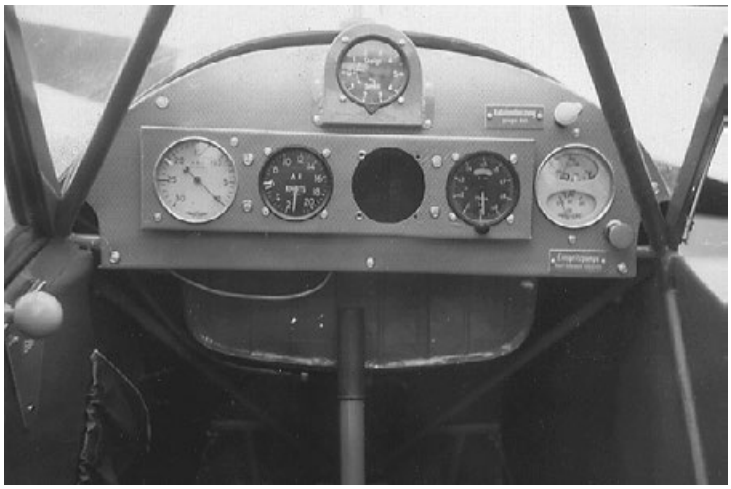
Rather breathless and elated, I taxi back to the hanger, switch off, fuel cock off, trim neutral, carburettor heating pushed fully home, that's it. In line are

waiting the instructors and student pilots, not without some hierarchy in offering their congratulations, which consists of two friendly helpers holding the freshly baked novice bent over. First the Flying club manager Schieferstein, the instructors next and then the pupil pilots. The latter, whose enthusiasm gave me cause to be thankful it was winter and not July, as the running shorts and overalls are a bit to thin to offer much protection. The logic behind all this is to make permanent my freshly won feeling for flying.

I can never forget this experience with the Piper, the smell of dope, petrol and oil, the rumbling engine, the rattle of the sliding window on the left, the fuel gauge before the windscreen, the plopp the fold down door makes as it contacts the fuselage. Many others have the same memories. The Piper was a sort of Volksplane of the pre war years of general poverty. The simple and cheap Piper J3 Cub was a standard trainer and sport aircraft for over thirty years. Today almost sixty years after its introduction there are many examples still flying. Some as carefully kept oldtimers and some as daily hacks. Others with more powerful engines and some with wingspan reduced by two meters, being the so called Clipped Wing Cub used for aerobatics. With the covering material removed, the Piper gives a frightening frail impression, especially so when the PIPER PA-18 Super Cub being fitted with a 150 hp engine and flaps. As trainer aircraft came later the Cessna 150, as tug aircraft the Morane or the Jodel Remorqueur.

The Piper J3 Cub is an original light aircraft for two people and small amount of luggage, 10 litres petrol per hour and a range of 100 kilometres. The Cubs (Bear cub) reliability and ease of flying comes from the low wing loading, this is the simplest and without doubt the cheapest aerodynamic solution. There is a clear trend today for designers to return to similar layout and construction methods of pioneer aircraft from the dawn of aviation to produce modern Ultralight airframes. The demand is growing for lightweight aircraft with weights between that of the Ultralights and the usual horrendously expensive all metal or GRP aircraft. I wonder, is there a new era of the Piper in coming.

I have had the wish for a very long time, to build a model of the Piper. There have been very many kits of the Piper, but a very few designs approached the concept of the full-size. Something always came up that stopped me building a Piper. But now after hearing a lot of praise for the plan and kit of the J3 Cub from Practical Scale with its completeness and quality, everything came back to me as if it were yesterday. No wonder this kit has been in production for so long. It is clear to see that real aircraft enthusiasts and scale practitioners were at work, not with all the small



details such as adjustable seats or door catches but a model that looks and flies like the original. The model, same with the full-size, can take a wide range of engines and can take some pretty wild aerobatics and is able to tow large gliders. Clear is that the scale friends will fit a petrol engine when they do not posses one of the five to seven times more expensive multi cylinder four strokes. These latter engines have the advantage they look better, but one should not overlook the fact that these motors sound a lot smoother than the raw sound of the full-size Cubs engine.

At last I can fulfil my dream of some years by building and flying a model of the aircraft that I soloed in.

Lars Waegner

Piper J3 and PA18 Super Cub

This kit has been in production since 1976, Toni was forced at this time to produce a large model kit very quickly, in the absence of a suitable kit anywhere on this planet. This urgent need for a kit was in order to sell the enormous 34 cc Quadra motor for which Toni had just been granted the exclusive import rights. Nobody could foresee what a revolution in the radio controlled model aircraft hobby this combination of Quadra and Toni's Piper would cause. Thousands of modelers have built their first big model with this Piper. Many have had such pleasure with the Piper they have built several more.

In the past the Piper kit was subject to many small improvements. The construction was from the beginning light and flexible, but tough enough to withstand the Quadras far from smooth running for some years. If you have owned a Quadra you will readily accept the Pipers ability to take the Titan ZG 62SL.

New, redesigned Kit.

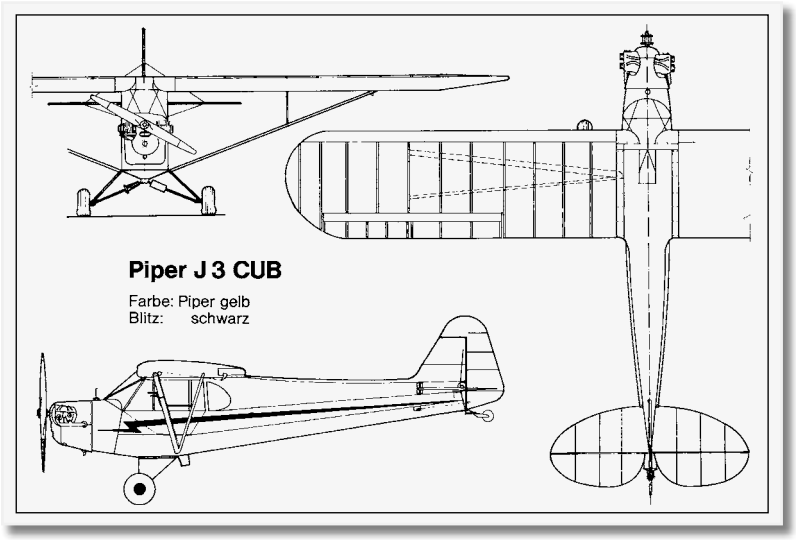
Why this redesigning? The main reason stemming from the original plans transparencies having reached such a state of deterioration they must be redrawn. I convinced Toni it would be better to use a true Clark Y section, this would have an even better stalling characteristic than his Clark T(oni) section. So while one is by drawing a new plan an improved wing construction can be made with proper Piper wing tips, flaps and the option of a Clipped wing. Simplified wing struts with even more strength which allows for easier fixing to the fuselage. Scale doors, improved fairing from the fin into the fuselage, installing the elevator servos under the tailplane, attractive wheel spats and a very efficient cooling air exit from the silencer compartment, designed specially for the Piper Hydro Mount System. More cross-sections and a very detailed set of building instructions with reasons given for the aerodynamic set up, so you can understand the ideas behind the construction fully.

Last but not least the new Piper has a tow line release included in the kit, that can operate from any direction of the line.

Wide Power Range.

The Piper is truly a multi purpose model. You can fly just like the full-size Piper with our Titan ZG 20 installed. That is if you have no ambition for glider towing, but you are satisfied with loops, rolls, stall turns and half a vertical upwards roll. But you wish to be able to tow gliders, then the Titan ZG 38SC is a better choice. With the 38 you can fly positive as well as negative figures with power to spare. Knife edge flying is unlimited. You can fly around with an almost fully throttled back engine, the model is then extremely quiet. Use a 20x10 propeller, this is the scale size. Should you wish to tow

More parts of this new Piper kit are now prefabricated: For example the ribs are CNC-milled, the leading edge is spindle moulded, spars, longerons and wing sheeting are ready chamfered for perfect joining. The spar webbing is cut to spar width, the landing gear is silver soldered together. Apart from these items, you will be pleasantly surprised to find many more "small" improvements.



NEW!

Redesigned, more Prefabrication, more Accessories!

Scale:	1:3,85
Wingspan:	2,8 m
Lenght:	1,8 m
Wing area	1,14 m^2
All up weight:	8-10 kg
Wing loading:	70-88 g/dm^2
Engine:	20-70 cm^3

sailplanes that are more than 7 kg then the 45 is the engine. Fit the Titan ZG 62SL and with a 16 kg sailplane hanging on the line, is in a couple minutes close under the cloud base. But with the 62 you should only use full throttle whilst towing, otherwise the Piper roars around the sky ruining any scale effect.

When fitting the Titan ZG 45SL or Titan ZG 62SL we recommend the Hydro Mount System Piper #6704, the integrated silencer #4640 or #6640, the carburettor intake bend #4587 or #6587 plus the 60 mm prop hub and the Super Silence 21x12" CF-3-blade propeller #9973. This engine combination gives a fantastic power to weight ratio as well as the minimum sound level. The firewall and cowl of the J3 CUB unfortunately is not big enough for the Hydro Mount.

Very stable Model.

The Pipers layout with rectangular and high mounted wings and a very low wing loading makes it a very stable flyer. It is therefore an ideal choice to start with large models. The Piper is our work horse, as previously mentioned, the Piper is ideally suited for glider and banner towing.

High Payload.

Because of the low wing loading and relative high aspect ratio, the Piper does not require very much power so there is plenty in reserve for towing. The Piper has a very dependable low speed performance, this is ideal for towing light weight gliders. With an inexperienced glider pilot on the tow line, a sudden jerk on the line, the Piper, due to it's mass, can easily keep going, thus avoiding the stationary bit and the subsequent stall. The Piper can pull a fairly large banner, carry a camera or any other load up to 5 kg.

Strong Construction.

The construction is conventional stripwood and sheeting, making for a very robust model, which is at the same time light in weight. The wings are in two halves. The UC is identical to the full size, being sprung with rubber shock cord which is a great deal better than springs, because the rubber has a very good dampening effect. The fully sprung and steerable tailwheel makes taxiing the model a pleasure. The motor cowl is made of very tough epoxy/glass and not a rather brittle plastic like ABS. With the Piper PA-18 the fuselage sides are parallel right to the firewall this is due to the wider cowl. Apart from the cowl the two fuselages are identical from behind the second former.

Complete Kit.

The complete kit, and by this we mean it really is all there in that plain brown box, right down to the last screw and nut. You have only to provide the adhesives and covering material to complete the airframe. Epoxy/glass cowl, **CNC machined ribs**, spindle moulded leading edges and wing struts, **landing gear legs and shock absorbers ready silver soldered**, preformed wire parts, formed steel strip for struts, ball joints, control wire, all rudder horns, hinges, screws, nuts and washers. Even the tiny nails for the windscreen, ball joint screw driver, wheels and tank and toughened windscreen material. Rolled full-size plans with detailed Instructions and an additional CAD plan printout for the wings for precise wing construction.

The vacuum formed imitation engine is included with the J3 Cub kit.

Piper J3 and PA18 Super Cub

COMPLETE KITS:

PIPER PA-18 *Super Cub* ..... #4018 € 599,—

PIPER J3 Cub..... #4000 € 599,—

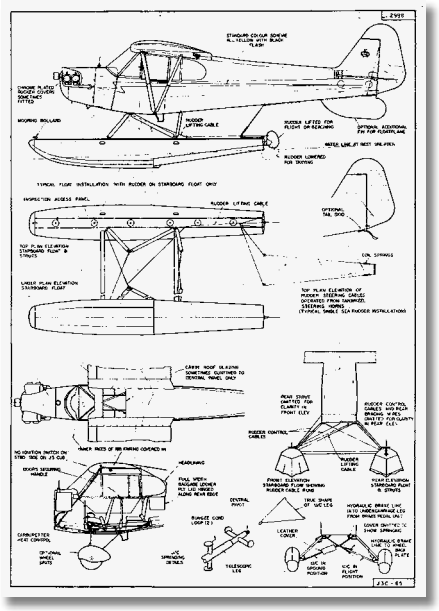
KITS minus tanks and wheels:

PIPER PA-18 *Super Cub* ..... #4008 € 577,—
PIPER J3 CUB ..... #4001 € 577,—

Airbubble cushion plastic sleeves
For wings and tail. Not in the kit..... **#4490 € 43,90**

Piper wheel spats ..... #4170 € 49,90
Epoxy/glass with white gelcoat. These attractive wheel spats are an extra accessory, not included in the kit.

Three View Drawing J3 Cub and L4
Two sheets 700 x 470 mm and 470 x 340 mm. A short text about the Piper with black and white pictures. Shows the J3 and L4 military version with the extended windows. Also shows the Edo Floats. A very detailed set of drawings. ..... **#4020 € 19,90**



5 meters *PROFICOVER* is required to cover the Piper.

The following parts are of course included in the kit but also obtainable separately.

Plans, instructions and parts list ..... #4010 € 59,90

Epoxy/glass motor cowl J3 Cub..... #4110 € 44,90

Epoxy/glass motor cowl PA-18..... #4118 € **55,—**

Fuselage kit PA 18..... #4308 € **199,—**

Fuselage kit J3 Cub ..... #4300 € 1**99,—**

This contains all wood parts for fuselage and tailplane. Does not include Cowl, windscreen, landing gear and any other metal parts.

Wing kit for one panel..... #4400 € 99,90
Contains all wood parts for one wing panel but without struts plan, metal fittings and screws.

CNC machined rib set ..... #4210 € 75,90
including plywood root ribs

Landing gear kit without wheels..... #4130 € 79,90
silver soldered together, all screws and fixing included and instructions.

Windscreen material ..... #4120 € 19,90
Two sheets 600 x 300 x 1 mm.

Wing struts..... #4220 € 49,90
Spindle moulded Ramin strips with metal fittings.

Wing strut screws, 8 pcs. ..... #4230 € 2,20

Transfers Piper Bear Cub..... #4070 € 6,95

Imitation engine for J3 CUB..... #4150 € 13,90
Vacuum formed plastic.

We reserve the right to alter prices and specifications without notice.

④

Piper Photo Sets

① PIPER J3 CUB ..... #4413 € 14,95
12 colour photos 15x10 cm. All white with a red lightning streak on the fuselage and red registration letters.

⑤ PIPER J3 CUB ..... #4030 € 5,95
5 colour photos 15x10 cm. Yellow with black lightning stripe angled front view, side and angled rear view, dash panel and engine.

PIPER J3 CUB ..... #4040 € 14,95
12 colour photos 15x10 cm. Yellow with black lightning stripe comprehensive set with plenty of details including the cabin.

② PIPER Clipped Wing CUB ..... #4060 € 24,50
19 coloured photos 15x10 cm. The aerobatic version of the Piper J3. This aircraft belongs to Giles Henderson, he was American Champion in the beginners class beating many Citabrias and Decathlons. Each wing was shortened by one meter at the roots, the aileron reaches almost to the fuselage. The Clipped wing model will have a wingspan of 2,30 m. Yellow with black sunburst stripes on the wings and tailplane. This paint scheme lends itself to a normal Piper.

③ PIPER PA 18 *Super Cub* ..... #4428 € 14,95
12 coloured photos 15x10 cm. Yellow with black lightning strike and registration letters.

④ Piper PA 18 *Super Cub* ..... #4418 € 14,95
12 coloured photos 15x10 cm. White with red striping and registration letters.

CAP 21

Scale:	1:3,4
Wingspan:	2376 mm
Length:	1900 mm
Wingarea:	83 dm^2
Weight:	7,5-8,5 kg

Ready for take off

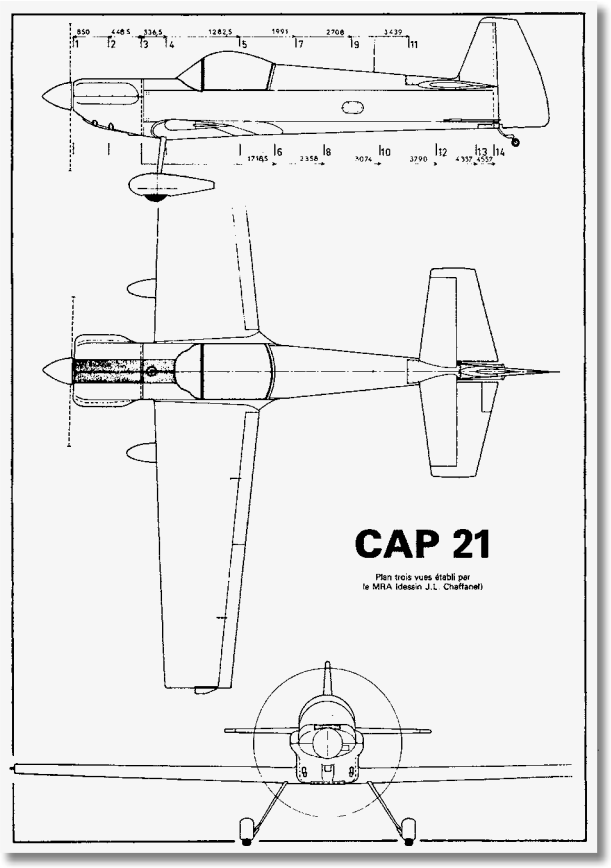
My CAP 21 is waiting for the next flight. She is fitted with the Titan ZG 62SL, Hydro Mount System, Stainless silencer #6660 and 21x12" Super Silence Carbon propeller #9971.

Our CAP 21 is designed for large model aerobatics and is especially light, but in spite of this is very strong. It can be best described as being of simple construction. Nevertheless our CAP 21 is scale in every detail. Due to this simplicity the model goes together in a surprisingly short time.

The wing is of conventional construction. That is to say, spars, ribs and fully planked with 2 mm Balsa sheeting. The wing is built in one piece, a two piece wing of the same strength would increase the weight to an unacceptable level. The full-size CAP is an all wood airplane, our CAP also, with the fuselage being a simple Balsa box construction with a half round Turtle deck. The CAP is totally unsuited for Fiberglass with it's flat fuselage sides. But the motor cowl, wing root fairings, the wheel spats and tailplane center section fairing are made with very lightweight epoxy and glass cloth. As with the full size CAP all the control surfaces on this model are shrouded. The ailerons have spindle moulded leading edges with matching wing trailing edges. The leading edges of the rudder and the elevators are vacuum formed. The kit contains all the necessary dowel hinges, rudder horns and ball joints for the shrouded control surfaces. Also supplied are all materials for installing the radio gear. The elevator servo is built into the tailplane, the tailplane being fixed with Hex socket machine screws and is removable. The rudder can be taken off by withdrawing the piano wire hinge pin, all this to ease transport.

The large cockpit canopy is made from vacuum formed clear VIVAK®. Apart from these aforementioned points the kit is made to our exacting standards, CNC milled ribs, formers, sheet fuselage sides and spindle moulded fuselage corner strips along with the ailerons, there are shaped jig strips to ensure accurate assembly of the wings and tailplane. All Balsa used in the kit is selected first at the log stage, and again when fully machined and sanded. Everything you need is in the kit right down to the last screw except covering materials and glue. The Dural landing gear is preformed, the wheels are super light, the tailwheel is fully sprung. A scale spinner with it's epoxy cone and Delrin backplate and a large Mylar decal sheet is supplied.

The two sheet plan shows every detail, the Quadra 34cc engine with the Quadra tuned pipe is drawn on the plan as this was the only suitable engine at the time. The ZG 38 can be fitted without need for modification of the firewall. Without doubt the best choice is the Titan ZG 62. Without a tuned pipe this engine has more than enough power for any form of aerobatics and has the added advantage of a saving in weight. The 62 can turn larger propellers without losing power, a prerequisite for scale maneuvers where the model flies slowly and with constant airspeed. The Titan ZG 62SL fitted onto the CAP 21 Hydro Mount System #6706 designed specially for our CAP 21 combined with the Stainless steel silencer #6660 makes the CAP 21 into a super show model but without the usual noise and maintenance. The engine and silencer fits inside the scale motor cowl. The scale fuselage without a slimmed down nose allows knife edge looping big and small. The slimmed down nose is a widely held fable due to the mistaken idea that a slimmed down cowl offers less resistance. But the engine parts such as the cylinders being exposed to the



airstream cause considerably more resistance and therefore causing the need for more engine power which leads to more noise.

The wing section used is from Eppler which is very similar to the one used on the full-size aircraft. This Eppler section, as apposed to the more usual F3A sections, gives approximately 20 per cent more lift. At the same time it shows an almost constant airfoil drag over a wide speed range. The result is, the model when diving, does not accelerate unduly, also does not cause the speed to drop off markedly in tight turns. The very uncritical stalling characteristics of this Eppler section combined with the wing planform (high aspect ratio and tapered) is an ideal combination for safe flying characteristics and precise, predictable flick maneuvers.

To summarize, the CAP 21 is a model that any average pilot can fly the modern aerobatic schedule, with any amount of tight turns and landings, and without a racing pulse.

CAP 21 kit without spinner, fuel tank, wheels and spats ..... #5999 € 799,—
Complete CAP 21 kit ..... #6000 € 945,—

Airbubble cushion plastic sleeves

for the wing and tailplane ..... #6490 € 45,90

The following parts are of course in the kit but can be purchased separately:

PLANS, instructions and parts list..... #6010 € 59,90

SPINNER ..... #6250 € 59,90
117 mm diameter, 117 mm long. The cone is formed in Epoxy fiberglass, the backplate is turned from Delrin. The spinner is a great deal lighter and vibration resistant than one made from aluminium. Shape and size is exact scale, cone is fixed to backplate same as the full-size. The spinner will fit any engine.

TWO PIECE ENGINE COWL..... #6110 € 69,90
Epoxy/glass with white gelcoat.

WHEEL SPATS, pair ..... #6120 € 69,90

TAILPLANE FAIRING..... #6130 € 17,90

WING FAIRINGS, pair ..... #6140 € 59,90

VAC-FORM PARTS ..... #6160 € 11,90
Rudder and elevator LE and pushrod fairings.

MYLAR TRANSFERS..... #6020 € 34,90

DURAL UC LEG, left hand ..... #6200 € 23,90
right hand..... #6201 € 23,90

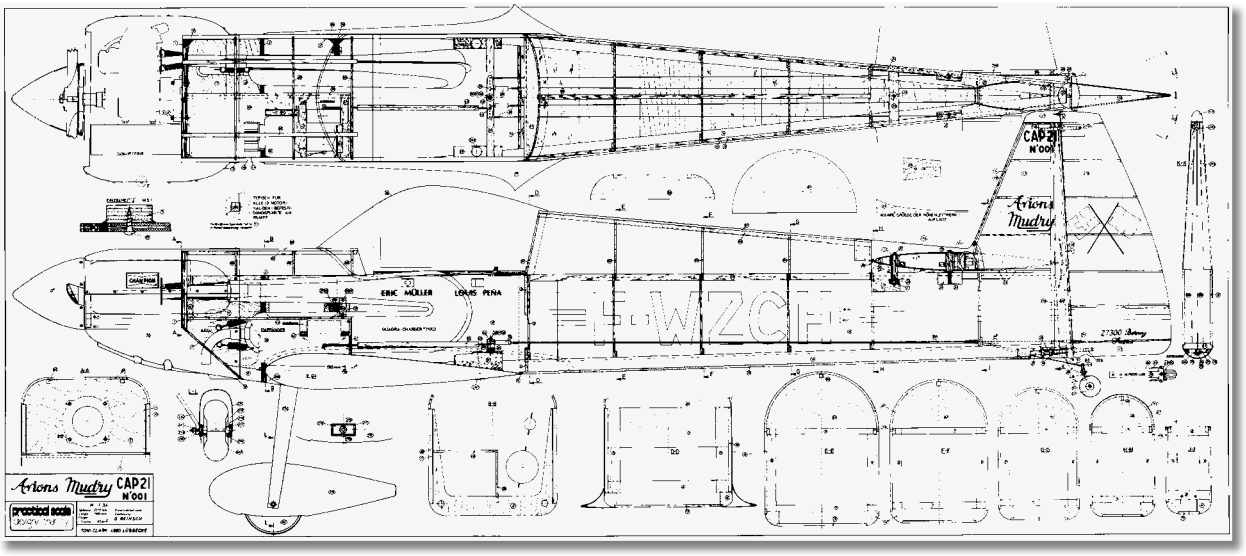
WHEEL AXLES, pair..... #6220 € 1,95
M5x70 socket screws.

TAILPLANE FIXING SCREWS ..... #6230 € 3,30
M3x50 socket screws, 3 pieces

COCKPIT CANOPY ..... #6150 € 49,90
from clear 1mm thick VIVAK®. Since 2009 we make these with a very high quality and lighter material. These newer canopies are tougher and can withstand sunlight on the hottest days.

WING KIT..... #6420 € 299,—
Contains all parts to built the wing, with hinges and ruderhorns. Without plans and undercarriage

FUSELAGE KIT..... #6450 € 199,—
All woodparts to build the fuselage. Without plans, Elevator, Epoxy parts and canopy.



Fuselage plan.

Photo Sets CAP 21:

CAP 21 No.001 F-WZCH ..... #6040 € 11,95

10 coloured photos 15x10 cm. Taken in 1982. Shows the modified CAP 21 without wheel spats and with aileron pushrods on the wing underside.

Aerial shot of undersides included.

CAP 21 No.4 I-IZAK ..... #6070 € 13,95

12 coloured photos 15 x10 cm. Taken in summer 2000 by Herr Schultze-Melling in Lugo Italy. This CAP 21 with the typical Italian paint scheme of white, red and green is in constant use for aerobatic training since its maiden flight in June 1982. A nice photo set including cockpit details.

CAP 21 No.1 F-GAUP ..... #6050 € 10,95

9 coloured photos 15 x 10 cm. Blue with dark blue and white sunburst stripes on wings and tailplane. Undersides of wing a large white double ended arrow from wing tip to wing tip. A very attractive paint scheme. The airplane belongs to the French woman aerobatic pilot Catherine Maunory.

CAP 21 No.7 F-GAUK ..... #6060 € 22,75

20 coloured photos 15 x 10 cm. A very well detailed set, painted blue-white-red. This aircraft being flown by Louis Pena, Helene Lacour, Patrick Courtonne and Marianne Maire at the Austrian Aerobatic world championship in 1982.

Pitts SPECIAL S1-S

Georg Schmid´s yellow and black Pitts, built from our kit.

This kit is without equal in quality, design, contents and price. All measurements have been taken exactly from the drawings of the Pitts Aerobatic Company Plans. The models construction hardly deviates from the full-size aircraft. The fully sprung landing gear, the fixing of the top wing and the struts all work the same as the full-size.

Scale:	1:3
Span:	1725 mm
Length:	1550 mm
Wing area:	1,0 m^2
Weight:	7,5 - 9 kg

One often hears that the Pitts as a model is something to avoid, it is difficult to take off and land. This may be true of some model Pitts, but not with our conventional wood Pitts. This ease of flying is all a question of model size, wing loading, power to weight ratio, CG position. Even so, the landing speed you will of course realize is somewhat faster than that of a trainer. Our Pitts reacts precisely and is at the same time docile. The landing is certainly not difficult. When you have had experience with a taildragger such as our Piper then you be able to handle our Pitts with ease.

In the light of experience it is best to power the Pitts with the Titan ZG 62 PCI-HV and the Hydro Mount System. With the 62 our Pitts exceeds the newest originals vertical performance. The ZG 62 PCI-HV and the Hydro Mounting System designed for the Pitts HMS #6650 with the stainless silencer #6650 fits under the cowl. This engine combination gives a fantastic power to weight ratio as well as the minimum sound level. Our Pitts can easily cope with this enormous power from the 62.

Several of our customers have powered their Pitts with the Titan ZG 74 or even the ZG 80 and are more than pleased with the results. With the stainless silencer #7472 and the 60 mm propeller hub, the ZG 80B fits under the Pitts cowl. The longer propeller hub causes the engine's CG to be set more rearwards thereby avoiding nose heaviness due to the extra weight of the engine.

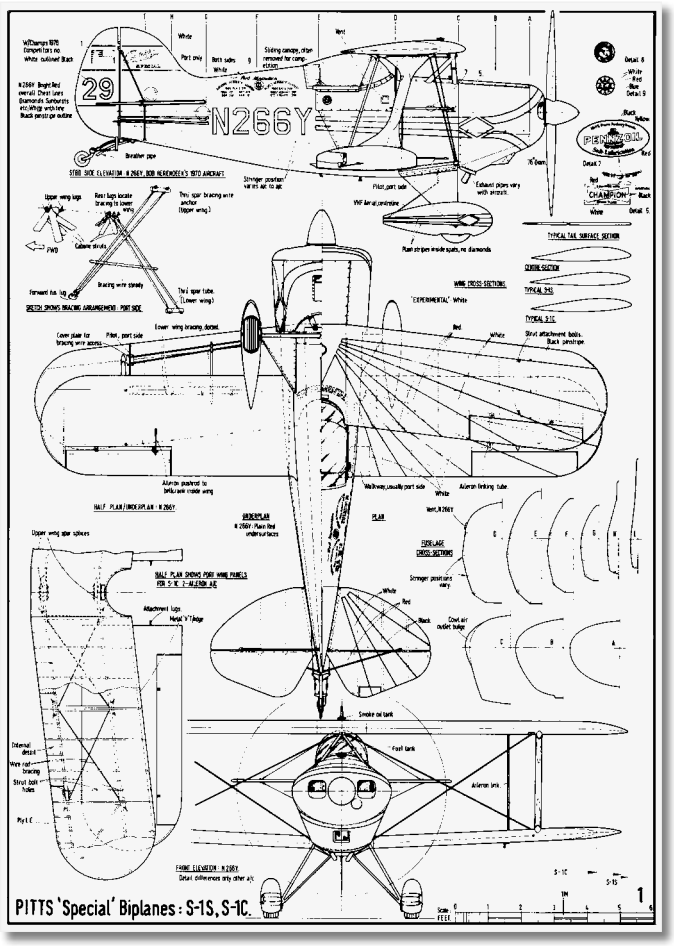
You will find our Pitts has a superb aerobatic performance, the knife edge flying and flick rolls are remarkable. The stall is not so violent, the ailerons are effective past the stall and the nose just drops so long as you keep the rudder straight. The tough and light structure can withstand very hard landings and any amount of violent aerobatics.

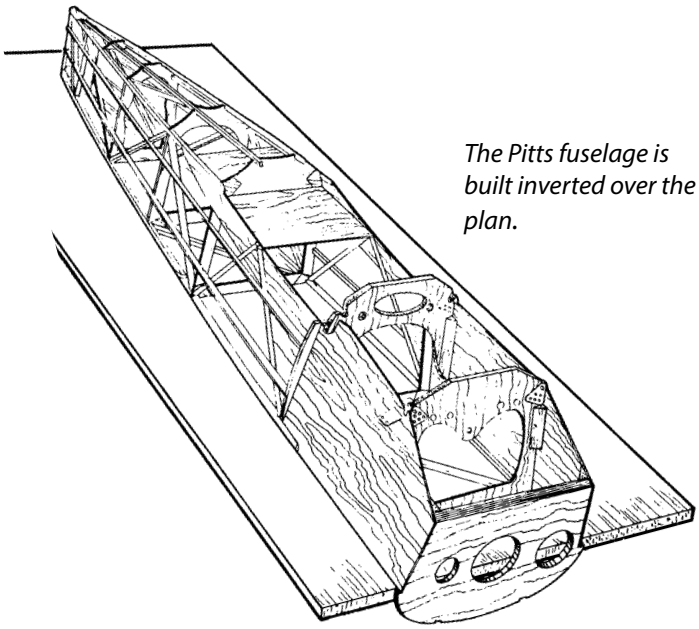
This kit is absolutely complete, all wire parts are ready silver soldered together. All that is needed to complete the airframe is adhesives and covering.

Kit contains:

Epoxy/glass motor cowl, cockpit covering and wheel spats. Vacuum formed canopy and Styrene parts. The landing gear legs are preformed and silver soldered together, the die stamped steel fixings, tailwheel with flat spring blades, preformed wire cabanes. CNC cut ribs, formers and fuselage sides. Many other wood parts sanded and milled to shape, spindle moulded aileron LE, all strip wood individually selected. Pneumatic wheels, tank with special clunk filter and every last nut screw and washer as well as the ball joint screw driver for the M3 socket screws. The model takes about five minutes to assemble on the flying field. Two large sheets of Mylar transfers, Aluminium sheet, very detailed full size plans, detailed building instructions and parts list.

For covering the Pitts we recommend one 5 m roll of *ProfiCover*.





The Pitts fuselage is built inverted over the plan.

PITTS SPECIAL S1-S ..... #5000 € 945,— Complete kit.

AIRBUBBLE PLASTIC CUSHION SLEEVES for wings and tailplane ..... #5490 € 45,90

THREE VIEW DRAWING ..... #5080 € 25,95
Shows the Pitts Special S1-S scale 1:12 on a single large drawing 79 x 56 cm. Very detailed with views from all sides, formers and wing sections, as well as the colour scheme and markings. This taken from the original DUNLOP-Pitts machine G-BOOK owned by the Englishman Brian Lecomber. Base colour is white with yellow and red borders, black lettering.

This 3 view drawing is not included with the kit.

The following parts are supplied with the kit but obtainable separately.

PLANS, instructions and parts list ..... #5010 € 69,90

MYLAR TRANSFERS ..... #5020 € 45,90
Especially thin with top quality screen printing.

MOTOR COWL ..... #5110 € 59,90
Epoxy/glass with white gelcoat.

WHEEL SPATS ..... #5120 € 59,90
Epoxy/glass with white gelcoat.

COCKPIT COVERING ..... #5130 € 21,90
Epoxy/glass with white gelcoat.

LANDING GEAR LEGS ..... #5140 € 65,90
ready silver soldered together.

CANOPY ..... #5150 € 39,90
Clear, for either open or fully enclosed.

VACUUM FORMED SHEET ..... #5160 € 8,90
Oil cooler, canopy rails, and landing gear fairings.

WING RIB SET ..... #5210 € 79,90
CNC-milled, all ribs for both wings.

AILERON CONNECTING RODS ..... #5220 € 8,95
Oval stainless steel tube.

SET OF SCREWS ..... #5230 € 5,95
For wing strut fixing, 8 pieces.

Should you have the need for further parts please give us a call.

Karl (Charly) Paul´s red Pitts.

PHOTO SETS

Pitts Special S1-S N41AC.....#5040 € 29,90

25 coloured photos 15 x 10 cm. Standard colour scheme. Red with white sunburst stripes edged with blue. No lettering.

Pitts Special S1-S N66JS.....#5050 € 29,90

22 colour photos 15 x 10 cm. Light blue with white sunburst striping edged with red. Similar to the standard colour scheme.

Pitts Special S1-S N2MN .....#5060 € 12,90

10 colour photos 15 x 10 cm. Black with yellow/orange/red striping on the fuselage with yellow/orange/red comet striping on wings and tailplane. Unusual. The registration lettering N2MN is very small hidden under the tailplane.

Pitts Special S1-S N31JF .....#5070 € 32,90

26 coloured photos 15 x 10 cm. White with blue sunburst stripes on the topsides of the wings and tailplane. Underside of wings have red chequering.

Albatros DVa

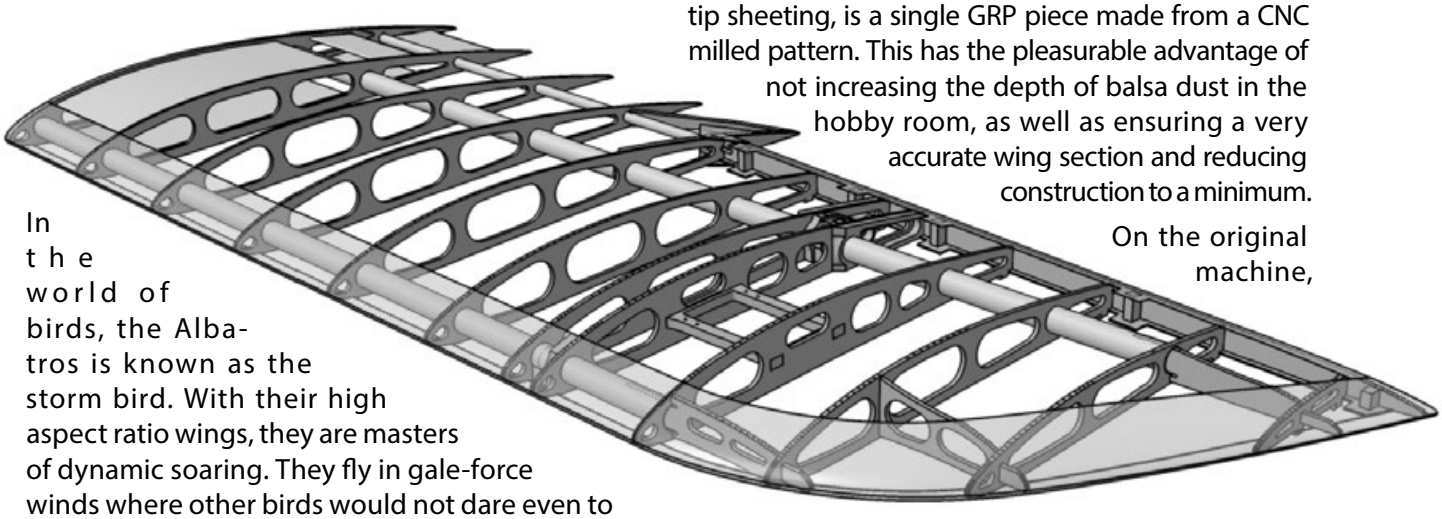
The Albatros DV is without doubt the most interesting and attractive single seater fighter built by the Germans in the first world war. We have been working for a very long time on our 1:3.5 model, to produce a really out of the ordinary kit. From the beginning of our Albatros project, we wished to break away from the conventional type of construction, to make something totally new in every aspect, with a perfect solution to the many design problems encountered, quick to build, with superb flying characteristics. For us, it was of utmost importance to have a really robust model, capable of withstanding any amount of transport, although light in weight. As we visit so many flying meetings, we need to be able easily stow the Albatros in our station wagon. An important factor was, and is, to keep the assembly of the model on the flying field as simple as possible. The pilot who is ready first fly in the not so turbulent early morning air, and has the airspace for himself.

With our albatross, one can take off with quarter throttle, and with even less throttle continue flying. This way the ZG 80 has a very realistic sound. The six cylinder Mercedes engine at maximum take off power was only making 1500 RPM.

In spite of the extensive prefabrication, we were not aiming at an ARF model, leaving the customer faced with the tedium of the final installation work. These gleaming ARF playthings give rise to boredom after some flights, if they have not already fallen to pieces in the meantime, due to poor design and commercial exigencies.

Due to the extensive prefabrication, you will find the Albatros will quickly take shape on your building board. Just to mention two examples: the GRP fuselage with all scale formers and stringers built in, and the wings with hard aluminium tubing for spars, and ready formed GRP leading edge sheeting with wing tips. Even so there is more than enough to do with building the Albatros. It is a real joy to see your Albatros growing piece by piece on your building board. Here and there a part being added, causing your model to resemble progressively the full-size.

Certainly the Albatros is not only an attractive model, it makes for real pleasure in flying. You can do everything the full-size did at the "Shuttleworth Uncovered" flying day in Old Warden, but there are more capabilities in this machine, an unusually aerodynamic and elaborate construction for it's time.



In the world of birds, the Albatros is known as the storm bird. With their high aspect ratio wings, they are masters of dynamic soaring. They fly in gale-force winds where other birds would not dare even to walk. The model hardly deviates from the bird in this respect. The optimal moment arm, the elliptical fuselage section, and a triangular sub-fin coupled with a low fin and rudder, allow the Albatros to make straight as a die starts, and that without built-in side thrust. Our Albatros even climbs in knife edge, makes wide diameter loops, positive as well as negative, rolls very slowly as well as quickly, and hangs on the propeller, like a modern aerobatic airplane. If you can simultaneously and independently control all three axis, like the bird, you will be able to fly in the strongest winds.

I sometimes find myself wondering how von Richthofen would have flown, if his Albatros DV had been as light, powerful and strong as our model?

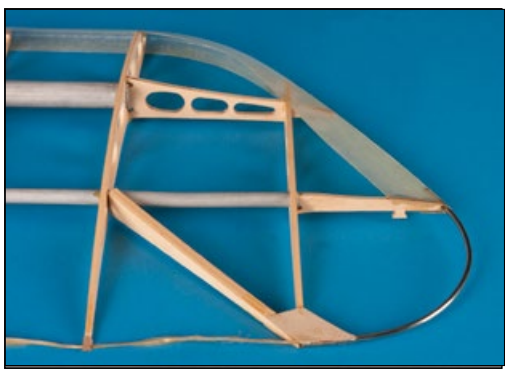
The Wings

Thinwall high tensile aluminium alloy tubing is used for the spars, this makes for an incredibly light but torsionally very stiff construction. Wing failure caused by flutter meant the total loss of a number of full-size machines, and pilots. The single lower wing main spar was located too far back. In those days the aerodynamic cause of flutter was not properly understood by aircraft designers.

The model's leading edge, with integral curved wing tip sheeting, is a single GRP piece made from a CNC milled pattern. This has the pleasurable advantage of not increasing the depth of balsa dust in the hobby room, as well as ensuring a very accurate wing section and reducing construction to a minimum.

On the original machine, the trailing edge was a single strand of wire. When covered with linen and doped, the inevitable shrinkage gave rise to the well know scalloped TE.

We have used a single strand of Kevelar rovings attached with cyano glue to the rib ends. The rovings are loose enough to allow the ProfiCover when it shrinks to form the scalloping perfectly.



and undercarriage, the ready drilled firewall, with crown nuts fitted for the engine fixing screws, all scale formers and stringers in the cockpit, the holes formed in the wing and tailplane stubs, also the rudder king post in the fin, with holes for the hinges. All these parts have been CNC milled and fitted accurately into the wet laminate, making the joint really strong, without the unsightly "runs" of epoxy resin spoiling the view.

Why a epoxy/glass fuselage?

The Albatros fuselage is curved in both directions. The fuselage skin consists of four shells, upper, lower, left, and right side shells. These shells were formed by pressing plywood panels into a concrete mould and gluing them together while still in the mould. Without using this elaborate and complicated technique it is impossible to obtain an exact replica of the original fuselage in plywood. Our solution is a GRP fuselage, with an exact geometric shape and wood grain effect.

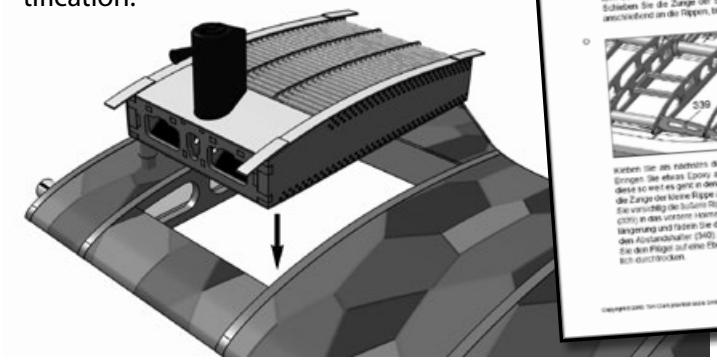
The wood grain is formed in the white gelcoat of the GRP fuselage by painting the fuselage with black paint, then wiping this off with steel wool, leaving the grain very visible. This then is sprayed with a two component matt transparent paint with a little yellow and brown colour added, the plywood fuselage is then ready.

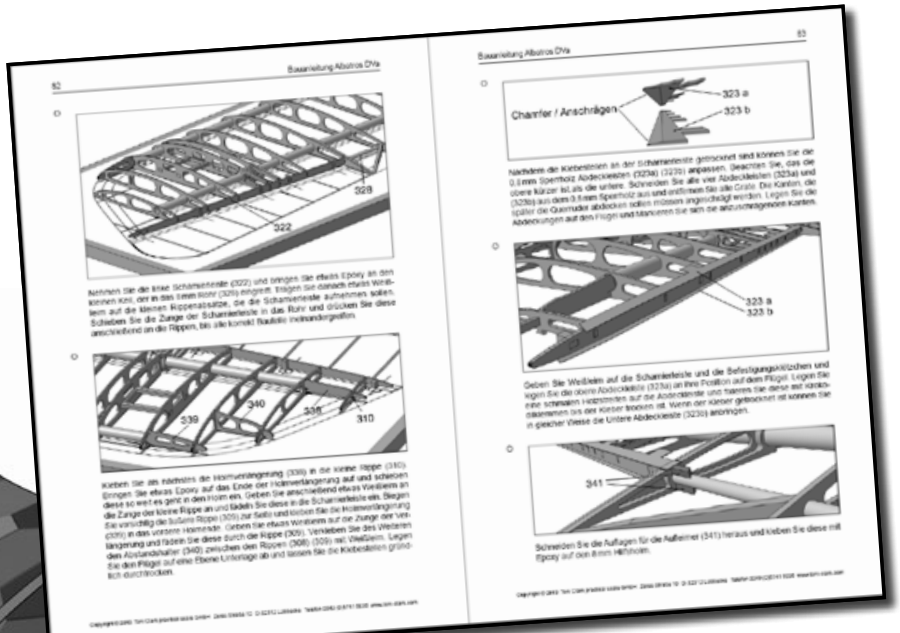
Moulded in the fuselage are the four aluminium reinforcements to take the wing centre section struts

In the cockpit area the fuselage is planked with 0,4 plywood so there is no glassfiber laminate visible.

Building manual

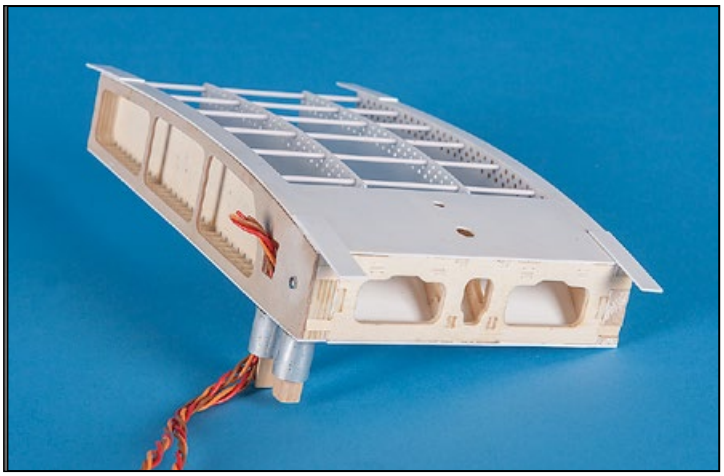
An impressive building manual belongs in an impressive kit. All phases of construction are described in 150 pages, detailing exactly the construction with approx. 300 illustrations and photo`s. All the milled plywood parts are shown on printed paper sheets to enable easy identification.





The simulated Teeves water cooler

Here our construction is NOT a simple vacuum formed unit that only roughly resembles the original, it is a small kit inside a big kit. The body consists of a sandwich construction made of wood and polystyrene. This resembles the original accurately and has a smooth, ready to paint surface like metal, showing no trace of wood grain. There is a jig supplied to make construction simple and accurate by spacing the sides and parting walls. For simulation of the cooling tubes, there are 160 pieces of tubing cut to length, which end to end would make 19 meters. The aileron servo cables are hidden in the return flow aluminium water pipe.

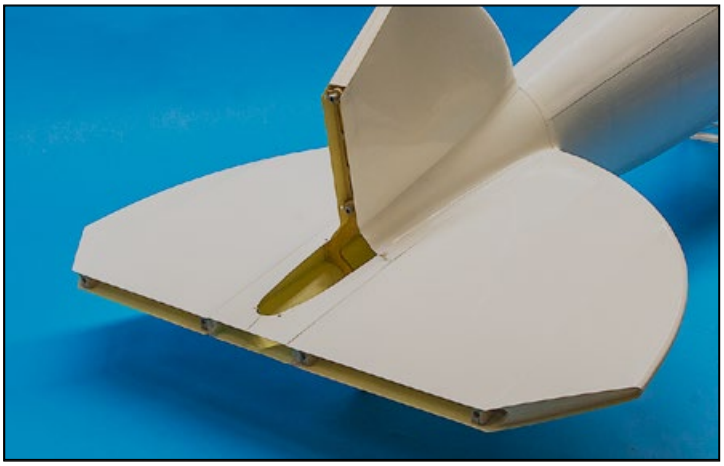


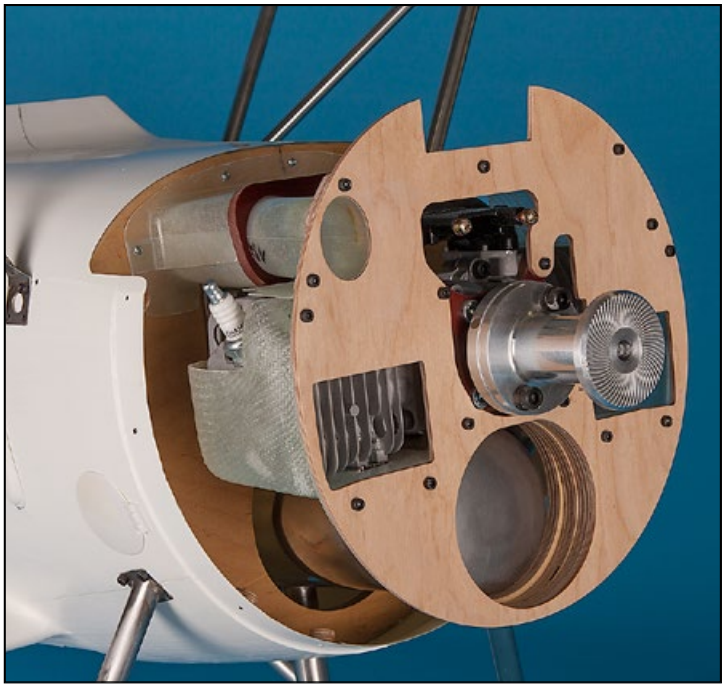
By the way:
you will not find any burnt wood edges in our kit. Instead of laser cutting, we prefer the rather more time consuming and expensive CNC milling. There are also some 3D milled parts in the kit. You cannot make these with a laser cutter.

Tailplane

The tailplane is made from sandwich Rohacell-GRP construction. When these are painted, you cannot see any difference to the classic rib construction, with sewn rib tapes and the covering material charcteristicaly slightly sinking between the ribs.

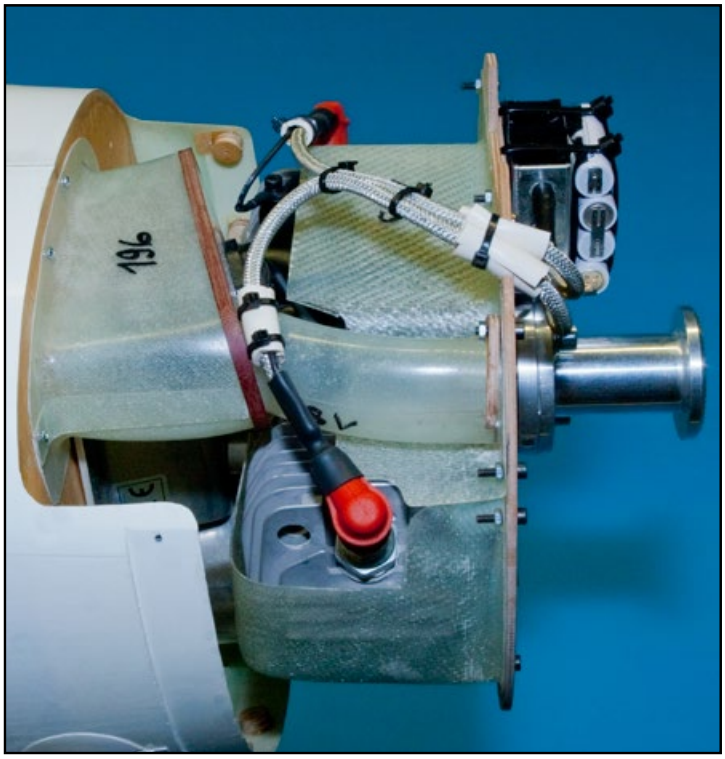
The tailplane halves are easily removeable for transport.





Efficient engine cooling system

We spent a lot of time, and money, developing this cooling system for the ZG80 to our satisfaction. The scale gap between the cowl and spinner is sufficient to cool both the engine and silencer and also provides enough cool air for the carburetor. Perhaps you wonder why the carburetor is fully enclosed, not able to suck in air out of the fuselage interior. The top engine cowl directs hot air past the machine guns where it can enter the fuselage through the cockpit opening. If we were to suck this warm air into the engine, after running a long while at full throttle, the first closing of the throttle would cause the engine to stop. This is due to the petrol being heated in the carburettor to a temperature above 50 degrees, which results in fuel starvation due to the petrol boiling and vaporising.

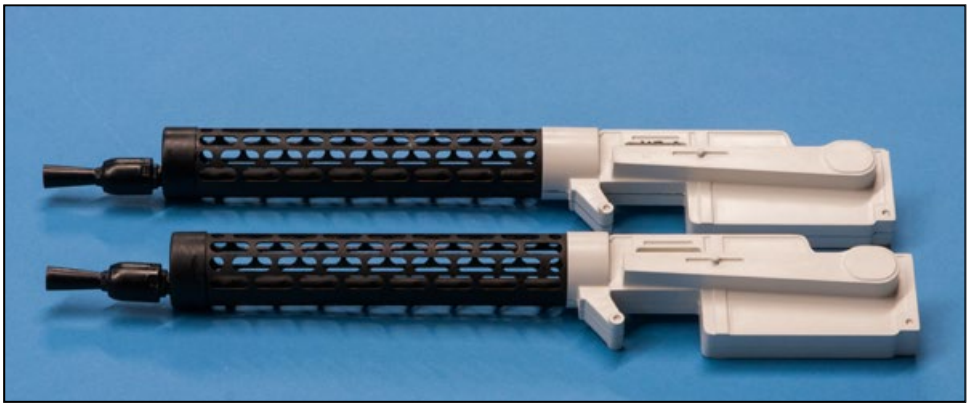


Why the ZG80?

Firstly, the ZG 80 is a very compact engine and it fits very well into the slim Albatros fuselage. The power from the ZG 80 is more than enough for every type of aerobatic maneuvers. No matter whether in low level turns or enormous loops, or if you so wish, the wildest of 3d stunts are possible. The best is one can take off at a quarter throttle and fly, the resulting engine sound is so very realistic. The full-size Mercedes six cylinder is only just reaching 1,500rpm at take off power.

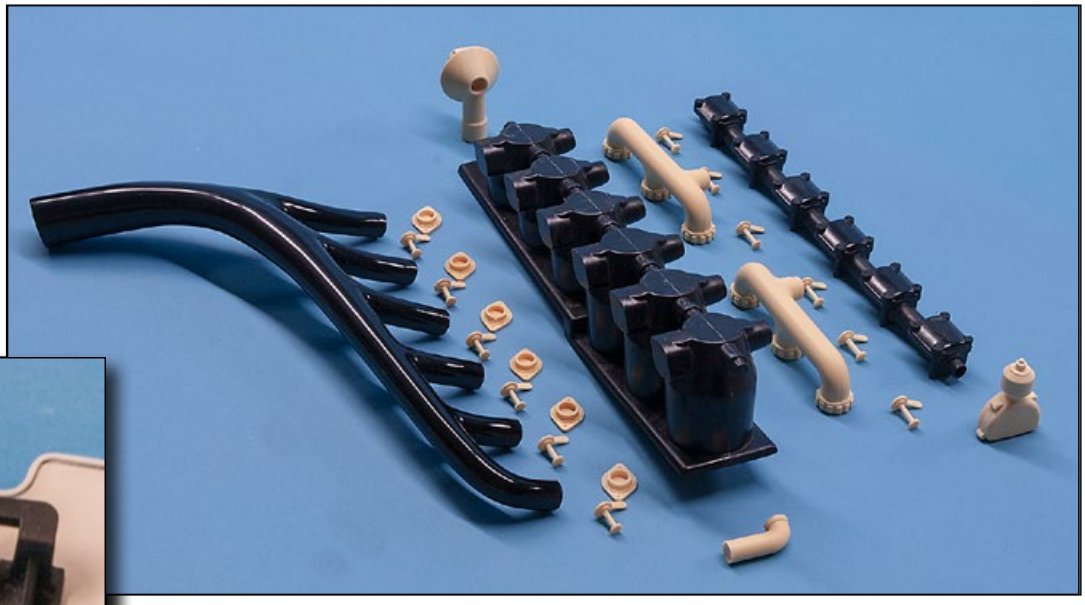
The ZG 80 is fairly insensitive to heat and well known for its robust reliability. In our prototype Albatros it has had hundreds of flying hours on so many flying meetings, in some cases under the most adverse weather conditions, all without any trace of unreliability. We have flown in temperatures of 35 degrees Celsius in the shade, without the slightest sign of overheating, clearly proving the effectiveness of the cooling.

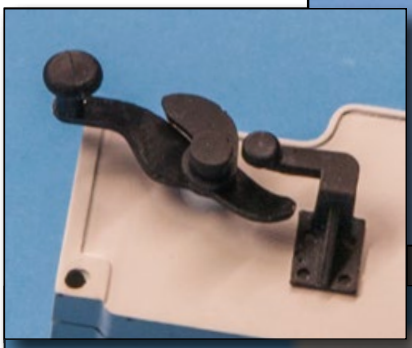
The 08/15 "Spandau" machine guns body parts, are made from hand layup epoxy glass laminate in our workshop, in moulds formed from CNC milled patterns. The gun barrel guard is CNC milled from phenolic paper tube. There are no wooden parts, so there is no irritating wood grain visible on steel components now or ever.

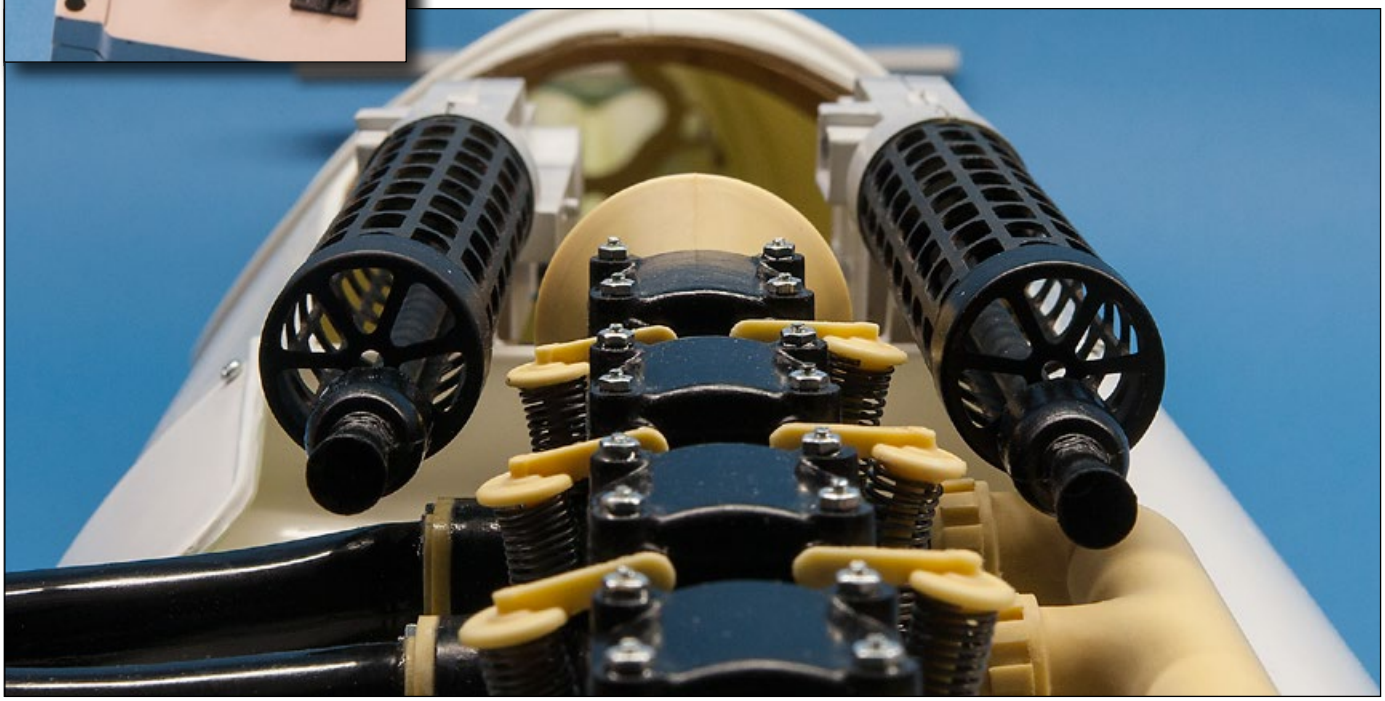


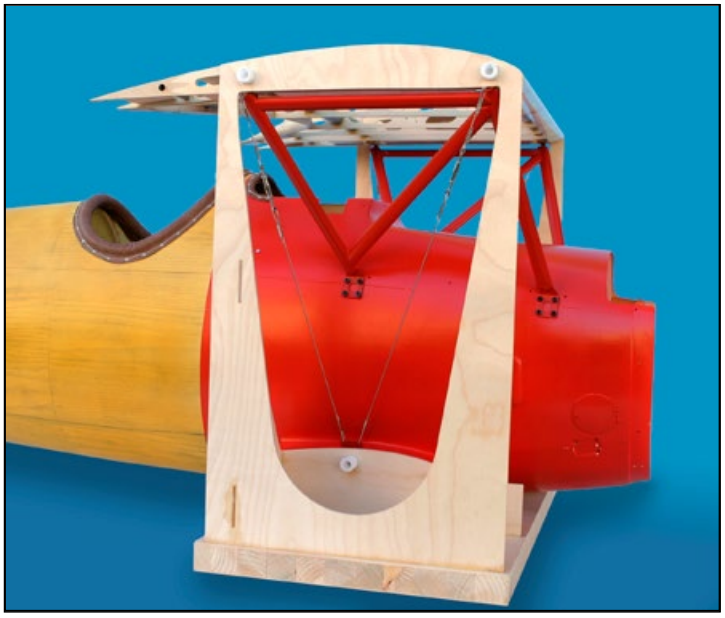
Imitation Engine and "Spandau´s"

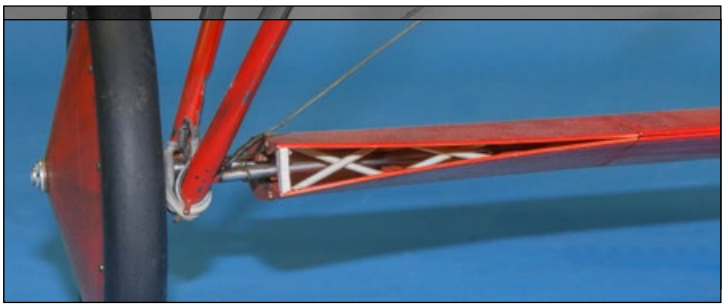
The model Mercedes D111a engine is a real attraction, not being a heap of vacuum formed plastic sheet parts that must be cut out and trimmed, then glued together, resulting in most cases in a rather flimsey structure. Instead the engine is made from hand layup epoxy glass laminate, the same as the machine guns. All the engine parts have fine detail, e.g. the rocker shaft housing, inlet and exhaust valves with springs, water and oil pump and exhaust manifold. This gives such a realistic appearance that it is difficult to distinguish between the model and full-size. The two "Spandaus" with their filigrane gun barrel heat shields, CNC milled from tubing, so they remain fully circular, really add to the overall scale appearance, nestling either side of the engine cylinders. The small cocking levers for the MG´s are cast from epoxy resin.











Wing Incidence jig

Supplied in the kit is a precise wing rigging incidence jig. This to position accurately the wing centre section. The fuselage is mounted in this jig, using the lower wing moulded-in fixing holes and the lower wing Delrin® dowels. The upper wing Delrin® fixing dowels can be screwed either up or downwards until they fit exactly into the holes. This also enables the precision milled interplane struts to fit exactly. Just one more example of the many small, unusual ideas that are in our Albatros kit, as we claim "practical scale".

Wing centre section struts and undercarriage legs formed from light stainless steel tubing

The centre section struts and undercarriage units, formed from stainless steel oval formed tubing, are completed with silver soldered fixing parts, ready to bolt to the fuselage. This construction is very light in weight as well as being very robust, looks superb and has the added advantage, that when the paint is chipped or scratched it shows the metal very realistically.

GRP wheels

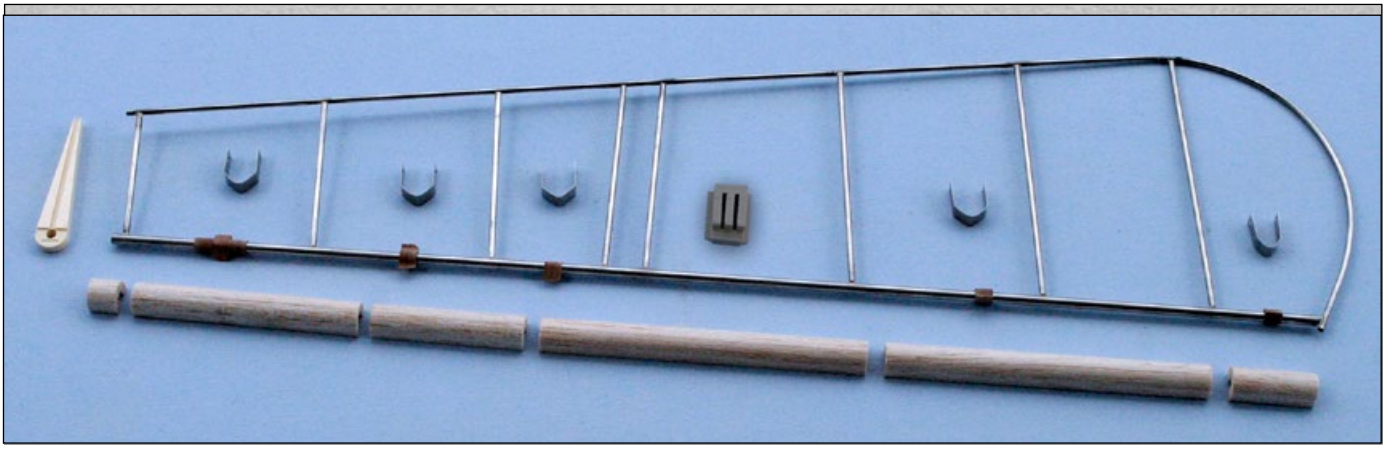
The spoked wheels fitted to the full-size Albatros were fitted with aluminium covers. Our kit wheels are laminated with Epoxy and Glassfiber, are far stronger than plastic wheels, and a lot lighter than spoked steel wheels.

GRP axle fairing

This fairing opens by single sided springing of the axle, is identical to the full-size machine, having exactly the same form of springing with rubber shock cords.

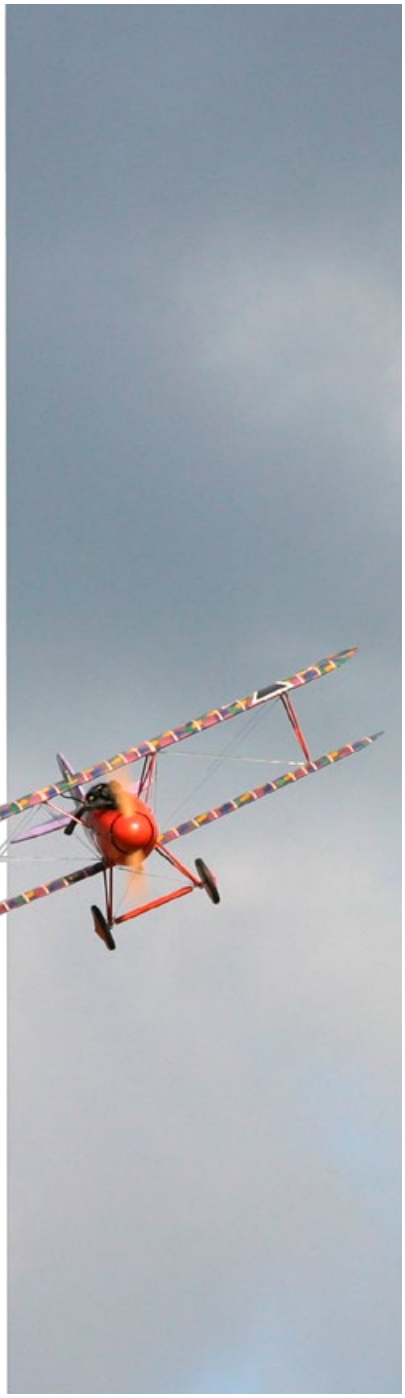
Stainless steel tubing ailerons

The ailerons are ready made, being silver soldered together in jigs, with the original washout. The hinge bodies are milled from wear resistant Tufnol, and the hinge flaps are formed from thin stainless steel. The ailerons are screwed to the wings, which is perfectly scale. The spindle moulded aileron leading edge is already cut to length to fit between the hinges.



The complete Albatros DVa kit contains:

- GRP fuselage with moulded in formers and stringers
- Imitation engine hand layup GRP and casting resin
- 08/15 Machine Guns GRP and casting resin, CNC milled parts
- GRP engine cowling
- Exact scale wheels, hand layup GRP
- Axle fairing, hand layup GRP with moulded in ribs
- Tailplane GRP vacuum formed sandwich construction
- Undercarriage legs and wing centre section struts from silver soldered air-foil section stainless steel tubing.
- CNC milled ribs and other parts, some even 3D milled
- Engine cooling cowling pieces made from GRP
- Cockpit coaming is real leather
- Three different shaped windscreens with preformed aluminium base frame
- GRP scale spinner
- Leading edges and integrated wing tips formed with GRP
- Ailerons ready made from thin wall stainless tubing
- Intricate Teeves water cooler kit
- Tailskid shaped in solid ash with silver soldered bearing
- All Nylon hinges and control horns
- Rigging tags, rigging wire and turnbuckles
- Fuel tank
- Jig to adjust the CS incidence
- Building manual with 300 pictures, parts list and identification plans
- CAD constructed plans for wings, elevators and rudder



Albatros DVa complete kit ..... #8000 € 3880,—

To complete the model, the covering material, adhesives, the engine and radio gear is required.

SIMPLY LIKE A REAL PLANE

In order to build a magnificent scale model, there is nothing new to invent, but you only have to make the most faithful replica of the real plane.
I discovered this simple truth when I built my first Fieseler Storch which had a welded steel tubing fuselage same as for the full size. The final result was simply astonishing!

Thanks to this type of skeletal structure which one can admire by looking through the cabin glazing and can also be imagined under the fabric covering, the model looks extremely realistic. You are not in front of the same old big scale model, but of a real, true-to-scale aircraft. These aircraft (I apologize, but I really can't call them simply "models") are not only a pleasure to the eye, but their flight characteristics are incredibly similar to those of the real ones. I obtained these results thanks to the large scale adopted and through a rigorous and careful work on the original plans and airfoils. But there is more: unlike what one would imagine, these stainless steel structures are not only extremely strong, but also very light, much lighter than their traditional balsa/ply counterparts. Let's take an example: a traditional quarter scale replica of a Fieseler Storch weighs around 17 kgs, but my Storch weighs only 11,5 kgs and in comparison, is much stronger.

In my kits nothing is left to chance, every modeler can finish the work making his own unique masterpiece, a wonderful replica which can withstand a lot of abuse, and even the hardest landings. Anyway, small repairs and servicing are simple and straightforward. The operational life of these small aircrafts, is bound to be similar to that of their beautifully preserved full-size brothers who are still flying today after so many years, are still giving wonderful emotions and great satisfaction to their owners.

Paolo Severin

RC SCALE KITS

Fokker E.I

1/2.5 specially made for Valach VM 120.

Wingspan:	4.040 mm
Length:	2.750 mm
Wing area:	3 sqm
Weight:	19 kg

Complete kit:	€ 5.390,–
Dummy engine:	€ 440,–
Silencer:	€ 149,–
Short kit Pilot:	€ 139,–

Bleriot

1/4 scale

Wingspan:	2.167 mm
Length:	1.844 mm
Wing area:	0.96 sqm
Weight:	5 kg

Complete kit:	€ 2.388,–

Aeronca C3

1/2.5 specially made for Valach VM-120.

Wingspan:	4.400 mm
Length:	2.500 mm
Wing area:	2 sqm
Weight:	approx. 17.5 kg

Complete kit:	€ 4.598,–

More information on our webpages and in our Paolo Severin catalogue.

PAOLO SEVERIN

RC SCALE KITS

Bücker BU133 Jungmeister

1/3 scale

Wingspan:	2.200 mm
Length w/o engine:	1.923 mm
Wing area:	1.21 sqm
Empty weight:	8,5 kg
Complete kit with scale ribs:	€ 4.200,–
Complete kit with CNC ribs:	€ 4.056,–
Set of instruments:	€ 96,–

Fieseler Fi156 Storch

1/4 scale

Wingspan:	3.542 mm
Length:	2.400 mm
Wing area:	1.75 sqm
Weight:	approx. 11,5 kg
Wing loading:	66 g/sqdm
Complete kit:	€ 3.510,–

Piper L4 "Grasshopper"

1/3 scale

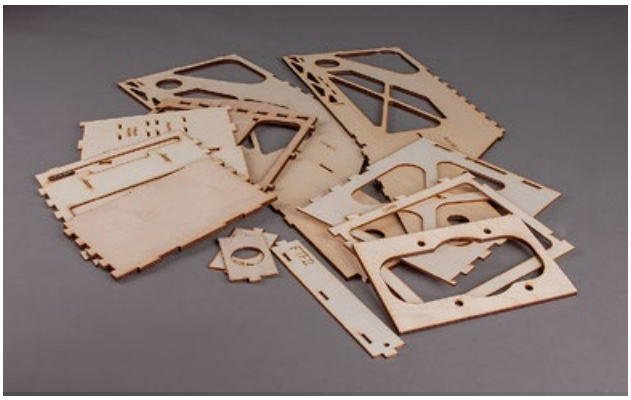
Wingspan:	3.577 mm
Length:	2.260 mm
Wing area:	1.86 sqm
Weight:	approx. 13,5 kg
Complete kit:	€ 3.598,–

Baby Ace

1/4 scale

Wingspan::	2.144 mm
Length:	1.426 mm
Wing area:	0.79 sqm
Weight:	approx. 5 kg
Complete kit:	€ 1.140,–

More information on our webpages and in our Paolo Severin catalogue.



Dalton Aviation

Extra 300ML

The first choice for precise world class aerobatics!

Designed by Mark Leseberg JR and DA account manager Tony Russo the Extra 300ML, has won numerous aerobatic competitions world wide. The Tucson Aerobatic Shoot-out, has been won the last six times in a row with the Extra 300ML. A "real" Kit for "real" modeler who have fun with building their own winner model. Wings, tail feathers and the turtle deck are made out of a styrofoam-balsa sandwich. The fuselage is a conventional construction made from laser cut plywood parts and balsa strips. The wing tubing and the landing gear are made from aluminium. The two-piece cowling and the wheel spats are GRP parts with a clear gel coat. The canopy is made from vacuum formed clear plastic.

Wingspan:.....3124 mm (123")
Length:.....2985 mm (117,50")
Weight:.....16,3-18,6 kg, depending on equipment
Engine:.....150 cc to 200 cc four-cylinder,
ideal for DA-150L or DA-200L

Typical setup used for competition:

2 Servos per aileron,

1 Servo per elevator,

2 Servos for the rudder, installed in the tail in a push pull configuration.

Dalton Extra 300ML Kit.....#8900 € 1499,—

The Quality Control with our
Titan ZG - Engines

Husqvarna Zenoah engines are primarily industrial units put together in flowband work. This means a very solid construction with very high quality of individual components. This is the basis which we use for our ZG engines. It is obvious by industrial mass production that everything possible is done to keep down the often biggest cost component being wages.

Holger Stasing is just putting together a Titan ZG 80B flat twin. The customer has ordered this engine with the optional longer propeller hub.

According to Husqvarna`s information, these engines are assembled in 20 second tact in sub assemblies. Time for completion of one engine is two minutes, of course in such a tempo there is no time for fault finding not to mention correcting.

We were aware of this problem as long ago as when we handled Quadras. It was clear to us from the beginning, that every Husqvarna Zenoah engine sold by us must be quality controlled in our own workshop. Over the years the check lists have grown ever longer after the motto “Es gibts nichts was es nicht gibt” rather difficult to translate but roughly equates to “there exists nothing that does not exist” in other words anything is possible. We no longer concentrate only on checking; after stripping down we rebuild and readjust engines for perfection as model aircraft power plants. We employ two full time workers in the engine department who strip down each and every engine, check and clean every component before rebuild just as we would wish for our own very valuable models.

It takes on average thirty minutes per engine and cost for this time has naturally to be part of the selling price. So as a small bonus you have five years guarantee on all our Titan ZG aero-engines.

Is it worth saving a few Euros for "Original Husqvarna Zenoah" Engines from a non franchised importer that does not shy from using our trademark?

The very good name and the utter reliability of our Titan ZG-model aircraft engines is "made in Germany" by our technicians.

New on the market are Husqvarna-Zenoah engine blocks fitted with the cheapest of Chinese battery ignitions. The Hall sensor carrier is a carbon reinforced injection molded plastic part. This small part is enough to claim a huge weight-saving due to the use of carbon fibre. They even re-invented the rectangular box type muffler made of soft aluminium.

5 Years Guarantee

for our
Titan ZG - Engines!

Over 30 years of experience with the Titan engines and our careful quality control allows us to extend the guarantee period to five years. This guarantee covers the engine and ignition components in addition to any legally required guarantee.

The following conditions apply:

The Guarantee is for 5 years from date of purchase.

The guarantee is only valid for the first purchaser, this guarantee is not transferable.

The serial number on the engine must not be damaged, defaced or removed. The purchase date and the engines serial number is registered by us.

These engines must run only with the recommended two stroke petrol oil mixture. The use of Methanol fuels nullifies the guarantee.

These engines may only be used with the original ignition. The fitting of the Easy Start is of course allowed.

The guarantee includes the Microprocessor Ignition units, the maximum permissible voltage must not be exceeded. Mechanical damage to the cables is not covered by the guarantee.

The guarantee is that we replace any defective parts free of all labour and material costs and pay only the return postage and packing. This guarantee covers only the engine and can in no way be construed to cover anything else.

The guarantee can in no way be construed to cover crash damage or any following affects of a crash.

This five year guarantee does not cover the G240RC and G270RC Car engine, the ZG 23SLM and ZG 26SCM Marine engines and the ZG 23SLH, ZG 231SLH and ZG 26SLH Helicopter engines.

Toni Clark practical scale GmbH Zeiss-Str.10 D-32312 Luebbecke phone (0049) 05741-5035 fax.40338

Titan ZG 20

No more glow plugs, even in small models!

Battery Ignition, Magnesium-Crankcase

Displacement:	20,1 cm³
Bore x Stroke:	32 x 25 mm
Power:	1,73 hp / 1,27 kW at 11.000 RPM
Torque:	1,23 Nm 9000 RPM
Weight:	820 g
incl. engine mount:	850 g
and intake trumpet:	860 g
and ignition:	1.040 g
and Silencer:	1.185 g

only € 279,90

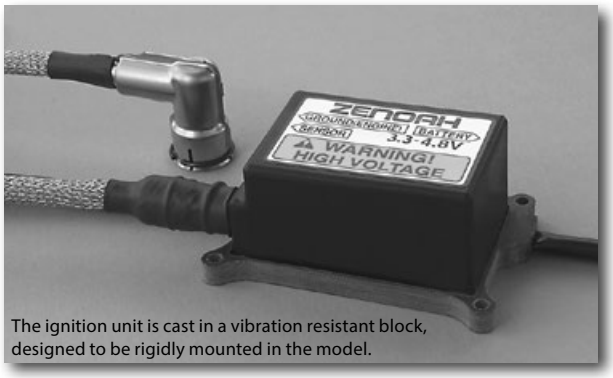
Including ignition unit, motormount, silencer and intake trumpet.

5 year guarantee!*

- Very cheap running costs, less than 1 litre per hour with normal two stroke petrol mix.
- Digital battery ignition with automatic advance, Hall sensor triggered.
- Runs on one single LiPo cell.
- Hand starting is child's play.
- Walbro pump carburettor, can be mounted in 90 degree steps.
- Super light magnesium die-cast crankcase..
- Extremely smooth running due to crankshaft being mounted in three ball races and double counterweights.
- Very long life due to roller bearings both ends of the conrod.
- Very thin pinned piston ring allowing largest possible transfer passages with optimum exhaust and inlet ports.

* Guarantee conditions see page 49

In America known as the Zenoah G20EI this new engine has been specially designed by Komatsu Zenoah's engineers for model aircraft and to power model helicopters and racing boats. The extra mounting lugs on the crankcase are provided for the latter two purposes. The well proven piston porting has been chosen for simplicity and reliability and long life.



The ignition unit is cast in a vibration resistant block, designed to be rigidly mounted in the model.

Due to it's very low weight and small size, the Titan ZG 20 is ideal for models normally powered by 10 to 20 cc glow engines, either two or four stroke.

Fuel is made up from normal grade lead-free petrol mixed with BelRay H1R in a ratio of 50:1. This fuel is certainly a lot cheaper than glow fuel. Petrol mixes do not affect the paints, so it is no longer necessary to use the expensive, glow fuel resistant model paint.

The carburettor high and low speed needles need only the initial adjustment and require no further settings ever. Due to the integral pump the tank can be fixed in any position in the fuselage. Corrosion problems as is with methanol based fuels are non-existent with petrol. Surprising is the very smooth running and low tickover speed.

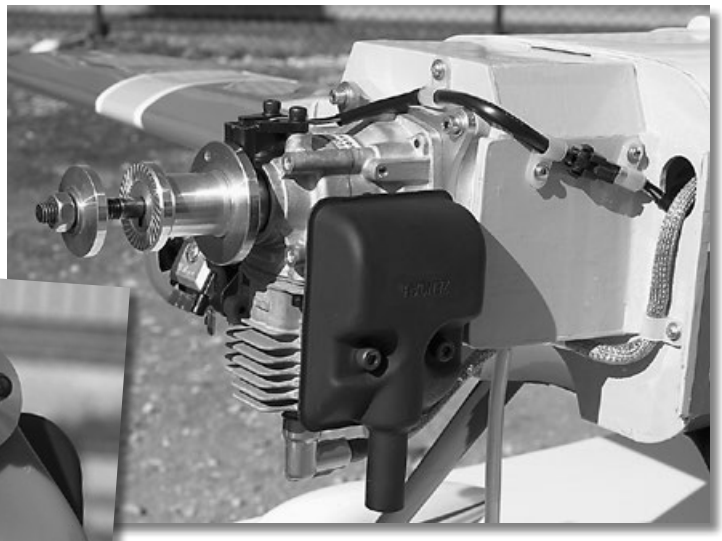
For the first time Komatsu Zenoah is using a high performance micro processor battery ignition with automatic timing advancement, specially developed for this engine. This ignition unit is unusually powerful and this makes for very easy hand starting. The high tension cable is well screened with a metal plug cap. We fit the ignition module with a CNC-milled base for protecting the wires and to provide an easy installation in the model.

Ideal power source is a LiPo cell (3,7V) having a capacity of 3,100 mAh, a LiFePO4 cell (3,3V) alternatively a 3,6V (3 cells) NiMH or NiCd battery can be used. The Micro processor can operate down to 3 volts. For revs above 12,000 RPM 4 cells (4,8V) are recommended. 15,000 RPM, as sometimes required for model boats, is then possible.

The ideal propellers are the APC 17x8"N or the APC 16x8". If the ground clearance is restricted one can use the APC 15x10". Menz S propellers in the following sizes are suitable: 15x8", 16x6", 16x8" and 17x6, and also the Super Silence carbon fiber propellers 15x11", 16x8" Pro and 16x10".

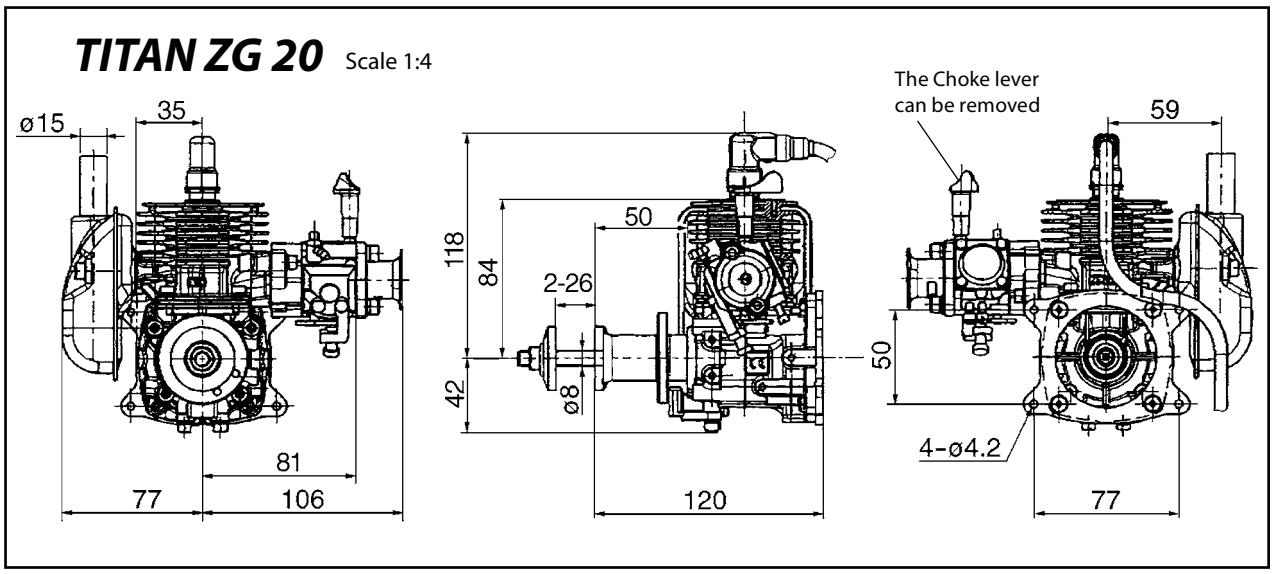
The Titan ZG 20 is supplied complete with ignition unit, silencer, intake tube and aluminium motor mounting plate. The battery and the ignition switch are not included.

TITAN ZG 20 ..... #2020 € 279,90

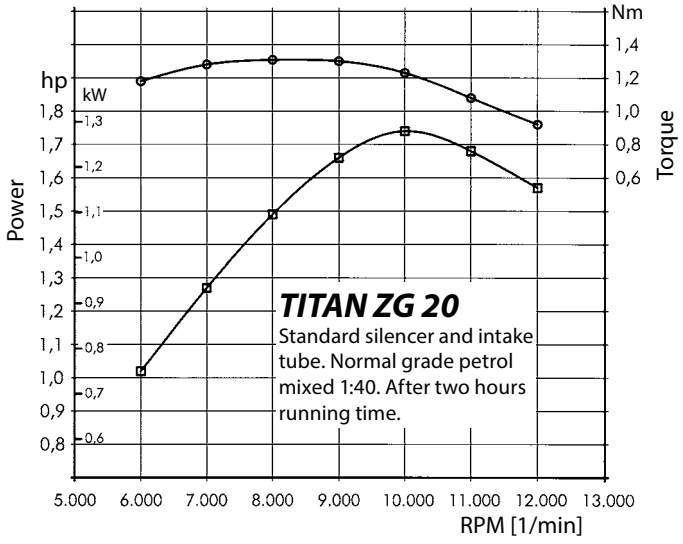


The Titan ZG 20 with standard silencer installed in a 1,65 m ARF Velox Rev II from "The World Models".
All up weight is 4,2 kg.
Propeller: APC 17x8N, 7700 RPM. The vertical performance and max. flying speed of this configuration is phenomenal!

Stainless steel mini pipe and headers on page 62



The three view drawing shows that the Titan ZG 20 will easily fit into Warbirds that have a radial engine cowl. The intake tube can be left off. The exhaust flange on the ZG 20 is identical to the flanges on the ZG 22, 23 and 26, the header pipes #2574, #2572, #2579, #2581 and #2571 will therefore fit the ZG 20.

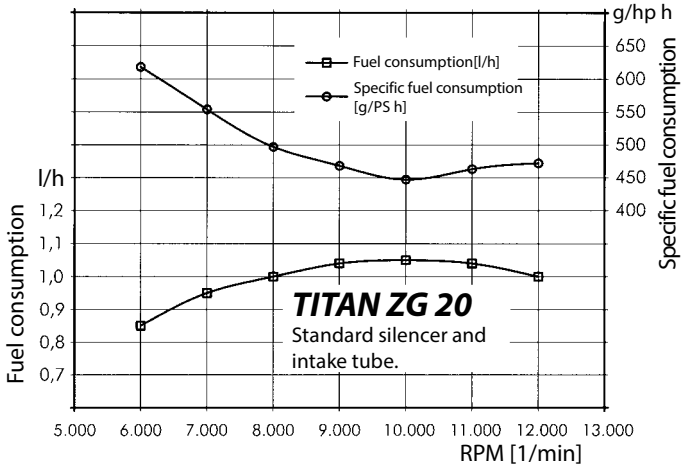


Propeller	RPM
APC 15x8"	8900
APC 15x10"	8300
APC 16x8"	8300
APC N17x8"	7700

These power curves and propeller RPM are measured with the standard silencer mounted directly onto the cylinder.

With an external silencer and a header tuned to the correct length, these figures will be 30% more. With a tuned pipe the power will be up by 40%.

Please take also into account, when comparing power with a glow plug engine using just the numbers, the more efficient propulsion is obtained by the ZG 20's ability to turn a much larger prop.



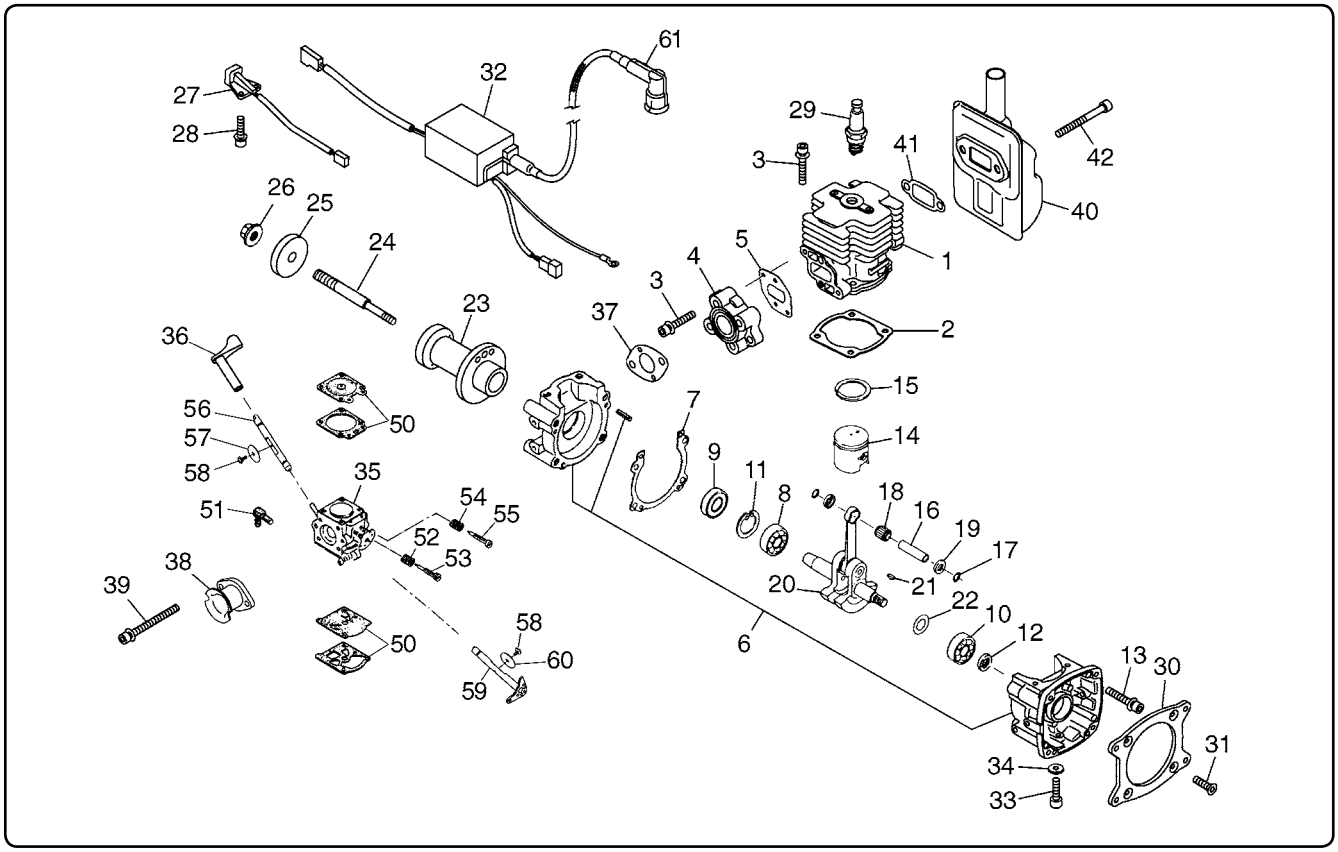
Ignition current consumption at 3,7V:

At tickover 0,6A.

Above 4,500 RPM up to max. revs 0,97A.

With engine still 45mA.

Spares Titan ZG20



No.	Item no.	Description	€
1	#2031	CYLINDER	59,50
2	#2032	GASKET, cylinder	1,75
3	#2033	BOLT, insulator 1 piece	0,50
4	#2034	INSULATOR	8,95
5	#2035	GASKET, insulator	1,75
6	#2036	CRANKCASE COMP.	64,00
7	#2037	GASKET, case	1,95
8	#2524	BEARING, open	6,95
9	#2525	BEARING, sealed	8,95
10	#2040	BEARING, open	6,95
11	#2526	SNAPRING	0,90
12	#2042	SEAL	3,30
13	#2043	BOLT, crankcase 1 piece	0,35
14	#2044	PISTON	19,90
15	#2045	PISTON RING	5,95
16	#2531	PISTON PIN	3,55
17	#2532	SNAP RING 1 pair	0,95
18	#2533	BEARING	7,08
19	#2534	SPACER WASHER for 2533 1 pair	2,95
20	#2051	CRANKHAFT COMP.	69,90
21	#2541	Woodruff KEY	0,95
22	#2052	SHIM	0,50
23	#2053	HUB COMP. with magnet	39,95
24	#2054	STUD	8,95
25	#2055	PROP WASHER	6,95
26	#2056	PROP NUT	1,30
27	#2057	SENSOR	15,95

No.	Item no.	Description	€
28	#2058	BOLT 1 piece	0,50
29	#2059	SPARK PLUG Champion Y82	10,95
30	#2060	ALUMINIUM MOTOR MOUNT	9,95
31	#2061	SCREW, motormount 1 piece	0,50
32	#2062	IGNITION UNIT	139,90
33	#2063	B0LT	0,20
34	#2064	WASHER	0,10
35	#2065	CARBRETOR ASSY	65,90
36	#2066	LEVER, choke	1,95
37	#2038	GASKET, carburettor	1,75
38	#2648	INTAKE TRUMPET	13,95
39	#2069	BOLT, carburettor 1 piece	0,65
40	#2070	MUFFLER	17,95
41	#2515	GASKET, muffler	1,75
42	#2072	BOLT, muffler 1 piece	0,50
50	#2509	CARBRETOR DIAPHRAGM SET	14,95
51	#2513	FUEL NIPPLE	4,70
52	#2080	SPRING, low speed needle	1,95
53	#2081	NEEDLE, low speed	7,95
54	#2082	SPRING, high speed needle	1,95
55	#2083	NEEDLE, high speed	7,95
56	#2085	SHAFT, choke	8,95
57	#2086	VALVE, choke	3,95
58	#2087	SCREW, for choke and throttle	0,50
59	#2088	SHAFT, throttle	9,95
60	#2089	VALVE, throttle	3,95
61	#2029	Plug cap with HT-lead	29,95

We reserve the right to alter specification and prices.

Titan ZG 26 SC

High Power Cylinder
Choke-Carburettor

"The little friend" has a very potent update in this new Titan ZG 26SC. This is the ideal engine for the middle size 3D Fun-Flyers and for the not so large models.

SPECIFICATIONS:

Capacity:	25,4 cm^3
Bore:	34 mm
Stroke:	28 mm
Effective compression ratio:	8,8
Power:	1,62 kW / 2,2 hp
Torque:	1,48 Nm
Power with tuned pipe:	> 3,0 hp
Weight:	1425 g
incl. engine mount:	1515 g
and Silencer:	1.660 g
Fuel:	1:40 to 1:50 Bel Ray H1R / petrol

TITAN ZG 26SC .....#2626 € 299,90

*5 years guarantee!**

- Walbro pump carburettor with choke and intake trumpet.
- New cylinder for considerably more power and efficient cooling.
- Very thin piston ring for minimal friction and maximum power.
- Magneto-electronic ignition with separate power coil and ignition coil, giving maximum power and smooth running.
- Small Champion spark plug RZ7C with 10 mm thread.
- Compact diecast crankcase.
- Double counterbalanced crankshaft, supported in three ballbearings. Needle roller bearings in conrod.

* Guarantee conditions see page 49.

The Titan ZG 26SC. is the result of constant development over the years. Only the front bearings, exhaust gasket and several screws are the same as the Titan ZG 22.

The new cylinder is the most prominent change in the outward appearance of the Titan ZG 26SC. It is not only optically perfect but the power this cylinder produces will meet the stringent demands of most 3D FunFlyers. The piston is fitted with a thin high performance single ring which considerably reduces surface friction with the cylinder. In addition to more power, this piston rings low drag, allows a lower reliable tickover speed.

The new Walbro pump carburettor with choke, simplifies the fitting of the intake bend #2587, allowing the air to be sucked out of the fuselage, and thereby silencing the intake noise. The choke eases starting and avoids the stink of petrol on the respective digit. The bellmouth intake tube is supplied with the engine.

The perfected crankcase of the Titan ZG 23SL has been adapted to the new cylinder. The outside measurements are not altered. It is not strictly necessary to use the supplied aluminium motor mount, instead the engine can be bolted directly onto a hard firewall.

The double counter balanced crankshaft constructed to take the extra power is suspended in three ball bearings, the cold forged con rod is fitted with needle bearing rollers both ends.

The two ignition modules and the flywheel are industrialy designed and produced components, developed especially for Zenoah model aicraft engines. Compared to battery ignition systems this magneto ignition is very tough and able to absorb quite an amount of abuse.

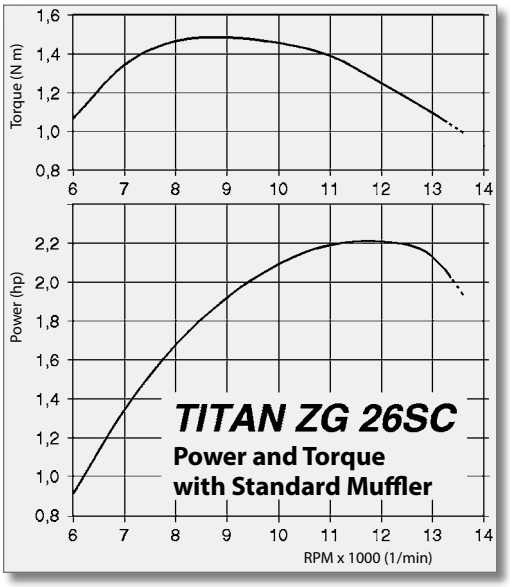
The power coil over the flywheel also contains the electronic components that sets the timing, the ignition coil is the second module. The high tension is 30,000 volts. This very high voltage is build up in a very short space of time so that even with a wet spark plug, the engine will fire. The magneto ignition, in spite of the flywheel, is hardly any heavier than a battery ignition with a reasonable sized battery.

For small glider tugs such as the "Big Lift" the Titan ZG 26SC is ideal. It uses a liter fuel for about an hours towing. The fuel can be bought cheaply at the petrol station even on Sundays.

Best two stroke mix is lead free normal grade petrol and Bel Ray H1R at a ratio of 1:50. You need neither starter or battery. Due to the built-in pump you can place the tank where you wish. Unlike with Methanol fuels corrosion is no problem at all.

Fitting a tuned pipe to the Titan ZG 26SC will considerably increase the performance. The Tuned Mini Pipe #2596 is ideal when used with a 22 cm long header pipe.

The Titan ZG 26SC is supplied with silencer, intake tube, motor mount and spark plug box spanner. The very detailed instructions provide the newcomer to petrol engines with a great deal of information and tips.

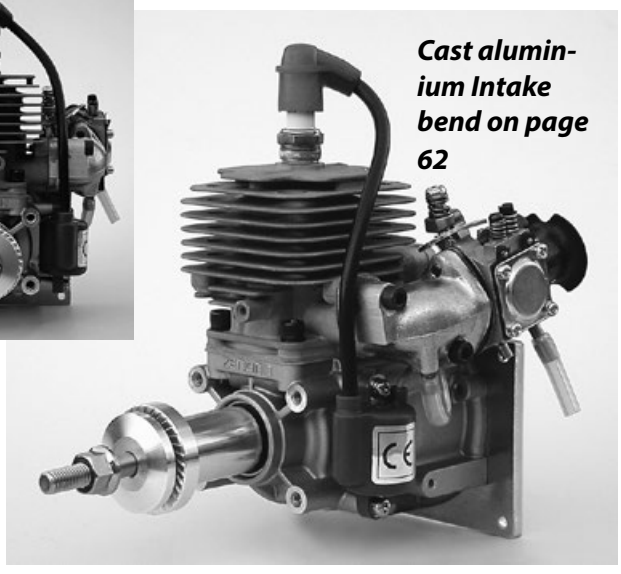


The Titan ZG 26SC turns a Menz S 18x8" propeller at 7,400 rpm with the standard silencer fitted. This is a good 200 rpm more than the ZG 23SL with the smaller 18x6" propeller.
Fit a tuned pipe and the 18x8" will turn at 8,500 rpm!

Recommended propellers are the 18x6", 18x8", 17x8" and the 17x10" Menz S and the Super Silence 2 blade CF-props 18x8" Pro, 17x12" and 18x11".

A 500 cc tank with a cotton felt filter and fuel tubing is all you require to get in the air!

TITAN ZG 26SC..... #2626 € 299,90



Cast aluminium Intake bend on page 62

Titan ZG 26 EI

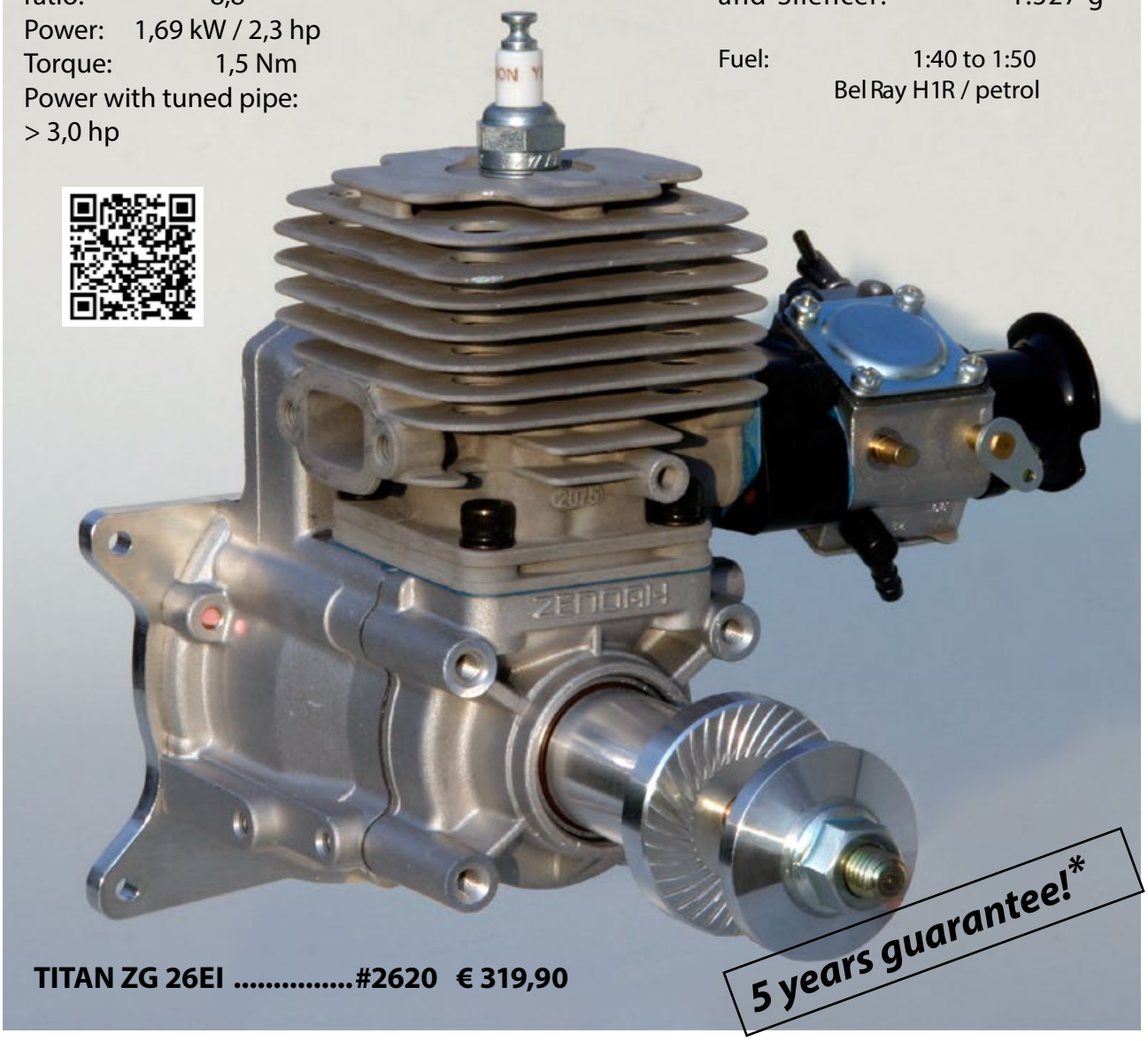
Zenoah electronic ignition

SPECIFICATIONS:

Capacity: 25,4 cm^3
Bore: 34 mm
Stroke: 28 mm
Effective compression ratio: 8,8
Power: 1,69 kW / 2,3 hp
Torque: 1,5 Nm
Power with tuned pipe: > 3,0 hp

Weight:
incl. engine mount: 1166 g
and intake trumpet: 1176 g
and ignition: 1.362 g
and Silencer: 1.527 g

Fuel: 1:40 to 1:50
Bel Ray H1R / petrol

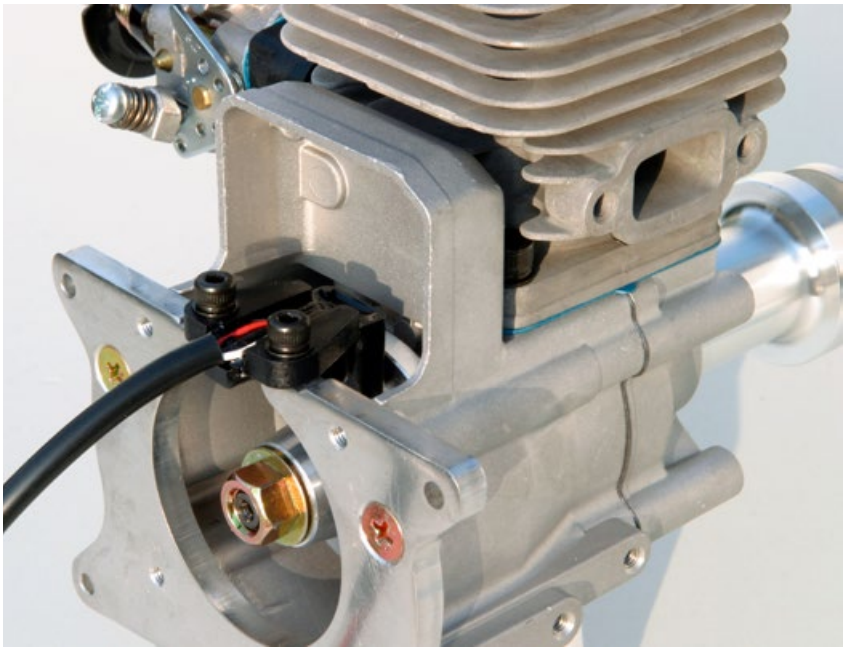


TITAN ZG 26EI .....#2620 € 319,90

*5 years guarantee!**

- Digital battery ignition with automatic advance, Hall sensor triggered.
- Runs on one single LiPo cell.
- Hand starting is child's play.
- Walbro pump carburettor with choke and intake trumpet.
- Compact die cast crankcase.
- Double counterbalanced crankshaft, supported in three ball bearings. Needle roller bearings in conrod.
- Very thin piston ring for minimal friction and maximum power.

* Guarantee conditions see page 49.



The Titan ZG 26EI is based on the ZG 26SC. Zenoah engineers fitted the electronic ignition from the Titan ZG 20 to improve engine starting and idle. Also engine weight is reduced.

Our European version comes with the ZG 38SC carburettor to further improve power and mid range throttle response.

Fitting a tuned pipe to the Titan ZG 26SC will considerably increase the performance. The Tuned Mini Pipe #2596 is ideal when used with a 23 cm long header pipe.

Ideal power source is a LiPo cell (3,7V) having a capacity of 3,100 mAh, alternatively a 3,6V (3 cells) NiMH or NiCd battery can be used. The Micro processor can operate down to 3 volts.

Recommended propellers are the 18x6", 18x8", 17x8" and the 17x10" Menz S and the Super Silence 2 blade CF-props 18x8" Pro, 17x12" and 18x11".

Best two stroke mix is lead free normal grade petrol and Bel Ray H1R at a ratio of 1:50. You need neither starter or battery. Due to the built-in pump you can place the tank where you wish. Unlike with Methanol fuels corrosion is no problem at all.

The Titan ZG 26EI is supplied complete with ignition unit, silencer, intake tube and aluminium motor mounting plate. The battery and the ignition switch are not included.

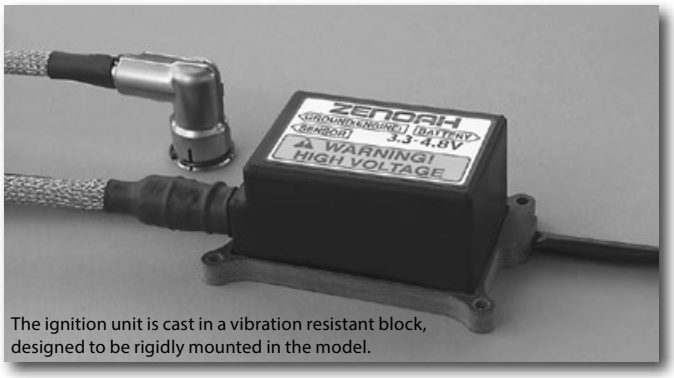
TITAN ZG 26EI..... #2620 € 319,90

Ignition current consumption at 3,7V:

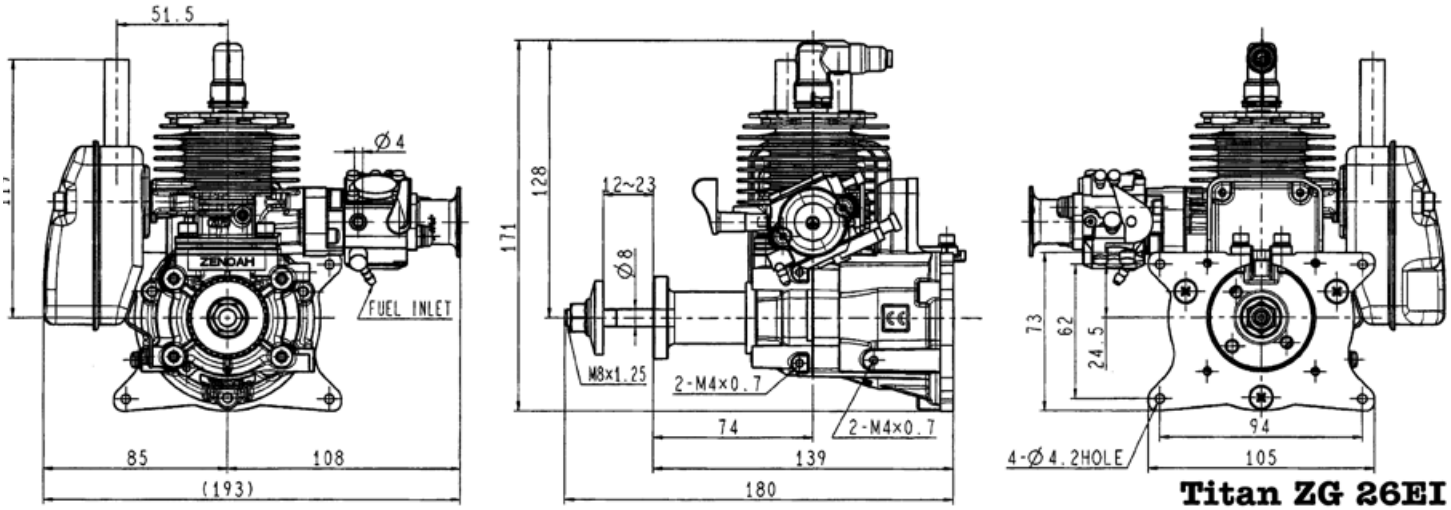
At tickover 0,6A.

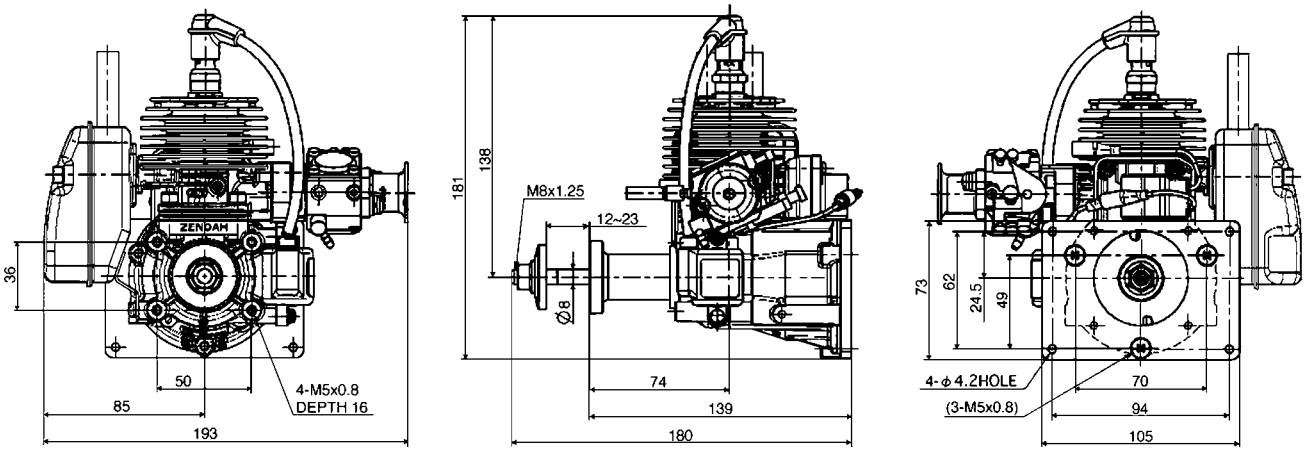
Above 4,500 RPM up to max. revs 0,97A.

With engine still 45mA.

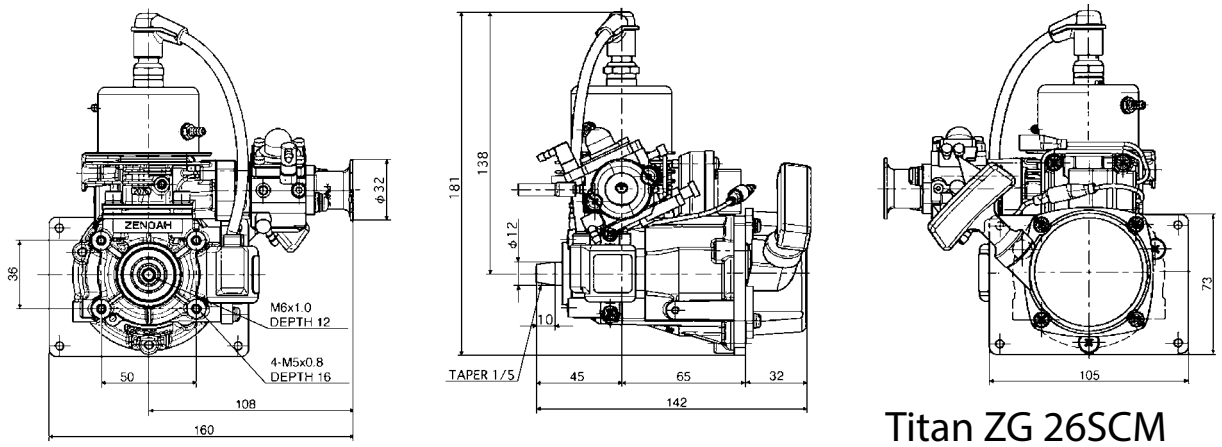


The ignition unit is cast in a vibration resistant block, designed to be rigidly mounted in the model.

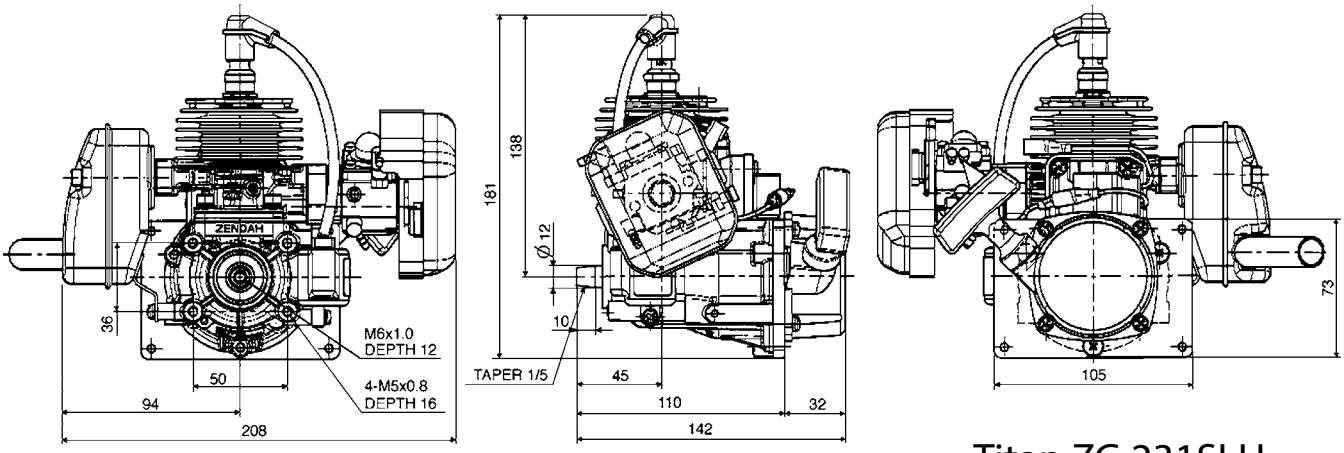




Titan ZG 26SC



Titan ZG 26SCM



Titan ZG 231SLH

Drawings 25% scale (1:4)

…for the Waterborne:

Titan ZG 26SCM

SPECIFICATIONS:

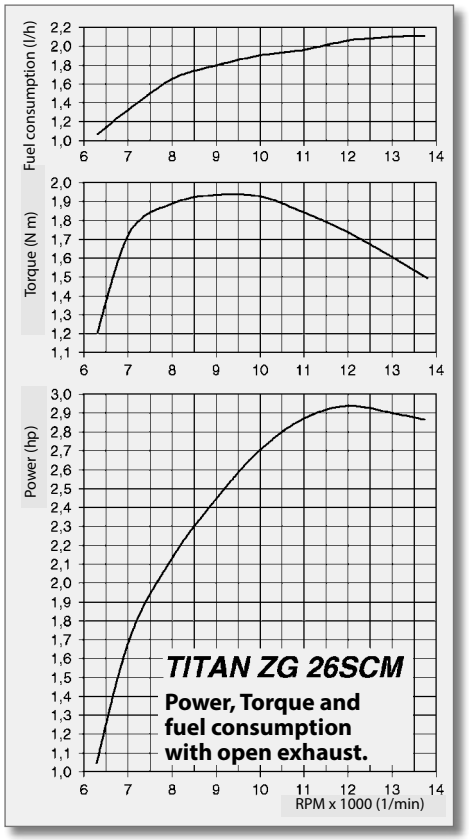
Capacity:	25,4 cm^3
Bore:	34 mm
Stroke:	28 mm
Weight:	1540 g
Power :	
without muffler:	
	2,16 kW / 2,95 hp
with tuned pipe:	
	>2,95 kW / >4,0 hp
Torque:	1,48 Nm
Effective compression ratio:	8,8
Fuel:	1:40 to 1:50
	Bel Ray H1R / petrol

TITAN ZG 26SCM #2426 € 299,—

The ZG 26SC fitted with a water cooled cylinder provides the boat enthusiast with a much higher performance engine and thereby excellent value. The reliability and long life of the Titan engines is held in high esteem on the water.

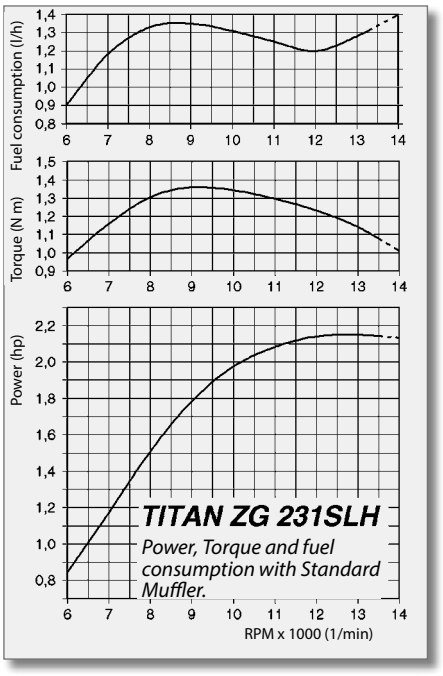
More information about this engine on pages 48-49.

TITAN ZG 26SCM ..... #2426 € 299,—
Complete with pullcord starter, air intake filter, Spark plug box spanner.



Titan ZG 26SLH and 231 SLH

TITAN ZG 231SLH #2399 and Titan ZG 26SLH #2666



More power and better cooling!

The new cylinder with the very thin high performance single piston ring is adapted from the extremely high power G230RC car engine for helicopter use. This new cylinder has four retaining screws as apposed to two for the G230RC cylinder. The extremely wide cooling fins are invaluable for helicopter use.

Other components are also optimized for helicopters, for example the crankshaft is very accurately aligned for the necessary concentric running. There is a very robust pullcord starter as well as very efficient airfilter intake silencer fitted to this engine. The carburettor is fitted with small priming pump to fill the carburettor for starting.

The Walbro carburettor is extremely reliable, is designed for the higher rpm involved, the completely dependable magneto ignition without contact breaker, the clean running due to low dilution full synthetic oil resulting in the absence of the smelly smoke trail, the availability of the fuel at every filling station with it's very low price. These are some of the arguments resulting in the popularity of first the ZG 22 and then the ZG 23SLH, are now exactly relevant to the ZG 231SLH.

SPECIFICATIONS:

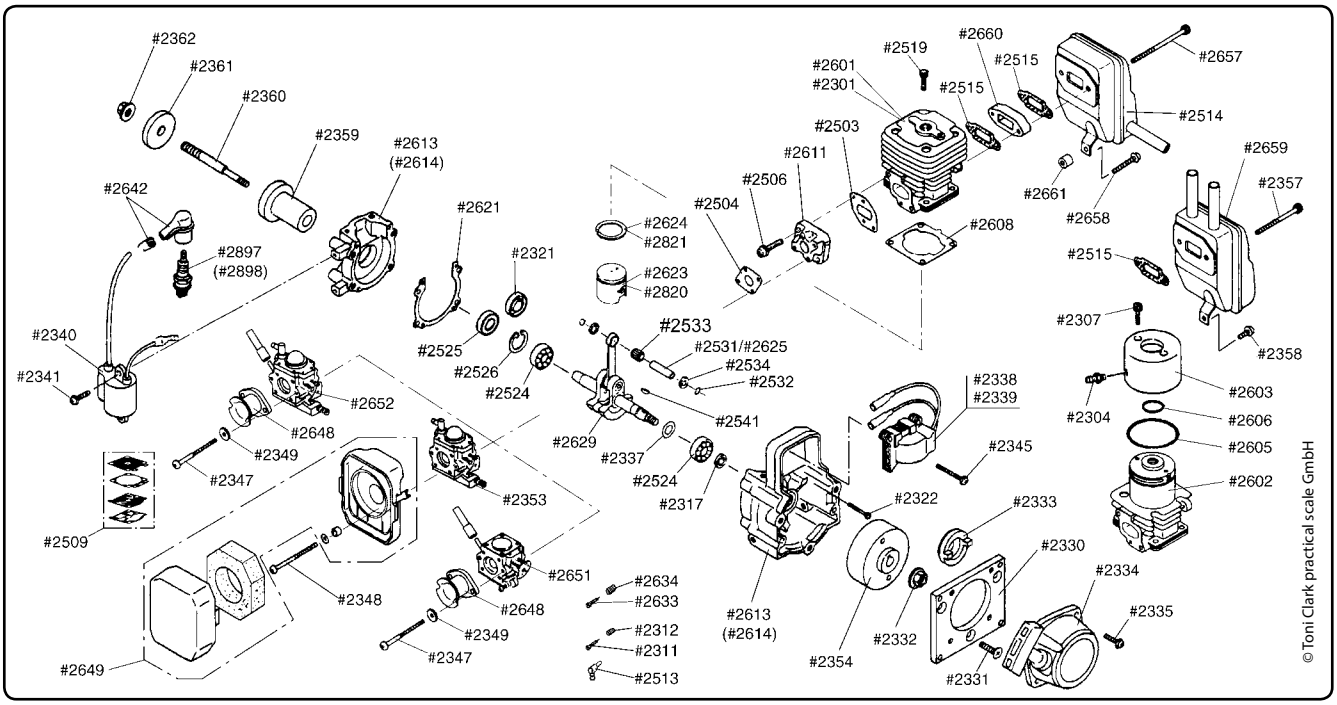
	ZG 231SLH	26SLH
Capacity:	22,5 cm^3	25,4 cm^3
Bore:	32 mm	34 mm
Stroke:	28 mm	28 mm
Compression ratio:	8,8 eff.	
Power:	1,58 kW	1,69 kW
	2,15 hp	2,3 hp
Tourque:	1,34 Nm	1,48 Nm
Power with Tuned pipe:	> 3,0 hp	
Weight:	1580 g (without muffler)	
Fuel:	1:40 Bel Ray H1R / petrol	

TITAN ZG 231SLH ..... #2399 € 319,90

TITAN ZG 26SLH ..... #2666 € 329,90

Complete with pullcord starter, silencer, air intake filter, Spark plug box spanner.

Spares TITAN ZG 26SC -SLH -SCM and ZG 231SLH



No.	SC	SLH	SCM	Description €	
#2301	-	1	-	Cylinder ZG 231SLH	63,90
#2304	-	-	1	Water jacket nipple ZG26SCM	1,80
#2307	-	-	2	Water jacket screw, per 1	0,20
#2311	1	1	1	Low speed needle	7,95
#2312	1	1	1	Spring for low speed needle	1,95
#2317	1	1	1	Rear crankshaft seal	3,65
#2321	-	-	1	Front crankshaft seal ZG26SCM	3,95
#2322	4	4	4	Crankcase screw, per 1	0,35
#2330	1	1	1	Aluminium motor mount	9,95
#2331	3	3	3	Countersunk screw, per 1	0,35
#2332	1	-	-	Flywheel nut for ZG 26SC	0,50
#2333	-	1	1	Crown for pullcord starter	3,75
#2334	-	1	1	Pullcord starter unit	29,95
#2335	-	4	4	Pullcord starter fixing screws, per 1	0,20
#2337	1	1	1	Shim washers, 1x 0,1/0,15 / 0,2 mm	1,50
#2338	1	-	-	Power coil, grey, for ZG 26SC	69,95
#2339	-	1	1	Power coil, red, ZG 231SLH/26SSM	69,95
#2340	1	1	1	Ignition coil	49,90
#2341	2	2	2	Ignition coil screw, per 1	0,20
#2345	2	2	2	Power coil screw, per 1	0,20
#2347	2	-	2	Carburettor screw, per1	0,50
#2348	-	2	-	Carburettor screw ZG231SLH, per 1	0,50
#2349	2	-	2	Washer (thick), per 1	0,15
#2353	-	1	-	Carburettor for ZG 231SLH	67,50
#2354	1	1	1	Flywheel (magneto)	44,95
#2357	2	-	2	Muffler screw, per 1	0,50
#2358	1	-	1	Muffler lug screw	0,20
#2359	1	-	-	Propeller hub for ZG 23SL, ZG 26SC	24,95
#2360	1	-	-	Propellershaft ZG 23SL, ZG 26SC	9,95
#2361	1	-	-	Prop washer ZG 23SL/26SC	6,95
#2362	1	-	-	Prop nut for ZG 23SL, ZG 26SC	1,30
#2503	1	1	1	Gasket Insulator - Cylinder	1,75
#2504	1	1	1	Gasket Carburettor- Insulator	1,75
#2506	2	2	2	Screw for insulator, per 1	0,30
#2509	1	1	1	Carburettor diaphragm set	14,95
#2513	1	1	1	Carburettor nipple	4,70
#2514	-	1	-	Muffler ZG 231SLH	23,95
#2515	1	1	1	Exhaust gasket	1,75
#2519	4	4	4	Cylinder socket screw, per 1	0,75
#2524	2	2	2	Open Ballbearing, per 1	6,95

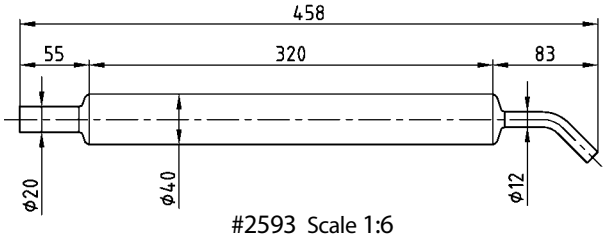
No.	SC	SLH	SCM	Description €	
#2525	1	1	-	Sealed Ballbearing	8,95
#2526	1	1	1	C-Clip	0,90
#2531	-	1	-	Gudgeon pin ZG 23... / ZG 231SLH	3,55
#2532	1	1	1	Gudgeon pin clips, pair	0,95
#2533	1	1	1	Small end needle bearing	6,95
#2534	1	1	1	Spacer washers for 2533 , pair	2,95
#2541	1	1	1	Woodruff key	0,95
#2601	1	1	-	Cylinder ZG 26SC, ZG 26SLH	63,95
#2602	-	-	1	Cylinder ZG26SCM, without W/jacket	63,95
#2603	-	-	1	Water jacket ZG26SCM	49,50
#2605	-	-	1	O-ring seal 3x40 black ZG26SCM	1,15
#2606	-	-	1	O-ring seal1,5x15,5 clear ZG26SCM	1,75
#2608	1	1	1	Cylinder gasket	1,95
#2611	1	1	1	Insulator block	7,95
#2613	1	1	1	Front and rear crankcase	79,50
				available only as a pair.	
#2614	1	1	1	Front and rear crankcase with seal	89,50
				and bearings fitted, matched pairs.	
#2621	1	1	1	Crankcase Gasket	1,95
#2623	1	1	1	Piston ZG 26SC/SCM, ZG 26SLH	22,50
#2624	1	1	1	Piston ring ZG 26SC/SCM, ZG 26SLH	6,40
#2625	1	1	1	Gudgeon pin for ZG 26SC/SCM/SLH	3,55
#2629	1	1	1	Crankshaft	79,90
#2633	1	1	1	High speed needle	7,95
#2634	1	1	1	Spring, big, for high speed needle	1,95
#2642	1	1	1	Sparkplug cap with spring	3,45
#2648	1	-	1	Intake Trumpet	13,95
#2649	-	1	-	Airfilter with choke	19,95
#2651	1	-	-	Carburettor with Choke ZG 26SC	69,90
#2652	-	-	1	Carburettor with Choke ZG 26SCM	76,45
#2657	-	2	-	Screw for Muffler, long, per 1	0,50
#2658	-	1	-	Muffler lug screw, long	0,20
#2659	1	-	1	Muffler ZG 26SC/SCM	25,95
#2660	-	1	-	Spacer for muffler	8,90
#2661	-	1	-	Spacer for muffler lug	0,95
#2820	-	1	-	Piston ZG 231SLH	22,50
#2821	-	1	-	Piston ring ZG 231SLH	6,40
#2897	1	1	1	Sparkplug Champion RZ7C	8,45
#2898	-	-	1	Sparkplug NGK CMR6H, optional,	8,45
				recommended only for ZG 26SCM.	

We reserve the right to alter specification and prices.

High Power Stainless Steel Mini Pipe

ZG 20:

... #2593 for Titan ZG 20 and ZG 23



#2593 Scale 1:6

A very effective mini tuned pipe with excellent silencing and a very pleasant sound. Is fitted to the engine with a header, increases the power of the ZG 20 by 40%. We have measured 9,400 rpm with a APC 16x8 propeller using this mini tuned pipe.

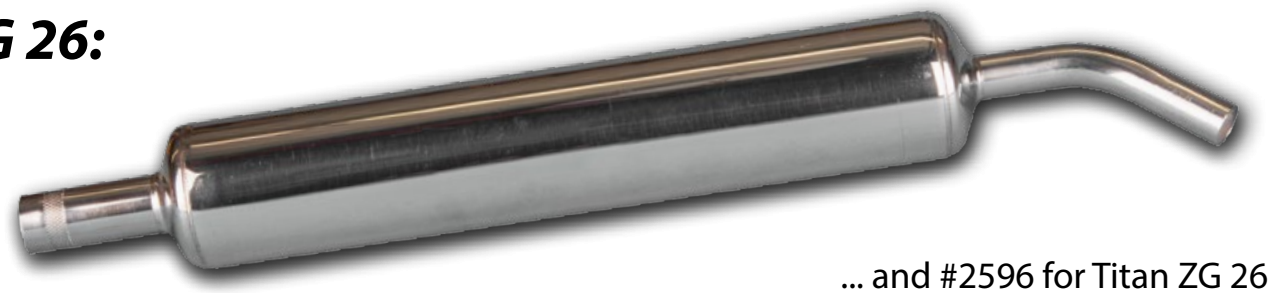
This tuned pipe is Laser welded and highly polished. With only 40 mm diameter and the short tuning length, will easily fit into most models. Even if you are forced to hang this pipe onto the underside of the model it does not detract from the overall appearance of the model too much. In fact it can have an enhancing effect on some models.

The header is joined with a 5 cm long Teflon tube #3894 and two spring clips #3893. Weight is 178 g.

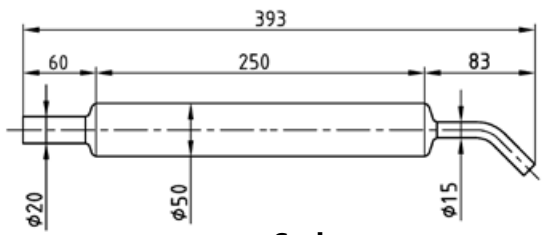
Stainless Steel Mini Pipe ..... #2593 € 99,90
the best silencer for ZG 20 and ZG 23 with 40 mm diameter.

Fixing Ring with Base 40 mm ..... #2594 € 10,60
Formed from stainless steel, safe and reliable fixing for 40 mm diameter silencers.

ZG 26:



... and #2596 for Titan ZG 26

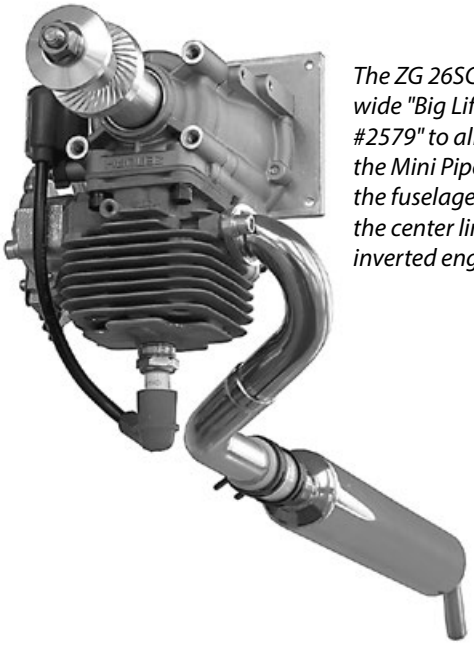


#2596 **Scale** 1:6

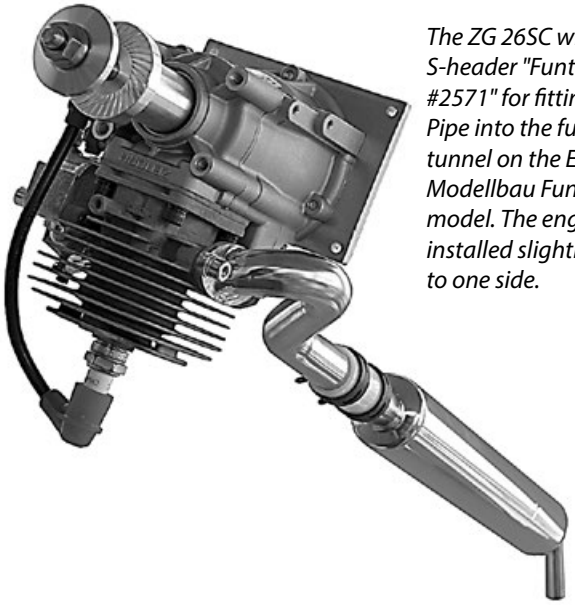
Stainless Steel Mini Pipe ..... #2596 € 99,90
the best silencer for ZG 26 with 50 mm diameter.
Weight: 260g.

Fixing Ring with Base 50 mm ..... #2597 € 10,60
Formed from stainless steel, safe and reliable fixing for 50 mm diameter silencers.

Headers for Titan ZG 20, ZG 23 and ZG 26



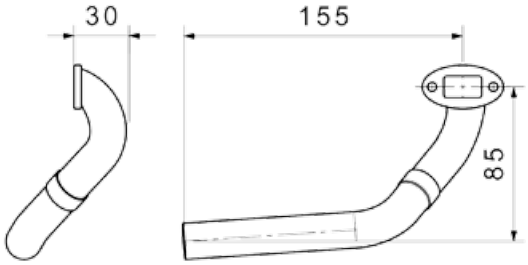
The ZG 26SC with the wide "Big Lift header #2579" to allow fitting the Mini Pipe under the fuselage along the center line with inverted engine.



The ZG 26SC with the S-header "Funtana type #2571" for fitting the Mini Pipe into the fuselage tunnel on the Exclusiv-Modellbau Funtana model. The engine is installed slightly turned to one side.

S-Header wide,
"Big Lift" type .... #2579 € 45,95

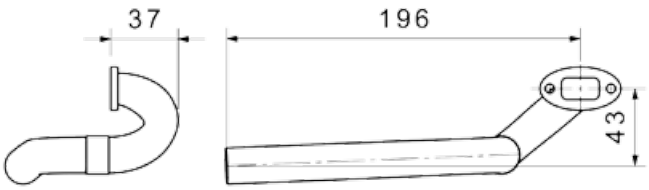
Header for the Big Lift from MPX. Made from 20x0,5 mm stainless tube. For fitting the Mini Pipe to the fuselage underside center line. Centerline silencer starts 85 mm below centerline of exhaust flange.



Best header length 230 mm, weight 80 g.

S-Header,
"Katana UL" type .... #2581 € 45,95

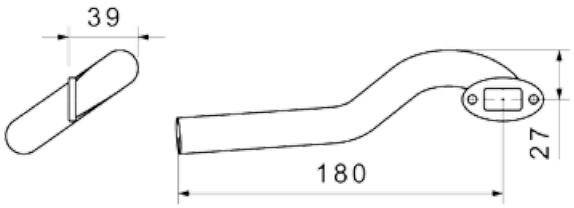
Like #2579 but centerline silencer 43 mm below centerline Exhaust flange. For fitting the Mini Pipe into the Katana UL silencer tunnel.



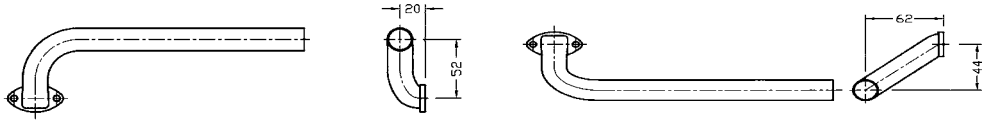
Best header length 230 mm, weight 89 g.

S-Header
"Funtana" type ..... #2571 € 39,90

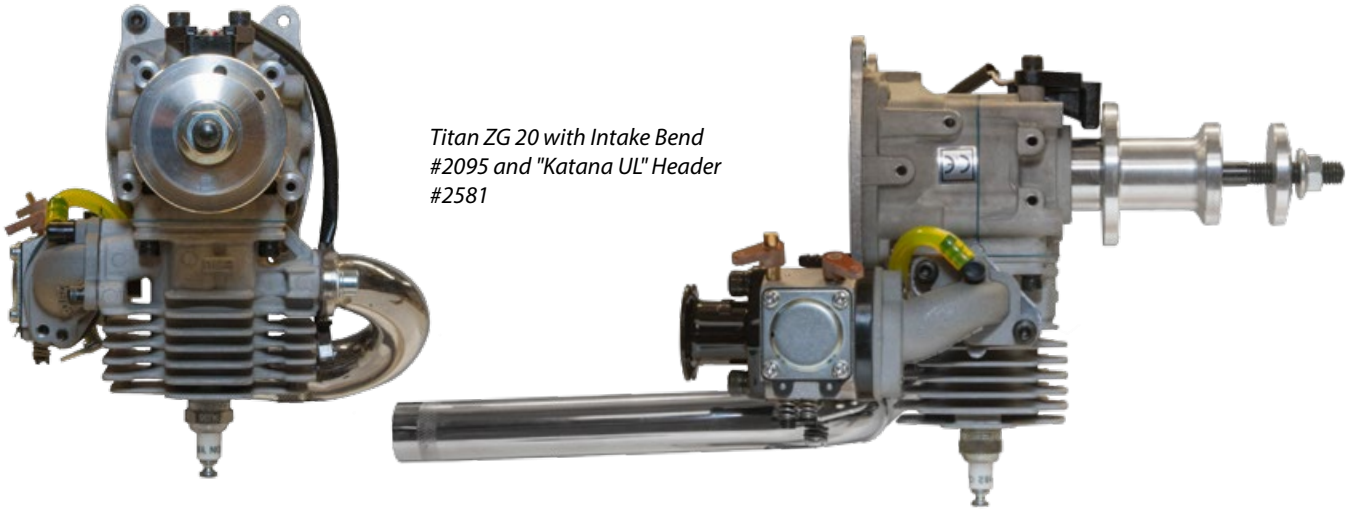
Header for the Funtana from Exclusiv-Modellbau. Made from 20x0,5 mm stainless steel tube. Intended for the Mini Pipe being fitted inside the fuselage or a tunnel.



Best header length 230 mm, weight 75 g.



More Silencer and Header on Page 65



Titan ZG 20 with Intake Bend #2095 and "Katana UL" Header #2581

Magnesium Intake Bend for ZG 20

This super lightweight magnesium Intake Bend makes your ZG 20 even more compact. To draw the intake air from inside the fuselage is the easiest method to reduce the intake noise. The carburettor can be mounted in different angles on the bend, to fit perfect to your model. Because of the use of magnesium the Intake Bend with the isolator and the Gaskets weights just 38,5 g.

To fit the carburettor to this bend, the fuel nipple must be turned in the carburettor body. This nipple consists of a brass core with a riffled edge over which a plastic spout is injection moulded. If you try to turn this nipple with pliers, the plastic is forced to expand over the riffles, making the nipple useless as it will only leak. To avoid any trouble send us your carburettor with your order and we will do this tricky nipple turning for you.

Magnesium Intake Bend ZG 20 ..... #2095 € 47,95

The intake bend for the Titan ZG 20 is supplied complete with gaskets and insulator.

Cast Aluminium Intake Bend ZG 23/26

In order to obtain a quiet engine you must not forget to do something to reduce the considerable intake noise. For model aircraft the simplest and most effective method is to draw the intake air from inside the fuselage. To fit the carburettor to this bend, the fuel nipple on the **ZG 23SL** must be turned in the carburettor body. This nipple consists of a brass core with a riffled edge over which a plastic spout is injection moulded. If you try to turn this nipple with pliers, the plastic is forced to expand over the riffles, making the nipple useless as it will only leak. To avoid any trouble send us your carburettor with your order and we will do this tricky nipple turning for you. With the **Titan ZG 26SC** the fuel nipple fits without turning it!

Intake bend ZG 23SL ..... #2587 € 45,95

The intake bend for the Titan ZG 23SL/26SC is supplied complete with parts shown here. I.e. gaskets, screws and insulator.

On page 53 you will note how compact the ZG 26SC is with the intake bend fitted.

Beech-End Grain Motormount for ZG 20

Beech is 3-times lighter than Aluminium, because the end grain is used, the compression strength is very high. Additionally, wood is restraining the vibrations much better than metal. The Novotex end plate helps to distribute the load from the narrow crankcase seating. I glued the motormount onto the firewall with Araldite 2011 and the Novotex end plate onto the motormount as well. The result is a spacing of about 32 mm and a rigid motormount, with a weight of only 25g. The aluminum backplate of the ZG 20 (it weights 28,5g) has not to be applied anymore.

Beech-End Grain Motormount, 32 mm long #2093 € 19,50

Stainless Steel Silencer for ZG20/23/26

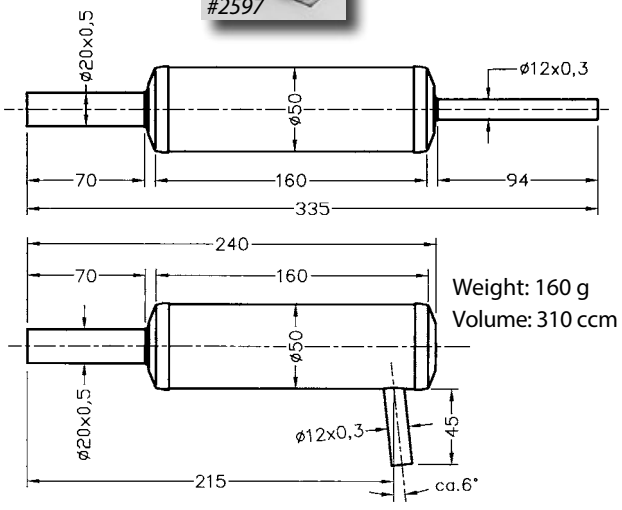
Rear outlet..... #2576 € 89,50
Side outlet..... #2577 € 89,50
Fixing Ring with base 50 mm..... #2597 € 10,60

A very efficient three chamber silencer. When fitted behind the original silencer, there is no loss of power. But when fitted without the original silencer and using the header pipe set to the correct length, power is increased by 25%. The silencing effect is the same. The most reliable method of connecting the header to the silencer is with the flexible steel tube #3882.

Best lengths for the header, measured from the exhaust flange to the beginning of the silencer body and including the 70 mm long lead in pipe on the silencer:

Menz S 16x8: 420 mm header length at 8400 RPM,
Menz S 17x8: 460 mm header length at 7700 RPM,
Heli: 340 mm header length at 10.000 RPM,

The intake tube #0080 is fitted in each case.



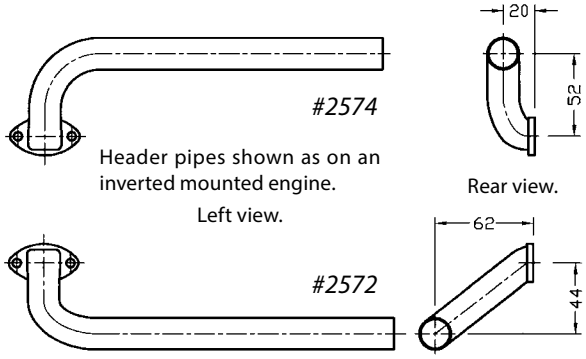
Weight: 160 g
Volume: 310 ccm

Stainless Header Pipe close fitting..... #2574 € 44,90

For use with fitting the tuned pipe or silencer inside the fuselage. This header lays with just 3 mm spacing from the crankcase at the same level as the crankshaft. Made from 20x0,5 mm stainless steel tube.

Wide fitting..... #2572 € 35,90

For fitting either the tuned pipe or silencer outside the fuselage. Made from 20x0,5 mm stainless steel tube.

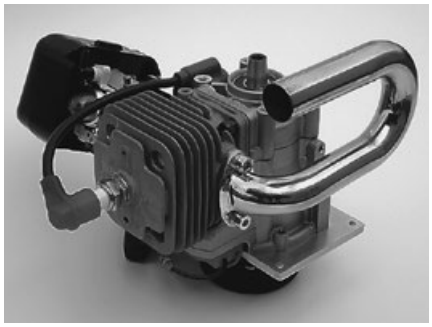


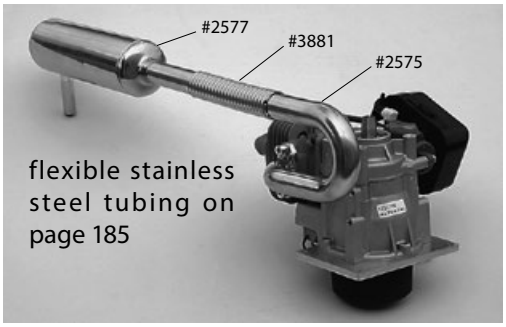
Exhaust flange for ZG20/22/23/26..... #2570 € 4,70

Laser cut from 3 mm stainless steel, absolutely flat.

Heli Header Pipe

Bent from 20x0.5 mm stainless tube. For the Titan ZG 231SLH and the Titan ZG 23SLH. Fits the Robbe FUTURA and most other helicopters. Due to it's form, this header provides the necessary length without having the silencer to far back, thereby avoiding CG problems. To join our stainless steel silencers #2576 or #2577 to the header pipe, it is best to use the flexible stainless steel tubing #3881. Silicone and Teflon tubing are not suitable, as they cannot withstand the high exhaust gas temperature usually found in petrol helicopters.



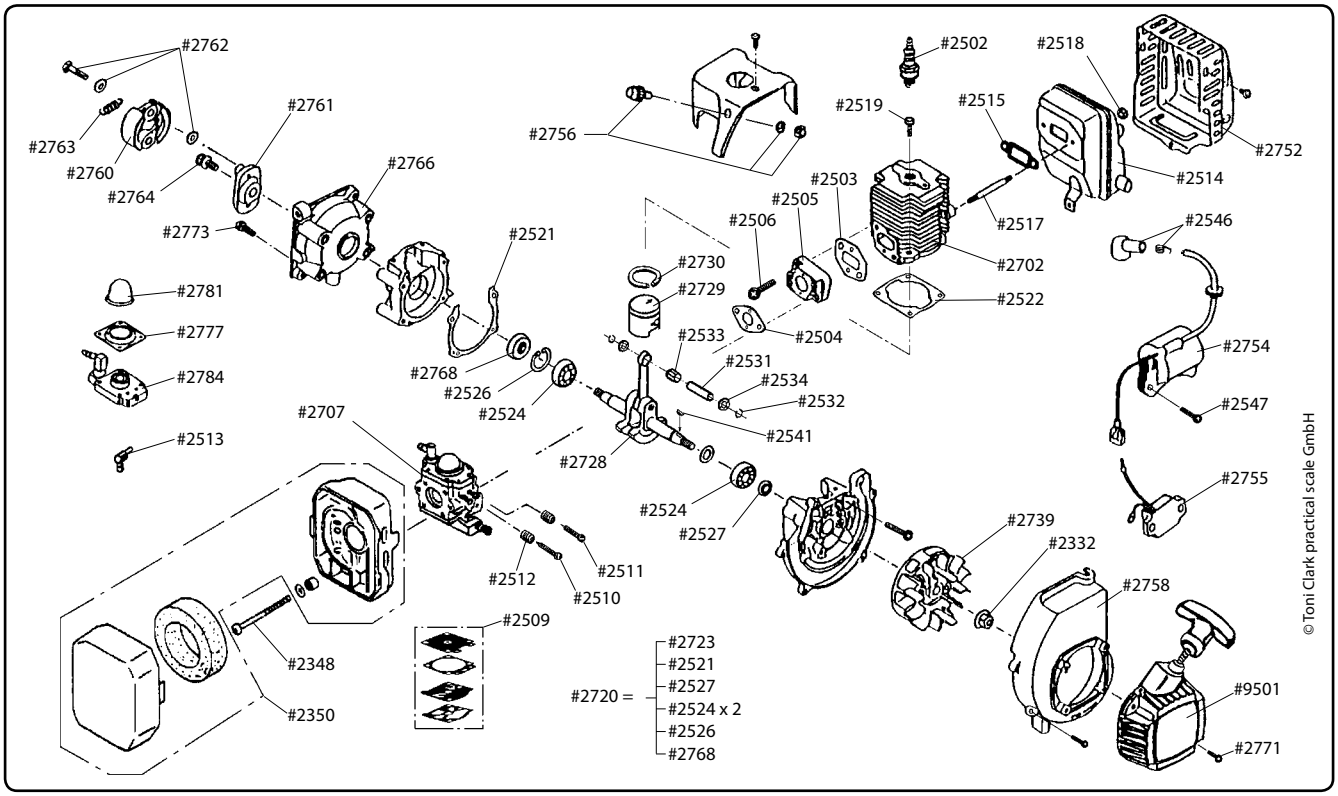


Heli-Header pipe for Robbe Futura ..... #2575 € 49,90
Heli-Header pipe for Robbe Nova Cuatro .. #2585 € 49,90

Set of manifold screws #2573 € 0,75

Two screws M5x16, Washers and spring washers, zinc plated.

Spares for the G2D96-D or "ZENOAH 97"



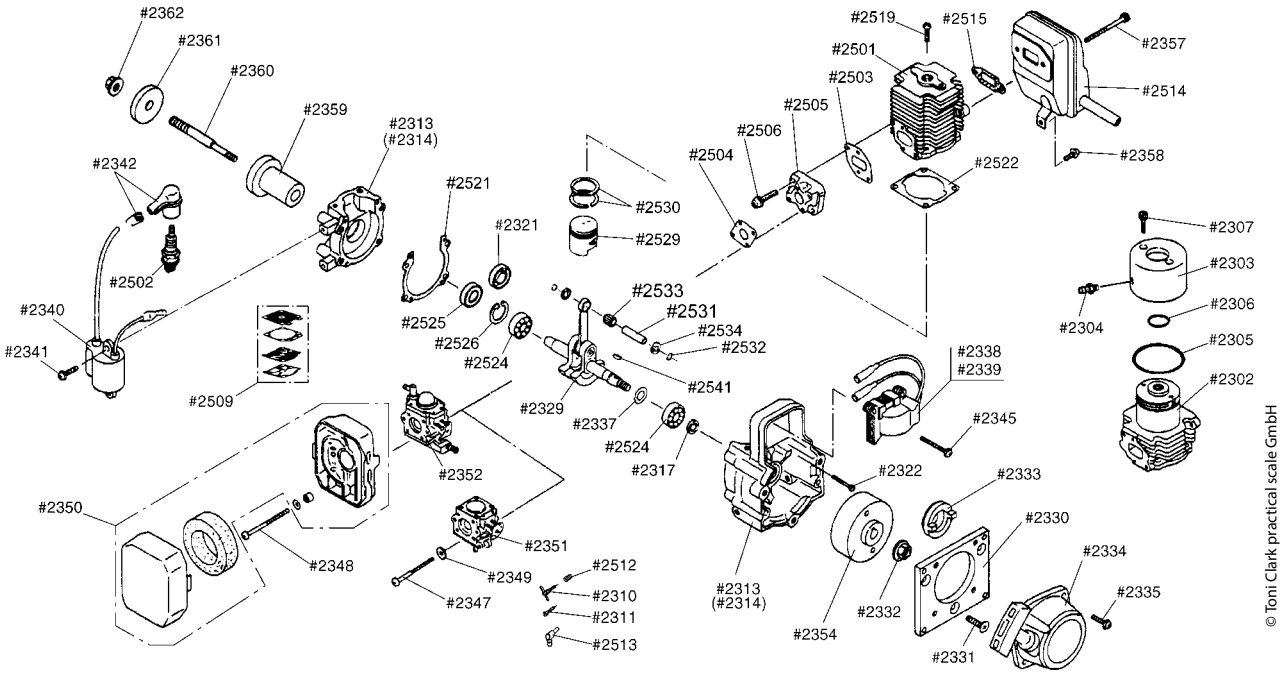
No.	Description	€	
#2502	Sparkplug NGK R BMR 7A		5,95
#2332	Flywheel nut		0,50
#2348	Carburettor screws, per 1		0,50
#2350	Airfilter with choke		19,95
#2503	Gasket insulator- cylinder		1,75
#2504	Gasket carburettor- insulator		1,75
#2505	Insulator block		7,95
#2506	Insulator block screw, per 1		0,30
#2509	Diaphragm set		14,95
#2510	High speed needle		7,95
#2511	Low speed needle		7,95
#2512	Jet needle spring		1,95
#2513	Fuel nipple		4,70
#2514	Silencer		23,95
#2515	Exhaust gasket		1,75
#2517	Exhaust studs, pair		1,95
#2518	Safety nuts, pair		1,50
#2519	Cylinder socket screw, per 1		0,75
#2521	Crankcase gasket		1,95
#2522	Cylinder gasket		1,95
#2524	Crankshaft ballbearing, per 1		6,95
#2526	C-clip		0,90
#2527	Rear crankshaft seal		3,65
#2531	Gudgeon pin		3,55
#2532	Gudgeon pin clips, pair		0,95
#2533	Small end bearing		6,95
#2534	Spacer washers for small end bearing, pair		2,95

No.	Description	€	
#2541	Woodruff key		0,95
#2546	Sparkplug cap with spring		3,45
#2547	Coil screw, pair		0,50
#2702	Cylinder G2D96 D (Zenoah 97)		59,95
#2707	Carburettor with primer pump G2D96-D		67,50
#2728	Crankshaft		79,90
#2729	Piston G2D96 D (Zenoah 97)		22,50
#2730	Piston ring G2D96 D (Zenoah 97)		6,40
#2739	Flywheel / cooling fan		49,90
#2752	Silencer guard		3,33
#2754	Ignition coil - no longer available -		
#2755	Electronic ignition module - no longer available -		
#2756	Engine kill switch		9,75
#2758	Aluminium cover for cooling fan		29,90
#2760	Sintered clutch shoes, pair		14,95
#2761	Clutch shoe hub		9,95
#2762	Shaft screw and washer for #2760, pair		7,95
#2763	Clutch shoe spring		2,95
#2764	Screw with spring washer for #2761		0,95
#2766	Die cast clutch housing		9,95
#2768	Front seal		3,65
#2771	Screw with spring washer, per 1		0,20
#2773	Screw with spring washer, per 1		0,20
#2777	Primer pump flange		5,95
#2781	Primer pump clear bubble		5,65
#2784	Primer pump body		12,95
#9501	Pullcord starter assembly		29,95

Tuning Flywheel for G2D70/G2D96-D #2740 € 46,06
Tuning Ignition Coil for G2D70/G2D96-D #2545 € 47,09

Quicker acceleration due to 40% less weight plus more power due to the altered ignition timing with the lightweight ignition coil.

Spares for the TITAN ZG23SL -SLH and -SLM

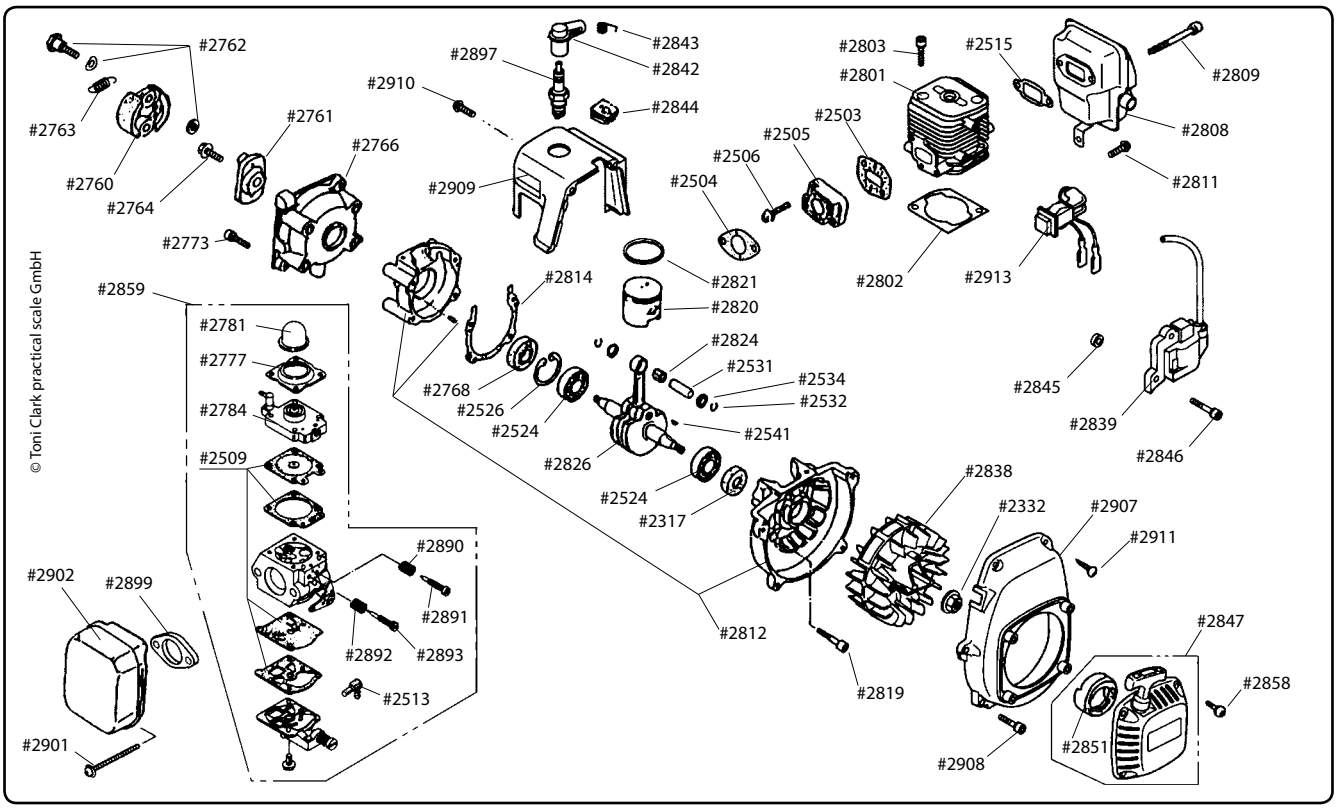


No.	SL	SLH	SLM	Description €	
#2302	-	-	1	Cylinder ZG23SLM, without w/jacket	59,90
#2303	-	-	1	Waterjacket ZG23SLM	39,90
#2304	-	-	1	Water jacket nipple ZG23SLM	1,80
#2305	-	-	1	O-ring seal 3x38, black ZG23SLM	1,15
#2306	-	-	1	O-ring seal 1,5x19,5, clear ZG23SLM	1,75
#2307	-	-	2	Waterjacket screw, per 1	0,20
#2310	1	1	1	High speed needle (with bar)	7,95
#2311	1	1	1	Low speed needle	7,95
#2313	1	1	1	Front and rear crankcase, available	79,50
				only as a pair.	
#2314	1	1	1	Front and rear crankcase, with bear-	89,50
				ings and seal fitted. Matched pairs.	
#2317	1	1	1	Rear crankshaft seal	3,65
#2321	-	-	1	Front crankshaft seal for ZG23SLM	3,65
#2322	4	4	4	Crankcase screw, per 1	0,30
#2329	1	1	1	Crankshaft with conrod	79,90
#2330	1	1	1	Aluminium motor mount	9,95
#2331	3	3	3	Countersunk screw, per 1	0,30
#2332	1	-	-	Flywheel nut for ZG 23SL	0,50
#2333	-	1	1	Crown for pullcord starter	3,75
#2334	-	1	1	Pullcord starter unit	29,95
#2335	-	4	4	Pullcord starter fixing screws, per 1	0,20
#2337	1	1	1	Shim washers, 1x 0,1/0,15 / 0,2 mm	1,50
#2338	1	-	-	Power coil (grey) for ZG23SL	69,95
#2339	-	1	1	Power coil (red) for ZG23SLH/SLM	69,95
#2340	1	1	1	Ignition coil	49,90
#2341	2	2	2	Ignition coil screw, per 1	0,20
#2342	1	1	1	Sparkplug cap with spring	3,45
#2345	2	2	2	Power coil screw, per 1	0,20
#2347	2	-	2	Carburettor screw, per 1	0,50
#2348	-	2	-	Carburettor screw ZG23SLH, per 1	0,50
#2349	2	-	2	Washer (thick), per 1	0,15
#2350	-	1	-	Airfilter with choke	19,95

No.	SL	SLH	SLM	Description €	
#2351	1	-	-	Carburettor ZG 23SL	65,90
#2352	-	1	1	Carburettor ZG 23SLH / ZG 23SLM	67,50
#2354	1	1	1	Flywheel	44,95
#2357	2	2	-	Silencer screw, per 1	0,50
#2358	1	1	-	Silencer lug screw	0,20
#2359	1	-	-	Propeller hub ZG 23SL	24,95
#2360	1	-	-	Propellershaft ZG 23SL	9,95
#2361	1	-	-	Prop washer ZG 23SL	6,95
#2362	1	-	-	Propeller nut ZG 23SL	1,30
#2501	1	1	-	Cylinder ZG 23SL and SLH	59,95
#2502	1	1	1	Sparkplug NGK R BMR 7A	5,95
#2503	1	1	1	Gasket insulator - cylinder	1,75
#2504	1	1	1	Gasket carburettor - insulator	1,75
#2505	1	1	1	Insulator block	7,95
#2506	2	2	2	Screws for insulator, per 1	0,30
#2509	1	1	1	Carburettor diaphragm set	14,95
#2512	2	2	2	Needle spring, per 1	1,95
#2513	1	1	1	Carburettor nipple	4,70
#2514	1	1	-	Silencer	23,95
#2515	1	1	1	Exhaust gasket	1,75
#2519	4	4	4	Cylinder socket screw , per 1	0,75
#2521	1	1	1	Crankcase gasket	1,95
#2522	1	1	1	Cylinder gasket	1,95
#2524	2	2	2	Open ballbearing, per 1	6,95
#2525	1	1	-	Sealed ballbearing	8,95
#2526	1	1	1	C-clip	0,90
#2529	1	1	1	Piston	22,50
#2530	1	1	1	Pistonring, pair	11,95
#2531	1	1	1	Gudgeon pin	3,55
#2532	1	1	1	Gudgeon pin clips, pair	0,95
#2533	1	1	1	Small end bearing	6,95
#2534	1	1	1	Spacer washers for #2533, pair	2,95
#2541	1	1	1	Woodruff key	0,95

We reserve the right to alter specification and prices.

Spares for the Zenoah G230RC

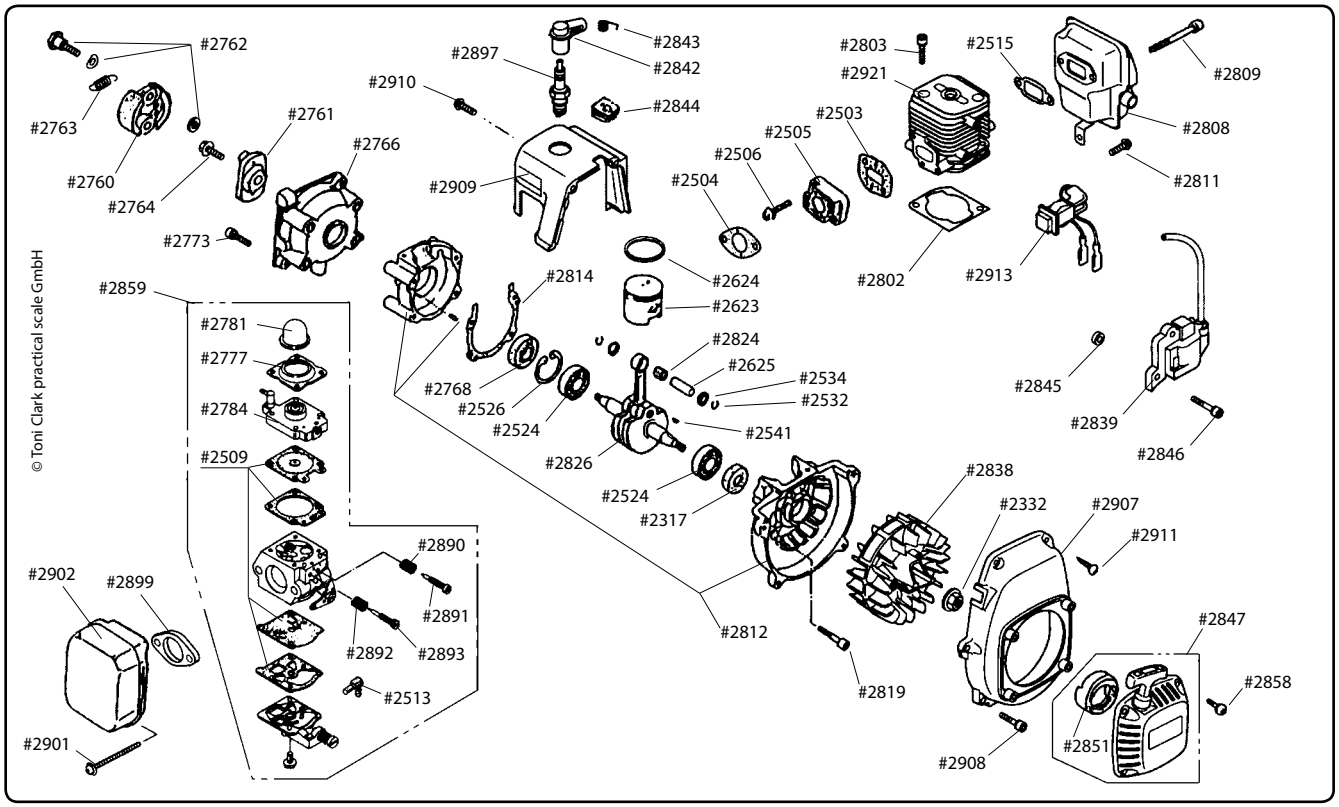


No.	Description	€	
#2317	Rear crankshaft seal		3,65
#2332	Flywheel nut		0,50
#2503	Gasket Insulator - cylinder		1,75
#2504	Gasket carburettor - Insulator		1,75
#2505	Insulator block		7,95
#2506	Screw for Insulator, per 1		0,30
#2509	Carburettor diaphragm set		14,95
#2513	Fuel nipple		4,70
#2515	Exhaust gasket		1,75
#2524	Ballbearing, per 1		6,95
#2526	C-clip		0,90
#2531	Gudgeon pin G230RC		3,55
#2532	Gudgeon pin clips, pair		0,95
#2534	Spacer washers for small end bearing, pair		2,95
#2541	Woodruff key		0,95
#2760	Sintered clutch shoes, pair		14,95
#2761	Clutch shoe hub		9,95
#2762	Shaft screw and washer, pair		7,95
#2763	Clutch shoe spring		2,95
#2764	Screw with spring washer for #2761		0,95
#2766	Die cast clutch housing		9,95
#2768	Front crankshaft seal		3,65
#2773	Screw with spring washer, per 1		0,20
#2777	Primer pump flange		5,95
#2781	Primer pump clear bubble		5,65
#2784	Primer pump body		12,95
#2801	Cylinder G230RC - no longer available -		
#2802	Cylinder gasket		2,55
#2803	Cylinder socket screw, per 1		0,75
#2808	Silencer - no longer available -		
#2809	Exhaust bolt, per 1		0,50
#2811	Silencer lug screw		0,20

No.	Description	€	
#2812	Crankcase, matched pairs		74,95
#2814	Crankcase gasket		1,95
#2819	Crankcase screw, per 1		0,30
#2820	Piston G230RC		22,50
#2821	Piston ring G230RC		6,40
#2824	Small end bearing		9,95
#2826	Crankshaft		79,90
#2838	Flywheel		39,90
#2839	Ignition module		49,90
#2842	Sparkplug cap		2,95
#2843	Spring for Sparkplug cap		0,95
#2844	Grommet		1,95
#2845	Plastic spacer, per 1		0,50
#2846	Screw with spring washer for Ignition coil		0,50
#2847	Pullcord starter assembly		29,95
#2851	Ratchet for pullcord starter		6,95
#2858	Screw with spring washer for pullcord starter		0,20
#2859	Carburettor with choke		69,50
#2890	Spring for low speed needle		1,95
#2891	Low speed needle		7,95
#2892	Spring for high speed needle		1,95
#2893	High speed needle		7,95
#2897	Sparkplug Champion RZ7C		8,45
#2899	Spacer		3,90
#2901	Carburettor screw, per 1		0,50
#2902	Aircleaner		19,90
#2907	Aluminium cover for cooling fan		39,95
#2908	Hex socket screw with spring washer		0,35
#2909	Cooling shroud		14,95
#2910	Screw with large washer		0,35
#2911	Screw		0,20
#2913	Kill switch		9,95

We reserve the right to alter specification and prices.

Spares for the Zenoah G260RC



No.	Description	€	
#2317	Rear crankshaft seal	3,65
#2332	Flywheel nut	0,50
#2503	Gasket Insulator - cylinder	1,75
#2504	Gasket carburettor - Insulator	1,75
#2505	Insulator block	7,95
#2506	Screw for Insulator, per 1	0,30
#2509	Carburettor diaphragm set	14,95
#2513	Fuel nipple	4,70
#2515	Exhaust gasket	1,75
#2524	Ballbearing, per 1	6,95
#2526	C-clip	0,90
#2532	Gudgeon pin clips, pair	0,95
#2534	Spacer washers for small end bearing, pair	2,95
#2541	Woodruff key	0,95
#2623	Piston G260RC	22,50
#2624	Piston ring G260RC	6,40
#2625	Gudgeon pin G260RC	3,95
#2760	Sintered clutch shoes, pair	14,95
#2761	Clutch shoe hub	9,95
#2762	Shaft screw and washer, pair	7,95
#2763	Clutch shoe spring	2,95
#2764	Screw with spring washer for #2761	0,95
#2766	Die cast clutch housing	9,95
#2768	Front crankshaft seal	3,65
#2773	Screw with spring washer, per 1	0,20
#2777	Primer pump flange	5,95
#2781	Primer pump clear bubble	5,65
#2784	Primer pump body	12,95
#2802	Cylinder gasket	2,55
#2803	Cylinder socket screw, per 1	0,75
#2808	Silencer	27,95
#2809	Exhaust bolt, per 1	0,50

No.	Description	€	
#2811	Silencer lug screw	0,20
#2812	Crankcase, matched pairs	74,95
#2814	Crankcase gasket	1,95
#2819	Crankcase screw, per 1	0,30
#2824	Small end bearing	6,95
#2826	Crankshaft	79,90
#2838	Flywheel	39,90
#2839	Ignition module	49,90
#2842	Sparkplug cap	2,95
#2843	Spring for Sparkplug cap	0,95
#2844	Grommet	1,95
#2845	Plastic spacer, per 1	0,50
#2846	Screw with spring washer for Ignition coil	0,50
#2847	Pullcord starter assembly	29,95
#2851	Ratchet for pullcord starter	6,95
#2858	Screw with spring washer for pullcord starter	0,20
#2859	Carburettor with choke	69,50
#2890	Spring for low speed needle	1,95
#2891	Low speed needle	7,95
#2892	Spring for high speed needle	1,95
#2893	High speed needle	7,95
#2897	Sparkplug Champion RZ7C	8,45
#2899	Spacer	3,90
#2901	Carburettor screw, per 1	0,50
#2902	Aircleaner	19,90
#2907	Aluminium cover for cooling fan	39,95
#2908	Hex socket screw with spring washer	0,35
#2909	Cooling shroud	14,95
#2910	Screw with large washer	0,35
#2911	Screw	0,20
#2913	Kill switch	9,95
#2921	Cylinder G260RC	65,90

We reserve the right to alter specification and prices.

Titan ZG 38 SC

New Carburettor with Choke

Our Titan ZG 38SC is Quality, Reliability, Precision. Since 1984 the ZG 38 and later the ZG 38S and ZG 38SC has been used very successfully by thousands of modelers for about every type of model aircraft. From the simplest of trainers to a huge four engine Hercules weighing 64 kg.

Hercules at la Ferté-Alais: Span 6m, weight 64 kg (142 lb), 4 x ZG 38S.
Convincing!

Motor mount #3890.

SPECIFICATIONS:

Capacity:	38 cc
Bore:	38 mm
Stroke:	33 mm
Power:	2,6 hp
with tuned pipe:	3,2 hp
Weight:	1800 g

(without silencer and engine mount)

Fuel: 1:50 BelRay H1R / petrol

Item-No. #3800 € 299,—

5 years guarantee!*

- CD Magneto ignition. M-shaped coil core making for easy hand starts and with automatic ignition advance.
- Three piece double counter weight crankshaft with big and small ends of the conrod fitted with caged roller bearings.
- Very thin fins for super efficient cooling.
- Pegged rings to allow maximum size of transfer passages, exhaust and inlet porting.
- The new and larger carburettor for more power and with integral choke for easier starting.

* Guarantee conditions see page 49

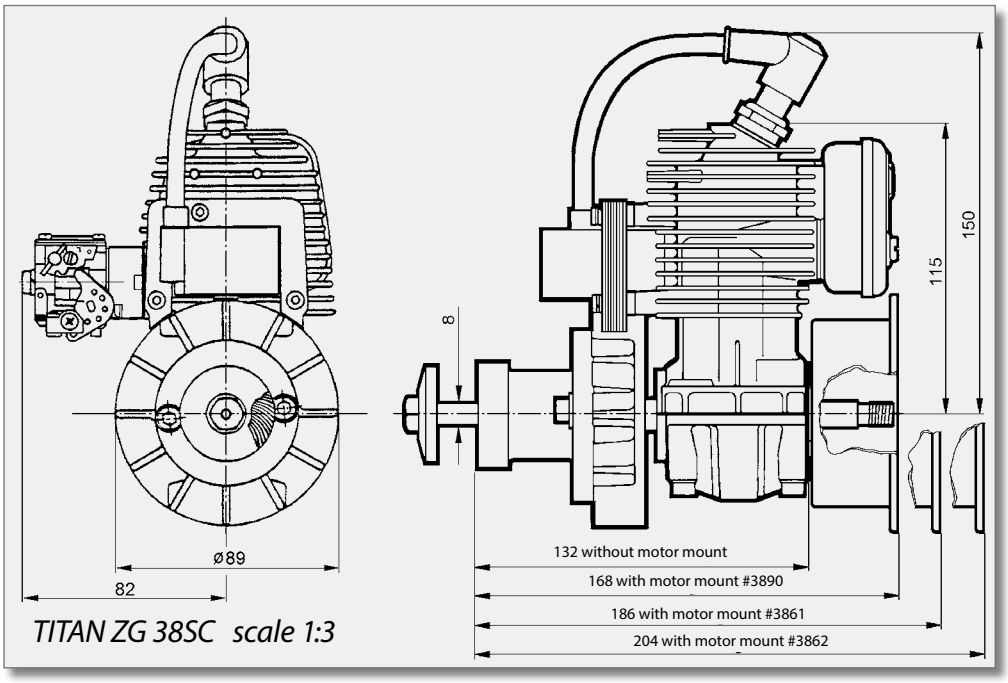
The new ZG 38SC is fitted with a Walbro Carburettor and this carburettor now has an integral choke plus the cross sectional area of the throat is increased, which raises the power. The choke is especially useful when the intake manifold #3878 is fitted to draw the air out of the fuselage. With the intake ram tube inside the fuselage and no choke in the carburettor, it would be very difficult to choke the motor for starting.

The engineers at Komatsu Zenoah reworked the ZG 38 several years ago, this entailed a completely new cylinder with very thin fins with increased surface area, this reworking brought a saving in weight of 100 g, reducing total weight to 1800 g. The intake port area was increased as well as that of the transfer passages and exhaust port giving an increase in performance.

The ZG 38SC is very noteworthy for its clean die casting and neat appearance, its reliability and power to turn large propellers with ease. The rearward exhaust porting is very useful in that it allows close fitting cowls. All threads are metric.

The three piece crankshaft has two counter weights for optimal balancing and is supported in two very robust ball races that can take the thrust from the propeller without a lot of additional friction. The gudgeon pin is hollow to reduce weight as much as possible on the reciprocating parts. The conrod is forged and hardened, has caged needle roller bearings both ends. The combustion chamber is almost hemispherical, transfer is by four Schnuerle transfer passages.

The very powerful ignition coil is fitted with a M-shaped core which means that by each turn of the flywheel the coil is charged twice, giving a very strong spark at even very low revs. There is also an automatic ignition timing advance, this coil makes for absolute ease of starting and very smoth idle.



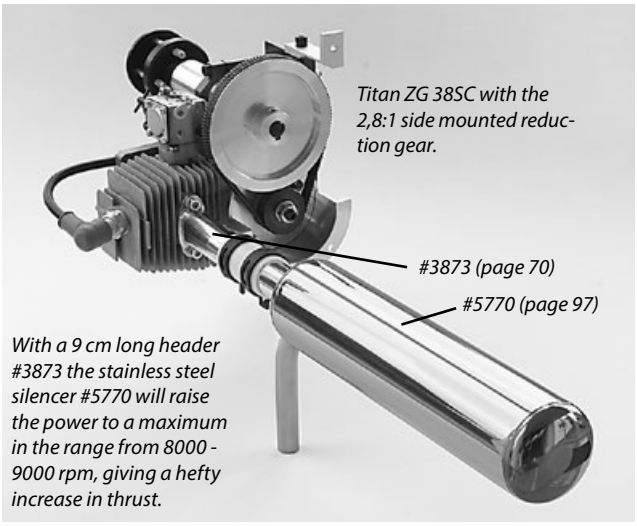
TITAN ZG 38SC scale 1:3

The ZG 38SC is happiest with large propellers. The Menz S 22x8" for large slow flying models and the 20x8", 20x9" and 20x10" for models such as our Piper. For aerobatic models the Menz S 19x10" is especially suitable.

For maximum performance, especially with aerobatic models, we recommend the 20x10", 20x11" or 20x12" Super Silence 2-blade CF propellers. You should use the 19x11" or 20x10" Super Silence 3-blade CF-propeller if your model has to be as quiet as possible.

To summarize the Titan ZG 38 is a very reliable and powerful engine and above all reasonably price. Although it is practically maintenance free it has a very long life.

TITAN ZG 38 SC ..... #3800 € 299,—



Titan ZG 38SC with the 2,8:1 side mounted reduction gear.

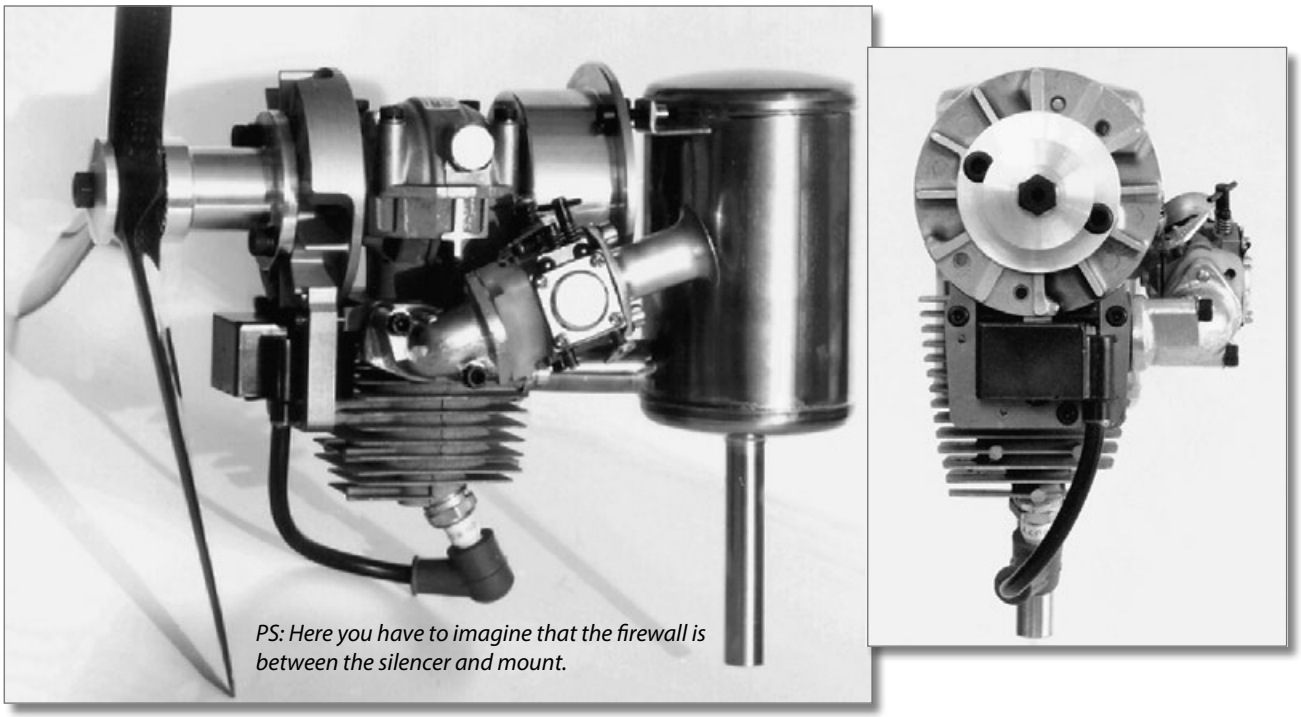
With a 9 cm long header #3873 the stainless steel silencer #5770 will raise the power to a maximum in the range from 8000 - 9000 rpm, giving a hefty increase in thrust.

Motor Mounts for TITAN ZG38/38S/38SC

Large area flange with 94 mm diameter. CNC-turned from cold drawn aluminium. Very tough and light!

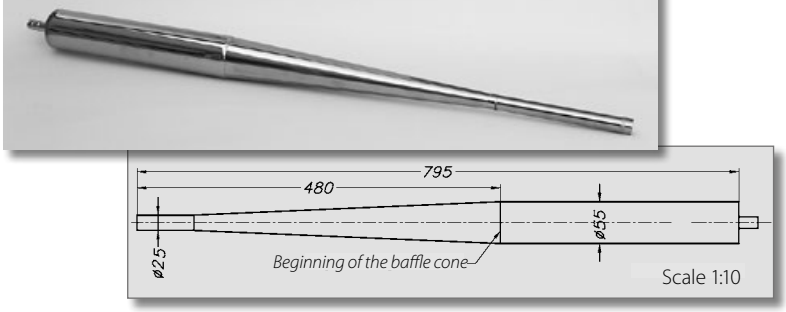
36 mm long, 110g ..... #3890 € 21,90
54 mm long, 130g ..... #3861 € 31,90
72 mm long, 170g ..... #3862 € 34,90

Accessories for all TITAN ZG 38 Versions



The TITAN ZG 38SC fitted out for lowest noise level with 19x11" Super Silence Carbon fiber 3 blade propeller, cast aluminium intake bend #3878, Intake tube #0081, aluminium motor mount #3890 and stainless steel silencer #3877. Not visible but necessary is an extra gasket #3803.

Stainless-Steel Tuned Pipe ZG 38



Made from highly polished stainless steel, Laser welded. Tuned length from exhaust to beginning of the baffle cone: 710 mm. Weight: 375g.

Stainless Steel Tuned Pipe ZG 38 ..... #3880 € 159,90

Header ZG 38

These headers are supplied in two diameters, made from light stainless steel tube with a 0,5 mm wall thickness. The 20 mm header is for the old Version of the tuned pipe #3880.

The 25 mm header is for use with the new version of the tuned pipe and the high performance silencer #5770 (page 99). The last combination lends itself perfectly for our Sopwith Pup and Big Tiger. This silencer increases the power almost to the level of the tuned pipe but with a much shorter overall length. The best header length for the reduction gear is 9 cm.

Header for the ZG 38, 20 mm diameter .....#3874 € 25,95

Header for the ZG 38, 25 mm diameter .....#3873 € 25,95

Carb. Intake Bend

Cast aluminium. With this bend fitted, the intake air can be drawn from the fuselage, effectively silencing the intake noise. The carburettor can be hooked up direct from the rear. The TITAN ZG 38SC runs really well with this bend, it also markedly reduces the fuel consumption.

An extra gasket #3803 will be needed and it is strongly recommended that the intake tube be fitted.

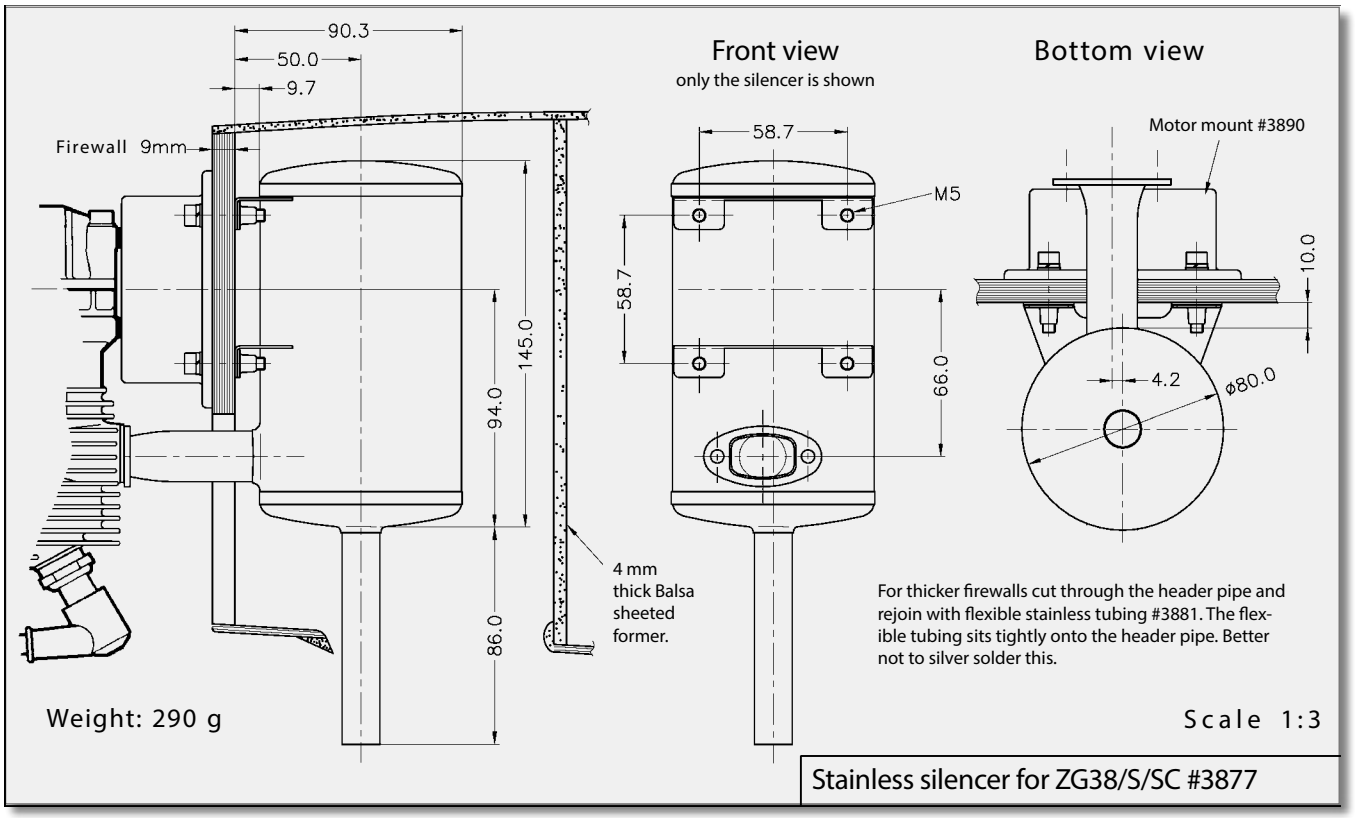
Carburettor Intake Bend ZG38 #3878 € 39,95

Intake Tube

This bell mouthed aluminium tube is permanently fixed into the Tufnol flange with Epoxy, it can be reduced in length should this be necessary. This intake tube raises the power output and at the same time reduces fuel consumption in our preferred rpm range. The acceleration is also improved.

Intake Tube with Flange, Set #0081 € 10,90

Stainless Steel Silencer for the ZG 38



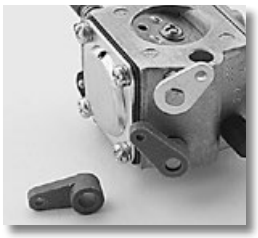
This three chamber silencer for the Titan ZG38 is fixed behind the firewall with the four motor mount fixing screws. This silencer will fit practically any model that can be fitted with the ZG 38. This type of fixing of the silencer is not only very simple because no extra parts are required to fit the silencer, but it has the added advantage that the silencer and engine are one integral unit, which prevents vibration induced failure to the silencer.

There is seldom enough room under the cowl with a ZG38 for a large enough and thereby effective silencer. The best answer is to fit the tank at the CG position where it belongs, then use the free space behind the firewall for the silencer. With the ZG 38 this method is ideal due to rear exhaust outlet. To obtain sufficient cooling, cut a hole in the firewall the same size as the cylinder and right up to the motor mount. Seal off the air outlet at rear of motor cowl and add ducting between the cowl front and firewall so that all air coming into the cowl is forced to go through the cylinder fins and out over the silencer.

This system of cooling will ensure that the hot rear side of the engine will also be cooled adequately, preventing any distortion and subsequent loss of power. This is a very serious problem with many large volume silencer bolted directly onto the cylinder preventing this essential all round cooling. The silencer compartment must be shut off from the fuselage with 4 mm thick Balsa sheet. Light Balsa wood has excellent insulating properties as well as being surprisingly heat resistant. It is totally unnecessary to cover the Balsa with Aluminium foil or similar. The cooling air exit with the minimum size of 30 mm x 120 mm is placed immediately in front of the Balsa dividing wall in the floor. To increase the suction effect glue a small triangular strip on the front outside edge of the opening.

Stainless silencer for ZG 38 #3877 € 139,90
Complete with screws and exhaust gasket..

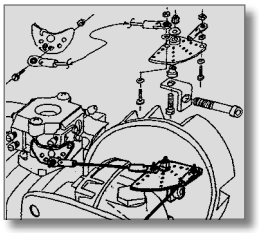
Tufnol-Throttle arm d=3,9mm



This CNC-milled throttle arm fits the throttle shaft from the ZG 20 to ZG 38. It is glued with Araldite 2011 (UHU PLUS Endfest 300) to end of the throttle shaft, considerably simplifying the throttle hook up.

Throttle Arm ZG 38SC ..... #3879 € 1,15

Throttle Linkage for the older ZG 38 with the Carburettor without Choke.



Comprises three ball joints, one bellcrank, angled bracket, screwed rod and screws. Makes for a compact and a play free coupling to the throttle arm from the rear. The bellcrank with the angled bracket is fixed onto the engines crankcase. With ZG 38SC the carburettor is mounted so that a Bowden cable can be directly fixed to the throttle lever.

Throttle linkage ZG 38 ..... #3895 € 6,95

See end of catalogue for further petrol engine accessories.

REDUCTION GEAR for the TITAN ZG38

We make the reduction gear in two versions, side mounted and inline. The side mounted gearing has the drive shaft running alongside the carburettor and is for ring cowls, such as our Sopwith Pup and horizontally opposed twins. The inline version has the drive shaft over the crankcase, this is for models such as the Tiger Moth. The distance between the drive and crankshaft is 70 mm center to center. The length of the motor fitted with reduction gear is the same as the standard motor with our standard motor mount. A TITAN ZG 38SC with the 2,8:1 reduction gear weighs 2700 grams. Our reduction gearing uses two miniature Polyflex vee belts, these belts have been developed by the American company Gates and they are the best belts available.

These Gates Polyflex belts are completely different in style and composition to all existing types of Vee belts, they are as revolutionary as the original vee belts were. These Polyflex belts are more flexible, smaller, thinner and in spite of this can transfer more power as well as requiring a lot less space.

This description you will find in the catalogue from Gates who were the company that invented the Vee belt in 1917.

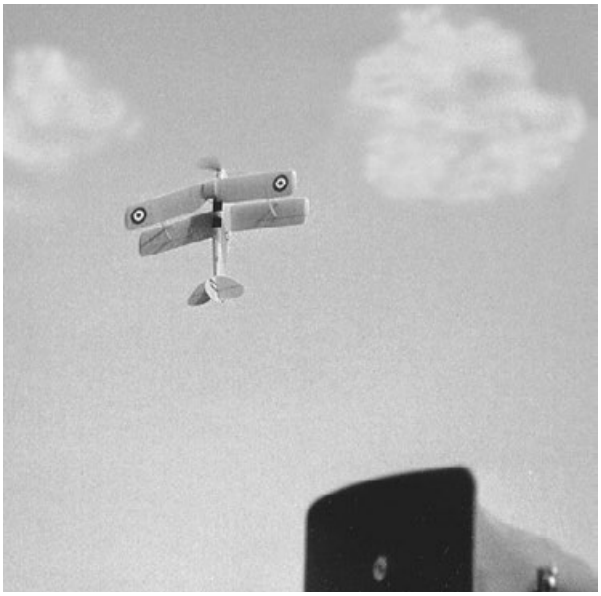
The life of these Polyflex belts is unusually long, we have had in our Tiger Moth a 2,8:1 gear that has been flown regularly most weekends during the summer and it was six months before the belts needed replacing. We often hear from our customers who have been flying for several years with the original set of belts. Because we fit two belts it is highly unlikely that the belts fail simultaneously. When a belt fails one can carry on flying without noticing anything until the next start. With only one belt it is nigh impossible due to slippage to start the engine, but a pair of new belts are easy and quick to refit.

The Titan ZG 38SC with tuned pipe turns the 32x18" propeller 3,000 rpm, tick over is 500 rpm. With our stainless steel silencer #3877 you will get around 2700 rpm.

We developed the reduction gear for our Sopwith Pup so as to be able to fly a model with scale size propeller. But to test the gearing we first put this into our Tiger Moth which weighed 14 kilos. If I try to tell you the possibilities that our Tiger possess with such a power unit it will be impossible to believe unless you have seen it yourself. Many who have seen our Tiger for the first time with the reduction gear installed have all said the same, they would have never believed it unless they had seen it for themselves. For take off, full up and full throttle, take off run is about 5 meters, I wait until I can see the full planform of the Tiger and the I let off the elevator, the Tiger will continue to climb vertically, with the speed of about that of a hot air balloon. When the Tiger has reached about 30 meters and hanging on the propeller, due to the torque she starts to turn slowly and like the hot air balloon is blown along by the wind.

In level flight the Tiger reaches a considerable speed and sounds exactly like the newly restored Me109 with the original Daimler Benz engine or pull the nose up and you can have a fantastic wing over. As she goes down with motor cut right back, the large propeller acts like an airbrake and slows the model right down.

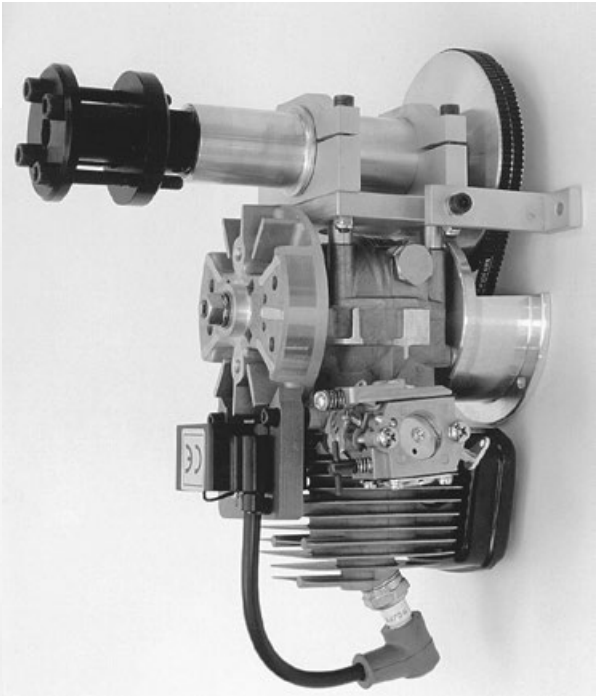
But the most impressive is the sound. The propeller rpm of 3,000 is the same as for full size, and this you can clearly hear. Flying the Tiger level over the landing strip most people would be easily convinced that it was a full-size aircraft they heard. At 1000 rpm the Tiger Moth performs as the full-size, but it is so quiet, you have to listen very carefully.



The well known full size aerobatic pilot Wolfgang Dallach asked for a „short" try at Harsewinkel the other year, after twenty minutes and a perfect landing a totally enthused Wolfgang said its a straight up Moth.

Our reduction gear is complete and factory assembled, ready to fit onto your engine. If you wish you can send us your motor and we will fit the gear unit to

the engine for you, adjust the belt tension and return it ready to install.



Reduction Gear, in line..... #3428 € 329,90
2,8:1, complete with motor mount.

Reduction Gear, side mounted .... #3458 € 329,90
2,8:1, complete with motor mount.

Fitting gear unit to motor..... #0440 € 59,90

Spare belts 5M 2,8:1 pair..... #0489 € 34,95

Propellershaft with keys..... #0410 € 27,95

Detlef Sewing's Curtis Jenny, wing span 5,3 m, weight 18,9 kg. ZG 38SC with reduction gear.
A dream to fly! And more amazing it is most realistic at half throttle!

Ballraces for shaft, 1 piece..... #0416 € 9,95

Propeller hub..... #0414 € 33,90

Propeller insert..... #0419 € 21,90

Shaft unit..... #0415 € 112,00
consists of the eccentric housing with ballraces, shaft and propeller shaft assembled.

Small pulley wheel ..... #0435 € 29,90
for 5M belts, fits both versions.

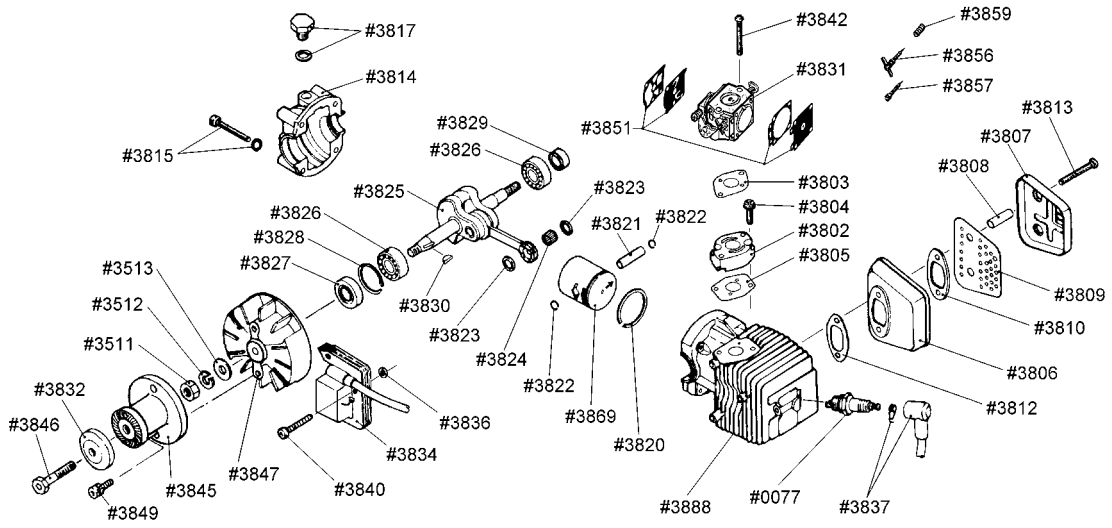
Brass split cone..... #0433 € 10,50
for fixing small pulley wheel to crankshaft.

Large pulley wheel..... #0469 € 53,90
97 mm dia. for 2,8:1 gearing for 5M belts. Fits both Versions.

Base plates with clamping rings:

for the side mounted gear..... #0417 € 87,50
for the inline gear..... #0418 € 87,50

Spares for the TITAN ZG38, ZG38S and ZG38SC



No.	Description	€
#0077	Sparkplug RCJ-7Y	4,95
#3511	Flywheel nut	0,50
#3512	Spring washer	0,20
#3513	Washer	0,15
#3516	LH nut for rear crankshaft	0,95
#3802	Insulator block	7,40
#3803	Gasket carburettor / insulator	1,75
#3804	Insulator screws, pair	0,50
#3805	Gasket cylinder / insulator	1,75
#3806	Silencer body	5,95
#3807	Silencer cover	5,95
#3808	Spacers, pair	1,40
#3809	Baffle plate	1,95
#3810	Stiffening flange	2,25
#3812	Exhaust gasket	1,95
#3813	Silencer screws, pair	1,40
#3814	Crankcase	17,95
#3815	Crankcase screws, 4 pieces	0,95
#3817	Sumpscrew with gasket	1,50
#3820	Piston ring	5,95
#3821	Gudgeon pin	3,95
#3822	Gudgeon pin clips	0,95
#3823	Spacer washers, pair	2,95
#3824	Small end bearing	6,95
#3825	Crankshaft with conrod	99,95
#3826	Crankshaft ballrace, per 1	5,50

No.	Description	€
#3827	Front seal, (large)	3,65
#3828	C-ring	0,90
#3829	Rear seal, (small)	3,65
#3830	Woodruff key	0,95
#3831	Choke carburettor	69,95
#3832	Prop washer	6,95
#3834	Ignition module	62,90
#3836	Plastic standoff rings, 3 pieces	1,50
#3837	Plug cap with spring	3,45
#3838	HT-cable	0,95
#3840	Ignition coil screws, 3 pieces	1,50
#3842	Carburetter screws, pair	0,95
#3844	Mount screws M5x16, 4 pieces	0,50
#3845	Propeller hub	27,95
#3846	Propeller screw, M8x1,25	3,95
#3847	Flywheel (Magneto)	44,95
#3849	Capscrews M6x20, pair	0,95
#3851	Diaphragm set ZG 38/38S/38SC	14,95
#3852	High speed needle ZG 38/38S	7,95
#3853	Low speed needle ZG 38/38S	7,95
#3854	Carburettor nipple	4,70
#3856	High speed needle ZG 38SC	7,95
#3857	Low speed needle ZG 38SC	7,95
#3859	Needle spring	1,95
#3869	Piston	25,95
#3888	Cylinder ZG 38S and ZG 38SC	89,95

Complete silencer,..... #3870 € 16,95
minus gasket.

Cylinder set ZG38S/38SC ..... #3868 € 117,50
Comprises cylinder, piston, piston ring, gudgeon pin and gudgeon pin clips.

We reserve the right to alter specification and prices.

HT-Lead Screening - for and against.

If you use a 2.4 Ghz remote control, HT-Lead screening is not necessary! Interferences of the ignition have a much lower frequency and will not jam your 2.4 Ghz remote control.

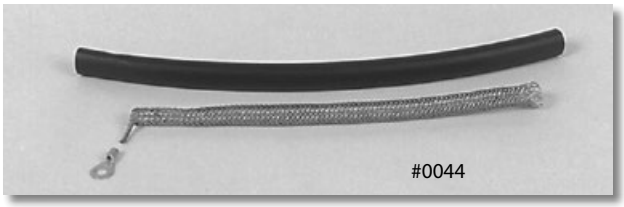
With exception to the ZG 80B, all Titan engines are not supplied with screened HT cables, but are always supplied with a resistor plug. Interference from the magneto ignition is a lot less than with battery electronic units, therefore these resistor plugs are usually sufficient to dampen down any interference, especially for quick acting PCM radio. In this case it is an advantage not to screen the HT cable. Why this is will be explained in the following text. Screening the HT cable for most PPM radios is not strictly necessary, but if done correctly will certainly do no harm.

If you use a PCM radio then you must program the fail safe modus so that in case of interference the engine will be throttled down to a safe tickover. When you can programme the reaction time then set this for 0,5 of a second. It can be said that the fail safe of the PCM radio coupled to the slight interference of the magneto ignition is a reliable fail safe and a real safety factor. First, the interference from the magneto is a lot less with the engine idling than at full throttle. Second, with the engine at idle the time between each spark allows a fast acting PCM radio to receive a complete information cycle. It follows that with the engine at idle, full range will be restored. In the event of other interference, with the receiver or transmitter losing range due to component deterioration, or a unsuitably laid out receiver aerial, the fail safe switches in, the engine is throttled back and the range then immediately increases. You can for a moment control the model. If you leave the throttle stick at full power, the RPM will begin to increase again causing the fail safe sequence to start from the beginning again, as long as the interference continues or you close the throttle yourself. With a little luck you can then land the model and find the cause of the trouble.
The simplest method to screen the ignition is with the fitting of a Bosch metal plug cap. This Bosch plug cap has proved very reliable with helicopters, but the HT lead should be as short as possible. In any case when fitting this metal plug cap the last 10 mm must be cut off from HT lead, because after removing the rubber cap there is a small hole in the HT lead made by the spring clip. The HT will use this hole to short over to the screening when the engine is at full throttle. One can compare the results to the reserve petrol can, only here this reserve is automatically poured into the tank as required. It is clear that the HT cable must not be screened. When the HT cable is screened and the engine is throttled there is no increase in range, the model comes down with the engine throttled but out of control. Rather similar to tipping the contents of the reserve can into the tank at the beginning of the journey to be able to drive further. But in case you should get into a traffic jam and the fuel consumption is thereby increased, in spite of the extra petrol at the start the tank is empty and of course the reserve is also empty.

Of course there exists a difference between various PCM radio gear in that the time it takes to transmit each cycle of information from the first to the ninth servo and then the control number, in some cases it can take so long that one cycle cannot fit between two sparks with the engine at tickover. Should you use such a slow PCM radio then you should follow the recommendation from the company Multiplex by screening the HT cable and fitting a Bosch metal plug cap. Naturally this screening obviates the early warning system.
Of course this early warning possibility does not exist with fully screened HT lead; when for some other reason the range is reduced from a kilometer to lets say 300 meters, you have not had the warning at 200 meters allowing you to turn the model back before the absolute limit of range is reached. Fail-safe is switched in at 300 meters throttling the motor, but this now does not help, due to the screening the range has not been reduced, it therefore follows that the range cannot be increased and Fail-safe is fully locked in, when you have programmed the throttle at 25% power the model crashes with plenty of power on.

By the way it does not help to try to switch out the fail safe, with PCM radio it is virtually impossible to switch out the fail safe, instead you have the possibility to say which position the servos shall go to in the event of fail safe due to the receiver not having a reliable signal from the transmitter. Fail Safe out simply means all servos stay in the last position before the interference started, and they stay at this position until the receiver has the signal once more. Fail Safe on means you can chose which position you wish the servos to run to after a definite time usually from 0,25 to 1 second when there is no decent signal received. You can see that difference is only that what happens after a predetermined time. But should the fail safe only operate for a tenth of second there is no difference. But in both cases you immediately gain control when for example the fail safe is only for two seconds. But the chances for regaining control are better when you have the fail safe switched in, also you are aware earlier that something is not right. Imagine, because of a defective component, or another pilot has switched on his radio which is on the same channel as yours, by take off with fail safe; the model runs full power direction bystanders, you will be more than thankful when the engine is immediately throttled, or.....!

Screening Set for the HT-cable .....#0044 € 5,90
Comprises a piece of heat shrink tube, copper screening flex with a cable crimp tab and detailed step by step instructions.



Screening Service:

You must be aware that poorly fitted screening is a greater risk than none. When your radio requires that you screen your HT lead and you wish to avoid any mistakes, send your ignition coil, or buying a new engine order the screening to be factory fitted.

HT Cable Screening .....#0047 € 13,90

Titan ZG 45 SL

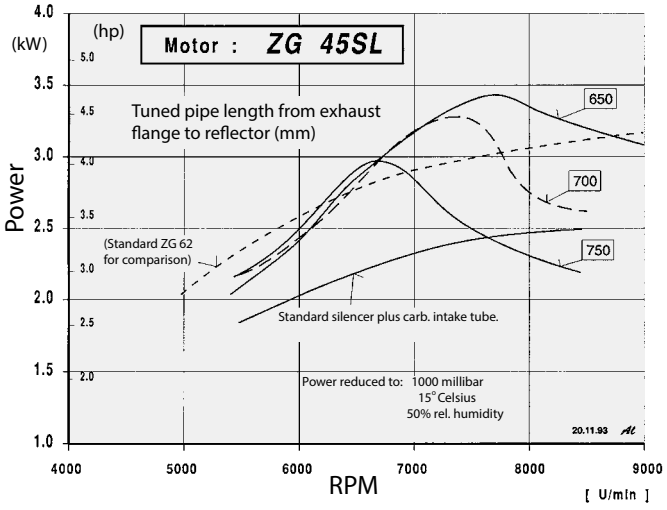
Specifications:

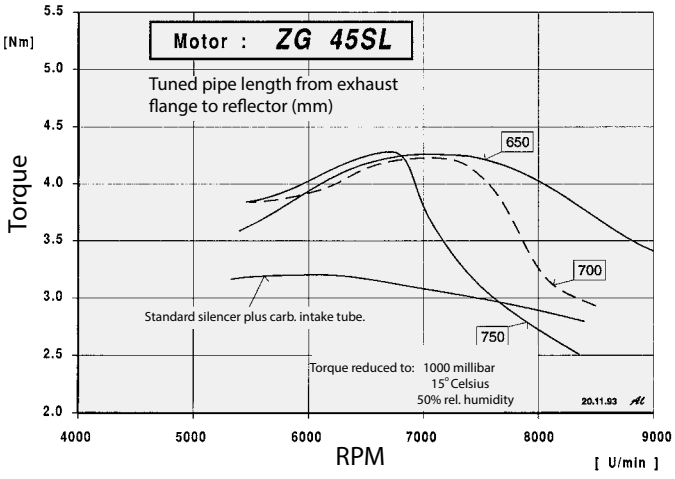
Capacity: 45 cc
Bore: 43 mm
Stroke: 31 mm
Power:
with tuned pipe: 4.6 hp
without silencer: 3.9 hp
standard silencer: 3.5 hp
Weight: 1850 g
without silencer.
Fuel:
Leadfree normal petrol
with BelRay H1R 50:1

The Titan ZG 45SL combines all the advantages of our ZG 62SL into a compact, low vibration powerplant for your not too big models.

5 years guarantee!*

Titan ZG 45SL #4500 € 359,—
40 mm Prop Hub is now Standard.





These charts were produced from tests carried out by Dietrich Altenkirch for the magazine „model" in 1994. These curves show that the ZG 45SL's power, when fitted with a tuned pipe, exceeds the power of a ZG 62S fitted with the standard silencer.

* Guarantee conditions see page 49

The popularity of the Titan ZG 62 has remained constant over the years. No other model aircraft petrol-engine has come anywhere near the sales volume of this superb engine. Many modelers do not want such large models, but they wish to have a slightly smaller engine with the same reliable qualities of the Titan ZG 62.

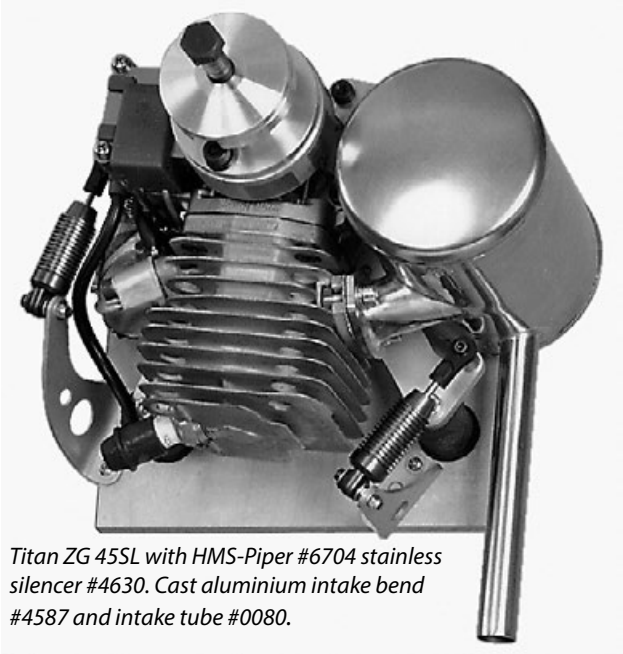
- For aerobatic models of about 2 m span, many scale and fun fly models, the ZG 45 is the answer. It has not only the outward appearances of the Titan ZG 62.
  The ignition, flywheel and propeller hub is identical.
- The crankshaft is also 15 mm diameter which is for this size of engine very robust.
  Exhaust and inlet is angled to stroke for optimum gas flow. The very light aluminium crankcase was specially developed for us by Zenoah.
- The ZG 45SL is 200 g lighter in weight than the ZG 62SL and has markedly smaller dimensions. The smaller and of course lighter piston coupled to the same size flywheel makes for a proportionally smoother running engine.

Recommended Propellers:

The Super Silence Carbon Propellers have proved to be especially efficient and quiet. For the ZG 45SL you can choose from the Super Silence 2-blade propellers 21x11", 21x12", 21x12"Pro, 22x8"Pro and 22x10".

If you prefer to use wood propellers, the Menz-S propellers are the best choice. Good all round performance is achieved with the 20x10" Menz-S. Our Piper flies also very well with the 21x10". For maximum thrust the 21x8" Menz S is perfect, but rather noisy.

The lowest possible noise level in flight is obtained by using our Hydro-Mount-System, with the stainless silencer, carburettor intake air drawn from the fuselage



Titan ZG 45SL with HMS-Piper #6704 stainless silencer #4630. Cast aluminium intake bend #4587 and intake tube #0080.

and the Super Silence 3-blade propellers 19x11", 20x10", 20x11" or 20x12".

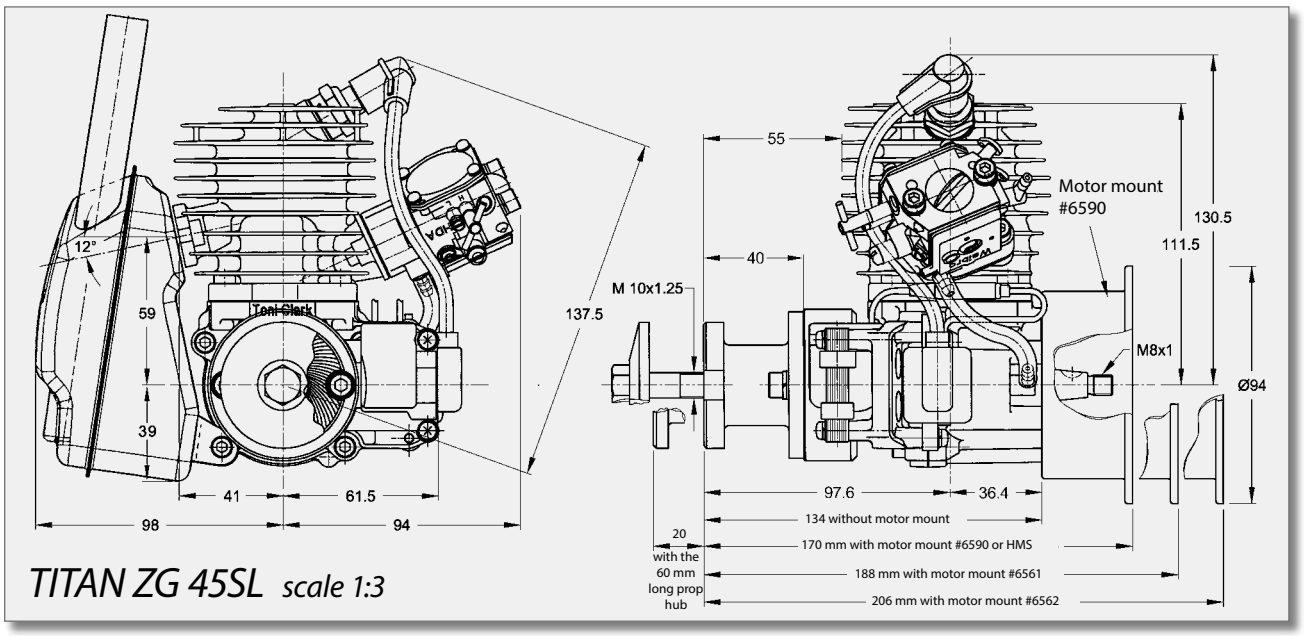
TITAN ZG 45SL ..... #4500 € 359,—
Complete with silencer, fitted with 40 mm prop hub.

Extra for 60mm prop hub ... #6560 € 24,95
Instead of the 40 mm standard hub. Only possible when purchasing a new engine.

60 mm propeller hub ..... #6563 € 37,95

Motor Mounts for ZG 45 and ZG 62:

36 mm long ..... #6590 € 21,90
54 mm long ..... #6561 € 31,90
72 mm long ..... #6562 € 34,90
CNC-turned from cold drawn Aluminium bar stock, large bearing surface, weight 110 g / 130 g / 170 g.



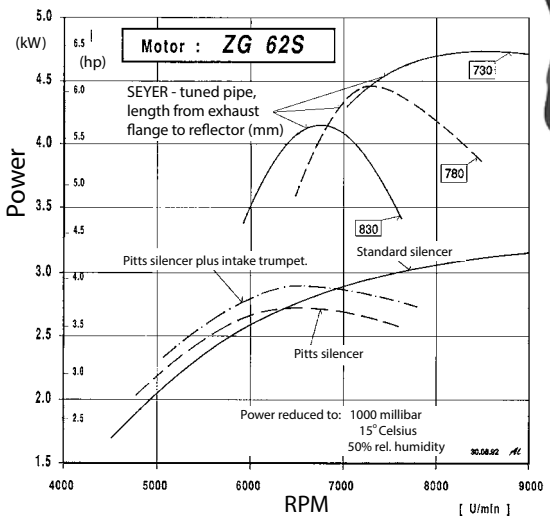
TITAN ZG 45SL scale 1:3

Titan ZG 62 SL

"... Due to it's legendary reliability and power, the most popular model aircraft engine worldwide!"

Specifications:

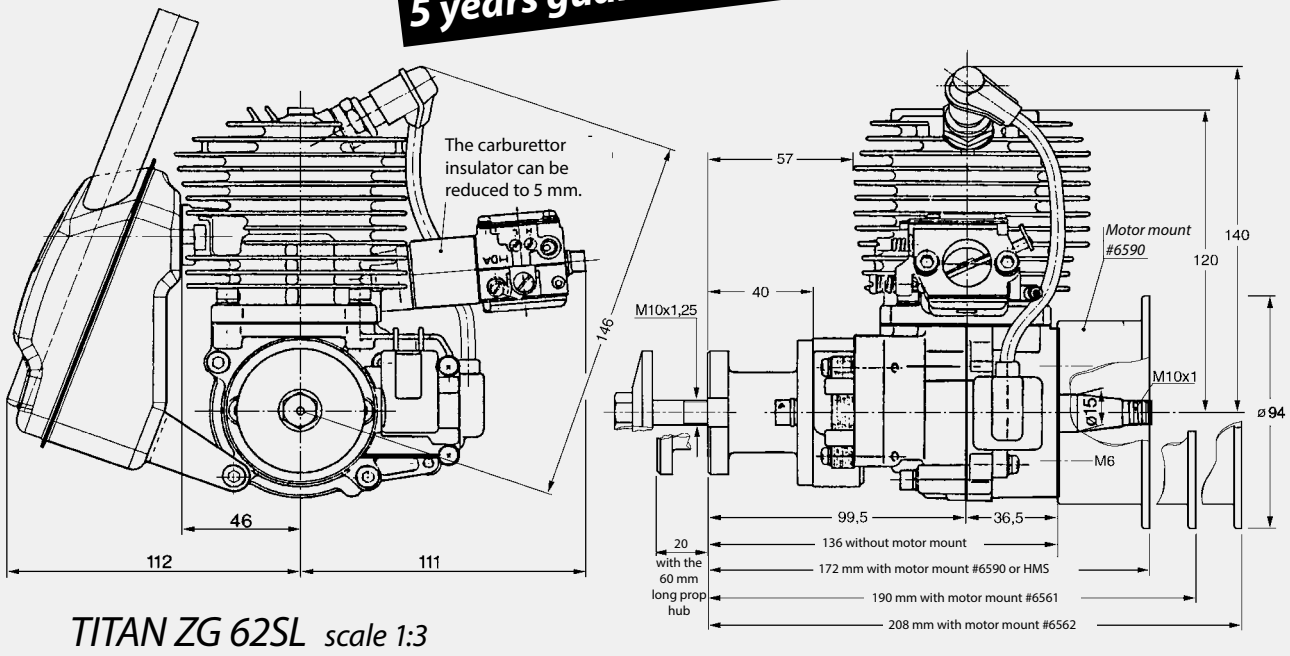
Capacity: 62 cc
Bore: 47,5 mm
Stroke: 35 mm
Power:
with tuned pipe: 6,6 hp
without silencer: 5,0 hp
Standard silencer: 4,3 hp
Weight: 2040 g
without silencer
Fuel:
Petrol + BelRay H1R 50:1



Titan ZG 62SL ... #6500 € 419,—

40 mm Prop Hub is now Standard.

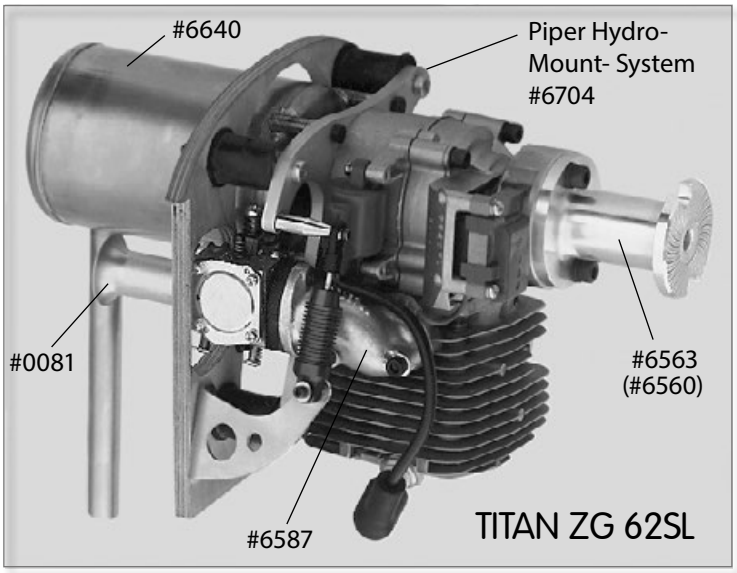
5 years guarantee!*



TITAN ZG 62SL scale 1:3

* Guarantee conditions see page 49

The Titan ZG 62 was first produced in 1985 being designed so as to fit into a chain saw and at the same time being able to be used for model purposes without modification. The sales volume with the ZG 38 for models made this possible. In 1990 Komatsu reworked the cylinder specially for model aircraft purposes this S cylinder had the transfer passages altered as well as the combustion chamber. This resulted in an increase of 200 rpm in the 6,500 range. Fit a tuned pipe and the rpm is considerably increased, giving a power of 6,6 hp at 8,400 rpm. The newest Titan, the 62SL, has a die-cast aluminium crankcase weighing 50 grams less than the previous sand cast version.



Many people still believe that chain saw engines are too heavy for models, that these motors run too roughly. This is to ignore the fact that such firms as Zenoah have been very active to stay competitive in a very hard market. These chain saw companies, to remain competitive, must continually invest very large sums of money in research and development to improve their engines, making them as light as possible, smooth running and powerful. The cost for such development requires huge sums of money, these large development costs are only possible due to the high volume of sales of chain saws.

Model engine manufacturers cannot sustain such enormous development costs. Another very important point is, the chain saw customer has exactly the same requirements of his chain saw as does the modeler of his model airplane engine. These are: light weight, minimum of vibration, power, reliability, minimum maintenance and more recently low noise levels. With the Titan ZG 62SL these requirements are arrived at by an unusual route.

The 62 has a very short stroke, this has two advantages, first the motor is smaller thereby, and second the piston acceleration is not so high reducing vibration. The latest die casting technology are employed to produce very wide but very thin cooling fins and the flywheel is unbelievably small and with the very light electronic ignition system, the ZG 62 is with a wide margin the lightest petrol motor in it's class.

The crankshaft is a hefty piece of forged steel, induction hardened, with a diameter of 15 mm and supported in two large ballraces, the conrod is a forged unit also induction hardened with caged roller bearings both ends, the gudgeon pin is hollow. There are two thin pegged rings. The ignition unit consists of two separate coils, both fixed to the side of the motor causing no interference with the cooling air. The standard Walbro pump carburettor is fitted with a choke.

On the ZG 62, the 24x10" Super Silence 2-blade CF-propeller has proved to give the highest performance of all propellers, either CF or wood. With the standard silencer it produces a thrust of 12,5 kilos at 6,400 rpm. The 23x12" Super Silence propeller is ideal for faster flight speeds.

From the excellent Menz-S beech wood propellers the 22x10" and 22x12" are recommended, the Menz-S 24x10 can be used for example on our Big Tiger Moth.

If you will, or must have a quieter model, it is recommended that you use the intake bend #6578 to draw the intake air out of the fuselage. The intake noise is in fact louder than the standard silencer noise. The lengthened intake tract with the bend allows the ZG 62 to run with Menz-S 24x12" and 26x8" propellers. Of course being so proped, the engine will not reach the maximum possible power, but due to the ample dimensions and the thin clean construction of the cooling fins, the ZG 62 can be run at lower rpm with large diameter propellers without difficulty.

The lowest possible noise level in flight with lots of power is obtained with our Hydro-Mount-System, coupled with the Stainless steel silencer, sucking the carburettor intake air out of the fuselage and fitting a Super Silence 21x12" Carbon 3-blade propeller.

TITAN ZG 62SL ..... #6500 € 419,—
Complete with silencer, fitted with 40 mm prop hub.

Extra for 60mm prop hub ... #6560 € 24,95
Instead of the 40 mm standard hub. Only possible when purchasing a new engine.

60 mm propeller hub ..... #6563 € 37,95

Motor Mounts for ZG 45 and ZG 62:
36 mm long ..... #6590 € 21,90
54 mm long ..... #6561 € 31,90
72 mm long ..... #6562 € 34,90
CNC-turned from cold drawn Aluminium bar stock, large bearing surface, weight 110 g / 130 g / 170 g.

Titan ZG 45 PCI-HV

Titan ZG 45PCI-HV .. #4594 € 449,—

Weight with ignition: 1690 g *

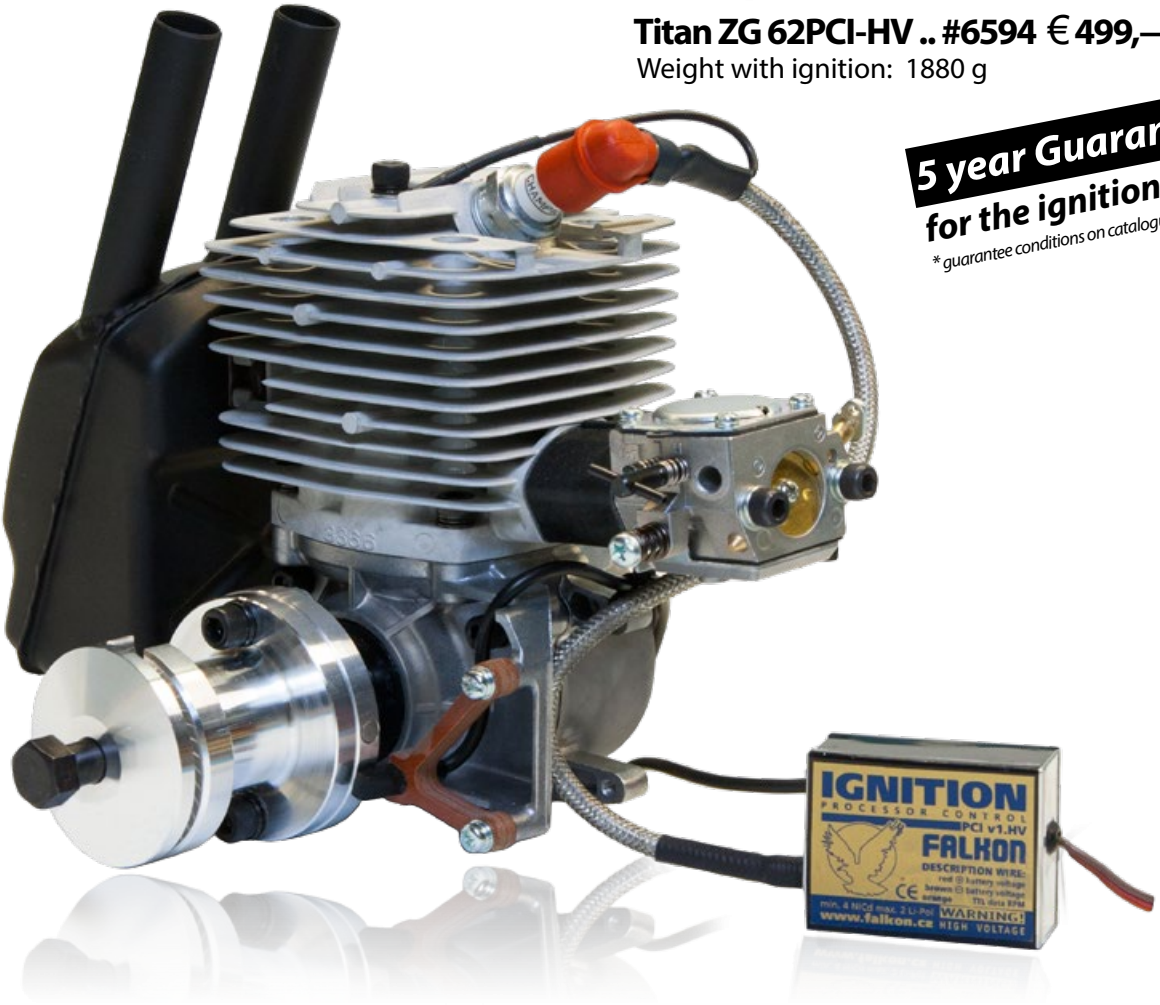
Titan ZG 62 PCI-HV

Titan ZG 62PCI-HV .. #6594 € 499,—

Weight with ignition: 1880 g

5 year Guarantee* for the ignition also!

*guarantee conditions on catalogue page 47.



FALKON PCI-HV1.3/2.3

Microprocessor controlled Battery Ignition

The Falcon PCI-HV 1.3 and PCI-HV 2.3 are microprocessor controlled battery ignition systems, professionally developed to the highest possible standard of quality. These two units are electronically as robust as the legendary Zenoah magneto ignition. If you do not exceed the maximum voltage supply the only possible damage you can possibly experience is mechanical.

The Hall sensor triggers the spark even by a very slow turning of the propeller. The engine is thereby child's play to get started.

The ignition advance timing curve is programmed in a memory chip. This has enabled us to choose the optimal timing for the Titan ZG engines from tickover to full throttle. This timing advance curve is different from previous Falkon and other battery ignition systems. The result of our work on this advance retard curve is a very stable and low speed tickover, especially useful on our Hydro- Mount-System.

The dubious advertising claims to increase power with conversion to battery systems is best ignored, a battery ignition alone cannot increase the power. This fictional power increase is possibly due to slipshod methods of measuring the rpm and small differences between engines of the same type. The magnetic induction force induced drag of the magneto ignition is very small, at 6,000 rpm it causes the minute loss of only 15 rpm. The magneto ignition has the ignition timing advance set as early as possible. To increase this advance would only increase the cylinder temperature, obviously having a negative affect on the power.

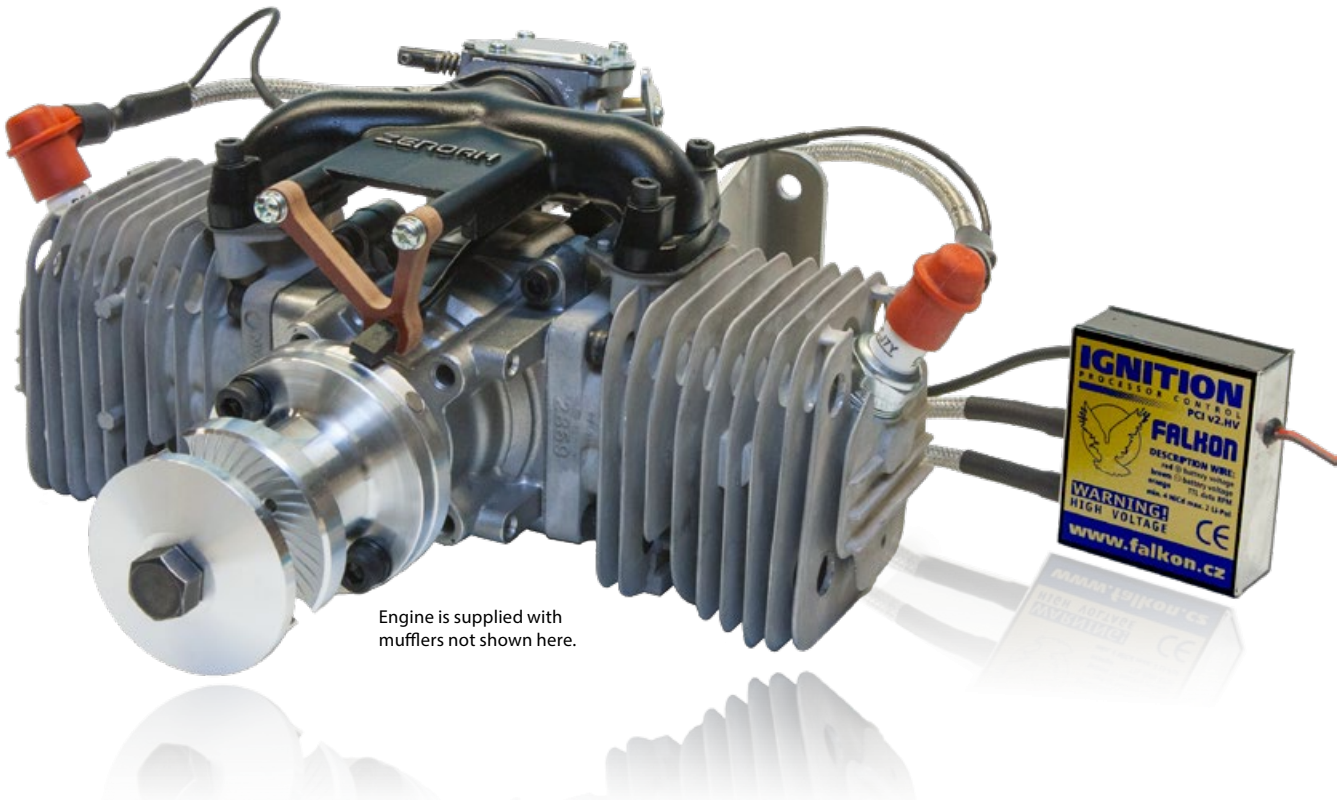
Why then the battery ignition?

A clear advantage with the battery ignition is that the tickover speed is a great deal lower than with a magneto ignition. The engine will start just as easily as with the Easy-Start-System, with the added advantage you do not need to carry the start box and plug it in.

Not including the battery, and comparing the battery ignition engines with the magneto engines with screened ignition cable and Bosch screened plug cap, there is a weight reduction of 220 grams on the ZG 45PCI-HV, the ZG 62PCI-HV and also on the ZG 80PCI-HV twin cylinder.

However he who would prefer the total maintenance free magneto with unlimited running time without an extra battery with the cable, switch and the installing of the ignition box in a model... then there is nothing better than

** Please note when comparing weights that silencer weight is not included.*



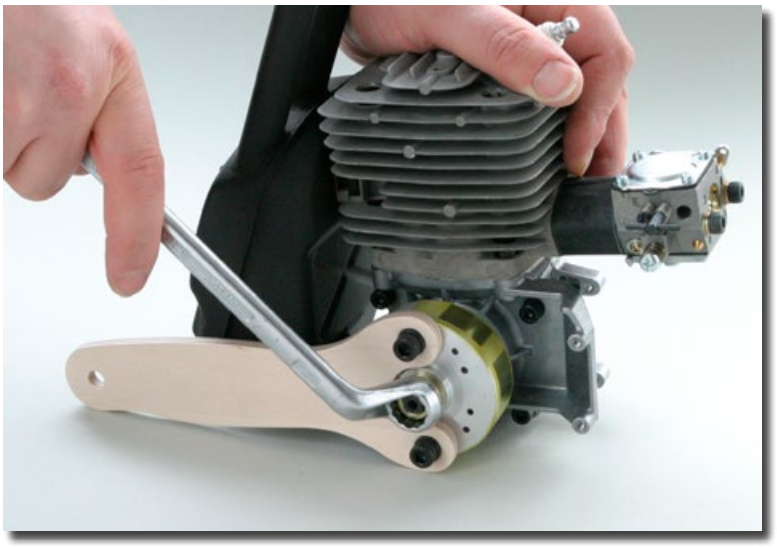
Engine is supplied with mufflers not shown here.

Titan ZG 80PCI-HV **Titan ZG 80PCI-HV ..... #7894 € 889,—**

Weight with ignition: 2705 g *

the Titan ZG engines with the electronic magneto ignition. His models do not need the super low speed tickover. They are rather ruggedly built and vibration proof, would tend to be even heavier with a battery ignition, as it seldom occurs that the battery can be placed in the model so far forward as the magneto flywheel sits on the engine, which can mean a piece of lead will be required to be fixed on the firewall, to get the CG in the right position.

The conversion set includes special tools and a manual with photo's giving step by step instructions. The conversion from magneto to electronic battery ignition is very simple



The included step by step instruction, guides through all work steps.

"Use a ring spanner to loosen the flywheel nut. This nut has a normal M10x1 right hand thread, the nut is really tight!"

and can be carried out with ease. The sensor is only screwed into place and is automatically adjusted. The same propeller hubs as with the magneto ignition are used.

Which Battery do I need?

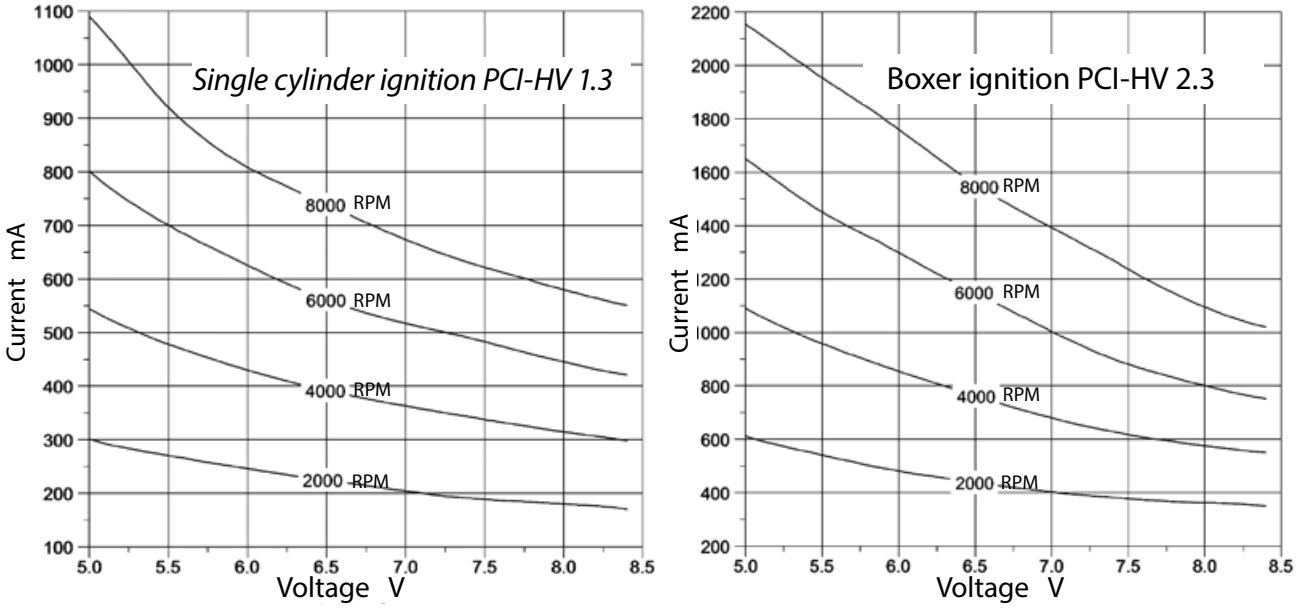
With the new PCI-HV ignition we have set the greatest value on a really strong spark, rather than on saving battery power. Of course, high- energy sparks are not possible without higher input power from the battery, but we believe this is a fair price to pay. With modern battery technology, the battery weight no longer matters, so why not go for the best possible starting, reliability and performance?

The PCI-HV ignition contains a very efficient voltage converter, which is capable of using the higher voltage instead of converting it to heat, as in the case of the common linear voltage regulators. With the PCI-HV ignition the rule is: the higher the voltage, the lower the current. Therefor it is best to use a 2s LiPo directly, without an external regulator, the flying time will be the longest.

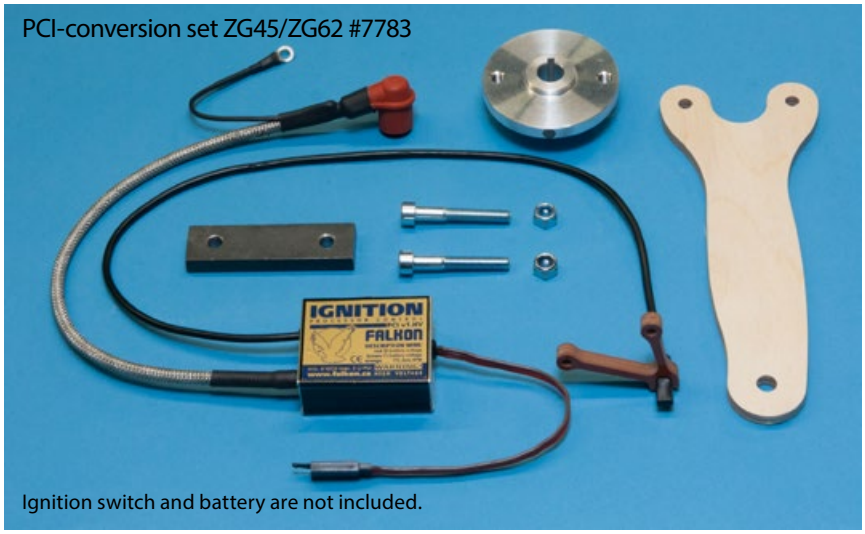
Beside the 2s LiPo battery, there are quite a few other options for an suitable ignition battery. This can be a two cell A123 or LiFePO4 battery - a very good choice, if you intent to leave the battery in the model when charging.

Also a 5 or 6 cell Sanyo Enerloop 2000 NiMH can be used.

Be warned, that if you go for a 4 cell NiCd or NiMH type, this has to be one with a low internal resistance. When the voltage drops below 4.8 V, especially the boxer engine will start to misfire. This will happen quiet soon, when the bat-



Current consumption of the ignition in relation to batteryvoltage and RPM with the single cylinder-ignition and the boxer-ignition.



PCI-conversion set ZG45/ZG62 #7783

Ignition switch and battery are not included.

Technical data

PCI-HV 1.3 = single cylinder,
PCI-HV 2.3 = twin cylinder
Weight incl. sensor, sensor carrier and Bosch screened plug cap:
PCI-HV 1.3: 138 g / PCI-HV 2.3: 227 g
Hub adapter weight: 70 g
Battery voltage: 4,8 to 6 volts
min. 3,8V, max. 6,7V
Current consumption at 2000/8000 U/min
PCI 1.3: 190 mA / 680 mA at 7,4V
PCI 2.3: 410 mA / 1320 mA at 7,4V
HT-voltage: 21 kV
Engine speed range: up to 9000 RPM
Working temperature: -10 to +85 °C
Hall Sensor temp. range: -40 to +150 °C
CE certificate no.: 1041242

teries internal resistance is high, as it is often the case with NiMH batteries. A 2s LiPo is first choice for best capacity to weight ratio.

We have deliberately chosen the robust standard spark plugs instead of the small and fragile CM6 spark plugs. Another reason being with the CM6 plugs the engine will not reach full power, because the electrodes from the smaller plug do not reach far enough into the combustion chamber.

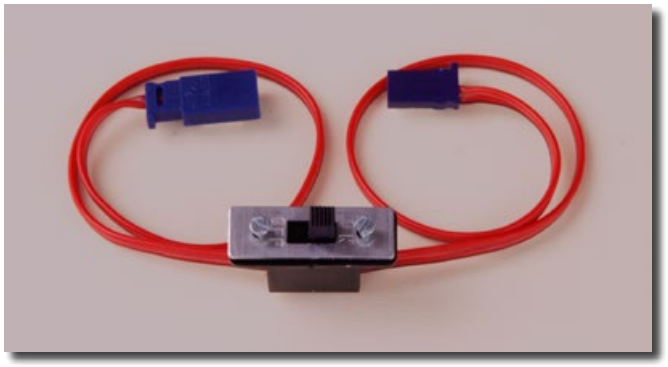
Is the ZG 38 available as a PCI version?

No! Not from us. A battery system for the ZG38 simply does not make sense. Due to the M shaped laminated core, the 38´s Magneto produces a really hefty spark at hand starting speeds, it also automatically advances and retards the ignition timing. This makes for an especially low vibration running engine, rather like with a battery ignition.

Due to the retarded ignition, the ZG 38 is very easy to start engine, the rather large fly wheel gives a low tickover speed.

Ignition switch

Use only knife edge contact switches, such as our switch order no. #2024. Toggle switches with roller contacts are not suitable as these are intended for 240 V. Used on low voltage, oxidation will occur, this increases the contact resistance and



will lead to ignition failure.

Switch ..... #2024 € 7,95
with gold coated connectors and silicone leads.

PCI-HV conversion set ZG 45/62 .. #7783 € 155,90
with Zenoah rubber plug cap.

PCI-HV conversion set ZG80B ..... #7784 € 199,90

with Zenoah rubber plug cap.

You can send us your engines for us to convert to battery ignition in our workshop, we do this at no charge:

Conversion ZG45/62 to PCI-HV ... #7788 € 155,90 with Zenoah rubber plug cap.

Conversion ZG80 to PCI-HV .. #7789 € 199,90

with Zenoah rubber plug cap.

You want to change the direction of your engine?

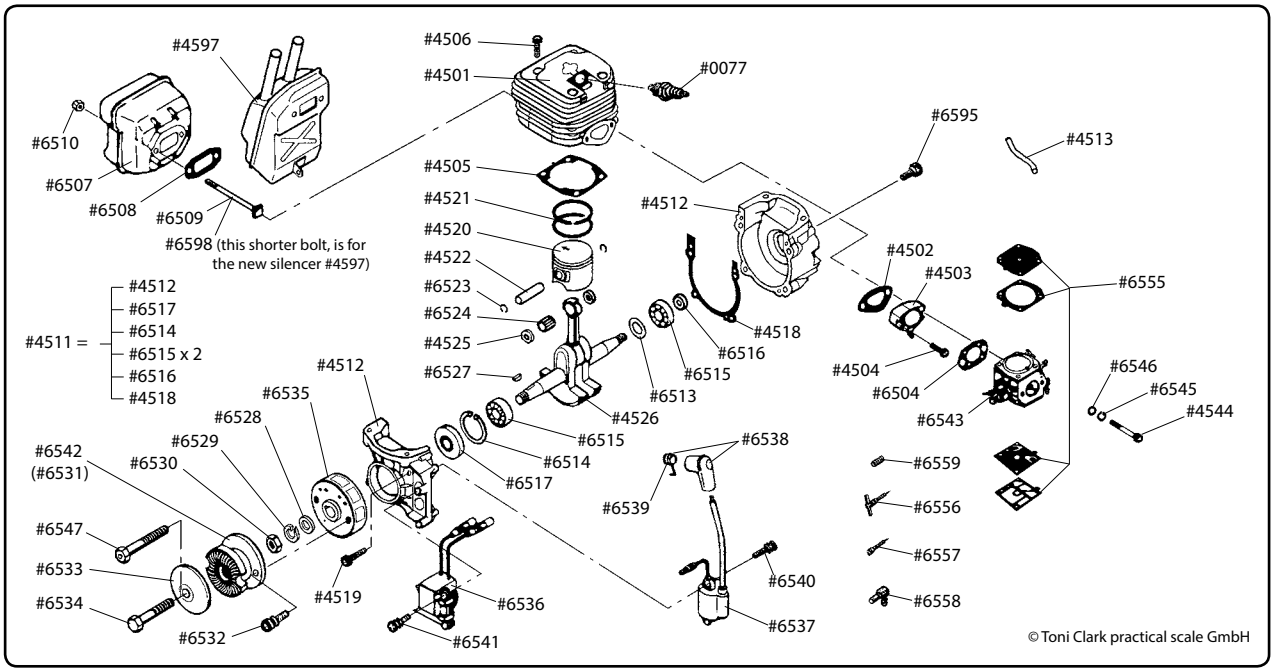
With this sensor carrier your engine turns clockwise. Pusher planes can be easily made, without being limited to a few pusher propeller. Same as twin engined planes with counterrotating props.

Sensor carrier „Clockwise“ ..... #7794 € 4,95

Spare parts:
PCI-HV 1.3 Ignition ..... #7793 € 124,90
with sensor and Zenoah-rubber plug cap.

PCI-HV 2.3 Ignition ..... #7799 € 166,90
with sensor and Zenoah-rubber plug cap.
Propellhub adapter with magnet...#7795 € 35,90
Sensor carrier ..... #7797 € 3,95

Spareparts for TITAN ZG 45 SL

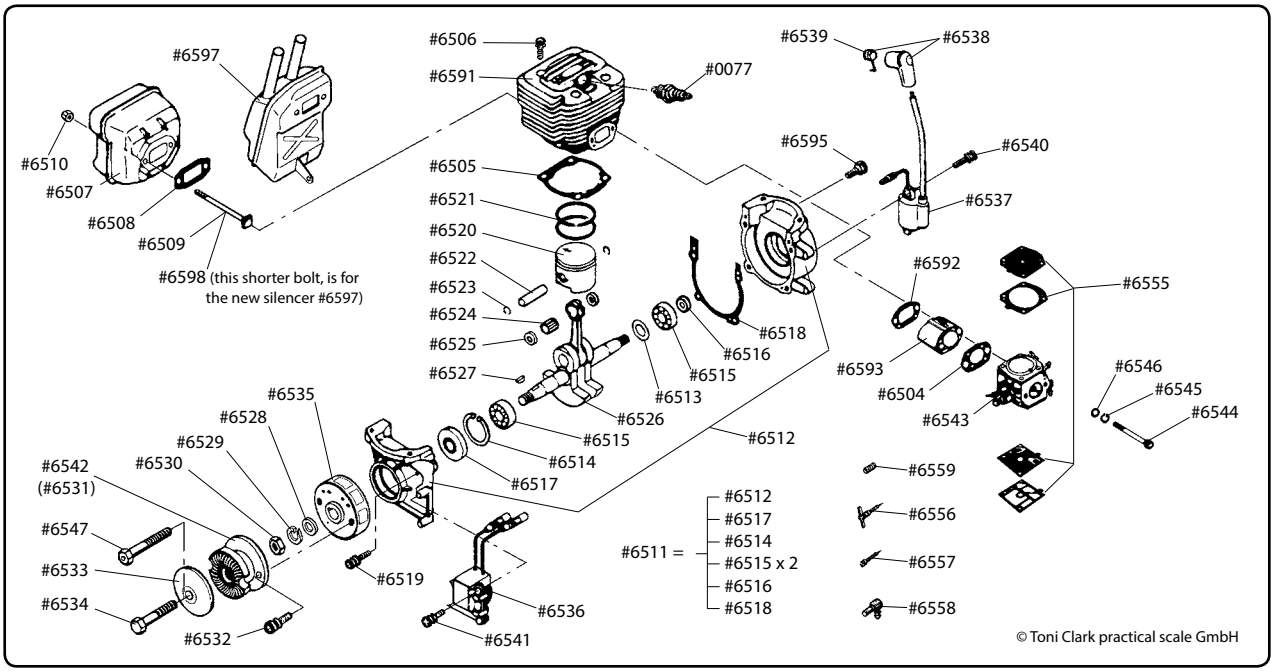


No.	Description	€
#4501	Cylinder ZG 45SL	109,90
#0077	Sparkplug Champion RCJ-7Y	4,95
#4502	Gasket insulator - cylinder	1,80
#4503	Insulator	9,95
#4504	Insulator screws, pair	1,20
#6504	Gasket Carburettor - Insulator	1,80
#4505	Cylinder gasket	2,40
#4506	Cylinder screw, per 1	0,50
#6507	Silencer -no longer available-	
#6508	Exhaust gasket	2,40
#6509	Silencer screw, per 1	1,80
#6510	Safety nuts, pair	1,50
#4511	Crankcase with bearings and seals,	74,90
	both halves available only as a pair.	
#4512	Crankcase without bearings/seals	65,95
#4513	Pump tube	0,30
#6513	Shim washers, 1 set	1,50
#6514	C-ring	0,90
#6515	Crankshaft bearing, per 1	6,95
#6516	Rear seal (small)	3,65
#6517	Front seal (large)	3,65
#4518	Crankcase gasket	2,40
#4519	Crankcase screw, per 1	0,50
#4520	Piston	28,95
#4521	Piston ring, pair	15,95
#4522	Gudgeon pin	4,95
#6523	Gudgeon pin clips	0,70
#6524	Small end bearing	6,95
#4525	Spacer washers, pair	2,95
#4526	Crankshaft with con rod	99,95

No.	Description	€
#4597	Silencer, new Version	27,60
#6527	Woodruff key	0,95
#6528	Washer	0,15
#6529	Spring washer	0,15
#6530	Flywheel nut	0,50
#6531	Prop hub, 30 mm long, -no longer available-	
#6532	Screw with spring washer, pair	0,95
#6533	Prop washer	9,95
#6534	Prop screw 45 mm	2,75
#6535	Flywheel	44,95
#6536	Source coil	69,95
#6537	Ignition coil without plug cap	49,90
#6538	Plug cap with spring	3,45
#6539	Plug cap spring	0,95
#6540	Screw with spring washer	0,20
#6541	Screw with spring washer	0,20
#6542	Prop hub, 40 mm long, since 08/03	28,95
#6543	Carburettor	78,50
#4544	Carburettor screws, pair	0,95
#6545	Spring washers for #4544, pair	0,15
#6546	Washers for #4544, pair	0,15
#6547	Prop screw 50 mm, with	4,95
	tapped hole for spinner.	
#6555	Carburettor diaphragm set	15,95
#6556	High speed needle (with bar)	7,95
#6557	Low speed needle	7,95
#6558	Carburettor nipple	4,70
#6559	Needle spring, per 1	1,95
#6595	Engine Mount screws, 4 pieces	0,95
#6598	Silencer screw for #4597, per 1	1,95

We reserve the right to alter specification and prices.

Spareparts for TITAN ZG 62 S / SL

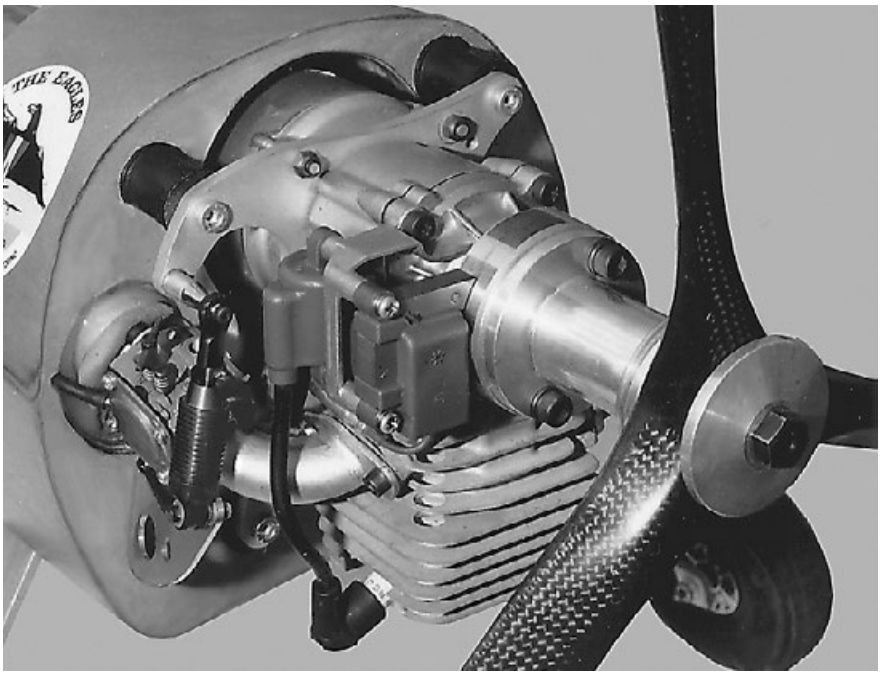


No.	Description	€
#0077	Sparkplug Champion RCJ-7Y	4,95
#6504	Gasket insulator - Carburettor	1,80
#6505	Cylinder gasket	2,40
#6506	Cylinder screw, per 1	0,75
#6507	Silencer -no longer available-	
#6508	Exhaust gasket	2,40
#6509	Silencer screws, per 1	1,80
#6510	Safety nuts, pair	1,50
#6511	Crankcase with bearings and	74,90
	seals, both halves available	
	only as a pair.	
#6512	Crankcase without bearings	69,95
	and seals	
#6513	Shim washers, 1 set	1,50
#6514	C-ring	0,90
#6515	Crankshaft bearing, per 1	6,95
#6516	Rear seal (small)	3,65
#6517	Front seal (large)	3,65
#6518	Crankcase gasket	2,40
#6519	Crankcase screw, per 1	0,95
#6520	Piston	29,95
#6521	Piston ring, pair	16,95
#6522	Gudgeon pin	4,95
#6523	Gudgeon pin clips	0,70
#6524	Small end bearing	6,95
#6525	Spacer washers, pair	2,95
#6526	Crankshaft with conrod	109,90
#6527	Woodruff key	0,95
#6528	Washer	0,15
#6529	Spring washer	0,15

No.	Description	€
#6530	Flywheel nut	0,50
#6531	Prop hub, 30 mm long, -no longer available-	
#6532	Screw with spring washers, pair	0,95
#6533	Prop washer	9,95
#6534	Prop screw 45 mm	2,75
#6535	Flywheel	44,95
#6536	Source coil	69,95
#6537	Ignition coil without plug cap	49,90
#6538	Plug cap with spring	3,45
#6539	Plug cap spring	0,95
#6540	Screw with spring washer	0,20
#6541	Screw with spring washer	0,20
#6542	Prop hub, 40 mm long, since 08/03	28,95
#6543	Carburettor	78,50
#6544	Carburettor screws, pair	1,50
#6545	Spring washers for #6544, pair	0,15
#6546	Washers for #6544, pair	0,15
#6547	Prop screw 50 mm, with	4,95
	tapped hole for spinner.	
#6555	Carburettor diaphragm set	15,95
#6556	High speed needle (with bar)	7,95
#6557	Low speed needle	7,95
#6558	Carburettor nipple	4,70
#6559	Needle spring, per 1	1,95
#6591	Cylinder ZG 62SL	114,95
#6592	Gasket insulator - cylinder	1,80
#6593	Insulator	7,95
#6595	Engine Mount screws, 4 pieces	0,95
#6597	Silencer, new Version	27,60
#6598	Silencer screw for #6597, per 1	1,95

We reserve the right to alter specification and prices.

Hydro-Mount-System
for ZG 45 and ZG 62



The Titan ZG 45SL with the Piper HMS and stainless steel silencer #4640. The intake bend in this picture is silver soldered together from the two flanges #4577,#6579 and the elbow #6578. We have a finished sand cast aluminium intake bend for the ZG 45SL #4567.

If you want a super quiet motor so you can hear the whistling noise from the air flow over the model, you should consider using our Hydro Mount System. The Hydro Mount System, or short HMS, as described here, is based on the two shock absorbers and very soft rubber mountings. This all produces a very efficient insulation of the engine from the fuselage. It would be impossible to use these soft rubber mountings without the two shock absorbers. The swing amplitude on the rubber mountings at tickover speeds would be 15 mm(!) and a low tickover speed would not be possible. A large proportion of the engines rotational energy would be absorbed by the soft rubber mountings and there would not be enough energy left in the propeller, to force the piston over the next compression stroke. If you use rubber mountings that are hard, that is to say stiffer, or even rubber grommets to keep the amplitude small, you will find these are only effective in the full throttle range, and then only partially so. At the low rpm range the system will run into resonance and the airframe´s vibration level will be even higher compared to a rigidly fixed engine.

The job for the shock absorbers is to dampen out the rotational oscillation, but of course some engine induced oscillation is transmitted to the fuselage as the engine must react against something. The advantage of our shock absorbers is that they are pure dampers without any spring effect, so absolutely no resonance can be created by them. These shock absorbers can be altered by using either low, medium or high viscosity oil. There is no knocking as would be the case with U-form brackets or other types of stops. You get the advantage of a very effective sound and vibration insulation at full throttle by the soft rubber mounting, combined with the dampening at tickover speeds by the shock absorbers. Being unable to obtain any suitable shock absorbers, we were forced to design and develop our own. These have an industrial pressure seal to cope with the very high stress involved. They also have cooling fins, because the shock absorbers convert mechanical energy into heat. The top end of the shock absorber is fitted with a rubber grommet, this is to absorb the high frequency vibration at full throttle, where the amplitude is only a few tenths of a millimeter.

The Hydro-Mount-System has three Versions:

- For our Pitts and the stainless steel silencer Pitts: Cylinder to the left, 22 degrees below horizontal.
- For our CAP 21 and the stainless steel silencer CAP 21: Cylinder to the right, 14 degrees below horizontal.
- For our Piper PA18: Cylinder inverted, 7 degrees to the left, stainless steel silencer behind engine fixed to the engine mounting plate.
- For most models one of these three versions should fit, providing the cowl is large enough for the engine itself.

The Hydro Mount is constructed with the rubber mountings in tension with respect to the thrust from the propeller. You will not find any reference to tension

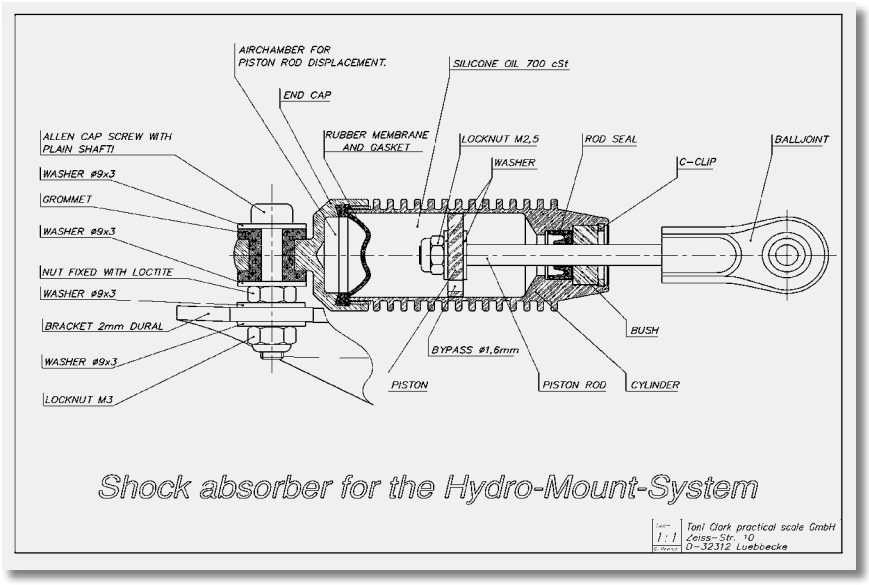
in information supplied by rubber mounting companies as this form of use is not envisaged by cars, machines and engine powered tool manufacturers. In these things top and bottom stays always the same, they are not involved with aerobatics! But on the other hand, every glider pilot knows how much rubber can be stretched, without going to any extreme.

My first attempt was with the rubber mountings under compression, using 15x15 mm rubber mounts. By performing Lombcevaks these split regularly! It was always the bottom rubbermount, this being due to the enormous gyroscopic moment due to performing a Lombcevak with the Pitts and in spite of the counteracting thrust that caused the engine unit to be forced downwards thereby bending the rubber mount beyond endurance. Four flights, each one with a Lombcevak and three bottom rubber mounts having failed, gave me statistically proof of the cause. The loading of rubber mountings in our models is not so simple as to be able to calculate exactly. But one thing is certain, the static loading from the propeller thrust is greatly exceeded by the dynamic forces in stunt flying and the stresses caused by the oscillations at idle.

The answer can only be larger, but very soft rubber mountings, that can withstand higher loadings without being too stiff. The mountings we now use have a vulcanized surface of 490 mm^2, 2,78 times the area of the 15 mm rubber mountings. The doubling of the length to 30 mm and a Shore hardness of 45 results in exactly the same resilience as the 15x15 mm rubber mounts with 55 Shore hardness. The special shape of the rubber mountings we now use, considerably reduces the danger of splitting starting at the edges. These mountings have the ability to sustain higher loadings and can be used in tension without fear of premature failure. Fitting these mountings in tension obviates the need for the U form stops in the compression system and this goes some way to compensate for the extra weight of the larger rubber mountings. The size of these rubber mountings gives the same distance of the engine to the firewall as our standard 36 mm aluminium motor mount does and allows the shock absorbers to be fixed to the front of the spider motor mount. The shock absorbers are thereby almost on the level of the connecting rod, this means that the vertical oscillations at low speeds are effectively dampened out. One must not forget that the motor is now held by the shock absorbers, the correct placing of these shock absorbers is directly related to the smooth running of the motor. Also the shock absorbers take up the energy and thereby considerably reduce the loading of the rubber mountings. In any case I have not had to replace the rubber mountings in my Pitts anymore. The whole thing, as is so often with mechanics, is the correct layout and dimensions.

A few words about weight: All parts of the Hydro Mount System Pitts weighs 380 grams. The normal cup shaped aluminium engine mount with screws is 170 grams. The middle of the Pitts firewall can be cut out saving 115 grams. So there is an increase in weight of only 95 grams. The smoother running engine, reducing the loads on the structure, allows some judicious lightning of the airframe.

It is no use to fit our Hydro Mount System, unless you fit a three chamber silencer and a bend between the carburettor and the engine, so the engine draws the air out of the fuselage. The Hydro Mount design did not allow for the use of the standard muffler instead our stainless steel muffler. The carburettor should have a bend between itself and the cylinder so the air can be sucked out of the fuselage. This bend can be made from the copper bend #6578 and the flanges #4577 or #6577 and #6579. Alternatively the cast aluminium bend, for the HMS Piper and Pitts the bend #6587 and for the Cap 21 HMS the bend #6586, can be used. In addition the intake trumpet #0080 must be fitted to the carburettor. A tuned pipe can be fitted, but it must be installed with a flexible mounting.



My Pitts is so quiet in flight that you really can hear a whistling noise from the air flow over the model. Measured from behind the Pitts it is 4 dB(A) quieter than from the side in the propeller arc and this with a very quiet carbon fiber three blade propeller running at 6,300 rpm. Seven meters from the side we had 79 dB(A). What you must not forget about these values is the amount of power available; with half throttle the Pitts hangs vertically on the prop, and with quarter throttle you have "electric flight".

Frequently asked questions about the Hydro-Mount-System:

The idle speed is too fast, what is the cause and what can I do?

The butterfly valve is operated by a special piece of Bowden cable supplied with the HMS. The Bowden cable isolates the movement of the engine from the fuselage. When problems occur with the idle speed on the HMS then this is mostly due to the Bowden cable vibrating. The answer is simple, the Bowden cable must so fitted that it pushes against the throttle return spring and does not pull it. The reason is due to the vibration of the Bowden cable causes the cable to be thrown outwards rather like the centrifugal action of a skipping rope. This then causes the loading on the throttle arm to be constantly changing allowing slightly more gas and then slightly less gas with the engine throttled down, which of course means a fully uncontrolled idle, can then easily lead to the engine stopping when you attempt to throttle down the engine even more, as the throttle return spring can then get the upper hand.

When the throttle servo pushes against the throttle return spring, then the spring and the centrifugal force both work in the same direction, and the engine then reacts reliable to the throttle lever.

Why don't you fit a distance piece between the engine and the spider leg mounting, then there is no need to clip off the corners of the cooling fins?

To fix the spider leg mounting directly onto the crankcase means that corners of the cooling fins at the rear of the cylinder must be trimmed back and some consider this a construction fault.

Fact is, this allows the rubber mountings to be carried forward so far as possible, this is absolutely important for the optimal functioning of the HMS. The advantage gain by the smoother tickover far outweighs the small amount of extra effort spent. The cropped cooling fins have not the slightest effect on the engine cooling.

Why must the rear crankshaft stub be sawn off to make way for the silencer?

This is to enable the silencer to be mounted as close as possible onto the engine. Every extra centimeter means increasing the header length which will reduce the engines power. Apart from this problem the silencer would not fit into our Piper and the silencer mountings will be more heavily loaded.

Is the guarantee still valid with the alterations?

Of course it is!

Why is it that harder rubber mountings are not used to reduce the vibration?

Because harder rubber mountings will have the opposite effect! Achim Hagensieker and Olaf Czerwinski found in their degree thesis covering "Examination, simulation and optimization of the Hydro-Mounting-System" only softer rubber mountings would improve the System. Unfortunately due to the increased flexibility they would not be suitable for aerobatic models.

My model vibrates ever more in the tickover range, what is causing this?

It is probable that the shock absorbers are losing oil and must be refilled. The shock absorber must be removed to check this. When pushing, or pulling, the piston shaft there must be no play discernable.

A certain vibration in tickover is normal as well as harmless. The amplitude is quite large and therefore easily seen, the energy causing the amplitude is very little, and cannot be compared to the vibration energy that a solid mounted engine imparts to the airframe.

A simple test will show you what I mean. Take hold of the wing tip and move it to the amount caused by the vibration and you will notice how little effort is required.

In the framework of the above mentioned degree thesis there were two CAP 21 models used, one had a solid mounted engine and the other a HMS, the result was a much lower vibration energy measured at the receiver position and the aileron horns by a factor of 50.

Gerhard Reinsch

Titan ZG 62SL with Hydro-Mount-System CAP 21, stainless steel silencer #6660 and the cast aluminium intake bend for the CAP 21 #6586.

Hydro-Mount-System-PIPER ..... #6704 € 159,90

Hydro-Mount-System-Pitts ..... #6705 € 159,90

Hydro-Mount-System-CAP21 ..... #6706 € 159,90

The complete system contains four rubber mountings, two ready filled shock absorbers, one CNC milled engine mount, CNC milled shock absorber brackets, all necessary screws, nuts and washers, a length of special Bowden cable for the throttle linkage and a detailed set of instructions with full-scale drawings..

Of course you can purchase parts separately:

Rubber mountings, each ..... #6720 € 5,95

M6x10 shorthead-socket screw ..... #6721 € 0,40

Shock absorber, each ..... #6730 € 49,90
Complete with balljoint, rubber grommet, fixing screws, filled with silicone oil, assembled but without bracket.

Ball joint pillar 15,5 mm long..... #6731 € 2,55

Ball joint pillar 18 mm long..... #6733 € 2,65

Ball joint pillar 30 mm long..... #6734 € 3,15

Engine mount 6 mm thick anodized:

PIPER version..... #6714 € 33,90

PITTS version..... #6715 € 33,90

CAP21 version..... #6716 € 33,90

Shock absorber brackets:

2 mm thick Dural CNC-milled, anodized.

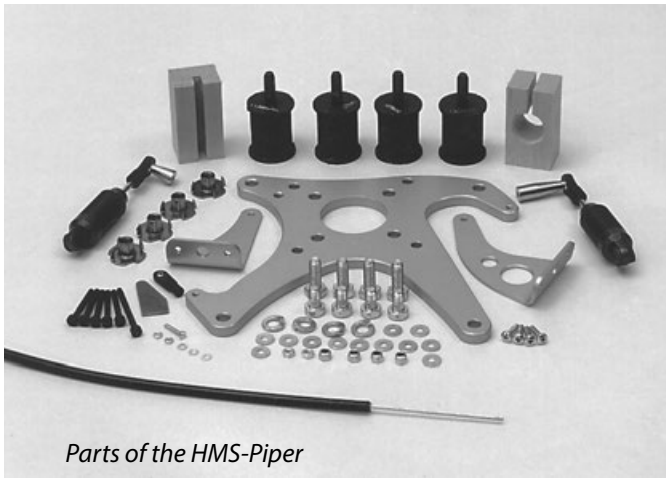
PIPER version..... #6754 € 19,90

PITTS version..... #6755 € 19,90

CAP 21 version..... #6756 € 19,90

Bowden cable with Teflon sleeve,

for throttle linkage, 40 cm..... #6795 € 1,95



Parts of the HMS-Piper

The shock absorbers are filled with silicone oil with a viscosity of 700 cSt. If you wish to experiment we can supply Silicone oil in 30 ml bottles:

Silicone oil 500 cSt (soft) ..... #6745 € 4,95

Silicone oil 700 cSt (standard) ..... #6747 € 4,95

Silicone oil 1000 cSt (hard) ..... #6749 € 4,95

Instructions with full-size drawings:

PIPER version..... #6764 € 3,90

PITTS version..... #6765 € 3,90

CAP 21 version..... #6766 € 3,90

Spare parts for the shock absorbers:

Ball joint ..... #6732 € 1,95

Piston shaft ..... #6737 € 8,95

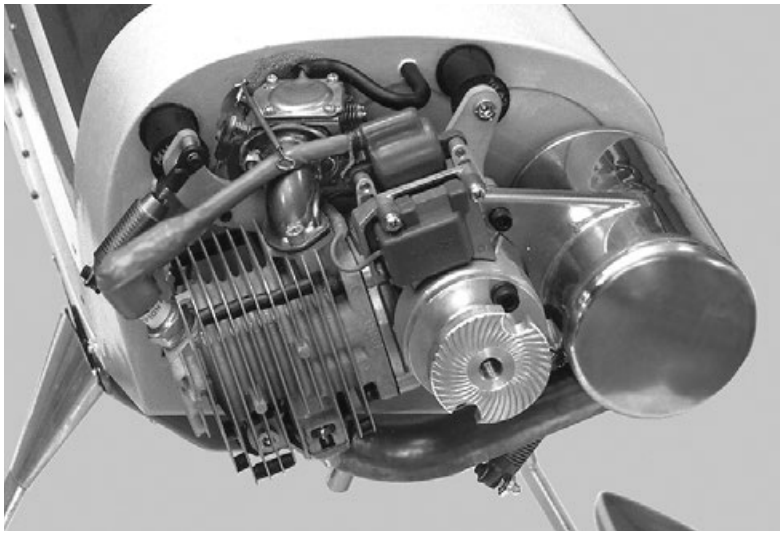
Safety clips ..... #6739 € 0,25

Piston shaft guide ..... #6738 € 1,95

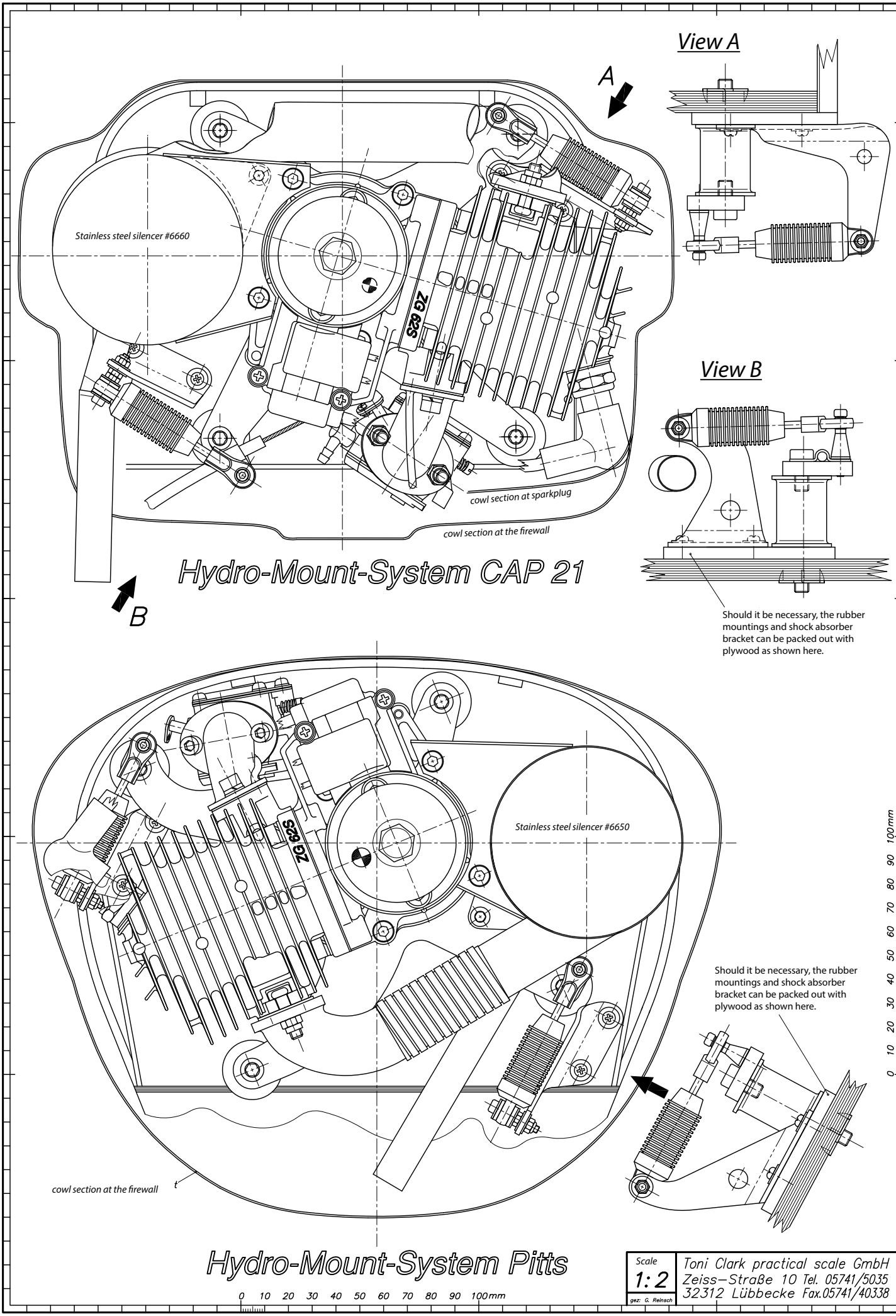
Shaft seal ..... #6735 € 4,50

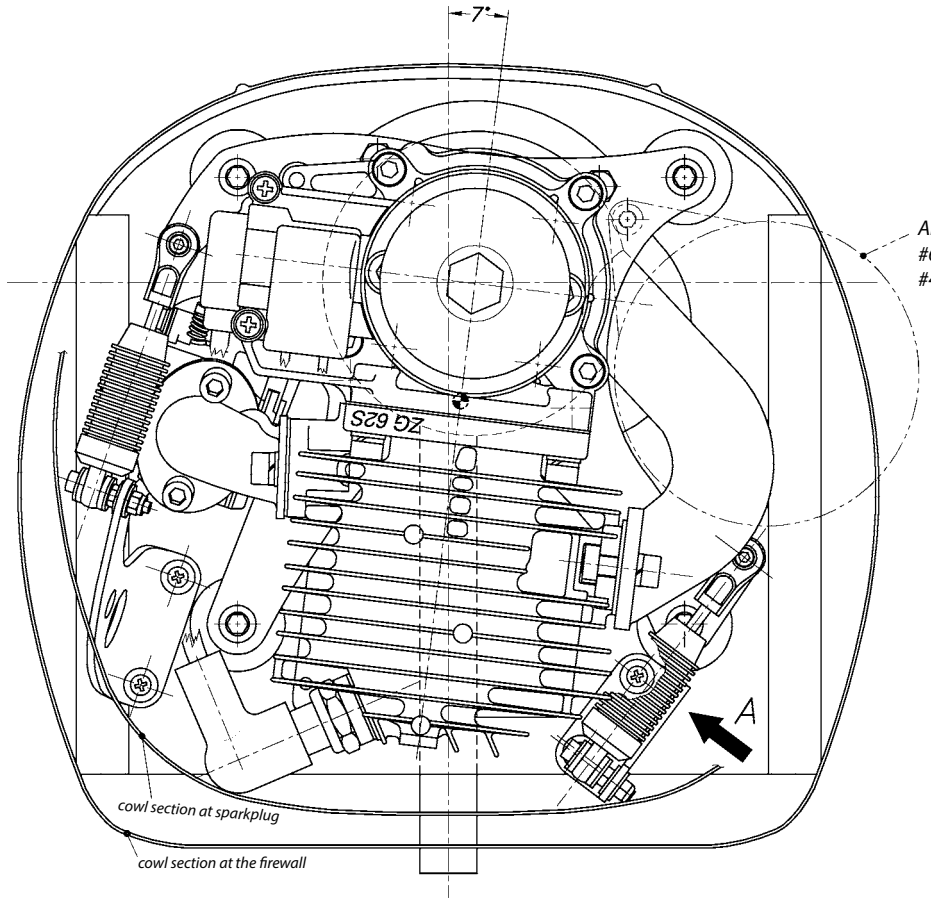
Bubbleseal ..... #6736 € 1,95

Grommet ..... #6740 € 2,25



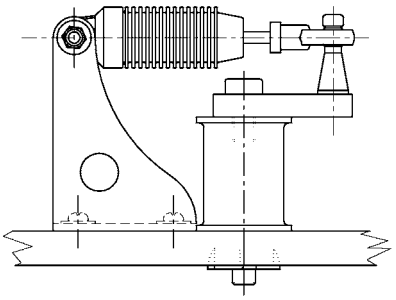
Titan ZG 62SL with Hydro-Mount-System Pitts and stainless silencer #6650. The intake bend is made from flanges #6577, #6579 and the copper bend #6578 silver soldered together. Alternative is the finished cast aluminium bend #6587.


View A
A
Stainless steel silencer #6660
ZG 62S
cowl section at sparkplug
cowl section at the firewall
View B
Should it be necessary, the rubber mountings and shock absorber bracket can be packed out with plywood as shown here.
Hydro-Mount-System CAP 21
B
Stainless steel silencer #6650
ZG 62S
Should it be necessary, the rubber mountings and shock absorber bracket can be packed out with plywood as shown here.
cowl section at the firewall
t
0 10 20 30 40 50 60 70 80 90 100mm
Hydro-Mount-System Pitts
0 10 20 30 40 50 60 70 80 90 100mm
Scale
1: 2
gez: G. Reinsch
Toni Clark practical scale GmbH
Zeiss–Straße 10 Tel. 05741/5035
32312 Lübbecke Fax.05741/40338



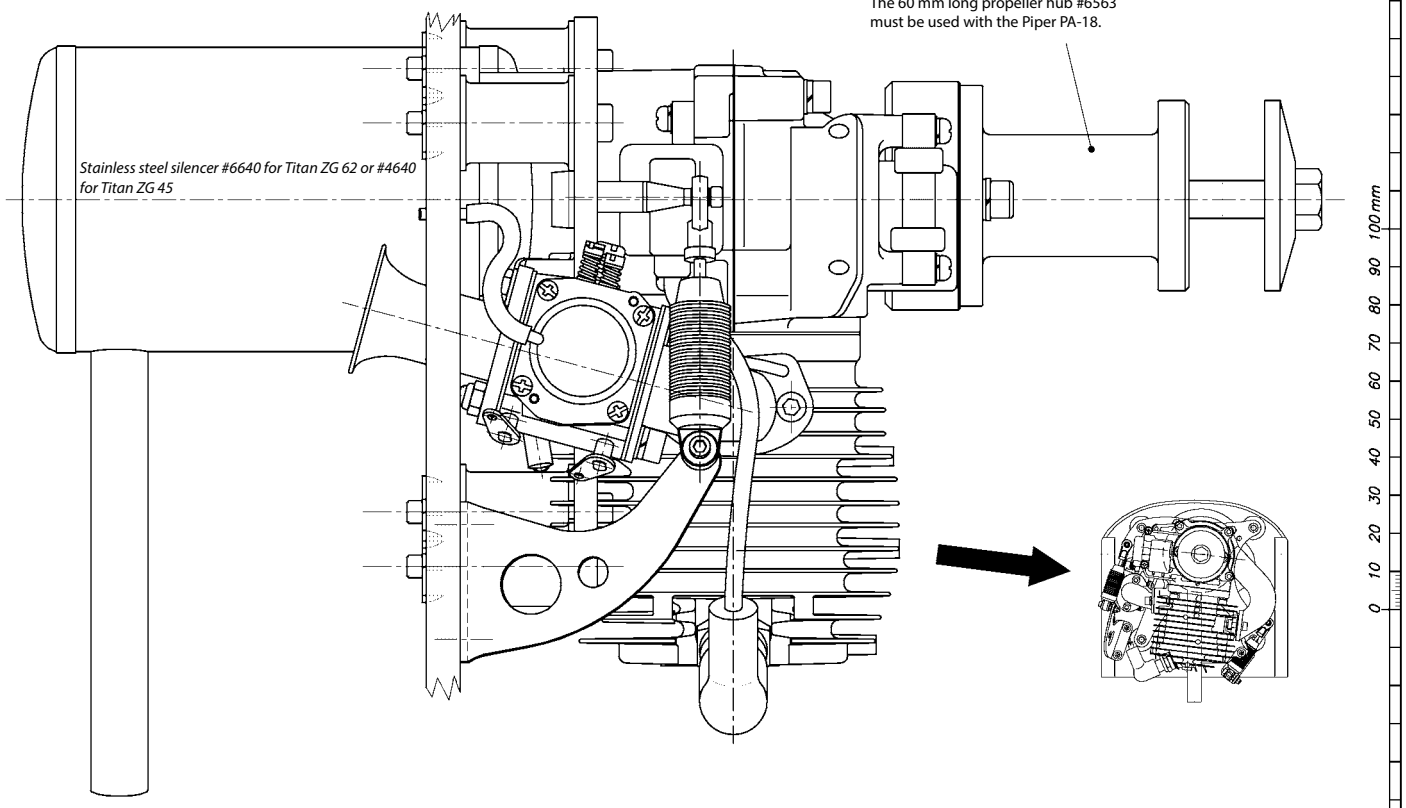
Alternative side mounted silencer #6630 for Titan ZG 62 or #4630 for Titan ZG 45.

View A



The 60 mm long propeller hub #6563 must be used with the Piper PA-18.

Stainless steel silencer #6640 for Titan ZG 62 or #4640 for Titan ZG 45



0 10 20 30 40 50 60 70 80 90 100 mm

Titan ZG 62SL with Hydro Mount System Piper and stainless steel silencer #6640

0 10 20 30 40 50 60 70 80 90 100 mm

Scale 1:2	Toni Clark practical scale GmbH
gez: G. Reinsch	Zeiss–Straße 10 Tel. 05741/5035
	32312 Lübbecke Fax.05741/40338

Using the Hydro-Mount-System

by Peter Erang

Peter Erang's experience with our Hydro Mounting System. Peter was a member of the German team at the Tournament of Champions in Las Vegas '94.

I needed an engine for my 240 cm span EA 300, I wished to fly with this model in the Tournament of Champions in Las Vegas. The first question I had to answer was single or twin cylinders. A horizontally opposed twin, the low vibration qualities not to be overlooked with a twin. On the negative side the cost, not only for the engine but two tuned pipes, two header pipes and two tunnels for the pipes, the latter not so expensive but very time consuming.

Experience gained over the last few years with large capacity single cylinder motors and the negative effect these engines have on the airframe when rigidly mounted was something I now wished to avoid. It is certainly not easy to construct a flexible mounting for such big engines, especially for such a large aerobatic model capable of pulling very high G's.

So my choice fell on the Titan ZG62SL with the Pitts version Hydro Mount System (this Pitts version did not need to be modified to fit my EA 300) and a Krumscheid tuned pipe. This combination gives plenty of power for an unbeatable low weight with the great advantage of very low level of vibration. An important factor governing my decision is the small amount of total parts involved, for example the super reliable magneto ignition not requiring a battery that must be constantly charged, a single exhaust system, thus reducing the amount of spares I must take to America. Of course this all contributes to reducing the building time and a lighter model.

I was anxious to find out how the Hydro Mounting would hold up in violent aerobatic manoeuvres, a few snap rolls would not be a problem, but the Las Vegas schedule requires for example two consecutive snap rolls, one left and one right. Horizontal rolls left and right, vertical rolls, snap rolls with full power. This all can be accurately described as bringing the model to the limit of its performance. My anxiety, I felt was not out of place, so it is not surprising that for the first flight I tried every snap manoeuvre possible. The Hydro Mount is indestructible, one important point when fitting the HMS the motor requires 10 mm space between it and the engine cowl.

Special attention must be paid to installing the tuned pipe and connecting this to the header pipe on the engine. The tuned pipe must be fixed with flexible mountings, the header pipe and connecting tube is from the Toni Clark accessories, these are a stainless thin walled bent pipe with Laser cut exhaust flange and is silver soldered together. The header pipe is cut in half and a piece of flexible stainless tubing is inserted and silver soldered together. The header is then joined to the pipe with Teflon tubing and two spring clips. The Krumscheid tuned pipe has two reinforced fixing points on the body, the flexible rubber mounts must be 5x15 and with a hardness of 55 Shore. The pipe is secured with two metal straps. This method has worked well, even after many flights.

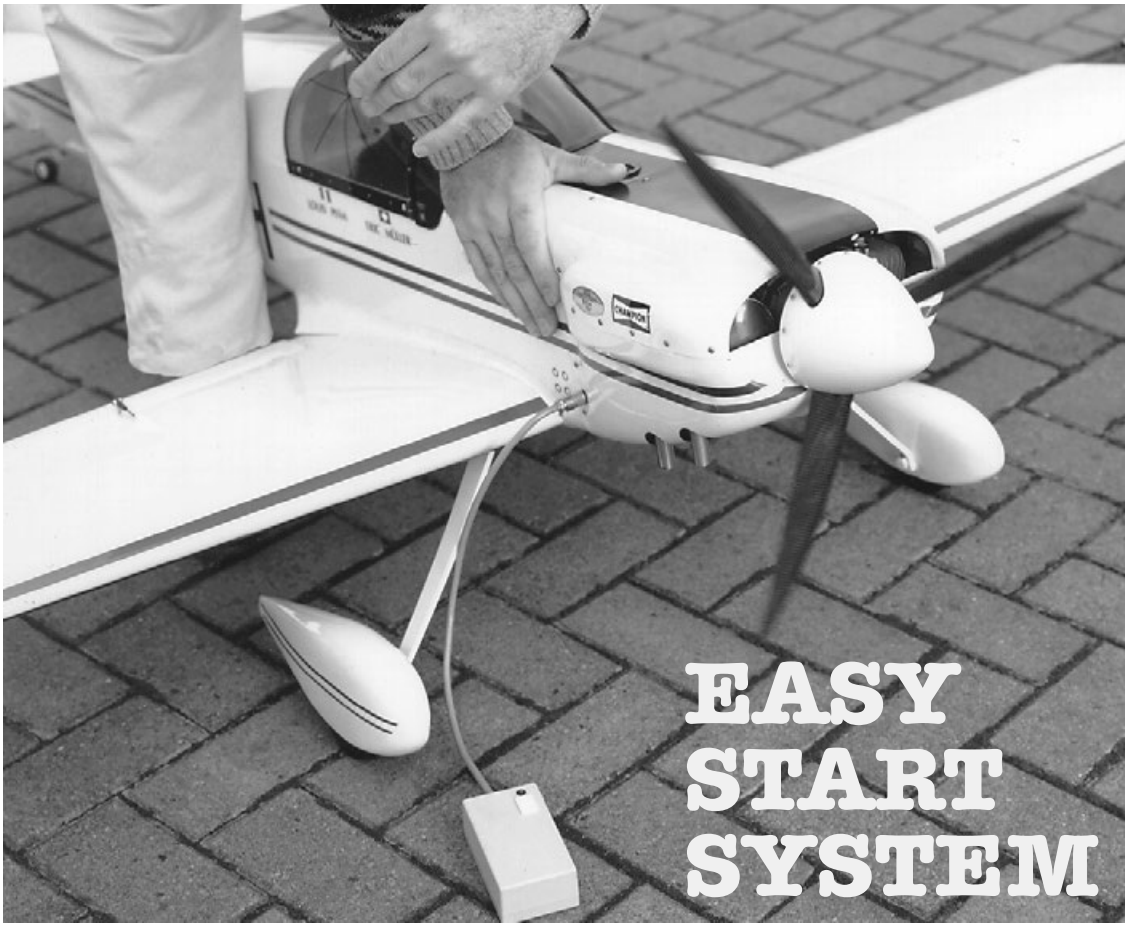
A great help is the highly detailed instructions supplied with the ZG 62 engine and the HMS. The many tips in these instructions stemming from specialist know how, ensure that the user does not need to modify anything for a trouble free engine unit.

The low vibration with the ZG 62SL and the Hydro Mounting System has a minimal effect on the airframe, removing all doubt about a large single cylinder motor. The reduction in noise with this system is a real surprise to those who have not tried this for themselves. Exaggeration you may think, my claim that the sound level is that of a contest F3A model. But one must not forget it is not the Hydro Mounting alone, it is a combination of drawing the air out of the fuselage, the Seyer NT Carbon fiber three blade propeller, also there is the small detail of fitting pieces of fuel tube between the cooling fins.

Hand starting with the soft mounted ZG 62SL, as apposed to a rigid mounted engine is not a problem for those who follow the instructions, prime really well the engine and flick the propeller from the correct position. As you may know there is only three minutes in contests for starting, so far this for me has been enough, with time to spare.

To sum up the Hydro Mount System from Toni Clark practical scale. This system can withstand all that a pilot can do with stunting a model, is the most effective method for mounting large volume single cylinder engines. My EA 300 has more than a hundred flights up to now and there has not been a single problem.

Peter Erang (right) and Peter Wessels with their exceptionally quiet Extras.



EASY START SYSTEM

You would have liked to be able to start either your ZG 45 or ZG 62 from behind the propeller with the left hand? But you say that's nonsense I'm not left handed; it's enough for me when from the front and with my right hand I barely manage to start it. Up to now this was the reality; you were not able to master the special starting technique and lost the nerve and gave up.

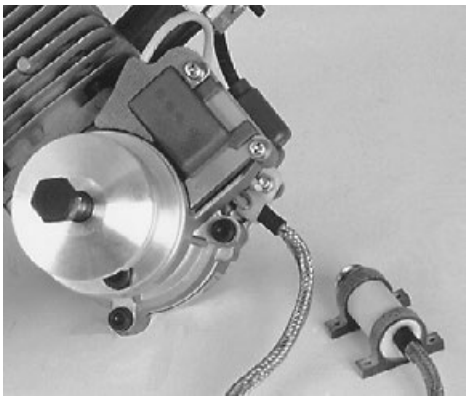
We now have a neat answer for these starting difficulties: Instead of a battery ignition system with all its inherent problems that must be carried in the model, we have packed the Easy Start System in a plastic box complete with a short lead ending in a plug. A socket is fitted to the engine with a built in switch to isolate the power coil from the ignition coil for starting the engine and a Hall sensor is triggered with the flywheel magnet.

The ignition timing is set for ease of starting and makes it impossible for the engine to kick back. The engine will not start in reverse! You only need to pull out the plug and she is ready to go. The Easy Start is supplied ready fitted to the Titan ZG 80B engines. Sad to say: The Easy Start only works with Titan ZG engines and no other types, it needs the power coil and the ignition coil as separate units as fitted to the Titan ZG 45 and ZG 62 engines.

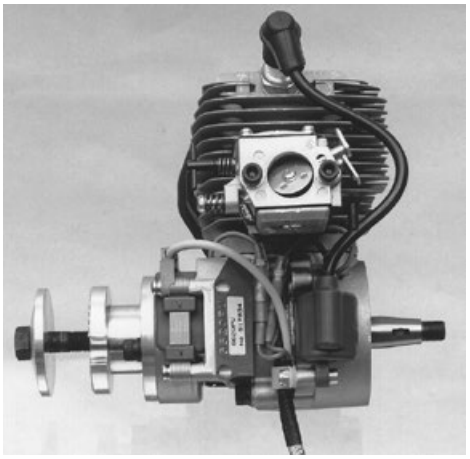
EASY-START-SYSTEM complete..... #7777 € 109,90

Extra socket with sensor ..... #7755 € 45,95
for every extra engine you need only the socket!

Single Easy-Start ingnition box ..... #7778 € 69,90



The hall sensor is simply screwed to the power coil using existing screws.



The plug and socket connector is parted and the Easy Start socket is connected between.

Stainless Steel Silencers for ZG 45 and ZG 62

These ready to instal silencers are tailored to fit our Hydro-Mount-System and models. The three chamber principle is used and the compact shape with large volume makes for a very quiet power unit. These silencers are carefully hand made from thinwall stainless steel tube, silver soldered together and polished. Stainless steel has proved to be outstanding for lightness and long life.

For silencer construction stainless steel is without doubt superior to aluminium, due to its considerably greater strength and heat resistance. To give an example, fixing screws on aluminium must constantly be tightened down whereas with stainless steel the screws will always remain secure. Stainless steel is far better able to withstand vibration than aluminium. Stainless silencers withstand heavy vibration induced loads for years without trouble but any aluminium silencer will often fail in a very short space of time. The greater specific weight of stainless steel is nullified by the smaller volume material required. The two disadvantages are its extremely tough nature making work very difficult and the very high price.

Due to the fixing of our silencers only to the engine they remain absolutely gas tight and vibration proof. Silencers are supplied with the exhaust gasket and fixing screws.

We supply these silencers in kit form and as well as single items thereof. You can therefore save money as well as being able to adapt these silencers to other makes of engines. The respective openings in the silencer bodies of the Pitts and CAP 21 to take the header and outlet pipes are precision cut and stamped. You have only to shape and fit the header pipe and silver solder the parts together.

The silencers can also be fitted with a 18 mm outlet tube (instead of 15 mm). This will increase the power by 100 rpm, with approximately 1 dB(A) more noise.

Silencer for HMS-Piper mounted behind the Crankcase for ZG 45 / ZG 62

This silencer is fitted behind the crankcase of the ZG 62 and ZG 45 for the Piper Hydro-Mount-System. See page 91. At first glance it may appear unusual, but this is the best allround system. The silencer fits into the smallest of models. The CG of the engine is set back in the shock absorbers plane which is ideal for the Hydro-Mount-Systems dynamics. The cooling air flows through the opening in the firewall exactly behind the cylinder into the silencer compartment, this way the cylinder is very effectively cooled. The silencer can only be fitted with the HMS Piper motor mount. This motor mount #6714 can be purchased separately and rigidly fixed to the firewall, if you prefer so.

Weight 325 g.

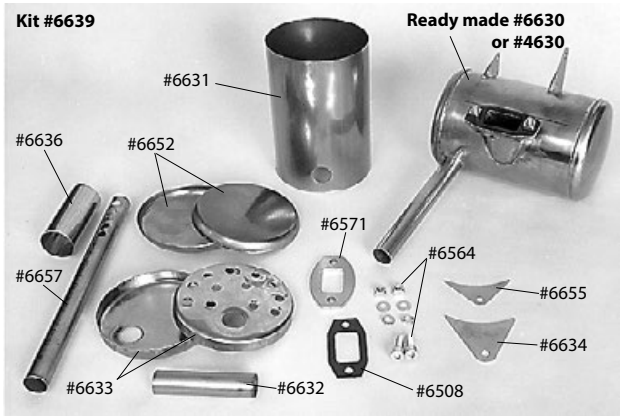
Ready made silencer for ZG 62 and HMS-Piper rearmounted ..... #6640 € 149,90
Ready made silencer for ZG 45 and HMS-Piper rearmounted ..... #4640 € 149,90
Silencer kit for ZG 45 and ZG 62 and HMS-Piper rearmounted ..... #6649 € 99,90

Silencer for HMS-Piper mounted beside the Crankcase, for ZG 45 / ZG 62

Sidemounted silencer for the ZG 45/62 with the Piper HMS, see drawing top of page 91 "alternative silencer position". This silencer can be used when it is impossible to use the type fitted behind the crankcase. This sidemounted layout is far from ideal dynamically and shows up in the tickover speeds as excessive movement. With the engine rigidly fixed there is no problem.

To use this silencer without the Hydro-Mount-System, you either use the motor mount #6714 or you will have to fit a piece of 1 mm thick metal plate between the engine and the motor mount #6590, #6561 or #6562, extend this plate to take the rear fixing lug on the silencer.

Weight 295 g.



Ready made silencer for ZG 62 - sidemounted ..... #6630 € 144,90
Ready made silencer for ZG 45 - sidemounted ..... #4630 € 144,90
Silencer kit for ZG 45 - sidemounted ..... #4639 € 89,90
Silencer kit for ZG 62 - sidemounted ..... #6639 € 89,90

Silencer for HMS-Pitts and ZG 62

This silencer is constructed for the ZG 62 in combination with the Hydro-Mount-System Pitts. The layout, where the silencer is a counter balance to the cylinder, results in a very effective functioning Hydro-Mount-System. The silencer fits perfectly under the Pitts engine cowl. Refer to the half-scale drawing of the HMS-Pitts on page 90. The spark plug is just about on the level of the crankshaft on the widest part of the cowl. Due to the built-in side thrust a little extra space is obtained. This layout is ideal for the majority of large models with horizontally opposed cylinders. There is hardly any point in fitting a ZG 45 into the Pitts, this is the reason for us not having a silencer to fit. But should you wish to use the ZG 45, you can make a silencer for it from the silencer kit parts by altering the front fixing lug.

Weight: 335 g.

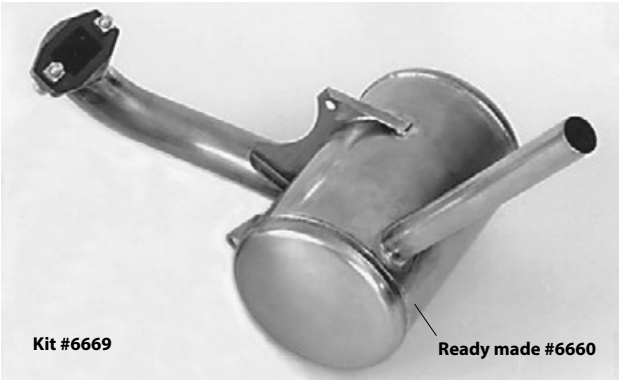
Readymade silencer for ZG 62 and HMS-Pitts ..... #6650 € 149,90

Silencer kit for ZG 62 and HMS-Pitts ..... #6659 € 99,90

Silencer for HMS-CAP 21 and ZG 62

This complete and ready to fit silencer is tailored exactly for our CAP 21 and the Titan ZG 62. It fits with the CAP 21 Hydro-Mount-System completely under the engine cowl. Refer to the half-scale drawing of the HMS-CAP 21 on page 90. The dynamics are as good as with the Pitts version. As with the Pitts there is hardly any point in fitting a ZG 45 into our CAP 21. But should you wish to use the ZG 45, you can make a silencer for it from the silencer kit parts by altering the front fixing lug.

Weight: 345 g.



Ready made silencer for ZG 62 and HMS-CAP21 ..... #6660 € 149,90

Silencer kit for ZG 62 and HMS-CAP21 ..... #6669 € 99,90

Price extra for larger outlet pipe (d=18 instead 15 mm) on the Silencers #6628 € 1,00

Parts for Stainless Steel Silencers

Version:	Piper sidemounted		Piper rearmounted		Pitts		CAP 21	
Body tube ø80 x 0,5 mm	#6631	€ 18,90	#6641	€ 18,90	#6651	€ 19,90	#6661	€ 19,90
Pair of endcaps	#6652	€ 16,90	#6652	€ 16,90	#6652	€ 16,90	#6652	€ 16,90
Pair of baffle plates	#6633	€ 15,90	#6653	€ 15,90	#6653	€ 15,90	#6653	€ 15,90
Connecting pipe 1. -> 2. Chamber	#6632	€ 1,95	—		—		—	
Front bracket	#6634	€ 5,50	—		#6654	€ 10,90	#6664	€ 10,90
Rear bracket	#6655	€ 4,95	—		#6655	€ 4,95	#6655	€ 4,95
Standoff bushes, ø10 x M5, 4 pcs.	—		#6644	€ 16,95	—		—	
Bend header pipe ø25 x 0,5 mm	#6636	€ 4,95	#6646	€ 13,90	#6656	€ 13,90	#6666	€ 16,90
Outlet pipe ø15 x 0,5 mm, drilled	#6657	€ 10,90	#6657	€ 10,90	#6657	€ 10,90	#6657	€ 10,90
Outlet pipe ø18 x 0,5 mm, drilled	#6658	€ 11,90	#6658	€ 11,90	#6658	€ 11,90	#6658	€ 11,90

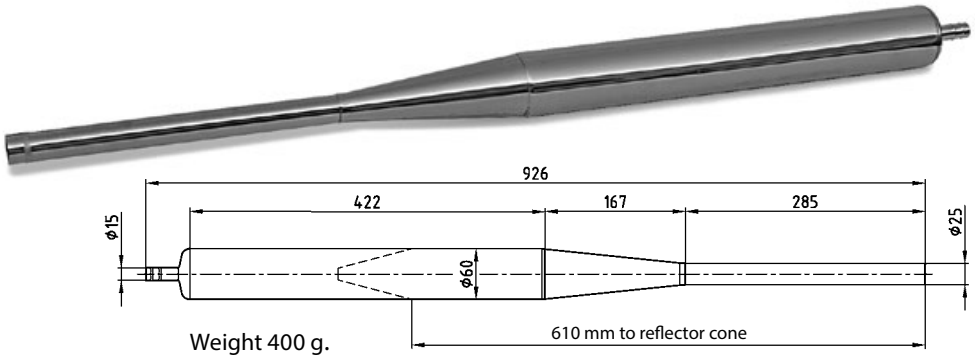
Exhaust Flange for ZG 45 / ZG 62 ..... #6571 € 5,90

Laser cut from 3 mm thick stainless steel, absolutely flat.

Set of Manifold Screws and Nuts ..... #6564 € 1,25

Two screws M5x16, Square nuts, Washers and spring washers, zink plated.

Stainless Steel Tuned Pipe for 45 to 80 cc



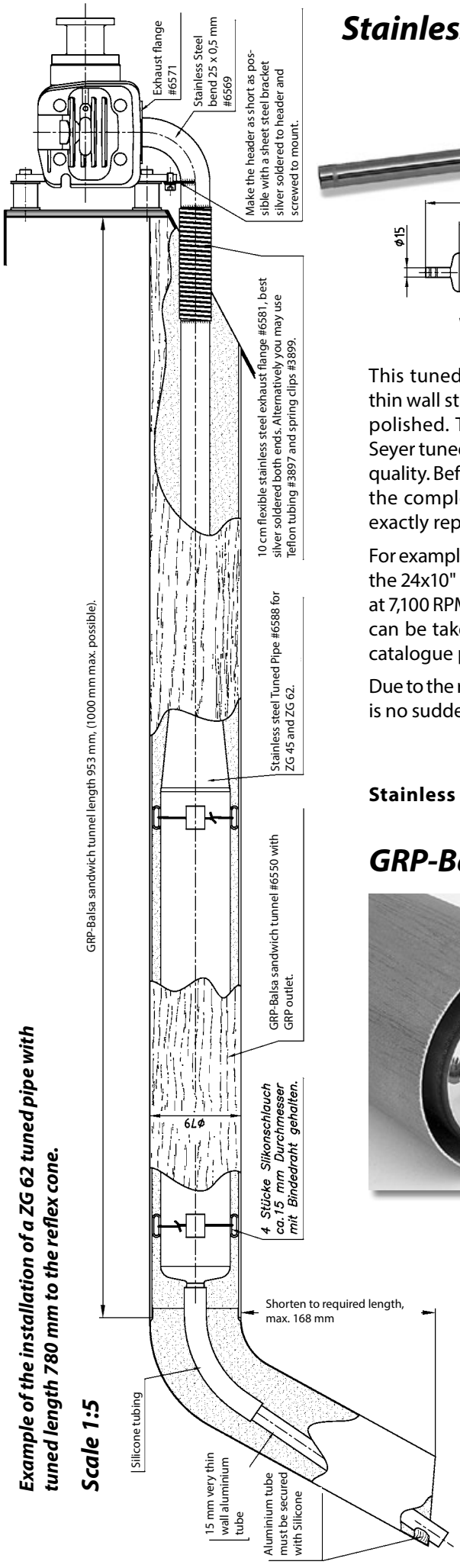
Weight 400 g.

This tuned pipe is precision engineered from thin wall stainless steel, laser welded and highly polished. The geometry is exactly that of the Seyer tuned pipe but it is of indescribably better quality. Before Seyer ceased business we bought the complete set of tools and dies so we can exactly reproduce these pipes.

For example, with this tuned pipe a ZG 62SL turns the 24x10" Super Silence CF two blade propeller at 7,100 RPM with a 17 cm header length. The tuning length for other propeller speeds can be taken from the power curves from the ZG 45, 62 and 80 on the respective catalogue pages.

Due to the reflector cone, the tuning effect produces a smooth increase in power, there is no sudden jump in RPM and the power increase is spread over a wider rpm range.

Stainless Steel Tuned Pipe for engines from 45 to 80 cc #6588 € 169,—



Example of the installation of a ZG 62 tuned pipe with tuned length 780 mm to the reflex cone.

Scale 1:5

GRP-Balsa Sandwich Tuned Pipe Tunnel.

These tunnels are exceedingly stiff while being extremely light, this enables a simple and quick installation. There are no extra formers required.

The sandwich is 1,5 mm Balsa glassed both sides with epoxy/woven glass fiber. The tunnel is 1 meter long, inside diameter is 75 mm. The tuned pipes for the ZG 38, ZG 45, ZG 62 and ZG 74/80 fits perfectly into the tunnels.

The very light epoxy/glass outlet is more than long enough and can be shortened, if required, to suit all conditions.

The Outlet is supplied with each tunnel. The tunnel tube and the outlet bend can be supplied colored, either blue or yellow.

GRP-Balsa Tuned Pipe Tunnel with outlet bend.....#6550 € 69,90
GRP-Outlet bend, transparent.....#6551 € 19,90

Stainless Steel Silencer with tuned header length

Tuned pipes are usually rather long and often difficult to build into the fuselage. The silencer #5770 is only half as long including the header, and lighter also.

Originally developed for the DA 50, this tuned silencer increases the power of the ZG 62 by 25%. The 23x12" and the 24x10" Super Silence CF-propellers turn at 6,800 rpm. The silencer is neatly laser welded and highly polished.

The optimum header length is 22 cm. It is measured from the exhaust gasket along the center line of the header up to the join between the header and the inlet of the silencer.

Tuned silencer #5770 with header #6670 mounted on a Titan ZG 62PCI.

Stainless steel silencer ZG 38/45/62/80B, DA 50/DA 100

with front exhaust .....#5770 € 109,90

with rear exhaust .....#5775 € 109,90

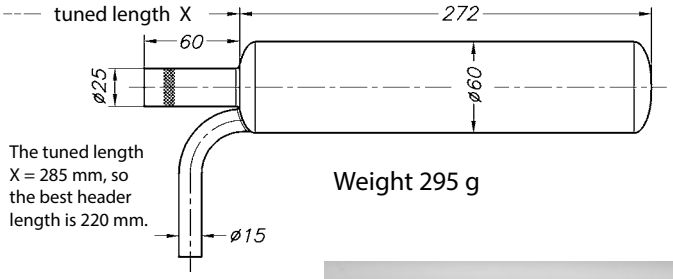
Extra for smoke nipple .....#5772 € 3,95

Fixing clamp with base .....#5773 € 12,95

Made from stainless steel, a simple quick and safe fixing for silencers with 60 mm diameter.

Teflon tube ø25x2 mm, 5 cm .....#3896 € 4,50

Spring clip for ø25 mm.....#3899 € 1,75



Weight 295 g

#5775

#5773

The tuned stainless steel silencer #5770, header #6676. Teflon tube #3896 and spring clip #3899.

Stainless Steel Headers for ZG 45 / 62

Light headers from tough thin wall stainless steel 25 x 0,5 mm. The headers are supplied with a middle line length of 22 cm, this is the optimum length for the stainless steel silencer #5770.

When used with the tuned pipe #6588, the header can be shortened to suit the desired tuned length. Usually sawed off to 17 cm measured along the center line.

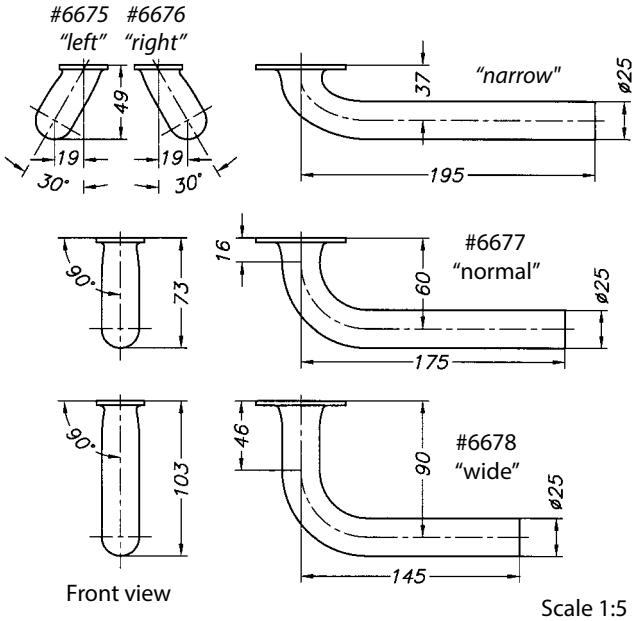
Weight as delivered is 90 g

Header ZG 45/62, narrow, inclined left #6675 € 31,95

Header ZG 45/62, narrow, inclined right #6676 € 31,95

Header ZG 45/62, "normal" #6677 € 29,95

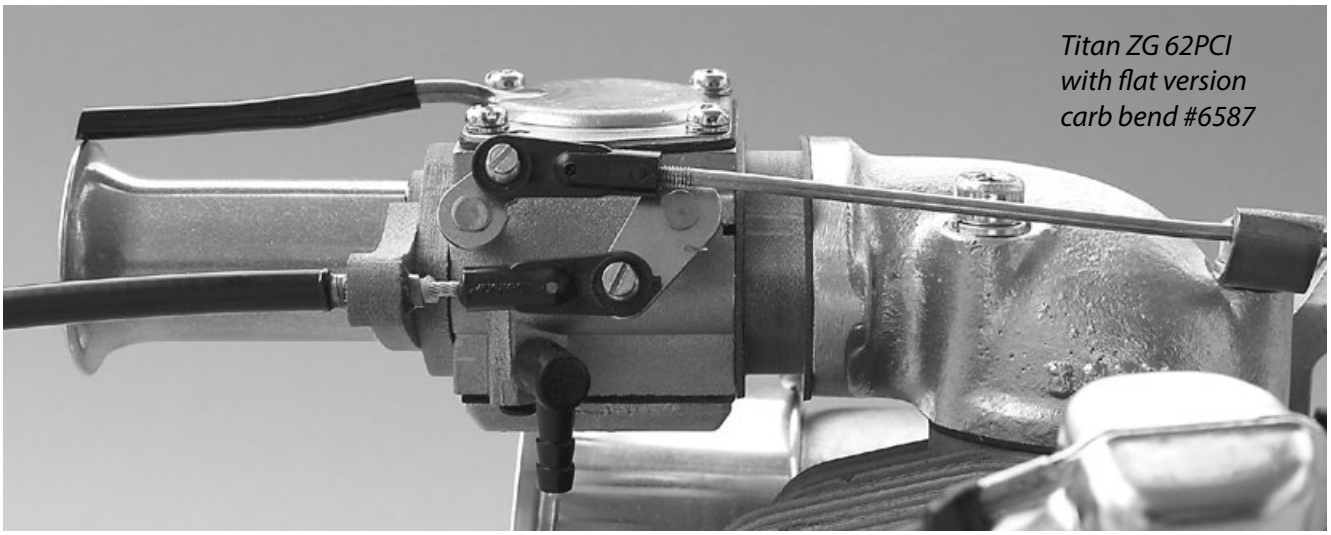
Header ZG 45/62, "wide" #6678 € 29,95



Front view

Scale 1:5

Carburettor intake bends for the ZG 62 and ZG 45



Titan ZG 62PCI with flat version carb bend #6587

Flat version carb bend for the ZG 62

Suitable for the Piper- and Pitts-Hydro-Mount-System and of course for rigid mounted engines. This manifold is somewhat flatter in profile than the manifold constructed from two flanges and a copper elbow. The intake tract of this manifold is rather like a corkscrew and therefor allows a surprisingly large radius. Running characteristics of the motor and power output are excellent. All fixing screws are easily accessible. You now have no reason for the unsightly carb to be poking out of the cowl. This bend is supplied with fixing screws. For use with the Piper and Pitts HMS we recommend you use the 7 mm insulator #6567; alternatively the black standard insulator supplied with the ZG 62 can be shortened to 7 mm. With the standard motor mount the 2 mm insulator #6552 is preferred. **One extra gasket #6504 is required!**

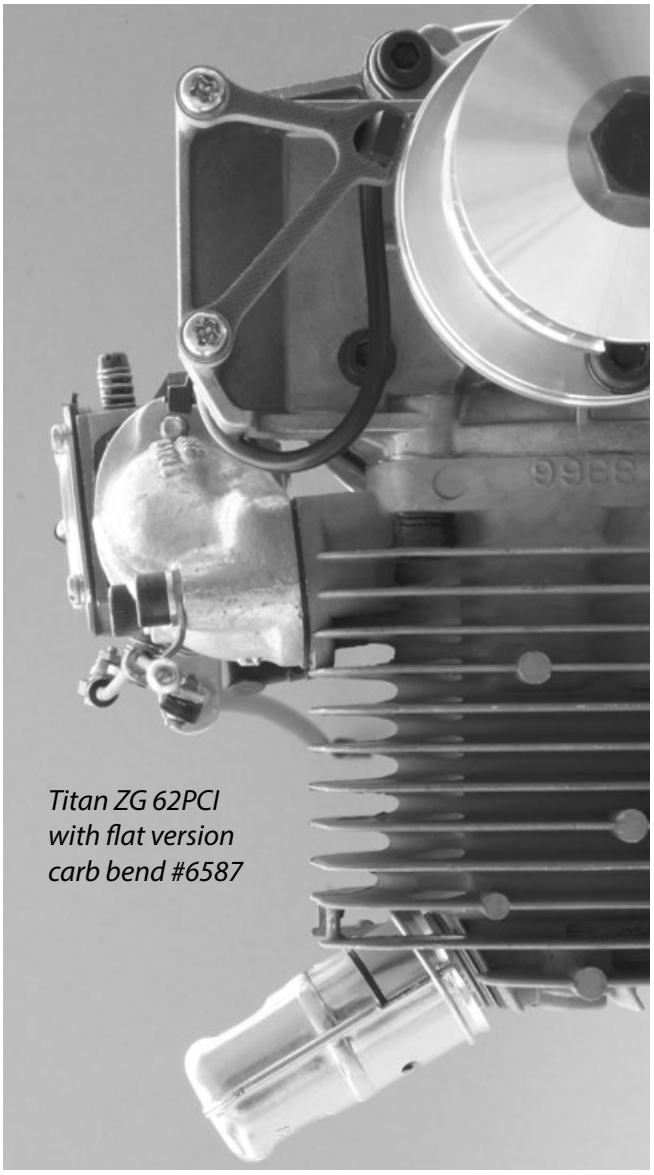
Carb bend, flat version for ZG 62 .....#6587 € 39,95

Carb bend for ZG 45SL

Suitable for the Piper Hydro-Mount-System, also for a normal motor mount.

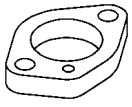
Supplied complete with fixing screws, gasket #6504 and the 6 mm insulator #4587.

ZG 45SL carb bend, complete..... ..#4587 € 46,95



Titan ZG 62PCI with flat version carb bend #6587

Carburettor insulating Blocks:



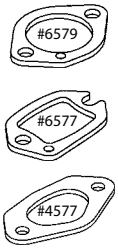
7 mm thick..... #6567 € 6,75
6 mm thick..... #4589 € 6,75
2 mm thick..... #6552 € 5,95

Without these insulating blocks there is the problem that the carburettor temperature will rise after shutting down the engine. Your wish to start the engine a few minutes after shutdown will not be possible, as the petrol entering the hot pump chamber and associated passages will vaporize. These insulators are CNC milled and bored for use with the intake bends.

Intake Bend ZG 62 for the CAP 21

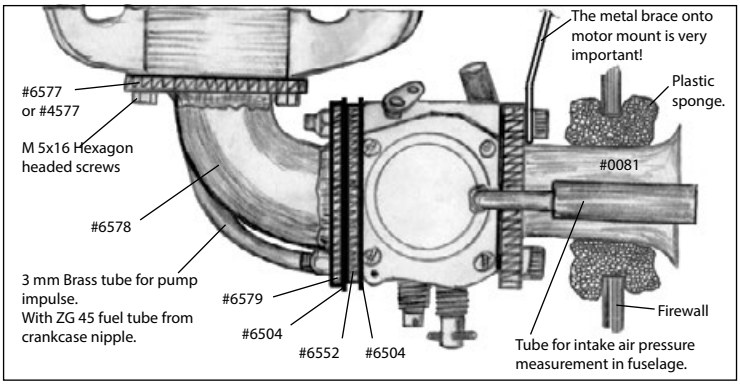
Unfortunately it is not possible to manufacture the special cast aluminium bend designed for our CAP 21 Hydro-Mount-System so that it performs as good as the bend you can make from the copper water pipe bend and the two respective flanges. You should better make your own bend using the drawing supplied with the CAP 21 Hydro-Mount-System. With the copper bend you will be able to get a lower tickover speed, which is a worthwhile reward for your handwork, especially with our very light weight CAP 21.

Laser cut Carburettor Flanges



Made from 2 mm stainless steel. Provided you can silver solder, the home made bend is a good alternative to the ready-made cast aluminium intake bend. It takes a little time, but saves money and you can alter the geometry to suit your needs. The bend must be as short as humanly possible to obtain the best possible tickover speed.

Carburettor flange ZG 45/62 ..... #6579 € 4,95
Carb. cylinder flange ZG 62 ..... #6577 € 4,95
Carb. cylinder flange ZG 45 ..... #4577 € 4,95
Copper bend and brass tube ..... #6578 € 1,95

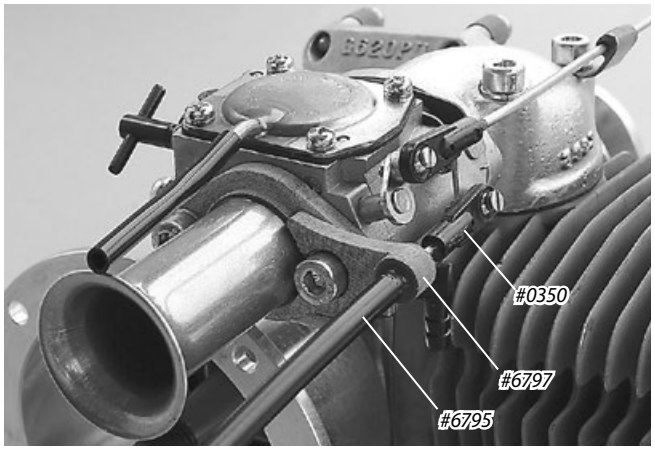


Intake Tube with Tufnol Flange

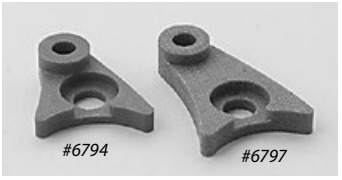
For the Titan ZG 23, ZG 38, ZG 45 and ZG 62 carburettor. This intake tube raises the power and reduces the fuel consumption in our preferred rpm range. The acceleration is also greatly improved. If required, you may shorten the trumpet shaped intake tube. It is then epoxied into the flange.

The precision CNC-milled Tufnol flange eliminates the common problem with the choke not fully closing when the intake trumpet is not carefully centered onto the carburettor.

Intake tube with Tufnol-flange ..... #0081 € 10,90
Tufnol flange only ..... #0089 € 4,95
Intake tube only ..... #0086 € 6,50

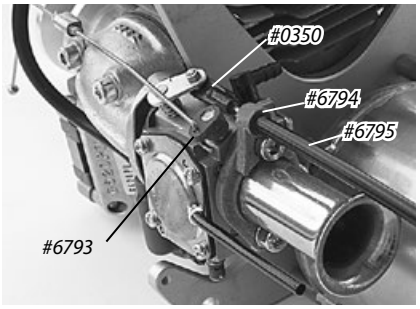


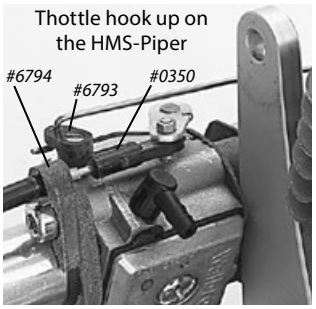
Bowden Cable Fixing Strut



These struts are CNC-machined from Tufnol. They make for a simple and precise fixing of the Bowden cable outer at the intake trumpet flange. The larger version will normally be used, but for our Piper Hydro Mount System, due to lack of space, the shorter version must be used as the ball joint must be **under** the throttle arm.

Bowden cable fixing strut "normal" #6797 € 1,95
Short fixing strut for use with HMS-Piper #6794 € 1,95





Tufnol Choke Lever Arm d=4,7mm

These CNC-machined lever arms fit the choke valve shafts on all the Titan ZG and Zenoah engines.

Remove the steel arm and epoxy the Tufnol arm onto the shaft with Araldite 2011. With Tufnol there is no fear of metal to metal contact when using a wire with a "Z" bend to operate the choke.

Choke lever arm for 4,7 mm shafts ... #6793 € 1,15

Steel Bowden cable with Teflon sleeve

for carburettor hook up, 40 cm ..... #6795 € 1,95

Titan ZG 80B

SPECIFICATIONS:

Capacity: 80 cm^3
Bore x stroke: 40,5 x 31 mm

Power:

Standard silencer 5,1 hp
without silencer: 6,0 hp
with tuned pipe: 7,2 hp
max. torque: 6,5 Nm

Weight: 2790 g
(without silencer)

Fuel: Lead-free normal petrol
BEL RAY H1R 50:1

Titan ZG 80B #7800 € 869,—

5 years guarantee!*

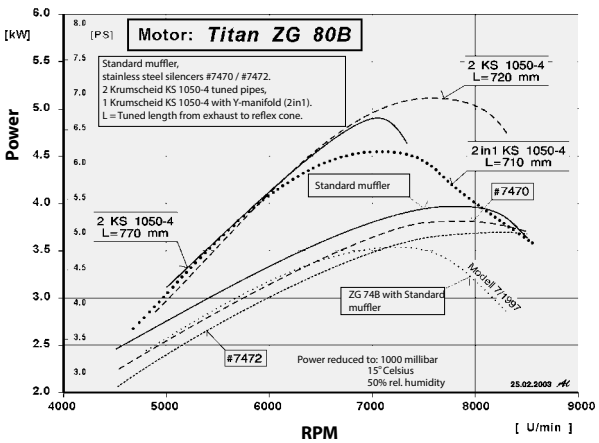
This engine is a masterpiece, it has got to be, it is made by Komatsu Zenoah's engineers. Komatsu engineers are doing what they do best, anyone can see this by just taking a quick glance at this new Zenoah twin. This engine is not a collection of industrial and purpose made parts put together by amateurs in spare time. It is a professionally designed and built engine from start to finish.

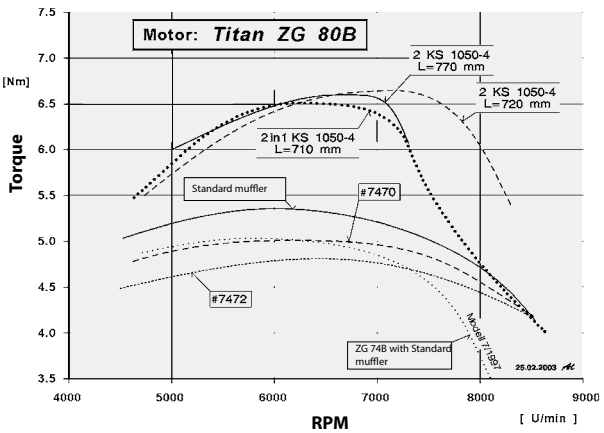
The cylinders of the new Titan ZG 80B have had the bore size increased, which of course means new pistons and rings. Outside measurements and components are exactly the same as the ZG 74B. The only visible difference is the addition of the three longitudinal ribs on the outermost cooling fin.

Note the extremely small offset between the cylinders, this reduces vibration to a minimum. The beautifully cast intake manifold is laying as flat as humanly possible onto the motor.

The vastly superior CD Magneto Ignition, using rugged standard size resistor spark plugs, but in spite of these, this twin is only 257 mm wide over all. Flying is such fun, it is enough that you must concern yourself about the fuel level without having to worry about an ignition battery. The ZG 80B is supplied with screened HT-cables.

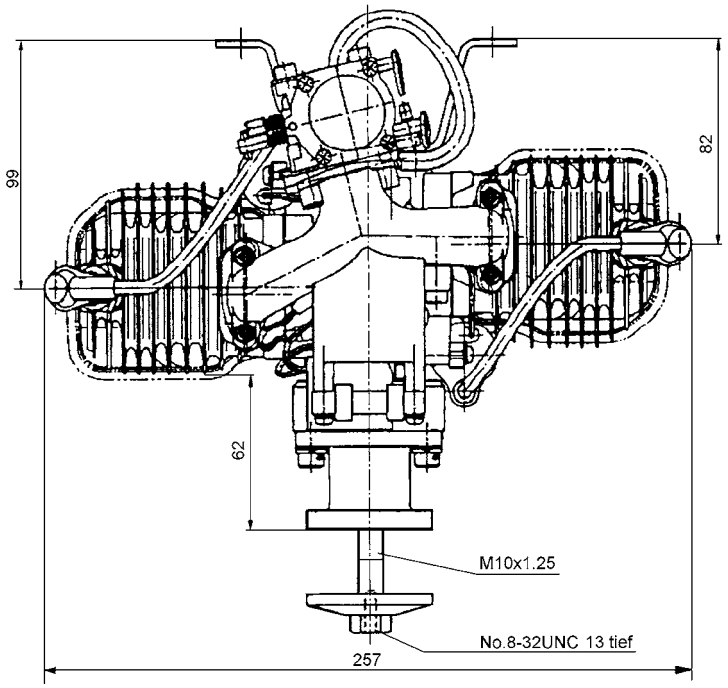
Only one carburettor for ease of adjustment and throttle linkup. Piston porting for simplicity and reliability, so no need for troublesome reed valves or complicated rotary inlet valves. Experience has shown us the single heavy duty propeller fixing screw is the best. No mechanically unsound, and dangerous, multi screw propeller fixing.

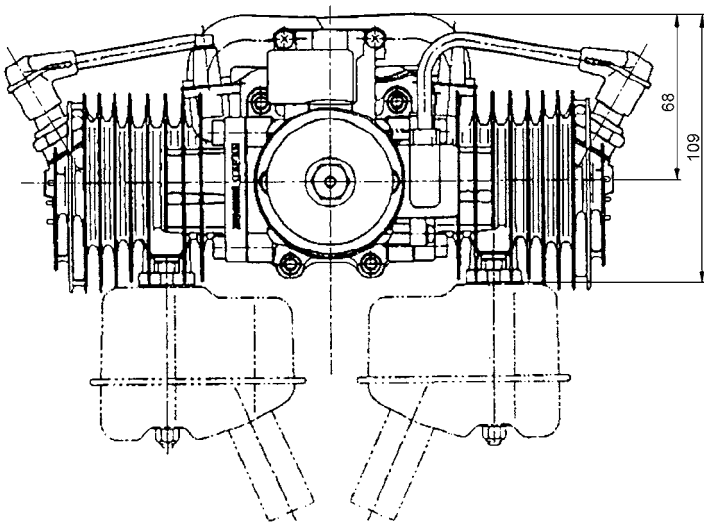




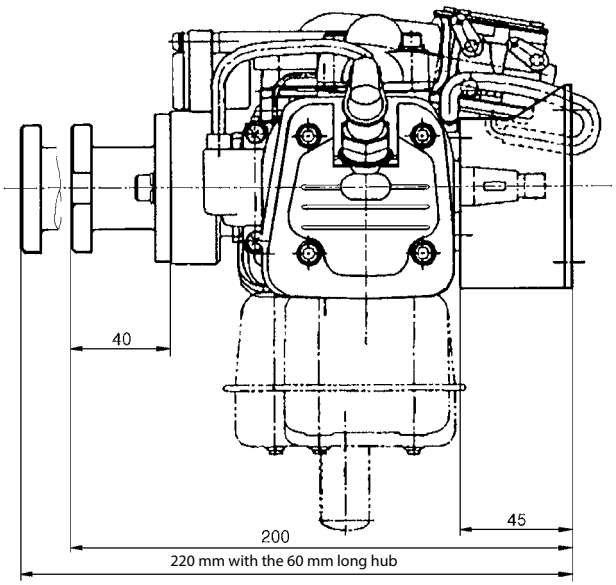
These curve charts were made by Dietrich Altenkirch. They are taken from his exhaustive test report of the Titan ZG80B in the Model Magazine dated June 2003. In the RPM range around 6000, one can use the bifurcated header #7478 and one tuned pipe, this is a lot cheaper and a lighter alternative to two tuned pipes.

* Guarantee conditions see page 49





Titan ZG 80B ***Scale 1:3***



Suitable propellers are the Menz-S-two blade 22x12, 24x10, 24x12, 26x8 and 26x10. From the Menz-S three blade propellers you can use the 21x12, 22x10 and 22x12. Ideal for quieter running is the 22x12 and 23x12 Super Silence -CF-3-blade. For best performance use the 24x12 Super Silence-CF-2-blade. With tuned pipes we recommend the 23x12, and 24x12 Super Silence -CF-3-blade prop´s. and the 26x12 Super Silence -CF-2-blade prop.

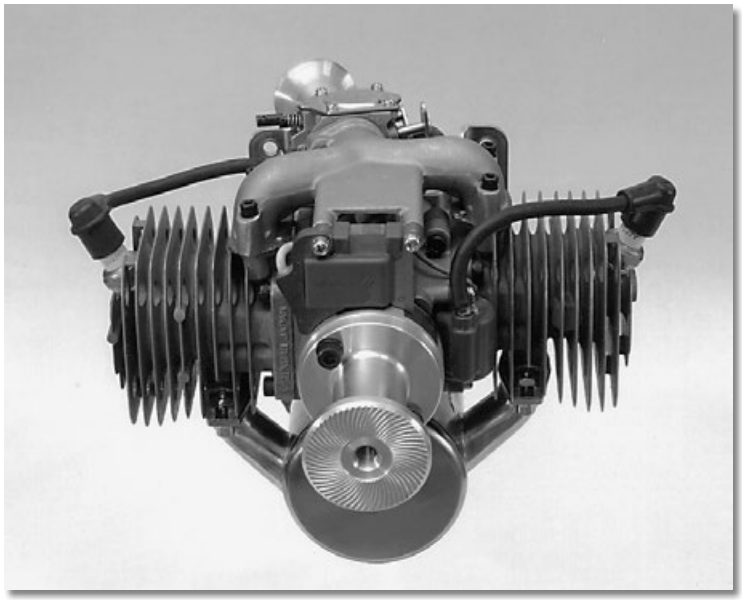
The ZG 80B is supplied with two silencers, spark plug spanner, motor mount and our Easy-Start System. Lightweight stainless steel silencers, header pipes, intake trumpet and longer propeller hubs are available.

Titan ZG 80B..... #7800 € 869,—
with Easy-Start-System, fitted with 40 mm prop hub.

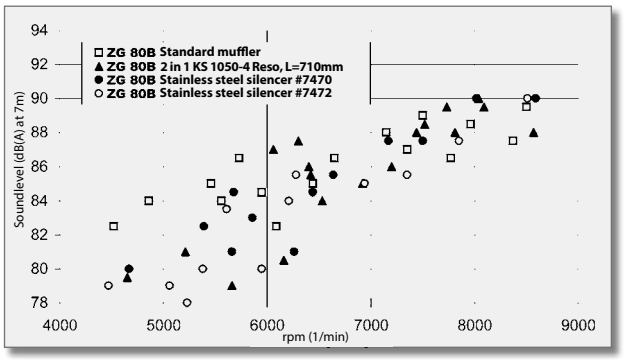
ZG 80B without Startbox #7899 € 809,—
but with Easy-Start-Socket fitted, 40 mm prop hub.

Extra for 60mm prop hub ... #6560 € 24,95
Instead of the 40mm standard hub. Only possible when purchasing a new engine.

60 mm propeller hub ..... #6563 € 37,95

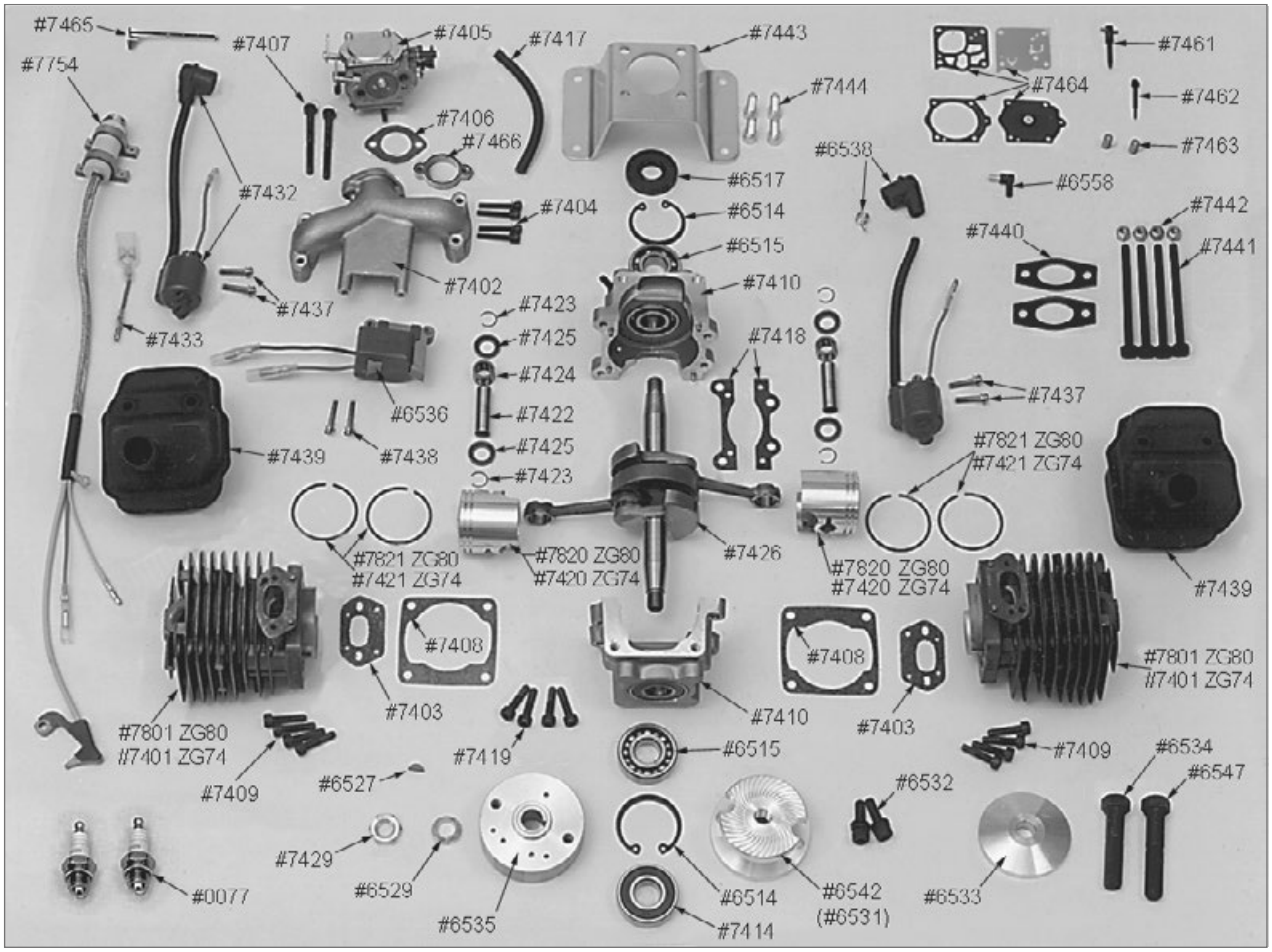


Titan ZG 74B fitted with the stainless silencer #7470 and intake tube #7480.



These sound levels were measured by Dietrich Altenkirch with Menz-S two blade propellers.

Spares for the TITAN ZG 74B/80B

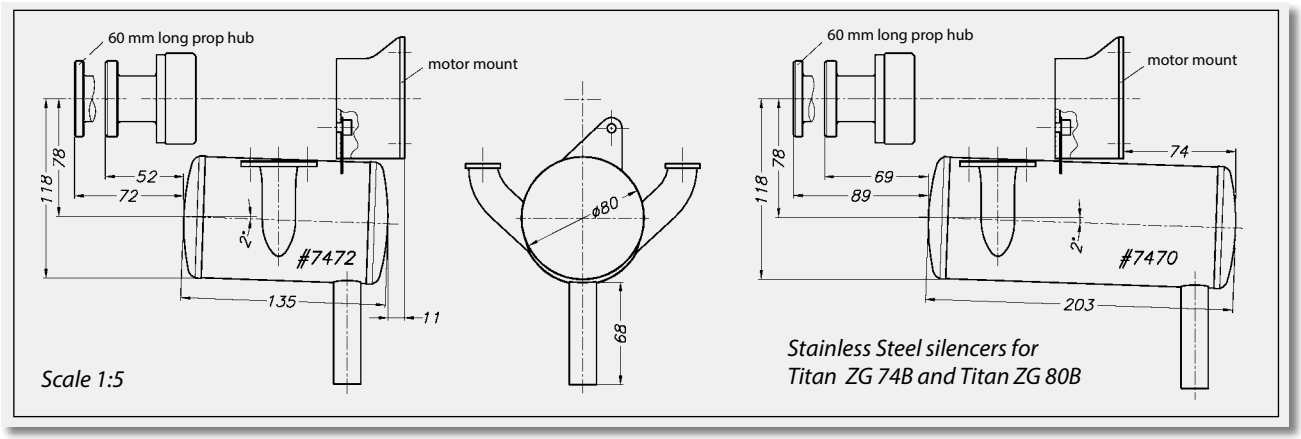


No.	Description	€
#0077	Sparkplug Champion RCJ-7Y	4,95
#6514	Snap ring	0,90
#6515	Crankshaft bearing, per 1	6,95
#6517	Seal	3,65
#6527	Woodruff key	0,95
#6529	Spring washer	0,15
#6531	Prop hub, 30 mm long, -no longer available	
#6532	Screws with spring washer, pair	0,95
#6533	Propeller washer	9,95
#6534	Prop screw, 45 mm long	2,75
#6535	Flywheel	44,95
#6536	Power coil	69,95
#6538	Plug cap with spring	3,45
#6542	Prop hub, 40 mm long, since 08/03	28,95
#6547	Prop screw, 50 mm long	4,95
#6558	Nipple for crankcase and carb	4,70
#7401	Cylinder for ZG 74B, 1 piece	89,95
#7402	Intake manifold	49,90
#7403	Gasket intake manifold - cylinder	1,95
#7404	Screw for Intake manifold, per 1	0,50
#7405	Carburettor	79,90
#7406	Gasket carb - Intake manifold	1,95
#7407	Screw for carburettor, pair	0,95
#7408	Cylinder gasket, per 1	2,55
#7409	Cylinder screw, per 1	0,75
#7410	Crankcase with bearings and seal	129,95
#7414	Sealed crankshaft bearing, front	8,95
#7417	Pump connecting tube	0,30
#7418	Crankcase Gasket, set	2,75

No.	Description	€
#7419	Crankcase screw, per 1	0,35
#7420	Piston for ZG 74B, per 1	22,50
#7421	Piston rings for ZG 74B, pair	13,85
#7422	Gudgeon pin, per 1	4,95
#7423	Gudgeon pin clips, per 1	0,50
#7424	Small end bearing, per 1	6,95
#7425	Spacer washers, pair	2,95
#7426	Crankshaft with conrod	169,90
#7429	Flywheel nut	0,50
#7432	Ignition coil with plug, screened	69,90
#7433	Y - connector	3,95
#7437	Ignition coil screw, pair	0,40
#7438	Screw for power coil, per 1	0,20
#7439	Silencer, per 1	22,50
#7440	Exhaust gasket, per 1	2,40
#7441	Silencer screw, per 1	1,80
#7442	Safety nuts, pair	1,50
#7443	Engine mount	29,95
#7444	Engine mount screws, 4 pieces	0,95
#7461	High speed needle (with bar)	7,95
#7462	Low speed needle	7,95
#7463	Needle spring, per 1	1,95
#7464	Carburettor diaphragm set	16,95
#7465	Throttle shaft	10,95
#7466	Insulator for carburettor	6,75
#7754	Easy-Start-Socket for ZG 74/80	47,95
#7801	Cylinder for ZG 80B, per 1	99,95
#7820	Piston for ZG 80B, per 1	28,95
#7821	Piston ring for ZG 80B, pair	13,95

We reserve the right to alter specification and prices.

Stainless Steel Silencers for the TITAN ZG 74 / ZG 80



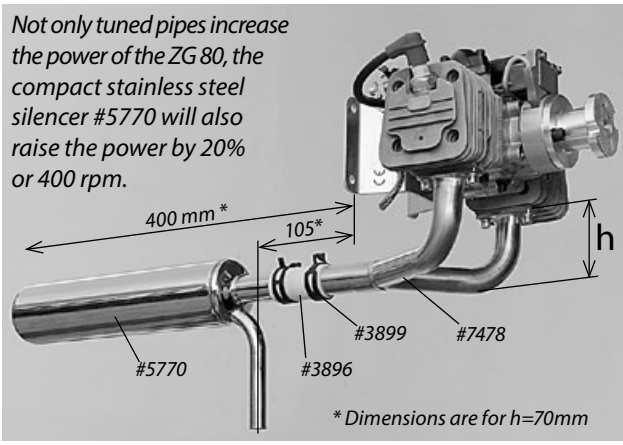
With this compact stainless steel silencer the exhaust gases from both cylinders are fed into one single, but double in volume silencer compartment. A large silencer volume absorbs the lower frequencies a lot better than two smaller ones. For the engine it makes no difference as the exhaust gas pressure is equal on one large or on two silencers of half the size. Therefore the large single silencer concept is more effective overall. This type of silencer is very difficult to manufacture, hence no kit of parts.

Also available with a larger, 20 mm dia. outlet tube.
More power - and noise!

Stainless Steel Silencer, short .. #7472 € 149,90
Although this silencer has only one chamber it is a lot quieter than the two industrial types. Weight is 280 g being somewhat lighter than the former.

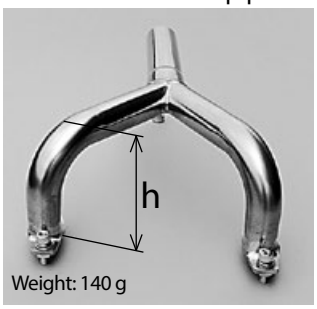
Stainless Steel Silencer, long ..... #7470 € 168,90
As above, with 20 mm dia. outlet ..... #7470 € 168,90
This longer Silencer version has three chambers. It has a really low noise level and more power than the short version silencer #7472. Weight is 395g.

Not only tuned pipes increase the power of the ZG 80, the compact stainless steel silencer #5770 will also raise the power by 20% or 400 rpm.



Y-Header for ZG74/80, 70 mm high ..... #7478 € 69,95
With this Y-Header one stainless steel silencer #5770 or one stainless steel tuned pipe #6588 can be fitted to the ZG 74/80B to increase the performance. The geometric layout gives equal lengths of 22 cm on both cylinders, this is the optimum tuning length for the silencer #5770.

The height h=70 mm. Other sizes in height can be made for an extra 5 Euros.



Weight: 140 g

Header Pipes for ZG 74/80 ... #7476 € 52,90

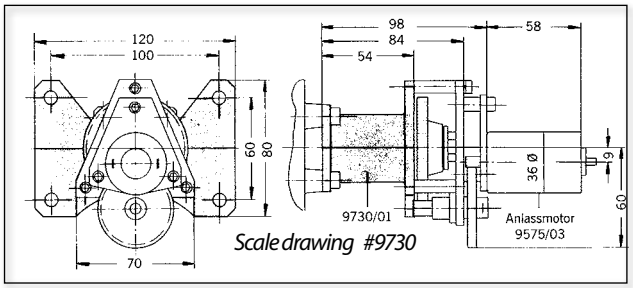
Lightweight header pipes made from 25 x 0.5 mm stainless steel bends.
They can be fitted either towards engine middle or outwards.
Height 50 mm
Weight: 170g/pair.

Intake tube ZG 80, DA-85, VM 170-420 #7480 € 29,95
Reduces fuel consumption and increases the power in the rpm range we prefer. Length 60 mm, inner diameter 22 mm. This aluminium intake tube weighs only 12 g. It is fixed to the carburettor without a gasket, so to assist cooling of the carburettor.

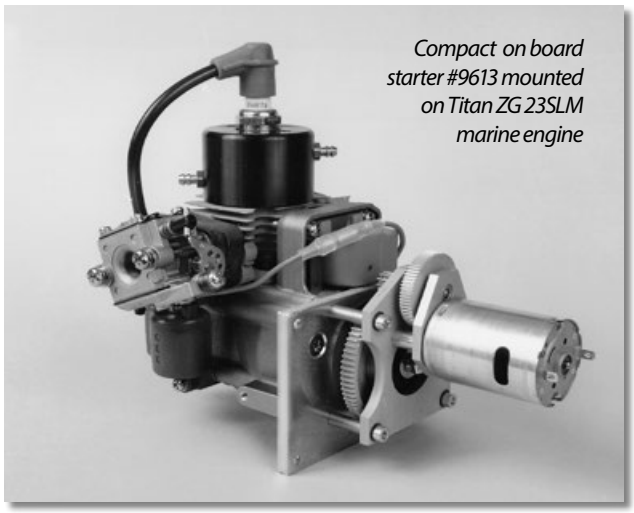
Exhaust Flange ZG74/80 ..... #7471 € 5,50
Laser cut from 3 mm stainless steel.

FEMA On Board Starter

Compact on board starter #9730 on Titan ZG 80B



Scale drawing #9730



Compact on board starter #9613 mounted on Titan ZG 23SLM marine engine

Using these FEMA starters enables one to start the engine either on the ground or in the air with the transmitter.

Compact-Onboard-Starter-System:

The electric motor and starter are built directly onto the engine as a single unit, thereby making a very compact unit.

Advantages with the compact on board starter:

- Simple to instal the engine complete with starter in the model as well as on the test stand.
- Easy to maintain either the starter or the engine.
- The complete unit can easily be fitted to shock damped rubber mountings.

The on board starter kits contain all the necessary mechanical and electrical parts including the electric motor with reduction gearbox and switches. The FEMA motor mount for the ZG 45/62 and the motor mount for the ZG 80 is also included. The motor mount for the ZG 80 has the same length and hole spacing as the standard motor aluminium mount has.

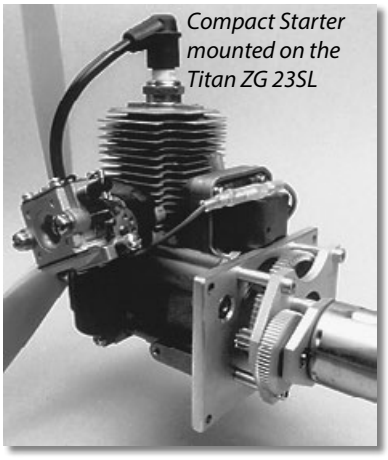
The Compact Starter for the ZG 45/62 can be mounted on the Pitts HMS. We can supply a special drilled spider leg motor mount.

The much feared kick back from the ZG engines, caused when not enough fuel has been sucked in before starting, can be absorbed by the EKA-module. (EKA = Electronic Kickback Absorber). This module contains a simple electronic which feeds the primary current into the coil only after a certain higher speed has been reached. This unit requires no extra energy supply and reduces the strain on the gearing when starting the engine. The EKA-module is inserted between the power coil and the ignition coil in the existing double end connector.

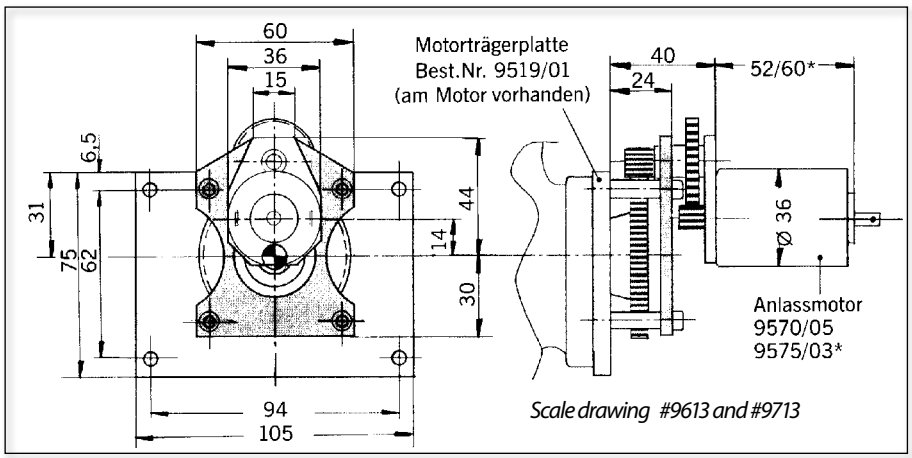
With the ZG 80 twin the EKA-module is not sufficient. The best answer is to convert the engine to the PCI battery ignition, no need for the EKA-module then.

The starter is switched on with a servo operated Micro Switch. A simple but more reliable method than with a complete electronic switching module.

The Starters (the complete sets as well) are supplied without a



Compact Starter mounted on the Titan ZG 23SL



Scale drawing #9613 and #9713

battery. The Starters require high performance NiCd-, NiMH- or LiPo batteries such as used for electric-flight. For engines up to the ZG 38 9,6V is needed, for the ZG 45 and 62 it is 12V. For the ZG 80 12V is minimum, 14,4 is better. Minimum capacity is 1,000mAh in every case. Starting current is 16A.

Compact on board starter, complete sets:

Compact on board starter ZG 20 .....#9715 € 192,20

Compact on board starter ZG 23/26 ....#9713 € 192,20
Weight without battery: 440g.

Comp.o.b. starter ZG 23/26 Marine.....#9613 € 198,50
Weight without battery: 440g.

Comp.o.b. starter Zenoah G230/260RC .....#9400 € 298,—

Comp.o.b. starter ZG 231SLH/ZG26SLH.....#9420 € 242,—

Compact on board starter ZG 38 .....#9714 € 192,—
Weight without battery 490g. Cannot be used with the stainless silencer #3877.

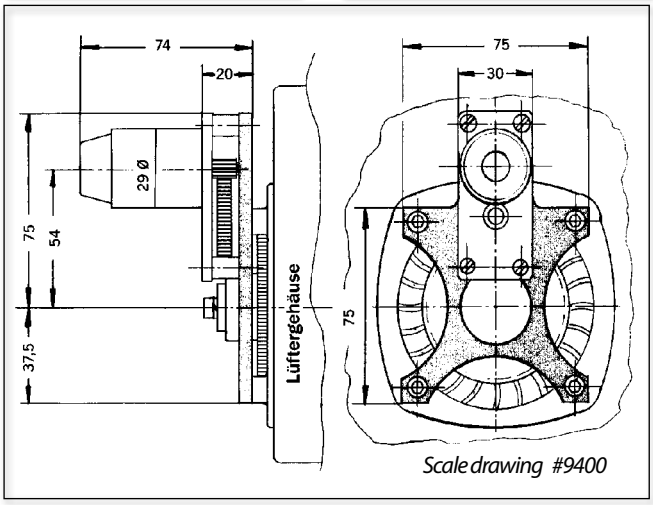
Compact on board starter ZG 45 .....#9725 € 239,50
Without EKA-module = Electronic Kickback Absorber. Weight without battery: 700g.

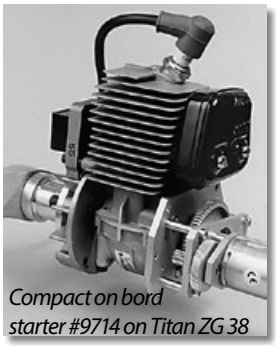
Compact on board starter ZG 62 .....#9724 € 239,50
Without EKA-module = Electronic Kickback Absorber. Weight without battery: 710g.

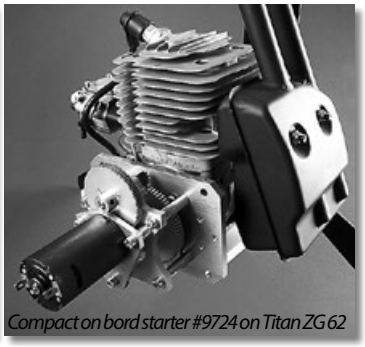
Comp. on board starter ZG 74/80B .....#9730 € 298,—
Without EKA-module = Electronic Kickback Absorber. Weight without battery: 840g.

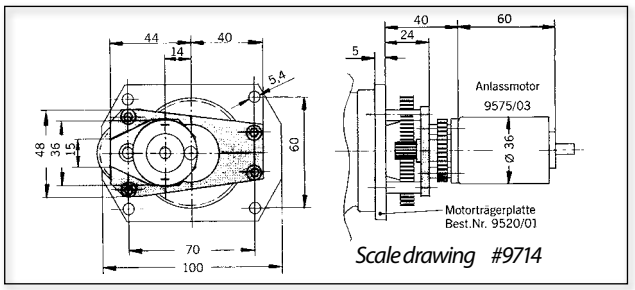
Note: When using the on board starters #9725 and #9724 on engines with the magneto ignition, the **EKA-module is required and has to be bought separately. (Not required with the battery ignition).**

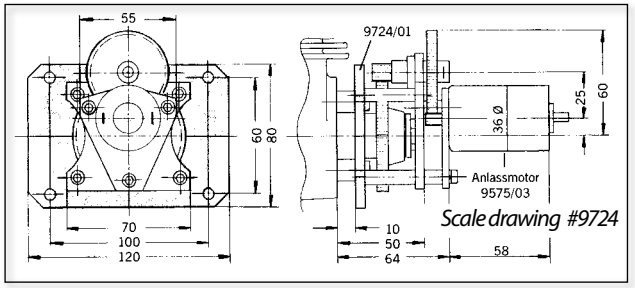
EKA-module .....#7752 € 29,50



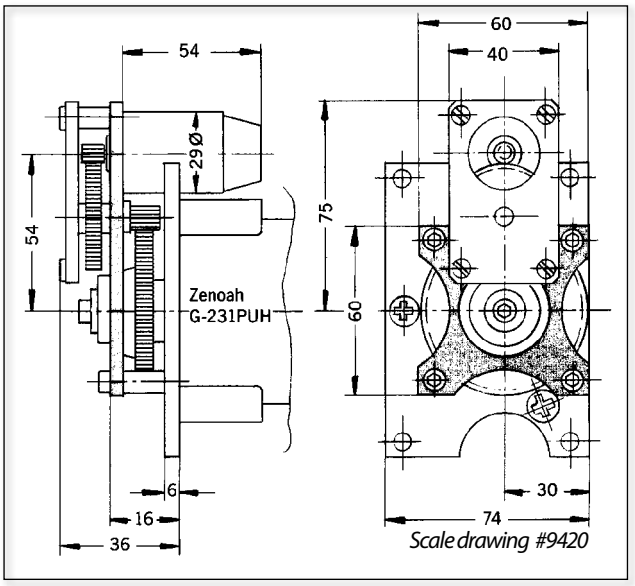

Compact on bord starter #9714 on Titan ZG 38


Compact on bord starter #9724 on Titan ZG 62






EKA-modul #7752



DESERT DA AIRCRAFT

Exclusive Engines

3 years Guarantee

on our

DA - Engines!

This guarantee covers the engine and ignition components in addition to any legally required Guarantee.

The following conditions apply:

The Guarantee is for 3 years from date of purchase.

The serial number on the engine must not be damaged, defaced or removed. The purchase date and the engines serial number is registered by us.

The aluminium cylinder fixing screws must not be tightened or the engines taken apart by the customers. The aluminium cylinder fixing screws can fail when the engine is running if they have been removed and refitted, or when they have been overtightened by unskilled hands.

These engines must run only with the recommended two stroke petrol oil mixture. The use of Methanol fuels nullifies the guarantee.

These engines may only be used with the original ignition.

The guarantee includes the ignition units, the maximum permissible voltage (6 V) must not be exceeded at any time and the polarity must not be reversed. Mechanical damage to the cables is not covered by the guarantee.

The guarantee is that we replace any defective parts free of all labour and material costs and pay only the return postage and packing. This guarantee covers only the engine and can in no way be construed to cover anything else.

The guarantee can in no way be construed to cover crash damage or any following affects of a crash.

Toni Clark practical scale GmbH   Zeiss-Str.10   D-32312 Lübbecke   Tel.05741/5035   Fax.05741/40338

DESERT DA AIRCRAFT

Exclusive Engines

New

DA-35

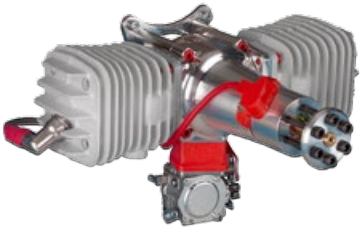
DA-50R

DA-60

DA-85

New

DA-70

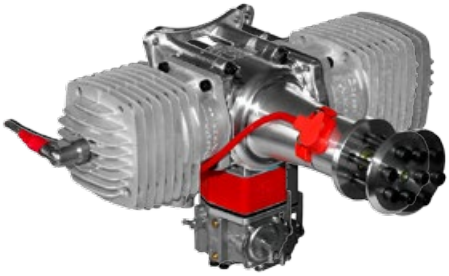


DA-100L

DA-100I

DA-120

DA-150L



DA-170

DA-200

On request, more Info on
www.toni-clark.com

DA-200 L

L = light cylinder.
On request, more Info on
www.toni-clark.com

DA-200 MG

MG = light cylinder and magnesium casting.
On request, more Info on www.toni-clark.com

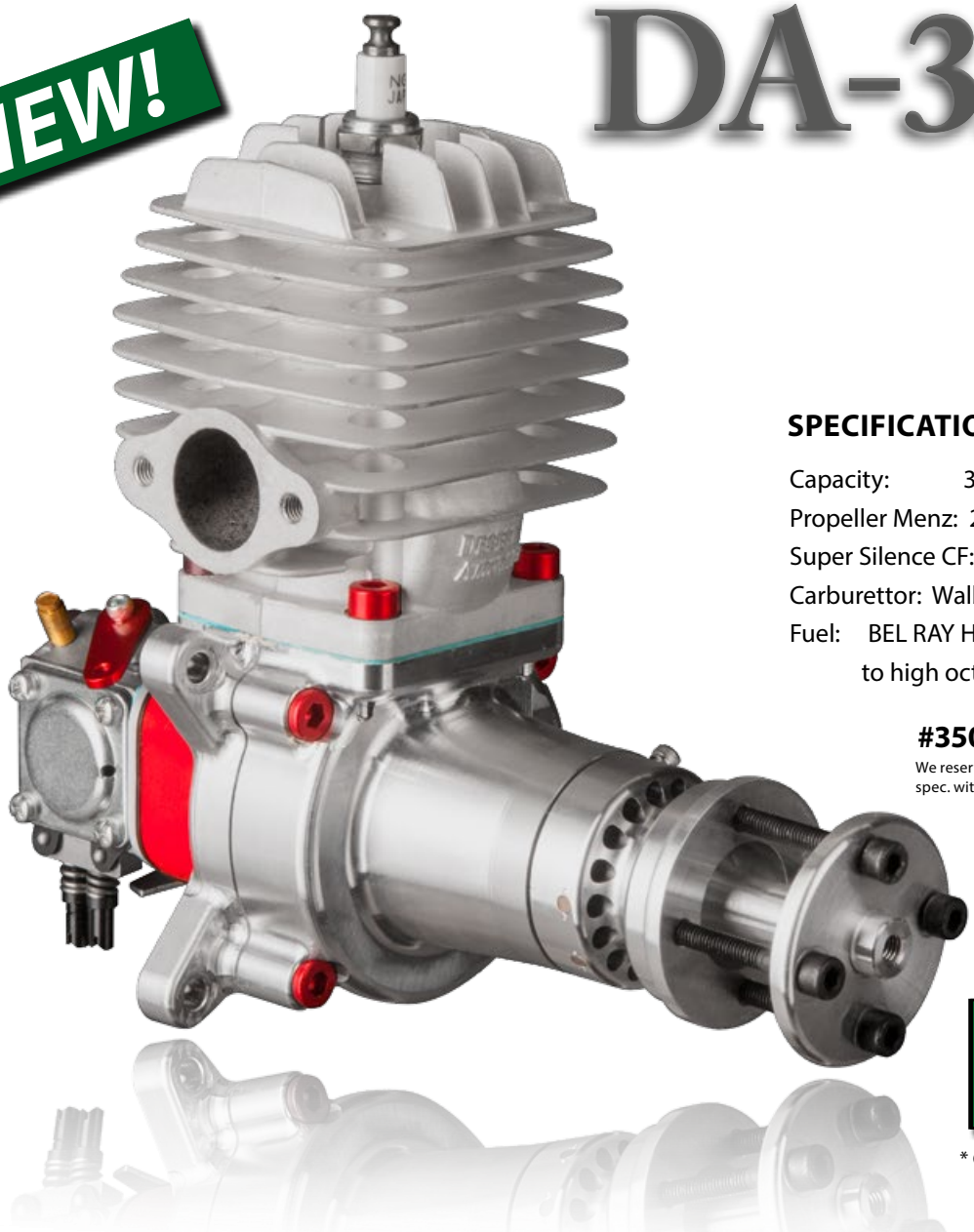
3 years Guarantee*
on all DAengines from Toni Clark practical scale

DESERT AIRCRAFT

Exclusive Engines

NEW!

DA-35



SPECIFICATIONS:

Capacity: 35 cc
Propeller Menz: 20x8
Super Silence CF: 20x8, 21x8
Carburettor: Walbro with Choke
Fuel: BEL RAY H1R / mid
to high octane gas 1:50

#3500 ..... € 548,—

We reserve the right to alter price and spec. without prior notice.

3 years Guarantee* by Toni Clark practical scale

* Guarantee conditions see page 108

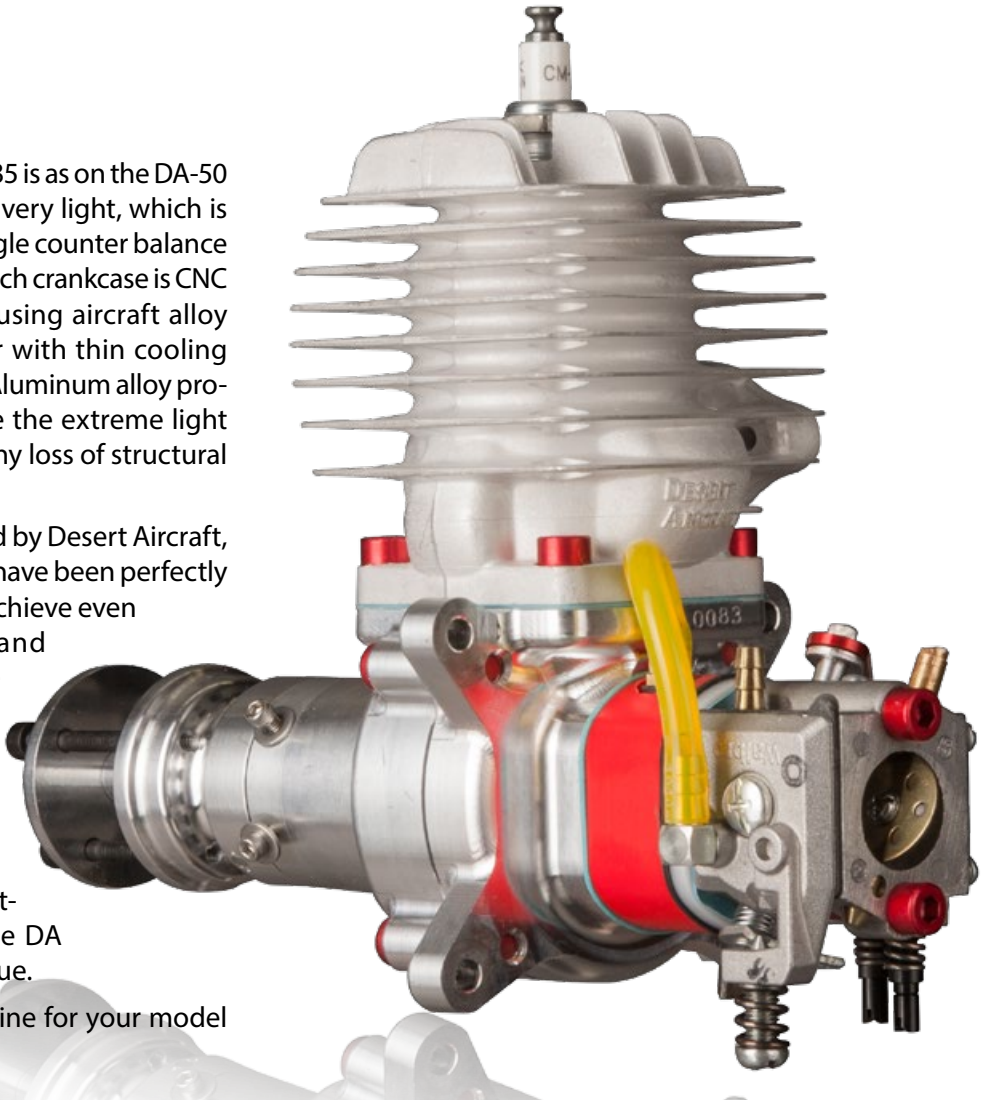
- New designed electronic ignition can be operated directly on two LiPo cells.
- Excellent power to weight ratio and structural integrity.
- Consistent engine performance at all flight attitudes and throttle settings.
- Aerobatic power curve.
- Exclusive Desert Aircraft designed cylinder, piston and crankshaft.
- Aluminium prop shaft extension.
- CNC milled, 7075 T-6 alloy crankcase.
- Long conrod with gudgeon pin located very near to piston crown to reduce side loads.
- Walbro Choke-Carburetor with Desert Aircraft four petal reed valve.
- Rapid spares delivery and repair service from Germany by Toni Clark practical scale GmbH.

The crankcase of the DA-35 is as on the DA-50 unbelievably compact and very light, which is only possible due to the single counter balance weight on the crankshaft. Each crankcase is CNC machined from the solid, using aircraft alloy 7075-T6. The light cylinder with thin cooling fins and such details as the Aluminum alloy propeller shaft makes possible the extreme light weight without incurring any loss of structural integrity.

The reed valves designed by Desert Aircraft, and the Walbro carburetor, have been perfectly matched to the engine to achieve even running in all attitudes and throttle settings. A throttle lever is fitted to the carburetor.

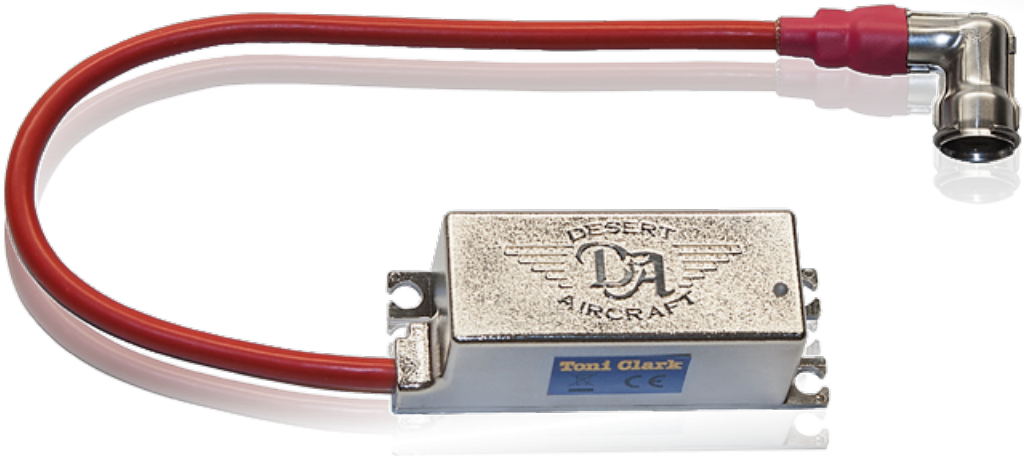
Before delivery, as with all DA engines, every DA-35 is thoroughly test run and the carburetor settings fixed. The worldwide DA service and support is unique.

A DA-35 is the ideal engine for your model in the 30-40 cc class.



DA-35 ..... #3500 € 548,—

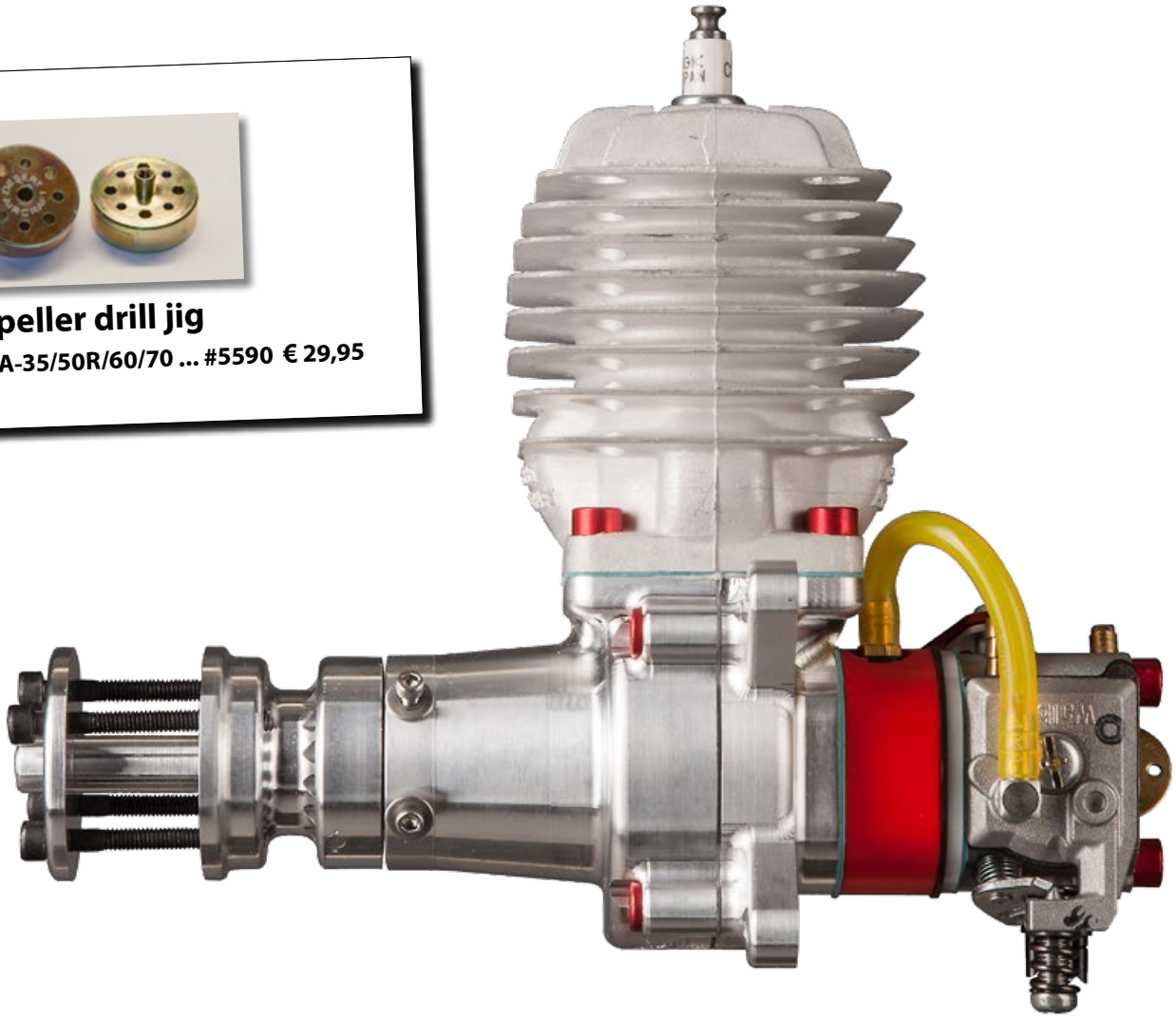
We reserve the right to alter price and spec. without prior notice.



The entirely new designed ignition of the DA-35 has a voltage range of 4.5-8.4 Volts and can be operated directly on two LiPo cells. The screening is protected against wear by a flexible coating. Another new feature is the HT cable of the new DA-Ignition, which can be changed easily.

Propeller drill jig

for DA-35/50R/60/70 ... #5590 € 29,95

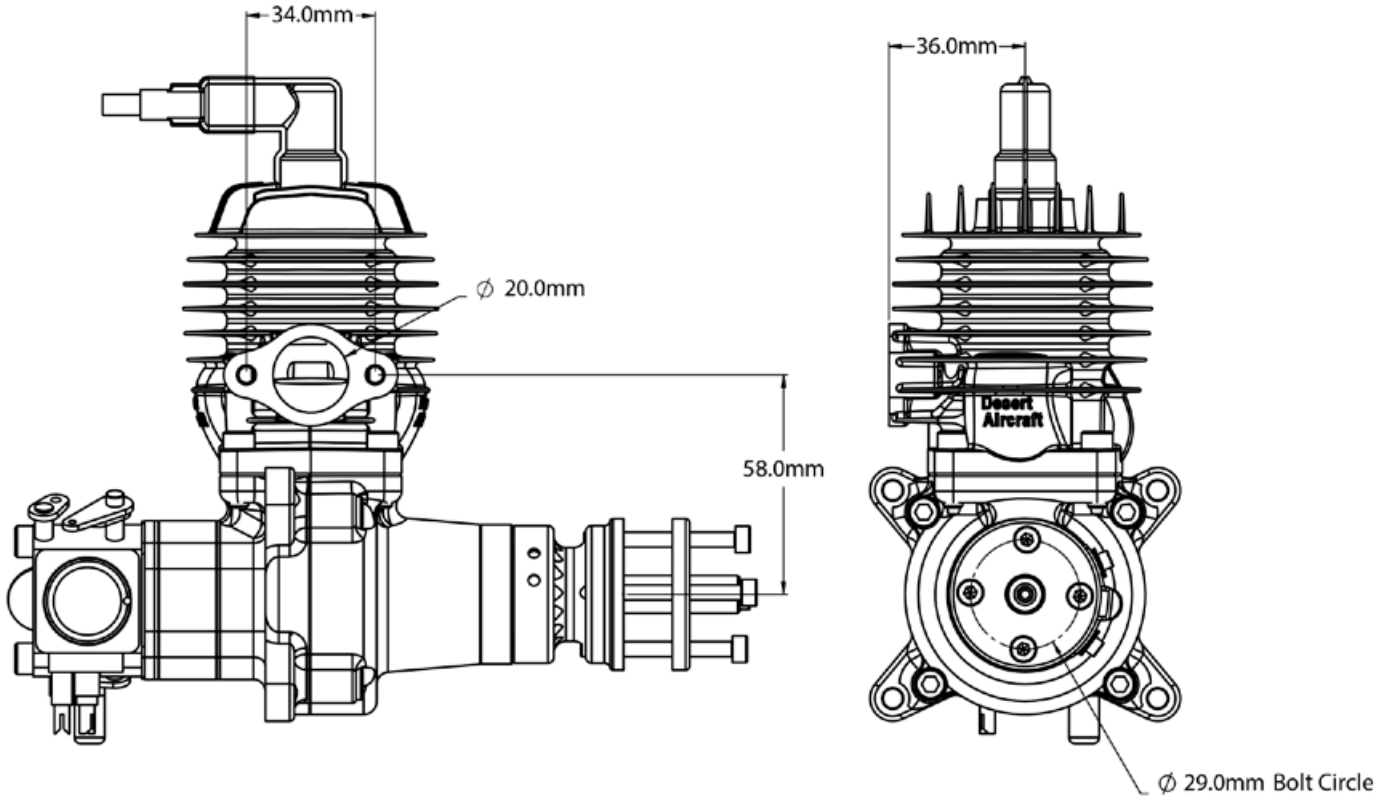


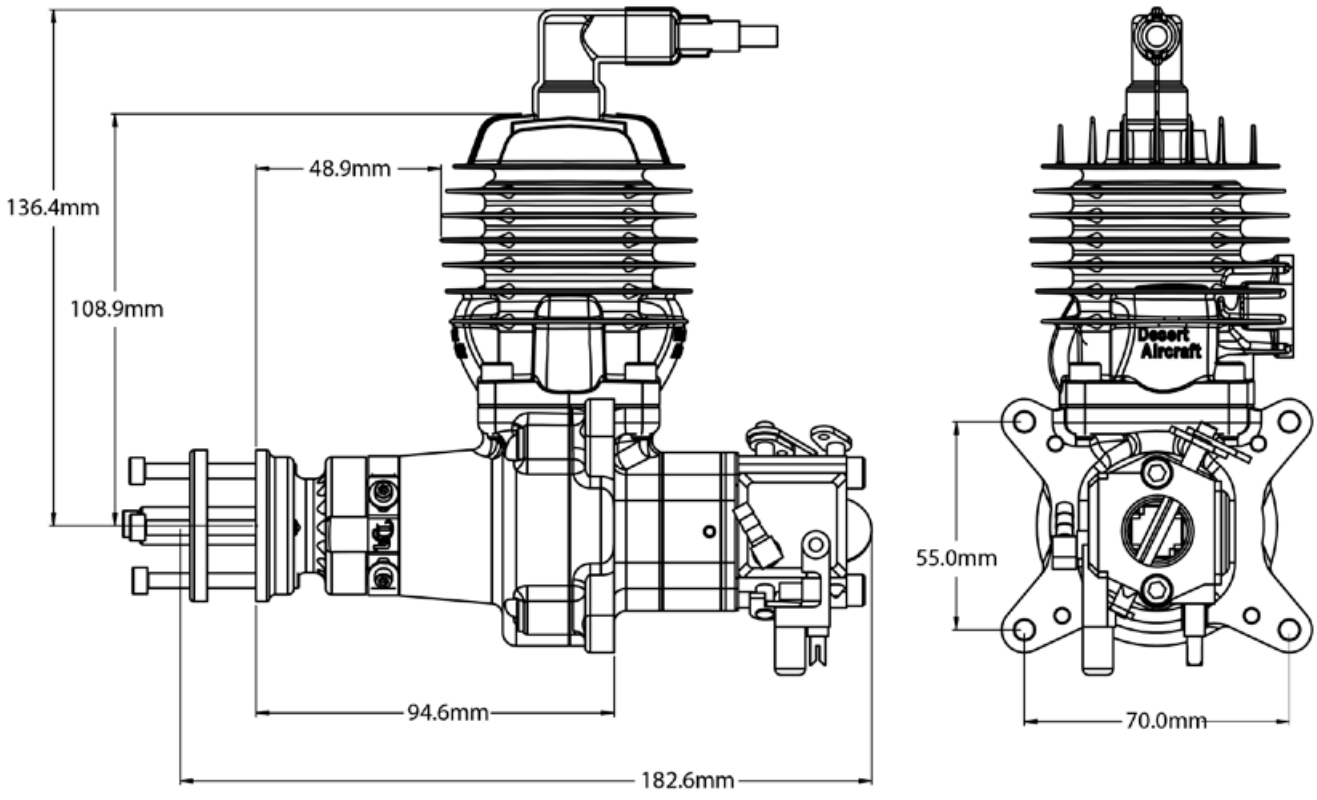
The sideview shows the extraordinary compact crankcase of the DA-35. The throttle responce is like on all DA engines very spontanously, due to the small volume of the crankcase. The engine is delivered with four 67 mm long Stand off`s, to mount the engine on the firewall.

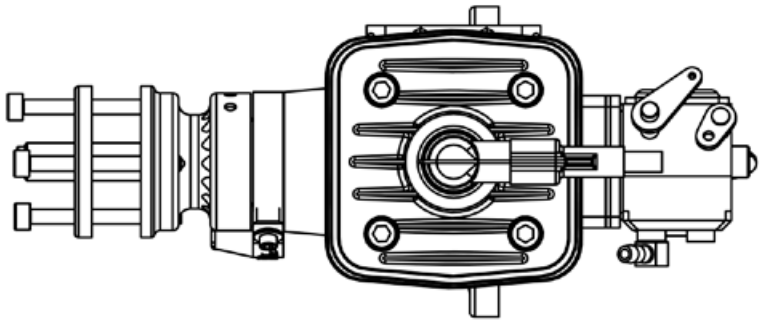
Intake Trumpet DA-35

This is the same as the intake trumpet #0081, but including a pair of M5x60 socket screws. Apply only a minimum of Loctite to the screws, Loctite must on no account enter the crankcase. Only tighten very lightly. What appears to be a simple rubber gasket holds down the reed valves and must not be squashed unduly.

Intake Trumpet DA-35/50R ..... #5581 € 11,50







DESERT AIRCRAFT

DA-35

Exclusive Engines

DA-50 R

SPECIFICATIONS:

Capacity: 50 cc
Bore x Stroke: 42,6 x 35 mm
Power: 3,73 kW (5 hp)
Weight: 1330 g
with ignition: 1470 g
Propeller Menz: 22x10, 23x10, 24x8, 22x12
Super Silence CF: 24x10, 23x12
Super Silence CF 3-blade: 21x12
Carburettor: Walbro with Choke
Fuel: BEL RAY H1R / mid to high octane gas 1:50

#5500 ..... € 628,—

We reserve the right to alter price and spec. without prior notice.

3 years Guarantee* by Toni Clark practical scale

* Guarantee conditions see page 108

- Low weight and high power due to unbelievably compact crankcase.
- Aerobatic power curve.
- Fast throttle response.
- CNC milled, 7075 aluminum alloy crankcase.
- Long conrod with gudgeon pin located very near to piston crown to reduce side loads.
- Walbro Carburetor
- Four petal reed valve
- Electronic ignition with auto advance and retard.
- DA engines are designed using the latest tools and techniques, including 3D CAD and Stereo Lithography.
- Rapid spares delivery and repair service from Germany by Toni Clark practical scale GmbH.

The DA 50-R is a high performance computer designed model aircraft engine. The first glance imparts a very strong impression of the high quality machining. All components, without exception, have been designed by DA without compromise, and are made by specialist firms exclusively for this DA engine.

The crankcase is unbelievably compact and very light, only possible due to the single counter balance weight on the crankshaft. Each crankcase is CNC machined from the solid, using aircraft alloy 7075-T6. In comparison to die casting, a very costly process in time and material. A system that moreover has the advantage of a perfect fit and an absolute correct alignment of the main bearings, plus extreme rigidity and strength. All very decisive requirements for an extremely high performance engine with very close tolerances throughout.

Due to it's very neat and gleaming exterior it seems a pity to hide this engine under the cowl.

The long aluminium alloy conrod plus the gudgeon pin being mounted close to the piston crown allows the high torque to be transferred without undue sideloads. This all reduces friction and wear while ensuring maximum power.

The very low crankcase volume plus the intake reed valves is the reason for this engines high performance. The DA 50-R when fitted with a custom designed silencer system will produce power equivalent to any 60cc engine or even more.

The piston, conrod and crankshaft design were with a computer simulation programme perfectly balanced and harmonized to each other. In spite of only one crankshaft balance weight the vibration levels are extremely low. The engine mountings reach quite a way forward making this an ideal engine to fit our Hydro-Mount-System.

The reliable Desert Aircraft Battery ignition unit has of course automatic advance and retard that makes starting so very easy, ensures maximum possible power. This unit is completely screened.

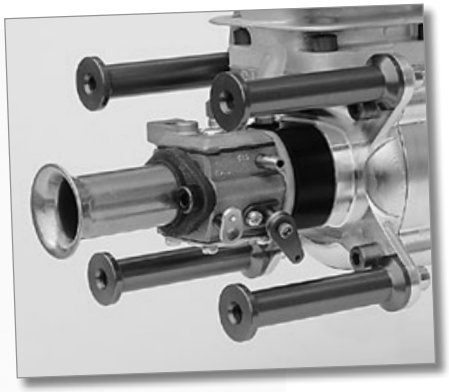
DA 50-R ..... #5500 € 628,—

We reserve the right to alter price and spec. without prior notice.

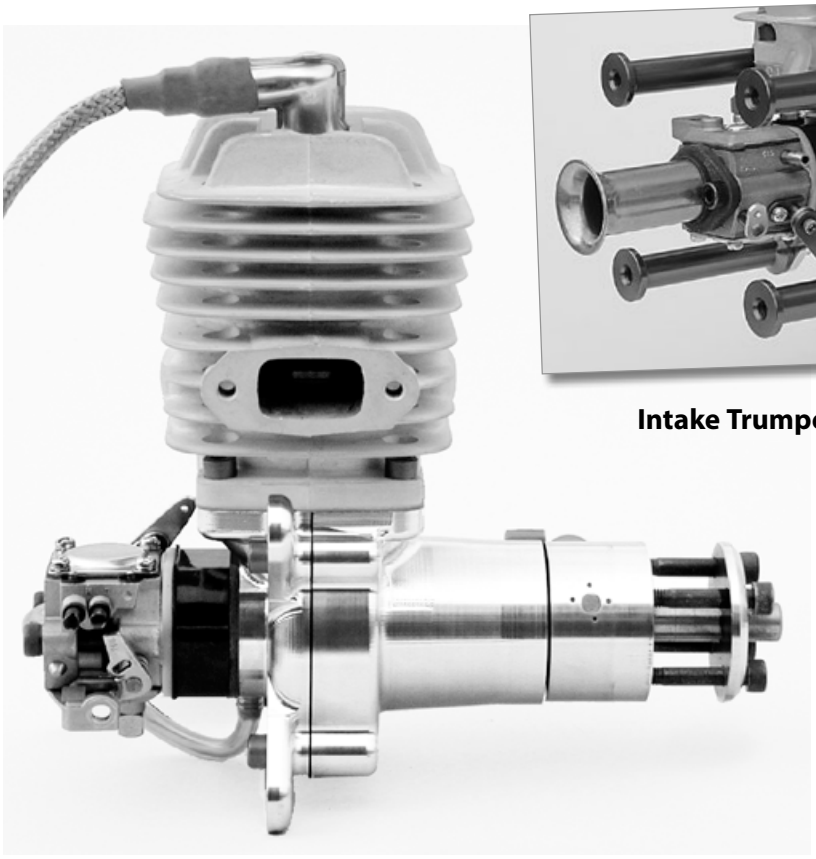
Intake Trumpet DA-50R

This is the same as the intake trumpet #0081, but including a pair of M5x60 socket screws. Apply only a minimum of Loctite to the screws, Loctite must on no account enter the crankcase.

Only tighten very lightly. What appears to be a simple rubber gasket holds down the reed valves and must not be squashed unduly.



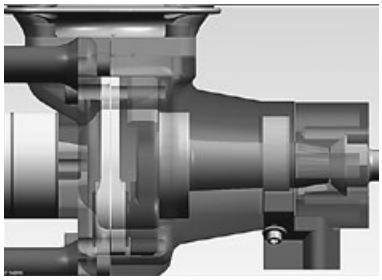
Intake Trumpet DA-50R ..... #5581 € 11,50



There are longer and shorter standoff mounts available:

3" = 76 mm long, per 1 ..... #5538 € 9,55

1 1/4 " = 32 mm long, per 1 .....#5539 € 9,50

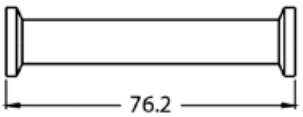


"Cutaway view"

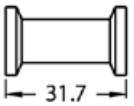
DA-50R Spares

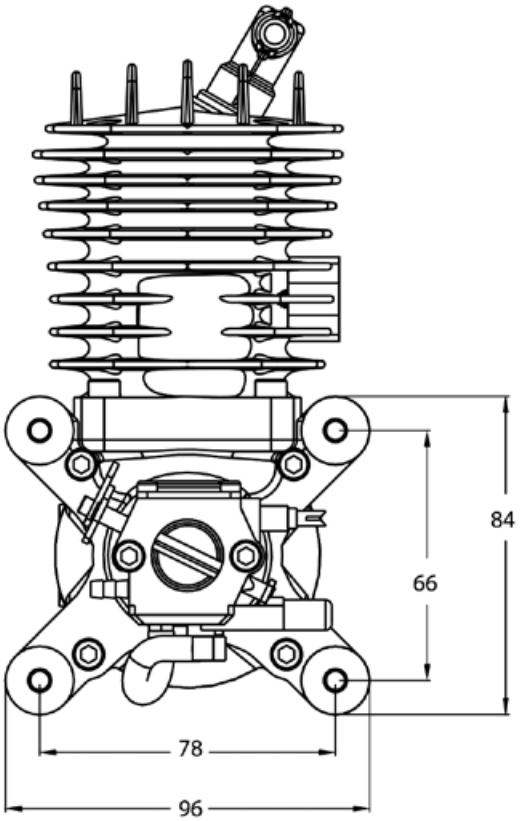
No.	Description	Price
#5566	Spark plug NGK CM-6	7,45 €
#5503	Ignition with plug caps	169,90 €
#5604	Ignition Cap	27,95 €
#5605	Pickup sensor	33,95 €
#5606	Magnet	3,30 €
#5607	Ignition pickup screws,4-40x3/8", per 1	0,35 €
#5610	Cylinder	129,95 €
#5611	Gasket, cylinder base	1,95 €
#5512	Cylinder base screw, red, M5 x 20 mm, Alu, per 1	1,95 €
#5613	Piston	46,20 €
#5614	Piston ring	6,30 €
#5615	Piston pin	6,50 €
#5616	Piston pin Cer clips, per 1	1,25 €
#5617	Bearing upper rod	6,95 €
#5618	Gasket, exhaust	1,75 €
#5520	Crankshaft	73,90 €
#5521	Connecting rod, steel, with lightening holes	39,95 €
#5522	Bearing, front	15,95 €
#5523	Bearing, middle	16,95 €
#5524	Woodruff key	1,95 €
#5525	Prop hub	41,50 €
#5626	Shaft extension nut	25,95 €
#5527	Prop bolts, M5x45, per 1	0,50 €
#5528	Prop washer	11,60 €
#5531	Crank case, front	119,00 €
#5532	Crank case, rear	79,90 €
#5533	Gasket, crank case	1,95 €
#5534	Crank case screws, Alu, screws, M5x20, red, per 1	1,95 €
#5535	Standoff mounts, per 1	8,95 €
#5536	Standoff mounting M5 x16, per 1	0,25 €
#5537	Motor mounting screws, hex cap M6	0,40 €
#5540	Carburettor	79,90 €
#5541	Gasket, carburettor base	1,55 €
#5542	Gasket, carb spacer to case	1,55 €
#5643	Carb mounting screws, M5x55, per 1	2,95 €
#5544	Carb throttle arm	10,95 €
#5545	Carb spacer mounting block	18,90 €
#5547	Reed valve cage	14,95 €
#5548	Reed valve, petals only, per 1	4,55 €
#5549	Reed valve rubber retainer	5,50 €
#5555	Carb diaphragm set	14,95 €
#5556	Low speed needle	7,95 €
#5557	Needle spring, per 1	1,95 €
#5558	High speed needle	7,95 €

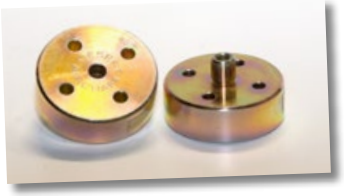
#5538



#5539

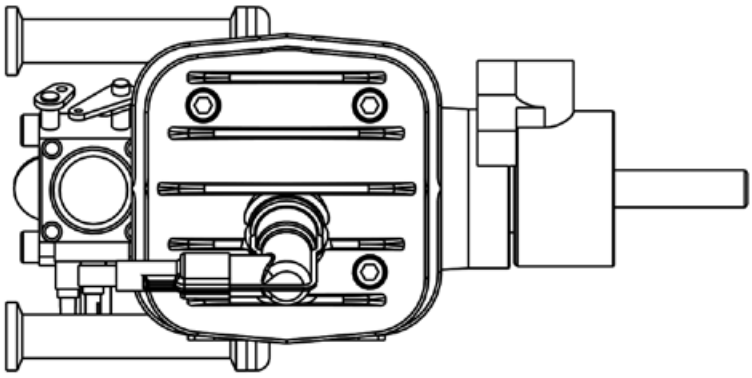


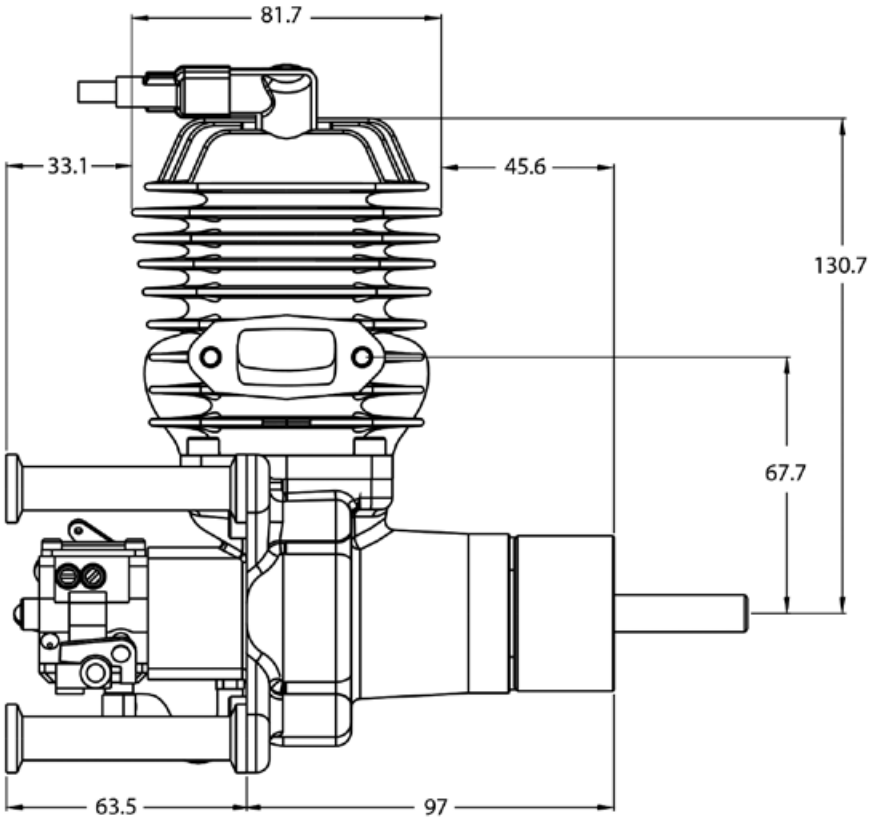


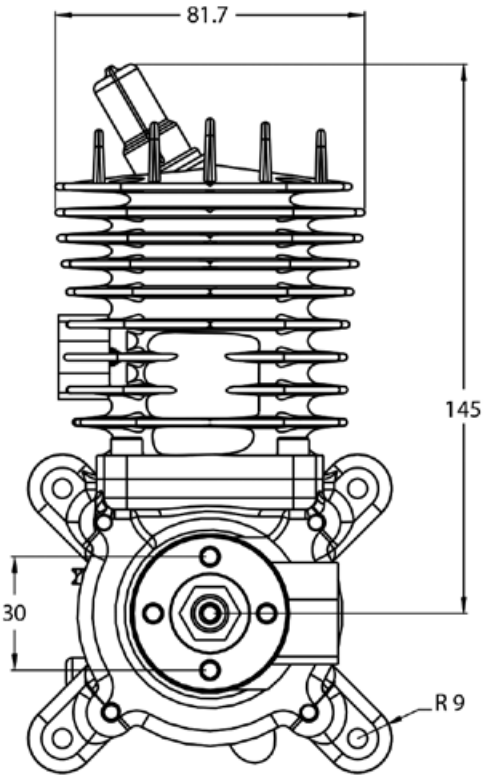


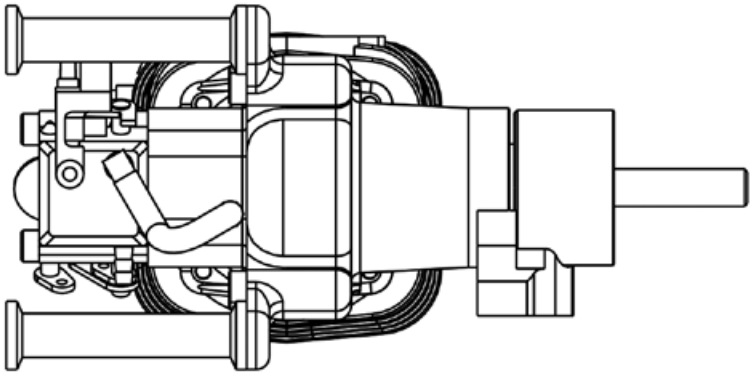
Propeller drill jig

for DA-50/60 ..... #5590 € 29,95









M1:2 **DA-50R**

Exclusive Engines

DA-60

SPECIFICATIONS:

Capacity:	60,5 cc
Weight:	1410 g
with ignition:	1517 g
Typical RPM range:	1200 - 7200 RPM
Propeller:	
Menz 2-blade:	22x10", 22x12", 23x8", 23x10",24x8", 24x10"
Super Silence 2-blade:	23x12", 24x10", 24x12"
Super Silence 3-blade:	22x10", 22x12"
Fuel:	1:50

BEL RAY H1R / Aral Ultimate 100 or Shell V-Power 100

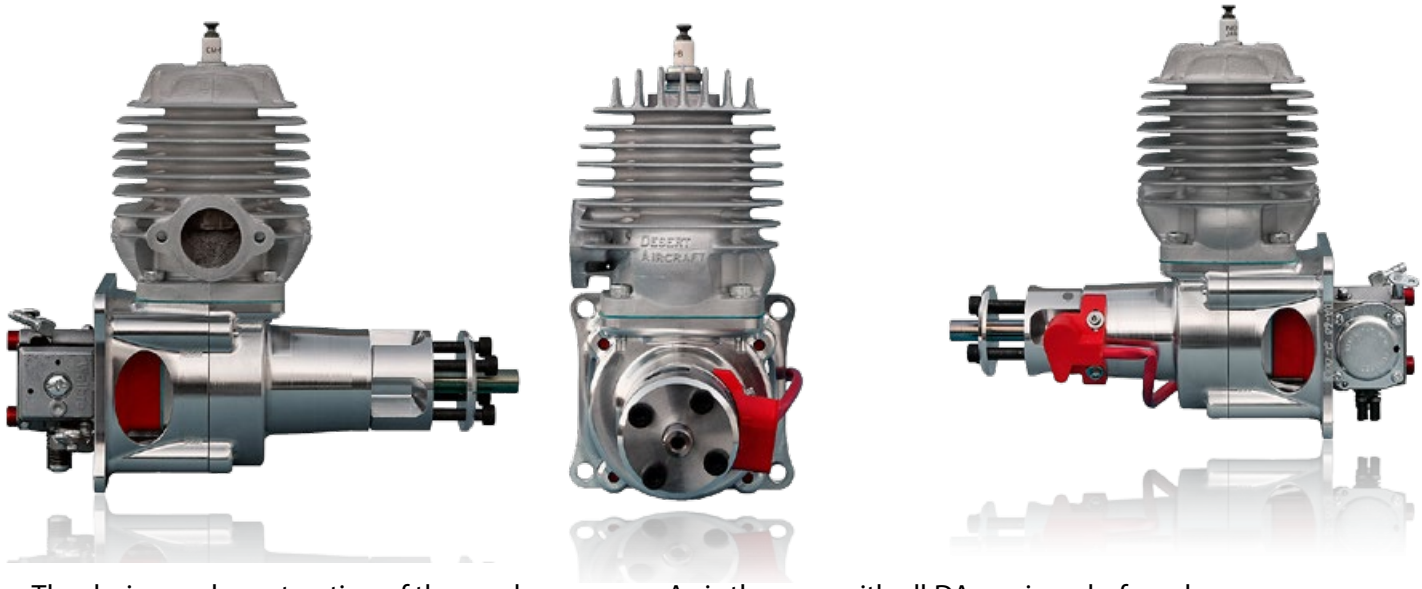
DA-60 ... #5300 € 798,—

We reserve the right to alter price and spec. without prior notice.

3 years Guarantee* by Toni Clark practical scale

* Guarantee conditions see page 108

- Excellent power to weight ratio and structural integrity.
- Out turns a DA-50R by 600+ RPM on equal props.
- Consistent engine performance at all flight attitudes and throttle settings.
- Aerobatic power curve.
- Rigid integral engine mount allows mounting without standoffs and thereby reduces vibration.
- Same bolt pattern as the DA-50R on engine mount and prop hub.
- Silencers and tuned pipes designed for the DA-50R are perfect for the DA-60 using the same header length.
- Exclusive Desert Aircraft designed cylinder, piston and crankshaft.
- Titanium prop shaft extension.
- CNC milled, 7075 T-6 alloy crankcase.
- Long conrod with gudgeon pin located very near to piston crown to reduce side loads.
- Walbro Carburetor.
- Electronic ignition with auto advance and retard.
- Rapid spares delivery and repair service from Germany by Toni Clark practical scale GmbH.



The design and construction of the crankcase allows you to bolt the DA60 direct onto the firewall without any form of torsionally weak standoffs. Experience shows that long standoffs cause excessive vibration on the model. The DA 60 is lighter with the integrated motor mount than the DA50-R with the four standoffs. The light cylinder with thin cooling fins and such details as the Titanium alloy propeller shaft makes possible the extreme light weight without incurring any loss of structural integrity.

600 rpm more with the same propeller for the DA-50R means 30% more power than the DA-50R. The power to weight ratio of the DA60 is simply phenomenal!

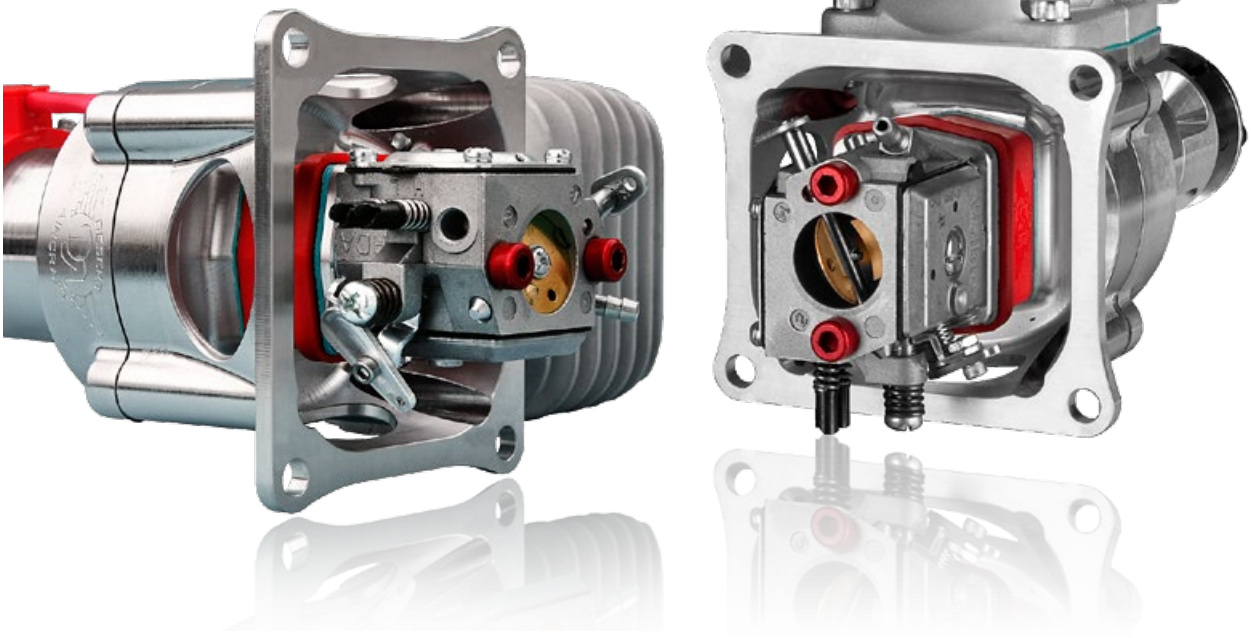
The reed valves designed by Desert Aircraft plus the Walbro carburettor have been perfectly mated to the engine to achieve an even running engine in all attitudes and throttle settings. A throttle lever is fitted to the carburettor.

As is the case with all DA engines, before delivery, every DA-60 is thoroughly test run and the carburettor settings fixed. DA service and support is unique in its world wide support.

A DA-60 is the ideal engine for your model in the 50-70 cc class.

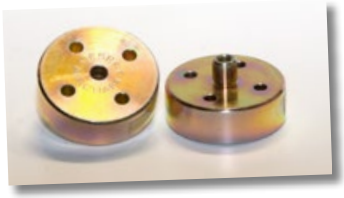
DA-60 ..... #5300 € 798,—

We reserve the right to alter price and spec. without prior notice.



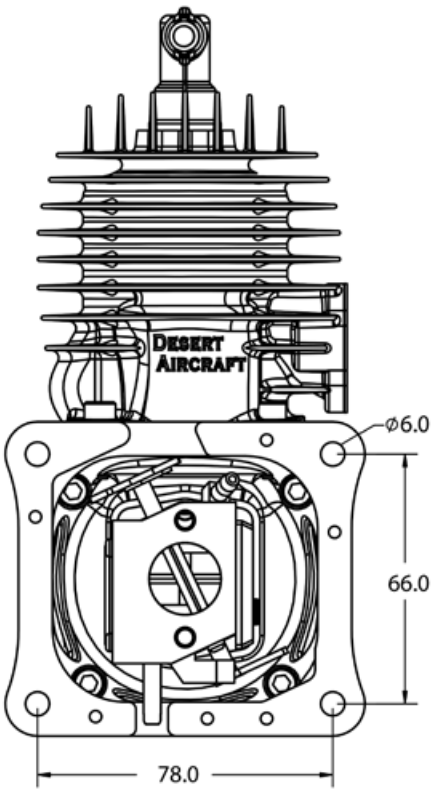
DA-60 Spares

No.	Description	Price
#5566	Spark plug NGK CM-6	7,45 €
#5503	Ignition with spark plug cap.	169,90 €
#5604	Spark plug cap	27,95 €
#5605	Pickup sensor	33,95 €
#5606	Magnet	3,30 €
#5607	Screw for pickup sensor 4-40x3/8", per 1..	0,35 €
#5310	Cylinder	189,00 €
#5311	Gasket, cylinder base	2,40 €
#5312	Steel cylinder base screw, per 1	0,40 €
#5313	Piston	54,95 €
#5314	Piston ring	7,95 €
#5315	Piston pin	7,95 €
#5616	Piston pin Cer clips, per 1	1,25 €
#5617	Bearing upper rod	6,95 €
#5218	Gasket, exhaust	1,75 €
#5320	Crankshaft, without connecting rod.	81,50 €
#5521	Connecting rod, steel, w. lightening cutouts.	39,95 €
#5522	Bearing, front	15,95€
#5523	Bearing, middle	16,95 €
#5526	Woodruff key, for prop hub	1,95 €
#5325	Prop hub	54,60 €
#5526	Shaft extension nut , Titanium	32,95 €
#5527	Prop bolt, M5x45, per 1	0,50 €
#5528	Prop washer	11,60 €
#5331	Crank case, front	168,00 €
#5332	Crank case, rear	118,50 €
#5333	Gasket, crank case	1,95 €
#5534	Crank case screw, Alu, M5x16, red, per 1	1,95 €
#5335	plywood engine mounting spacer	16,90 €
#5339	Carb mounting screw, M5x70, per 1	4,50 €
#5340	Carburetor	69,95 €
#5341	Gasket, carburetor base	1,55 €
#5342	Carb throttle arm	8,95 €
#5343	Aluminum plate for Carburator	9,95 €
#5344	Gasket Aluplate -> reed valve carrier	1,55 €
#5345	Reed valve carrier, without reed valves	12,25 €
#5346	Reed valve rubber retainer	5,50 €
#5347	Reed valves, 1 set	12,95 €
#5349	Carb spacer mounting block ,red	18,95 €
#5350	Gasket, carb spacer to case	1,55 €
#5355	Carb diaphragm set	15,95 €
#5356	Low speed needle	7,95 €
#5557	Needle spring, per 1	1,95 €
#5358	High speed needle	7,95 €



Propeller drill jig

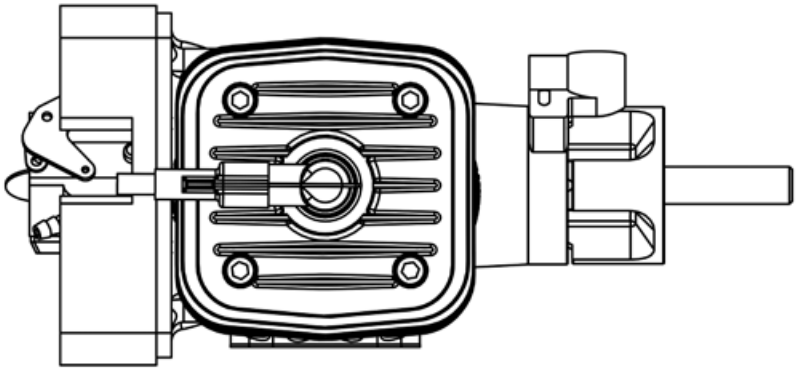
for DA-50/60 ..... #5590 € 29,95

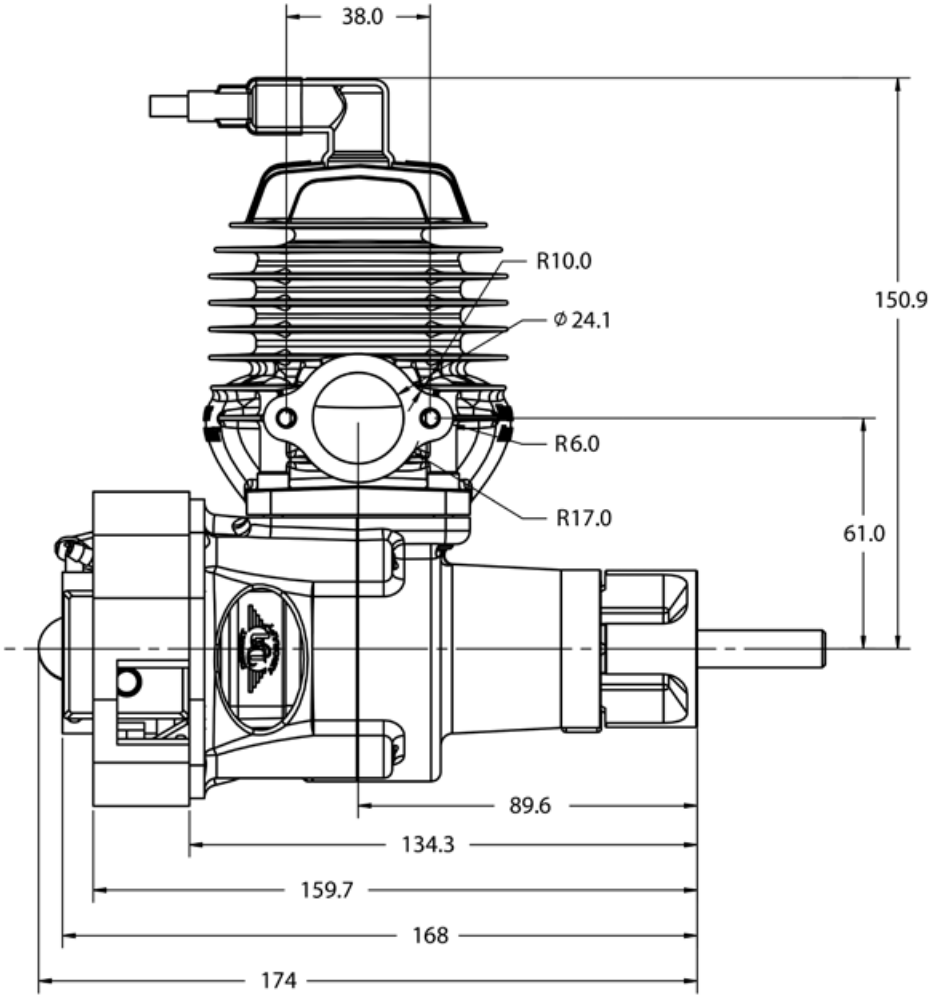


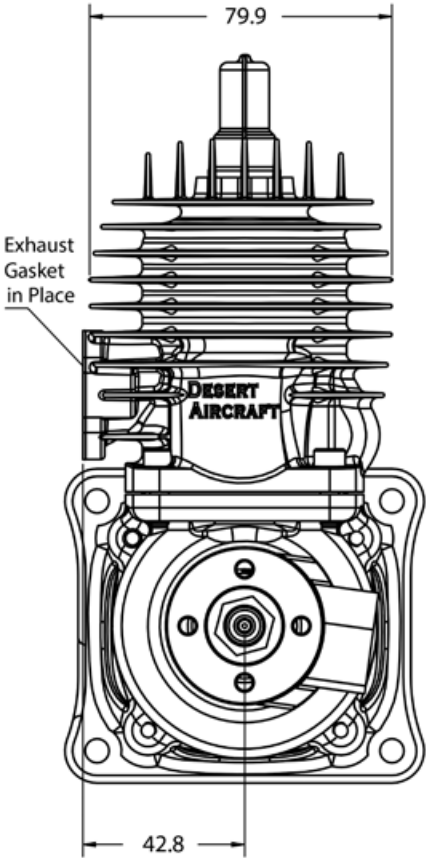
Intake trumpet for DA-60

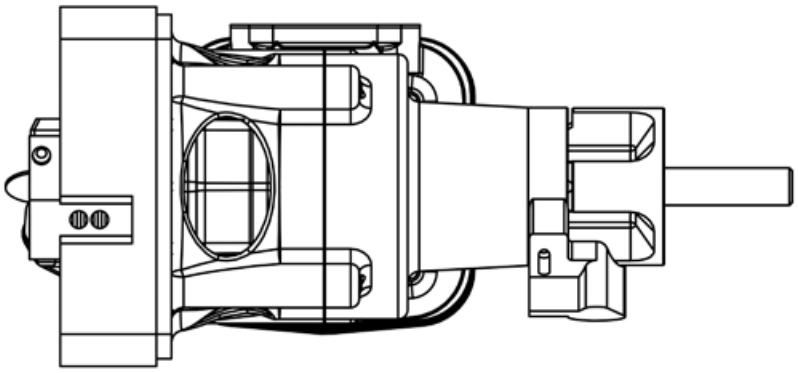
Like #0081, but includes two M5x70 screws, to fit the DA-60.

Intake trumpet DA-60 #5381 € 11,50




38.0
R10.0
Ø 24.1
R6.0
R17.0
150.9
61.0
89.6
134.3
159.7
168
174

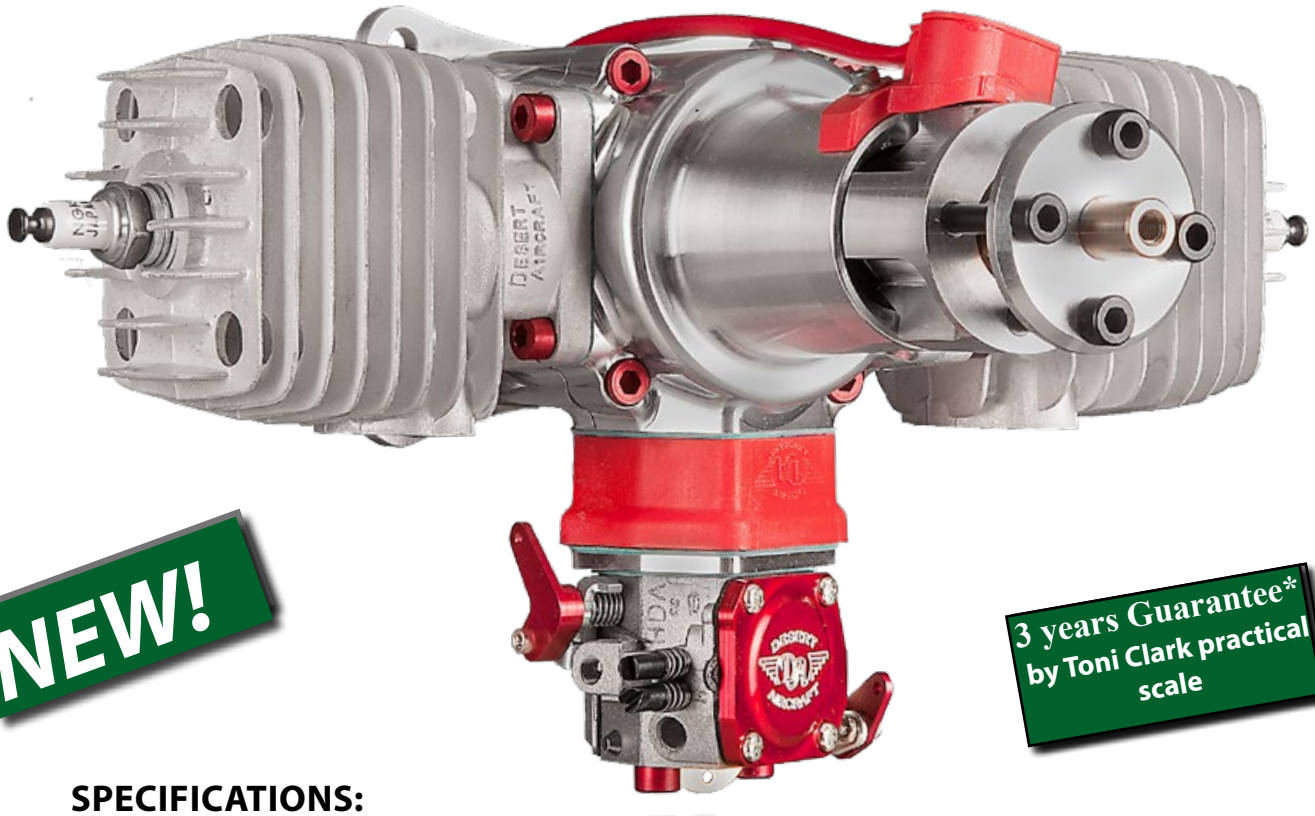

79.9
Exhaust
Gasket
in Place
DESERT
AIRCRAFT
42.8



M1:2 **DA-60**

Exclusive Engines

DA-70



NEW!

3 years Guarantee* by Toni Clark practical scale

* Guarantee conditions see page 108

SPECIFICATIONS:

Capacity: 70 cc

Weight: 1700 g

with ignition: 1850 g

Propeller: 22x12, 24x8, 24x10 Menz S.
24x12 and 26x8 Super Silence CF

3-blade: 21x12, 22x10, 22x12
Super Silence CF

Crankshaft with 3 ball bearings

RPM range: 1000-6900 RPM

Carburettor: Walbro

Fuel: BEL RAY H1R / mid
to high octane gas 1:50

- Computer simulation designed high performance engine with very high torque output.
- 400 RPM more than the DA 60 on the same prop.
- Custom built DA carburettor cover with optimized air pressure measuring right beside the intake.
- Cylinder piston and crankshaft developed by Desert Aircraft.
- Long conrod with gudgeon pin located very near to piston crown to reduce side thrust.
- Unbelievably smooth running due to computer simulation development.
- Battery ignition with automatic advance and retard.
- Rapid spares delivery and repair service from Germany.

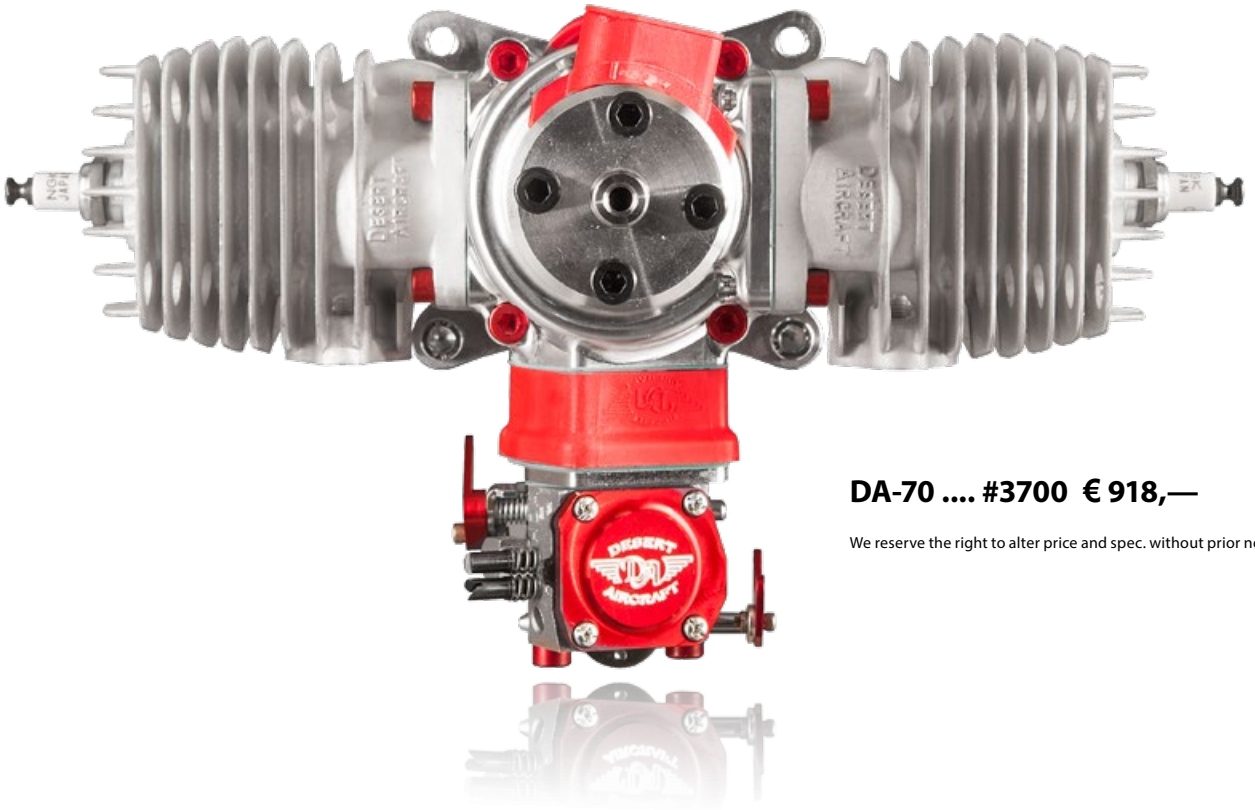
DA-70 .... #3700 € 918,—

We reserve the right to alter price and spec. without prior notice.

Compared to other flat twin engines in its class, the DA 70 has an excellent power to weight ratio. The DA-70 out turns the DA 60 by about 400 RPM on the same prop, with a weight of only 1850 g including the ignition!

The specially made carburetor cover not only looks very neat; it measures the intake pressure directly next to the carburetor intake. As a result of this, air pressure fluctuations inside the cowling do not affect the carburetor so much as with conventional Walbro covers.

A prominent feature with DA-engines is the very long front crankcase. The third bearing is placed well forward, directly behind the propeller hub. The very stiff and long crankshaft housing makes for ease of installing the engine under the cowl.



DA-70 .... #3700 € 918,—

We reserve the right to alter price and spec. without prior notice.

The throttle response is as like on all DA engines very spontaneously, due to the small volume of the crankcase.

The reed valves developed by DA, plus the Walbro carburetor, are perfectly adapted to the engine, giving an even-running engine in all attitudes and throttle settings. An aluminum throttle arm is fitted to the carburetor throttle shaft.

The DA-70 has been designed especially to run with two silencers and only develops its enormous power with these.

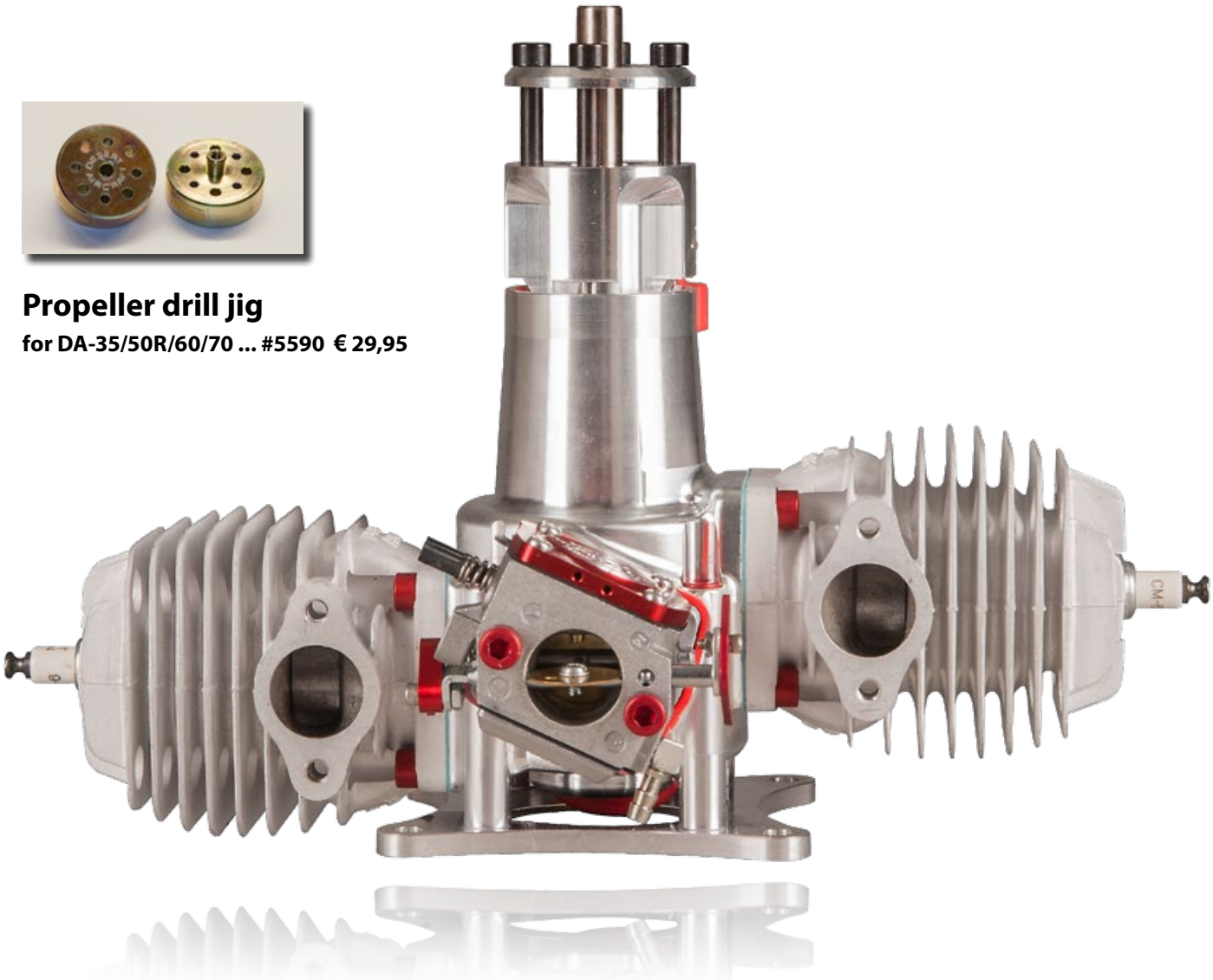
A As with all DA engines, the DA-70 has been factory test run and the carburetor needles adjusted. The world wide DA service and support is unique.

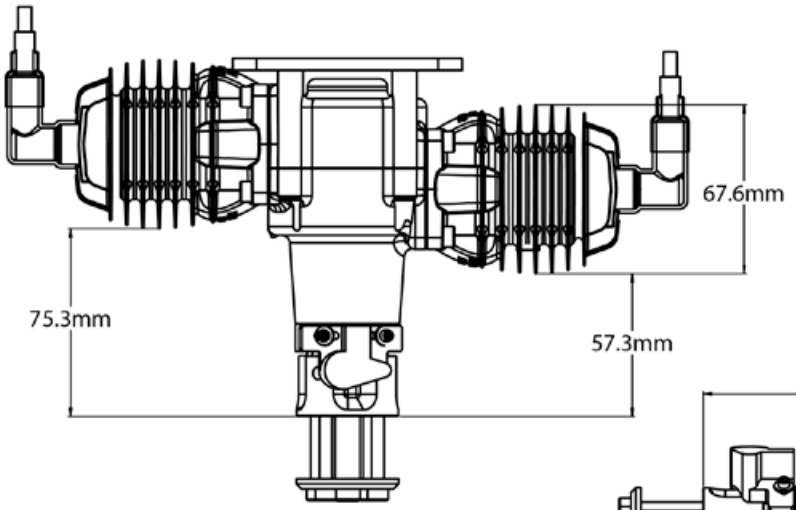
If you want to enjoy the smooth running characteristics of a flat twin engine, then the DA-70 is the ideal power plant for your model in the 60-80 class.

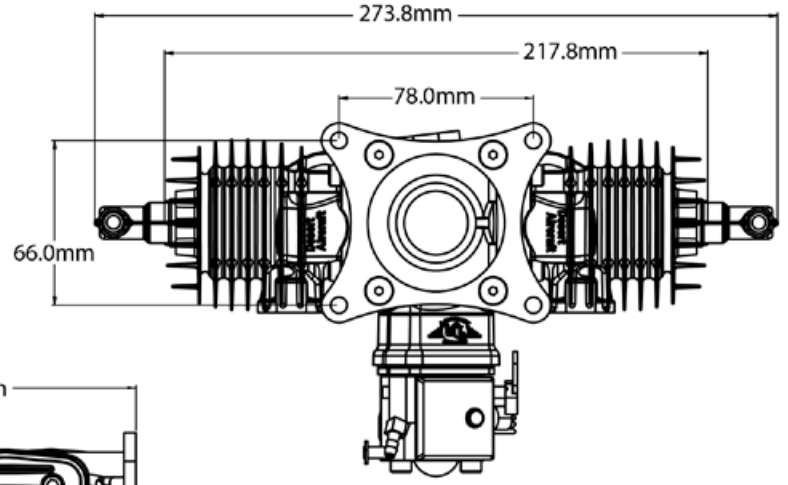
DA-70 .... #3700 € 918,—

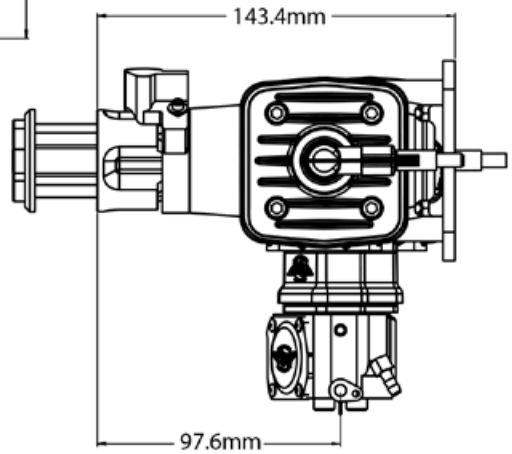
We reserve the right to alter price and spec. without prior notice.

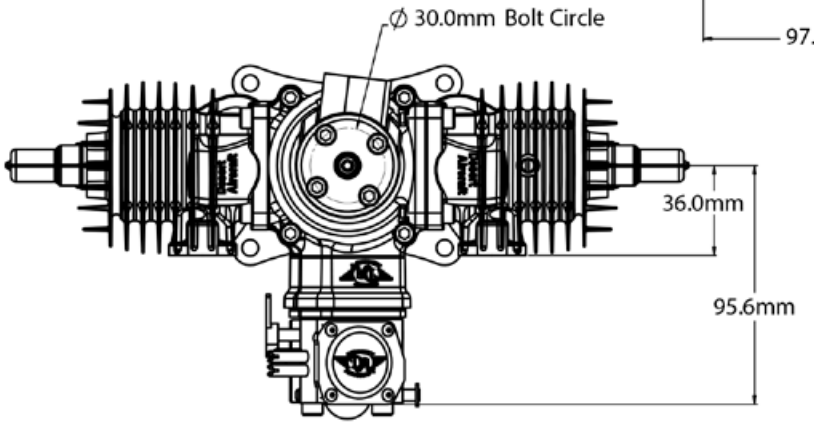
Propeller drill jig
for DA-35/50R/60/70 ... #5590 € 29,95

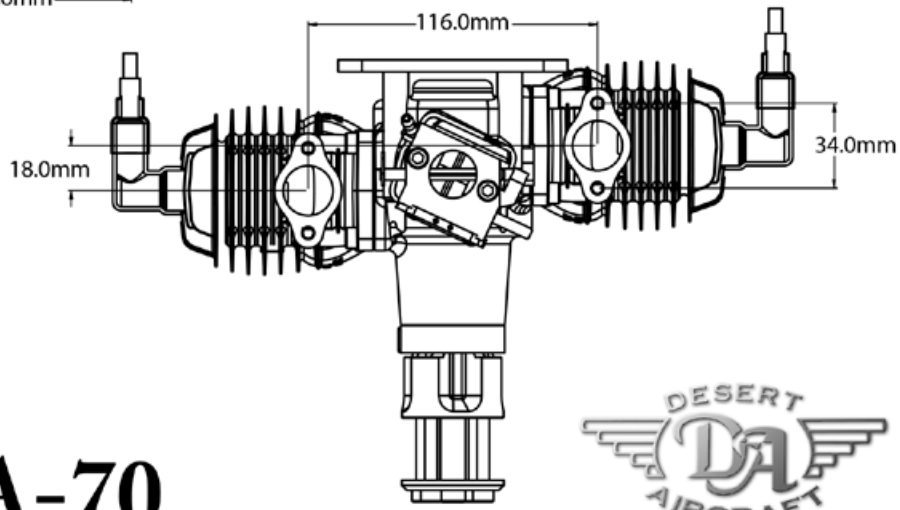



67.6mm
75.3mm
57.3mm


273.8mm
217.8mm
78.0mm
66.0mm


143.4mm
97.6mm


∅ 30.0mm Bolt Circle
36.0mm
95.6mm


116.0mm
18.0mm
34.0mm

DA-70

DESERT AIRCRAFT

Exclusive Engines

DA-85

SPECIFICATIONS:

Capacity: 85,9 cc
Bore x Stroke: 52 x 40,5 mm
Weight: 1952 g
with ignition: 2060 g
Propeller: Menz S: 26x12, 27x10
Super Silence CF: 27x12, 28x12
Super Silence CF 3-blade:
24x12, 25x12
Carburettor: Walbro (with Choke)
Fuel: BEL RAY H1R / mid
to high octane gas 1:50

#8500 ..... € 918,—

We reserve the right to alter price and spec. without prior notice.

3 years Guarantee* by Toni Clark practical scale

* Guarantee conditions see page 108

- Most torque in its class.
- Fast throttle response.
- Aerobatic power curve.
- Exclusive Desert Aircraft designed cylinders, pistons, and crankshaft.
- CNC milled, 7075 aluminum alloy crankcase.
- Long conrod with gudgeon pin located very near to piston crown to reduce side loads.
- Four petal reed valve
- Walbro Carburetor with Choke.
- Electronic ignition with auto advance and retard.
- DA engines are designed using the latest tools and techniques, including 3D CAD and Stereo Lithography.
- Rapid spares delivery and repair service from Germany by Toni Clark practical scale GmbH.
- 3 Years Guarantee* by Toni Clark practical scale GmbH.

The DA-85 combines low weight and the cost for a single cylinder, but with the power from an average 100cc engine. The minimal crankcase volume and the timing with the four reed valves produces a very high power output.

The long conrod with the gudgeon pin mounted close to piston crown transmits.
The high torque with reduced side thrust, this reduces the friction and wear as well as increasing the power.

Due to the integral engine mount, allows the DA-85 to be bolted directly onto the firewall, without torsion weak stand offs, experience shows that long stand offs that are torsion weak is often the cause for excessive vibration in a model.

The reed valves developed by DA plus the Walbro carburettor are perfectly adapted to the engine giving an even running engine in all attitudes and throttle settings. An aluminium throttle arm is fitted to the carburettor throttle shaft.

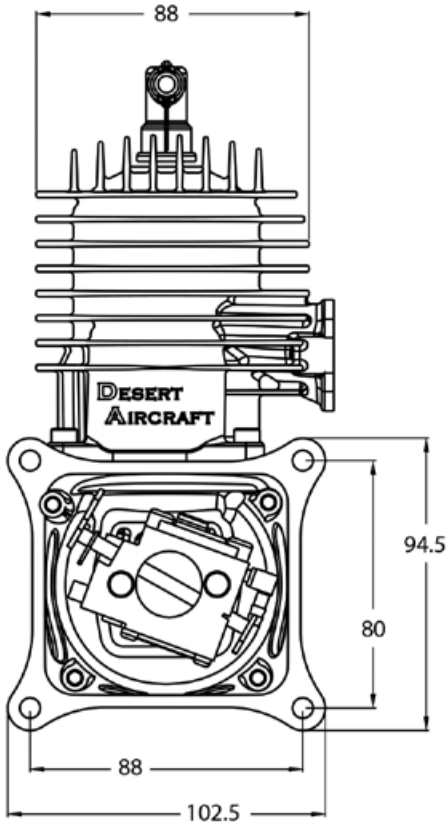
As is with all DA engines the DA-85 has been factory test run, the carburettor needles adjusted. The world wide DA service and support is unique. The DA-85 is certainly the best choice for your 1:3 3D aerobatics.

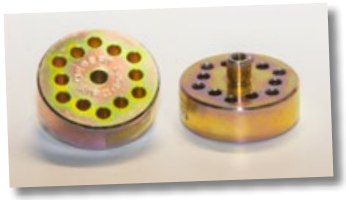
DA-85 ..... #8500 € 918,—

We reserve the right to alter price and spec. without prior notice.

DA-85 Spares

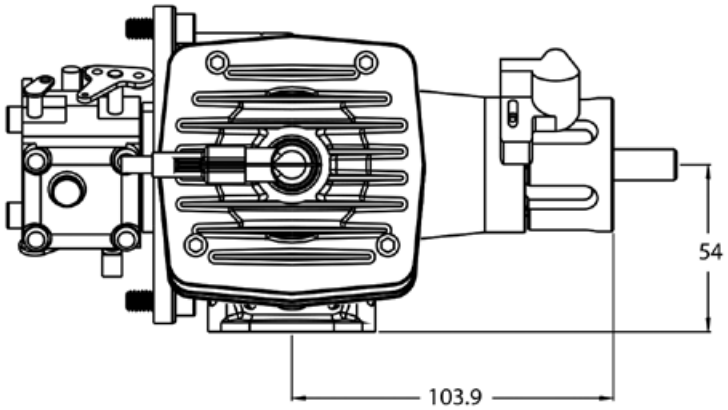
No.	Description	Price
#5566	Spark plug NGK CM-6	7,45 €
#5503	Ignition with spark plug cap	169,90 €
#5604	Spark plug cap	27,95 €
#5605	Pickup sensor	33,95 €
#5606	Magnet	3,30 €
#5607	Screw for pickup sensor 4-40x3/8", per 1	0,35 €
#5910	Cylinder	179,95 €
#8511	Gasket, cylinder base, with Aluminium Core	6,55 €
#8512	Cylinder base screw, per 1	0,40 €
#8513	Piston	51,95 €
#8514	Piston ring	6,95 €
#5815	Piston pin	6,50 €
#5816	Piston pin Cer clip, per 1	1,25 €
#5817	Bearing upper rod	9,50 €
#8518	Gasket, exhaust	1,75 €
#8520	Crankshaft, without connecting rod	79,90 €
#8521	Connecting rod, steel, lightened	44,95 €
#5622	Bearing, front	16,80 €
#5623	Bearing, middle	17,85 €
#5524	Woodruff key, for prop hub	1,95 €
#8525	Prop hub	49,50 €
#5626	Shaft extension nut	25,95 €
#8526	Shaft extension nut, black version, for serial numbers up to ca. 600 only!	25,95 €
#5627	Prop bolt, M5x45, per 1	0,50 €
#5628	Prop washer	12,95 €
#8531	Crank case, front	129,50 €
#8532	Crank case, rear	124,50 €
#8533	Gasket, crank case	2,95 €
#8534	Crank case screw, per 1	0,40 €
#8539	Carburetor screw, 1 piece	1,95 €
#5640	Carburetor	79,90 €
#5641	Gasket, carburetor base	1,55 €
#8542	Carb throttle arm	8,95 €
#5743	O-Ring for carburetor screw	1,90 €
#8543	Aluminium-Plate, carb >reed valve carrier	10,95 €
#8544	Gasket, Aluminium-Plate >reed valve carrier	1,55 €
#8545	Reed valve carrier, - without reed valves -	16,95 €
#8546	Reed valve Retainer, black rubber	5,50 €
#8547	Reed valves with doubler, set	33,95 €
#8549	Carb Carrier, red	18,95 €
#8550	Gasket, from red carb carrier to crankcase	1,55 €
#5655	Carb diaphragm set	16,95 €
#5656	Low speed needle	7,95 €
#5557	Needle spring, per 1	1,95 €
#5658	High speed needle	7,95 €

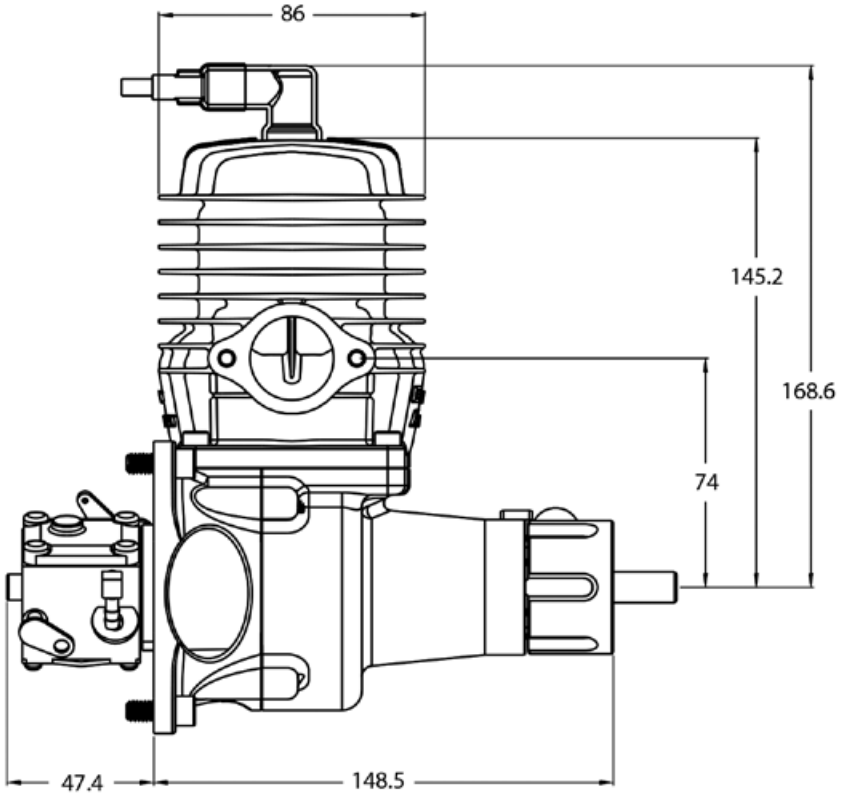


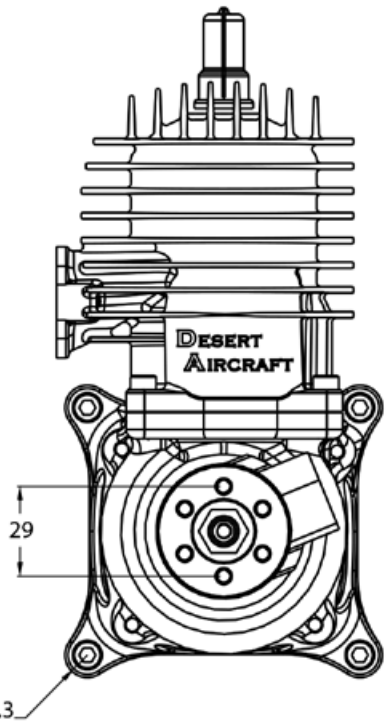


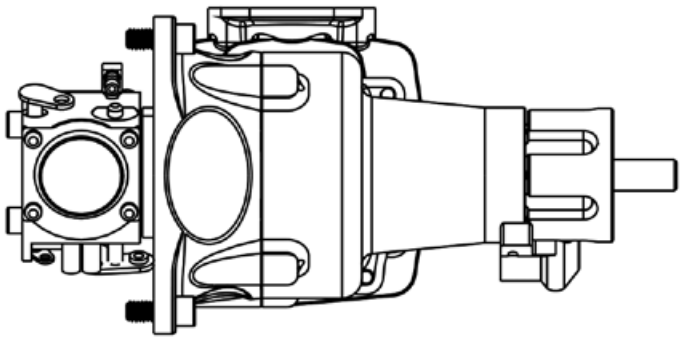
Propeller drill jig

for DA 85-150 ..... #5690 € 32,50







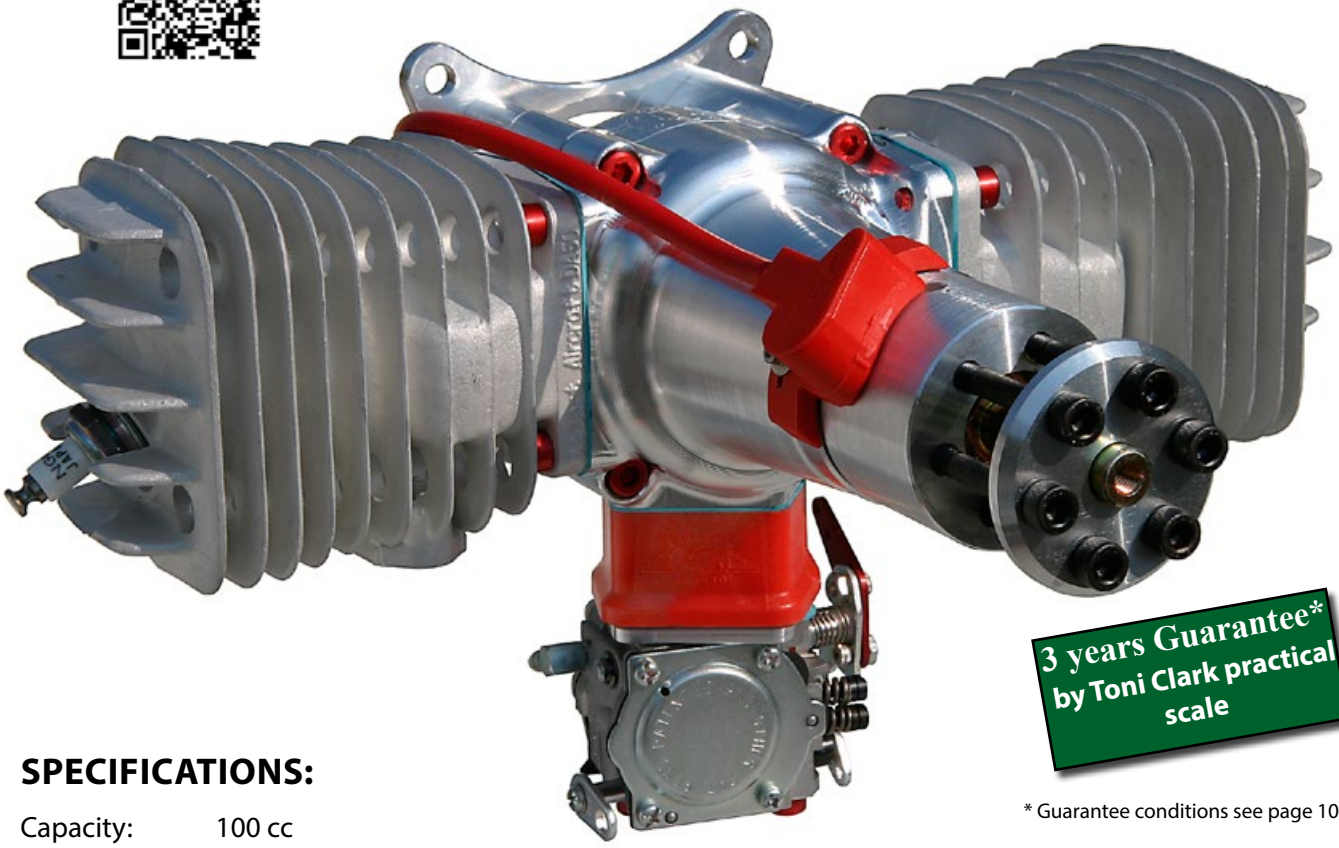


M1:2,5 **DA-85**

DESERT AIRCRAFT

Exclusive Engines

DA-100L



3 years Guarantee* by Toni Clark practical scale

* Guarantee conditions see page 108

SPECIFICATIONS:

Capacity: 100 cc

Bore x Stroke: 42,6 x 35 mm

Power: 7,6 kW (10,3 hp)

Weight: 2475 g

with ignition: 2620 g

Propeller: 26x12, 27x10, 28x10 MenzS. 28x12, 27x14 Super Silence CF

3-blade: 26x12, 27x12 Super Silence CF

Crankshaft with 3 ball bearings

RPM range: 1000-6700 RPM, max. 8500 RPM

Carburettor: Walbro with Choke

Fuel: BEL RAY H1R / mid to high octane gas 1:50

DA 100L ..... #5700 € 1188,—

We reserve the right to alter price and spec. without prior notice.

- Computer simulation designed high performance engine with very high torque output.
- 180 g less weight and 100 RPM more than the DA 100 on the same prop.
- New and smaller crankcase, CNC machined from high tensile aircraft alloy aluminium.
- Cylinder piston and crankshaft developed by Desert Aircraft.
- Long conrod with gudgeon pin located very near to piston crown to reduce side thrust.
- Unbelievably smooth running due to computer simulation development.
- New design 4 leaf reed valves.
- Battery ignition with automatic advance and retard.
- Rapid spares delivery and repair service from Germany.

The DA 100L is a computer designed high performance model aircraft engine. The finish of the machining makes a very strong impression of the overall quality. All components have been designed by Desert Aircraft without compromise, are machined by specialist firms exclusively for this engine.

The long conrod, plus the gudgeon pin being mounted close to the piston crown allows the high torque to be transferred without undue side-thrust. This reduces wear and piston drag thereby increasing the performance, so much so the DA 100L has the power of many other 120cc engines.

Piston, conrod and crankshaft design were with a computer simulation programme perfectly balanced and harmonized to each other. The DA 100L gives the lowest vibration levels in it class over the entire throttle range.

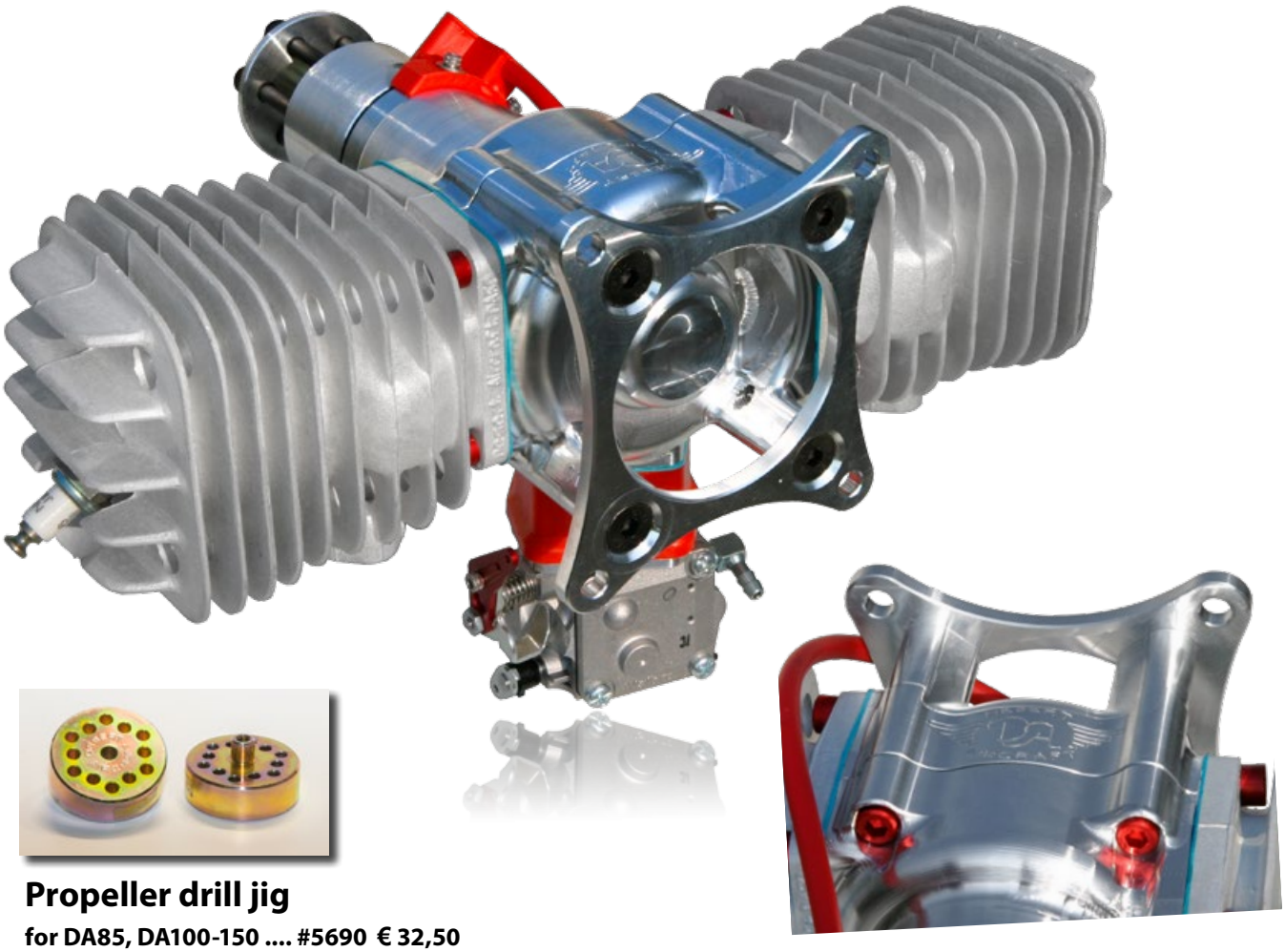
A prominent feature is the very long front crankcase. The third bearing is placed well forward directly behind the propeller hub. The very stiff and long crankshaft housing makes for ease of installing the engine under the cowl.

Each single crankcase is machined out of the full from the high tensile aircraft alloy 7075-T6. Compared to die casting, a very expensive method in time and material. This all has the great advantage of a high standard of precision and perfectly aligned crankshaft bearings as well as a superior strength and stiffness; all requirements of a high performance engine with a very long life. Last thing, the optical effect of the perfectly machined surfaces on the DA 100L makes one reluctant to hide all under the cowl.

The reliable Desert Aircraft battery ignition unit has of course automatic advance and retard that makes starting so very easy and ensures maximum power.

DA 100L ..... #5700 € 1188,—

We reserve the right to alter price and spec. without prior notice.



Propeller drill jig

for DA85, DA100-150 .... #5690 € 32,50

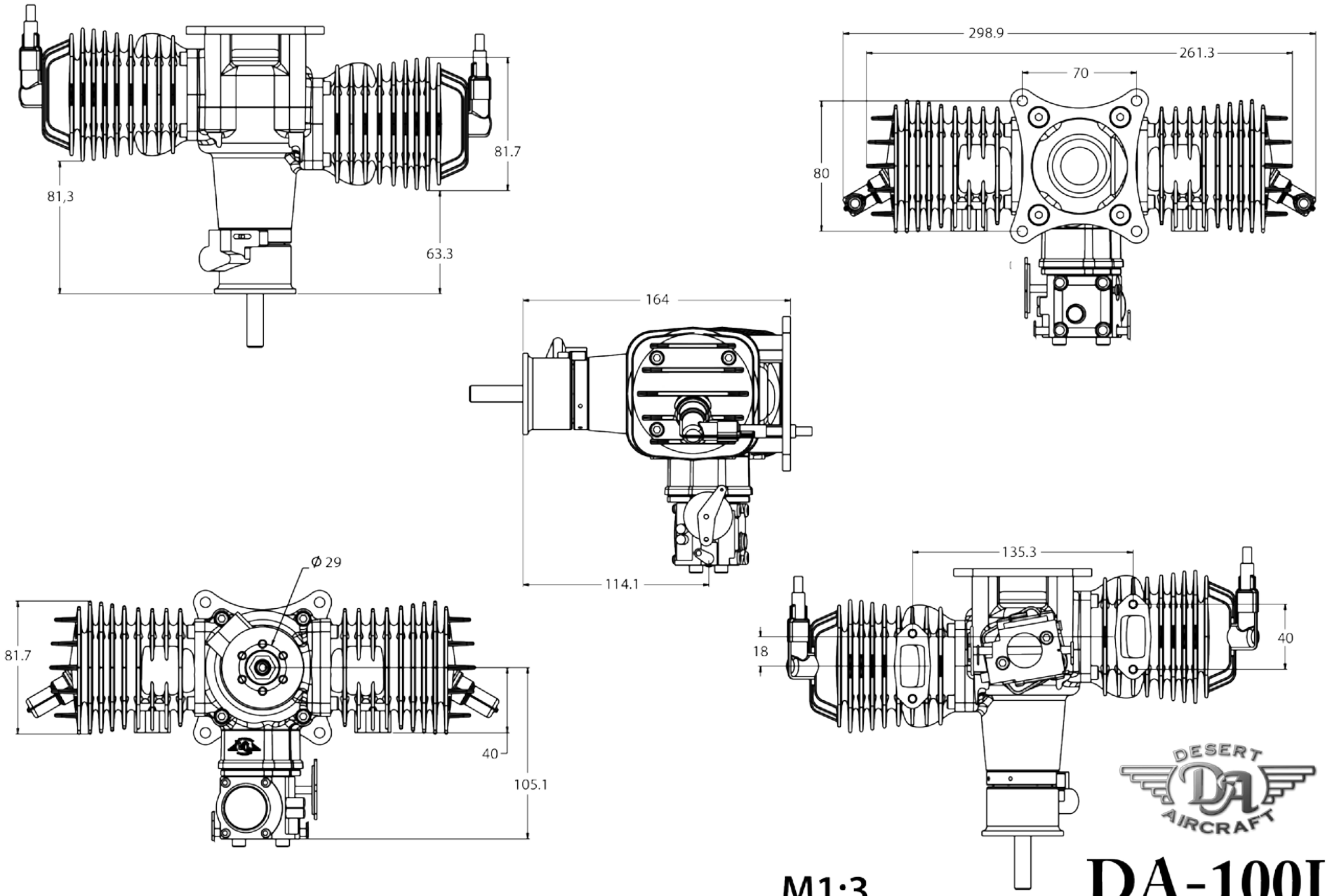
Spares

DA-100L

Nr.	Description €	
#5566	Spark plug NGK CM-6, per 1	7,45
#5603	Ignition with spark plug caps	209,90
#5604	Spark plug cap, per 1	27,95
#5605	Pickup sensor	33,95
#5606	Magnet	3,30
#5607	Screw for pickup sensor , per 1	0,35
#5610	Cylinder, per 1	129,95
#5611	Gasket, cylinder base, per 1	1,95
#5512	Cylinder base screw, red, Alu, per 1	1,95
#5613	Piston, per 1	46,20
#5614	Piston ring, per 1	6,30
#5615	Piston pin, per 1	6,50
#5616	Piston pin Cer clip, per 1	1,25
#5617	Bearing upper rod, per 1	6,95
#5618	Gasket, exhaust, per 1	1,75
#5620	Crankshaft assembly with rods	237,50
#5622	Bearing, front	16,80
#5623	Bearing, middle	17,85
#5624	Bearing, rear	12,95
#5524	Woodruff key for prop hub	1,95
#5625	Prop hub	49,50
#5626	Shaft extension nut	25,95
#5627	Prop bolt, M5x50, per 1	0,50
#5628	Prop washer	12,95
#5731	Crank case, front	249,95
#5732	Crank case, rear	178,50
#5633	Motormount	34,95
#5534	Crank case screw, Alu, M5x20, red, per 1	1,95
#5735	Gasket, crankcase	4,95
#5739	Carb mounting screw, Alu M5x75, per 1	4,65
#5640	Carburetor	79,90
#5644	Carb throttle arm	8,95
#5641	Gasket, carburetor base	1,55
#5743	O-Ring for carburettor screw	1,90
#8543	Aluminium-Plate, between carb and reed valve carrier	10,95
#8544	Gasket, Alu-Plate>reed valve carrier	1,55
#8545	Reed valve carrier, without valves	16,95
#8546	Reed valve Retainer, black rubber	5,50
#8547	Reed valves with doubler, set	33,95
#8549	Carb Carrier, red	18,95
#8550	Gasket, red carb carrier to crankcase	1,55
#5655	Carb diaphragm set	16,95
#5656	Low speed needle	7,95
#5557	Needle spring, per 1	1,95
#5658	High speed needle	7,95

DA-100

Nr.	Description €	
#5566	Spark plug NGK CM-6	7,45
#5603	Ignition with spark plug caps	209,90
#5604	Spark plug cap, per 1	27,95
#5605	Pickup sensor	33,95
#5606	Magnet	3,30
#5607	Screw for pickup sensor 4-40x3/8", per 1	0,35
#5610	Cylinder, per 1	129,95
#5611	Gasket, cylinder base, per 1	1,95
#5512	Cylinder base screw, red, Alu, per 1	1,95
#5613	Piston, per 1	46,20
#5614	Piston ring, per 1	6,30
#5615	Piston pin, per 1	6,50
#5616	Piston pin Cer clip, per 1	1,25
#5617	Bearing upper rod, per 1	6,95
#5618	Gasket, exhaust, per 1	1,75
#5620	Crankshaft assembly with rods	237,50
#5622	Bearing, front	16,80
#5623	Bearing, middle	17,85
#5624	Bearing, rear	12,95
#5524	Woodruff key, for prop hub	1,95
#5625	Prop hub	49,50
#5626	Shaft extension nut	25,85
#5627	Prop bolt, M5x50, per 1	0,50
#5628	Prop washer	12,95
#5631	Crank case, front	254,80
#5632	Crank case, rear	179,90
#5633	Motormount	34,95
#5534	Crank case screw, Alu, M5x20, red, per 1	1,95
#5635	Gasket, crank case	3,40
#5640	Carburetor	79,90
#5641	Gasket, carburetor base	1,55
#5643	Carb mounting screw, M5x55, per 1	3,50
#5644	Carb throttle arm	8,95
#5645	Carb mounting block	44,95
#5512	Carb block screw, Alu, red, M5x16, per 1	1,95
#5647	Reed valve cage with petals	43,95
#5648	Reed valve, petals only, long	9,75
#5649	Reed valve, petals only, short	9,75
#5655	Carb diaphragm set	16,95
#5656	Low speed needle	7,95
#5557	Needle spring, per 1	1,95
#5658	High speed needle	7,95

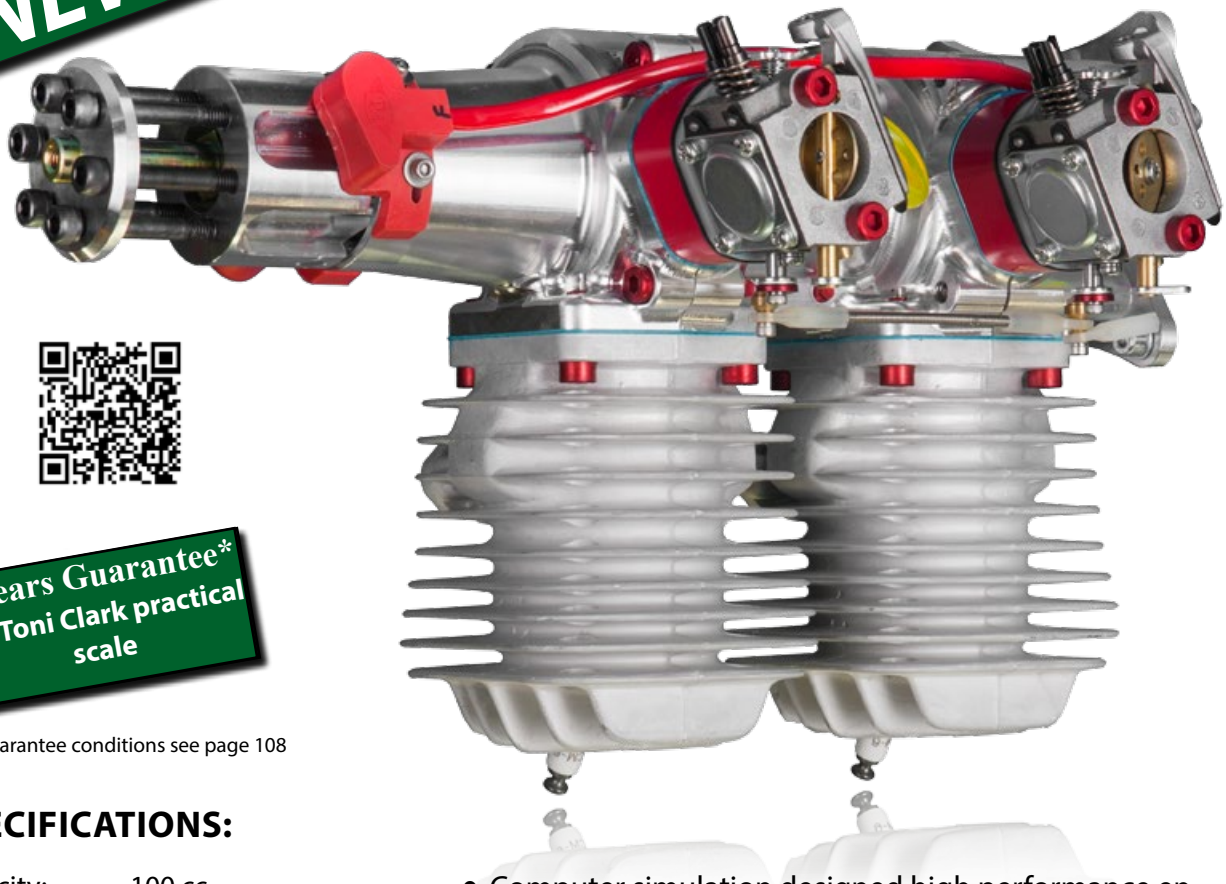

81,3
81.7
63.3
298.9
261.3
70
80
164
114.1
Ø 29
81.7
40
105.1
135.3
18
40
M1:3
DA-100L

DESERT DA AIRCRAFT

Exclusive Engines

DA-100I

NEW!



3 years Guarantee* by Toni Clark practical scale

* Guarantee conditions see page 108

SPECIFICATIONS:

Capacity: 100 cc
Bore x Stroke: 42,6 x 35 mm
Weight: 3230 g
with ignition: 3450 g
Propeller: 26x12, 27x10, 28x10 MenzS. 28x12, 27x12, 26x14 Super Silence CF
3-blade: 26x12, 25x12 Super Silence CF
Crankshaft with 5 ball bearings
RPM range: 1000-6700 RPM, max. 8500 RPM
Carburettor: Walbro with Choke
Fuel: BEL RAY H1R / mid to high octane gas 1:50

- Computer simulation designed high performance engine with very high torque output.
- Sensational low idle.
- Very spontaneous throttle response due to the low volume of the crankcase.
- Crankcase CNC machined from high tensile aircraft alloy aluminium.
- Long conrod with gudgeon pin located very near to piston crown to reduce side thrust.
- Unbelievably smooth running just like the DA-200 4-cylinder boxer.
- New design 4 leaf reed valves.
- Battery ignition with automatic advance and retard.

Rapid spares delivery and repair service from Germany.

DA-100I .... #5100 €1848,—

We reserve the right to alter price and spec. without prior notice.

Based on the DA-100L, Desert Aircraft developed a very impressive inline engine.

The DA 100I is a computer designed high-performance model aircraft engine. The perfectly balanced and harmonized design of the piston, conrod and crankshaft was achiefed with the help of a computer simulation program. The DA 100I has the lowest vibration levels in it`s class over the entire throttle range.

Because the cylinders fire in succession, one after the other, the DA-100I has a sensational smooth and low idle of about 800 RPM.

The throttle response as usual with all Desert Aircraft engines is very spontaneous. This is achieved by the two separate carburettors and the resulting low crankcase volume.

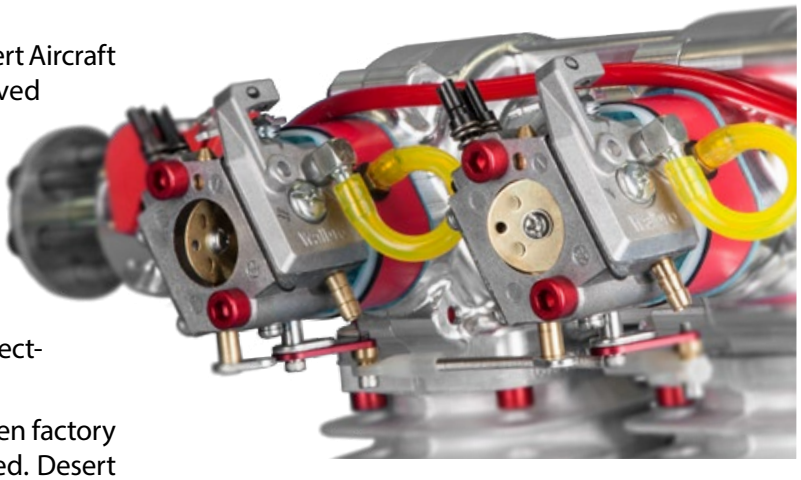
The reed valves developed by DA and also the Walbro carburettors are perfectly adapted to the engine, giving an even-running engine in all attitudes and throttle settings. Aluminium throttle arms and a connecting rod are fitted to the carburettors.

As with all DA engines, the DA-100I has been factory test run and the carburettor needles adjusted. Desert Aircraft is famous for their first class world wide service and support.

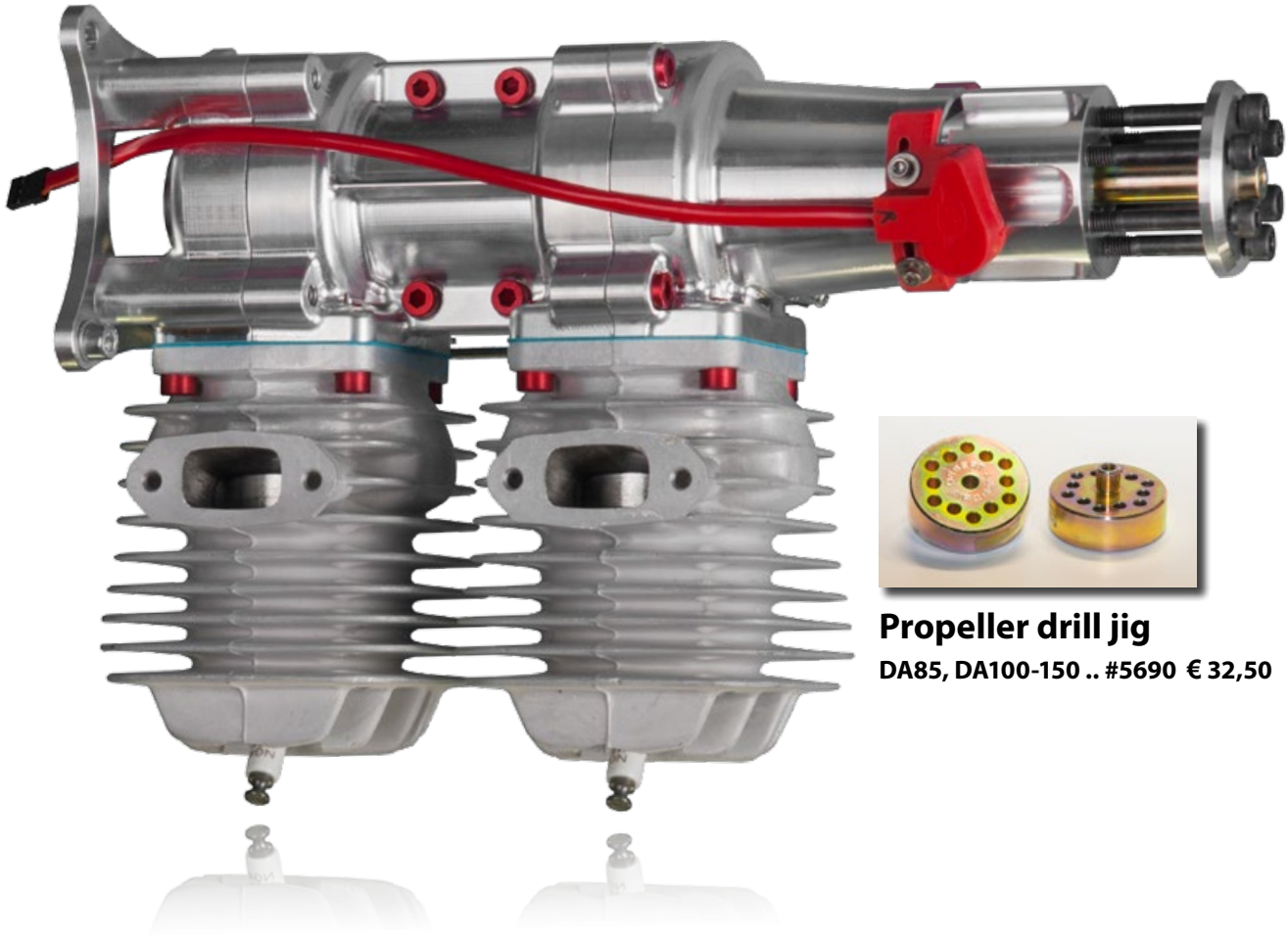
A DA-100I is the ideal engine for your high performance warbird, but can also convince in aerobatic models, due to its smooth running characteristics.

DA-100I ..... #5100 € 1848,—

We reserve the right to alter price and spec. without prior notice.



The double Carburettors of the DA-100I are responsible for the exceptionally smooth running characteristics.

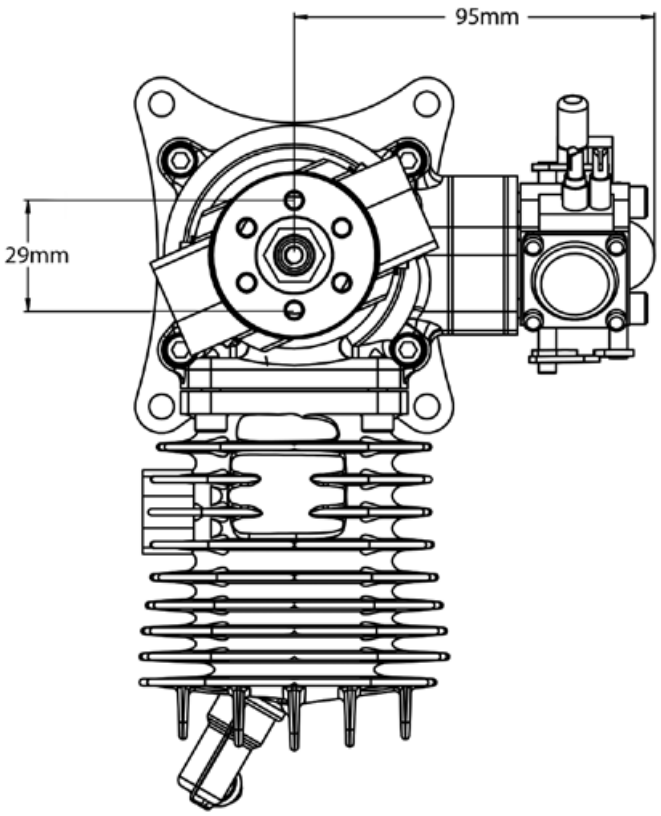


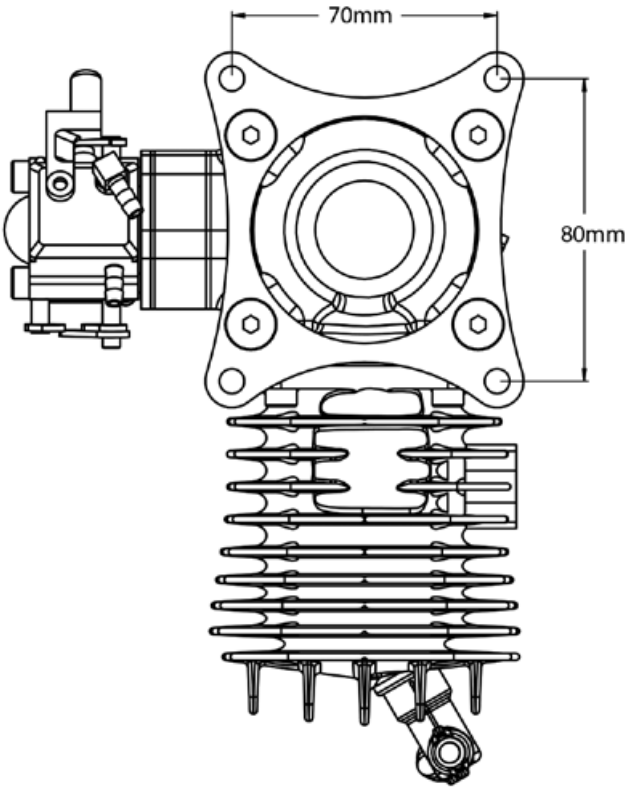
Propeller drill jig

DA85, DA100-150 .. #5690 € 32,50

DA-100I Spares

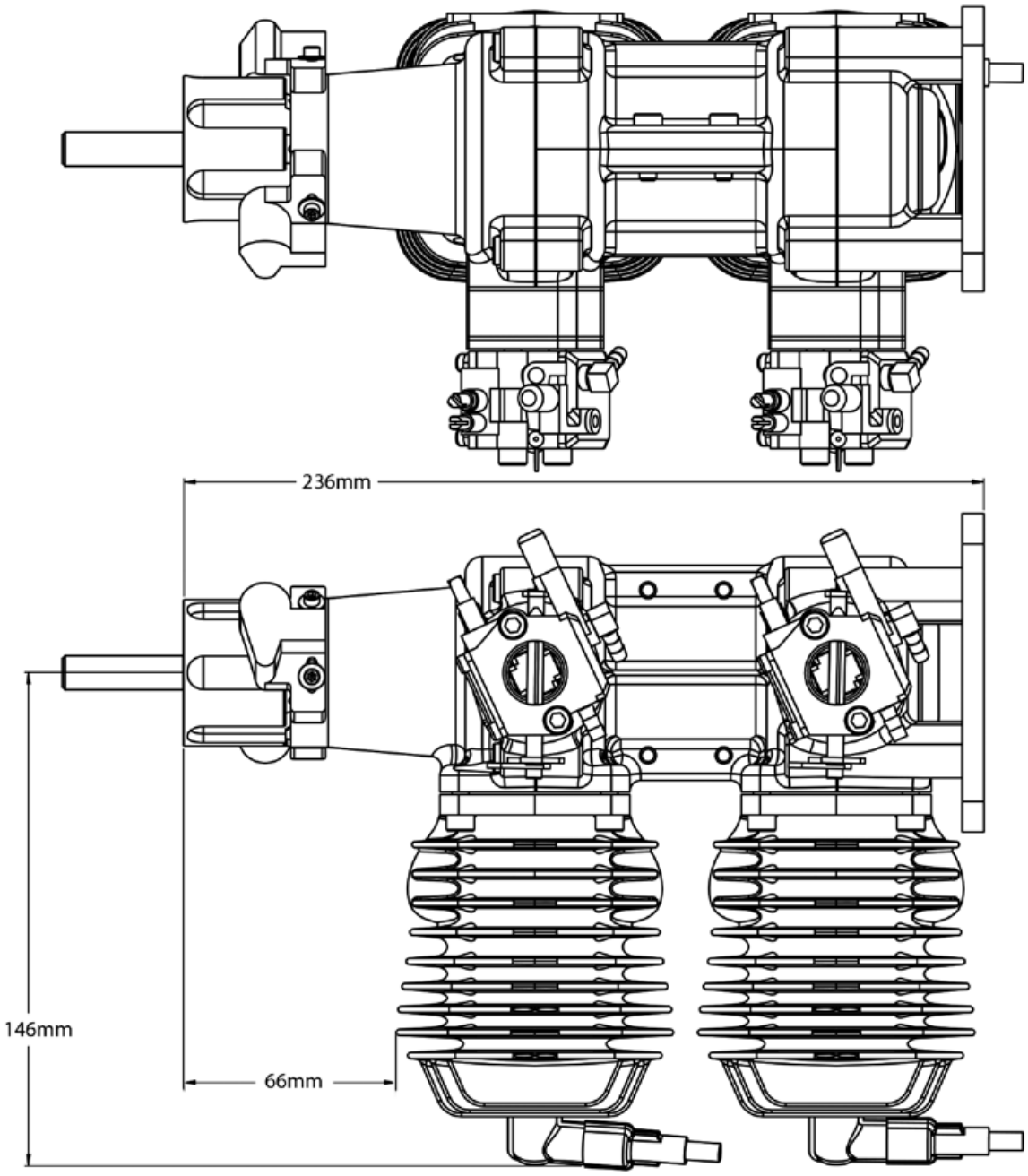
No.	Description	Price
#5566	Spark plug NGK CM-6, per 1	7,45
#5603	Ignition with spark plug caps	209,90
#5604	Spark plug cap, per 1	27,95
#5605	Pickup sensor	33,95
#5606	Magnet	3,30
#5607	Screw for pickup sensor , per 1	0,35
#5610	Cylinder, per 1	129,95
#5611	Gasket, cylinder base, per 1	1,95
#5512	Cylinder base screw, red, Alu, per 1	1,95
#5613	Piston, per 1	46,20
#5614	Piston ring, per 1	6,30
#5615	Piston pin, per 1	6,50
#5616	Piston pin Cer clip, per 1	1,25
#5617	Bearing upper rod, per 1	6,95
#5618	Gasket, exhaust, per 1	1,75
#5622	1st Bearing from the front	16,80
#5623	2nd Bearing from the front	17,85
#5624	5th Bearing from the front	12,95
#5926	Woodruff key for prop hub	1,95
#5225	Prop hub	78,90
#5626	Shaft extension nut	25,95
#5627	Prop bolt, M5x50, per 1.	0,50
#5628	Prop washer	12,95
#5633	Motormount	34,95
#5534	Crank case screw, Alu, M5x20, red, per 1	1,95
#5135	Gasket, crankcase	5,95
#5540	Carburetor	80,90
#5541	Gasket, carburetor base	1,55
#5542	Gasket, carb spacer to case	1,55
#5643	Carb mounting screw, Alu M5x55, per 1	2,95
#5544	Carb throttle arm	10,95
#5145	Carb Carrier, red	18,90
#5547	Reed valve carrier, without valves	14,95
#5548	Reed valve, petals only, per 1	4,55
#5549	Reed valve rubber retainer	5,50
#5555	Carb diaphragm set	16,95
#5656	Low speed needle	7,95
#5557	Needle spring, per 1	1,95
#5658	High speed needle	7,95
#5159	Carburettor linkage rod	14,95

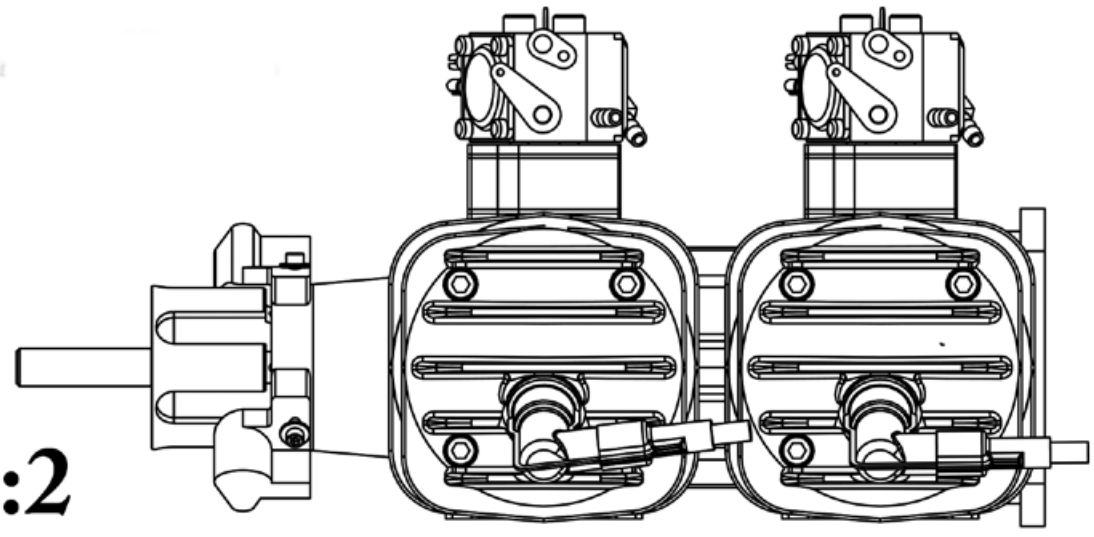




DA-100I

DESERT AIRCRAFT

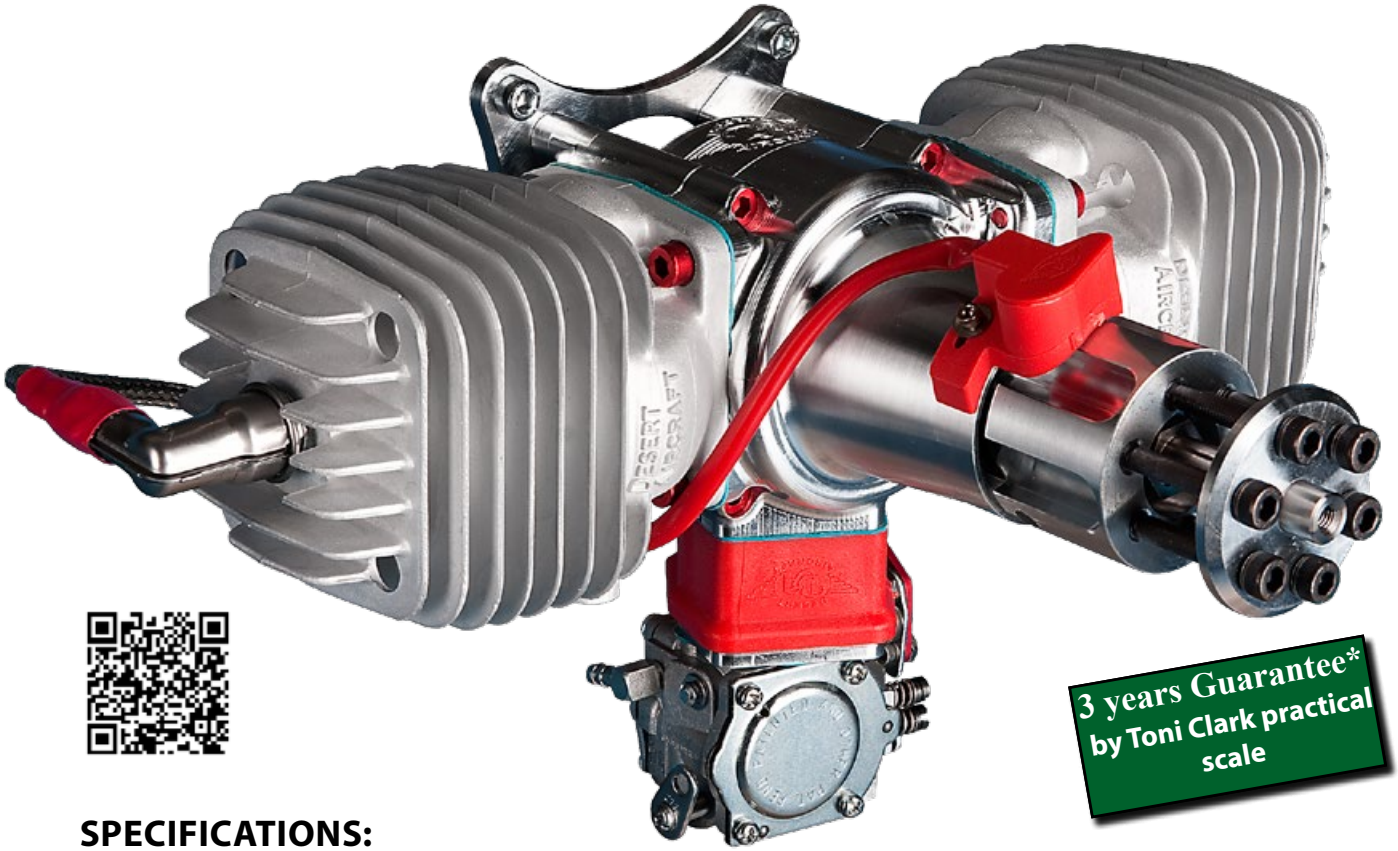




M1:2

DESERT AIRCRAFT

Exclusive Engines
DA-120



3 years Guarantee* by Toni Clark practical scale

SPECIFICATIONS:

Capacity:	121 cc
Bore x Stroke:	46,9 x 35 mm
Weight:	2300 g
with ignition:	2445 g
Propeller:	28x12, 29x10
	29x12 Super Silence CF
	3-blade: 27x12
Crankshaft with 3 ball bearings	
RPM range:	1000-6800 RPM, max. 8500 RPM
Carburettor:	Walbro with Choke
Fuel:	BEL RAY H1R / mid to high octane gas 1:50

DA-120 .... #5200 € 1368,—

We reserve the right to alter price and spec. without prior notice.

- 175 g less weight than the DA-100.
- Silencers and tuned pipes designed for the DA-100 are perfect for the DA-120 using the same header length.
- Crankcase CNC milled from 7075 aluminum alloy.
- Long conrod with gudgeon pin located very near to piston crown to reduce side loads.
- Three crank bearings, long spacing between front bearings.
- Walbro Carburetor
- Four petal reed valve, bottom induction.
- Electronic ignition with auto advance and retard.
- DA engines are designed using the latest tools and techniques, including 3D CAD and Stereo Lithography.
- Rapid spares delivery and repair service from Germany by Toni Clark practical scale GmbH.

* Guarantee conditions see page 108

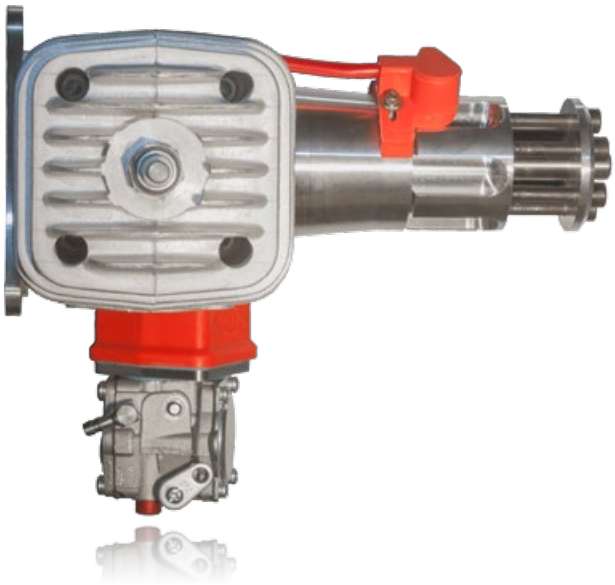
The DA-120 is a computer designed high performance model aircraft engine. One is convinced at the first glance with the superb finishing. The cylinder, piston and crankshaft have been designed exclusively by Desert Aircraft and produced by specialist companies.

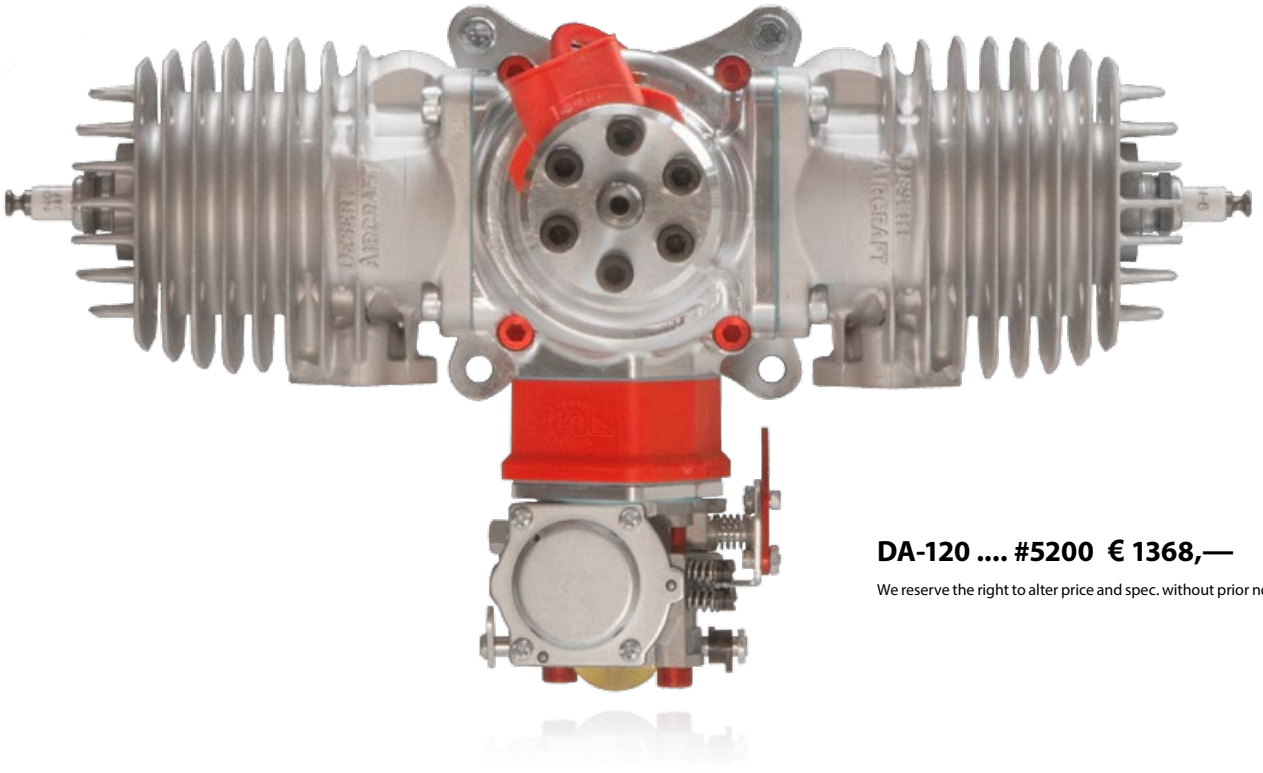
With the DA-120 it has been possible to develop an engine that has the power of a 150cc engine and the weight of a 100cc engine. In comparison to the DA-100 is the DA-120 175 g lighter. The lightweight cylinder of the DA-120 with the thin cooling fins and details such as the Titanium propeller shaft allows the low weight without compromising the structural integrity.

The reed valves developed by DA plus the Walbro carburettor are perfectly adapted to the engine giving an even running engine in all attitudes and throttle settings. An aluminium throttle arm is fitted to the carburettor throttle shaft.

As is with all DA engines the DA-120 has been factory test run, the carburettor needles adjusted. The world wide DA service and support is unique.

The DA-120 is the ideal power plant for your model in the 120-150 class.





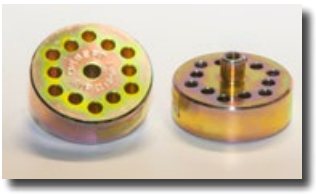
DA-120 .... #5200 € 1368,—

We reserve the right to alter price and spec. without prior notice.

DA-120 Spares

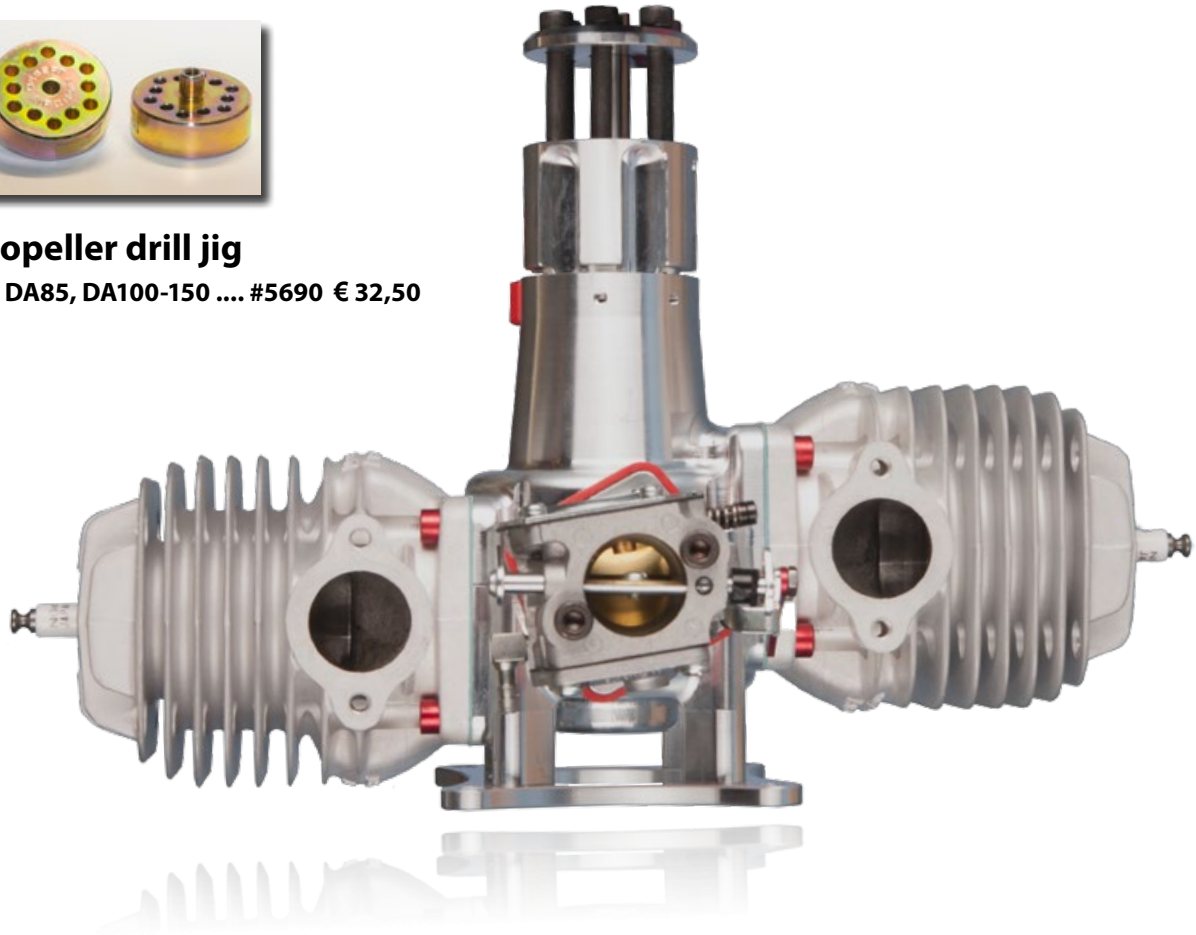
No.	Description	€
#5566	Spark plug NGK CM-6, per 1	7,45
##5603	Ignition with spark plug caps	209,90
#5604	Spark plug cap, per 1	27,95
#5605	Pickup sensor	33,95
#5606	Magnet	3,30
#5607	Screw for pickup sensor , per 1	0,35
#5310	Cylinder	189,00
#5311	Gasket, cylinder base, per 1	2,40
#5312	Cylinder base screw, per 1	0,40
#5313	Piston, per 1	54,95
#5314	Piston ring, per 1	7,95
#5315	Piston pin, per 1	7,95
#5616	Piston pin Cer clip, per 1	1,25
#5617	Bearing upper rod, per 1	6,95
#5218	Gasket, exhaust, per 1	1,75
#5219	Crankshaft assembly with rods	249,90
#5622	Bearing, front	16,75
#5223	Bearing, middle	17,85
#5624	Bearing, rear	12,95
#5926	Woodruff key for prop hub	1,95
#5225	Prop hub	78,90
#5326	Shaft extension nut, Titanium	32,95
#5627	Prop bolt, M5x50, per 1	0,50
#5628	Prop washer	12,95
#5231	Crank case, front	279,00

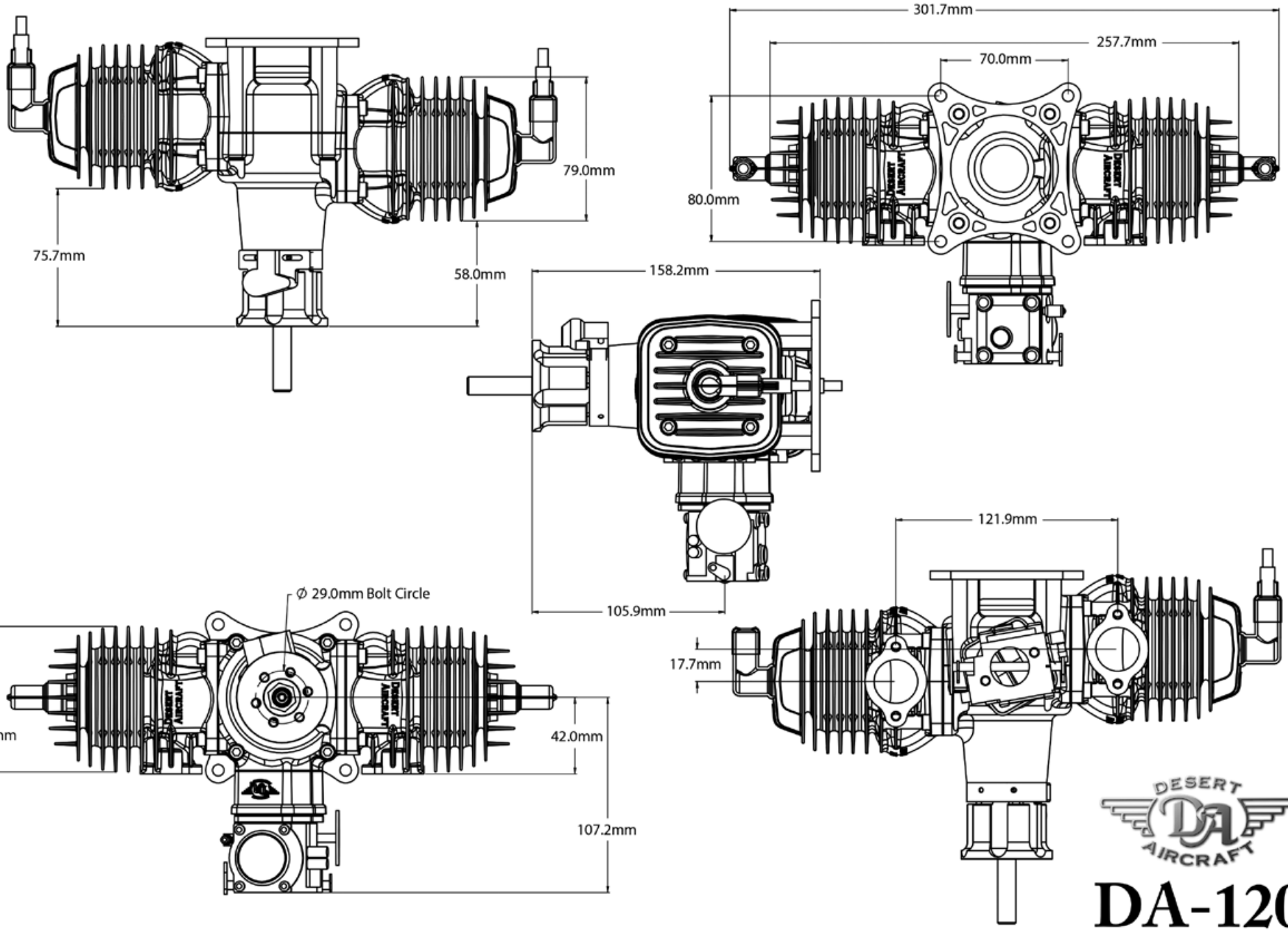
No.	Description	€
#5233	Crank case, rear	299,00
#5633	Motor mount	34,95
#5235	Gasket, crankcase	4,95
#5534	Crank case screw, Alu, M5x20, red, per 1	1,95
#5739	Carb mounting screw, Alu M5x75, per 1	4,65
#5640	Carburetor	79,90
#5641	Gasket, carburetor base	1,55
#5644	Carb throttle arm	8,95
#5743	O-Ring for carburetor screw	1,90
#8543	Aluminium-Plate, between carb and reed valve carrier	10,95
#8544	Gasket, Alu-Plate>reed valve carrier	1,55
#8545	Reed valve carrier, without reed valves	16,95
#8546	Reed valve Retainer, black rubber	5,50
#8547	Reed valves with doubler, set	33,95
#8549	Carb Carrier, red	18,95
#8550	Gasket, red carb carrier to crankcase	1,55
#5655	Carb diaphragm set	16,95
#5656	Low speed needle	7,95
#5557	Needle spring, per 1	1,95
#5658	High speed needle	7,95



Propeller drill jig

for DA85, DA100-150 .... #5690 € 32,50

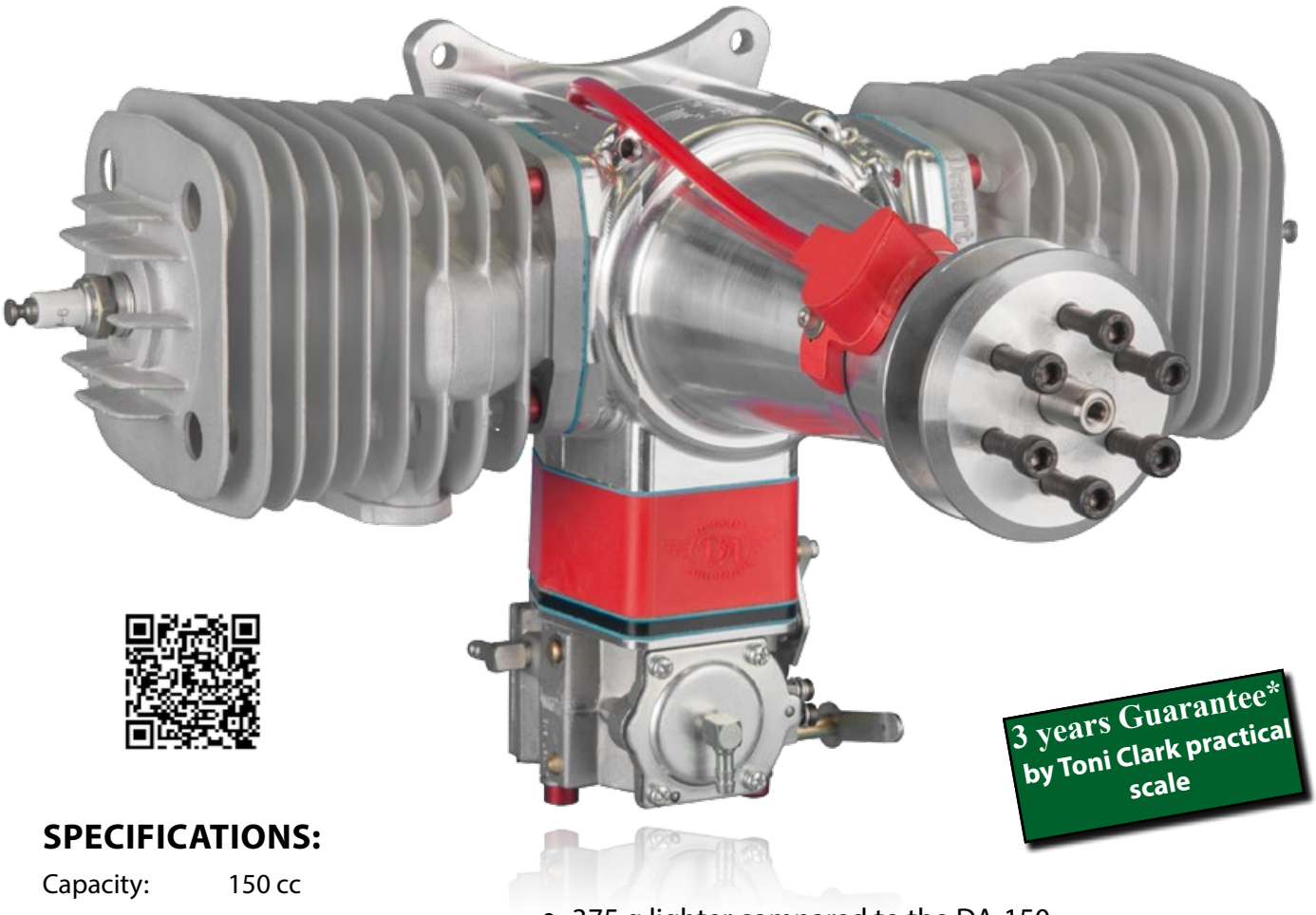



301.7mm
257.7mm
70.0mm
80.0mm
79.0mm
75.7mm
58.0mm
158.2mm
105.9mm
121.9mm
17.7mm
Ø 29.0mm Bolt Circle
79.9mm
42.0mm
107.2mm
DESERT AIRCRAFT
DA-120

DESERT AIRCRAFT

Exclusive Engines

DA-150L



3 years Guarantee* by Toni Clark practical scale

SPECIFICATIONS:

Capacity: 150 cc

Bore x Stroke: 49 x 40 mm

Power: 12,3 kW (16,5 hp)

Weight: 3325 g
with ignition: 3470 g

Propeller: 30x10/12 32x10/12
3-blade: 28x12, 30x10

optimal: 30x16 Super Silence CF.

Crankshaft with 3 ball bearings

RPM range: 1000-6500 RPM,
max. 8500 RPM

Carburettor: Walbro with Choke

Fuel: BEL RAY H1R / mid
to high octane gas 1:50

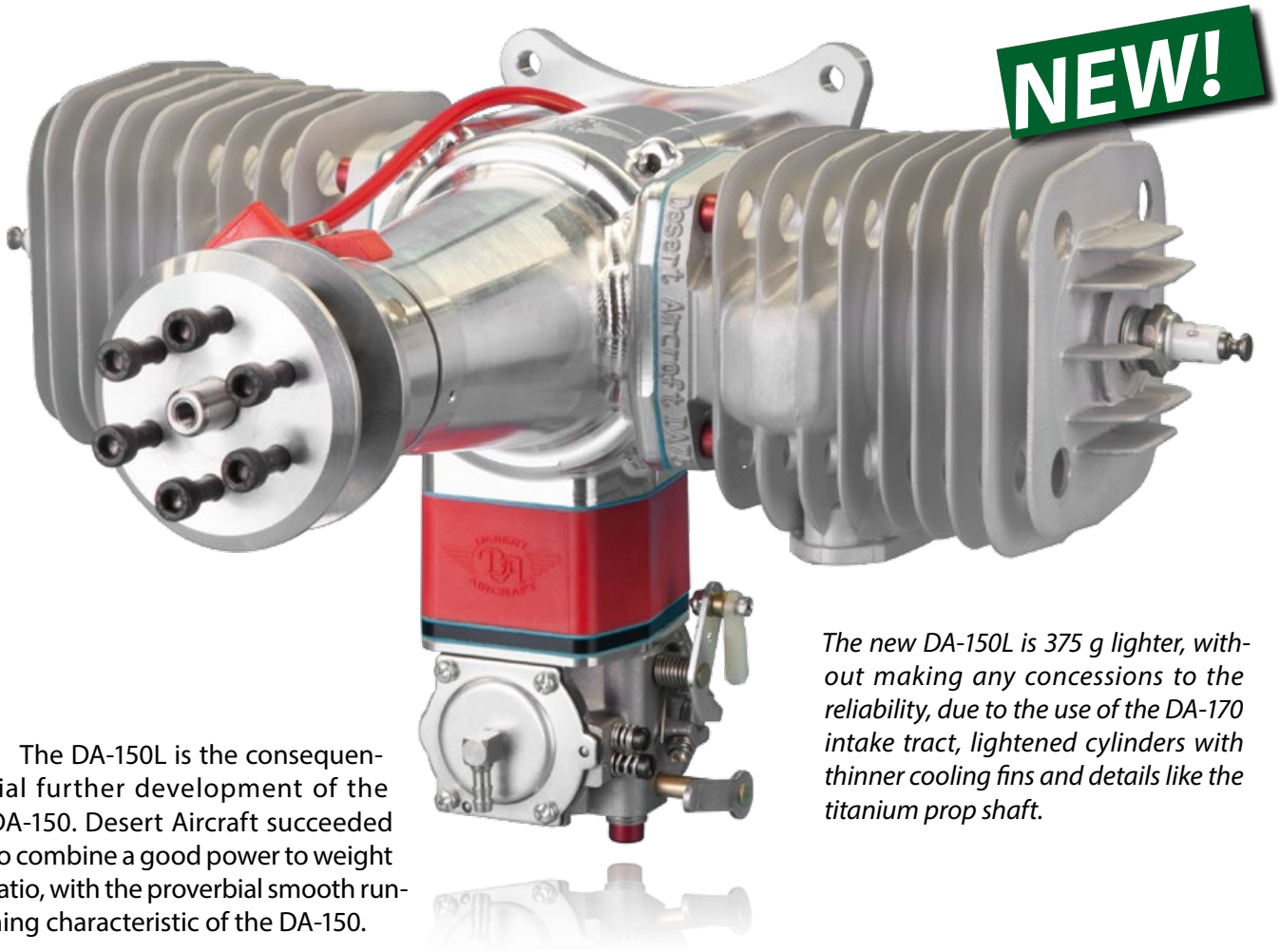
- 375 g lighter compared to the DA-150.
- Thinner cooling fins.
- Even better throttle responce, due to the smaller crank-case volume.
- The cylinder, piston and crankshaft are developed by Desert Aircraft.
- Long conrod with gudgeon pin set very near piston crown for reduced side load.
- Low vibration due to computer simulation aided design.
- 4 Leaf reed valves.

  Battery ignition with automatic advance and retard.
- Rapid spares delivery and repairs service from Germany.
- 2 Years Guarantee* by Toni Clark practical scale GmbH.

DA-150L ..... #5800 € 1598,—

We reserve the right to alter price and spec. without prior notice.

* Guarantee conditions see page 108



The new DA-150L is 375 g lighter, without making any concessions to the reliability, due to the use of the DA-170 intake tract, lightened cylinders with thinner cooling fins and details like the titanium prop shaft.

The DA-150L is the consequential further development of the DA-150. Desert Aircraft succeeded to combine a good power to weight ratio, with the proverbial smooth running characteristic of the DA-150.

The piston, conrod and crankshaft are perfectly balanced and harmonized to each other with the help of a computer simulation program. The DA 150L has the lowest vibration level possible over the complete throttle range.

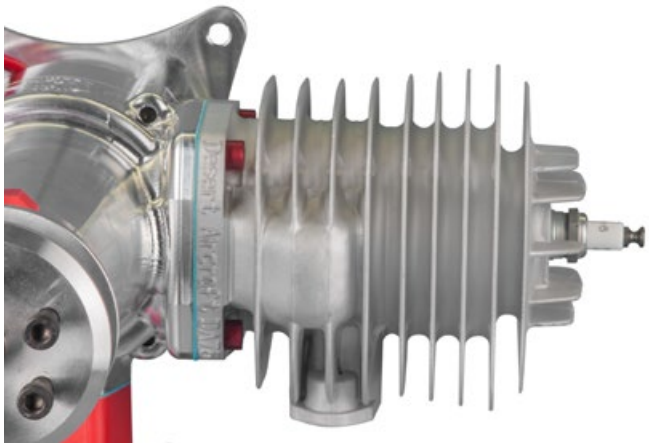
The long conrod with the gudgeon pin mounted very near the piston crown allows the high torque output to be transferred with the minimum of piston side force, thereby reducing drag and wear.

The DA 150L has a higher output than the special edition engines from other manufacturers. All, with no need for tuned pipes. Port timining and porting of the DA-150L are optimized for the use of expansion mufflers.

The most prominent feature, as with all DA-Engines, is the very long crankcase, this makes installation very easy. The front bearing is positioned right behind the propeller hub.

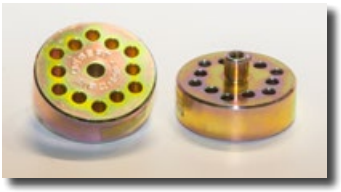
The reliable Desert Aircraft battery ignition makes starting very easy and ensures maximum power.

The DA-150L is the best choice for your aerobatic model of the 150-170cc class, especially when you don`t want to use tuned pipes.



The cylinders of the DA-150L are costly finished by CNC machines. The especially thin fins are not only very light, they also improve the cooling capacity of the engine.

Propeller drill jig



for DA85, DA100-150 .... #5690 € 32,50

DA 150L ..... #5800 € 1598,—

We reserve the right to alter price and spec. without prior notice.

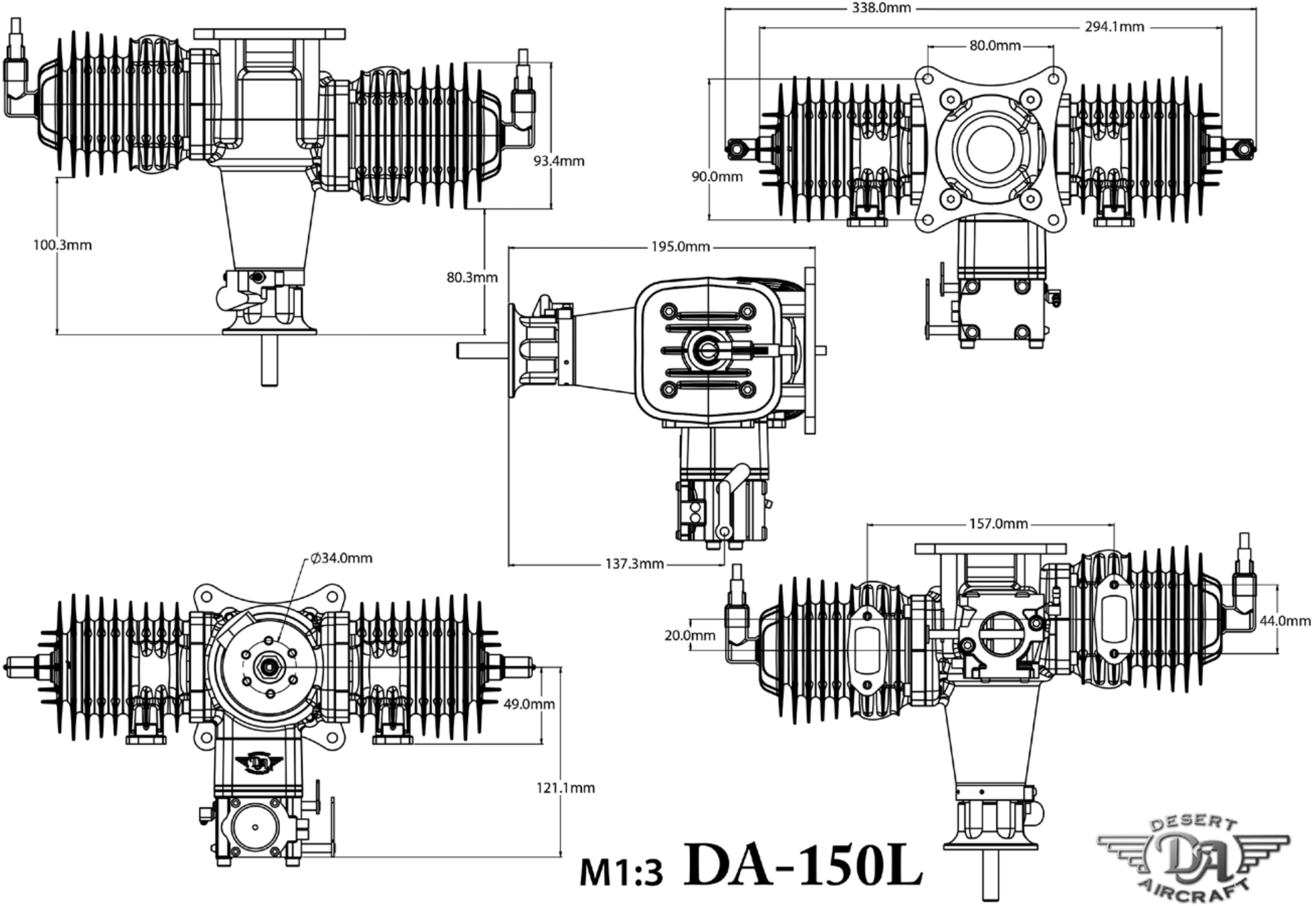
Spares

DA-150L

No.	Description €	
#5566	Spark plug NGK CM-6, per 1	7,45
#5603	Ignition with spark plug caps	209,95
#5604	Spark plug cap, per 1	27,95
#5605	Pickup sensor	33,95
#5606	Magnet	3,30
#5607	Screw for pickup sensor, per 1	0,35
#5809	Cylinder, per 1	
#5811	Gasket, cylinder base, per 1	2,45
#5534	Cylinder base screw, red,	1,95
	M5 x 20 mm, Alu, per 1	
#5813	Piston, per 1	51,90
#5814	Piston ring, per 1	5,95
#5815	Piston pin, per 1	6,50
#5816	Piston pin Cer clip, per 1	1,25
#5817	Bearing upper rod, per 1	9,50
#5818	Gasket, exhaust, per 1	1,75
#5820	Crankshaft assembly	269,90
#5822	Bearing, front	16,80
#5823	Bearing, middle	17,85
#5824	Bearing, rear	12,95
#5926	Round key	1,95
#5826	Prop hub	59,95
#5326	Shaft extension nut, Titanium	34,95
#5827	Prop bolt, M5x55, per 1	0,50
#5828	Prop washer	19,90
#5829	Crank case, front	
#5830	Crank case, rear	
#5833	Motormount	46,95
#5834	Crank case bolt, M6x80, per 1	2,50
#5835	Crankcase gasket	5,85
#5839	Carb mounting screw, Alu	4,95
	with washers, per 1	
#5940	Carburetor	109,95
#5841	Gasket, carburettor base	2,55
#5943	Aluminium-Plate, between carb	14,95
	and reed valve carrier	
#5844	Carb throttle arm	3,95
#5944	Gasket, from Aluminium-plate	2,55
	to reed valve carrier	
#5945	Reed valve carrier, without reed valves	29,95
#5946	Reed valve Retainers w. screws, set of 2	6,95
#5947	Reed valves, set	19,90
#5948	Gasket, from reed valve carrier	2,55
	to carb carrier	
#5949	Carb carrier, red	22,90
#5950	Gasket, from red carb	2,55
	carrier to crankcase	
#5855	Carb diaphragm set	17,95
#5856	Low speed needle	7,95
#5857	Spring for low speed needle	1,95
#5858	High speed needle	7,95
#5859	Spring for high speed needle	1,95

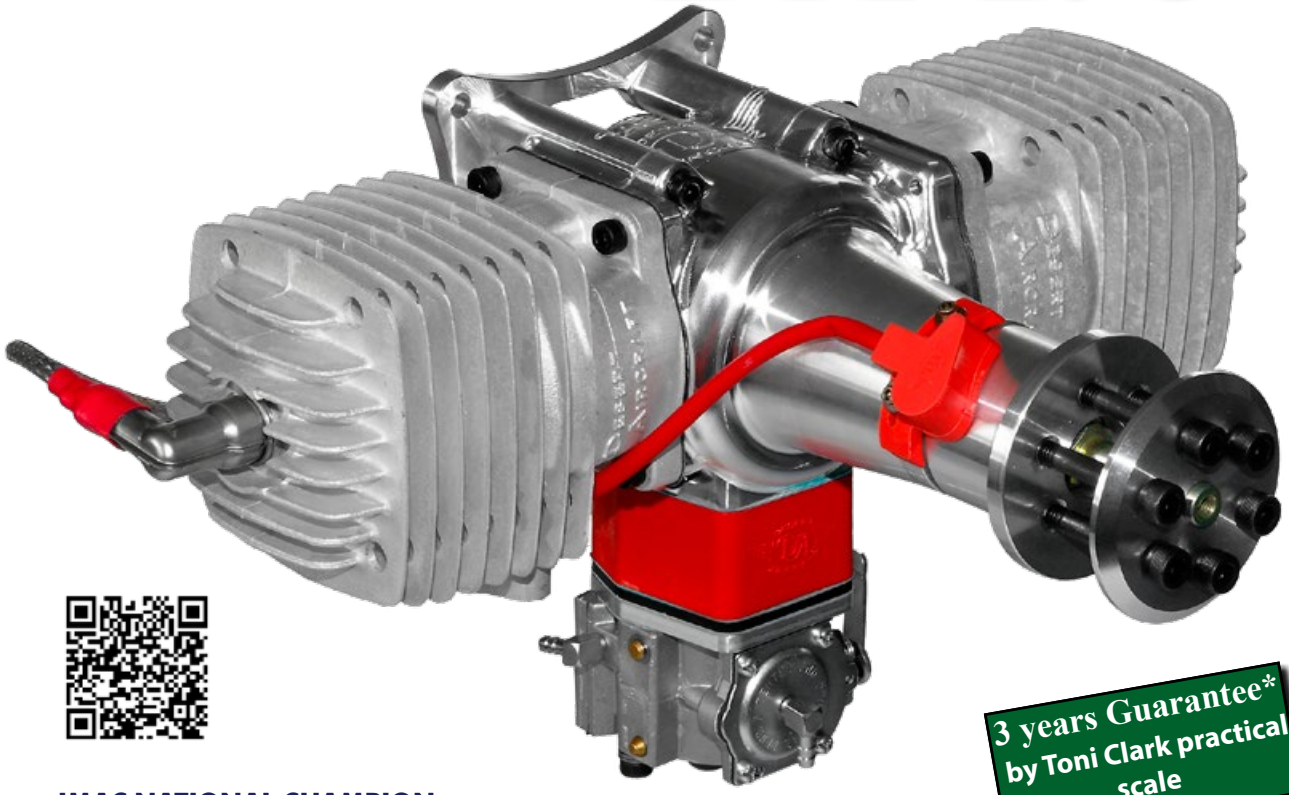
DA-150

No.	Description €	
#5566	Spark plug NGK CM-6, per 1	7,45
#5603	Ignition with spark plug caps	209,95
#5604	Spark plug cap, per 1	27,95
#5605	Pickup sensor	33,95
#5606	Magnet	3,30
#5607	Screw for pickup sensor	0,35
	4-40x3/8", per 1	
#5810	Cylinder, per 1	159,90
#5811	Gasket, cylinder base, per 1	2,45
#5534	Cylinder base screw, red,	1,95
	M5 x 20 mm, Alu, per 1	
#5813	Piston, per 1	51,90
#5814	Piston ring, per 1	5,95
#5815	Piston pin, per 1	6,50
#5816	Piston pin Cer clip, per 1	1,25
#5817	Bearing upper rod, per 1	9,50
#5818	Gasket, exhaust, per 1	1,75
#5820	Crankshaft assembly, new version,	269,90
	requires new round key hub #5826	
#5822	Bearing, front	16,80
#5823	Bearing, middle	17,85
#5824	Bearing, rear	12,95
#5524	Woodruff key, for old prop hub	1,95
#5825	Prop hub, old version	54,95
#5926	Round key, for new prop hub	1,95
#5826	Prop hub, new version	59,95
#5626	Shaft extension nut	25,95
#5827	Prop bolt, M5x55, per 1	0,50
#5828	Prop washer	19,90
#5831	Crank case, front	319,00
#5832	Crank case, rear	229,00
#5833	Motormount	46,95
#5834	Crank case bolt, M6x80, per 1	2,50
#5840	Carburetor	107,50
#5841	Gasket, carburettor base	2,55
#5643	Carb mounting screws, M5x55, per 1	3,50
#5844	Carb throttle arm	3,95
#5845	Carb mounting block	44,95
#5512	Carb block screws, Alu,	1,95
	red, M5x16, per 1	
#5847	Reed valve cage with petals	43,95
#5848	Reed valve, petals only, long	9,75
#5849	Reed valve, petals only, short	9,75
#5855	Carb diaphragm set	17,95
#5856	Low speed needle	7,95
#5857	Spring for low speed needle	1,95
#5858	High speed needle	7,95
#5859	Spring for high speed needle	1,95


338.0mm
294.1mm
80.0mm
93.4mm
90.0mm
100.3mm
80.3mm
195.0mm
137.3mm
157.0mm
Ø34.0mm
44.0mm
20.0mm
49.0mm
121.1mm
M1:3 DA-150L
DESERT
DA
AIRCRAFT

Exclusive Engines

DA-170



IMAC NATIONAL CHAMPION
XFC CHAMPION CLOVER CREEK CHAMPION

3 years Guarantee* by Toni Clark practical scale

DA 170 ..... #5900 € 1938,—

We reserve the right to alter price and spec. without prior notice.

- Same length and mounting like the DA 150.
- Computer Simulation designed high performance engine with very high torque output.
- Crankcase CNC milled from high tensile aircraft aluminium.
- The cylinder, piston and crankshaft is developed by Desert Aircraft.
- Long conrod with gudgeon pin set very near piston crown for reduced side load.
- 4 Leaf reed valves.
- Battery ignition with automatic advance and retard.
- Rapid spares delivery and repairs service from Germany by Toni Clark practical scale GmbH.

SPECIFICATIONS:

Capacity: 171,8 cm^3

Bore x Stroke: 52 x 40,5 mm

Weight: 3650 g
with ignition: 3790 g

Propeller: 30x12 32x10/12
3-blade: 28,5x12, 29x12

Crankshaft with 3 ballbearings

RPM range: 1000-6500 1/min,

Carburettor: Walbro with Choke

Fuel: BEL RAY H1R / mid
to high octane gas 1:50

* Guarantee conditions see page 108

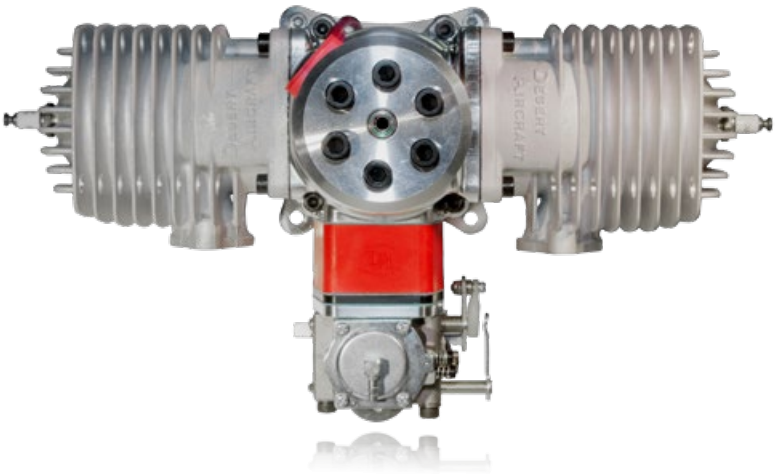
The experience with the extreme reliability of the DA-150 in mind, the DA-170 was fully new developed. More capacity and therefore more power, with the same weight is the result. Many top places in the international aerobatic championships prove the amazing power of this engine.

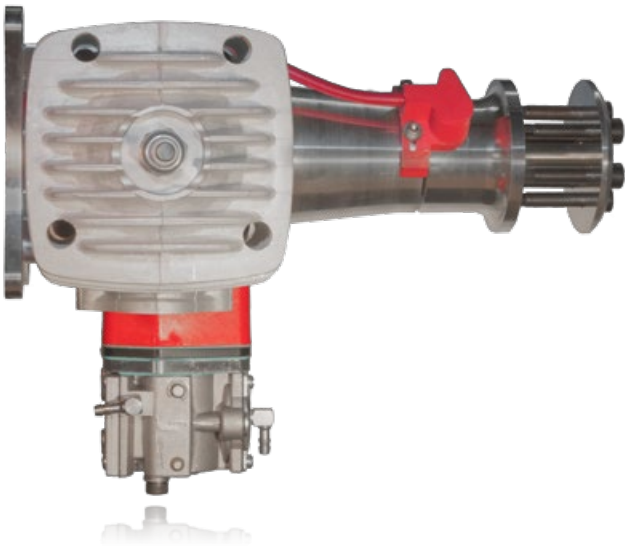
The reed valves developed by DA plus the Walbro carburettor are perfectly adapted to the engine giving an even running engine in all attitudes and throttle settings. An aluminium throttle arm is fitted to the carburettor throttle shaft.

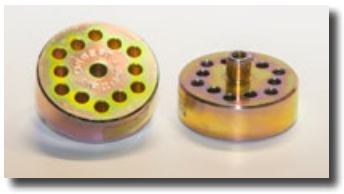
The DA-170 has been designed especially to run with tuned pipes and only develops its enormous power with these. Should you decide against fitting these pipes then the DA-150 is the far better choice.

As is with all DA engines the DA-170 has been factory test run, the carburettor needles adjusted. The world wide DA service and support is unique.

The DA-170 is the ideal engine for your 40% aerobatic models.

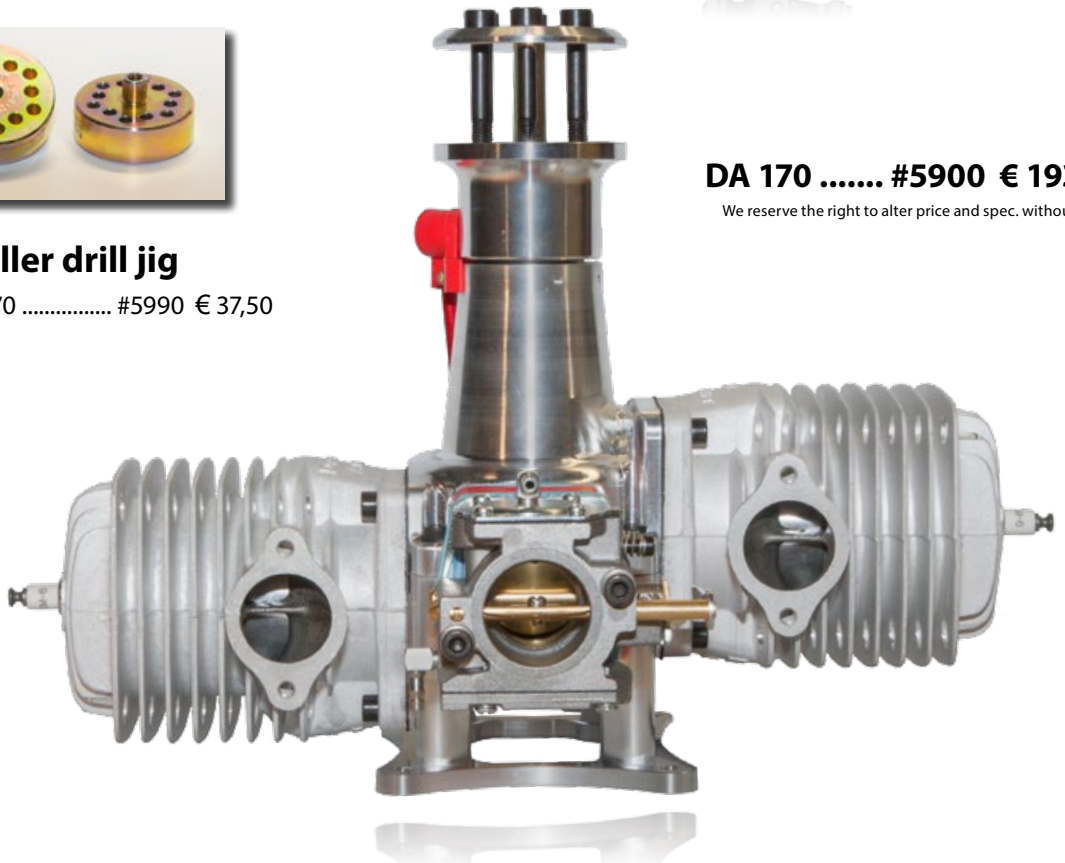






Propeller drill jig

for DA-170 ..... #5990 € 37,50



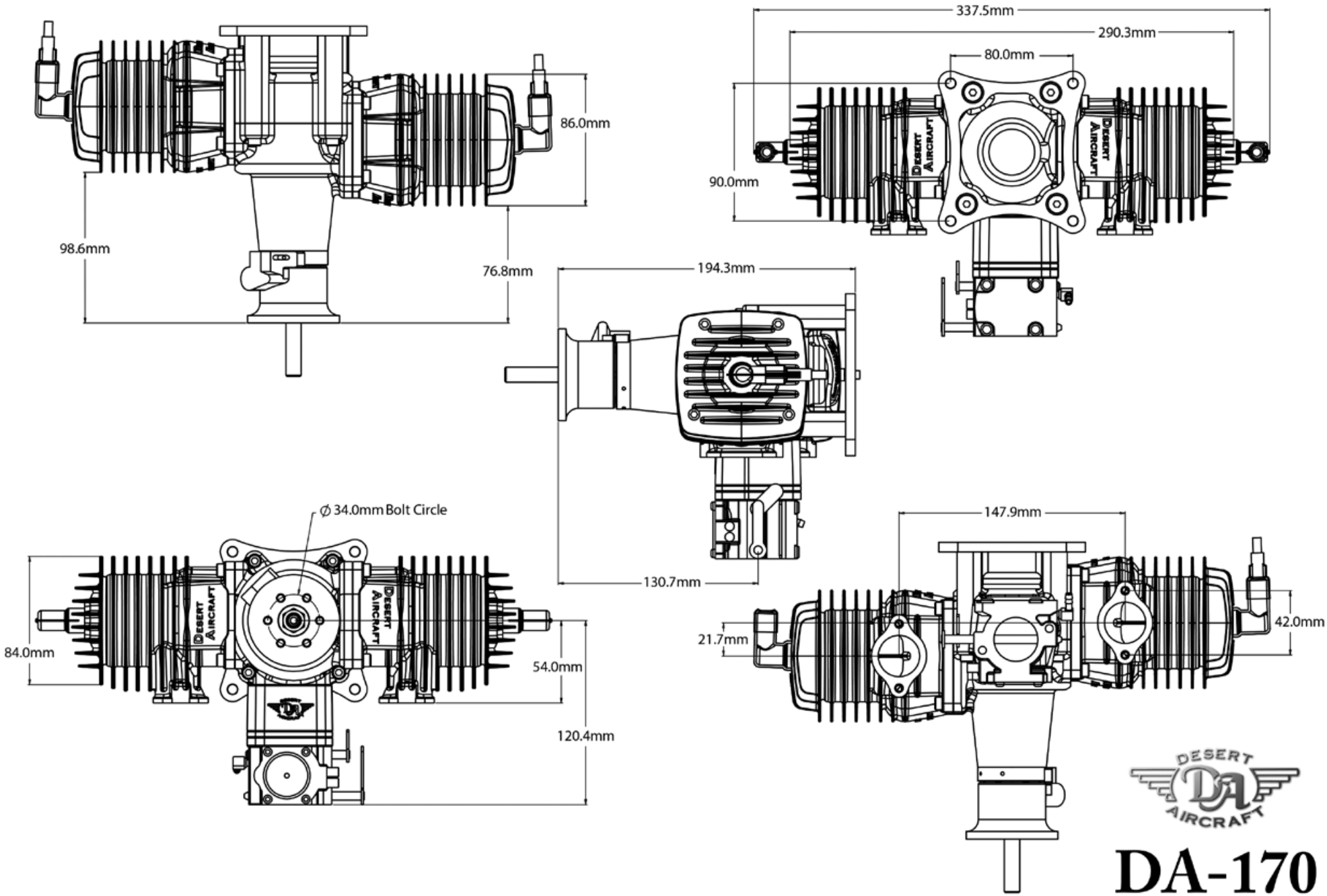
DA 170 ..... #5900 € 1938,—

We reserve the right to alter price and spec. without prior notice.

DA-170 Spares

No.	Description	€
#5566	Spark plug NGK CM-6, per 1	7,45
#5603	Ignition with spark plug caps	209,95
#5604	Spark plug cap, per 1	27,95
#5605	Pickup sensor	33,95
#5606	Magnet	3,30
#5607	Screw for pickup sensor, per 1	0,35
#5910	Cylinder, per 1	179,95
#5911	Gasket, cylinder base, per 1	6,55
#5912	Cylinder base screw, per 1	0,40
#8513	Piston, per 1	51,95
#8514	Piston ring, per 1	6,95
#5815	Piston pin, per 1	6,50
#5816	Piston pin Cer clip, per 1	1,25
#5817	Bearing upper rod, per 1	9,50
#8518	Gasket, exhaust, per 1	1,75
#5920	Crankshaft assembly with rods	329,00
#5622	Bearing, front	16,80
#5623	Bearing, middle	17,85
#5522	Bearing, rear	12,95
#5925	Prop hub	69,95
#5626	Shaft extension nut	25,95
#5926	Round key, for prop hub	1,95
#5927	Prop bolt, M6x55, per 1	0,60
#5928	Prop washer	22,50
#5931	Crank case, front	338,00
#5932	Crank case, rear	247,00
#5933	Motor mount	59,95

No.	Description	€
#5934	Bolt for Motor mount, per 1	0,65
#5935	Gasket, crank case	5,85
#5936	Crank case bolt, per 1	0,40
#5939	Carb mounting screw,	1,55
	with washers, per 1	
#5940	Carburetor	109,95
#5841	Gasket, carburetor base	2,55
#5942	Ball Link with fixing screw and	3,95
	nut, for throttle linkage	
#5943	Aluminium-Plate, between carb	14,95
	and reed valve carrier	
#5944	Gasket, from Aluminium-Plate	2,55
	to reed valve carrier	
#5945	Reed valve carrier, without reed valves	29,95
#5946	Reed valve Retainers w. screws, set of 2	6,95
#5947	Reed valves, set	19,90
#5948	Gasket, from reed valve carrier	2,55
	to carb carrier	
#5949	Carb Carrier, red	22,90
#5950	Gasket, from red carb	2,55
	carrier to crankcase	
#5855	Carb diaphragm set	17,95
#5856	Low speed needle	7,95
#5857	Spring for low speed needle	1,95
#5858	High speed needle	7,90
#5859	Spring for high speed needle	1,95


337.5mm
290.3mm
80.0mm
86.0mm
90.0mm
98.6mm
76.8mm
194.3mm
130.7mm
Ø 34.0mm Bolt Circle
147.9mm
84.0mm
54.0mm
120.4mm
21.7mm
42.0mm
DESERT AIRCRAFT
DA-170

DESERT AIRCRAFT

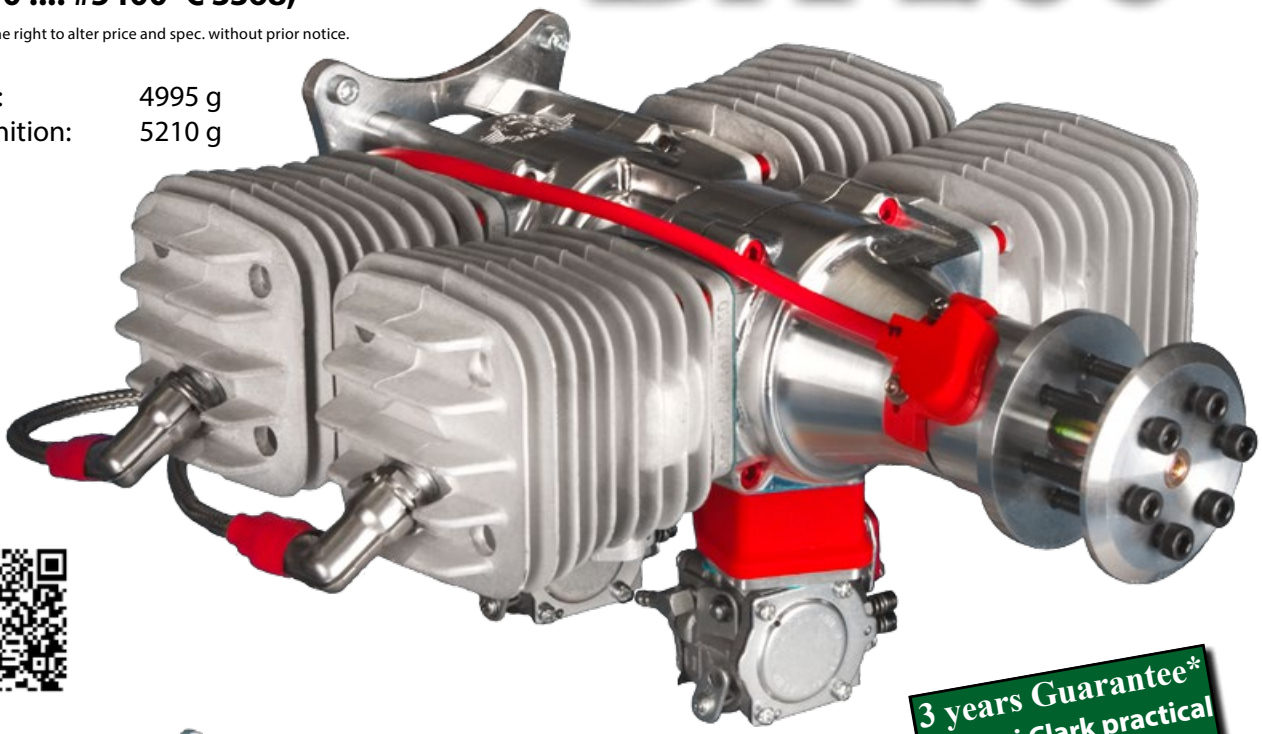
Exclusive Engines

DA-200

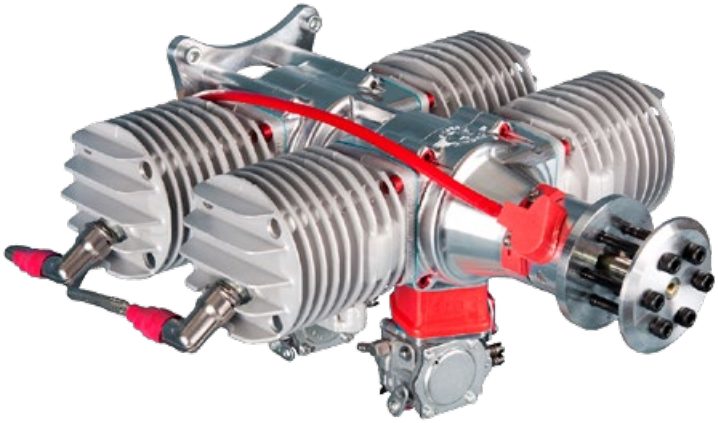
DA-200 .... #5400 € 3368,—

We reserve the right to alter price and spec. without prior notice.

Weight: 4995 g
with ignition: 5210 g



3 years Guarantee* by Toni Clark practical scale

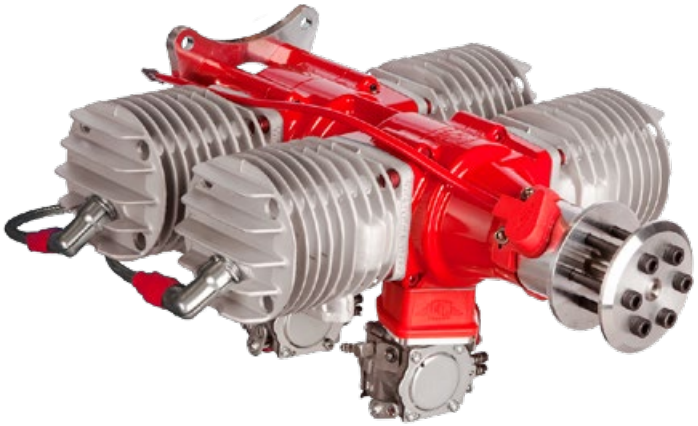


DA-200L .... #5401 € 3668,—

We reserve the right to alter price and spec. without prior notice.

Compared to the DA-200 almost 560 g lighter, because of the turned cylinder.

Weight: 4438 g
with ignition: 4653 g



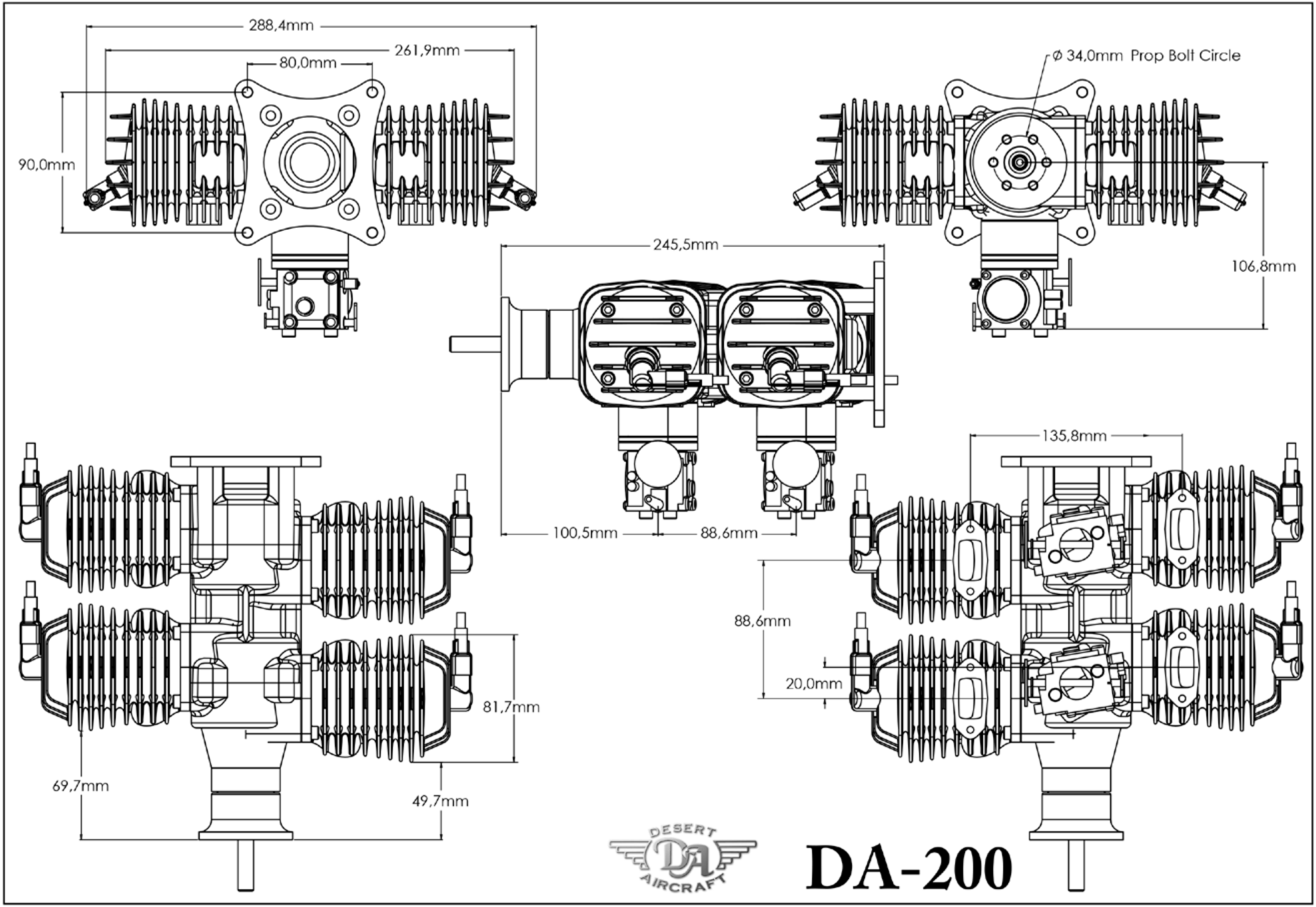
DA-200MG.... #5402 € 4368,—

We reserve the right to alter price and spec. without prior notice.

250 g lighter than the DA-200L because of the usage of a magnesium alloy crankcase.

Weight: 4184 g
with ignition: 4399 g

* Guarantee conditions see page 108


288,4mm
261,9mm
80,0mm
90,0mm
Ø 34,0mm Prop Bolt Circle
106,8mm
245,5mm
100,5mm
88,6mm
135,8mm
88,6mm
20,0mm
81,7mm
69,7mm
49,7mm
DESERT
DA
AIRCRAFT
DA-200

Edelstahlschalldämpferanlage für DA 35 und 70

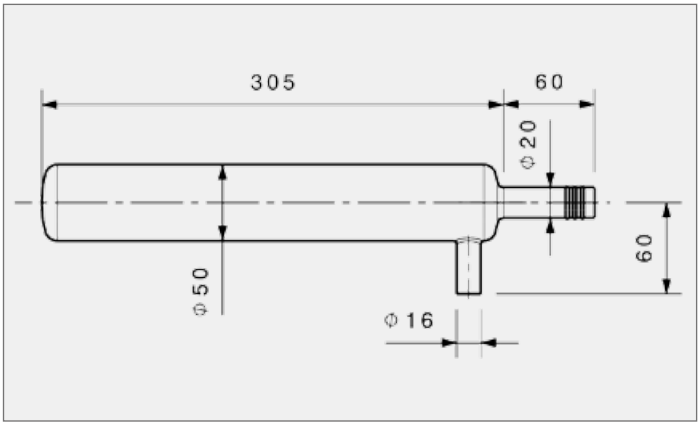
Stainless steel silencer system for DA-35 and DA-70 *

** two required for the DA-70*

Stainless steel silencer for DA-35 / DA-70

Without header and fixing materials, for the DA-70 two are required. Weight 255 g.

Stainless steel silencer, 1 piece ... #3770 € 89,00



Smokenipple

The stainless steel silencer #3770 is supplied with a fitted nipple for smoke oil.

Fixing Clamp with Base 50 mm

Made from stainless steel, a simple quick and safe fixing for silencers with 50 mm diameter.

Fixing clamp with base ..... #2597 € 10,60

For PTFE Tubing and Spring Clips for 28 mm Tube please see page 195.

Exhaust flange:

Laser cut from 3 mm stainless steel.

DA-35 and DA-70 ..... #3571 € 4,90

"Do it yourself"-header for DA-35 and DA-70

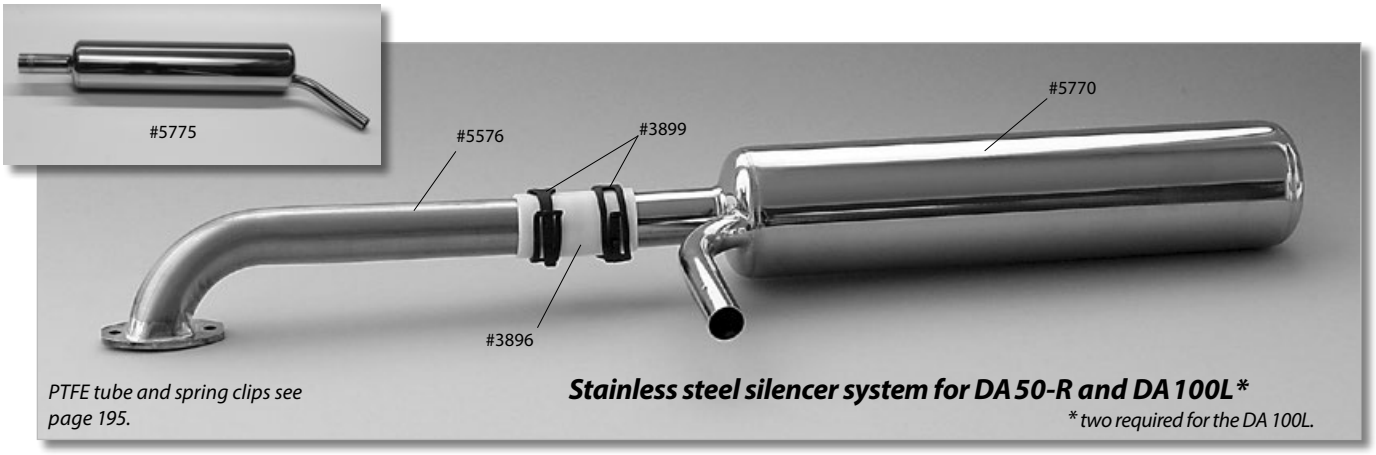
Fitting your situation shorten the short end of the stainless steel bend has to be shortened and pushed into the flange #3571 with the correct side thrust. Afterwards the header can be silver solderd to the flange very easily with our flux coated silver solder #0981. No jig is needed because of the snag fit of both parts.

90 degree stainless steel bend ø20 mm ..... #3872 € 11,95

Stainless steel Flange DA-35/DA-70 ..... #3571 € 4,90

Flux coated silver solder, 1 rod ..... #0981 €11,95

Stainless Steel Silencers for DA 50-R / 60/ DA 100L / 120



PTFE tube and spring clips see page 195.

Stainless steel silencer system for DA 50-R and DA 100L*

** two required for the DA 100L.*

Stainless steel silencer DA 50 / 60 / DA 100L/ 120

Without header and fixing materials. For the DA 100L/120 two are required. Weight 295 g.

Stainless steel silencer, 1 piece #5770 € 109,90

Silencer with rear exhaust #5775 € 109,90

Smoke Nipple

The stainless steel silencer #5770 can be supplied fitted with a nipple for smoke oil.

Extra cost for smoke oil nipple ..... #5772 € 3,95

Fixing Clamp with Base 60 mm

Made from stainless steel, a simple quick and safe fixing for silencers with 60 mm diameter.

Fixing clamp with base ..... #5773 € 12,95

Stainless Steel Headers

Light and tough headers made from stainless steel tube 25 x 0,5 mm. On the DA 100L the narrow headers can be mounted inclined either to the middle or to the outside. The center line length on all headers is 220 mm, this is the correct length for the silencer #5770.

Header DA 50-R, narrow, inclined left #5575 € 31,95

Header DA 50-R, narrow, inclined right #5576 € 31,95

Weight: 90g. **normal #5577 € 29,95**

wide #5578 € 29,95

Header pair for DA 100L, narrow .....#5776 € 62,95

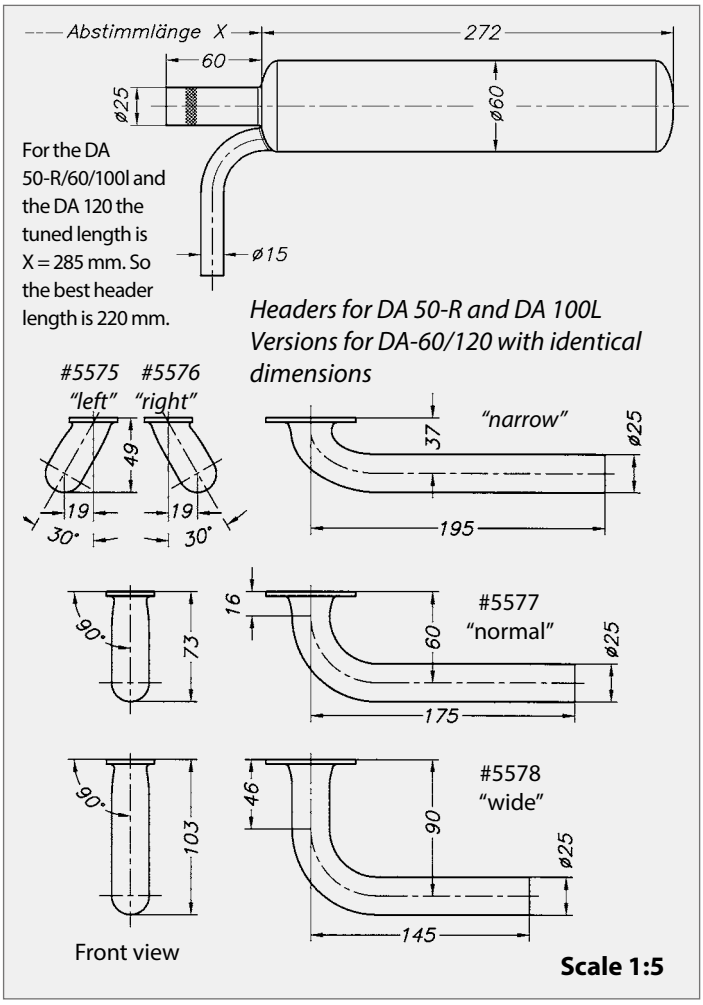
Weight per pair: 180g. **normal.....#5777 € 58,90**

wide .....#5778 € 58,90

Exhaust flange:

Laser cut from 3 mm stainless steel..

DA 50-R and DA 100L .....#5771 € 5,50



Header DA 60, narrow, inclined left #5375 € 31,95

Header DA 60, narrow, inclined right #5376 € 31,95

Weight: 90g. **normal #5377 € 29,95**

wide #5378 € 29,95

Header pair for DA 120, narrow .....#5276 € 62,95

Weight per pair: 180g. **normal.....#5277 € 58,90**

wide .....#5278 € 58,90

Exhaust flange :

Laser cut from 3 mm stainless steel.

DA 60 and DA 120 .....#5271 € 5,50

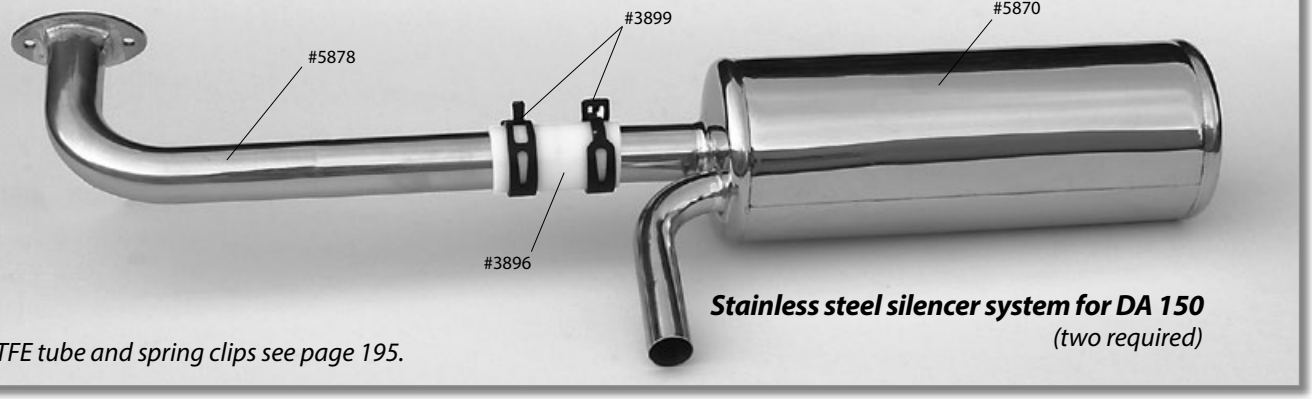
Stainless Steel Silencers for the DA 150

The DA engines achieve their high power with a tuned silencer system, as is the case with all high performance engines.

The large volume and the compact construction (large volume with small surface area) make these silencer units especially quiet. They are made from thin-wall stainless steel tubing, Laser welded and highly polished. The use of stainless steel throughout makes for an exceedingly robust and lightweight unit.

Stainless steel is vastly superior to aluminium in two ways, stainless alloys can withstand much higher temperatures and are very much tougher. To give an example, the header fixing screws can be firmly tightened down and do not need to be regularly tightened as is the case with aluminium. Also stainless can withstand far better, the constant oscillation and vibration that exhaust system must live with.

Stainless steel silencers have a very long life, exceeding by a large margin other metals that will often fall apart after a short running time. The higher specific weight is compensated by the thinner wall thickness that one can use. The only disadvantages are the higher cost of stainless plus it's extreme toughness makes it very difficult to work with.



Stainless steel silencer system for DA 150
(two required)

PTFE tube and spring clips see page 195.

Stainless steel silencer for DA 150

Without header and fixing materials. Two are required. Weight 430 g.

Silencer DA 150, 1 piece ... #5870 € 149,90

Fixing Clamp with Base 80 mm

Made from stainless steel.

Fixing clamp ..... #5873 € 13,95

Smoke Nipple

The stainless steel silencer can be suplied fitted with a nipple for smoke oil.

Extra cost for smoke nipple #5772 € 3,95

Stainless Steel Headers

Light and tough headers made from stainless steel tube 25 x 0,5 mm. The narrow headers can be mounted inclined either to the middle or to the outside. The center line length on all headers is 300 mm, this is the correct length for the silencer #5870 on the DA150.

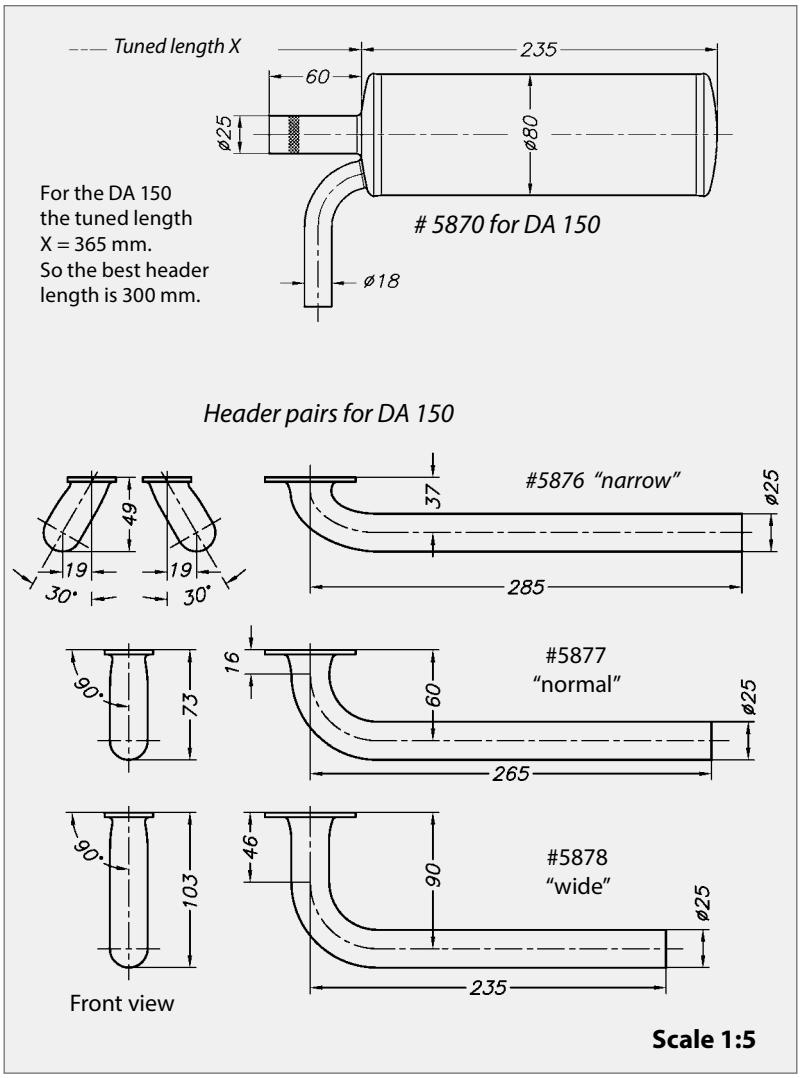
The weight of each header pairs is 240 g

Header pair DA 150, narrow #5876 € 62,95
normal #5877 € 58,90
wide #5878 € 58,90

Exhaust flange DA 150

Laser cut from 3 mm stainless steel.

Exhaust flange DA 150 ..... #5871 € 5,50



Stainless Steel Silencer for DA 85 and DA 170

Very compact, tuned stainless steel silencer diameter only 70 mm and two 15 mm outlet pipes.

Without header and fixing materials. For the DA 170 two are required.

Weight 379 g.

Silencer DA 85 / DA 170, 1 piece .... #8570 € 159,90

Smoke Nipple

The stainless steel silencer #8570 can also be supplied fitted with a nipple for smoke oil.

Extra cost for smoke oil nipple ..... #5772 € 3,95

Fixing Clamp

Made from stainless steel, a simple quick and safe fixing for silencers with 70 mm diameter.

Fixing clamp with base 70mm..... #8773 € 13,95

For PTFE Tubing and Spring Clips for 28 mm Tube please see page 195.

Stainless Steel Headers

Light and tough headers made from stainless steel tube 28 x 0,5 mm. On the DA 170 the narrow headers can be mounted inclined either to the middle or to the outside. The center line length on all headers is 210 mm, this is the correct length for the silencer #8570.

Header DA 85, narrow, inclined left #8575 € 31,95

Header DA 85, narrow, inclined right #8576 € 31,95

Weight: 110g. **normal #8577 € 29,95**

wide #8578 € 29,95

Header pair for DA 170, narrow..... #5976 € 62,95

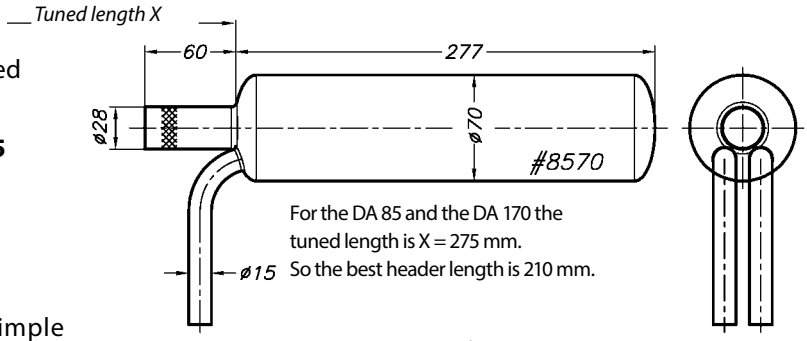
Weight per pair: 220g. **normal ..... #5977 € 58,90**

wide ..... #5978 € 58,90

Exhaust flange:

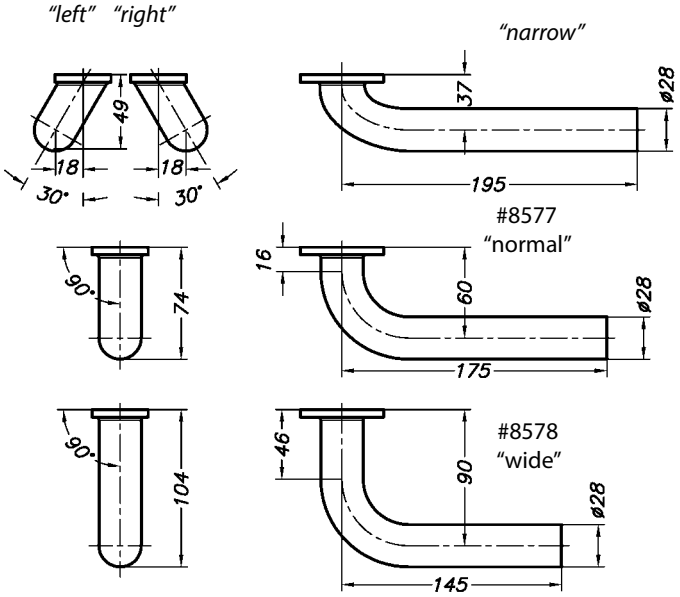
Laser cut from 5 mm stainless steel.

Exhaust flange DA 85 and DA 170 .....#8571 € 5,50



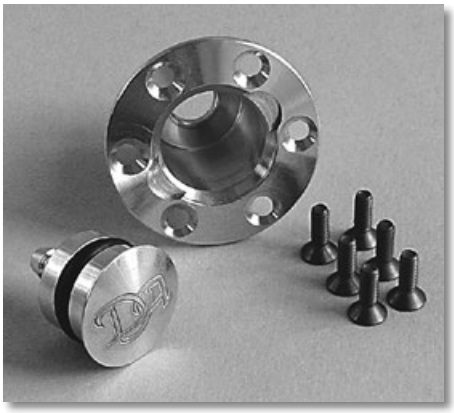
#8575 #8576
"left" "right"

Headers for DA 85 and DA 170



Front view

Original DA Fuel Dot "Tankcap" with engraved DA-Logo



The DA Fuel Dot serves as a cap for filling the tank. Very neat and workmanlike appearance

The cap has an O-ring which holds it in the bezel. The red anodized screws have an English thread and these must be screwed into the fuselage wood covering as a self tapping sheet metal screw would be.

Diameter 34 mm,
Weight including screws 16 g.

Original DA-Fuel-Dot #5585 € 24,95

Original DA Mufflers

We now offer these DA mufflers, due to requests from countries such as Greece, Spain, Portugal, Italy and Iceland.

The Original DA mufflers have the indisputable advantage of being simple to fit inside the cowl of ARF wood models and give a first class running performance over the entire throttle range.

Being bolted directly onto the cylinder prevents a sudden resonance induced jump in the rpm. Due to the large diameter outlet of these mufflers, the DA engines produce a very good performance without tending to overheat. Many so called Pitts style mufflers are to be strongly criticized in that they cause power loss and overheating. The DA mufflers are made of welded aluminium tubing and delivered with smoke nipples.

The standard mufflers supplied with the Zenoah engines can only be describe as super quiet, after hearing the indescribable noise from a DA muffler. **We vehemently advise you not to use these DA mufflers on any model flying field that is subject to noise regulations.**

DA-50R Muffler #5560 € 69,90

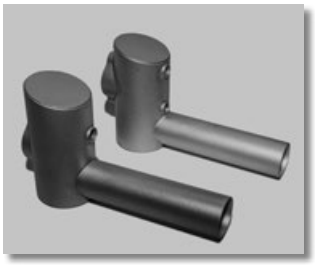
For Inverted mounted engine.
L = 98 mm, d = 50 mm.
Outlet tube i.d. 27 mm.
Weight incl. screws 145 g.

DA-60 Muffler #5360 € 89,90

For Inverted mounted engine.
L = 103 mm, d = 50 mm.
Outlet tube i.d. 29 mm.
Weight incl. screws 155 g.

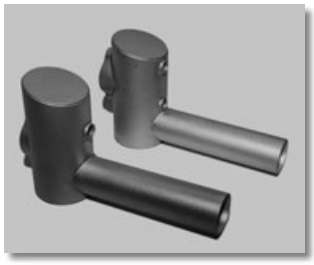
DA-85 Slimline Pitts Style Muffler #8560 € 149,90

L = 180 mm, d = 50 mm.
two outlet tubes i.d.24 mm.
Weight incl. screws 380 g.



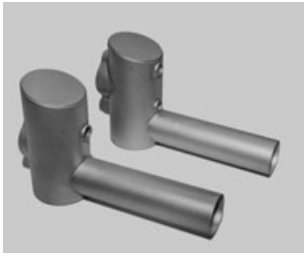
DA-100 Compact-Muffler-Set #5660 € 189,90

L = 100 mm, d = 50 mm.
Outlet tube i.d. 27 mm.
Weight incl. screws 295 g.



DA-120 Compact-Muffler-Set #5261 € 199,90

L = 105 mm, d = 50 mm.
Outlet tube i.d. 29 mm.
Weight incl. screws 260 g



DA-150 Compact-Muffler-Set #5860 € 199,90

L = 124 mm, d = 63 mm.
Outlet tube i.d. 30 mm.
Weight incl. screws 390 g.

DA-170 Muffler-Set #5960 € 159,90

L = 126 mm, d = 63 mm.
Outlet tube i.d. 36 mm.
Weight incl. screws 385 g

Apparel

Desert Aircraft Cap
with embroidered logo. Natural w/ Navy blue brim.
Desert Aircraft - Cap #5720 € 12,90

Desert Aircraft T-Shirt
Royal blue with large white silk screened logo on back, smaller logo on front. 100% cotton. S, M L, XL, XXL

Desert Aircraft T-Shirt, Size M.....#5710 € 12,90
Desert Aircraft T-Shirt, Size L.....#5711 € 12,90
Desert Aircraft T-Shirt, Size XL.....#5712 € 12,90
Desert Aircraft T-Shirt, Size XXL .....#5713 € 12,90

VM 60 S1-4T

NEW!

SPECIFICATIONS:

Capacity:	60 ccm
Bore x Stroke:	47x35 mm
Weight:	2240 g
with ignition:	2360 g
Fiala Prop 2-blade:	24x12", 24x14", 26x10"
Fiala Prop 3-blade:	22x12",24x10"
Fuel:	1:30
Valvoline SynPower® 2T / Aral Ultimate 102	

VM 60 S1-4T ..... #7600 € 899,—

We reserve the right to alter price and spec. without prior notice.

- Very light, 1 kg lighter than other four-strokes in it`s class
- Turns big propellers highly efficient with reasonable RPM`s
- Very pleasing sound due to the big Honda valves and valve seats with matching timing
- Spontaneous throttle response and smooth mid-range transition
- Very narrow design with valve train, carburettor and exhaust in the rear of the engine
- Nickel-Silicon plated cylinder surfaces
- Completely encapsulated valve train with only one camshaft
- Crankshaft with 3 ball bearings
- Valach microprocessor battery ignition with automatic advance and retard
- Two Lipo Cells can be used as ignition battery
- VM-engines are now being produced with state of the art machines and methods
- Rapid spares delivery and repairs service from Germany by Toni Clark practical scale GmbH

With the VM 60 the designer Zdenek Vlach has produced a ground-breaking engine. The engine is 1 kg lighter than other four-strokes in it`s class, because of only one camshaft, nickel-silicon cylinder lining and a CNC milled crankcase. Anyway it is a robust engine with M5 crankcase and cylinder base screws.

The carburettor is placed behind the engine, resulting in an very narrow engine which fits into nearly every cowling.

Being a four stroke with a large capacity produces a very realistic full-size aircraft sound. With a relatively small silencer the sound level is very low rather like a small saloon car.

The Valach VM 120B2-4T is a four stroke OHV engine with two valves per cylinder, running on petrol/oil mixture. Valves and their seats are manufactured by Honda, ensuring a very high quality. The fully encapsulated valve train reduces sound as well as ensuring the rocker arms are well lubricated.

The Fiala propellers are very efficient, this being due to minimal blade thickness. They sound especially good on four stroke engines. Ideal Fiala two blade propeller sizes for the VM 60: 24x12", 24x14" and 26x10". For aerobatics and glider towing the 24X12" is ideal. For our big Tiger Moth the 26x10" is the best choice.

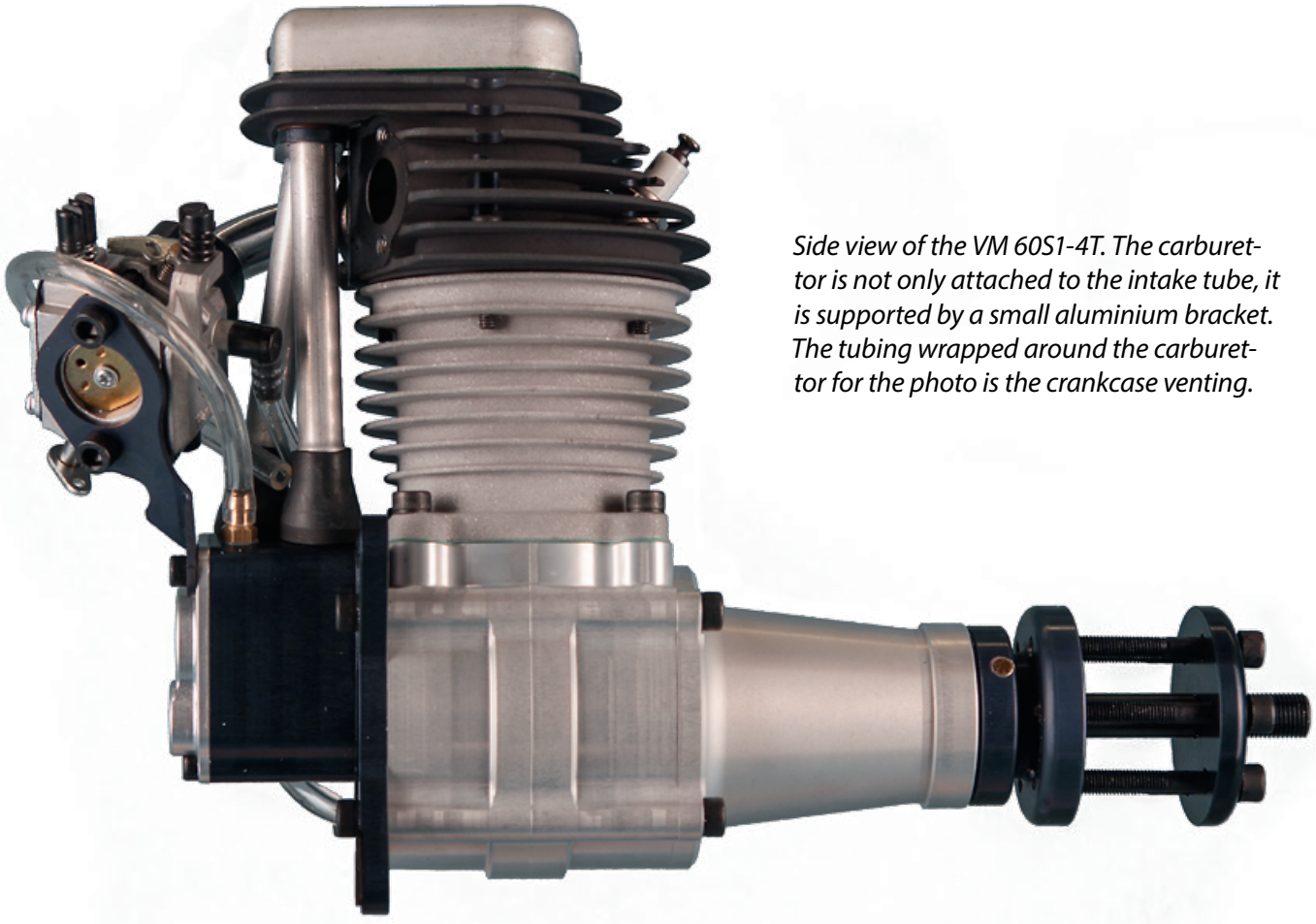
The fuel consumption is approximately 50% compared to that of a two-stroke engine with the same displacement. A 300cc fuel tank lasts for about 15-20 minutes of flying time.

We recommend Aral Ultimate 102, as the smell is not so penetrating and it can be stored without deteriorating. It does not contain any ethanol.

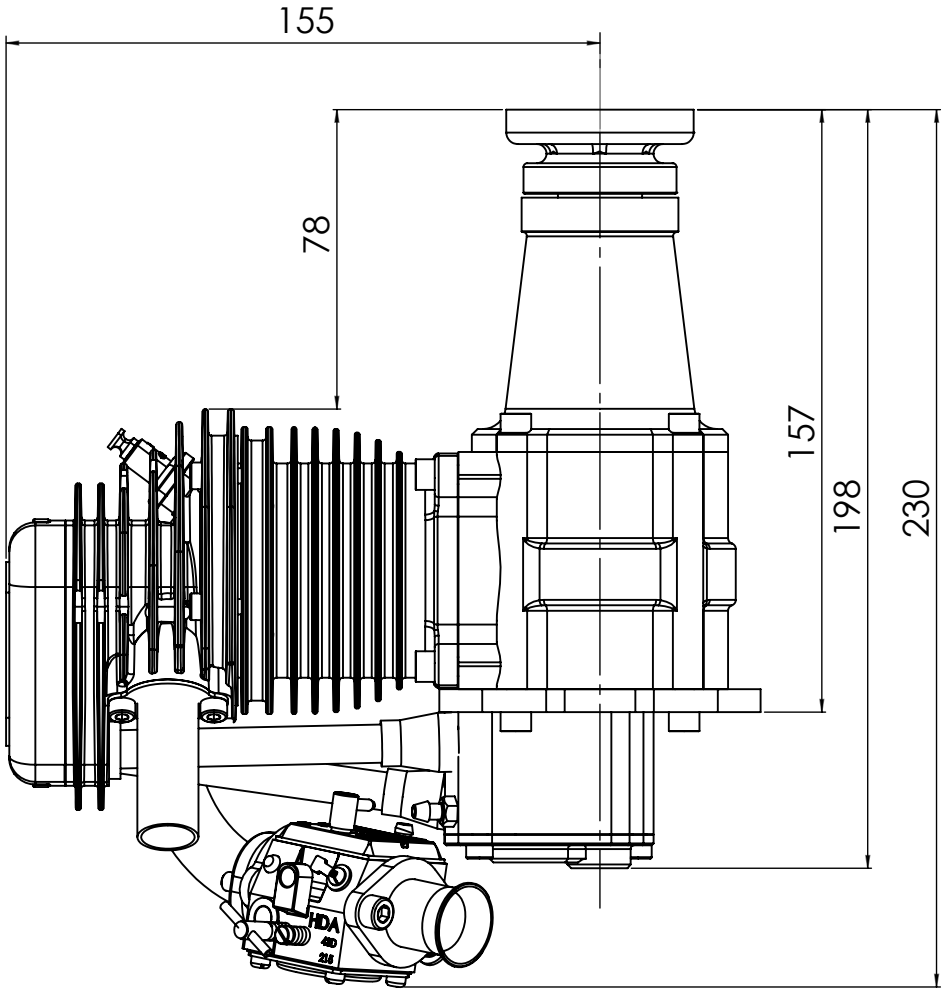
We had tried many oils, but recommend Valvoline SynPower 2T oil. Our BEL-RAY H1R although excellent for two strokes, is not ideal for four strokes, as it burns very well without deposit and not much gets past the piston, as is the case by the Valvoline SynPower 2T.

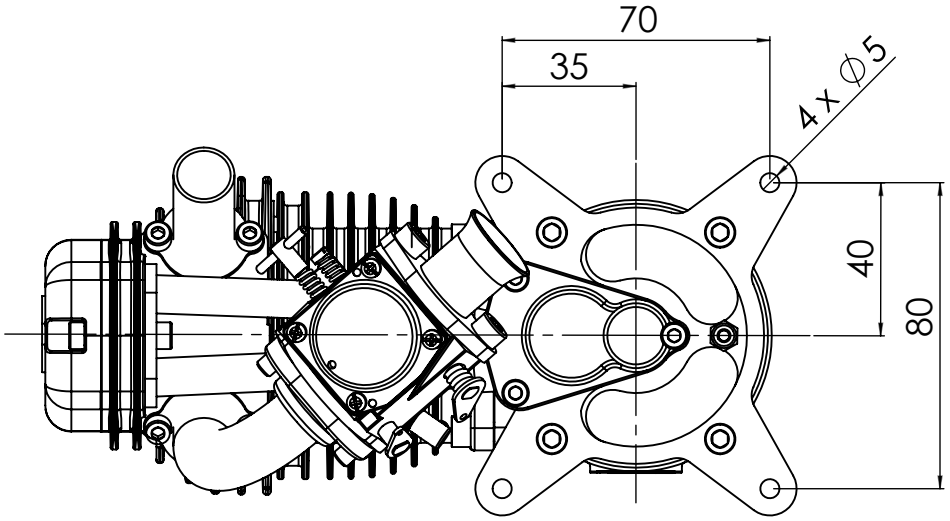
Front view of the Valach VM 60S1-4T. The carburettor is placed behind the engine, resulting in an very narrow engine which fits into nearly every cowling.

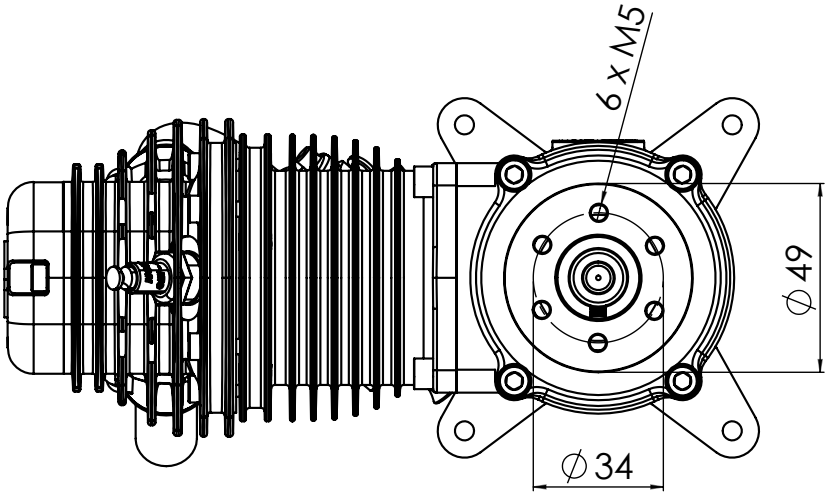
Our 2,70 m wing span Tiger Moth equipped with the VM 60S1-4T on a low pass. Motorized with the VM 60 she out preforms her ZG 62 driven fellows with a warm and pleasant sound and lots of power. The engine is turning the 26x10" Fiala 2-blade propeller with 4800 RPM and develops 10 kp of thrust.

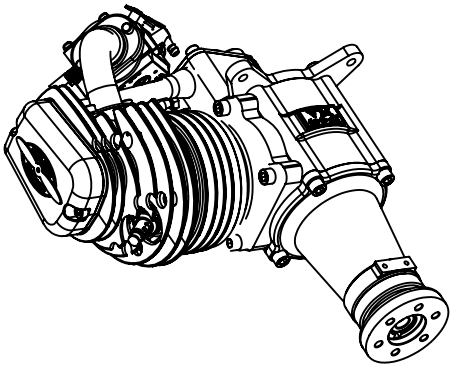


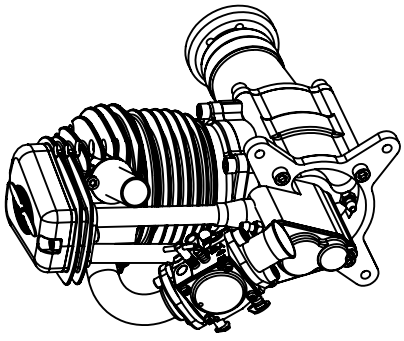
Side view of the VM 60S1-4T. The carburettor is not only attached to the intake tube, it is supported by a small aluminium bracket. The tubing wrapped around the carburettor for the photo is the crankcase venting.











VM 60 S1-4T

VM 120 B2-4T

Scalemodels, Aerobatic and Glidertowing reexperienced!

SPECIFICATIONS:

Capacity:	120 ccm
Power:	approx.10 hp
Bore x Stroke:	47x35 mm
Weight:	3450 g
with ignition:	3640 g
Voltage range:	4,8 - 9 Volt
Fiala Prop 2-blade:	
	30x12", 30x14", 32x12"
Fiala Prop 3-blade:	
	27x14",28x12
Fuel:	1:30

Valvoline SynPower® 2T / Aral Ultimate 102

VM 120 B2-4T ... #7300 € 1699,—

complete with Intake RAM tube.

Y-piece to drain oil ..... #7365 € 1,75

... out of the tube of the carburettor pump.

We reserve the right to alter price and spec. without prior notice.

- Sensational smooth running and high torque
- Spontaneous throttle response and smooth mid-range transition
- Extremely low vibration throughout the RPM range because of the four stroke principle
- Honda valves and valve seats
- Nickel-Silicon plated cylinder surfaces
- Completely encapsulated valve train
- Walbro carburettor
- Valach microprocessor battery ignition with automatic advance and retard
- two Lipo Cells can be used as ignition battery
- VM-engines are now being produced with state of the art machines and methods
- Rapid spares delivery and repairs service from Germany by Toni Clark practical scale GmbH

The Valach engines VM 120 B2-4T looks just like an original aero engine, only smaller, it runs smoothly like an original aero engine and above all it sounds like an original aero engine. The designer Zdenek Vlach has produced a real winner, an engine that demanding modellers have been waiting for, for a very long time.

Due to being a four stroke, the low vibration, is nothing but sensational, and torque is really high. The response to the throttle being opened is so smooth without the slightest attempt to surge, making the Valach 120 B2-4T absolutely ideal for your aerobatic model.

Being a four stroke with a large capacity produces a very realistic full-size aircraft sound. With a relatively small silencer the sound level is very low rather like a small saloon car.

The Valach VM 120 B2-4T is a four stroke OHV engine with two valves per cylinder, running on petrol/oil mixture. Valves and their seats are manufactured by Honda, ensuring a very high quality. The fully encapsulated valve train reduces sound as well as ensuring the rocker arms are well lubricated.

The aluminium crankcase and cylinder heads are cast with the lost wax process, which enables a very light weight. The VM-120 B2-4T's casting surface finish gives a very realistic appearance.

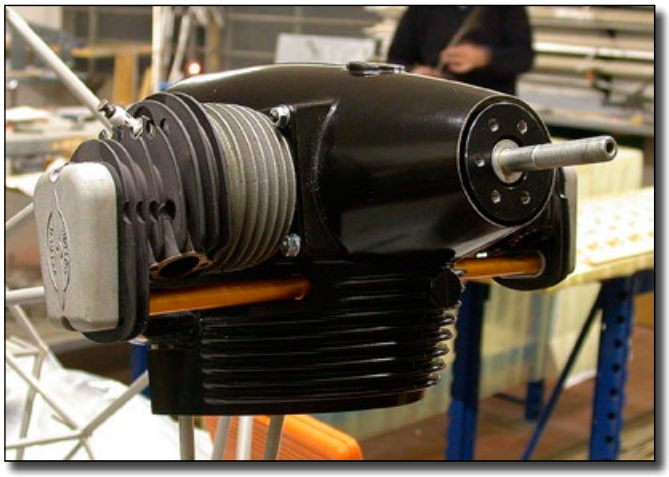
The cylinder's nickel-silicon lining is far lighter than conventional steel cylinder liners.

The processer controlled ignition allows easy starting and a exceptionally smooth running in all throttle settings.

The Fiala propellers are very efficient, this being due to minimal blade thickness. They sound especially good on four stroke engines. Ideal Fiala two blade propeller sizes for the VM120: 30x12", 30x14" and 32x12". For aerobatics and glider towing the 30X12" is ideal. For big and slow flying vintage models, as is with Paolo´s Aeronca C3, the 32x12" is the best choice

We recommend Aral Ultimate 102, as the smell is not so penetrating and it can be stored without deteriorating. It does not contain any Bio-Alcohol.

The fuel consumption is approximately 50% compared to that of a two-stroke engine with the same displacement. A 500cc fuel tank lasts for about 15-20 minutes of flying time.

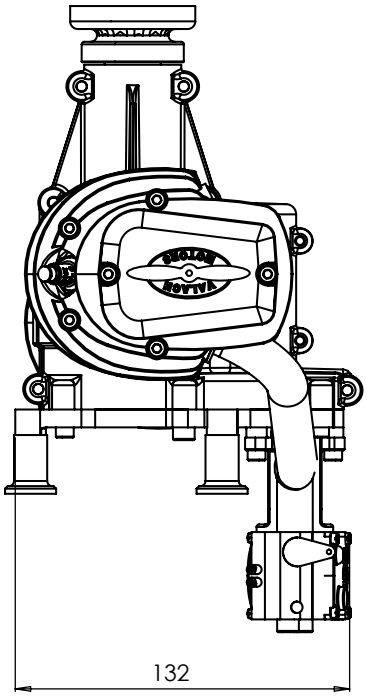


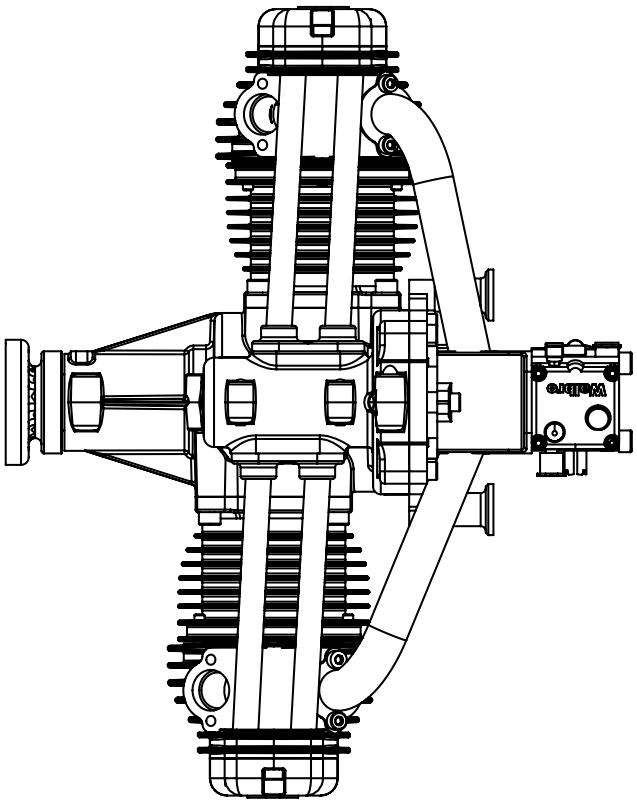
Paolo Severin refuelling his Aeronca C3. Paolo built this model around the Valach engine. The engine is so very similar to the full-size, it only needed a dummy E113 crankcase for the perfect scale apearance.
The model weighs 17,5 Kg with a span of 4,4 m. The VM 120 provides plenty of power, static thrust being more than 20 kg.

Top view of the VM 120B2-4T.
The very slim crankcase is evident. It is made with the lost wax process, same is for the cylinder heads, this type of casting allows the very thin fins to be formed, not being possible with normal gravity sandcasting.

The intake tube(Ram tube) is suplied with the engine and should definitely be fitted, this plays an important part in the smooth running of the VM-120 B2-4T.

Rocker gear covers are normal aluminium colour as standard. These can be had by ordering, anodised in Blue,Red or Gold.


132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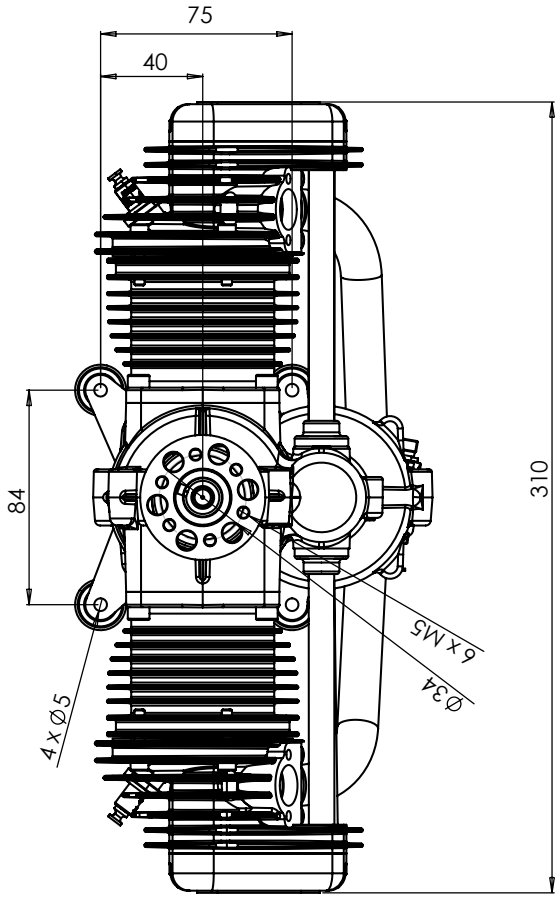
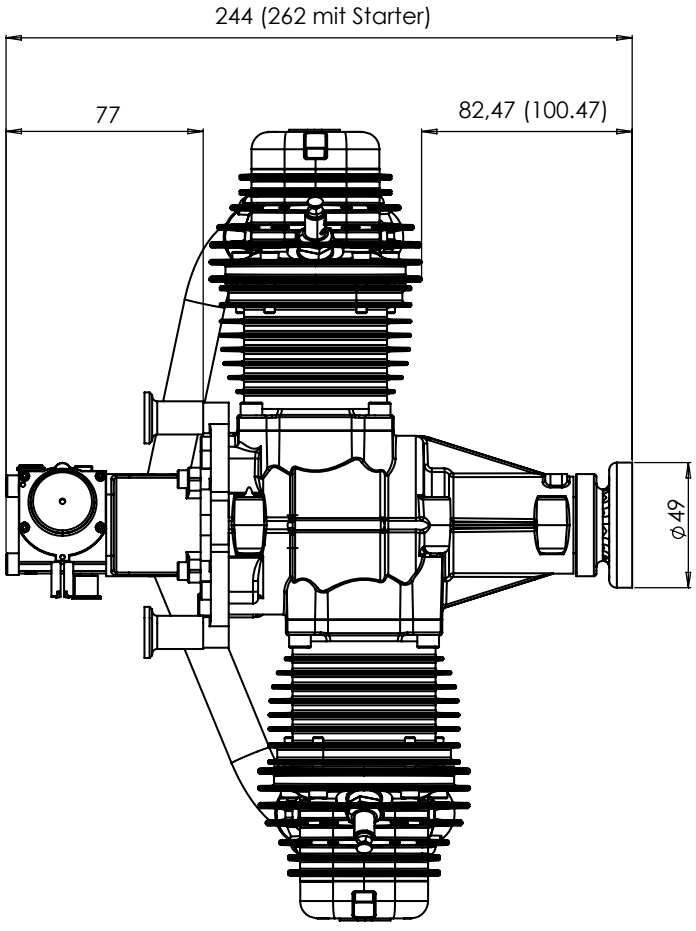

75
40
84
310
6 x M5
Ø34
4 x Ø5


244 (262 mit Starter)
77
82,47 (100.47)
ø49

VM 120 I2-4T

EW!

"The Voice"

Like no other, the new Valach Motors Inline Twin stands for perfect, smooth running characteristics, a combination of power and hefty torque, plus the unique and realistic Valach sound and appearance.

An unforgettable experience!

SPECIFICATIONS:

Capacity:	120 ccm
Power:	approx.10 hp
Bore x Stroke:	47x35 mm
Weight:	4640 g
with ignition:	4890 g
Voltage range:	4,8 - 9 Volt
Propeller:	
Fiala Prop 2-blade:	30x12", 30x14", 32x12"
Fiala Prop 3-blade:	27x14", 28x12"
Fuel:	1:30

Valvoline SynPower® 2T / Aral Ultimate 102

VM 120 I2-4T ... #7900 € 2499,—

Y-piece to drain oil ..... #7365 € 1,75
... out of the tube of the carburettor pump.

We reserve the right to alter price and spec. without prior notice.

- Especially light and compact
- Crankshaft with 5 ball bearings and 180° crank angle.
- Honda valves and valve seats
- Nickel-Silicon plated cylinder surfaces
- Completely encapsulated valve train
- Walbro carburettor
- Valach microprocessor battery ignition with automatic advance and retard
- two Lipo Cells can be used as ignition battery
- VM-engines are now being produced with state of the art machines and methods
- Rapid spares delivery and repairs service from Germany by Toni Clark practical scale GmbH

Based on the on the proven VM 120B2-4T Valach Motors developed an inline engine which convinces on the first glance.

Superb smooth running characteristics, due to the well balanced crankshaft with five ball bearings and 180° crank offset, throughout the whole RPM range

Being a four stroke with a large capacity produces a very realistic full-size aircraft sound. With a relatively small silencer the sound level is very low rather like a small saloon car.

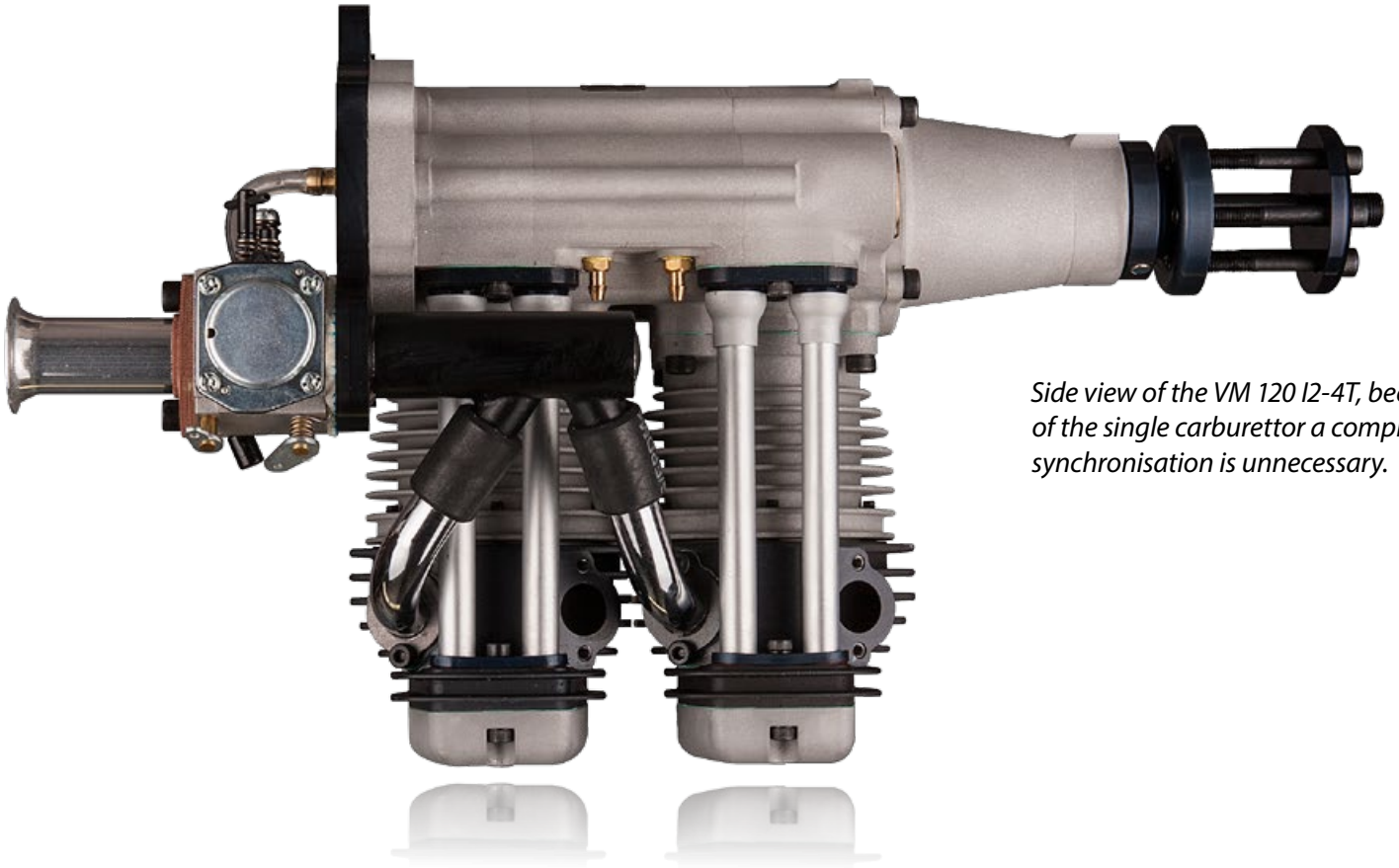
The Valach VM 120 I2-4T is a four stroke OHV engine with two valves per cylinder, running on petrol/oil mixture. Valves and their seats are manufactured by Honda, ensuring a very high quality. The fully encapsulated valve train reduces sound as well as ensuring the rocker arms are well lubricated.

The aluminium cylinder heads are cast with the lost wax process, which enables a very light weight.

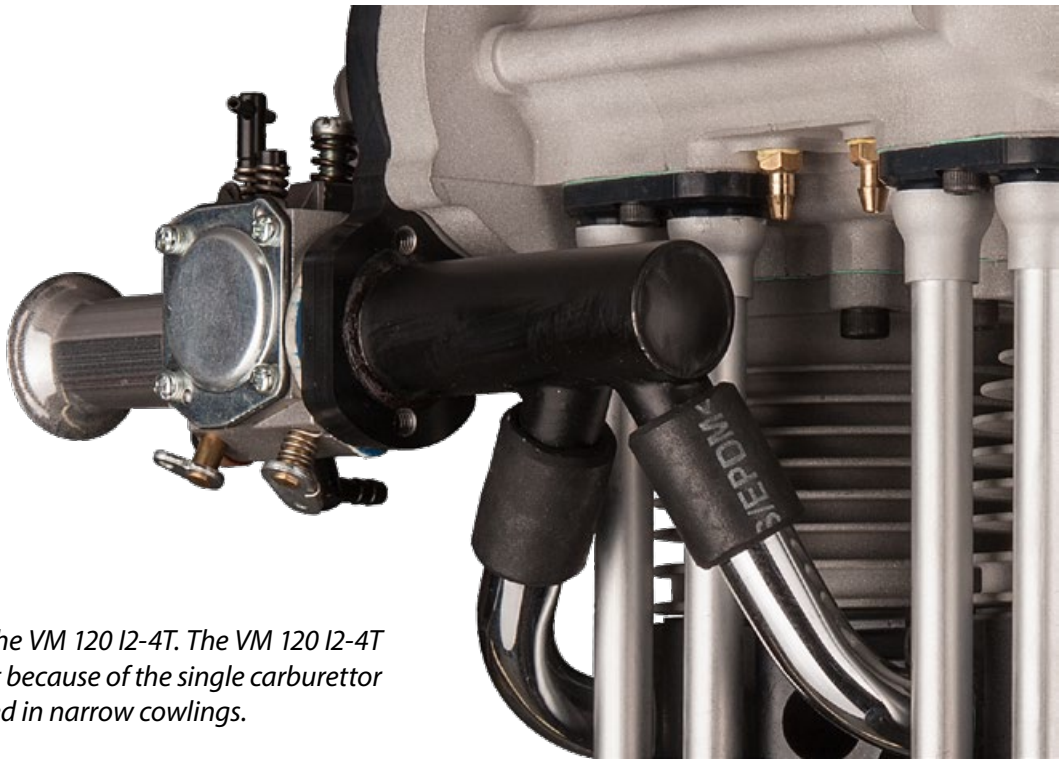
The cylinder's nickel-silicon lining is far lighter than conventional steel cylinder liners.

The processer controlled ignition allows easy starting and a exceptionally smooth running in all throttle settings.

The Fiala propellers are very efficient, this being due to minimal blade thickness. They sound especially good on four stroke engines. Ideal Fiala two blade propeller sizes for the VM120: 30x12", 30x14" and 32x12". For aerobatics and glider towing the 30X12" is ideal. For big and slow flying vintage models, the 32x12" is the best choice.



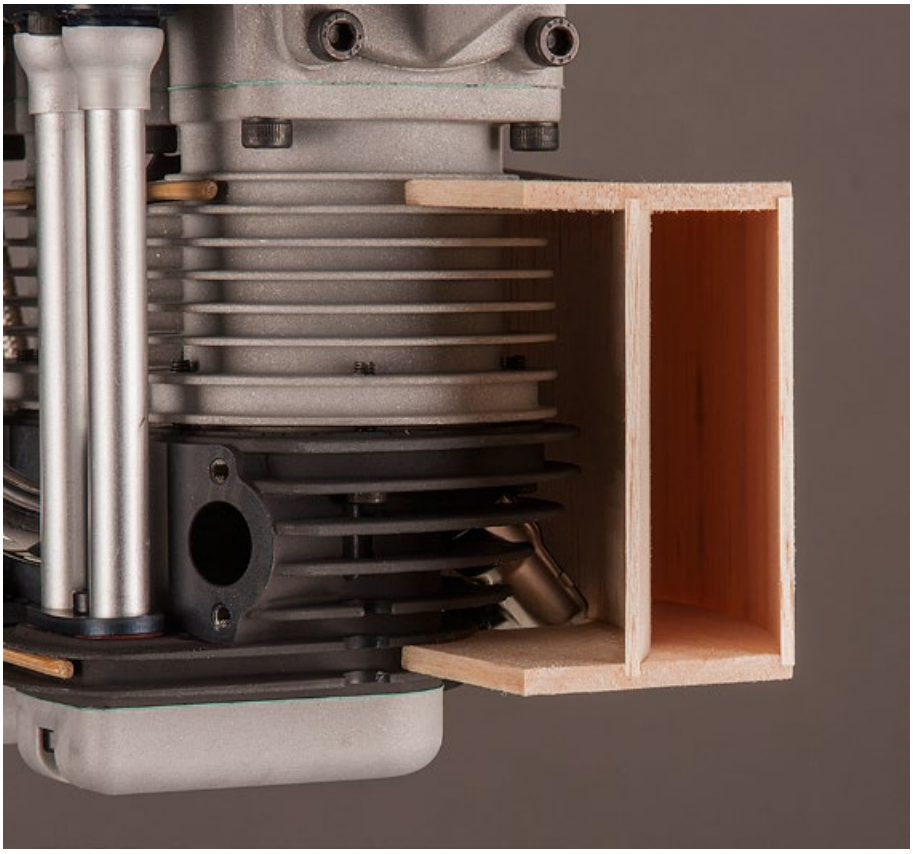
Side view of the VM 120 I2-4T, becaus of the single carburettor a complex synchronisation is unnecessary.



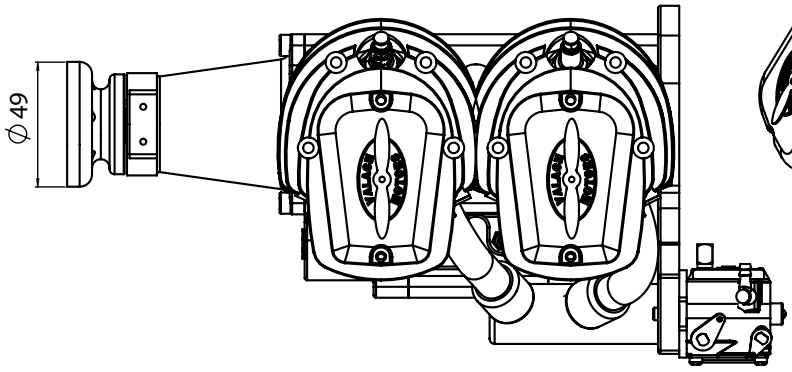
Detail view of the VM 120 I2-4T. The VM 120 I2-4T is very compact because of the single carburettor and can be fitted in narrow cowlings.

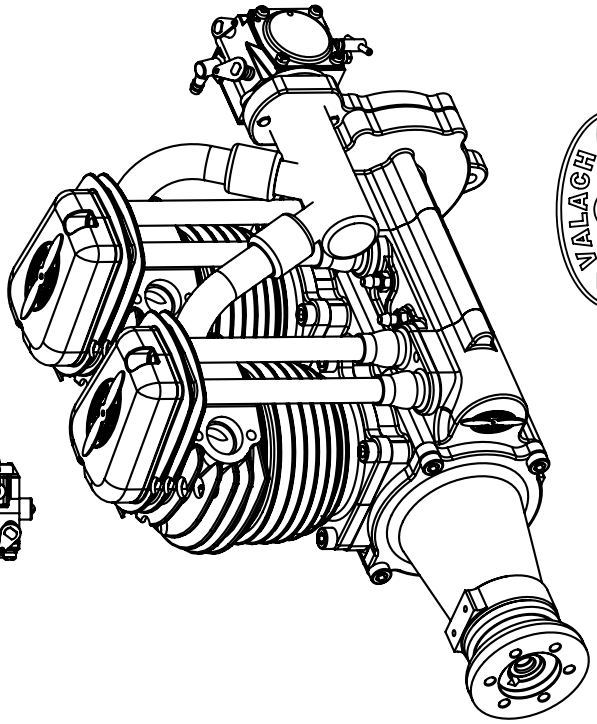
We recommend Aral Ultimate 102, as the smell is not so penetrating and it can be stored without deteriorating. It does not contain any ethanol.

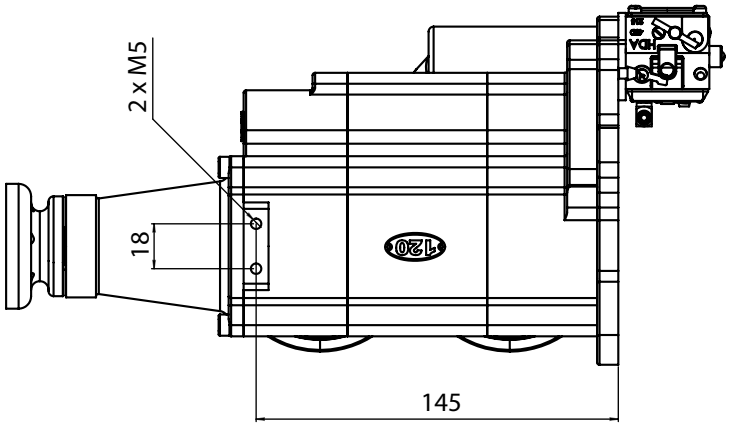
The fuel consumption is approximately 50% compared to that of a two-stroke engine with the same displacement. A 500 cc fuel tank lasts for about 15-20 minutes of flying time.

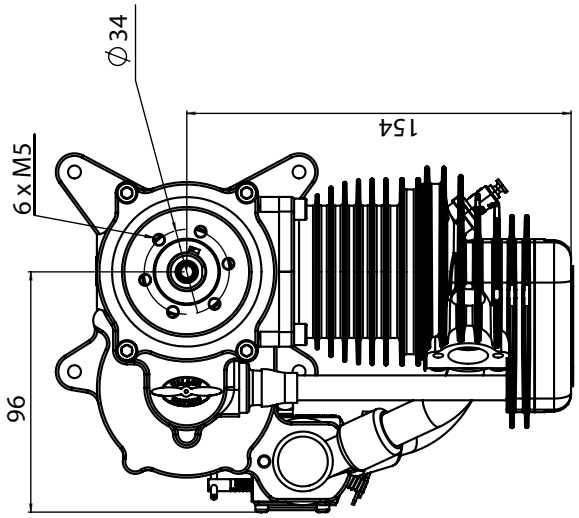


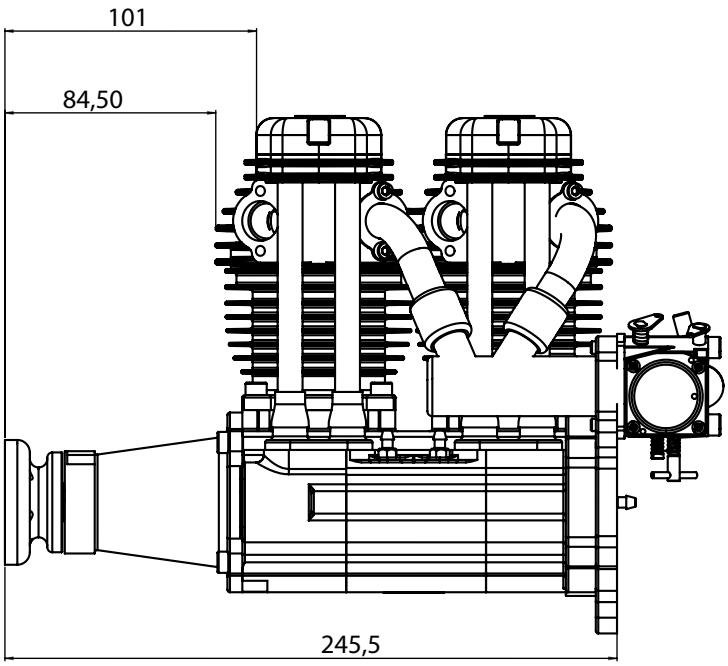
To cool our VM 120 I2-4T on the test bench and the model, we designed an universal cooling duct, that is supplied with the engine. The duct consists of 2 and 4 mm balsa, that is glued together with cyano and can easily be attached by sliding it between the cooling fins. To cool the engine in the best manner, the air is guided through the cooling fins of each cylinder. The spark plug caps project into the duct to cool them as well.

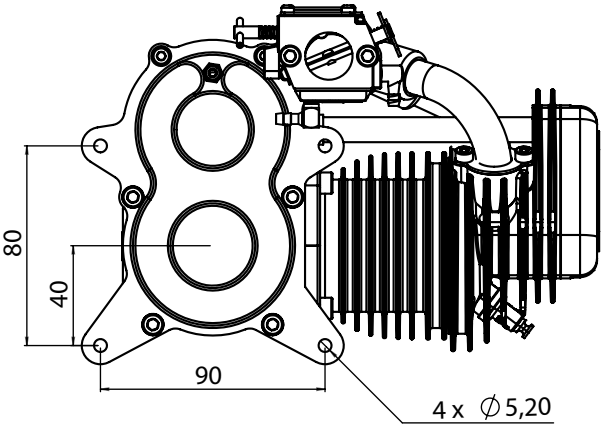






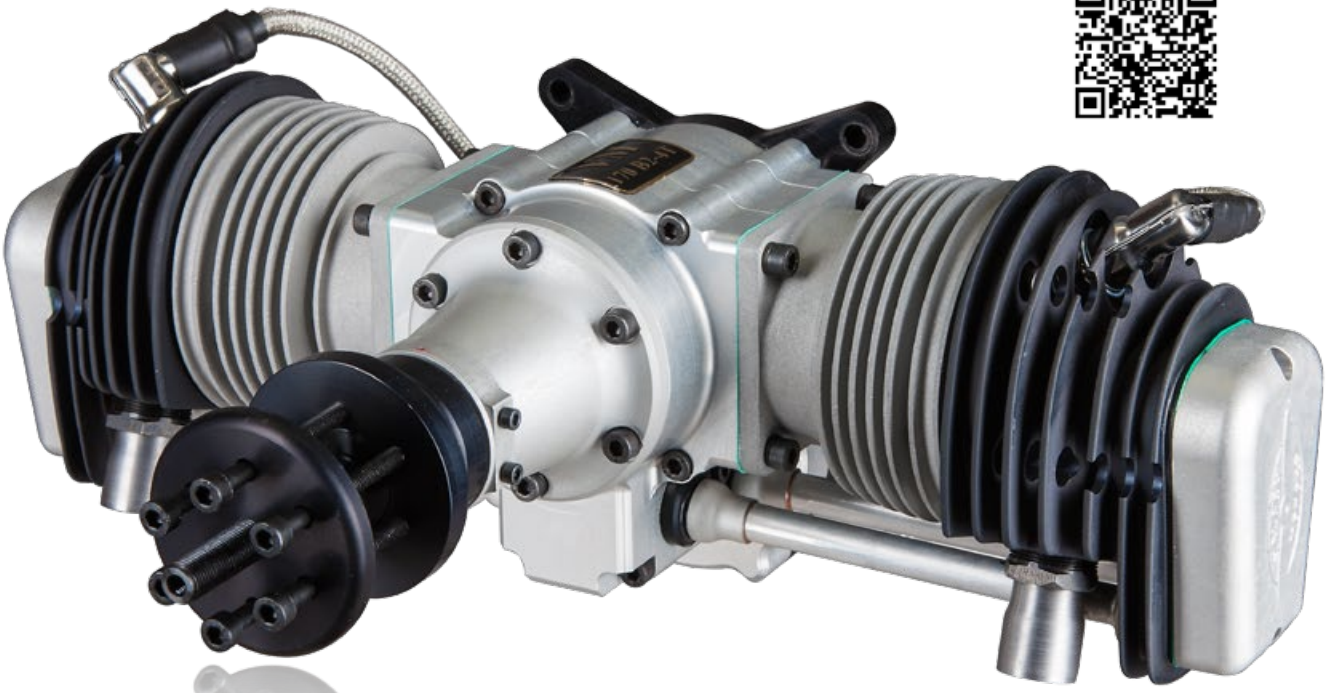






VALACHMOTORS VM 120 i2-4T

VM 170 B2-4T Mk.2



NEW!
Completely encapsulated valve train
New designed crankcase

The sound, it's just music!

SPECIFICATIONS:

Capacity:	170 cc
Power:	13 hp
Bore x Stroke:	52x40 mm
Weight:	5545 g
complete with ignition, exhaust stubs, prop screws and prop washer	
Voltage range	4.8 - 9 Volt
Fiala Prop 2-blade:	34x12", 34x14"
Fiala Prop 3-blade:	30x14"
Fuel:	1:30
Valvoline SynPower® 2T / Aral Ultimate 102	

- Completely encapsulated valve train
- CNC milled crankcase.
- Sensational smooth running and high torque
- Spontaneous throttle response and smooth mid-range transition
- Extremely low vibration throughout the RPM range because of the four stroke principle
- Honda valves and valve seats
- Walbro carburettor
- Valach microprocessor battery ignition with automatic advance and retard
- Two Lipo Cells can be used as ignition battery
- VM-engines are now being produced with state of the art machines and methods
- Rapid spares delivery and repair service from Germany by Toni Clark practical scale GmbH

VM 170 B2-4T ... #7200 € 2199,—

Intake ram tube ..... #7480 € 29,95

Y-fitting to drain oil .... #7365 € 1,75
... out of the tube of the carburettor pump.

We reserve the right to alter price and spec. without prior notice.

The Valach engines VM 170B2-4T Mk.2 looks just like an original aero engine, only smaller, it runs smoothly like an original aero engine and above all it sounds like an original aero engine.

Due to being a four stroke, the low vibration is nothing but sensational, and torque is really high. The response to the throttle being opened is so smooth without the slightest attempt to surge, making the Valach VM 170B2-4T Mk.2 absolutely ideal for your big aerobatic model.

Being a four stroke with a large capacity produces a very realistic full-size aircraft sound. With a relatively small silencer the sound level is very low rather like a small saloon car.

The Valach VM 170B2-4T Mk.2 is a four stroke OHV engine running on petrol/oil mixture. Valves and their seats are manufactured by Honda, ensuring a very high quality. The totally encapsulated valve train reduces sound, as well as ensuring the rocker arms are well lubricated. Due to the steel cylinder liners this engine will have a long life.

The recommended RPM range for the VM 170B2-4T Mk.2 on the ground is 4,500–5,000.

We have measured the following RPM rates on a well run in VM 170B2-4T:

Fiala 2 blade propellers:

32x14" ca. 5050 RPM	
34x12" ca. 5000 RPM	good static thrust/sound
34x14" ca. 4700 RPM	higher speed
36x14" ca. 4050 RPM	this is too big

Fiala 3 blade propellers:

30x14" ca. 4850 RPM

Super Silence CF-2-blade:

32x19" ca. 4700 RPM	Very quiet, no propeller sound hearable in flight.

On the VM 170B2-4T installed in the Pitts Special S1-S we use the Fiala 34x12" prop as this has proven to be ideal. Immediately after landing, that means with a hot engine, 28.5 kp static thrust was measured. When winds are strong I change over to a 34x14" Fiala. As would be expected the ground speed is increased, unfortunately the Pitts sound is partly lost thereby.

The Fiala propellers are very efficient, this being due to minimal blade thickness. They sound especially good on four stroke engines.

Like on the VM 120 B2-4T, the valve train of the new VM 170 B2-4T Mk.2 is totally encapsulated. This gives better lubricating on the rocker arms and the valve train runs quieter. The crankcase of the VM 170 B2-4T Mk.2 is manufactured from solid aluminium and guarantees highest strength with a low weight.

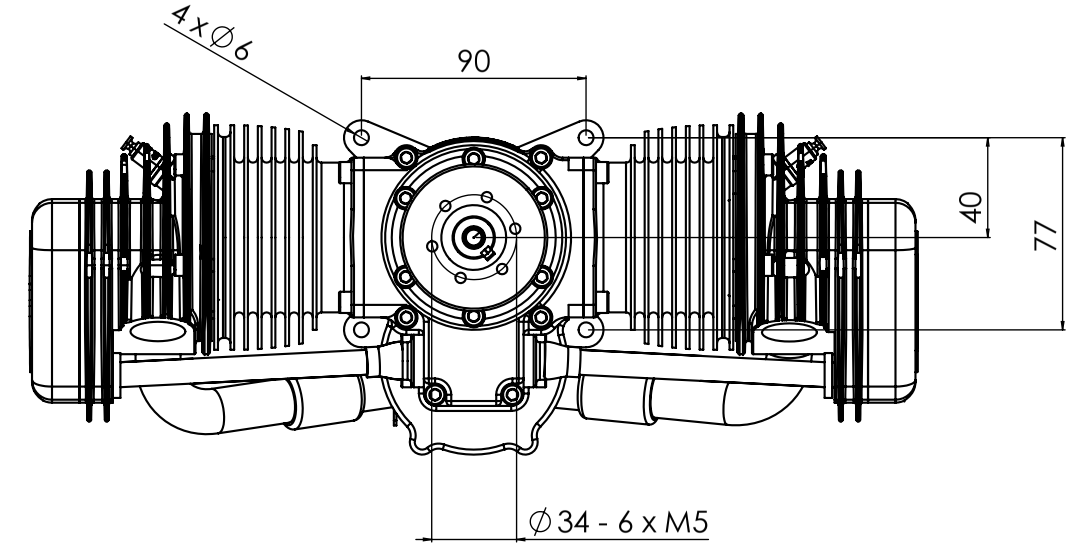
The processor controlled ignition allows easy starting and a exceptionally smooth running in all throttle settings.

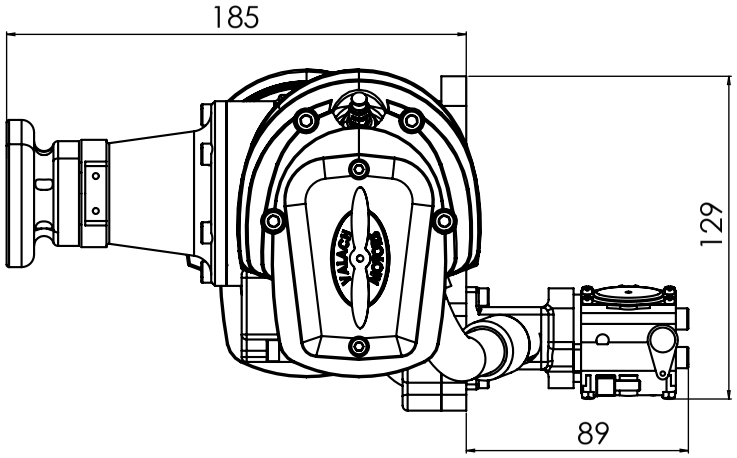
We had tried many oils, but recommend Valvoline SynPower 2T oil. Our BEL-RAY H1R although excellent for two strokes, is not ideal for four strokes, as it burns very well without deposit and not much gets past the piston, as is the case by the Valvoline SynPower 2T. We recommend Aral Ultimate 102, as the smell is not so penetrating and it can be stored without deteriorating. It does not contain any ethanol.

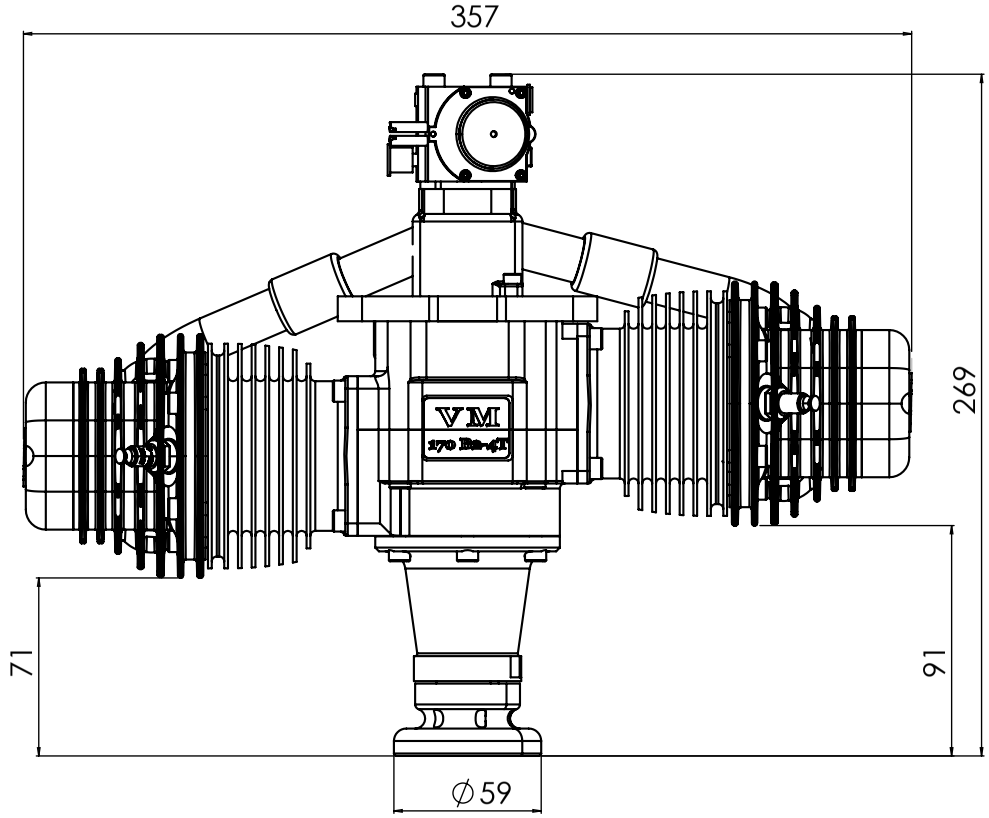
The fuel consumption is approximately 50% compared to that of a two-stroke engine with the same displacement. A 750 cc fuel tank lasts for about 15-20 minutes of flying time.

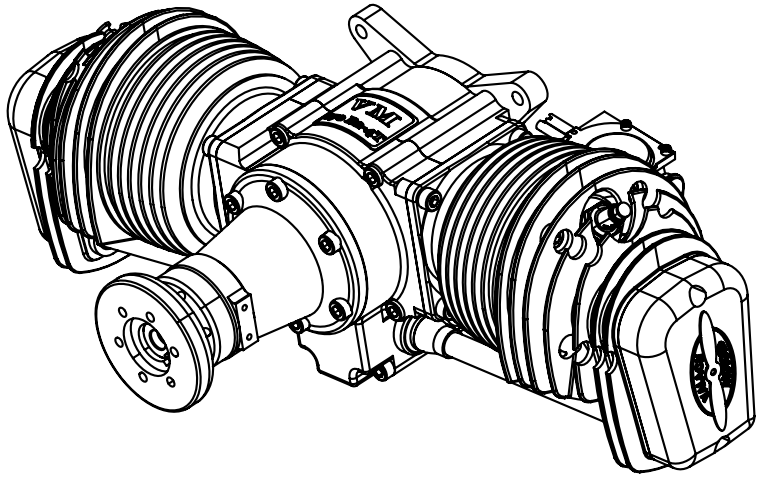
For a good throttle response in all RPM ranges, we recommend the use of an intake RAM tube. Our carbon intake RAM tube, which weights only 7 g can be found on side 176.

EMWH Pitts S-1, scale 1:2,1 built by Christian Jacobi powered with the VM 170B2-4T.
In the air it is not possible to notice a difference between the model and full-size, this being due to the so realistic exhaust note.









VALACH MOTORS VM 170 B2-4T Mk.2

VM 210 B2-4T Mk.2

NEW!
Completely encapsulated valve train
New designed crankcase

Maximum four-stroke Power!

SPECIFICATIONS:

Capacity: 210 cc
Power: 16 hp
Bore x Stroke: 52x50 mm
Weight: 6125 g
complete with ignition,
exhaust stubs, prop screws
and prop washer.
Voltage range 4.8 - 9 Volt
Fiala Prop 2-blade: 34x16", 36x12", 36x14"
Static trust with 36x14":
35 kp at 4800 1/min
Fuel: 1:30
Valvoline SynPower® 2T / Aral Ultimate 102

VM 210 B2-4T ... #7210 € 2399,—

Intake ram tube ..... #7480 € 29,95

Y-Fitting to drain oil .... #7365 € 1,75
... out of the tube of the Carburettor pump.

We reserve the right to alter price and spec. without prior notice.

- Completely encapsulated valve train
- CNC milled crankcase.
- Sensational smooth running and high torque
- Spontaneous throttle response and smooth mid-range transition
- Extremely low vibration throughout the RPM range because of the four stroke principle
- Honda valves and valve seats
- Walbro carburettor
- Valach microprocessor battery ignition with automatic advance and retard
- two Lipo Cells can be used as ignition battery
- VM-engines are now being produced with state of the art machines and methods
- Rapid spares delivery and repairs service from Germany by Toni Clark practical scale GmbH

The 210B2-4T Mk.2 is a stretched VM 170B2-4T, the cylinder is longer but using the same piston and cylinder head. This then required a new crankshaft with steel conrod, giving more capacity, power and torque.

The immediate and smooth reaction to the throttle, without the slightest surge, makes the VM 210 a first class power plant, not only for glider towing, but aerobatic models up to 25 kg AUW, without a noise problem, with well over 30 kp static thrust to catapult the model into the air. Once there was an advertisement by Curtis Pitts with the headline "going up in style", this describes very well the experience when flying my big Pitts with the 210B2-4T Mk.2.

Being a four stroke with a large capacity of 105 cc per cylinder, causes a very realistic full-size aircraft sound. If required, even with a relatively small silencer the sound level is very low, rather like a small saloon car.

The Valach 210B2-4T Mk.2 is a four stroke OHV engine running on petrol/oil mixture. Valves and their seats are manufactured by Honda, ensuring a very high quality. The completely encapsulated valve train reduces sound, as well as ensuring the rocker arms are well lubricated. Due to the steel cylinder liners this engine will have a long life.

The processer controlled ignition allows easy starting and a exceptionally smooth running in all throttle settings.

The recommended RPM range for the VM-210 on the ground is 4,400-5,000. Depending on the silencer, we have measured on the ground with the 36x14" Fiala propeller 4500-4800 RPM.

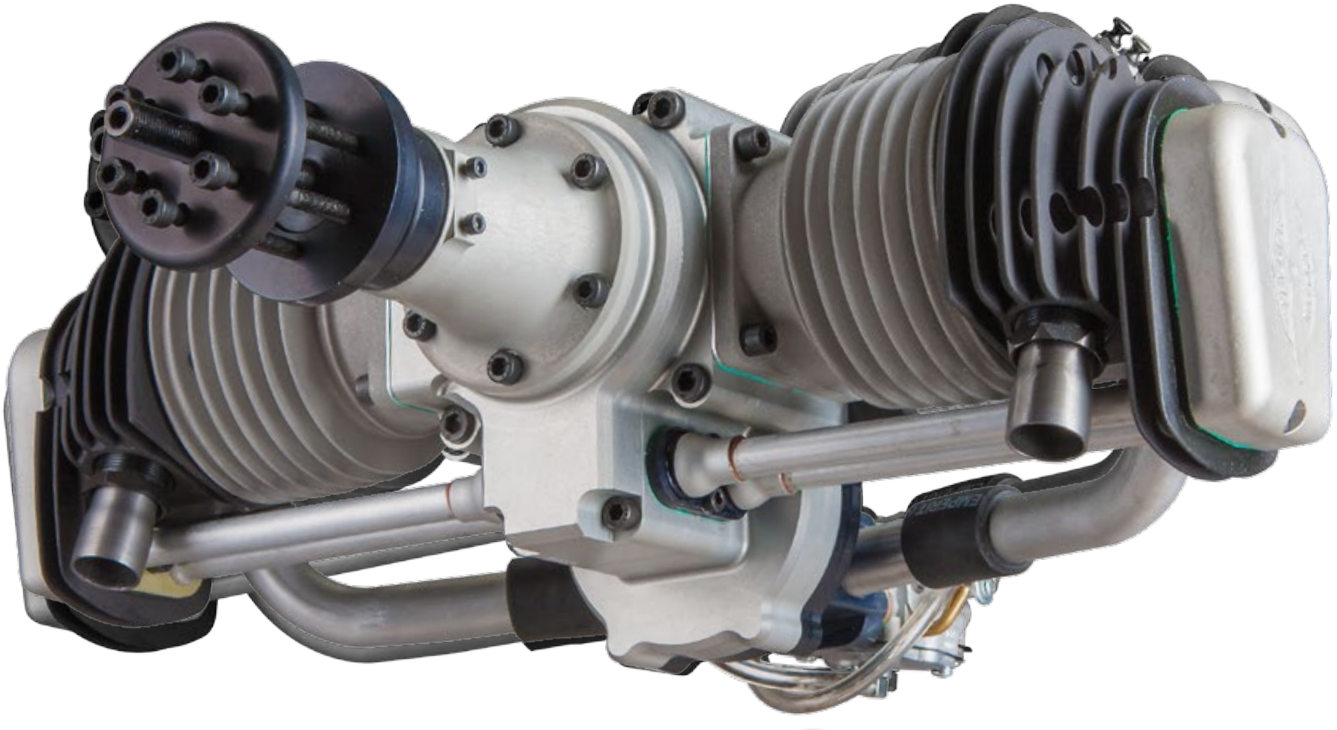
For the VM 210B2-4T Mk.2 installed in the Pitts Special S1-S, we use the Fiala 36x14" as this has proved to be ideal.

At 4800 RPM with the silencer #7293 we measured 35 kp static thrust. With the 2 in 1 silencer #7290 the VM 210 turns the 36x14" Fiala with 4500 RPM.

We had tried many oils, but recommend Valvoline SynPower 2T oil. Our BEL-RAY H1R although excellent for two strokes, is not ideal for four strokes, as it burns very well without deposit and not much gets past the piston, as is the case by the Valvoline SynPower 2T.

We recommend Aral Ultimate 102, as the smell is not so penetrating and it can be stored without deteriorating. It does not contain any ethanol.

The fuel consumption is approximately 50% compared to that of a two-stroke engine with the same displacement. A 1000 cc fuel tank lasts for about 15-20 minutes of flying time.



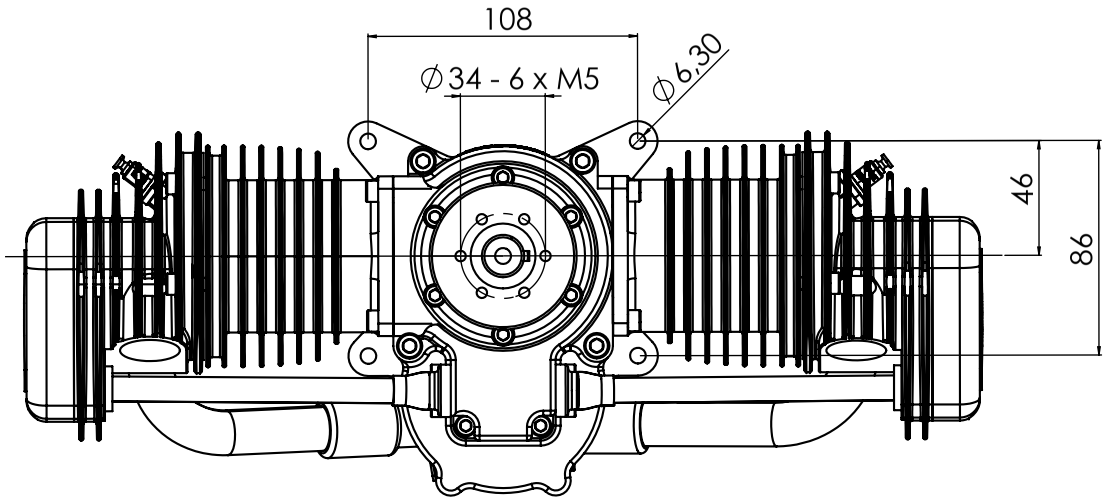
Like on the VM 120 B2-4T, the valve train of the new VM 210 B2-4T Mk.2 is totally encapsulated. This gives better lubricating on the rocker arms and the valve train runs quieter. The crankcase of the VM 210 B2-4T is manufactured from solid aluminium and guarantees highest strength with a low weight.

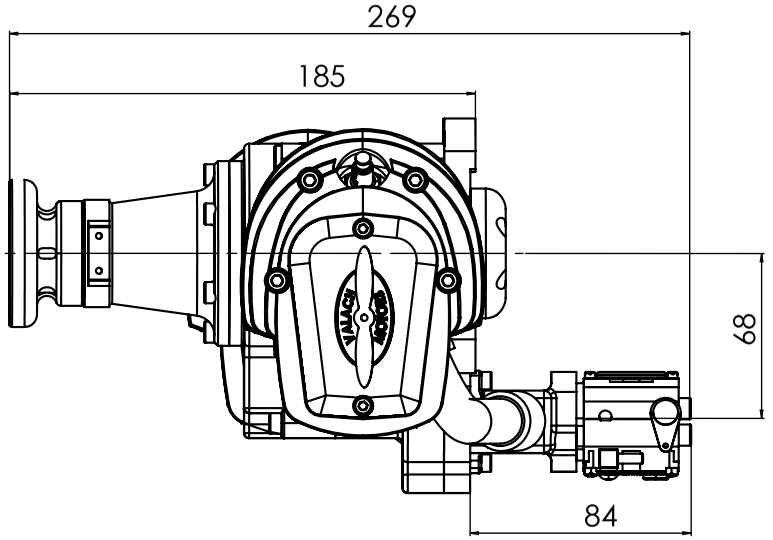
The Delro Turner 4X fitted with VM-210 B2-4T at the Oerlinghausen Spring Fly In. This models previous engine, a 250 radial had to make way for the VM-210 B-2 4T the radial was in power and sound not in the same class. Due to the unlimited aerobatic performance of the VM -210 B2-4T allows the Turner to make inverted fly by's with ease.

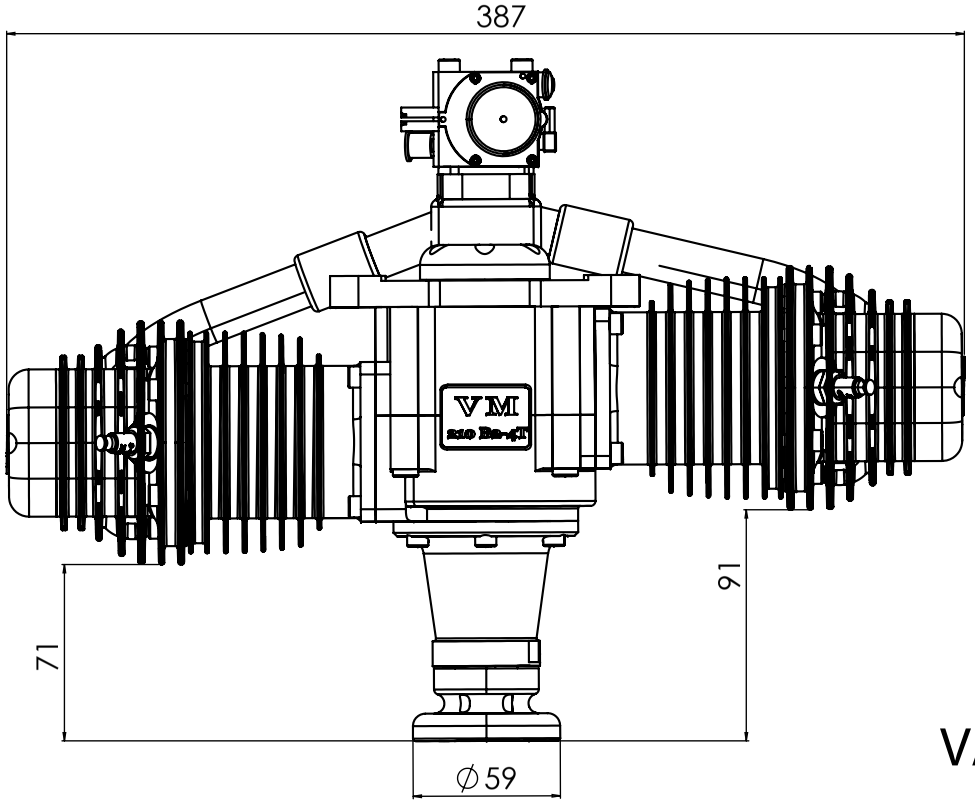
This noble and super light carbon intake RAM tube is made by hand in our own workshop. The intake tube is fixed to the carburetor without a gasket with the delivered custom made screws. It reduces fuel consumption and increases the power in the rpm range we prefer, but first of all it improves the throttle response of your engine. Length 60 mm, inner diameter 22 mm, weight 7 g. Suitable for VM 170-420, ZG 80 and DA 85.

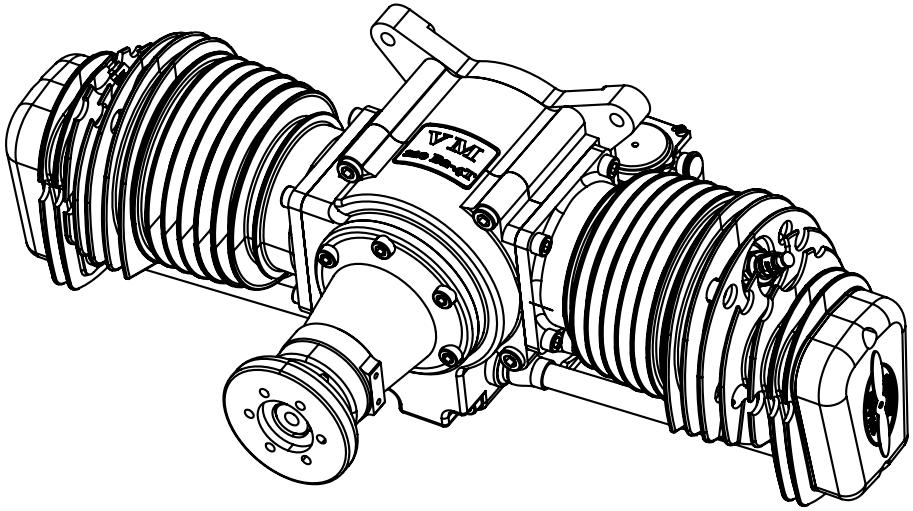
Carbon Intake RAM tube ..... #7481 49,90 €

Alternatively you can use the aluminum intake tube #7480, on page 105.



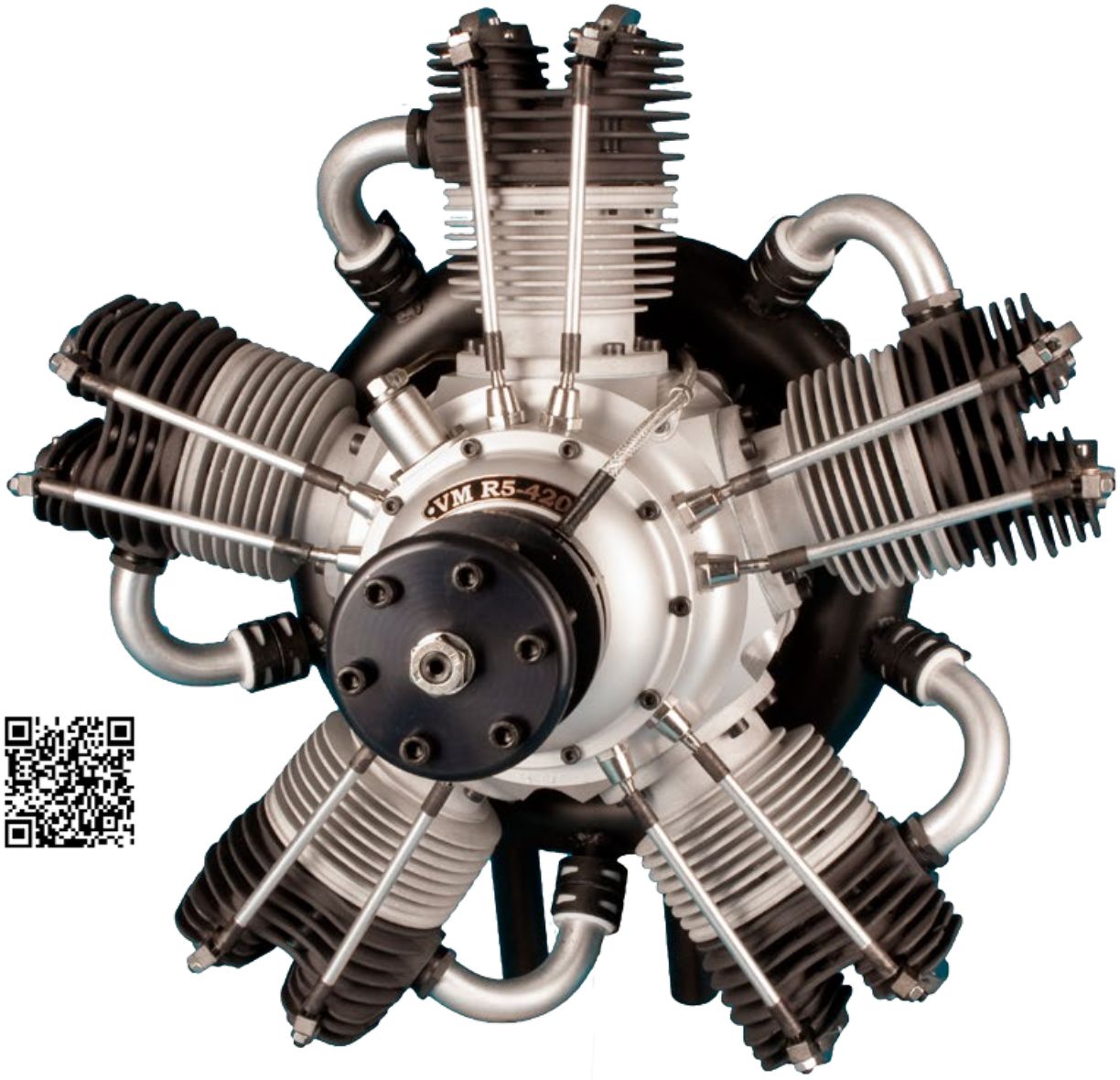






VALACH MOTORS VM 210B2-4T-Mk.2

VM R5-420



SPECIFICATIONS:

Cylinders:	5
Capacity:	420 cc
Power:	ca. 25 hp
Bore x Stroke:	47 x 48.5 mm
Weight:	11,8 Kg
complete:	14,1 Kg
Voltage range:	6 - 9 Volt
Fiala Prop 2-blade:	38x24"- 40x20"
Fiala Prop 3-blade:	36x24"- 40x18"
Fuel:	1:30

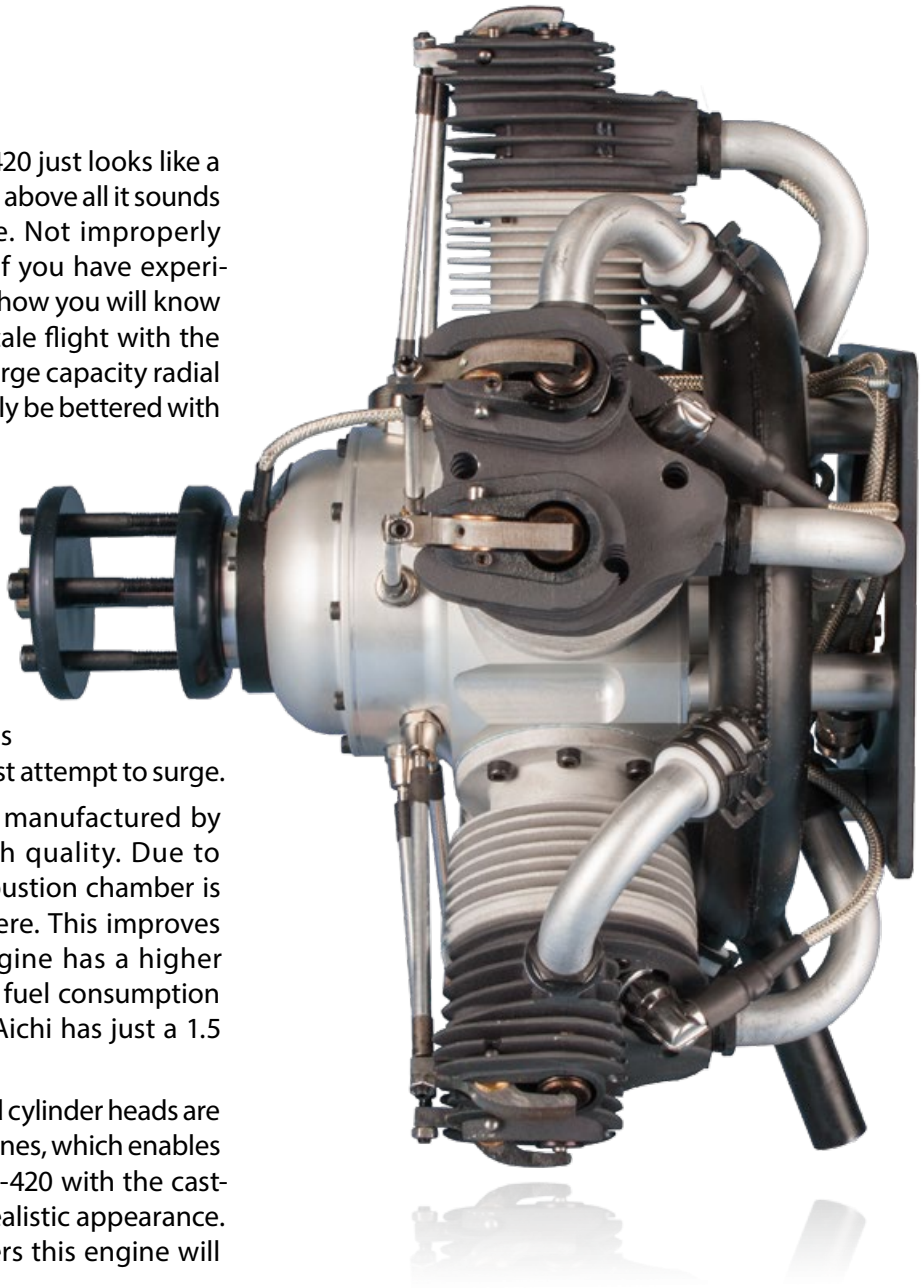
Valvoline SynPower® 2T / Aral Ultimate 102

- Sensational smooth running and high torque
- Spontaneous throttle response and smooth mid-range transition
- Extremely low vibration throughout the RPM range because of the four stroke principle
- Honda valves and valve seats
- Walbro carburettor.
- Valach microprocessor battery ignition with automatic advance and retard.
- two Lipo Cells can be used as ignition battery
- VM-engines are now being produced with state of the art machines and methods.
- Rapid spares delivery and repairs service from Germany by Toni Clark practical scale GmbH.

VM R5-420 ... #7500 € 4499,—

Carbon Intake RAM Tube #7481 € 49,90

We reserve the right to alter price and spec. without prior notice.



The Valach Motors VM R5-420 just looks like a real radial engine, only smaller, above all it sounds like a real aero radial engine. Not improperly smooth, like smaller radials. If you have experienced our Aichi Val on an air show you will know what I mean. The absolute scale flight with the marvellous sound from that large capacity radial engine can, if at all possible, only be bettered with a full-size machine.

The big capacity per cylinder, the valve timing and the supplied ring shaped silencer are responsible for the realistic sound on idle and on part load. Like all Valach engines, the response to the throttle being opened is so smooth without the slightest attempt to surge.

Valves and their seats are manufactured by Honda, ensuring a very high quality. Due to the inclined valves, the combustion chamber is shaped more like a hemisphere. This improves the combustion and the engine has a higher performance. In addition the fuel consumption is lower than otherwise. My Aichi has just a 1.5 Liter fuel tank!

The crankcase, cylinders and cylinder heads are cast like with full-size aero engines, which enables a light weight and the VM R5-420 with the casting surface finish has a very realistic appearance. Due to the steel cylinder liners this engine will have a long life.

The VM R5-420 mounted in our Aichi VAL. This model weighs 66.9 kg and flies most realistically at third throttle. Full throttle and huge loops and Lomcevak´s not exactly scale but utterly impressive.

We have fitted an electric petrol pump, the VM R5-420 is easy to start and in every flying attitude has a reliable petrol feed. After sucking in with choke closed the VM R5-420 starts after the first or second flip.

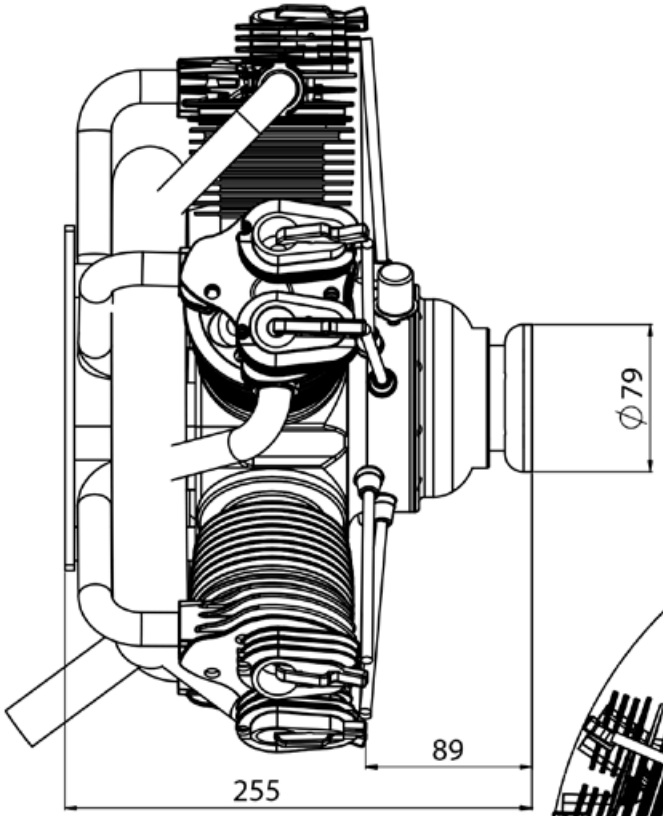
The processor controlled ignition allows easy starting and a exceptionally smooth running in all throttle settings. The ignition can be operated with a two cell Lipo battery

We had tried many oils, but recommend Valvoline SynPower 2T oil.

We recommend Aral Ultimate 102, as the smell is not so penetrating and it can be stored without deteriorating. It does not contain any ethanol.

For a good throttle response in all RPM ranges, we recommend the use of an intake RAM tube. Our carbon intake RAM tube, which weights only 7 g can be found on side 152.

What a majestic airplane, with a matching backdrop, the Swiss Alps in autumnal sunlight. This flight taking place at the Friederichshafen airport, adjacent to the "Faszination Modelbau" exhibition. Photo: Nicholas Guet.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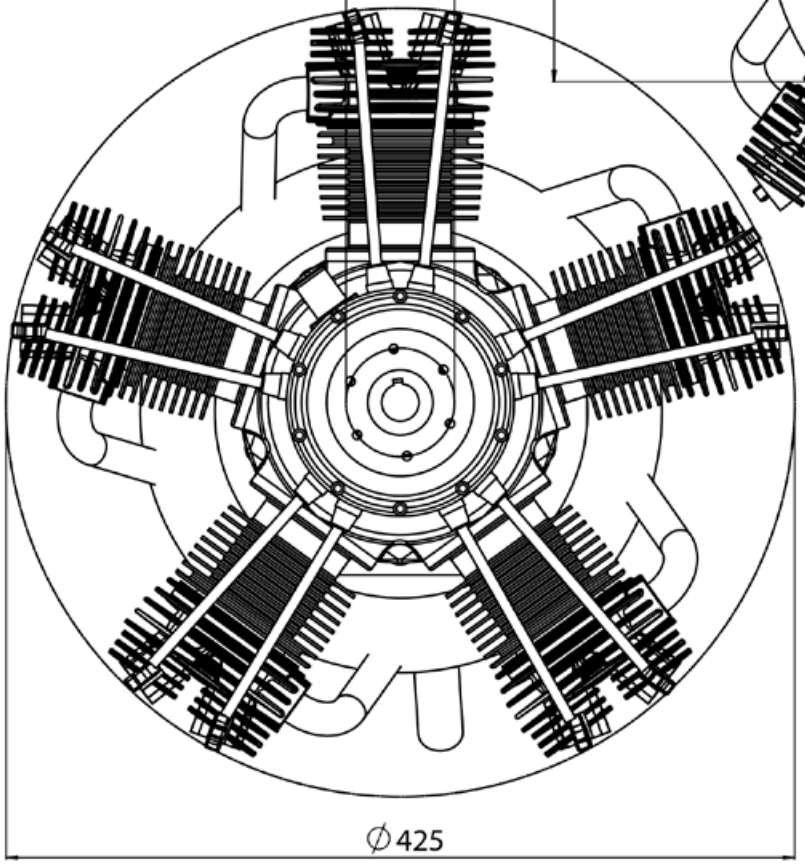
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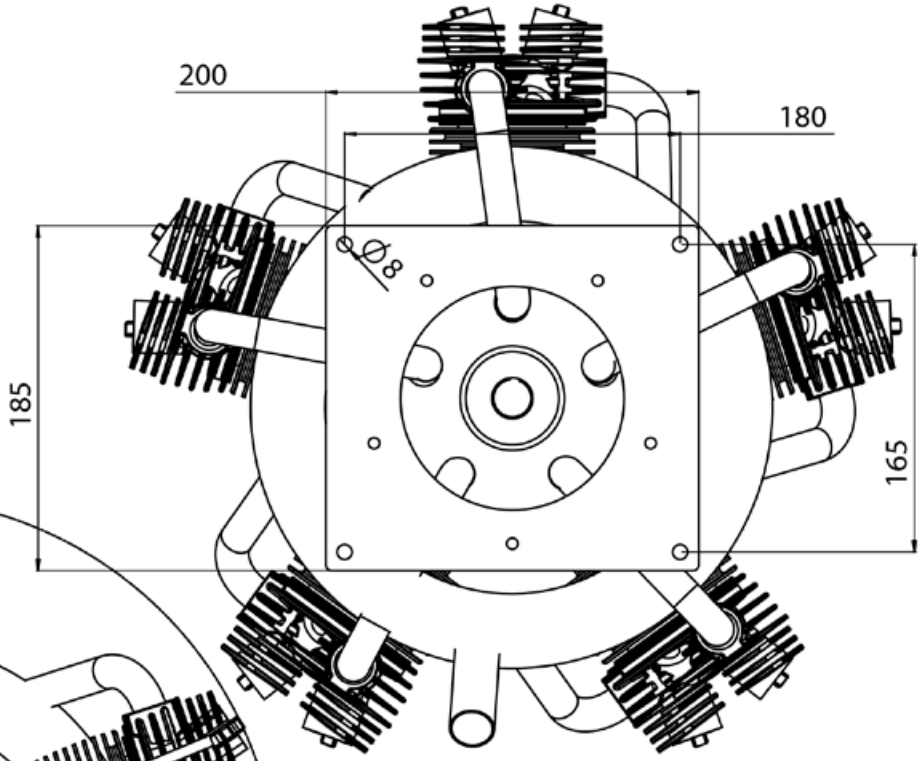
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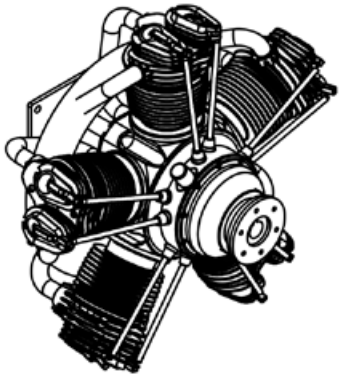
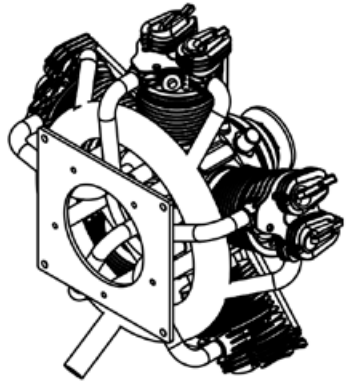
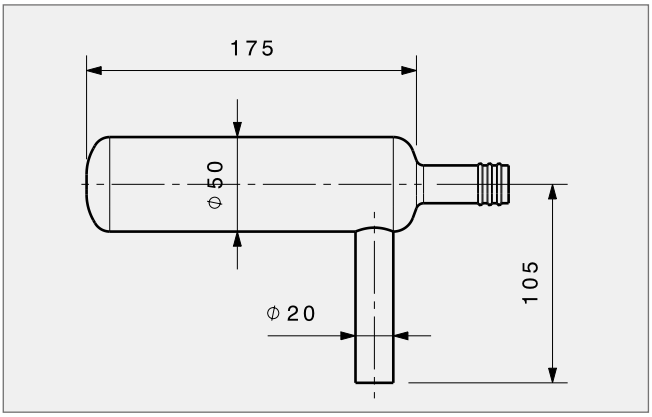
180
Ø8
185
165



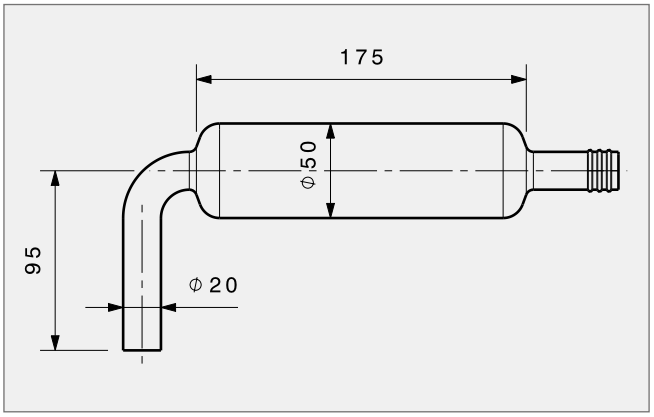


Stainless steel silencer for Valach VM-60S1-4T



Silencer VM 60 front exhaust.....#7670 € 96,50

With ø20 mm intake and ø20 mm exhaust, weight 160 g.



Silencer VM 60 rear exhaust.....#7675 € 96,50

With ø20 mm intake and ø20 mm exhaust, weight 170 g.

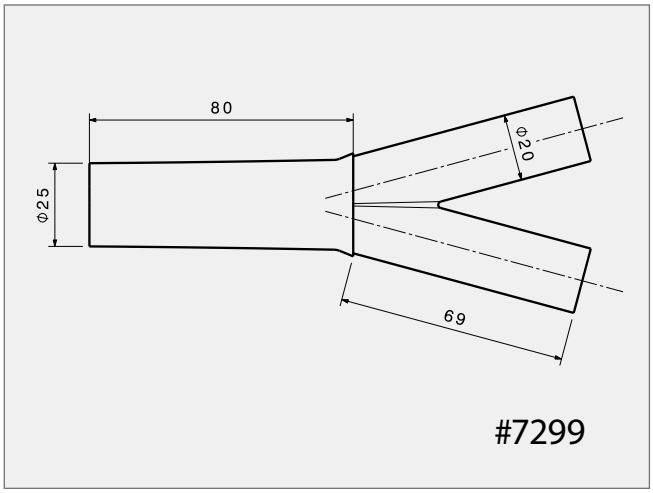
Ready-made stainless steel header with 10 cm flexible tubing. The tubing can be cut to length if necessary. The header is attached to the silencer by screwing it counterclockwise and tightened, by turning it clockwise. The flexible tubing is wrapped like a spiral spring and as a result the diameter can be adjusted.

S-Header with Flex-tubing VM 60.....#7673 € 72,80

Fitting our big Tiger Moth.

Y pipe

This Y pipe is the right choice to increase the power of your engine without using a silencer. The engine will turn more RPM`s because of the optimized gas flow, as with the silencers with y-intake. The sound of this version is much smoother, because the single impulses from both cylinders are merged. Fitted with the Y-pipe the sound of the 120 inline engine is damn close to the Gipsy Major of a full-size DH82 Tiger Moth..



Y pipe VM 120/170/210..... #7299 € 27,95

With 2 x ø20 mm and ø25 mm exhaust, weight 69 g.

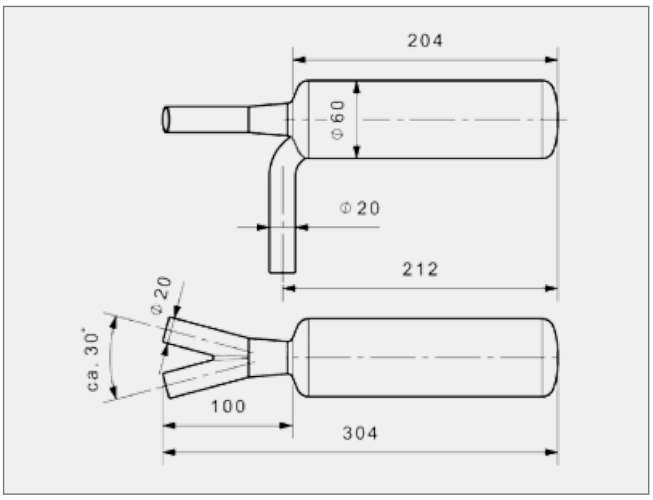
Stainless steel silencer for Valach four-stroke engines

This silencers are made from thin-wall stainless steel, Laser welded and highly polished. The use of stainless steel throughout makes for an exceedingly robust and light-weight unit.
With four-stroke engines feasible header lengths have almost no effect on power, but header length has a pronounced effect on the sound. A longer header produces a "warmer", more pleasing exhaust tone if the engine is run without a silencer.
The versions with the Y-intake develop the most power.

Because of the optimized gasflow, the engine turns about 400 RPM`s more compared to other silencers. The advantage of using only one silencer is the phenomenally light weight, and the engine is not much louder than with two silencers.

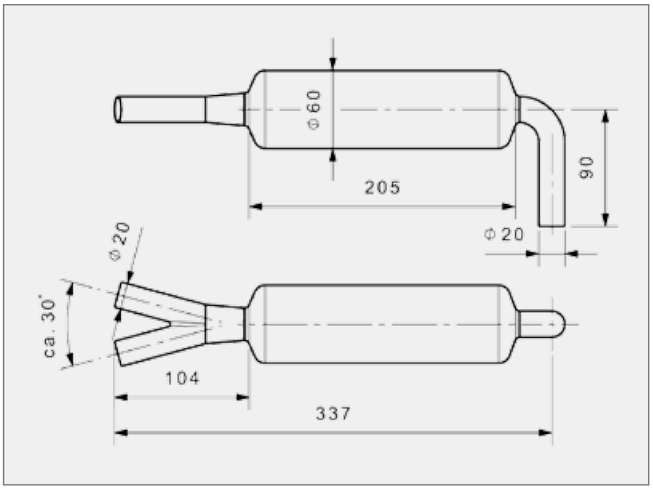
The compact construction with small surface area combined with the large inner volume, makes both these silencers super quiet. With a Menz 34x12" prop on the VM 170B2-4T and 2x #7275, the noise level is only a mere 72 dbA at 25 Meters.

High performance silencer with y-intake for a maximum of power



Y-Silencer VM 120 front exhaust.....#7272 € 129,95

With y-intake 2 x ø20 mm and ø20 mm exhaust, weight 215 g.



Y-Silencer VM 120 rear exhaust.....#7273 € 129,95

With y-intake 2 x ø20 mm and ø20 mm exhaust, weight 240 g.

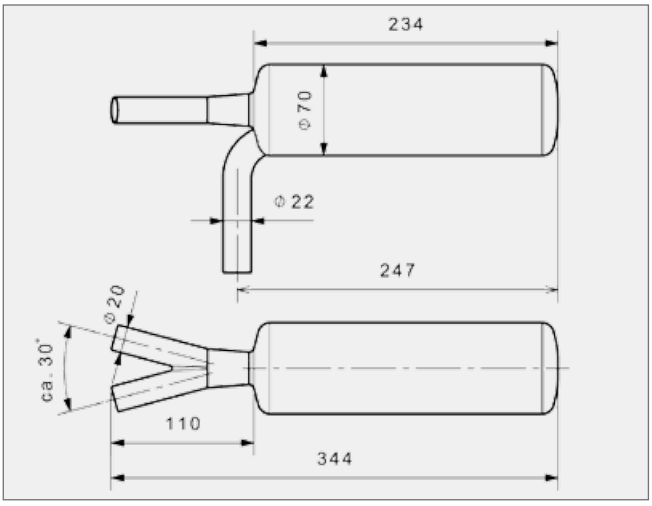
Fixing Clamp

Made from stainless steel, a simple quick and safe fixing for silencers.

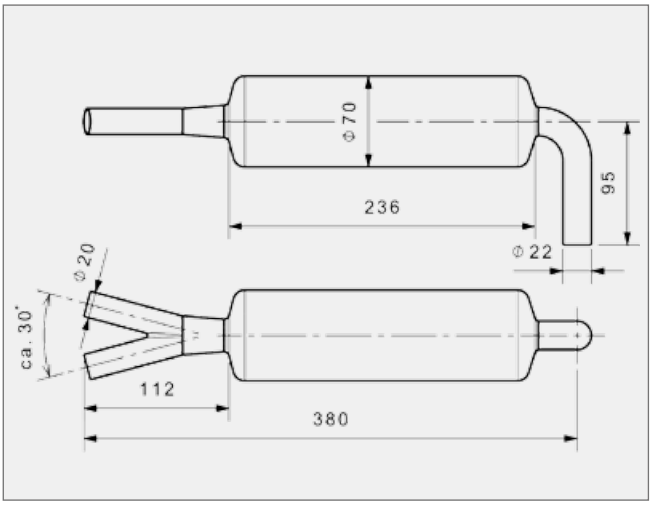
Fixing clamp with base 60 mm ..... #5773 € 9,95

Fixing clamp with base 70 mm ..... #8573 € 13,95

The MXS from Jan Rottmann, equipped with the VM 120 and silencer #7273 with y-intake. Because of the tuned length of the header and the y-intake, the engine develops the most power and a "warm" pleasing exhaust tone.



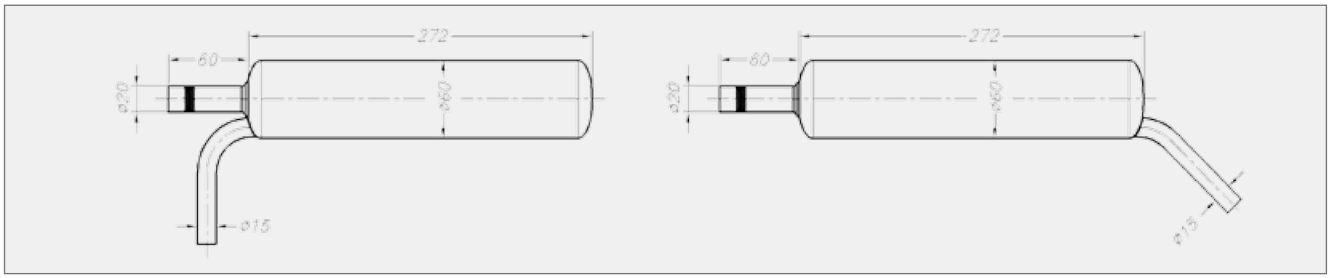
Y-Silencer VM 170/210 front exhaust..#7292 € 149,95
With y-intake 2 x ø20 mm and ø20 mm exhaust, weight 275 g.



Y-Silencer VM 170/210 rear exhaust .....#7293 € 149,95
With Y-intake 2 x ø20 mm and ø20 mm exhaust, weight 295 g.

Very quiet silencer with smoke oil nipple

This is the best silencer, if your model has to be as quiet as possible. Two are required for the Valach Boxer engines!

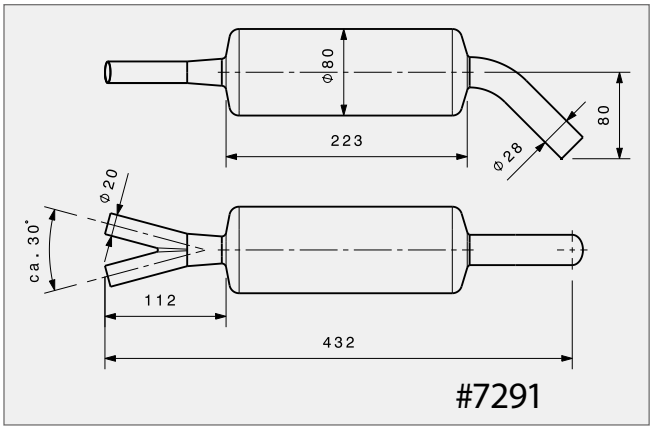


Silencer VM-120/170/210 front exhaust #7270 € 109,90
With intake ø20 mm and ø15 mm exhaust, weight 300 g.

Silencer VM-120/170/210 rear exhaust ....#7275 € 109,90
With intake ø20 mm and ø15 mm exhaust, weight 310 g.

New high performance silencer with Y-intake and extra wide exhaust

This silencer is specially made for the VM 170 and VM 210 . It delivers the most power from all silencers. The sound is deeper compared to the other versions, because of the extraordinary big exhaust diameter of 28 mm. The sound level will not rise significant.



Y-silencer VM 170/210 rear exhaust .....#7291 € 164,95

With Y-intake 2 x ø20 mm and ø28 mm exhaust, weight 380 g.

2 in 1 silencer for Valach VM 170 / VM 210

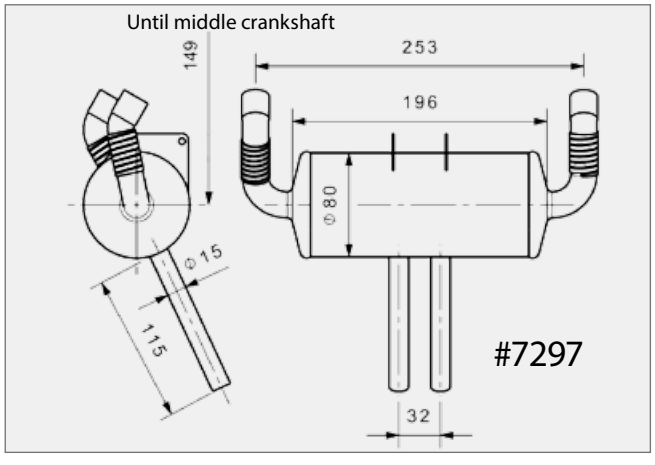
This silencer is directly mounted on the crankcase of the VM-170 e.g. VM 210. Simply bolt it on the engine and you are ready, the easiest way to install a silencer!

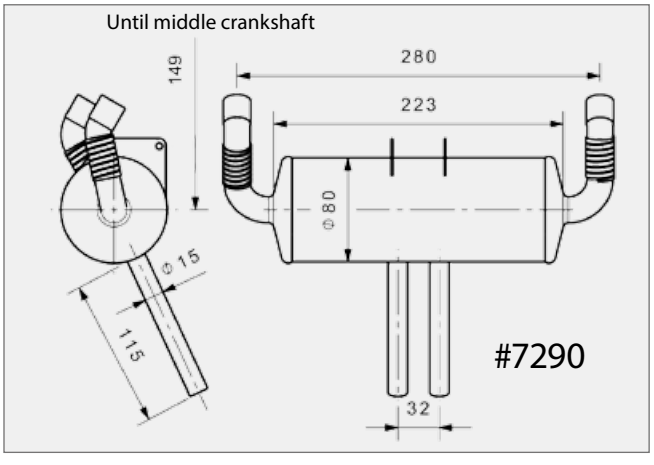
2 in 1 Silencer VM-210 .....#7290 € 229,90

Silencer 2 in 1 for VM 210, not suitable for the MK2 Version. weight 410 g.

2 in 1 Silencer VM 170 .....#7297 € 226,90

Silencer 2 in 1 for VM 170, not suitable for the MK2 Version. weight 430 g.





Y-fitting to drain oil out of the tube of the carburettor pump ..... #7365 € 1,75

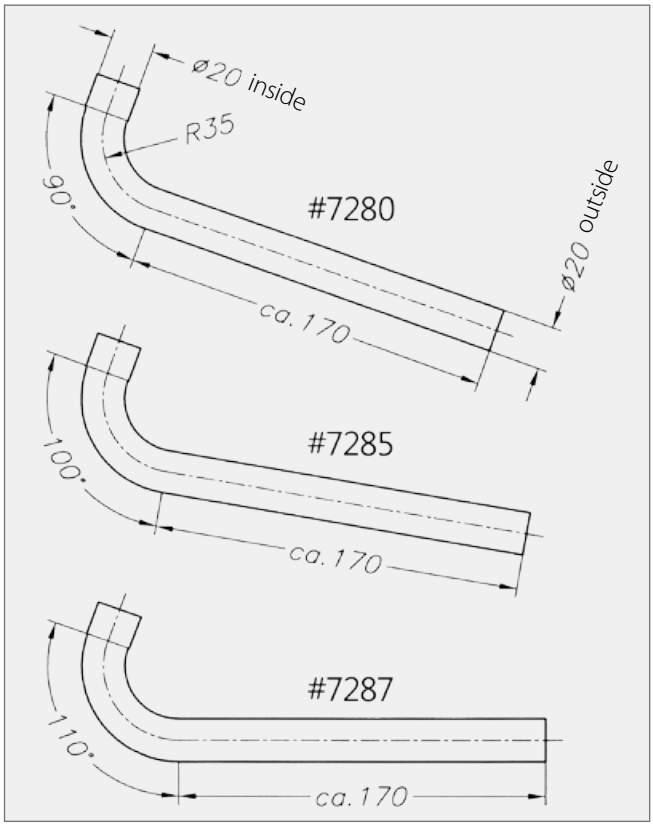
This Y-fitting makes it easy to remove the unwanted oil from the pressure tube of the carburettor. Loop-in the two "branches" into the pressure tube and extend the "trunk" about 6-12 cm to lead it to the lower side of the cowling. Place the Y-fitting underneath the carburettor and the surplus oil will be gathered into the "drainage tube" and can be dumped from time to time., without removing the cowling. **Attention: do not forget to close the tube securely with a plug!**

Stainless steel header kit for Valach VM-120

Fitting your situation the stainless steel bend has to be formed in a bench vice to an oval shape. Now the bend can be pushed into the flange and than silver soldered. Afterwards the flexible tube can be pushed on the widened end of the bend and also silver soldered. The connection to the silencer does not need to be soldered.

Stainless steel flange for VM 120, to push in and silver solder the 18 mm bend ..... #7336 € 3,95
Flexible stainless steel exhaust tube, 20 cm long, ø20 mm inside diameter ..... #3882 € 14,90
90 degree stainless steel bend, ø18 to ø20 mm ..... #7281 € 13,95
100 degree stainless steel bend, ø18 to ø20 mm ..... #7282 € 13,95
110 degree stainless steel bend, ø18 to ø20 mm ..... #7283 € 13,95

Stainless steel bends for Valach VM-170/VM-210



Light and tough bends made from stainless steel tubing ø20x0,5mm. Perfect for making your own custom headers for the VM-170 and VM 210 engines. The short end is swaged to fit over the exhaust stubs that already come with the engines. The swage allows for easy silver soldering. The direction of the exhaust stub on the cylinder is rotated forward from vertically down by 20 degrees. Hence the 110 deg bend will point horizontally backward.

90 deg Bend ..... #7280 € 13,95
100 deg Bend ..... #7285 € 13,95
110 deg Bend ..... #7287 € 13,95

Menz-S 2-Blade Propellers

These propellers are made from kiln dried Red Beech. They produc
plenty of power without being too noisy. They are very accurately ma
chined. Sizes up to and including 20 inches are bored to 8 mm, large
diameter to 10 mm. The 32x18" propeller is predrilled to fit our reductio
gear! Center hole is 20 mm plus four 6 mm holes.

The 3 blade props are joined with two aluminium discs glued with Epox
which makes a perfectly safe joint. 3 blade props up to and including 1
inches are bored to 8 mm, larger diameter to 10 mm.

15x6"	#0156	€ 10,90
15x8"	#0158	€ 10,90
15x10"	#0150	€ 10,90
15x12"	#0152	€ 10,90
16x6"	#0166	€ 11,40
16x8"	#0168	€ 11,40
16x10"	#0160	€ 11,40
16x12"	#0162	€ 11,40
17x6"	#0176	€ 12,90
17x8"	#0178	€ 12,90
17x10"	#0179	€ 12,90
18x6"	#0186	€ 13,90
18x8"	#0188	€ 13,90
18x10"	#0180	€ 13,90
18x12"	#0182	€ 13,90
19x8"	#0198	€ 14,90
19x10"	#0199	€ 14,90
19x12"	#0192	€ 14,90
20x6"	#0206	€ 14,10
20x8"	#0208	€ 16,90
20x9"	#0209	€ 16,90
20x10"	#0200	€ 16,90
20x12"	#0212	€ 16,90
20x14"	#0214	€ 17,90
21x8"	#0218	€ 19,90
21x10"	#0210	€ 19,90
21x12"	#0215	€ 19,90
21x14"	#0217	€ 19,90
22x8"	#0228	€ 20,90
22x10"	#0220	€ 20,90
22x12"	#0213	€ 20,90
22x14"	#0224	€ 20,90
23x8"	#0238	€ 23,90
23x10"	#0230	€ 23,90
24x8"	#0248	€ 25,90
24x10"	#0240	€ 25,90
24x12"	#0242	€ 25,90
24x14"	#0244	€ 25,90
24x16"	#0247	€ 25,90
26x8"	#0268	€ 33,50
26x10"	#0260	€ 33,50
26x12"	#0262	€ 33,50
26x14"	#0264	€ 35,50
26x16"	#0266	€ 35,50
27x10"	#0270	€ 37,90
27x12"	#0272	€ 37,90
28x8"	#0288	€ 39,90
28x10"	#0280	€ 39,90
28x12"	#0282	€ 39,90
28x14"	#0284	€ 39,90
28x16"	#0286	€ 41,90
30x10"	#0300	€ 49,50
30x12"	#0302	€ 49,50
30x14"	#0304	€ 49,50
32x10"	#0320	€ 56,00
32x12"	#0322	€ 56,00
32x14"	#0324	€ 56,00
32x18" G 2,8:1	#0328	€ 59,90
32x18	#0329	€ 57,90
34x10"	#0340	€ 64,90
34x12"	#0342	€ 64,90
34x14"	#0344	€ 64,90
34x18"	#0348	€ 64,90

We can precision balance Menz propellers for the following prices:

Precision balancing on 2-blade props ... #0111 € 3,50

Precision balancing on 3-blade props ... #0113 € 4,95

Menz-S 3-Blade Propellers

15x6"	#1356	€ 31,90
15x8"	#1358	€ 31,90
15x10"	#1350	€ 31,90
16x6"	#1366	€ 34,10
16x8"	#1368	€ 34,10
16x10"	#1369	€ 34,10
18x8"	#1388	€ 41,90
18x10"	#1380	€ 41,90
18x12"	#1382	€ 41,90
19x8"	#1398	€ 45,90
19x10"	#1390	€ 45,90
19x12"	#1392	€ 45,90
20x8"	#1308	€ 47,90
20x10"	#1300	€ 47,90
20x11"	#1301	€ 47,90
20x12"	#1302	€ 47,90
20x14"	#1304	€ 47,90
21x8"	#1318	€ 53,90
21x10"	#1310	€ 53,90
21x12"	#1312	€ 53,90
22x8"	#1328	€ 57,30
22x10"	#1320	€ 57,30
22x12"	#1322	€ 57,30
23x8"	#1338	€ 61,90
23x10"	#1330	€ 61,90
24x10"	#1340	€ 65,10
24x12"	#1342	€ 65,10
26x10"	#1360	€ 79,70
26x12"	#1362	€ 79,70
26x14"	#1364	€ 79,70
27x10"	#1370	€ 87,50
27x12"	#1372	€ 87,50
28x10"	#1385	€ 96,50
28x12"	#1386	€ 96,50
28x14"	#1387	€ 96,50
30x10"	#1395	€ 120,90
30x12"	#1396	€ 120,90
30x14"	#1397	€ 120,90
32x12"	#1399	€ 130,95

Super Silence CF-Propellers

The transparent high gloss gel coat allows one to see the diagonally laid carbon fiber cloth in these Super Silence propellers. These propellers have been computer designed to achieve maximum power with lowest possible sound levels. The blades are hollow to reduce weight. Propellers are laminated in precision CNC milled moulds, ensuring the blade thickness is accurately held from root to tip. Propellers are balanced.

CF-2-blade:

Size	suitable for	No.	Price
15x11"	18 – 20 ccm	#9960	€ 32,90
15,5x13"	18 – 23 ccm	#9902	€ 37,00
16x8" Pro*	18 – 25 ccm	#9903	€ 40,50
16x10"	18 – 23 ccm	#9904	€ 40,50
16x14"	20 – 25 ccm	#9906	€ 40,50
17x12"	23 - 30 ccm	#9908	€ 42,60
18x8" Pro*	24 – 28 ccm	#9970	€ 47,40
18x11"	25 – 30 ccm	#9910	€ 47,40
19x11"	30 – 38 ccm	#9912	€ 49,75
20x8" Pro*	30 – 38 ccm	#9972	€ 51,60
20x10"	30 – 38 ccm	#9914	€ 51,60
20x11"	35 – 45 ccm	#9916	€ 51,60
20x12"	35 – 45 ccm	#9918	€ 51,60
21x11"	40 – 50 ccm	#9920	€ 54,70
21x12"	40 – 55 ccm	#9922	€ 54,70
21x12" Pro*	40 – 55 ccm	#9924	€ 54,70
22x8" Pro*	40 – 50 ccm	#9974	€ 57,00
22x10"	40 – 55 ccm	#9926	€ 57,00
22x12"	50 – 65 ccm	#9928	€ 57,00
22x14"	55 – 70 ccm	#9930	€ 57,00
23x12"	50 – 70 ccm	#9932	€ 61,40
24x8" Pro*	45 – 65 ccm	#9968	€ 64,70
24x10"	50 – 70 ccm	#9934	€ 64,70
24x12"	60 – 80 ccm	#9936	€ 64,70
24x14"	70 – 100 ccm	#9938	€ 64,70
25x12"	70 – 90 ccm	#9980	€ 71,80
26x12"	75 – 100 ccm	#9940	€ 75,10
26x14"	75 – 120 ccm	#9942	€ 75,30
27x8" Pro*	80 – 100 ccm	#9941	€ 84,00
27x10"	80 – 100 ccm	#9949	€ 84,00
27x12"	80 – 100 ccm	#9944	€ 84,00
27x14"	90 – 120 ccm	#9964	€ 84,00
28x12" New!	100 – 120 ccm	#9946	€ 93,80
28x14"	100 – 140 ccm	#9948	€ 88,50
29x12"	100 – 140 ccm	#9950	€ 95,80
30x12"	120 – 150 ccm	#9952	€ 115,00
30x14" New!	140 – 160 ccm	#9966	€ 115,00
30x16" New!	140 – 160 ccm	#9962	€ 115,00
31,5x10" Pro*	100–120ccm	#9958	€ 133,80
31,5x14" New!	140–160ccm	#9956	€ 136,90
31,5x16" New!	150–180ccm	#9976	€ 136,90
32x19" New!	200–240ccm	#9978	€ 140,60

CF-3-blade:

Size	suitable for	No.	Price
15x11"	20 – 25 ccm	#9955	€ 49,50
15,5x13"	20 – 25 ccm	#9957	€ 55,90
16x10"	20 – 25 ccm	#9959	€ 60,00
18x11"	28 – 35 ccm	#9961	€ 66,60
19x11"	38 – 45 ccm	#9963	€ 70,80
20x8" Pro*	35 – 45 ccm	#9953	€ 74,10
20x10"	38 – 45 ccm	#9965	€ 74,10
20x11"	45 – 62 ccm	#9967	€ 74,10
20x12"	45 – 60 ccm	#9969	€ 74,10
21x12"	55 – 70 ccm	#9971	€ 80,75
21x12" Pro*	55 – 70 ccm	#9973	€ 80,75
22x10"	50 – 65 ccm	#9975	€ 87,20
22x12"	60 – 80 ccm	#9977	€ 87,20
22x14"	60 – 80 ccm	#9951	€ 87,20
23x12"	65 – 80 ccm	#9979	€ 94,90
24x10"	65 – 85 ccm	#9981	€ 102,10
24x12"	70 – 90 ccm	#9983	€ 102,10
24x14"	80 – 100 ccm	#9943	€ 102,10
25x12"	80 – 100 ccm	#9985	€ 111,30
26x12"	80 – 120 ccm	#9987	€ 119,00
26x14"	100 – 120 ccm	#9945	€ 119,00
27x12"	100 – 120 ccm	#9989	€ 126,20
28x12"	120 – 140 ccm	#9993	€ 135,20
28x14"	140 – 160 ccm	#9947	€ 135,20
29x12" New!	120 – 160 ccm	#9995	€ 160,40
30x12"	140 – 160 ccm	#9997	€ 152,30

CF-4-blade:

Size	suitable for	No.	Price
27x12"	140 – 160 ccm	#9992	€ 168,30
28x14"	150 – 180 ccm	#9994	€ 178,00

We cannot accept liability for any damage or injury resulting from use of these propellers as we are unable to control the fitting and use.

* Pro = new, sickle shaped blade form.
New! = new designed blade with more carbon fiber for more torsional stiffness

Fiala-2-blade-Propeller

16x6".....#8166 € 10,90
16x8".....#8168 € 10,90
16x10".....#8160 € 10,90
17x6".....#8176 €12,90
17x8".....#8178 € 12,90
17x10".....#8170 € 12,90
18x6".....#8186 € 16,90
18x8" .....#8188 € 16,90
18x10" .....#8180 € 16,90
20x8" .....#8208 € 17,90
20x10" .....#8200 € 17,90
20x12" .....#8202 € 17,90
21x10".....#8210 € 19,90
22x10" .....#8220 € 20,90
22x12" .....#8222 € 20,90
23x10" .....#8230 € 21,90
24x8" .....#8248 € 22,90
24x10" .....#8240 € 22,90
24x12".....#8242 € 22,90
24x14".....#8244 € 22,90
26x8" .....#8268 € 26,90
26x10" .....#8260 € 26,90

Fiala propellers are manufactured in the Czech Republic with modern CNC machines, they have a very close tolerance plus high quality varnishing. Balancing is almost unnecessary, but when is, it is minimal. Due to the thin section, these propellers are very efficient. In comparison to other propellers, it is possible to fit an rather larger Fiala which will give the same rpm but more static thrust. The Fiala propellers are optimized for the Valach engines. Fixing bolt hole is 10mm, for the smaller sizes an 8mm sleeve is provided.

26x12".....#8262 € 26,90
27x8" .....#8278 € 33,90
27x10" .....#8270 € 33,90
27x14".....#8274 € 33,90
28x8" .....#8288 € 37,90
28x10" .....#8280 € 37,90
28x12" .....#8282 € 37,90
28x14" .....#8284 € 37,90
30x10" .....#8300 € 46,90
30x12" .....#8302 € 46,90
30x14" .....#8304 € 46,90
30x16" .....#8306 € 46,90
32x10" .....#8320 € 55,90
32x12" .....#8322 € 55,90
32x14" .....#8324 € 55,90

32x16" .....#8326 € 55,90
32x18" .....#8328 € 55,90
34x12" .....#8342 € 64,90
34x14" .....#8344 € 64,90
34x16" .....#8346 € 64,90
36x12" .....#8362 € 89,90
36x14" .....#8364 € 89,90
36x16" .....#8366 € 89,90
38x12" .....#8382 € 105,90
38x14" .....#8384 € 105,90
38x16" .....#8386 € 105,90
40x20".....#8340 € 119,90
42x20".....#8350 €125,90

Fiala-3-blade-Propeller

27x14 .....#8474 € 87,90
28x12 .....#8482 € 97,90
28x14 .....#8484 € 97,90

30x12 .....#8402 € 119,90
30x14 .....#8404 € 119,90
40x18 .....#8408 € 309,90

Hollow Glassfiber Propeller 31,5x18"

The optimum propeller for our 2,8:1 reduction gear, light grey color. The glassfiber propellers are hollow and have a spar through the middle, these are similar in construction to a glassfiber wing and are lighter than a wood propeller and have a lower gyroscopic effect. The glassfiber propellers are balanced and ready bored for our 2,8:1 reduction gear.

From our own Glassfibre workshop!

Hollow Glassfiber Propeller 31,5x18".....#0315 € 69,95

- We cannot accept liability for any damage or injury resulting from use of these propellers as we are unable to control the fitting and use. -

DU-BRO
Tru-Spin Prop Balancer

Due to exact centering with two straight side cones on a steel shaft, this shaft running on very free running light aluminium discs, allows really precise propeller balancing in all sizes. Spinners and impellor rotors can also be balanced. Suitable for propellers with a center hole ranging from 3,2mm up to 14mm.

Tru-Spin Prop Balancer ..... #9275 € 44,80

FEMA Precision Prop Balancer

The unusual construction allows balancing in all directions. Three and four blade props can easily be balanced. The built in bubble balance combined with the friction free suspension on the pin guarantees exactitude pure, the smallest degree of imbalance is clearly shown. Accuracy is 0,05 g at 15 cm. The suspension parts are made from tool steel, the surfaces are hardened and ground. This new balancer is for props up to 32" diameter and center holes of 8,10 and 12 mm.

FEMA precision prop balancer, for prop´s up to 32"... #9270 € 42,55

CAP 21 Spinner

CAP spinner Size 117 x 117 mm. The cone is glass fiber and epoxy. Backplate is from high tensile strength Delrin. The spinner is lighter and far more resistant to centrifugal forces than aluminium types. The cone is fixed, same as for proper aircraft with small screws around periphery, looks really neat.

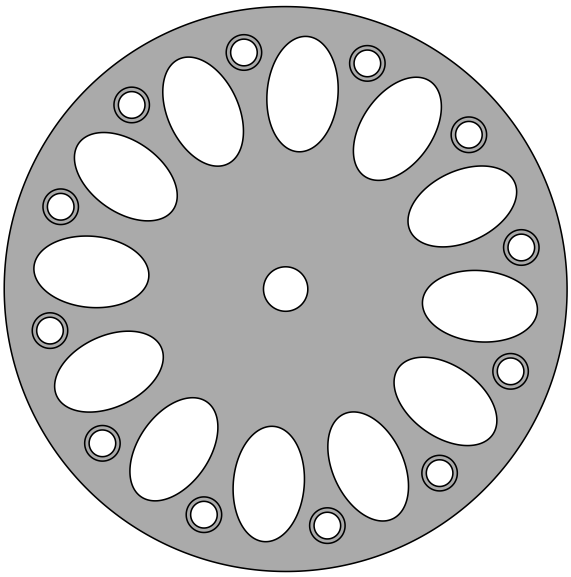
GRP-Delrin Scale-Spinner, ca. 125g ..... #6250 € 49,90

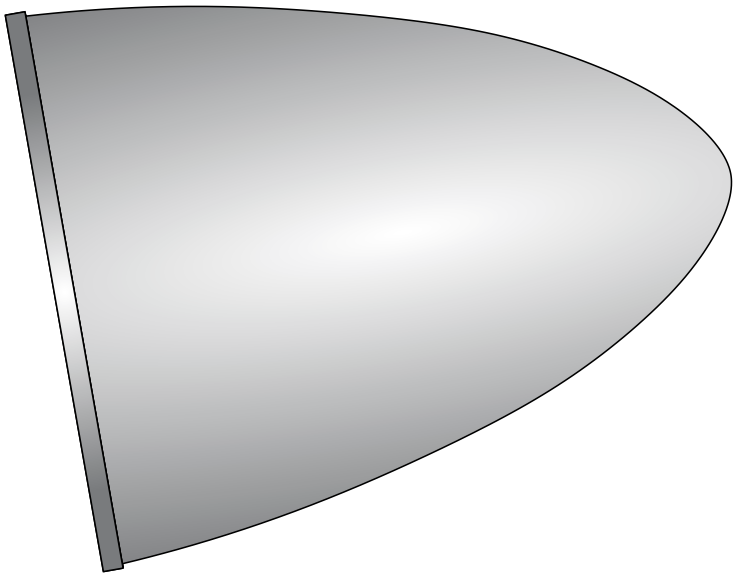
Piper Spinner

Size 82x60 mm. The cone is glass fiber and epoxy. Backplate is from high tensile strength Novotex. The spinner is lighter and far more resistant to centrifugal forces than aluminium types. The cone is fixed, same as for proper aircraft with small screws around periphery, looks really neat.

GRP-Scale-Spinner, ca. 49g..... ..... #4250 € 39,90

CF-BS-Spinner



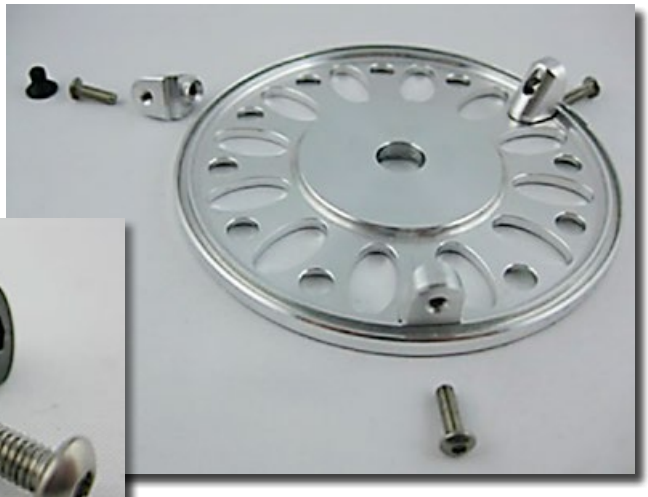


Extremely low weight and high strength, with very accurate centring are the mark of quality with these CF-spinners. They are fixed with the supplied M5 central screw onto the engine. The aluminium back plate has lightning holes at the periphery.

CF-Spinner 80x91 mm, ca. 60g ..... #9222 € 57,55
CF-BS-Spinner 92x115 mm, ca. 84g..... #9223 € 64,60
CF-BS-Spinner 104x131 mm, ca. 115g ..... #9214 € 71,25
CF-BS-Spinner 112x140 mm, ca. 125g ..... #9208 € 79,90
CF-BS-Spinner 127x155 mm, ca. 150g ..... #9212 € 89,25
CF-BS-Spinner 159x200 mm, ca. 230g ..... #9221 € 112,90

Additionally, the spinner cone can be fixed to the backplate with small right angle aluminium brackets. These prevent the spinner cone from tipping. For two or three blade propellers are 3 brackets. 4 brackets are required for four blade propellers.

Alu bracket for BS-Spinner, 1 piece ..... #9250 € 3,30



Extra long Prop Bolts for ZG 45/62/74/80

These bolts are very usefull for extreme thick props and when the CF-Spinners with M5 fixing screws are used .

60 mm Prop-Bolt ..... #6548 € 2,70
as above, with M5 threaded hole..... #6549 € 5,95

These AEROPROPSAVERS are made in an identical fashion as is used for the full size aircraft. A 100% scale accessory, and they look very smart.

On the full size aircraft they prevent damage in the hanger and on the field, the signal color is to prevent people walking into them.

These Aeropropsavers are lined with a thick soft inner, these serve very well to prevent transport

damage, apart from being a dust jacket and an optical gag.

Due to the elasticity of the material, these stay put on the props without additional means, they are fitted and removed very quickly with ease.

Naturally these Aeropropsavers fit all other makes of propellers, Menz is only representative for all standard propellers with wide blades, the Super Silence CF propellers have relatively narrow blades.

But as mentioned, the Aeropropsavers are elastic and adapt to all widths perfectly.

As with the full size, Aeropropsavers are supplied with the inscription "REMOVE BEFORE FLIGHT".

Red AEROPROPSAVER with white lettering:
"REMOVE BEFORE FLIGHT"

Propeller size	Propeller type	Order. No.	Price per 1*
17" - 20"	Menz S and Super Silence	#1711	5,95 EUR
21" - 23"	Super Silence	#1713	5,95 EUR
21" - 23"	Menz S	#1715	5,95 EUR
24" - 25"	Menz S and Super Silence	#1717	6,95 EUR
26" - 27"	Menz S and Super Silence	#1719	6,95 EUR
28" - 32"	Menz S and Super Silence	#1721	6,95 EUR
ca. 32 - wide blade	31,5 x 18" GRP Gear Propeller	#1723	6,95 EUR

** As propellers come with a different number of blades, the AEROPROPSAVERS are sold single. For a 2-blade prop, you have to order two AEROPROP-SAVER, for a 3-blade three pieces.*

Accessories for Petrol Engines

Petrol proof Aerobatic Tanks

Very light, petrol resistant tanks made from HDPE (= High density polyethylene). Complete with large nipples, cotton felt clunk filter and petrol resistant clunk tube.

Weight of tank bottle with lid but without fittings: 500 ccm = 40g. 1,000 ccm = 74g.

Tank 500 ccm, 70x70x150 mm ..... #0050 € 12,90
Tank 1000 ccm, 85x85x180 mm ..... #0051 € 14,90

NEW!

Additional size tanks

Extra strong tanks made from HDPE with blue PP (= Polypropylene) screw caps. Complete with large nipples, cotton felt clunk filter and petrol resistant clunk tube.

Weight of tank bottle with lid but without fittings: 250 ccm = 41 g. 750 ccm = 75 g 1500 ccm = 127 g.

Tank 250 ccm, 60x60x130 mm ..... #0062 € 12,90
Tank 750 ccm, 83x83x192 mm..... #0065 € 14,90
Tank 1500 ccm, 108x108x211 mm..... #0069 € 16,90

Tank Bottles with Lid, without fittings:

Tank Bottle 250 ccm ..... #0061 € 3,25
Tank Bottle 500 ccm ..... #0052 € 3,25
Tank Bottle 750 ccm ..... #0066 € 4,95
Tank Bottle 1000 ccm ..... #0054 € 4,30
Tank Bottle 1500 ccm ..... #0068 € 5,90

Large Tank Nipple sets ..... #0053 € 4,95

Large nipples for fuel tubing with 3,2 mm id.

The set comprises two single sided nipples and one double sided nipple, three fine thread nuts and three washers

Single side nipple,
with nut and washer ... **#0056 € 1,45**

Double side nipple,
with nut and washer ... **#0055 € 2,25**

Cotton Felt Clunk Filter ..... #0060 € 4,95

Heavy lead zinc body with 3 mm thick cotton felt sleeve. Will allow you to fly the tank absolutely empty. This filter is absolutely necessary for petrol motors. It prevents air entering the carburettor and any fine dirt that is always present in petrol. It has a very large surface area and will never become blocked up, even after years of use.

The optimum placing of the Tank Nipples

Make two air vents made with fuel tubing, fitted to two single sided nipples in the tanks topside, central at the rear end. These two air vent lines must be led forward over the tank and then down into the fuselage floor at the cooling air outlet of the engine cowling. One of these vent lines (does not matter which) is used to fill the tank. The vent lines are far back, as a result of this a small amount of air remains in the tank after filling it, at least in a taildragger. You can turn the model in every position, without any fuel running out. Our 750ml tank for example can hold up to 1000ml so the small amount of air is no problem.

These two lines are always shut off, with two 3,5 mm self tapping screws 15 mm long with heads removed, while the model is flying or otherwise parked. Because the threads are so coarse, enough air can enter the tank, but even during violent stunting no fuel will be lost. The saving in fuel is considerable! This system is simple and 100% reliable, also during filling the tank, you will not spill fuel over your model. The double sided tank nipple from the clunk filter is best placed in the middle of the tank cap.

Spark Plug Box Spanner
19 and 14mm, suitable to the CM-6 spark plug.
#0102 € 6,95

Accessories for Petrol Engines

Petrol proof Fuel Tubing

This tubing stays flexible and with its 2 mm thick wall will not easily kink even when pulled around very tight corners. Inner diameter 3 mm.

1 m	**#0070**	**€ 4,65**
3 m	**#0073**	**€ 12,95**
5 m	**#0075**	**€ 21,00**

TYGON® Fuel Tubing

This transparent yellow high tech tubing is totally resistant to Petrol, Diesel and Kerosene. Very flexible, UV and Ozone proof, does not swell or harden, totally different from clear PVC-tubeing. TYGON® yellow tubing is ideal for petrol engines and turbines.

Diameter 3,2 mm, wall thickness 1,6 mm:

1 m	**#0090**	**€ 4,95**
3 m	**#0093**	**€ 14,30**
5 m	**#0095**	**€ 23,30**
15 m	**#0097**	**€ 67,95**

Jets with staggered multi tank installations require bigger 4,8 mm ID fuel tubing for safety. Wall thickness is also 1,6 mm:

1 m Tygon-fuel tubing ID 4,8 mm	**#0101**	**€ 6,95**
3 m Tygon-fuel tubing ID 4,8 mm	**#0103**	**€ 20,50**
5 m Tygon-fuel tubing ID 4,8 mm	**#0104**	**€ 33,50**
15 m Tygon-fuel tubing ID 4,8 mm	**#0105**	**€ 97,50**

Seamless Precision Steel Tubing St35bk

Thin wall seamless precision steel tubing to make headers, silencer outlet pipes and landing gear shock absorbers. This tubing weighs half that of copper water pipe.

ø10 x 0,5 mm, 400 mm lang	**#3910**	**€ 5,95**
ø10 x 1,0 mm, 400 mm lang	**#3911**	**€ 5,95**
ø12 x 0,5 mm, 400 mm lang	**#3912**	**€ 6,40**
ø13 x 0,5 mm, 400 mm lang	**#3913**	**€ 6,75**
ø14 x 0,5 mm, 400 mm lang	**#3914**	**€ 6,95**
ø16 x 1,0 mm, 400 mm lang	**#3916**	**€ 7,50**

Thinwall stainless tube see page 196.

Stainless Steel Bends

Due to the thin wall of only 0.5 mm, these bends are very light. The alloy is 1.4301, which has high strength and is very tough. The perfect choice for headers!

ø12 x 0,4 mm, radius 23 mm	**#6612**	**€ 8,95**
ø15 x 0,5 mm, radius 35 mm	**#6615**	**€ 10,90**
ø18 x 0,5 mm, radius 35 mm	**#6618**	**€ 11,95**
ø20 x 0,5 mm, radius 35 mm	**#3872**	**€ 11,95**
ø22 x 0,5 mm, radius 35 mm	**#6572**	**€ 13,70**
ø25 x 0,5 mm, radius 44 mm	**#6569**	**€ 15,95**
ø28 x 0,6 mm, radius 44 mm	**#5869**	**€ 17,95**

Stainless Steel S-Bends

Radius is 44 mm to center line of pipe. A real space saving header.

ø25 x 0,5 mm	**#6568**	**€ 19,90**
ø28 x 0,6 mm	**#5868**	**€ 20,90**

Stainless steel "Do it yourself"-header

Now you can make a perfect fitting header by yourself. Stub`s, bow`s and 60mm extensions are widened on one side to slide them into each other. Afterwards the connection can be silver soldered.

Stubs for ZG20/23/26, Ø 20 mm	**#6682**	**€ 12,50**
Stubs for ZG 45/62, Ø 25 mm	**#6686**	**€ 12,95**
Stubs for DA 50/100, Ø 25 mm	**#6685**	**€ 12,95**
Bow 90° Ø 20 mm Radius 28 mm	**#6688**	**€ 5,25**
Bow 90° Ø 25 mm Radius 45 mm	**#6690**	**€ 5,95**
Extension Ø 20 mm 60 mm	**#6692**	**€ 1,95**
Extension Ø 25 mm 60 mm	**#6694**	**€ 2,50**
Extension Ø 20 mm 150 mm	**#6696**	**€ 3,85**
Extension Ø 25 mm 200 mm	**#6698**	**€ 4,25**

Accessories for Petrol Engines

PTFE Tubing

PTFE tube is the best material to connect an aluminium tuned pipe. Of course it requires adequate cooling and must not be subject to mechanical stress. The only method of fixing is with the special spring clips that automatically fit and keep a constant pressure on the tube .

PTFE Tube	**ø20x2 mm 5 cm**	**#3894**	**€ 3,95**
	10 cm	**#3891**	**€ 6,40**
	15 cm	**#3892**	**€ 8,95**
PTFE Tube	**ø25x2 mm 5 cm**	**#3896**	**€ 4,50**
	10 cm	**#3897**	**€ 6,95**
	15 cm	**#3898**	**€ 9,95**
PTFE Tube	**ø28x2 mm 5 cm**	**#5896**	**€ 4,50**
	10 cm	**#5897**	**€ 8,50**
	15 cm	**#5898**	**€ 11,95**

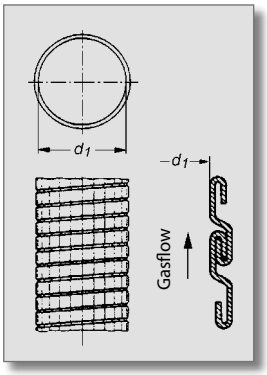
Spring Clips for PTFE tubing:

for ø20 mm Tube	**#3893**	**€ 1,45**
for ø25 mm Tube	**#3899**	**€ 1,75**
for ø28 mm Tube	**#5899**	**€ 1,95**

Flexible Stainless Steel Exhaust Tubing

10 cm ø20 mm	**#3881**	**€ 7,95**
20 cm ø20 mm	**#3882**	**€ 13,70**
30 cm ø20 mm	**#3883**	**€ 19,30**
50 cm ø20 mm	**#3885**	**€ 29,90**
10 cm ø25 mm	**#6581**	**€ 8,50**
20 cm ø25 mm	**#6582**	**€ 14,80**
30 cm ø25 mm	**#6583**	**€ 20,90**
50 cm ø25 mm	**#6585**	**€ 31,95**
10 cm ø28 mm	#8581	€ 8,95
20 cm ø28 mm	#8582	€ 16,20
30 cm ø28 mm	#8583	€ 23,00
50 cm ø28 mm	#8585	€ 34,50

This Tubing is made specially for industrial exhaust systems. As apposed to axial corrugated tubing it is vibration proof as well as having a smoother inside surface and therefore a much lower drag value. You can use this tubing to connect the exhaust header pipe to a tuned pipe.



The advantage with this stainless tubing is it will not kink and can withstand the high exhaust temperature of petrol engines indefinitely. This tubing is wound from 1,4301 stainless steel and can be easily joined with silver solder.

The tube with the 20 mm inside diameter is for the TITAN ZG 20/23/26/38 and the Valach four stroke engines. The 25 mm inside diameter is the right choise for the TITAN ZG 45, ZG 62 and ZG74/80B.

Synthetic 2 stroke oil BEL RAY H1R

This is an improved version of the MC H-1-X synthetic two stroke oil for petrol engines. Mixed to a ratio of 50:1, this is a 2% oil content. This oil provides a more efficient lubrication of the engine than a 20:1 mixture using mineral oil. Using BelRay H1R you will have an increase by some 100 rpm as apposed to mineral oil, this comes about due to the reduction in oil drag and increased petrol volume.

BelRay H1R causes little or no deposit to be formed in the engine, this keeps the spark plug piston and combustion chamber clean. There are no corrosion problems. The exhaust is almost oil free. Due to the excellent lubrication the piston ring cylinder sealing is improved, this makes for better starting.

BEL RAY H1R, 1 litre ..... #0194 € 25,95

Würth *saBesto* HHS 5000

A fully synthetic penetrating oil containing PTFE, reducing friction to an absolute minimum on moving parts, has very high film strength. Temperature range is from -20 to +200C, short period up tp+250C. We use this HHS 5000 for the rocker arm lubrication on the VM engines. The 500cc can will last a long while.

Würth saBesto HHS 5000, 500ml ... #7295 EUR 33,95

Valvoline SynPower® 2T

After many tests, the oil we recommend for the Valach Motors four-stroke engines is Valvoline SynPower® 2T. The extremely good BelRay H1R, we use for our two stroke engines, is not ideal for petroil lubrication in four-stroke engines. BelRay H1R burns off very well and deposit free, but it does not blow down past the piston rings into the crankcase as well as Valvoline SynPower® 2T.

Valvoline SynPower® 2T, 1 Litre ... #7294 EUR 12,95

Stainless Steel round and oval Tubing

Thinwall Stainless Steel Tubing

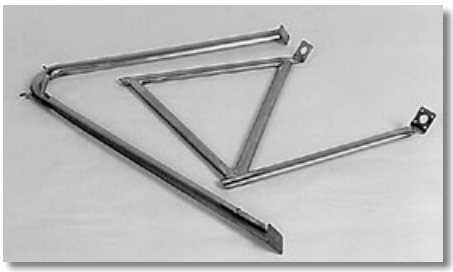
Ideally suited to build fuselages, tailplanes and wing struts as well as scale motor mounts. This tubing is cold drawn and very hard, is very easily joined with our silver solder. The trapped flux cannot cause corrosion as is the case with normal steel tube. This tubing is supplied in one meter lengths.

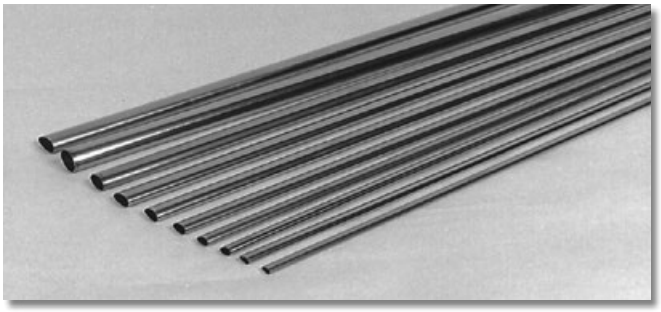
Thinwall stainless tube, 1 meter long:

ø2 x 0,2 mm, weight 20 g	#1602	€ 7,95
ø3 x 0,3 mm, 20 g	#1603	€ 7,95
ø4 x 0,3 mm, 25 g	#1604	€ 8,95
ø5 x 0,3 mm, 32 g	#1605	€ 9,50
ø6 x 0,3 mm, 39 g	#1606	€ 9,95
ø7 x 0,3 mm, 47 g	#1607	€ 11,50
ø8 x 0,3 mm, 57 g	#1608	€ 11,95
ø9 x 0,3 mm, 62 g	#1609	€ 11,95
ø10 x 0,3 mm, weight 68 g	#1610	€ 14,95
ø12 x 0,3 mm, 78 g	#1612	€ 15,95
ø14 x 0,5 mm, 168 g	#1614	€ 16,95
ø15 x 0,4 mm, 144 g	#1615	€ 16,90
ø18 x 0,5 mm, 213 g	#1618	€ 17,90
ø20 x 0,6 mm, 231 g	#1620	€ 20,95
ø22 x 0,5 mm, 261 g	#1622	€ 21,95
ø25 x 0,5 mm, 310 g	#1625	€ 21,95
ø28 x 0,6 mm, 350 g	#1628	€ 21,95

Streamline Stainless Steel Tubing

This tubing allows extremely strong undercarriage and wing struts to be made. This tubing is very easily silver- soldered and complicated constructions can be formed. The undercarriage and cabane struts for our Albatros DVa are made from this tubing and save 400 grams weight against conventional materials. This tubing has far superior strength to that formed from aluminium. Even when the stainless tubing is knocked and the paint is chipped off, the resulting effect is very realistic.

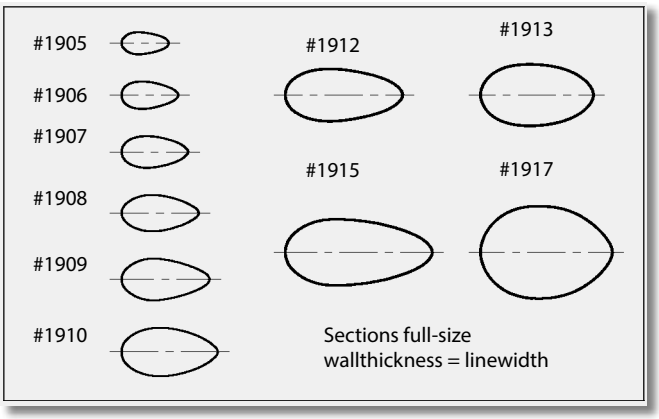




The tubes #1917 and #1913 are thicker thereby being more resistant to bending making these ideal for undercarriages.

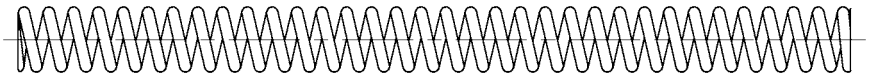
Streamline stainless steel tubing, 1 meter long:

6,5 x 3,2 x 0,3 mm, weight 32 g	#1905	€ 12,50
7,8 x 3,9 x 0,3 mm, 39 g	#1906	€ 12,95
9,1 x 4,5 x 0,3 mm, 47 g	#1907	€ 14,95
10,5 x 5,1 x 0,3 mm, 57 g	#1908	€ 16,95
11,9 x 5,8 x 0,3 mm, 62 g	#1909	€ 16,95
13,0 x 6,7 x 0,3 mm, 68 g	#1910	€ 19,95
15,8 x 7,2 x 0,3 mm, 78 g	#1912	€ 20,95
15,2 x 8,4 x 0,3 mm, 78 g	#1913	€ 20,95
19,7 x 9,0 x 0,4 mm, 144 g	#1915	€ 23,95
17,7 x 12,5 x 0,4 mm, 144 g	#1917	€ 23,95

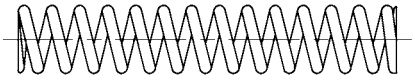


Compression Springs

We use these springs for our Big Tiger Moths undercarriage and tail skid.



Springs full-size

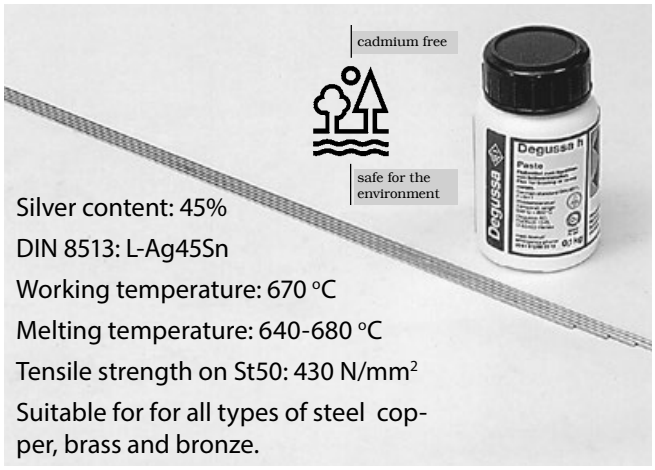


110 x 8,6 mm - 34 turns ø1,5 mm, 1 off ..... #2262 € 2,75

Seamless steel tubing ø10x0,5x400mm .....#3910 € 5,95

50 x 9,0 mm - 14 turns ø1,5 mm, 1 off ..... #2263 € 2,55

Solder Materials



Silver content: 45%
DIN 8513: L-Ag45Sn
Working temperature: 670 °C
Melting temperature: 640-680 °C
Tensile strength on St50: 430 N/mm²
Suitable for for all types of steel copper, brass and bronze.

A specially low running temperature cadmium free silver solder. Melts as soon as steel shows first dark cherry red in daylight. Due to this low running temperature you can silver solder spring steel without causing brittleness. Our flexible stainless steel tubing can withstand working temperatures up to 600 °C, using our silver solder this can be soldered at almost the working temperature.

This silver solder is ideal for soldering thin wall steel tubing and thin sheet steel such as is used in making header pipes and silencers. As apposed to the flux coated rods you apply the paste flux directly onto the bare joint to be soldered, avoiding a build up of oxidized surface metal. The workpiece needs only to be laid onto a firebrick, heated up with a Propane gas burner until the flux melts giving a clear liquid, this then is the temperature at which the silver solder will run. Allow the join to cool slowly. Remove the flux residue with hot water and a brass or stainless steel wire brush.

Silver Solder, 1 rod, 1,5x500 mm .....#0984 € 8,95
Silver Solder, 2 rods, 1,5x500 mm.....#0980 € 17,50

Flux Paste

Working temperature 500-800 °C. The 100 g jar is enough for a lot more than two rods, but a smaller package is not economical.

Flux paste, 100 g.....#0985 € 8,95

SPONTEX-Profi Stainless Steel Cleaning Pads

Silver solder always requires a good cleaning off of flux residue from the work pieces. First the workpieces are laid in hot water for an hour, then the flux residue detaches itself mostly. If you have used too little Flux it will burn itself onto the metal, this requires wet or dry paper and a stainless wire brush, the Spontex will then clean and polish the metal as new!

SPONTEX-Profi cleaning pads .....#0987 € 2,25

Silver content 55%
DIN 8513: L-Ag55Sn
Working temp.: 650 °C
Melting temp.: 620-660 °C
Tensile strength: 330-420 N/mm²
Especially suitable for all types of stainless steel (chrome nickel steel), also for steel, copper, brass and bronze.

Many beginners make the easily made mistake of overheating the work piece and letting it glow bright red, this forms a very difficult to remove layer of oxide that normal flux cannot loosen, this oxide must be sanded and filed off before beginning anew.

This green flux is made especially for stainless steel, it is very aggressive and prevents the oxides building up in spite of overheating.

Warning! You must not inhale any fumes! Suck fumes away or work in an open space. Wear safety glasses. Do not handle solder rods unnecessarily.

Flux coated silver solder

1 Rod ø1,5 (ø3,0) x 500 mm long .....#0981 € 11,95
2 Rods ø1,5 (ø3,0) x 500 mm long.....#0982 € 23,95

Aluminium Solder

An extremely thin flowing zinc free alloy for soldering sheet, tube and cold drawn aluminium. Even stainless steel screws can be soldered to aluminium with this solder alloy. It has a very good capillary flow characteristic combined with a high strength of 190 N/mm².

With this solder alloy and a little practice, using a normal Propane blowlamp, you will be able to solder aluminium silencers and the like.

Due to the special flux, which indicates the solder rods running temperature very accurately, soldering aluminium will now become a simple matter. The solder is an eutectic alloy, so the running temperature is way below the melting temperature of the aluminium.

Alu-solder, 10 rods, ø2,0x500 mm .....#0920 € 7,95
Flux paste for above, 30 g.....#0925 € 7,50

KAVAN "Scale"-Pneumatic Wheels

These wheels are unusually light and strong. The 100 mm wheels are supplied in our CAP 21 kits, they weigh 55 grams per one. In the Piper and big Tiger are the 125 mm wheels, weight 73 grams. The 150 mm wheels weigh 96 grams. These wheels are fitted with wear resistant plastic bushes to take 6 mm axles. For 5 mm axles we supply brass reducing tubes. A bicycle pump adapter is also supplied, but please only a minimal amount of air pressure (max. 1 bar). These wheels do not have any reinforcing like your car tyres!

ø100 mm, pair .....#6211 € 19,50
ø125 mm, pair .....#0630 € 23,95
ø150 mm, pair .....#0631 € 29,95

KAVAN Tailwheels

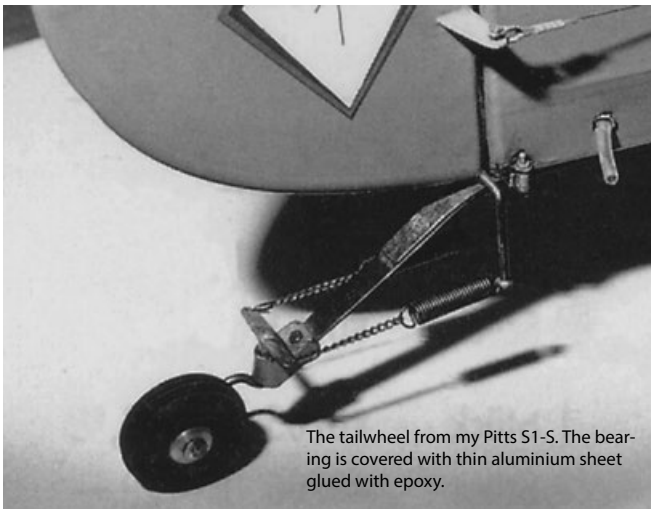
Super light pneumatic tailwheels. Weight 5,8 and 6,4 gramm.

Tailwheel ø40 mm .....#0601 € 2,95
Tailwheel ø45 mm .....#0602 € 3,25

Scale Tailwheel Kit with Leaf Springs

Silver soldered fork, spiral springs, chain fixing materials and 45 mm tailwheel. For the Pitts S1-S, the Piper J3/PA18 and similar models.

Tailwheel set with leaf springs.....#4140 € 21,90



The tailwheel from my Pitts S1-S. The bearing is covered with thin aluminium sheet glued with epoxy.

FEMA wheels solid rubber-wheels

FEMA wheels are designed to meet the highest demands and are suited for engine models as well as for large scale gliders. The wheels are extremely resilient and have ideal damping features. Even the load of the model weight for several hours in midsummer temperatures does not lead to the dreaded flat tire.

ø90 mm	**1 pcs.**	**95 g**	**#0619**	**€ 18,50**
ø100 mm	**1 pcs.**	**105 g**	**#0610**	**€ 19,50**
ø112 mm	**1 pcs.**	**135 g**	**#0611**	**€ 20,50**
ø127 mm	**1 pcs.**	**180 g**	**#0612**	**€ 22,50**
ø140 mm	**1 pcs.**	**225 g**	**#0614**	**€ 25,00**
ø152 mm	**1 pcs.**	**300 g**	**#0615**	**€ 28,00**
ø165 mm	**1 pcs.**	**350 g**	**#0616**	**€ 30,00**
ø178 mm	**1 pcs.**	**380 g**	**#0617**	**€ 32,00**

Rubber Bungee Cord

Cotton covered multi strand cord. Supplied in our Pitts, Piper and Sopwith Pup kit for scale axle suspension. The cotton covering is very durable and has a good dampening effect.

Rubber bungee cord, ø4 mm, 1 m.....#7180 € 1,55
Rubber bungee cord, ø4 mm, 2 m.....#7182 € 2,90

Tailwheel Set for CAP 21

With one single thicker leaf spring, much lighter as the Piper tailwheel set. Steering is by steel wire from servo to rudder horn with two spiral springs. Weight is saved by omission of wire fork. Ideal for aerobatic models. The strength is not compromised, the tailwheel set takes my tailwheel first landings with my CAP 21 without complaint. The set contains 37 mm wheel, leaf spring, wheel axle, bearing, control wire with crimping sleeves, spiral springs and nuts and screws.

CAP 21 tailwheel set.....#6440 € 14,95

Spiral Springs

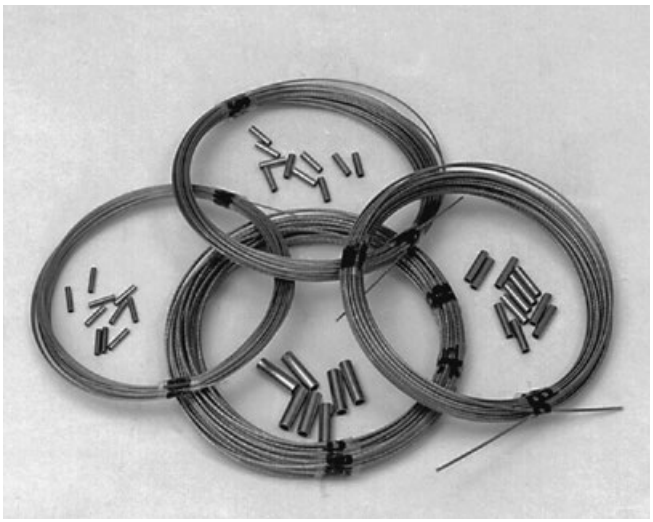
32 x 7,5 mm - 23 turns, ø1,0 mm wire. Supplied with tailwheel set to relieve the rudder servo.

Spiral-springs, 2 pieces.....#4142 € 2,90

Rigging - and Control Wires

Nylon covered multi strand Stainless Wire

This flexible wire is covered with clear, almost invisible, Nylon. The wear on linkages and rigging wire fixings is kept to a minimum. The Nylon covering prevents mechanical generated noise interference. Please note: Due to the Nickel-Chrome alloy used this wire cannot be soft soldered. Crimping sleeves are used to fix and join the wire.



15 kp breaking strength, ø 0,65 mm:

10 m .....#0730 € 5,40
50 m (5 rolls à 10 m) .....#0731 € 24,20

For closed loop control surface actuation and for rigging wire on light scale models up to 6 kg flying weight.

30 kp breaking strength, ø 0,75 mm:

10 m .....#0740 € 6,10
50 m (5 rolls à 10 m) .....#0741 € 27,80

Rigging wire for models such as our small Tiger Moth. Closed loop control surface actuation on large models.

60 kp breaking strength, ø 1,0 mm:

10 m .....#0750 € 7,50
50 m (5 rolls à 10 m) .....#0751 € 33,50

Rigging wire for large models such as our big Tiger and Sopwith Pup.

110 kp breaking strength, ø 1,35 mm:

10 m .....#0800 € 9,95
50 m (5 rolls à 10 m) .....#0801 € 44,80

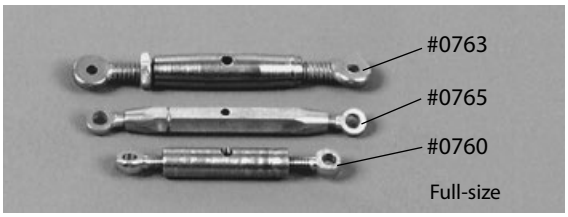
Rigging wire for large models, we use this for the undercarriage bracing wires on our Sopwith Pup.

Crimping Sleeves for Nylon covered Wire

Manufactured from a special alloy and nickel plated. These sleeves are simply pressed flat with pliers and then lightly nicked two or three times with a pair of pincers. Sleeves provide a 100 % safe fixing. Instead of one 110kp sleeve, it is possible to use two 60kp sleeves in a row, that looks much more elegant. To fit the 110kp wire you need to press the 60kp sleeves to an oval shape.

C-sleeves	for 15 kp wire:		for 30 kp wire:		for 60 kp wire:		for 110 kp wire:	
10 pieces:	#0735	€ 1,55	#0745	€ 1,70	#0755	€ 2,20	#0805	€2,90
20 pieces:	#0737	€ 2,65	#0747	€ 2,95	#0757	€ 3,95	#0807	€5,20
50 pieces:	#0739	€ 5,40	#0749	€ 6,20	#0759	€ 8,25	#0809	€ 10,90

Turnbuckles:



Steel, nickel plated, M3 threads, adjustable from 32 to 44 mm, high strength:
1 piece .....#0767 €4,55
2 pieces .....#0763 €8,95
10 pieces .....#0769 €41,95

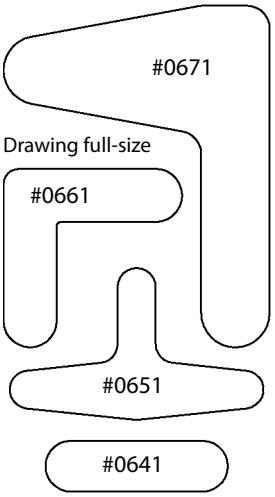
Brass, hexagon cross-section, M2 threads, adjustable from 32 to 46 mm:
1 piece .....#0765 €3,50
10 pieces .....#0766 €31,90

Brass, M2 threads, adjustable from 22 to 32 mm:
1 piece .....#0760 €3,25
10 pieces .....#0761 €28,90

Shackles:

Nickel plated brass.
5 piece .....#0775 € 10,75
10 pieces .....#0770 €19,90

Rigging Tags from 1 mm Brass:

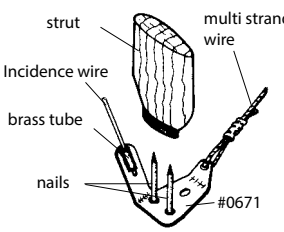


Wing strut ends, L-Form
S. Pup, Big Tiger Moth:
1 piece .....#0671 € 0,90
8 pieces .....#0678 € 5,95

Wing strut ends, L-Form
Small Tiger Moth:
1 piece .....#0661 € 0,70
8 pieces .....#0668 € 4,70

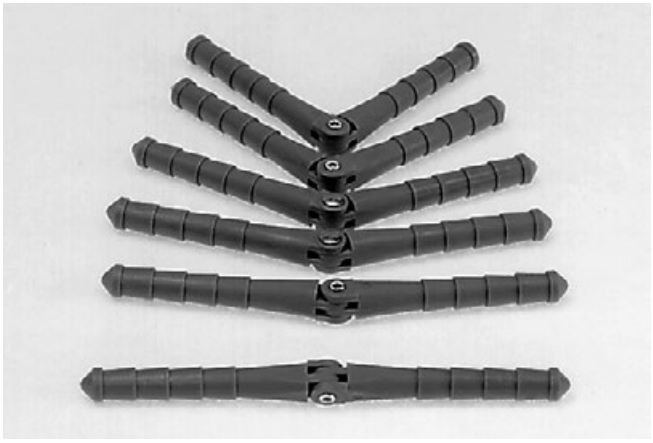
Wing strut ends, T - Form:
1 piece .....#0651 € 0,80
8 pieces .....#0658 € 5,60

Straight strip, rounded ends:
1 piece .....#0641 € 0,40
8 pieces .....#0648 € 2,70



Two nails are inserted into holes in the brass fitting and silver soldered to the tag, the brass tube is also silver soldered to the tag. Two matching holes are bored into the strut end. The strut end is glued onto the nails with epoxy. The incidence wire is cut to length and soft soldered into the brass tube.

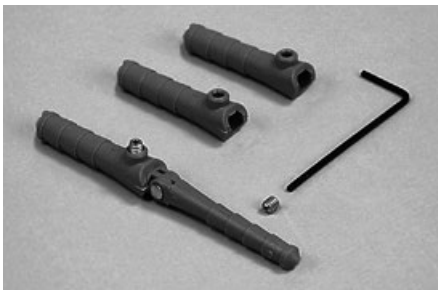
Robart Dowel Hinges for large Models



Quick and simple, needs only a 5 mm hole and epoxy. Especially stiff and without play due to double overlap. Ideal for shrouded surfaces. We supply these hinges with our CAP 21 kit.

Dowel hinges ø5 mm 10 pieces .....#0791 € 7,95
20 pieces .....#0792 € 14,95

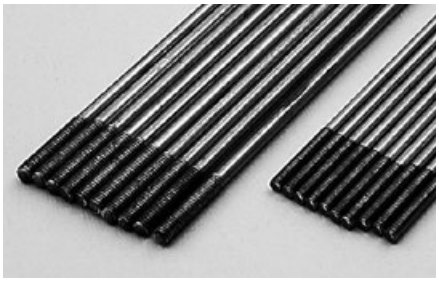
Sockets for Robart Dowel Hinges



These sockets make for a quick and efficient fixing for the dowel hinges and are very secure. These sockets are epoxied into the wings and tailplane. They give the added advantage that they considerably increase the stiffness in shrouded control surfaces. Supplied with grub screw and hexagonal key.

Sockets, 10 pieces.....#0796 € 8,95
Sockets, 20 pieces .....#0797 € 16,95

Rolled threaded Rods



Due to the rolled thread these rods are not liable to break like a die cut thread.

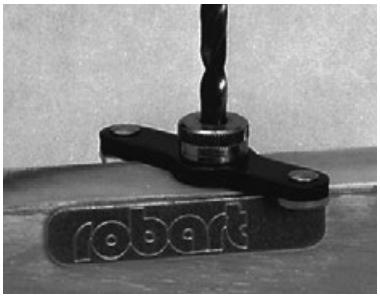
The ø2 mm rods have a 2,2 mm thread and are a deal more robust than the normal 2 mm die cut versions. These 2,2 mm threaded rods are suitable for light control surfaces on large models.

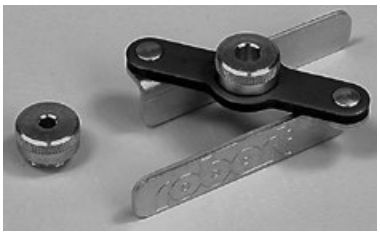
The M3 rods will take really heavy loads.

Threaded rods ø2 mm 1 piece .....#0713 € 0,30
length 180 mm 10 pieces .....#0717 € 2,50
Threaded rods M3 1 piece .....#0715 € 0,60
length 230 mm 10 pieces .....#0719 € 4,95

Robart Drilling Bush and Jig

A very practical tool for speed in drilling accurate holes for the dowel hinges. The complete jig is placed onto the workpiece and held securely with the two blades and the centring is then automatic. Supplied with bushes for large and small hinges. There is an extra bush available with 6,3 dia. for the hinge sockets.

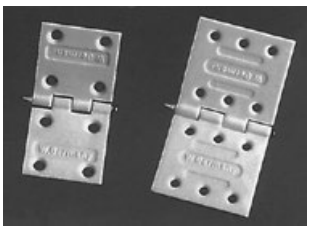




Drilling jig for dowel hinges.....#0798 € 10,95
Drilling bush 6,3 mm, for Sockets.....#0799 € 6,95

KAVAN Hinges

Very tough and dependable flat nylon hinges. Perforated to ensure secure glue joint. We use these in all our kits excepting the CAP 21.



Normal, 34x16 mm, 10 pieces.....#0789 € 2,20
50 pieces.....#0780 € 8,75
Large, 39x20 mm, 10 pieces.....#0781 € 3,25
50 pieces .....#0785 € 13,90

Ball Joints for M2, M2,2 and M3 Rods

Nylon with brassball. Very tough and stiff. Can be screwed onto M2 and M2,2 threads as delivered. Drilled out to 2,5 mm they fit M3 threads. We supply these in all our kits.

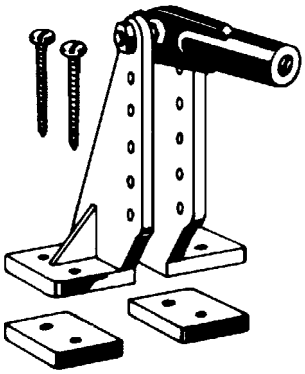
Ball joints, 10 pieces.....#0350 € 5,95

Large Ball Joints M3

These heavy duty ball joints are used in our Hydro Mount System. The nickel plated steelballs have a 3 mm hole. These ball joints are extremely strong and wear resistant. In the Hydro Mount System they are on the end of the shock absorbers and take the ZG 62's vibration with ease. They are perfectly suited for large models.

Large ball joint, 1 piece .....#0353 € 2,00
10 pieces.....#0359 € 16,95

Double Horns with Ball Joint



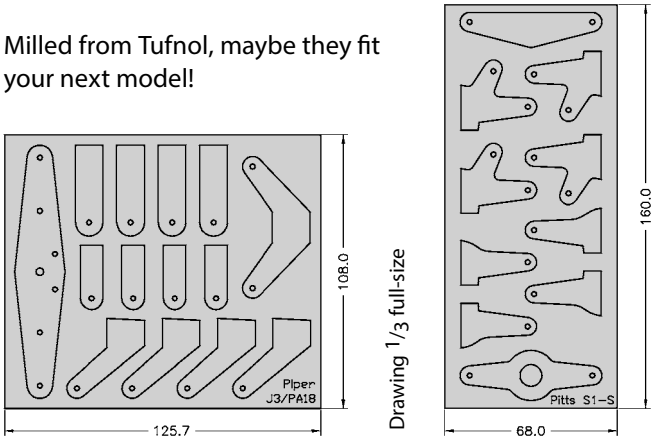
Made from high quality Nylon, 34 mm long. Comes with screws and ball joint.

This arrangement is much more rigid than a single horn with ball joint.

Double horns and ball joint ..... #0726 € 1,95

CNC-milled Tufnol Rudder Horns

Milled from Tufnol, maybe they fit your next model!



Piper horns set, 1,5 mm thick.....#4280 € 7,50

Pitts S1-S horns set, 2 mm thick .....#5280 € 7,50

Very light, but stiff Rudder horns, milled from 3 mm Tufnol. Originally made for the SebArt Funtana S140, but maybe they fit your model.

Funtana horn set, 3mm thick ..... #5282 € 9,95

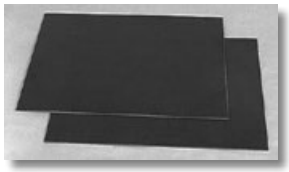
Horns and Clevises for large models with M3 screwed Rod

Made from high quality Nylon. Extremely tough and rigid. Absolutely play free due to clevis interlocking with the horn. A shaft screw ensures safety. The horn is 38 mm high.

Horn with clevis and M3 srewed rod ....#0714 € 1,95

Tufnol Sheet Material

This material is phenolic resin reinforced with artificial fibers. It is self lubricating and wear resistant. It is used industrially to make gearwheels, guides and bushes.



For us modellers Tufnol is perfect for horns, hinges, fittings and similar. No more ground down screws and wear widened holes as you get with epoxy/glass laminate. Closed loop control wires have an almost unlimited life when Tufnol is used for the horns.

Tufnol is brown in color and can easily be cut with a fret saw. It can also be CNC-milled. With CNC-milling the cutter must be air cooled.

Rough up with coarse grit paper areas to be glued with epoxy (Araldite 2011) or instant glue.

Tufnol Sheet Material:

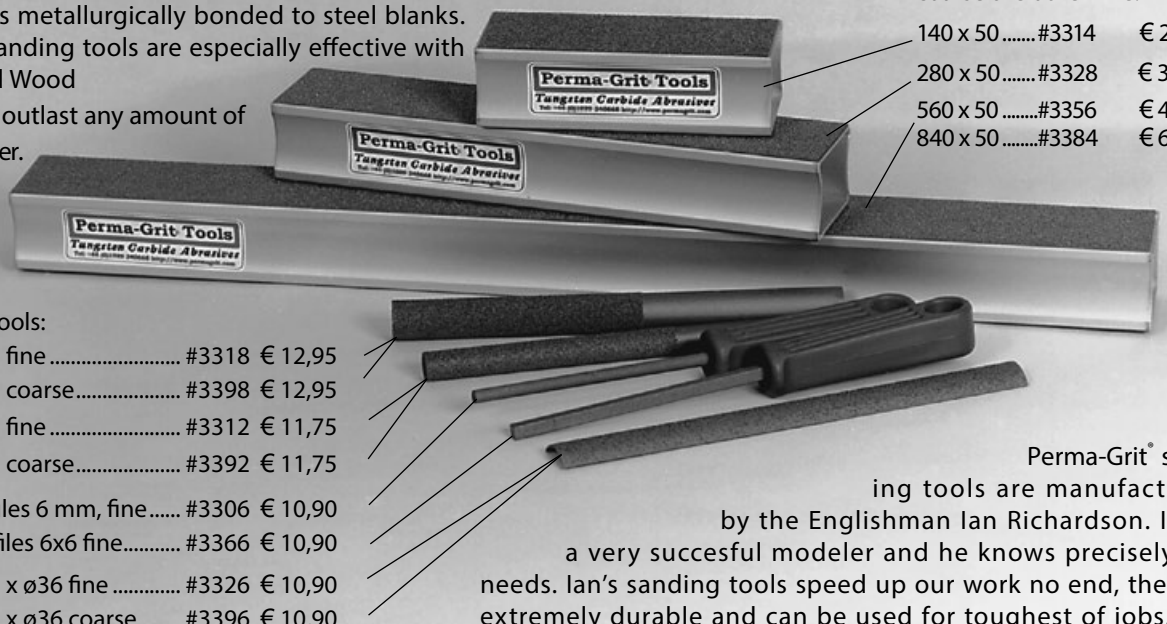
200 x 150 x 1,0 mm ..... #0991 € 6,75
200 x 150 x 1,5 mm ..... #0960 € 6,95
200 x 150 x 2,0 mm ..... #0990 € 7,45
200 x 150 x 3,0 mm ..... #0993 € 8,35
200 x 150 x 4,0 mm ..... #0994 € 9,35
200 x 150 x 5,0 mm ..... #0995 € 9,95
200 x 150 x 6,0 mm ..... #0996 € 10,95
200 x 150 x 7,0 mm ..... #0997 € 11,95
200 x 150 x 8,0 mm ..... #0998 € 12,70

Perma-Grit® Tools

Perma-Grit® Tools are tungsten carbide abrasives. The grit (one of the hardest materials next to diamond) is metallurgically bonded to steel blanks. These sanding tools are especially effective with GRP and Wood and will outlast any amount of sandpaper.

The double sided light aluminium block sits perfectly in your hand. One side is coarse the other fine:

140 x 50	#3314	€ 21,95
280 x 50	#3328	€ 33,95
560 x 50	#3356	€ 49,90
840 x 50	#3384	€ 69,90



Round tools:

ø18 mm fine	#3318	€ 12,95
ø18 mm coarse	#3398	€ 12,95
ø12 mm fine	#3312	€ 11,75
ø12 mm coarse	#3392	€ 11,75
Round files 6 mm, fine	#3306	€ 10,90
Square files 6x6 fine	#3366	€ 10,90
230 x 26 x ø36 fine	#3326	€ 10,90
230 x 26 x ø36 coarse	#3396	€ 10,90

"fine" = 320 Grit, "coarse" = 180 Grit.

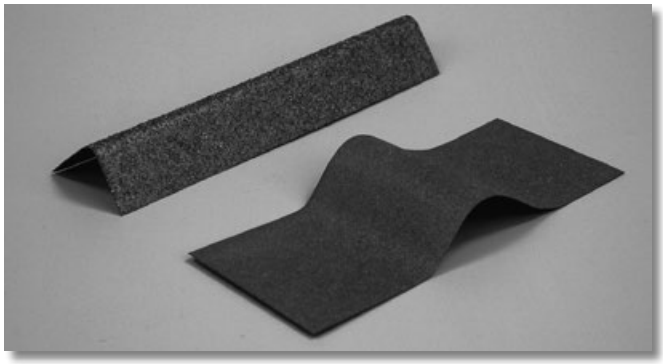
The Perma-Grit® sanding tools are manufactured by the Englishman Ian Richardson. Ian is a very succesful modeler and he knows precisely our needs. Ian's sanding tools speed up our work no end, they are extremely durable and can be used for toughest of jobs. You only have to try these once and you will never be without them.

Perma-Grit® Wedge Block 45°

This new Perma-Grit® sanding block has both ends cut to 45°, this enables you to reach into the most difficult of corners.

Perma-Grit® Wedge Block , 140 x 50 .....#3315 € 21,90

Perma-Grit® Flexi-Strips

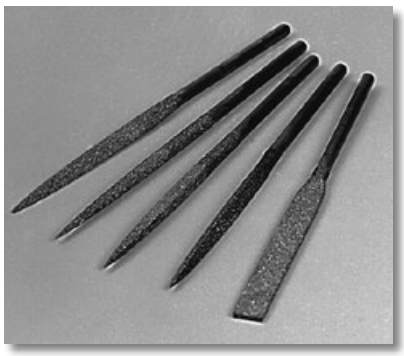


Flexible tungsten carbide grit coated thin sheet steel. Thin enough to be bent to any shape, internal or external. Cut with old scissors. Can be glued with double sided tape or epoxy. Allows sanding of any type of shrouding of control surfaces. Use is limited only by your fantasy.

Fine grit 140 x 50 mm, 1 piece	**#3342**	**€ 8,95**
Coarse grit 140 x 50 mm, 1 piece	**#3344**	**€ 8,95**
Fine grit 280 x 50 mm, 1 piece	**#3345**	**€ 12,25**
Coarse grit 280 x 50 mm, 1 piece	**#3346**	**€ 12,25**
Fine grit 280 x 115 mm, 1 piece	**#3347**	**€ 21,95**
Coarse grit 280 x 115 mm, 1 piece	**#3348**	**€ 21,95**

Perma-Grit® Large Needle Files

The Perma-Grit® needle files can be used to make precise openings in GRP motor cowls and fuselages. They are extremely versatile tools. These files cut in any direction and do not clog easily, they cut quickly.



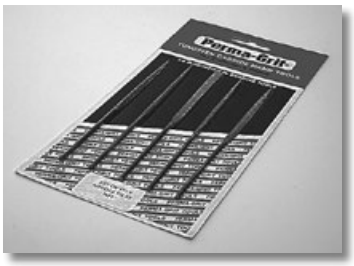
A customer told us about another good use: many (other) kit manufacturers do not bother to mill into the corners of notches in ribs and formers. The rounded corners can be very quickly and easily squared with the Perma-Grit triangular needle file so as to achieve a proper fit of the stripwood. Medium, 280 Grit. Total length is 180 mm.

Flat, 9,5 x 2,5 mm	**#3331**	**€ 9,95**
Round, tapers from 5,5mm to a point	**#3332**	**€ 9,95**
Triangle, tapers from 6,5mm to a point	**#3333**	**€ 9,95**
Square, tapers from 4,5mm to a point	**#3334**	**€ 9,95**
Half Round, tapers from 9 mm to a point	**#3335**	**€ 9,95**
Set of five Large Needle Files	**#3337**	**€ 47,95**
File Handle, for large needle files	**#3339**	**€ 4,95**
Set of five Files and one handle	**#3330**	**€ 51,90**

Very tough plastic handle with brass collet chuck for the large Perma-Grit® needle files.

Perma-Grit® Needle Files, small.

These files cut in any direction and do not clog easily, they cut quickly, leaving an excellent finish.
140 mm overall lenght.
Medium = 280 Grit.

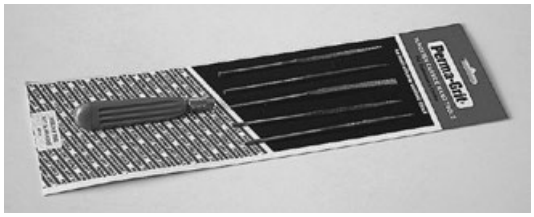


Flat, 6 x 2 mm	**#3361**	**€ 7,50**
Round, tapers from 3,5 mm to a point	**#3362**	**€ 7,50**
Triangle, tapers from 4 mm to a point	**#3363**	**€ 7,50**
Square, tapers from 3 mm to a point	**#3364**	**€ 7,50**
Half Round, tapers from 5 mm to a point	**#3365**	**€ 7,50**
Set of all five files	**#3367**	**€ 32,95**
File handle for small needle files, per 1	**#3359**	**€ 4,95**
Set of five files and one handle	**#3360**	**€ 36,95**

Perma-Grit® Curved Riffler Files.

Rifflers allowing access to those difficult to reach places.
140 mm overall length.
Medium = 280 Grit.

Flat, 6 x 2 mm	**#3351**	**€ 7,50**
Round, tapers from 3,5 mm to a point	**#3352**	**€ 7,50**
Triangle, tapers from 4 mm to a point	**#3353**	**€ 7,50**
Square, tapers from 3 mm to a point	**#3354**	**€ 7,50**
Half Round, tapers from 5 mm to a point	**#3355**	**€ 7,50**
Set of all five files	**#3357**	**€ 32,95**
File handle for small needle files, per 1	**#3359**	**€ 4,95**
Set of five files and one handle	**#3350**	**€ 36,95**

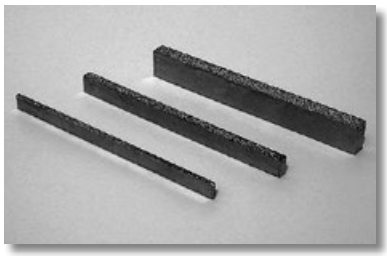


Cleaning: The Perma-Grit® tools do not clog easily, but a wire Brush can be used for cleaning. Resins, epoxy, glues, and paints can be removed by simply cleaning with DIY paint remover, this may change the colour, but will not effect the tools efficiency.

Perma-Grit® Slotter.

Gritted on one face only, to allow the user to cut a perfect sized slot or groove. Very popular with scratch model builders.
150 mm long, fine = 320 Grit, coarse = 180 Grit.

3 mm, fine	**#3372**	**€ 9,50**
3 mm, coarse	**#3373**	**€ 9,50**
6 mm, fine	**#3375**	**€ 10,50**
6 mm, coarse	**#3376**	**€ 10,50**



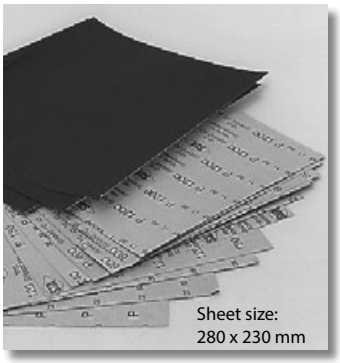
SIAWAT Professional Wet or Dry Paper

Sanding is probably not the most likeable job but is very necessary for a super finish. It is not a good idea to try and make do with all the cheap stuff that is on offer at the local DIY stores. We had enough of this poor grade paper and wanted something better. This SIWAT paper is very flexible and the grit stays put on the paper and retains its cut much longer.

The Swiss manufacturers advertising slogan says it all:

"Quality brings Success."

P 1200	**#3220**	**€ 0,90**
P 800	**#3280**	**€ 0,90**
P 600	**#3260**	**€ 0,90**
P 400	**#3240**	**€ 0,90**
P 320	**#3232**	**€ 0,90**
P 240	**#3224**	**€ 0,95**
P 180	**#3218**	**€ 0,95**
P 120	**#3212**	**€ 1,15**
P 100	**#3210**	**€ 1,20**
P 80	**#3208**	**€ 1,40**
P 60	**#3206**	**€ 1,50**



SIASOFT Dry Rubbing Paper with Foam Backing

Ideal for dry rubbing down painted surfaces. Rounded surfaces are very easy to clean up with the very pliant SIASOFT. Same goes for Balsa and hardwood surfaces. The SIASOFT lays perfectly in the hand due to the foam backing. The edges of CNC milled plywood are quickly and easily cleaned up with SIASOFT. Just try the stuff out, it's a very pleasant surprise for those who do.
Size 140 x 115 mm.

SIASOFT grit P220, 2 sheets	**#3122**	**€ 1,25**

Our Best !

The Californian company Bob Smith Industries has been producing unequalled adhesives for the Hobby Industry since 1983. Or do you know of an instant glue that while being elastic adheres so well as INSTA-FLEX? or instant glue that will glue GRP parts permanently as IC-2000 will?

INSTA-CURE™

has a water-thin viscosity that wicks deep into joints by capillary action and cures in a matter of seconds. INSTA-CURE ™ work very well on balsa since they penetrate into the wood and form more than just a surface bond.

INSTA-CURE™

28,4 g Bottle..... #0950 € 5,95

INSTA-CURE+™

is a higher viscosity CA for loose fitting joints in which the adhesive must bridge gaps. The thicker CA is applied to one surface and then the parts are held tightly together for about 5 to 15 seconds. For large surface areas, including those with close fitting joints such as laminations, INSTA-CURE+™ should also be used.

INSTA-CURE+™

28,4 g Bottle..... #0953 € 5,95

MAXI-CURE™

MAXI-CURE ™ is the best CA for most plastics. It can be carved with a knife or razor blade and sanded and feathered to form a finish indistinguishable from plastic. MAXI-CURE™ bonds fiberglass, hardwood, metal and rubber better than any other hobby adhesive.

MAXI-CURE™

28,4 g Bottle..... #0951 € 5,95

SUPER-GOLD+™

The SUPER-GOLD+™ do not attack white foam; therefore, it can be used in the building of foam core wings and the assembly and repair of plastic and foam ARF's. They will not fog clear plastic. SUPER-GOLD+™ is ideal for attaching clear canopies. There are no fumes that irritate the nose and eyes.

SUPER-GOLD+™

14,2 g Bottle..... #0955 € 6,95

IC-2000™

IC 2000 contains pulverized rubber, the rubber increases the adhesive strength on plastics and makes IC-2000 flexible. Being black makes it ideal for joining rubber tyres. Is especially good for gluing formers into GRP fuselages, it adheres better than epoxy.

IC-2000™

14,2 g Bottle ..... #0957 € 5,95

INSTA-FLEX™

INSTA-FLEX™ ideal for many applications, including the installation of CA hinges.It has superior shock resistance. Although not as thin in consistency as INSTA-CURE™, INSTA-FLEX™ still has good penetrating qualities and its application can be easier to control.

INSTA-FLEX™

28,4 g Bottle..... #0942 € 5,95

INSTA-FLEX+™

clear rubber toughened has similar qualities to IC-2000™ but can be used in applications where you do not want the adhesive to be seen. The carbon component of IC-2000™ that gives the CA its black color also contributes to its unsurpassed strength. Since INSTA-FLEX+™ has this carbon removed, its strength is a little less but still superior to standard CA's.

INSTA-FLEX+™

28,4 g Bottle..... #0944 € 5,95

IC-GEL™

is a cyanoacrylate paste that is extremely thick which comes in an applicator tube like toothpaste. It has the same bonding and curing time characteristics as MAXI-CURE™; IC-Gel™, however, can be applied to a vertical surface and will stay in place. It will not run.

IC-GEL™

20 g tube..... #0945 € 6,95

INSTA-SET™

INSTA-SET An accelerator that can be safely used on all foams and clear plastic. It hardens the cyano in the shortest of time, also by thick layers. Unlike other accelerators it has no detrimental affect on strength. For difficult to bond materials, INSTA-SET™ can be applied to one surface and CA to the opposite surface.

INSTA-SET™

56ml Pumpspray ..... #0947 € 5,95

236ml Refill bottle..... #0948 € 11,95

UN-CURE™

If parts are bonded incorrectly, a few drops of UN-CURE™ will dissolve the CA in about a minute. Once stuck, use acetone to clean off softened CA, then wash off with soap and water. Since cured CA is essentially acrylic plastic, anything that will dissolve CA will also soften most plastics.

UN-CURE™

28,4g Bottle ..... #0941 € 2,95

IC-LOC BLUE™

is a medium thickness, medium strength threadlock that is applied to the threads before assembly. Once the IC-Loc Blue™ is cured, the fasteners can be disassembled with standard hand tools.

IC-LOC BLUE™

10 ml Bottle.....#0973 € 5,95

IC-LOC RED™

IC-LOC RED is a medium thickness, high strength threadlock that is applied before assembly. Ideal for bearings and shafts, this can only be loosened with heat, or very high torque.

IC-LOC RED™

10 ml Bottle.....#0978 € 5,95

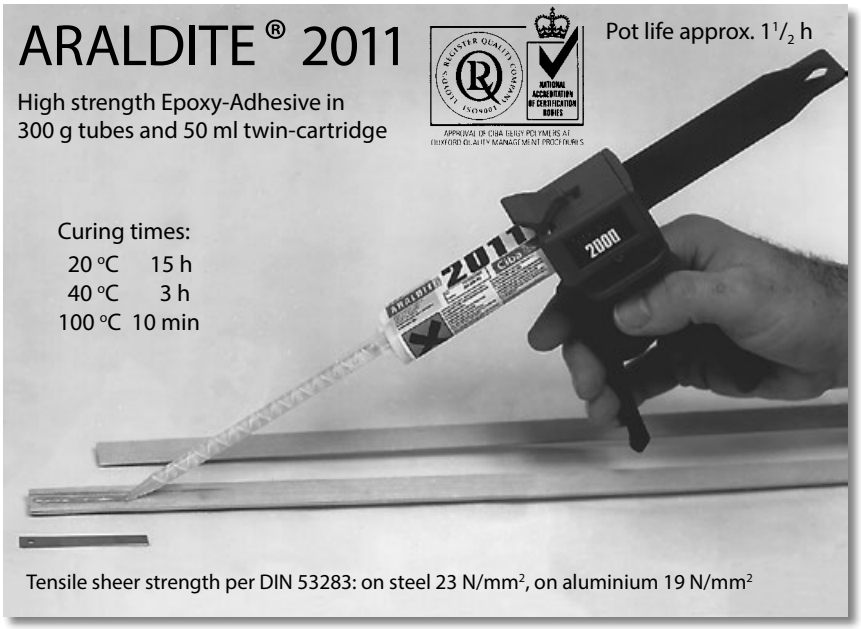
IC-LOC GREEN™

is a thin, medium-high strength threadlock that is applied to fasteners that are already assembled. IC-Loc Green™ wicks down into the threads of fasteners using capillary action.

IC-LOC GREEN™

10 ml Bottle.....#0975 € 5,95

Araldite 2011 Epoxyglue



I do not trust 5 minute Epoxy after a 10 cc engine complete with former fell out of my model. Where high strength and resistance to mechanical damage is required, there is no alternative to slow curing Epoxy glue.
ARALDITE 2011 is an industrial Epoxy adhesive. The 300 g (giant) tubes are very economical. Alternatively the twin - cartridge and precision dispenser allows the smallest and exact amounts to be ejected. The mixing tubes speed up the work considerably and reaches difficult to get at corners.

ARALDITE indus. dispenser #1940 € 79,90
with double cartridge and mix nozzle.

50 g Twin - cartridge ..... #1950 € 19,90
Mixing tube, 1 piece .....#1955 € 1,75

Large set ARALDITE 2011
300 g in two tubes. ..... #1930 €39,90

HobbyLite Filler

How often have you needed to fill out a dent in Balsa, you dream of a filler that sands the same as Balsa and as light as Balsa, does not clog the glass-paper, does not shrink or crack, that you can form an edge that does not crumble, can be cut with a knife, does not need a smelly and dangerous hardener, adheres to most surfaces on a model, can be kept for years in a closed jar and can be worked with ease.... An impossible list of demands you rightly think.

Many times in the past, as I have mixed epoxy and micro balloons or the standard polyester body filler, I had never imagined that I would have a filler that came out of the jar ready to use, requiring at the most two or three drops of water, yet when dry, is water and fuel proof.

Now all this is possible, we have the dream filler, it is Micro-Fill.

We have used Micro-Fill very successfully with Roofmate when making patterns for GRP moulds. Micro-Fill does not dissolve Expanded Polystyrene. Glassfiber reinforcements on the wing roots and overlaps on *PROFICOVER* can be filled to perfection.

No need to attempt to fill areas absolutely smooth, just apply Micro-Fill to the damaged area or gap and leave a while to harden. You then have only to sand off the surplus filler and you will find the filler sands to a perfect feather edge.

Micro-Fill comes in white and Balsa colour, you can mix Acrylic water based colour with the white. Like on Balsa, cyano glue can be used to toughen up the surface.

In short, Micro-Fill is fantastic, try it once and you will surely find you cannot live without the stuff.

Micro-Fill, 227 ml jar with screw-top lid:

White ..... #0900 € 7,95

Balsa colour ..... #0907 € 7,95

Heat sensitive adhesive coating

Heat sensitive brush on adhesive coating
If your Covering material has no adequate adhesive layer, a single coat considerably increases the adhesion to wood.
375 ml can ..... #0555 € 10,95

Attention:
ProfiCover does not need heat sensitive adhesive!

Marston Silicone/Sealing Compounds

MD-SIL clear

A clear, single component Silicone sealing compound. Cures to a tough rubber at room temperature. MD-SIL is heat-, low temperature- and weather-resistant. We use MD-SIL to fix our CAP 21 canopy with. There are of course many other applications, such as fixing servo carriers, batteries and endless other pieces that require a vibration proof fixing.

MD-SIL - clear - 100g tube..... #0933 € 7,95

MD-SIL red high temperature Silicone

Withstands temperatures up to 300° C. Ideal for gasket forming, remains elastic, does not shrink.

MD-SIL - red - 100g tube ..... #0938 € 9,45

MARSTON universal sealing compound

A Polyurethane based liquid gasket material. Does not go hard. Can withstand Methanol, Petrol, Mineral oil and most synthetic oils. Can withstand temperatures up to 270° C. Ideal for sealing the crankcases of our Titan ZG 38 engines after repair.

MARSTON 20 ml Tube..... #0932 € 3,55

Covering and Finishing Materials

ProfiCover
Iron on Covering

ProfiCover is very easy to use, it is a woven Polyester fabric that is extremely tear resistant and temperature stable. Due to the very effective adhesive coating the airframe does not need any form of coating as is the case with other covering materials. *ProfiCover* shrinks rather more along the length of the roll than across it. The shrinkage can be controlled precisely by varying the irons temperature. The most difficult of areas can be easily covered without a single crease or fold. *ProfiCover* is very easy to iron on, as trapped air bubbles can dissipate through the material and the untreated wood. Rounded wing tips are a cinch. Heat the *ProfiCover* with the iron, almost like rubber cloth then it is possible to pull it into any shape. A heat gun is not necessary as the iron will not scratch the material. A *ProfiCover* covered model will not suffer warps or air bubbles when you take care with ironing the material.

ProfiCover imparts enough stiffness without shrinking too much. This considerably reduces the drum effect in the interest of sound reduction. *ProfiCover* can be coated practically with every type of paint, providing the paint has a certain amount of flexibility. Two-component car paint (Acryl or Polyurethane) with a plasticiser agent added is absolutely ideal for the purpose. Single component Alkyd resin based paints can also be used. For vintage models Clou dope is ideal. Do not use any form of filler coat or similar as these materials become very hard and develop cracks and particles break off. To achieve the Vintage look of clear doped linen, the *ProfiCover* can be painted with Clou L4 Light Oak furniture lasur varnish.

ProfiCover, white, weight 100g/m², width of roll 1,20 m:

1 m ..... #0500 € 24,95
3 m roll ..... #0503 € 72,80
5 m roll ..... #0509 € 115,95
10 m roll ..... #0501 € 219,90

Self adhesive Pinking Tape

#2231 5 mm, 0,5 mm Saw tooth

#2238 8 mm, 0,5 mm Saw tooth

#2235
10 mm, 0,5 mm Saw tooth height

#2237
13 mm, 0,5 mm Saw tooth height

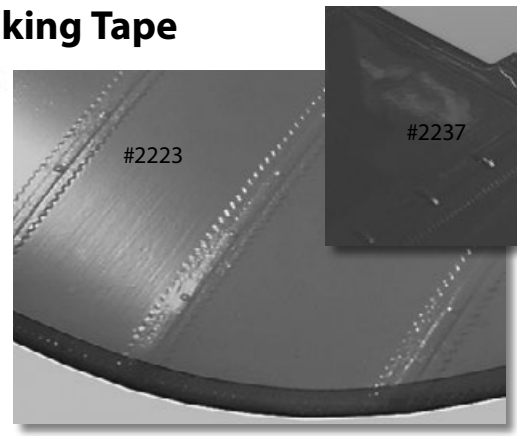
#2223
13 mm, 1 mm Saw tooth height

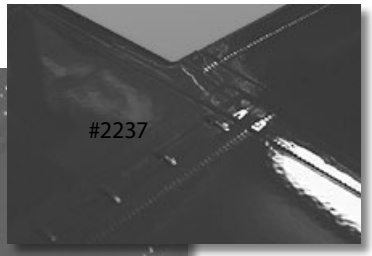
#2226
20 mm, 1 mm Saw tooth height

All examples are full-size!

#2228
26 mm, 1 mm Saw tooth height

z





The covering on full size aircraft is not only glued on with dope, but is sewn to ribs and stringers to achieve a stronger covering. The distance between the knots is variable. In high stress areas such as in the propeller wash, the knots are more closely spaced. For protection all edges and sewing are covered with pinking tape.

To improve the realistic effect of a scale, or semi scale model, the sewing is a deciding factor. It is a pity that a well built model is so often all too shiny and smooth, this is very boring especially on large antique models, which then do not appear to be very scale.

Our Pinking Tape is made from a highly flexible, non shrinking white self adhesive film. This tape is applied before painting the model. For those who wish to go further, the knots can be simulated with PVA glue and a hypodermic needle.

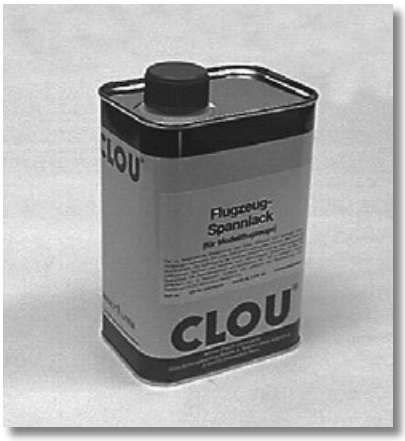
On the full size Piper Cub the Pinking Tape was 50 mm wide over the ribs, and double so wide around the wing tips and tailplane edges, the saw teeth are approximately 2 mm high. The experts use the Pinking Tape #2237 with the 0,5 mm saw teeth. The fine toothed pattern is difficult to see on the model. On the full size it is no different. If one stands at the wing tip then the saw teeth on the fuselage are not visible to the naked eye. For he who would like more readily visible saw teeth can use the Pinking Tape #2223.

The Pinking Tape #2235 is just right for the Small Tiger and the tape #2223 for the Big Tiger.

5 mm wide, z=0,5 14 Strips a 1,2 m = 16,8 m ..... **#2231 € 8,95**
8 mm wide, z=0,5 14 Strips a 1,2 m = 16,8 m ..... **#2238 € 8,95**
10 mm wide, z=0,5 14 Strips a 1,2 m = 16,8 m ..... **#2235 € 8,95**
13 mm wide, z=0,5 14 Strips a 1,2 m = 16,8 m ..... **#2237 € 8,95**
13 mm wide, z=1 14 Strips a 1,2 m = 16,8 m ..... **#2223 € 6,75**
20 mm wide, z=1 10 Strips a 1,2 m = 12,0 m ..... **#2226 € 6,75**
26 mm wide, z=1 8 Strips a 1,2 m = 9,6 m ..... **#2228 € 6,75**

Covering and Finishing Materials

CLOU Clear Dope



This dope is ideal for Oldtimers, it gives a sort of half matt finish that looks absolutely realistic. This Clou Dope can be painted over with any type of the usual paints employed for models. Clou dope is proof against petrol and oil and this includes BEL RAY MC-H1R. We recommend this Clou dope for our Cap 21 to cover and prime the Balsa before the two component paint finish. For painting our Sopwith Pup and the Tiger Moth we add 5-10% of the mixing color from the two-component acrylic car paint, this is has the advantage of a very light finish, we use acetone with retarder for thinners.

1 litre can.....#0590 € 27,95

Dope Paint Retarder

This is mixed with cellulose paints for spraying and prevents the paint drying between the gun and the work piece.

500 ml Retarder.....#0591 € 11,95

MONOKOTE self adhesive Mylar Film

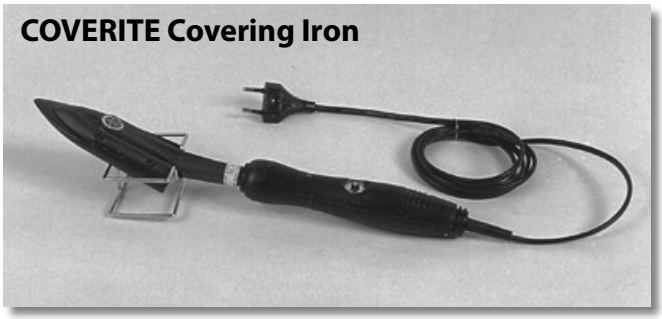
This is very useful for lettering and markings. This film is exceedingly thin so that there are no thick edges visible.

The film does not shrink and is fuel proof. The surface of the model can be moistened with water and a couple of drops of washing up liquid, this allows accurate placing of the film. The water can be carefully mopped off with tissue paper and the results are as if you have painted the film onto the model.

Sheet size 910 x 125 mm, the following colors are available:

Black	#0910	€ 4,95
Jet white	#0911	€ 4,95
Missile red	#0912	€ 4,95
Orange	#0913	€ 4,95
Yellow	#0914	€ 4,95
Forest green	#0915	€ 4,95
Insignia blue	#0916	€ 4,95
Maroon	#0917	€ 4,95
Chrome	#0918	€ 4,95
Gold	#0919	€ 4,95

COVERITE Covering Iron



Specially made for ironing on *PROFICOVER* and Monokote covering film. Perfect shape for covering models. Short time to working temperature and very exact electronic thermostat (+- 1,7 °C). Grip is fiber reinforced plastic and completely insulated allowing unlimited use with full temperature. Supplied with a sock and wire stand.

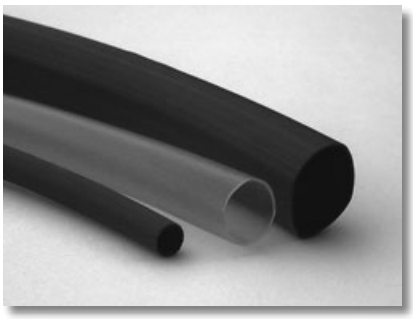
Coverite covering iron, 220 Volt .....#0505 € 59,95

MONOKOTE Polyester Covering Film

One can see at a glance when a model is covered with Monokote. With this polyester material you can achieve the best possible plastic film finish. As Monokote became unobtainable in Germany many professional modelers started asking us why we did not supply Monokote in addition to *PROFICOVER* for our scale models. I myself prefer *PROFICOVER* and use two-component car paint. But noticing at flying meet a really attractive Pitts built from my kit, it took me a quarter of an hour to realize this Pitts was covered with Monokote and not painted as I first thought. It was clear to me plastic film means Monokote.

MONOKOTE length of roll:	**1,82 m**	**7,62 m**
Price per roll, 66 cm wide:	**€ 19,90**	**€ 79,90**
Black	#1501	#1507
Dove gray	#1511	#1517
Cream	#1521	#1527
Jet white	#1531	#1537
Yellow	#1541	#1547
Cub yellow	#1551	#1557
Orange	#1561	#1567
Missile red	#1571	#1577
True red	#1581	#1587
Dark red	#1591	#1597
Maroon	#1621	#1627
Sky blue	#1631	#1637
Royal blue	#1641	#1647
Sapphire blue	#1651	#1657
Insignia blue	#1661	#1667
Forest green	#1671	#1677

Heat shrink tubing



We use this heat shrink tube in the production of our Easy-Start unit. It is high quality Polyolefin heat shrink tubing made to the military specification MIL-I-23053/5 class 3*. Shrinkage ratio is 3:1 and is therefore suitable for many purposes. It remains flexible and shrinks at 100 °C. It is ideal for insulating the relatively delicate servo cables.

Heat shrink tube 3:1 black, 3 mm **1 m ..... #0023** **€ 1,65**
Heat shrink tube 3:1 transparent, 6 mm **1 m ..... #0016** **€ 1,95**
Heat shrink tube 3:1 black, 9 mm **1 m ..... #0029** **€ 1,95**

* except the transparent tube

Heat shrink tube with hot melt adhesive, black 3:1

Diameter 9 mm, shrunk 3 mm. Made to the military specification MIL-I-23053/4c class 3. The hot melt adhesive in this heat shrink tube makes for a very tough and fully protected connection.

Heat shrink tube with adhesive 9 mm, 0,5 m..... #0035 **€ 2,95**
1 m..... #0039 **€ 5,50**

Screening Sleeve

Woven from tinned copper wire. For screening ignition HT-cable from 3 - 9 mm diameter.

Screening sleeve, 1 m .....#0025 **€ 1,95**

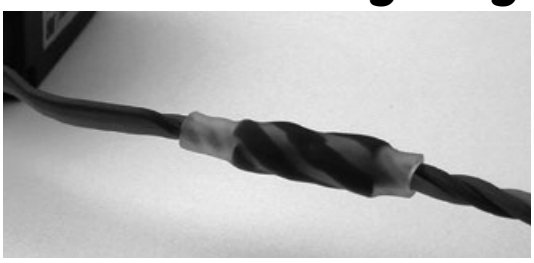
A complete set for screening the HT-cable you will find on page 75.

Servocable

3-wire, twisted Servocable with a high flexible PVC insulation. Identical color code than JR/Graupner. Made in Germany.

Servocable twisted 3x0,25 mm², per meter..... #4742 **€ 0,80**
Servocable twisted 3x0,34 mm², per meter..... #4743 **€ 0,90**
Servocable twisted 3x0,50 mm², per meter..... #4744 **€ 1,00**

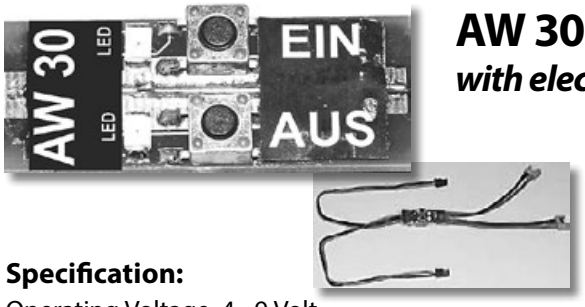
Heat Shrink Tubing Usage:



The main use of this tubing in model aircraft is of course for wiring up the radio equipment. For lengthening the servo cables one takes the 3 mm tube #0023 and secures the joint additionally with the transparent tube #0016. This allows one to control the safety of the joints.

For the green Multiplex high amperage plugs and sockets, I use the heat shrink tube #0039 with hot melt adhesive to secure the wires to the pins. I push the heat shrink tube, while still hot, against the plug and socket. The result is a very robust connection that allows one to better grip the plug and socket.

The top quality high amperage Multiplex plug and socket secured with heat shrink tubing.



AW 30DSQ *battery backer with electronic safety switch*

Specification:

Operating Voltage 4 - 9 Volt.

Peak 80 A, short term 50 A, continuous rating 30 A.

High current Power-FETs with very low Internal Impedance.

Turn on with the Ein (on) button switch, when running this on switch is dead.

You have 2 min time from pulling the plug to putting the plug back into the socket.

LED indicators.

Absolutely vibration proof due to SMD tecnique.

Large cable cross section and high curent plugs and socket allowing large current flow.

High quality gold plated plugs and sockets.

Very light and flat.

The use of two batteries combined with the 30 Ampere continuous rating of the AW30DSQ and plugs and sockets provides the highest possible safety.

Low component count, plus only passive elements in the power supply, provides highest possible reliability. The High current Power-FETs serves for high current flow without losses, the resistance is less than that of a mechanical switch. Through using the maximum cross sectional area of the cables gives maximum possible current to the servos.

To switch on, the „EIN" (= on) key is pressed, this switches on the electronics and thereafter this key is ineffective. During power failures up to 2 minutes the electronics remain switched on, so the system can continue working even with vibration induced trouble with either, or both the batteries or the associated cables. To switch off, the „AUS" (=off) key must be pressed for minimum of one second.

Supplied with mountings, bezel and drilling template.

AW 30DSQ with Cables and Plugs..... #4730 € 74,95

AW 30DSQ PC board without cables ..... #4731 € 49,90

PowerBox „Sensor"... *the electronic switch backup*

Specification:

Power loading to a maximum of 5A
For 7,4V LiPo batteries, or 5 NiCd or NiMH cells.

Two independent linear voltage regulators supply precisely 5,9V.

Two independent electronic switches.

Set button for on/off switching protection.

LED indicators for both power sources.

Operating voltage range 4,0 to 9V.

Temperature range -10 to +75 deg. Celsius.

Min. voltage drop approx. 0,35V

Weight only 35 grams including all cables.

Power Box Sensor with MPX plug ..... #4712 € 90,—

The PowerBox Sensor is absolutely ideal for our kit models. I use these in our Big Tiger, Piper, Taylorcraft and the Avro Tutor for some considerable time. The PowerBox Sensor eliminates the risk of a mechanical switch failure. Our models, up to now, have all been fitted with Futaba S9003 and S9405 servos.

Digi-Switch with MPX plug .... #4710 € 54,—

Digi-Switch *by PowerBox Systems*

Specification:

Electronic Switch using a sensor button switch.

Linear IC-controlled voltage regulator.

Multi colored LED for monitoring battery voltage, low voltage detection.

Input Voltage 8,4 Volt (2 LiPo cells).

Output Voltage 5,5 Volt, equals a charged 4 cell NiCd battery.

Regulator capacity 3-5 A depending on cooling.

Weight only 15 grams.

The smallest combined electronic switch and linear regulator system for model aircraft. It is suitable for small up to middle size models having up to 6 servos, also for F3A models, sailplanes with up to 10 servos or more, depending on servo size, Helicopters with rotor diameter up to 1,5 m, Electric Helis, RC cars and boats.

Above all the Digi-Switch is ideal for the Falcon PCI 1,3 and 2,3 battery ignition as well as the Desert Aircraft battery ignition when using two LiPo cells.

Operation:

Press the sensor button switch for about 0,5 sec., the LED will then glow orange, press a second time and the LED will then be green. The Digi-Switch is now switched on and ready. To switch off press the sensor button for 0,5 sec. until the LED is orange, then press again and the LED is out. The Digi-Switch is off. By plugging in the batteries the switch is always immediately switched on and the LED is green.

Nuts and Bolts

Round Head Slotted Wood Screws

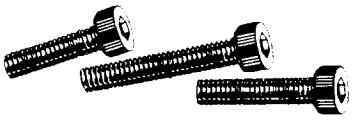
Zinc plated. As dummy screws and for fixing small parts.

2x8 mm 100 pieces.....#0890 € 9,95

Half Round Sheet Metal Screws, Cross Head:

2,2 x 9,5 20 pieces ..... #0812 € 1,75

2,2 x 13 20 pieces ..... #0813 € 1,75



Hex socket Screws, black, per 10 pieces:

New! *So small* *and allredy* *Inbus!*

M 2 x 6	#0831	€ 2,25	M 3 x 30	#0879	€ 3,50	M 5 x 12	#0857	€ 1,75
M 2x8	#0832	€ 2,35	M 3 x 35	#0880	€ 5,95	M 5 x 16	#0869	€ 1,75
M 2x10	#0833	€ 2,45	M 3 x 40	#0881	€ 6,95	M 5 x 20	#0895	€ 1,75
M 2x12	#0834	€ 3,20	M 3 x 50	#0882	€ 11,95	M 5 x 25	#0898	€ 1,75
M 2x20	#0837	€ 4,95	M 4 x 6	#0868	€ 1,95	M 5 x 45	#0872	€ 2,95
M 3 x 6	#0891	€ 1,95	M 4 x 12	#0897	€ 1,75	M 5 x 50	#0899	€ 3,95
M 3 x 12	#0856	€ 1,75	M 4 x 20	#0888	€ 1,75	M 5 x 55	#0876	€ 4,95
M 3 x 16	#0896	€ 1,75	M 4 x 25	#0894	€ 2,25	M 5 x 60	#0877	€ 4,95
M 3 x 20	#0893	€ 1,95	M 4 X 30	#0886	€ 2,50	M 5 x 65	#0878	€ 5,95
M 3 x 25	#0892	€ 2,25	M 4 x 40	#0887	€ 2,75	M 6 x 30	#0858	€ 2,25
			M 4 x 50	#0889	€ 4,50	M 6 x 55	#0859	€ 4,95

Cheese Head Slotted Screws, Zinc plated, per 10 pieces:

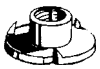
			M 2 x 25	#0819	€ 1,75	M 3 x 20	#0825	€ 1,25
M 2 x 6	#0827	€ 0,95	M 2,5 x 20	#0828	€ 1,95	M 3 x 25	#0829	€ 1,25
M 2 x 12	#0821	€ 0,95	M 3 x 12	#0823	€ 0,95	M 3 x 30	#0861	€ 1,75
M 2 x 20	#0822	€ 1,45	M 3 x 16	#0824	€ 1,25	M 4 x 16	#0826	€ 1,25

Safety Nuts DIN 985:

M 2,5	10 pieces	#0862	€ 3,95
M 3	10 pieces	#0873	€ 1,95
M 4	10 pieces	#0874	€ 1,95
M 5	10 pieces	#0875	€ 1,95
M 6	10 pieces	#0867	€ 1,95

Hexagon Nuts, Steel, zi.pl.:

M 2	20 pieces	#0852	€ 0,95
M2,5	20 pieces	#0851	€ 0,95
M 3	20 pieces	#0853	€ 0,95
M 4	20 pieces	#0854	€ 0,95
M 5	20 pieces	#0855	€ 1,25



Blind Nuts, Steel, zi.pl.:

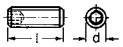
M 3	10 pieces	#0883	€ 1,95
M 4	10 pieces	#0884	€ 1,95
M 5	10 pieces	#0885	€ 1,95
M 6	10 pieces	#0866	€ 1,95

Washers, zi.pl., DIN 125:

M 2	50 pieces	#0842	€ 1,75
M2,5	50 pieces	#0841	€ 1,75
M 3	50 pieces	#0843	€ 1,75
M 3 large	50 pcs.	#0844	€ 1,95
M 4	50 pieces	#0845	€ 1,95
M 4 large	50 pcs.	#0846	€ 1,95
M 5	50 pieces	#0847	€ 1,95
M 6	50 pieces	#0848	€ 2,25

Spring Washers, DIN 127A:

M3	20 pieces	#0816	€ 0,75
M4	20 pieces	#0817	€ 0,75
M5	20 pieces	#0849	€ 0,95
M6	20 pieces	#0818	€ 1,25



Grubscrews DIN 916:

For hex key, ringcutter tip:

M 3 x 5	10 pcs.	#0863	€ 1,55
M 4 x 5	10 pcs.	#0864	€ 1,55
M 5 x 5	10 pcs.	#0865	€ 1,75

M2 Screws, Nuts and Washers Pack:

Contains 10 screws M2x12, 10 Nuts M2 and 20 washers.

M2 screw pack .....#0871 € 1,95

Nylon Hexagon Head Screws with Blind Nuts:

We use these to fix our Pipers wings.

M6 x 35 10 pieces ..... #0636 € 4,75

Plastic Halfround Screws with Blind Nuts:

We use these for the Pitts and CAP 21 wing fixing.

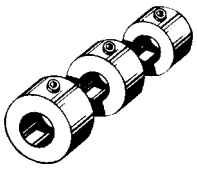
M6 x 35 10 pieces ..... #0635 € 3,95

Steel Eye Screws M3

Steel eye screws for fixing 3 mm wire. We use these for fixing the Pitts cabane struts. The ends of the cabane wires are fixed with two eye screws onto the plywood sides. One can exactly position the struts before permanently fixing with epoxy.

M3 Eye screws 12 pieces .....#5232 € 11,95

Steel Wheel Collets



Turned from high tensile steel with hexagon key drive grub screws.

for 4 mm axles, 4 pieces.....#0644 € 2,75
for 5 mm axles, 4 pieces.....#0645 € 2,95
for 6 mm axles, 4 pieces.....#0647 € 2,95

Steel Wheel Collets with Hex socket Screws M3x6

The socket screws can be tighten more than grub screws. We use these for fixing wheel spats.

For 5 mm axles, 4 pieces .....#0646 € 2,95

Knurled Screwed Bushes

Made from brass. M3 thread, outside diameter 5 mm knurled, 18 mm long. The first 10 mm is smooth to act as a leading to the threaded portion. Ideal for struts, covers and cowls. With these bushes you only need to unscrew the struts from the wings, while the struts stay permanently fixed to the fuselage with the rigging wires. No need for turnbuckles to be unscrewed. It is impossible to forget to take the struts. By assembly, the screws can be led into the bushes keeping the rigging tight. Using the ball joint screw driver, the struts are quickly and easily fixed. Makes biplanes a real joy!

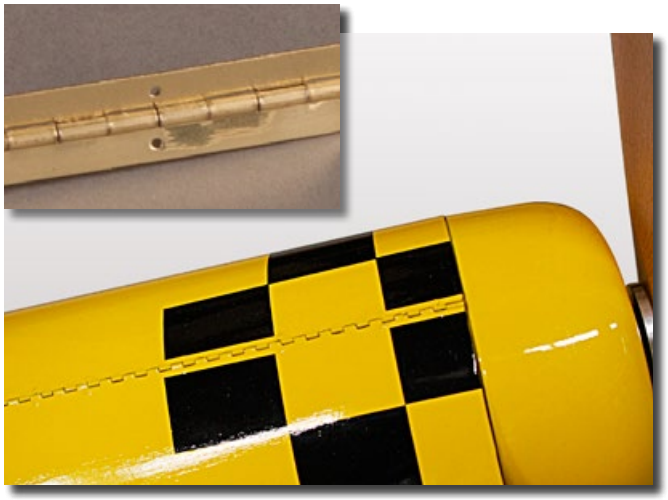
M3 Knurled Bushes 1 piece .....#0680 € 1,15
10 pieces.....#0689 € 9,95

Ball Joint Screwdriver

For M3 hex socket Screws.

The ball joint allows very quick assembly without slipping.

Ball Joint Screw driver, SW 2,5 .....#0700 € 5,95



Miniature brass strap hinge

deal to hinge cowlings and hatches and other movable details on your model. Width 9mm.

Brass strap hinge 0,5 m ..... #1245 € 2,95
Brass strap hinge 1 m ..... #1249 € 5,60

Brass door hinge

We use this hinge in our big Tiger Moth kit to hinge the cockpit doors. Width 9 mm, length 15 mm.

Brass door hinge, 1 Piece..... #1240 € 0,35

Toggle clips can be found on page 214

Toggle Latches

Toggle Clip
for Cowlings and Covers

This neat Toggle Clip was originally designed by Paolo Severin for the Aeronca C3. Ready to install, laser cut from stainless steel, complete with screws and nuts. Length 59, width 13 mm.

Toggle Clip, 1 piece ..... #8869 22,90€

Toggle Clip
for Cowlings and Covers

Industrial grade Toggle Clip made from stainless steel. This clip is shorter, but wider than Paolos Toggle Clip for the Aeronca C3, Length 39 mm, width 15 mm.

Toggle Clip, 1 piece ..... #2270 4,95€

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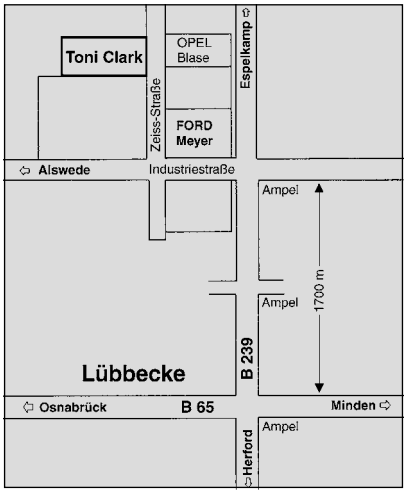

You will find us in Luebbecke in the "Industriegebiet West" (industrial estate west).

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