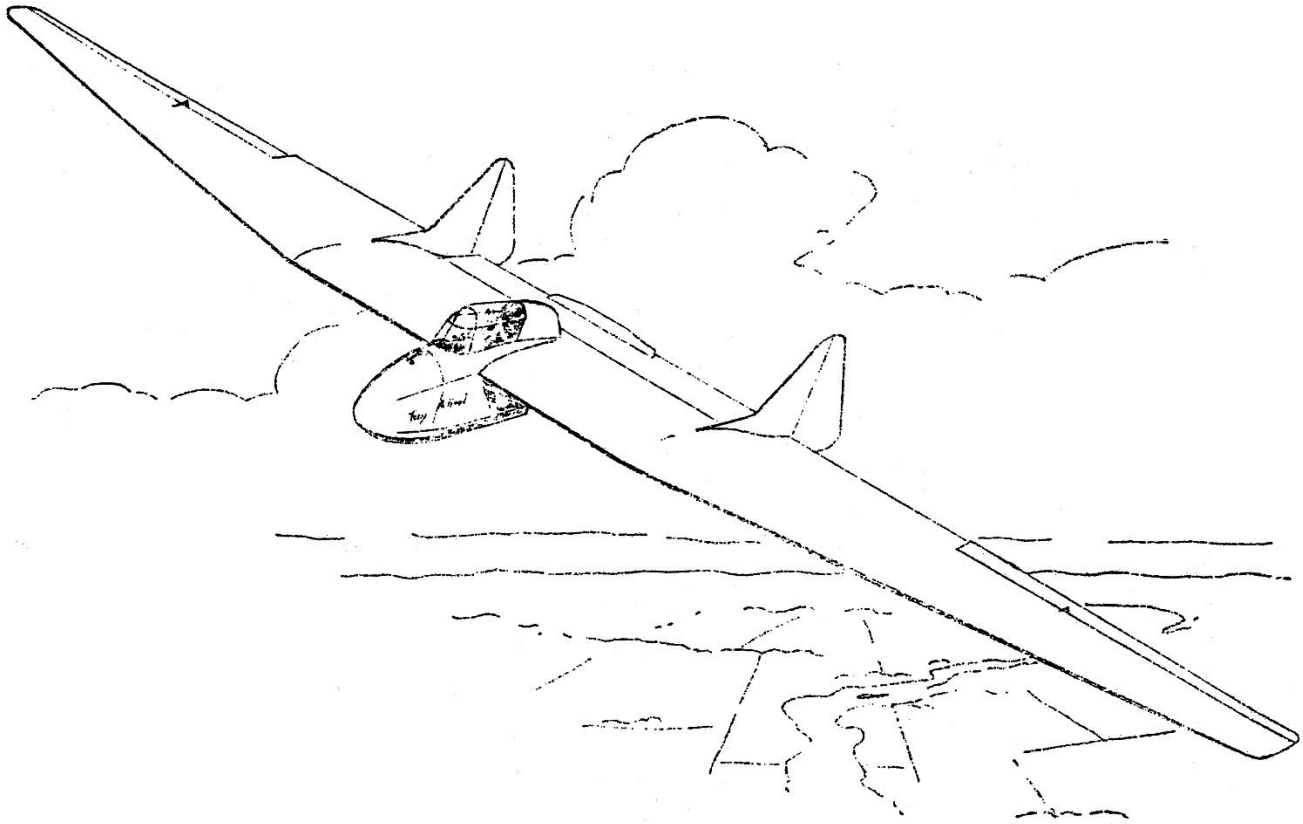
FLIGHT MANUAL



TAIL-LESS SAILPLANE

C.H. & J. Fauvel

A.V. 36

INSTRUCTION FOR UTILIZATION
GLIDER FAUVEL A.V. 36

The glider Fauvel A. V. 36 can be piloted in the usual manner, and there is no more difference between this glider and a glider commonly used, than between two gliders of accepted design. It can be said that due to its limited size and its rigidity, the A.V. 36 is more of a small stable glider than of a big one. Its aerodynamic cleanliness and its small weight, combined with a reduced drag, especially at small angles of incidence, give it a versatility, greater than that of usual gliders of even greater maximum cleanliness.

IN FLIGHT

Further to what has been said previously, we can add that the glider will not stall even when the centre of gravity is located at its authorized maximum rear limit and consequently there is no danger of getting into a spin, with or without air brakes applied. In rough weather, note that as a result of the weight concentration and the reduced dimension, as well as an excellent stability, the oscillations are not as abrupt as for an ordinary glider. For the same reason the A.V. 36 will climb more sharply.

TAKE-0FF

The double hook arrangement with the V cable permits faster towing and greater pull because it unballasts the wing while placing the forces near the center of gravity horizontally, as well as vertically. Put the V cable on the ground along the glider center lines in the take-off direction, and align the towing cable on the ground along the same axis over a distance of 20 meters, so that the V cable may be centred before take-off. Note that the use of this V cable facilitates take-offs with side wind, in addition to the fact that the ailerons of the A.V. 36 are efficient from the start. Due to its small total weight and its reduced drag, the A. V. 36 is easily towed, even by the least powerful tow used in practice.

Set the tab neutral.

Do not try to lift the glider from the ground prematurely, since it is sufficient to let it take off by itself: the glider may bounce off the ground uselessly and in soft ground, with a less powerful tow, the take-off may be braked by the rear end of the glider skid. In cases of take-off difficulty in soft ground with a pursy tow at the point where the take-off speed is almost reached, the air brakes can be lowered at approximately 30° provided they are closed slowly in flight when a normal speed is attained.

To stretch the cable in flight, the air brakes can be used. Note that for speeds higher than 80 kilo/h. corrected speed, it is preferable to open the air brakes slowly by pushing on the lever to the degrees desired. The aircraft towing speed in climb must be higher by five to ten kilo/h than that of the glider Meise-Nord 2,000, since it is preferable. If a too low speed is used (for example, lower than the normal speed for the Meise) and the glider was flying under the aeroplane the glider might have to be released in want of a climb.

The minimum winch towing speed must be increased by approximately ten kilo/h., although to obtain this higher -minimum speed, the winch tow will need less fuel than would be used to tow other gliders, since the A.V. 36 in small, has a reduced drag and a small all-up weight.

When taking off on heavy, sticky ground with a skid having no steel-linings, it advantageous for the pilot to lean aft as much as possible and hold the control stick about half way back when the towing aircraft accelerates; this will reduce the drag of the glider.

MULTIPLE AEROTOW

The aerotowing of the A.V. 36 at the same time as other gliders or of several A.V. 36s is made very easy by the use of the “V" towline. It is sufficient to place the gliders on the ground, prior to take-off, in the position they must have in flight, the apexes of the "V” towline will be moved to be in line with the towing aircraft. Taking off then does not present any difficulty and the gliders remain in flight in their take-off positions. In the case where non-sliding type “V” towlines are used, shorten one branch of the of the required quantity. By shortening this branch a little more than necessary the tendency of the gliders to keep, away from each other is improved.

AERO TOWING

With the hooks placed near the center of gravity, the occasional jolts caused by the tension of the cable will not produce a climbing or diving tendency. While cruising in calm weather, a suitable, true speed of 125 kilo/h will give a pleasant flight. In rough air the speed should be reduced. When cruising in calm weather, one can travel easily and agreeably at 125 kilo/h 78 M.P.H,). When cruising in rough weather, it is more comfortable to slow down for example, between 105 and 110 K.P.H. (65 to 70 M.P.H.) in very bumpy weather, using the controls as little as possible.

If, during the towing the “V” cable has slid such that the glider longitudinal axis does not pass through the “V” cable apex either because of rough air or inattention from the glider pilot, the glider can be centered, by slackening the cable, by pushing slightly on the control column, then bringing it back to its normal instincts. This gives you a smoother and more precise centering than by using the rudder pedal with the cable taut.

RELEASE

It is mandatory that the hooks be of the tight 'semi-open with safety” (with hooks slope of 27° +/- 1° relative to the reference wing under surface). The release will occur normally and automatically at the end of the towing run and may also occur when the line of flight between the glider and the towing aircraft becomes too separated.

NOTE:

With Schweizer hook the release is not automatic,

The landings will not be different than those obtained with the conventional gliders although with this tailless, arrangement - without tail ski - the glider can be landed with a very high angle of incidence and will permit a slow lauding on the rear part of the skid with a short landing run. It is recommended to use such a landing procedure with or without use of the airbrakes. This landing speed can he reduced by five kilo/h by using the air brakes and slightly higher angle of incidence.

The approach is neither different than the one used for conventional gliders. It can be either direct in S, in slide slip, or in a turn with a certain amount of slide slip like on all good conventional gliders with the restriction that the glider is not levelled too late which also applies for conventional gliders.

Furthermore, these maneuvers can be executed with air brakes without any vibration or flutter. To lengthen the glide it is sufficient to close the air brakes like on all gliders and if longer glide is still wanted, it is sufficient to increase speed. Simply notice that the type of air brakes used on the A.V. 36 are more effective at higher speeds (placard speed with brakes open 130 K.P.H. (81 MPH,). This is the reason for which landing with brakes is so easy.

The only detail worth noticing in the use of the air brakes is that when the glider is short of the landing field at low altitude, i.e. below 5 to 7 meters high (over a field or a road along side the aerodrome) the air brakes should not be close completely, especially if the speed is low but should be closed to approximately 30° which will maintain the lift coefficient high enough while reducing the drag appreciably.

TRANSP0RTATI0N

(a) When putting the aircraft in a hangar (even if full hangar there will be enough place for it) or for small halls 4 men or even 3 can carry the glider, especially if the nose cover and pylon are removed; one man holding the glider under each fin and looking towards the wing tip ensuring that the rudders do not act as supporting points. Two men or one at the lifting rod at the nose section. Do not put anybody on the wing tips since it would load one of the bearers positioned at the fins. Simply watch that there is enough space for the movement, when necessary.

Always have a lifting rod in the cockpit where a place has been provided for it on the cross bar along side the pilot's seat (dead weight 265 grams) at least when taking off from a field where the local help may be used. Paint it red to see it better in the grass, or not to forget it on the nose.

(b) On the runway: use the B.O. trolley, pushing the rear of the skid against its stop on the trolley; the pin perpendicular to the axle must automatically fit in the hole of the skid. With this trolley, the glider may taxi and turn with the minimum effort.

(c) On the road: unscrew the center screw of the nose cover with a coin, unhook the pedal spring, unscrew the upper butterfly head nuts of the pylon, rotate the latter and unhook at the bottom.

(d) The pylon and nose cover on the trailer using the same procedure inversely. Rotate one rudder towards the outside and unseat the horn from its axis by hand. Fold the rudder and fasten it with a butterfly head screw, a metal washer, (large) and two foam rubber discs made for this purpose and carried easily in the wing compartments. Repeat the same operation for the other rudder. Place pylon and nose on the trailer by reversing this operation

(e) Install the control surface lock to the right aileron.

(f) Lock the elevators downward by inserting on each side between the extremities of the ends and the fins a piece of thin rubber which must be inserted to avoid any movements of the elevator on the road.

(g) The wing trestle on the trailer being open, install the glider on the trailer resting the rear of the skid on the support then the hole in the skid will fall automatically on the trailer pin, and the hole of the skid main shock will be in line with the hole of the immobilization hook which will be inserted and turned to hold.

(h) Close the wing trestle over the left wing insert the hook and turn.

(i) Hitch the trailer to the vehicle and install the stop lights. For night travel do not forget to put at the wing tip in the rear, reflector glass and red pennant, useful although it may not be enforced, they will be affixed to the wing skid.

BALANCE

Follow the instructions given in the weight and balance data. It must be remembered that for the glider A.V. 36 of an empty weight of 115 Kg (253 lbs.) with a center of gravity position 10 millimeters (.394") behind the front surface of the spar (and at 25 m/m above the wing undersurface, (.984"). Pilots of 57 to. 85 Kg (125. lbs. to 187 lbs.) can fly this glider as long as they are equipped with a back pack parachute 11 to 12: centimeters, (4.33" to 4.72") thick, (as for the CRS 101 and AVIOREX used for gliders). Pilots weighing less than 57 Kg. (125.5 lbs.) with these conditions and equipment will be ballasted with lead plates fixed on the pylon or can be positioned forward of the original pilot's location with cushions to fulfil the conditions of the weight and balance.

If these recommendations are not followed, the responsibility will lie entirely on those who are making use of the glider.

Heavy pilots will gain by seating as far back as possible.

The balance will have to be made with the glider ready to fly; i.e., doped, painted and fully equipped. It will have to be done again should coats of dope or paint be added to the glider, as this might be sufficient to change the Cg on such a light machine.

Follow closely the instructions of the weight and balance sheet which indicate that the Cg must be situated in the interval between 130 m/m and 160 m/m in front of the forward face of the wing spar and fuselage main bulkhead on a line 30 m/m below and parallel to the undersurface of the wing.

Do not trust the roller method of balance as it is only valid if carried out in the still air of a large hangar. If this method is used, the vertical of equilibrium shall pass through a point situated between 130 m/m and 160 m/m in front of the forward face of the wing spar and 130 m/m below the wing chord line parallel to the wing chord and 30 m/m below the wing under surface shall be drawn on the fuselage and the forward and aft Cg limits marked on it.

It is of course obvious that in the case of flight without parachute the same Cg positions shall have to be maintained. This can be achieved by the use of cushions or of a box of suitable thickness (about 100 to 110 m/m).

See at the end of this instruction the table of ballasting for different pilot weights.

ADJUSTMENTS

Details are given in, the construction instructions. It is reminded that:

Ailerons - the control column when centered must correspond to a neutral position of both ailerons (ailerons must not be lifting) cables being conveniently taut.

Elevators - stiff, must have when the push rods are adjusted as de5oribed in the construction instructions, a neutral position corresponding to the section of the wing when the top of the control column Axis is at 10m/m (.394”) behind the control panel edge (Max. downward movement 14° +/- 1°).

Rudder - both: must be aligned so that they are in neutral position when the normal pressure of the feet are exerted on the pedals for straight line flight. Besides, the outside maximum position of 1 rudder must correspond to the outside maximum of the other rudder. The same can be said for the inside maximum travel which must be at least 15° while the outside travel must be at least 40°.

Air Brakes - at the maximum forward position of the level, there must not be any tension in the cable that will have the tendency to open the air brakes. Verify that the air brakes open simultaneously and have the same relative position at a 30° incidence. A slight deviation of incidence between these two when fully open or an opening slightly greater than 90° for one (3° difference between air brakes incidence in both cases) are unimportant.

Indicate the position of the lever for an incidence of 30° in order that this incidence of 30°can be obtained without effort.

Release - Verify that the release is simultaneous and that it is obtained before the end of the take-off run. To verify position the V cable is kept taut by a helper.

Adjustable Tab - This tab has a 'greater downward (30° to 35°) travel than upward (12°).

The lever must take into account this difference of travel and not be in its middle position when the tab is in neutral in order to allow full downward travel.

Like for every other glider, it is good 'practice to load the wing situated on the wind, side with one or two old tires, parachute, etc., the best position being as usual with a lateral wind.

In any case it is a good practice when at rest on the ground to immobilize the elevators in downward position especially with a balanced elevator (this can be done with a parachute put on the control column in the cockpit). With the help of the adjustable tab, (positioning it in neutral position with lateral wind, in downward position with lifting wind and in upward position with rear wind).

The mooring on the ground can be done:

- By hooking the wing tips in the hole provided for this purpose, in the wing tip skid
- Complete if necessary, with mooring at the nose section taken on the lifting rod and a mooring of the rear of the skid.
- Eventually, by mooring at the towing hooks, pulling forward and at the lifting rod pulling aft.

SPEEDS

The largely spread speed polar of the A.V. 36 is very favorable for distance flights For the best use of the glider, see the speed polar diagrams given for AUV of 172 to 225 Kg (379 to 496 lbs.) thus, giving a range of pilot weights from 57 to 110Kg (125 to 242 lbs.) for an empty weight (fully equipped) of 115 Kg (253 lbs.). Here are some figures for 2 cases of AUW.

C.E.V. test flight measurement done at AIJW 211 Kg (465 lbs.) and corrected for the standard pilot weight of 75 Kg - 7 Kg. parachute (165 lb. - 15.7 lbs.) at AUW 197 Kg (434 lbs.)

	AUW - 211 Kg (465 lbs.)	
Min. sinking speed	.87 m/sec. @ 70 KPH	2.85 ft./sec. @ 45.5 MPH
Max. gliding ratio	24 @ 82 KPH	24 @ 51 MPH
Speed frequently interesting when flying between thermals.	80 KPH	49.7 MPH
Sink at 100 KPH	1..48 m/sec.	4.85 ft./sec.
Sink 1m/sec. (3.27 ft./.sec.)	57 to 87 KPH	35.4 to 54.1 MPH
Gliding ratio 22	69 to 95 KPH	43 to 59 MPH

	AUW - 197 Kg (454 lbs)	
Min. sinking speed	.84 m/sec. @ 67 KPH	2.75 ft./sec. @ 41.6 MPH
Max. glide ratio	24 to 79 KPH	24 @ 49.1 MPH
Speed frequently interesting when flying between thermals.	80 KPH	49.7 MPH
Sink at 100 KPH	1.54 m/sec.	5.05 ft./ sec.
Sink 1 m/sec. (3.27 ft./sec.)	54 to 86 KPH	33.6 to 53.5 MPH
Gliding ratio 22	67 to 93 KPH	41.6 to 57.8 MPH

An Anemometer type 25 - 11 (Badin 101) with its main and statics pickup placed as shown on sheet 4 of the file gives the true speed within 3 KPH approximately (1 .87 MPH).

Minimum sinking speed at AUW 172 Kg (379 lbs.): .78 m/sec. (2.56 ft./sec.) sinking speed at AUW 225 Kg (496 lbs.) at 100 KPH (62.2 MPH): (4.69 ft./sec.)

MAXIMUM AUTHORIZED SPEEDS

All A.V. 36's have an ultimate load factor of 12 at a AUW of 200 Kg (441 lbs.). All A.V. 36's built from files No. 56 and up or incorporating the changes from Sheets 9 and 10 of the file, have an ultimate factor of 12 at a AUW of 225 Kg (496 lbs.). This is true also for the glider built by Wasamer Company starting at No. 103 and up.

All speeds given in this instruction are true speeds (EAS) given by a good Anemometer corrected as proscribed by Norme 2104.

PLACARD SPEEDS

Aero tow:	Calm air	180 KPH	112 MPH
	Rough air	128 KPH	80 MPH
	Very rough air	105 to 110 KPH	65 to 68.4 MPH
	Optimise for climb	90 KPH	56 MPH

It will be noted that the STampeSV-4 of 140 HP gives a very enjoyable tow and climb as fast as the Fleseler Storch of 250 HP.

The ballast plates will be 135 m/m tall and of the width of the ballast box. They can be made of either lead or, steel. The lead plate will be 2.75 m/m thick (.108"). The steel plate will be 4 m/m thick (.157”), They will be trimmed to weigh about 250 grams (0.55 lb.).

- It is always possible to correct a glider Cg when empty by the use of a fixed ballast in order to bring it back to case 1. e.g. - A case 2 glider will become case 1 by adding a fixed ballast of 2 Kg (4.4 lb) on the pylon beside the ballast box. A case 3 glider will become a case I by adding a lump of lead of 560 gr. (1.1 lb) under each fin at the rear end.
- It is advantages for a heavy pilot to sit as tar aft as. possible. A light pilot can be placed forward by adding a cushion at the back of the seat as 60 to 70 m/m of cushion thickness approximately equals to 5 ballast plates.
- Any fixed ballast plate will be painted of the same color as the adjacent structure The removable ballast plates will be painted red.

_ _

NOTE:
The A.V. 36 can be equipped with 3 special nose ribs
on each side of the cockpit for installation of oxygen bottles.

Maneuvers for 2 simple aerobatic figures are described below.

Loop

- Trim the sailplane to about 56 MPH (using tab)
- Dive to about 95 MPH
- Pull the control stick slowly at first and accelerate until the glider attains the vertical, then slow down in such a way that the control is never pulled against its stop. Pulling to fast would reduce the speed too rapidly by i putting the sailplane in a mushing attitude. Pulling too slowly would not produce a loop since the radius of loop would be too large for the above starting speed.
- Diving at more than 100 MPH to enter a loop is unnecessary.

Hammerhead Stall

- Trim the sailplane to about 56 MPH (using tab)
- Dive to about 95 MPH
- Pull the control stick as for the loop until the sailplane is vertical.
- Put full rudder either way as soon as the sailplane reaches the vertical.
- The lateral fall off occurs more cleanly than on a conventional glider.

Spin

- All attempts to spin this sailplane have been unsuccessful.
- As long as the A.V. 36 is balanced within the limits specified in the manual, it is completely spin-proof.

STANDARD MANOEUVERS

Side-slipping - is quite classical a manoeuvre with the A.V. 36. It can be done with the airbrakes either closed or open. Note that with airbrakes fully open, slide-slipping allows the shortest possible landing to be made and is extremely useful when landing is made outside of an airport.

Landing - Normal procedure is to pull, gradually on the control to slow the glider to a minim speed. Touch down occurs then on the rear end of the skid, (similar to a 3-point landing of an aircraft). Do not make your approach too fast and do not pump the control in any case. Remember that the effectiveness of the control increases with the speed and that a light glider is much more responsive than a heavy one.

A.V. 36 GLIDER - CH. & J. FAUVEL

PERFORMANCE CURVE