n Flugzeug ganz vorne –
FFMANN-Propeller

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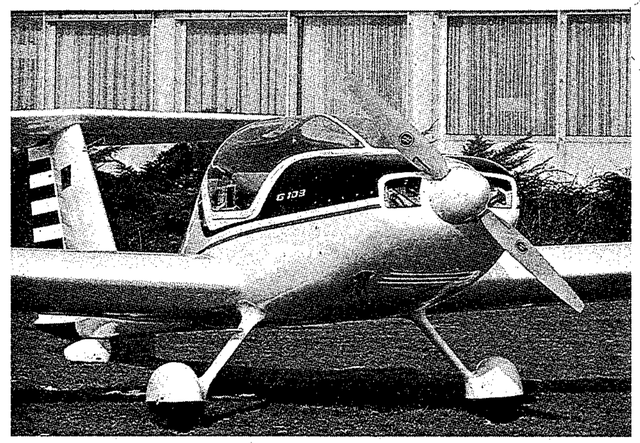
Owner's Manual

NR. E 0107.72

feathering propeller models
HO-V 62
HO-V 62 R



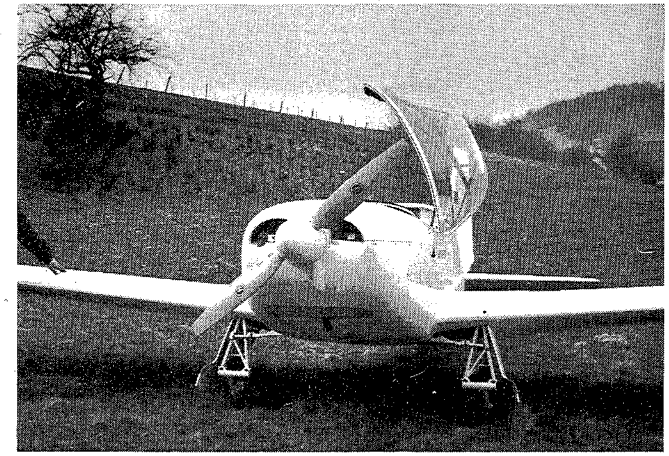


Figure 1
SCHLEICHER AS K-16

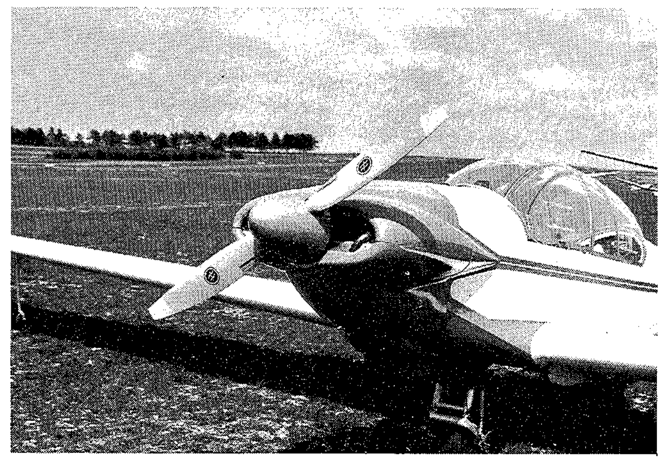


Figure 2
SPORTAVIA RF 5 B Sperber

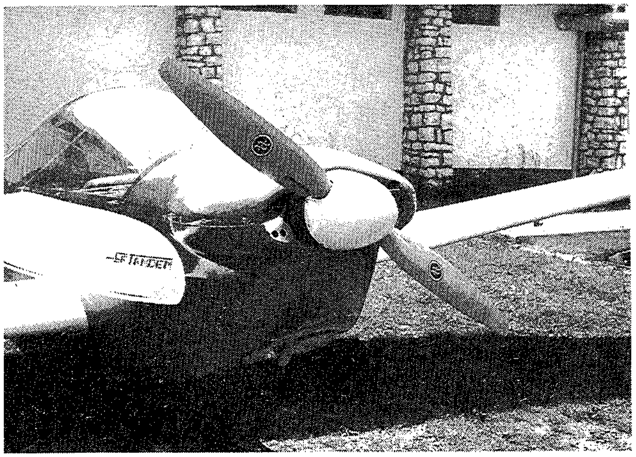


Figure 3
SCHEIBE SF 28 A

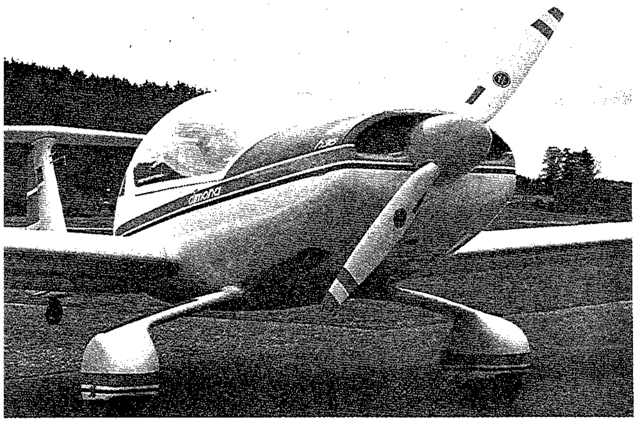


Figure 4
HOFFMANN H 36
DIMONA

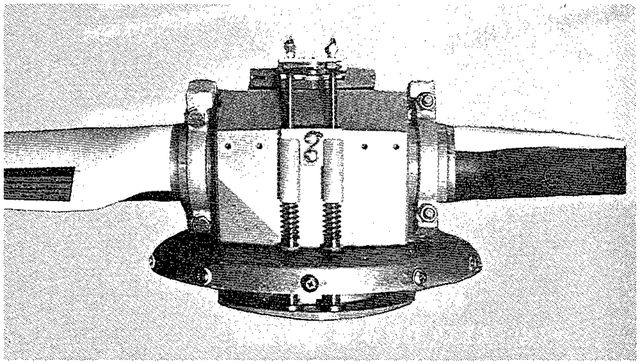


Figure 5
HO-V 62 R
Propeller model

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Edition No. 4, August 1982

General

The HO-V 62 Propeller was developed mainly for powered gliders and has a start and a feathered blade position. The HO-V 62-R has an additional cruising position which allows a better utilization of engine performance in cruising flight.

The change from start to cruising position and vice versa must be done with the engine running. On both propellers the change to the feathered position is done with the engine stopped or idling. The tendency of the HO-V 62-R is always to return to the starting position. In any case, however, on both propellers if the feathered position fails, the blades will always return to the starting position.

Designation

2.1 Hub designation

Model designation and serial number are stamped into the hub as well as the year of manufacture.

HO-V 62 - ( ) R ( )

- ( ) — Minor alteration with no effect on interchangeability
- R — crusing position
- ( ) — hub mounting sign, if applicable
- 2 — Number of blades
- 6 — Number of basic construction
- V — Variable pitch
- HO — Hoffmann GmbH & Co. KG

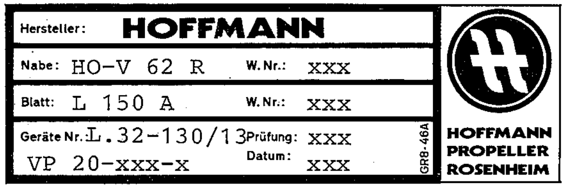
2.2 Blade designation

The blade designation, serial number, date and number of inspection are on a label on the root end of the blade. The serial number of the blade is also stamped onto the butt face of the blade ferrule (not visible from the outside).

L 150 A - ( ) ( )

- ( ) — Shortening of the standard diameter in cm
- ( ) — construction material of blades:
  - none: compreg + spruce
  - P = compressed wood
- A — key number for basic design
- 150 — basic diameter in cm
- L — direction of rotation
  - None = righthand, tractor
  - D = righthand, pusher
  - L = lefthand, tractor
  - LD = lefthand, pusher

2.3 The complete designation of a propeller is a combination of the hub designation and blade designation:



A part number VP 20-(...)-( ) designates applicability to a specific aircraft model.

Performance data

The following data are guidelines. For approval purposes, only the data which are given in the Geraete-Kennblatt No. 32.130/13 of the German Luftfahrt-Bundesamt are binding.

N_{max}		75 HP	or 100 HP
n	at	3600 rpm	at 2750 rpm
Number of blades		2	
Diameter		150 - 160 cm	
Range of pitch change		approx. 75°	
Weight HO-V 62 (Ø 150 - 160cm)		8.500 kg (18,7 lbs)	
HO-V 62-R (Ø 150 - 160cm)		9.450 kg (20,8 lbs)	
Spinner		1.100 kg (2,4 lbs)	
Mounting flange		80 mm diameter boltcircle 6 bolts 7/16 - 20 UNF center bore 47 mm dia.	

Construction

4.1 Blade assembly

The Hoffmann-Composite-blade is of a joint construction. It consists of totally compressed veneers (compreg) in the root part, and spruce in the rest of the blade. In addition, blades may be constructed totally from compreg. Special lag screws provide excellent connection between compreg and metal ferrule. The blade has the same leading edge protection as successfully used over the years on our fixed pitch composite-propellers. To increase the torsional stiffness the blade is covered with layers of fiberglass epoxy.

Fatigue failures due to vibration are unknown with such blades because the internal damping of the material used is considerably higher than that of Duraluminum.

The fiberglass epoxy covering is sprayed with several layers of polyurethane lacquer which insures high resistance to moisture, erosion and mechanical damage without loss of necessary elasticity.

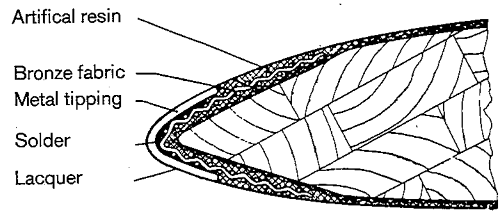


Figure 7 Hoffmann-Blade Tipping

4.2 Blade bearing

An axial needle bearing absorbs the centrifugal force of the blade. The bearing races are made of corrosion resistant steel. The needle cage is split into two halves to allow exchange of the cage without removing the blade ferrule.

The blade ferrules are made from forged aluminum alloy which is shot peened to prevent fatigue cracks. The blades are fixed into the hub by blade retention nuts also manufactured from aluminum alloy.

On the HO-V 62 the blades have no counterweights. The blades of the HO-V 62 R have counterweights to lessen the force needed to change the pitch. The blade nuts are sealed from the outside by silicon rubber, so no water can enter the blade bearing.

4.3 Hub

The hub is forged from aluminum alloy, shot peened and anodized. At the mounting flange it has 7/16" - 20 UNF studs. The propeller is mounted to the engine flange by self locking nuts.

4.4 Pitch change mechanism

In this description, all parts of the pitch change mechanism which lie outside the hub will be termed "outside change mechanism" and all parts inside the hub will be termed "inside change mechanism".

An important feature of the mechanical change device of the HO-V 62 is that no bearings within the change mechanism run constantly with the engine, but only in the short intervals of the change.

4.4.1 HO-V 62 R

For the following description, refer to figure 8. When a change in propeller pitch is desired, a movable U-arm 8-2 mounted on the engine presses against thrust plate 8-3 by means of two ball bearings mounted on the U-arm 8-2. The force of the U-arm acts against the pressure of four

springs 8-4 onto four studs 8-5 and in addition, because of the running engine, against the centrifugal twisting moment of the propeller blades. The force lifts the yoke 8-6 with the stop 8-11 on the front end of the hub 8-7.

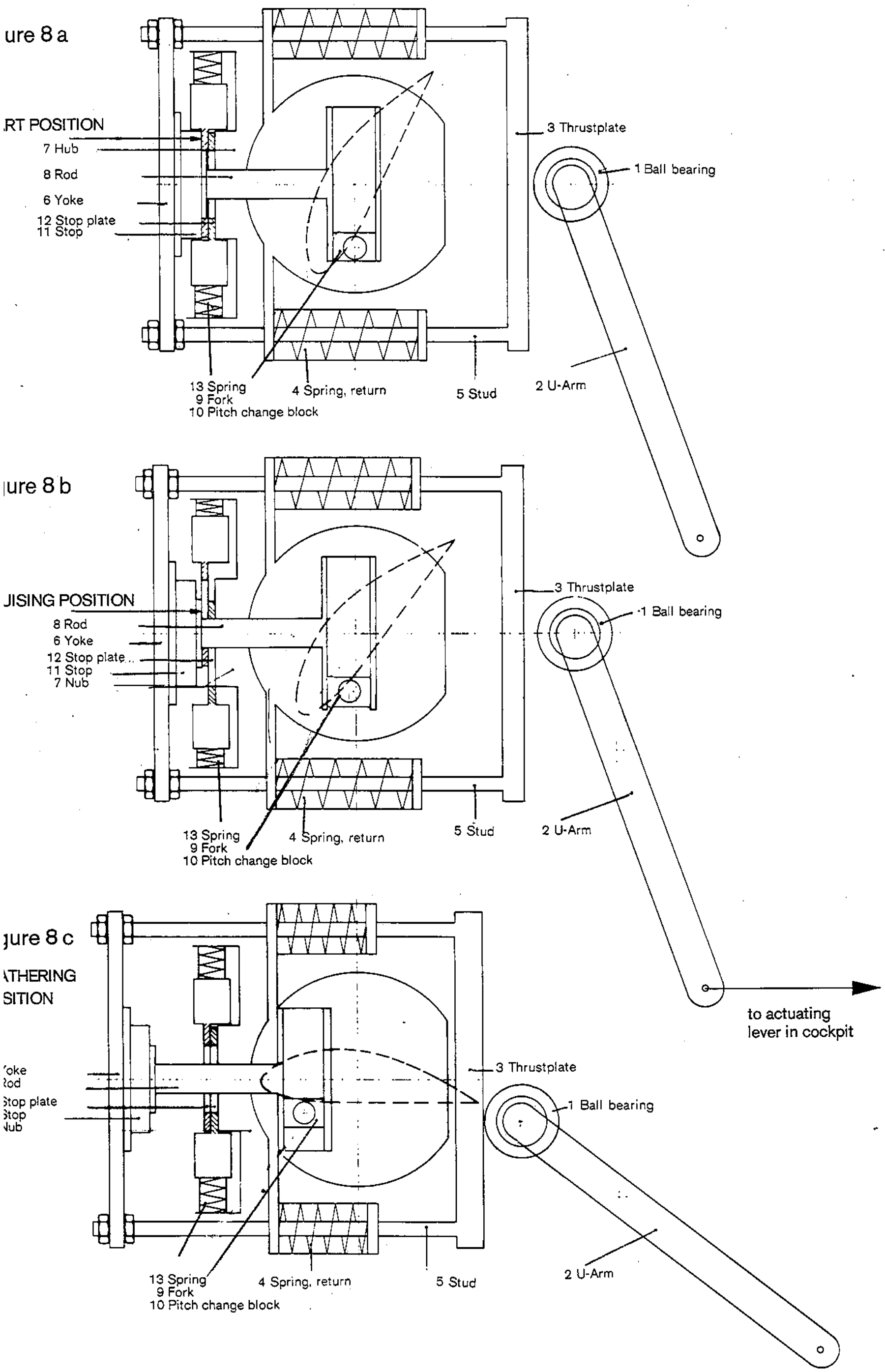
The centrally located rod 8-8 reaches into the hub 8-7 and holds the fork 8-9 of the internal change mechanism. Out from the fork are the pitch change blocks 8-10, which when moved, axially, change the blade angle.

The centrifugal twisting force of the blades and the force of the springs 8-4 tend to return the blades to the low pitch take-off position.

Figure 8 shows the three possible blade angle positions. Figure 8a shows the propeller in take-off position, e. g. at the smallest blade angle. The stop 8-11 lies within the stop plates 8-12, and the springs 8-4 hold it in this position.

Figure 8b shows the propeller in cruising position with stop 8-11 lying against 8-12. This means that the stop is now further forward. A movement of 1.5 mm equals a 5° greater blade angle which drops the engine rpm (full power) approximately 500 rpm lower than take-off position.

The change from take-off position to cruise position is only possible at rpm's higher than 1800 because the stop plates 8-12 are held by the springs 8-13 in inside position. Only at rpm's greater than 1800 does the centrifugal force of the stop plates 8-12 overcome the force of their springs 8-13.



If the actuating lever in the cockpit is pulled at rpm's higher than 1800, the yoke 8-6 is lifted from the hub 8-7 and centrifugal force presses down the springs 8-13. This allows the plates 8-12 to move outward until the holes lie on rod 8-8. This is the stop for the cruising position.

If a change to the take-off position is desired without stopping the engine or moving to the feathered position (after which the propeller would come back to the take-off position automatically) it is necessary to reduce the rpm below 1300. Now the force of the springs 8-13 is higher than the centrifugal force of the stop plates 8-12; a slight pull on the actuating lever loosens them and the blades return to the take-off position.

Figure 8c shows the propeller in feathered position. The correct blade angle is determined by the length of the cable from the cockpit. The propeller blades are held against the pressure of the springs 8-4 by means of a lock in the cockpit. The fork 8-9 constitutes only a safety stop within the hub. It prevents the blades from reaching an angle from which the pressure of the springs 8-9 would not be able to return the blades to take-off position.

4.4.2 HO-V 62

The functions of the internal and external change mechanisms are the same as on the HO-V 62-R. Since this propeller has only a take-off and a feathered position, the parts 8-12 and 8-13 are deleted. The change to feathered position and return is the same, with activation done only by a stopped or idling engine.

4.5 Spinner

The spinner is one piece and spun from an AlMgSi alloy. The spinner is screwed to the spinner bulkhead which consists of an aluminum alloy centering plate and a spun ring. Parts are riveted together. The spinner bulkhead, which adjusts the outside change mechanism, is fastened to the hub by four screws M 8.

Installation instructions

5.1 Limbach engine

5.1.1 Clean propeller and engine flanges with petrol or solvent. The engine power is transferred to the propeller mainly by friction, therefore mating surfaces must be smooth and clean.

5.1.2 Remove the spark plug from number one cylinder (nearest to propeller flange.) Turn the engine until the piston of this cylinder is on upper dead center.

5.1.3 In this position put the propeller onto the flange with the blades vertical. Use washers under nuts and torque to 4.5 - 4.7 daNm (390 - 410 inlb).

5.1.4 Grease the thrust plate along the track of the ball bearings with Calypsol H 442 or equivalent. Carefully turn the propeller while checking alignment. Maximum allowance blade track is 3 mm, measured about 10 cm from the tip of the blade on the trailing edge.

5.1.5 The actuating mechanism must be installed according to the instructions given by the aircraft manufacturer. The ball bearings must be at least one mm from

the thrust plate at take-off position. Check the pitch change by cycling several times to the feathered position. If no difficulties are encountered, mount the spinner and run up the engine. Perform a static rpm check according to the requirements of the aircraft manufacturer. If the engine runs rough, remount the propeller 180°.

5.2 Modification from fixed pitch propeller to variable pitch propeller is possible. The engine flange must be changed according to engine manufacturer's instructions.

5.3 HO-V 62 R, check of rpm's

5.3.1 The data of the aircraft handbook are binding; the following values are for your information.

5.3.2 The change to cruising position (high pitch) is only possible with a running engine. With the engine rpm at about 2100, pull the actuating lever about one fourth of the way and release. With the throttle position constant, the engine rpm will drop by about 500.

5.3.3 The change from cruising position to take-off position is possible with either a running or a stopped engine. With the engine running, reduce the rpm to 1000, pull back the actuating lever shortly and release. Open the throttle and check the rpm.

5.3.4 Repeat this test three times, and if no difficulties are encountered, mount the spinner and conduct a flight test.

spection

1 Preflight inspection

Check the blade installation. No blade shake but radial play (angle) up to 1,5 degrees are allowed. Change the pitch by turning the blades from low to high pitch and watch for smooth operation. Check for loose screws and safety wires. Check all visible hub parts, spinner and bulkhead for cracks. If counterweights are installed, check them for proper position. Check the parts of the actuating mechanism, ball bearings and thrust plate. Ball bearings must have at least 1 mm distance from the thrust plate.

2 Fifty hour inspection (periodically up to the overhaul time each 50 hours).

2.1 Remove the spinner and check the blade installation for absence of blade shake and radial play. Check for smooth turning of the blades. Grease the four studs 6-5 of the outside change mechanism where they slide in the bushings. Grease thrust plate 6-3 slightly.

Check visible hub parts for cracks and corrosion. Check screws and safety wires. Check torque moment of the attaching bolts or stop nuts by applying the specified torque 4.5 - 4.7 daNm (390 - 410 inlb) without loosening the parts beforehand. Check for grease leakage. Check the spinner and the spinner bulkhead for cracks and loose rivets. Check counterweights for proper position. Check that the sealing compound on the blade retention nuts is intact. Use new sealing compound if the existing gasket leaks.

6.2.2 Inspection of the blades

The inspection of the composite-blades is easy and sure. Critical vibrations will be indicated through the plastic covering on the blade surface. No sudden failure can occur with these blades because of the wood material, even though cracks may exist. Following subsections will be important for the determination of whether or not cracks are critical.

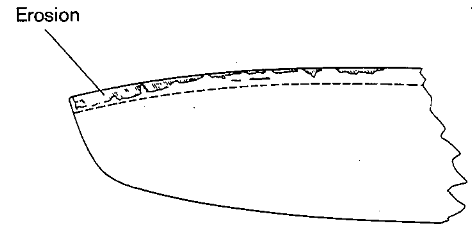


Figure 10 Normal erosion, no matter for concern.

6.2.2.1 A fine crack in the lacquer on the joint between metal ferrule and blade is not dangerous because this is a natural indication of expansion due to normal loads.

If the crack increases over 0,3 mm the propeller should be removed from service and shipped to the factory for examination.

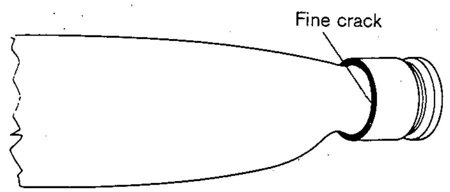


Figure 11 Crack in lacquer at metal ferrule. No concern up to 0,3 mm width.

2.2.2 A fine crack along the blade tipping or along the end of the bronze fabric is not dangerous. A fine crack at the starting point of the bronze fabric or blade tipping is also not dangerous. Sometimes such cracks occur and are a normal indication of the different expansion of the different materials (wood, brass, bronze fabric.)

During the maintenance period a lacquer should be used to cover such cracks and protect the blades against penetration of moisture.

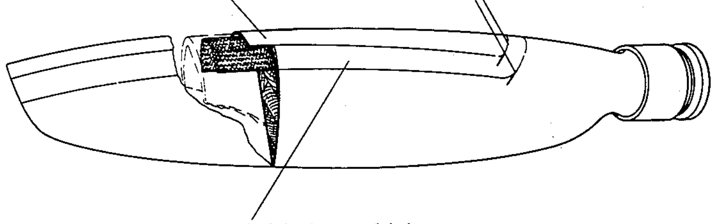


Figure 12: Possible cracks in lacquer at leading edge – no concern. Cover with lacquer to prevent moisture to enter.

.2.2.3 Fine cracks in the lacquer surface or in the metal tipping across the blade axis are indications of bending vibrations. Such cracks occur mostly in the outer part of the blade. No sudden blade failure can occur due to these cracks since the load is carried by the wood core. If such cracks do occur, the factory should be consulted regarding airworthiness.

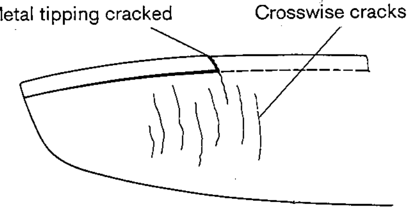


Figure 13: Cracks in lacquer crosswise to blade axis. Contact factory.

6.2.2.5 Damaged fibreglass cover

Normal stone nicks are unimportant as long as the plastic protection of the wood core exists. Air bubbles with a maximum of 0.6 inches in diameter are unimportant only if the size does not increase during use.

Scratches and nicks should be protected during routine maintenance with a coating of water resistant lacquer.

6.2.2.6 If cracks form in the metal sheet of the blade tipping, the blade tipping must be replaced. Nicks and bulges are important only if they are sharp, since cracks may form them. If deep nicks and bulges exist, soft soldering can be used for repair. In any case, the wood core should be protected against moisture.

6.3 Additional periodic inspections

New propeller-engine-aircraft combinations may require additional periodic inspections such as partial disassembly and thrust bearing examination between overhaul periods. These inspections must be done in the factory or in a propeller repair station, authorised by the manufacturer.

6.4 Overhaul

The time between overhaul is to be obtained from Service Bulletin No. 1 ( ) which will be reissued, whenever new information on TBO is considered necessary.

The overhaul must be done by the manufacturer or by a propeller repair station authorised by the manufacturer.

5 Special Inspection

5.1 Overspeed:

If the propeller is involved in an overspeed up to 15 % over the take-off RPM of the installed engine, only normal periodic inspection is required. At overspeeds between 15 % and 25 %, the propeller has to be inspected completely by the manufacturer or an authorized company. In this case the exact noted RPM should be indicated. No ferry flight should be made if the overspeed was more than 25 %.

5.2 For unconventional installations special instructions might become necessary. A conventional installation is a tractor installation on a single engine aircraft.

Maintenance and repair

1 The resistance of the polyurethane lacquer of our Hoffmann-Composite blades is excellent against nearly all solvents. The propeller should be periodically cleaned with car-wash solution or equivalent and polished with car wax. In every case the surface protection (lacquer and epoxy fibreglass) should be kept completely sealed so that no moisture can enter into the wood core and procedure unbalance.

2 Small scratches and nicks can be easily repaired by using epoxy resin and polyurethane lacquer. Before repairing, check to see that the fibreglass covering is still well bonded to the wood.

2.1 Rub the damaged area with fine sandpaper and clean it with lacquer thinner. Use epoxy resin (Tixothrop) or equivalent to fill the bulges, then let the material dry as required.

2.2 Again rub the area with fine sandpaper to a smooth surface. Use a polyurethane lacquer.

7.3 Broken blade tips can be repaired by rebuilding, if 75 % of total blade length are still available and free of split cracks. Such repairs can only be done in the factory or in a propeller repair station, authorized by the manufacturer.

8. Shipping and storage

8.1 Shipping

Careful packing is the best protection against damage during shipment; therefore the propeller is shipped to the client in a special wooden case. This case can be used more than once. The blade tips and trailing edge should be sufficiently protected. The propeller should be fastened to the packing case by the blades near the hub or by the hub mounting bolts.

8.2 Storage

No propeller should be stored by standing on the tips. If storage is required, it is recommended to use the original packing.

Usually the propeller need not be protected for storage periods of more than six months in dry, normal temperature rooms.

The aluminum parts are protected by chromatic acid anodizing, the steel parts by cadmium plating and the blades by polyurethane lacquer. No preservation is required for the blades. The metal parts can be protected with standard preservation mediums.

In cold weather conditions the propeller should not be stored close to heating systems or in rooms with extreme changes in temperature.

9. Parts List HO-V 62, HO-V 62 R

Index	Part No.	Nomenclature	Quantity HO-V 62	Quantity HO-V 62 R
1. 1	VP 20-482B	hub	1	1
1. 2	VP 20-490A	ring	1	1
1. 3	VP 20-529	thrust plate	1	1
1. 4	VP 20-578A	stud	4	4
1. 5	VP 20-493B	rod	4	4
1. 6	D 227	spring	4	4
1. 7	VP 20-583	center rod	1	1
1. 8	VP 20-497A	rear spacer	1	1
1. 9	VP 20-489D	fork	1	1
1.10	VP 20-486B	pitch change block, excentric hole	2	2
or	VP 20-744	pitch change block	AR	AR
1.11	VP 20-824	front spacer	1	-
1.12	VP 20-491A	yoke	1	1
1.13	VP 20-624	guide	2	2
1.14	M6	nut DIN 936	4	4
1.15	VP 20-494A	spacer	4	4
1.16	M6	stop nut LN 9348	4	4
1.17	VP 20-496A	front washer	1	1
1.18	8.4	washer DIN 125	5	5
1.19	M8	stopnut LN 9348	1	5
1.20	VP 20-826	stop	1	-
1.21	VP 20-492	housing	-	1
1.22	VP 20-825	stop washer (4° diff.) *)	-	1
1.23	VP 20-531	stop plate	-	2
1.24	VP 20-530A	stop bushing	-	2
1.25	2,5 x 10	rollpin DIN 1481	2	4
1.26	D 066	spring	-	2
1.27	VP 20-508A	spring guide	-	2
1.28	2,2 x 35	cotter pin DIN 94 corres.	-	2
1.29	VP 20-501	rest	-	1
1.30	AN503-10-14	screw	4	4
1.31	VP 20-559	hex head screw	4	4
1.32	AS 6590	race	4	4
1.33	ANK 6590	needle cage	2	2
1.34	VP 20-509B	stud	6	6
1.35	52 NE-070	stop nut	6	6
1.36	AN 960-716	washer	6	6
1.37	A-48	balance weight	AR	AR
1.38/39	A-1635-..	screw	AR	AR
1.40	VP 10-287A	counterweight	-	2
1.41	M8 x 55	bolt LN 9037	-	4
1.42	8.4	washer DIN 125	-	8
1.43	VP 20-465	lock plate	2	2
1.44	A-1635-18	screw	4	4
1.45	5,3	washer DIN 125	8	10
1.46	VP 20-641	guide shim	-	2
1.47	A-1635-22	screw	-	2
1.48	VP 20-725	spring guide tube	4	4
1.49	VP 20-831	front spacer	-	1
1.50	VP 20-849	spring guide tube	4	4

*)	VP 20-898	stop washer (5° difference)	-	1
	VP 20-899	stop washer (9° difference)	-	1

Index	Part No.	Nomenclature	Quantity HO-V 62	Quantity HO-V 62 R
2. 1/.3	AR	blade body	2	2
2. 4	VP 10-252C	ferrule	2	2
2. 5	VP 10-238C	blade retention nut	2	2
2. 6	2-9294	blade seal	2	2
2. 7	28-37	thrust bearing	2	2
2. 8	VP 20-488A	delrin ring	2	2
2. 9	VP 10-23D	lag screw 70	10	10
2.10	8m5 x 40	pitch change pin DIN 6325	2	2

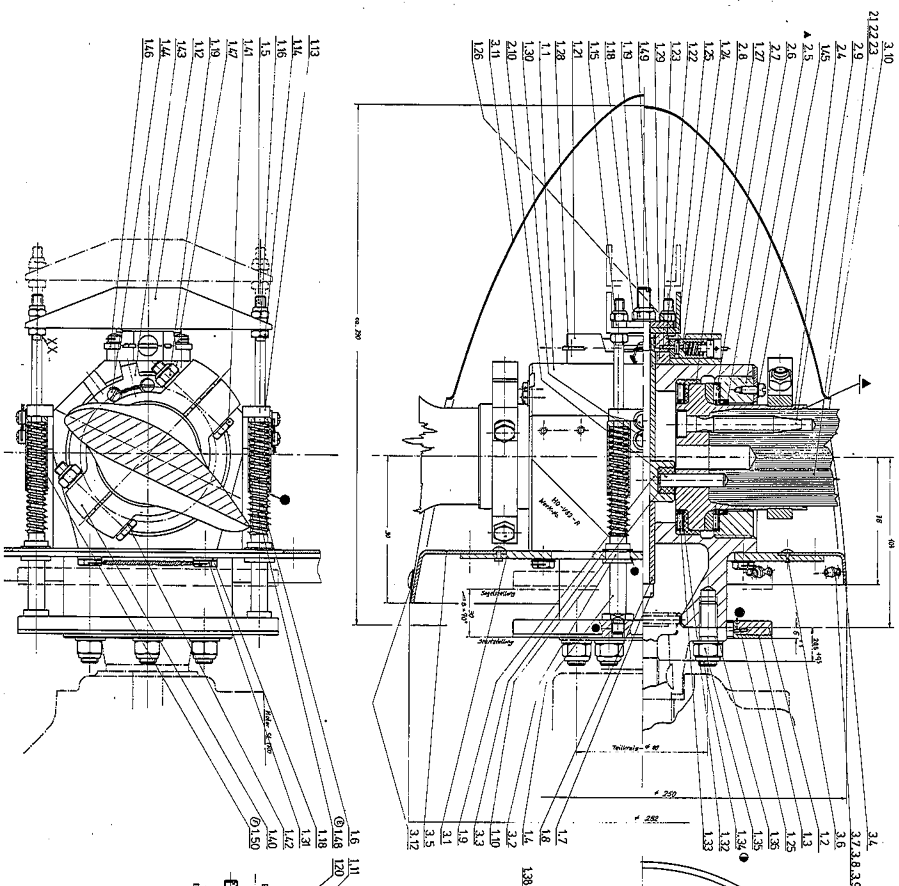
NOTE: Spinner bulkhead to be installed and adjusted in the factory and balanced with propeller. Spinner dome can be replaced in the field.

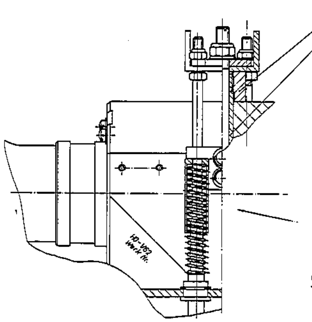
Spinners			VP 30-81	VP 30-82
3. 2	VP 30-71B	sleeve	4	4
3. 3	A 15 x 1V	retaining ring	4	4
3. 4	VP 30-64C	bulkhead assy	1	-
3. 5	VP 30-76C	bulkhead assy	-	1
3. 6	MS20470AD4-6	rivet	AR	AR
3. 7	MS20426AD3-4	rivet	AR	AR
3. 8	AN526C1032R7	screw	10	10
3. 9	K 1000-3	nut plate	AR	AR
3.10	VP 30-63	spinner dome	1	-
3.11	VP 30-77	spinner dome	-	1
3.12	A-1020	shim	10	10

Spacer				
Not shown	VP 20-580	spacer (for Cont. 0-200)	-	6
Not shown	AN 76-12		-	6
Not shown	VP 20-528	washer	-	6

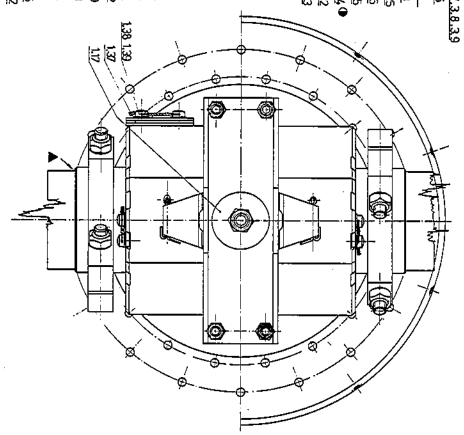
Miscellaneous				
-	RTV 109	silicone rubber	AR	AR
-	comp. 75	Loctite	AR	AR
-	H 442	grease, Calypsol	AR	AR

-	ISAMET R 6/47	Epoxy resin, blade tipping	ISAR-Rakoll
-	ISAMET R50/47	Epoxy resin, fibre glass	ISAR-RAKOLL
-	91117	fibre glass fabric	INTERGLAS
-	RAL 7030	super Durotex PU-Paint, grey	DÜRSCHMIDT
-	black dull	Acrytex	DÜRSCHMIDT
-	RAL 1007	Acrytex, yellow	DÜRSCHMIDT





HO-V 62
Detail showing pitch stop
without cruising position



10. Installation list

Before installation into aircraft check Part No. P/N incorporates propellermodel, pitch setting and spinnermodel.

Flugzeug aircraft	Motor engine	Propeller propeller assy	Haube Spinner	Teil-Nr. part-No.
Alpla AVO 68-v SAMBURO	SL 1700 E I	HO-V62R/L150A	VP30-81	VP20-512-2
Fournier RF 9 RF 10	SL 1700 E I L 2000 EO 1	HO-V62R/L160T HO-V62R/L160T	VP30-82 VP30-82	VP20-512-7 VP20-512-10
Grob G 109	L 2000 EB 1	HO-V62R/L160T	VP30-82	VP20-512-5
Hoffmann H 36 DIMONA	L 2000 EB 1	HO-V62R/L160T	VP30-81	VP20-512-9
I. A. R. IS-28 M 2	SL 1700 E I L 2000 E 01	HO-V62R/L160T HO-V62R/L160T	VP30-82 VP30-82	VP20-512-7 VP20-512-10
Ryson ST 100 CLOUDSTER	TMC 0-200 A	HO-V62R/170Y	VP30-64 spinner bulkhed only	VP20-512-8
Scheibe SF-25 Cs	SL 1700 EA I	HO-V62/L150A HO-V62R/L150A	VP30-81 VP30-81	VP20-512-1 VP20-512-2
SF-25 E	SL 1700 EA I	HO-V62/L150A HO-V62R/L150A	VP30-81 VP30-81	VP20-512-1 VP20-512-2
SF-28 A	SL 1700 EA I	HO-V62/L150A HO-V62R/L150A	VP30-81 VP30-81	VP20-512-1 VP20-512-2
SF-36	L2000 EA 1	HO-V62R/L160T	VP30-81	VP20-512-9
Schleicher ASK 14	Hirth F 10K1a	HO-V42/48-02 (R)/ L-665+15-7,6-LP	VP30-117	
ASK 16, 16B ASK 16, 16B	SL 1700 EB I L 2000 EB 1	HO-V62R/L160T HO-V62R/L160T	VP30-81 VP30-81	VP20-512-6 VP20-512-9
Slingsby T 61 G	SL 1700 EA I	HO-V62R/L150A	VP30-81	VP20-512-2
Sportavia- Pützer SFS 31	Rectimo 4AR 1200	HO-V42/48-02-11 (R) L-665+15-7,6-LP	VP30-117	

'lugzeug ıircraft	Motor engine	Propeller propeller assy	Haube Spinner	Teil-Nr. part-No.
F-5, 5B SPERBER"	SL 1700 E I	HO-V62R/L150A	VP30-82	VP20-512-3
F-5B	SL 1700 E I	HO-V62R/L150A-5	VP30-82	VP20-512-4
F-5-2	L 2000 EO 1	HO-V62R/L160T	VP30-82	VP20-512-5
F 5-2 B	L 2000 EO 1	HO-V62R/L160T	VP30-82	VP20-512-5
'alentin 'aifun 17 E	L 2000 EO 1	HO-V62R/L160T	VP30-82	VP20-512-12
'ari ZE	TCM 0-200 A	HO-V62R/LD160T-2	VP30-82	VP20-512-11