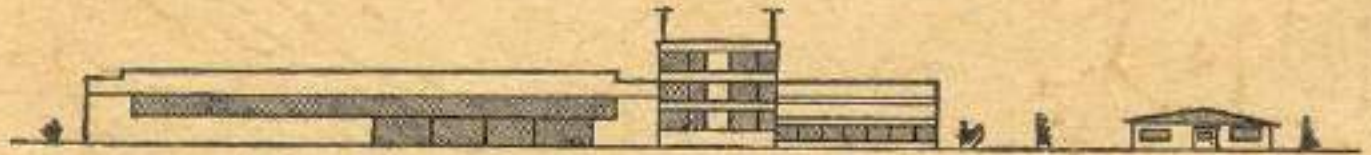


SPORTAVIA
PUTZER GMBH, & CO., KG



D-5377 POST SCHMIDTHEIM, FLUGPLATZ DAHLEMER BINZ
Telefon Schmidtheim (02447) 277/278, Telex 833602 spkg

Owner's Manual

for the aircraft

Fournier RF 4 D

Serial-No: _____

Immatriculation-No: _____

Chapter 1: Flight Manual

Chapter 2: Maintenance Manual

Fournier RF-4 D

OWNER'S MANUAL

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Revisions

| No. | Page | Contents of Revisions | Date | Signatures |
|-----|------|-----------------------|--------------|------------|
| 1 | 37 | Electrical System | July 9 1968 | |
| 2 | 38 | Radio System | July 9 1968 | |
| 3 | 20 | Fuel System | Feb. 19 1970 | |
| 4 | 21 | Fuel Tank Vent | Feb.19 1970 | |
| 5 | 4 | General description | July 15 1970 | |
| 6 | 8 | Air screw designation | July 15 1970 | |

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Section 1 General

1.1 Units and conversion

The units mainly used in this manual are the following

Distance and altitudes

| | |
|--------------------|----------------|
| Feet (ft.) | 1 ft. = 0.30 m |
| Statute mile (sm) | 1 sm = 1.61 km |
| Nautical mile (nm) | 1 nm = 1.85 km |

Speed

| | |
|--------------------------|--------------------|
| Feet per minute (ft/min) | 1 ft/min = 0.5 m/s |
| Miles per hour (MPH) | 1 MPH = 1.61 km/h |
| Knots (KTS) | 1 KTS = 1.85 km/h |

Weight

| | |
|--------------|------------------|
| Pound (lbs.) | 1 lbs. = 0.45 kp |
|--------------|------------------|

Temperature

| | |
|------------|--|
| Centigrade | $T^{\circ} C = 5/9 (T^{\circ} F - 32^{\circ})$ |
|------------|--|

Pressure

| | |
|-----------------------------|---------------------------------|
| Pound per square inch (PSI) | 1 psi = 0.07 kp/cm ² |
|-----------------------------|---------------------------------|

Capacity

| | |
|------------------------|--------------------|
| Imp. Gallon (Imp. Gal) | 1 Imp gal = 4.54 l |
| US Gallon (US-gal) | 1 US gal = 3.78 l |

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1.2 General description

The Fournier RF 4 D or "Avion-Planeur" is, as its name implies, a single-seater in the sporting class, designed to be used either as an aeroplane or a glider.

This new dual role conception has been tested already with the RF 3 -series in thousand of flights with complete success.

This small single-seater with an empty weight of 600 lbs (275 kg) has a cruising speed of 110 mph (180 km/h) and an operational range of about 350 nm (650 km). Its maneuverability is excellent and handling qualities straight forward and simple.

With the engine stopped it has excellent glide ratio of 20-1 and very low rate of sink rate of 240 ft/min (1.20 m/s). This permits long and economical flights in thermals, or especially interesting flight in mountain waves.

Mountain regions have great possibilities for interesting flights by studying wave conditions

1.3 The Aircraft

The RF 4 D is a single-seater with cantilever wing, normal tail unit and retractable single wheel landing gear.

The fuselage has four longerons covered with plywood. The wing with single spar and a plywood D-tube is of one piece and connected with the fuselage by four bolts

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The tail unit (both empennage and rudder) are removable.

The landing gear consists of a bungee spring and fully retractable main wheel, with brake, a tail wheel coupled to the rudder and light weight spring hoops under the wings.

The canopy is fitted with a normal release and on the right side with emergency release (red lever).

The flight controls are of usual kind with trim on right side.

Throttle control – left side – with friction lock, also spoiler control lever lower left side.

Under the pilots right leg is the locking device for the landing gear, and the retraction/extension lever is on the cockpit wall.

The panel has all the basic instruments necessary for flight, engine control, and navigation.

Below the panel on the left is the brake lever, on the right side the choke, fuel valve and decompression lever (if installed) and hand starter lever.

Between the pilots legs is the plastic cowling for the landing gear.

The fuel tank is between the firewall and the panel is fixed by two metal straps.

Pilots comfort and leg room is adjusted by the use of cushions.

The baggage compartment is behind the pilot. The battery storage in the rear wall.

The engine is a four cylinder flat opposed type with fixed pitch wooden propeller. Both cowlings are made of reinforced plastics (fiberglass).

Equipment is in detail in chapter 2 “ Maintenance Manual”

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1.4 Specifications

1.4.1 General

| | | |
|--|----------|-----------|
| Span | 36.93 ft | (11.26 m) |
| Length | 19.85 ft | (6.05 m) |
| Height - flight position | 7.05 ft | (2.15 m) |
| - landing position | 5.15 ft | (1.57 m) |
| Propeller clearance under static load | .92 ft | (0.28 m) |
| tire and spring fully defected | .46 ft | (0.14 m) |

1.4.2 Wing

Airfoil: NACA 23012 wing tip
23015 root section

| | | |
|--------------|-----------------------|-------------------------|
| Area | 121.5 ft ² | (11.30 m ²) |
| M.A.C. | 3.52 ft | (1.075 m) |
| Aspect ratio | 11.2 | |
| Dihedral | 4° | |
| Twist | 4° | |

1.4.3 Ailerons

| | | |
|-----------------|----------------------|------------------------|
| Area | 8.34 ft ² | (.775 m ²) |
| Deflection – up | 19° +/- 1° | |
| down | 12.5° +/- .6° | |

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1.4.4 Spoilers

| | |
|--------|---------------|
| Span | 4.07" (1.23m) |
| Height | .32" (.10m) |

1.4.5 Horizontal tail

Form: trapezoid

| | |
|-----------------------------|---|
| Area | 18.85 ft ² (1.752 m ²) |
| Area of elevator | 6.07 ft ² (.564 m ²) |
| Deflection of elevator - up | 20° +/- 1° |
| - down | 20° +/- 1° |

Angle of incidence of stabilizer +2°

| | |
|--------------------|--|
| Trim tab - surface | .26 ft ² (.024 m ²) |
| - deflection | 40° +/- 1° |

1.4.6 Vertical tail

Form: trapezoid

| | |
|----------------------|--|
| Area | 9.05 ft ² (.84 m ²) |
| Area of rudder | 5.28 ft ² (.49 m ²) |
| Deflection of rudder | |
| -left | 25° +/- 2° |
| -right | 25° +/- 2° |

1.4.7. Landing Gear

Main wheel tire 380 x 150 Dunlap or Continental
-tire pressure 28.5 psi (2 kg/cm²)
Spring type SANDOW rubber
Normal type brake
Tail wheel 125-375-40 Continental-Kuli
Spring type Paulstra 5125503

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Engine group

Engine: Rectimo 4AR 1200 (1192cc)
Four Cylinder opposed
Power 39 HP at 3600 rpm
Single ignition
Fuel: Aviation Fuel 80 Octane
Oil: ESSO Extra Motor Oil Multi grade
Summer time 20w/ 30w/ 40
Winter time 10w/ 20w/ 30
Capacity: Fuel 10 US Gallons, (8.36 Imp. Gallons)
Oil 2.1 US Quarts, (.5 Imp. Gallon)
1.13 US Quarts min., (.27 Imp Gal. Min.)
Carburetor: ZENITH type 28 RXZ
Magneto: BENDIX S 4 RN 2 I

1.4.9 Propeller: Wood

Hoffmann FH S/ S 11*-133-70-6,81 L
Hoffmann HO 11* – 133 S 70 L
Hoffmann F-H2/ S 11*-133-70-6-8 L
Diameter 52.4 inch
Weight 4.85 lbs.

1.5 Equipment: (Panel see page 33)

Airspeed Indicator 0-200 or 0-160 MPH
(0-350 km/h)
Altimeter 0-20,000 ft.
(0-6,000 m)
Variometer +/- 2,000 ft. (10 m/s)
Bank Indicator Optional
Inclinometer
Compass
Warning light red: Stall warning
Warning light orange: Landing gear w/ Buzzer

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Test button for testing the warning devices
Oil pressure gauge
Oil temperature gauge
Tachometer 0-4,000 rpm

Pitot System (see page 34):

The pitot system consists of

- Airspeed indicator
- Variometer
- Altimeter
- Pitot tube under the left wing
- two static ports on both sides of the fuselage about six feet behind the canopy
- bottle for the variometer fixed at the back of the firewall
- meter and plastic tubes

Fuel system (see page 35):

The fuel system consists of

- Fuel tank 10 US gallons (8.36 Imp gallons)
- Fuel valve
- Fuel filter
- Two flexible hoses

Fuel transport by gravity

On the top of the fuel tank is a special cap fitted with a float fuel measuring device

A long wire fixed to the float and guided by a small tube in the fuel cap shows by projected length the contents of the fuel tank. Zero length means 1.32 US gallons (1.1 Imp gallons) remains.

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N.B. It is vital that the breather hole in the small guidance tube faces forward to ensure air flow on its opening and therefore positive pressure.

The fuel valve combined with the filter device is fixed in front of the firewall.

Fuel tank, filter and carburetor are connected by two flexible tubes fitted with fire-resistant coverings.

1.5.1.4 Oil system (see page 36)

The Oil system is supplied from the engine sump.

Oil capacity 2.4 US quarts (.5 Imp Gal., 2.25 l)

An orifice for filling, an outlet, a dipstick and an air-vent are the main installation, The air vent is fitted with a tube fixed to the right side of the firewall.

Oil pressure gauge and Oil temperature gauge. 2 bar min. 4 bar max pressure, 107° c degrees max oil temperature.

1.5.1.5 Ventilation System

In front of the seat are at the left and right hand air vents. The inlets are on the wing leading edges near the fuselage.

The canopy is fitted with a window (left) and an air vent device right aft.

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1.5.1.6 Electrical System (see Page 37):

Safety system:

This system covers the following points:

- stall warning
- landing gear position
- spoilers out

The stall warning device fixed on the leading edge of the right wing energizes the red warning light, when the critical angle of incidence is reached.

The gear warning is given by the orange warning light and by horn single if power setting is reduced without landing gear being extended.

It also operates if the spoilers are extended without the landing gear extended. This gives warning to the pilot that tries to land with the engine stopped and on a glide approach using spoilers without the gear retracted.

micro switches are installed at the landing gear axis, the spoiler control and the throttle control.

A test button is installed on the left side of the panel for testing the warning lights and buzzer.

The battery box for the electrical system is in the aft wall of the baggage compartment. The batteries are rechargeable. Information of the recharging procedure are given by a special brochure.

Ignition System

The ignition system consists of a single BENDIX magneto with impulse coupling.

Safety Harness: 5-point French safety harness

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Section 2: Operating limitations

2.1 Basis of certification

The FOURNIER RF 4 D is certified on the basis of the requirements AIR 2052 (ch. 9: avions fins à atterrissage plané court)

Category UTILITY and AEROBATIC

The ATC of the Federal Republic of Germany is based on the German Powered Glider Requirements (Vorläufige Richtlinien für die Prüfung und Zulassung von Motorseglern)

Category Normal Powered Glider (N) incl. certain aerobatics

2.2 Airspeed limits (indicated airspeed MPH (km/h))

| | <u>Cat. U</u> | <u>Cat. A</u> |
|--------------------------------------|---------------|---------------|
| | MPH (km/h) | MPH (km/h) |
| Vne never exceed speed | 155 (250) | 155 (250) |
| Vno max. structural cruising speed | 130 (210) | 130 (250) |
| Vc design cruising speed | 130 (210) | 130 (210) |
| Vp design maneuvering speed | 124 (200) | 124 (200) |
| max spoiler extended speed | 112 (180) | 112 (180) |
| Vle max gear extended speed | 155 (250) | 155 (250) |
| Vlo max gear extension speed | 68 (110) | 68 (110) |
| Vso stalling speed spoilers extended | 46 (75) | 45 (72) |
| stalling speed spoilers retracted | 45 (73) | 44 (70) |

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Airspeed indicator markings

| | MPH | (km/h) |
|-------------------------------------|---------|-------------|
| Red line | 155 | (250) (Vne) |
| Yellow arc (caution range) | 130-155 | (210-250) |
| Green arc (normal operating range) | 45-130 | (73-210) |
| White arc (spoiler operating range) | 46-112 | (75-180) |

Stall warning operates about 6 mph (10 km/h) above stalling speed.

2.3 Weight

| | lbs. (kg) |
|----------------------|-----------|
| max. take-off weight | 860 (390) |
| empty weight about | 595 (280) |

2.4 Load factors

DELETED

2.5 Loading limits

The pilot is responsibly for operating within the limits of the weight and center of gravity:

payload (pilot and parachute)

min. 110 lbs. (50 kg)

max. 240 lbs. (109 kg)

fuel storage optional

baggage max. 22 lbs. (10 kg)

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2.6 Center of gravity (c.g.)

-reference: upper stringer of fuselage horizontally
-datum: wing leading edge root chord

foremost c.g. - 11.8 inch (30cm) aft datum
aft most c.g. - 19.3 inch (49cm) aft datum

in flight conditions:

empty weight lbs. - 572 (260 kg) - 595 (270 kg) - 615 (280 kg)
c.g. - 12.2...17.2 - 12.2...17.3 - 12.2...17.4
in. aft datum

2.7 Crosswind Limit

max. crosswind for operation: 15 kts

2.8 Placards

- stall warning
- gear warning
- gear up
- gear down
- Down wind at 65 MPH undercarriage down
- gear lock
- fuel push on
- pull choke to richen mixture to start
- ignition - on - off
- spoiler in
- spoiler out
- park brake
- baggage max. 22 lbs. (10 kg)
- trim - nose up - nose down
- emergency release

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This powered glider must be operated as a Normal powered glider category aircraft in compliance with the operating limitations stated in these placards and the flight manual.

Airspeed limitations

| | |
|----------------------------------|--------------------|
| VA maneuvering speed | 125 mph (200 km/h) |
| VFE max. speed spoilers extended | 112 mph (180 km/h) |
| VLO max. gear operation speed | 68 mph (110 km/h) |

Flight maneuvers are limited to the following:

-at max weight 860 lbs. (391 kg)

steep turn chandedlle

stall loop 112 mph (180 km/h)

spin stall turn 118 mph (190 km/h)

lazy eight

-at max. weight 816 lbs. (370 kg) additionally:

roll off the top 130 mph (210 km/h)

slow roll 112 mph (180 km/h)

(recommended entry airspeed)

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2.9 Power Plant Limits

- max. continuous power at 3,600 RPM
- max. recommended cruising power at 3,400 RPM
- oil temperature max. 107° C
- oil pressure 29 - 52 lb/in (2.0 - 3.5 kg/cm²)

- fuel pressure by gravity (but vital that small tube (vent hole) at tank cap faces forward to ensure airflow pressure)

Propeller

- min. revs. at static run up 2,900 RPM

Markings of engine control instruments:

- max. oil temperature 107° C Red line
- oil pressure range 29 - 52 lb/in (2.0 - 4 kg/cm²)
- RPM max. 3,600 RPM: Red line
caution range 3,400 - 3,600 RPM: yellow arc
normal range 700 - 3,400 RPM: green arc

2.10 Fuel

Aviation fuel min. 80 Octane

Capacity: 10 US Gallons, (38 L) (8.36 Imp. Gallons)
Fully usable

Reserve: 1.32 US Gallons (5 L) (1.1 Imp. Gallons)

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2.11 Oil

Oil type ESSO Extra Motor Oil multi grade

- summer w20/ 30/ 40
- winter w20/ 20/ 30

capacity: max. 2.1 US Quarts (2.25 L) (.5 Imp. Gallon)
min. 1.13 US Quarts (1.25 L) (.275 Imp. Gallon)

oil consumption is very low under normal operating conditions.

When operating in the aerobatic flight check the oil storage every 5 hours of operation.

2.12 Maneuvers

- Stall

Spoilers and gear extended or retractable the stall occurs without any significant warning (except warning light), stall is straight forward, loss of altitude is about 65 feet (20 meters)

Recovery is orthodox and positive

- Spins

Spins is allowed, recovery by normal procedure

- Aerobatics

At max. weight of 860 lbs. the following maneuvers are permitted.

steep turn - stall - spin - lazy eight - chandelle - loop (112 mph (181 km/h) -stall turn (118 mph (191 km/h)

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At max weight of 816 lbs. additionally the following are permitted:

roll off the top (130 mph (211 km/h))
slow roll (112 mph (181 km/h))

Recommended entry airspeed within brackets

Section 3 Emergency Procedures

3.1 Engine failure at take-off

-runway length sufficient:
cut ignition
extend spoilers
operate brake
stick back

-runway length too short:
same procedure, eventually retract landing gear to avoid obstacles.

3.2 Engine failure after take-off

shut fuel valve
cut ignition
make landing as a glider

3.3 Engine failure in flight

same procedure as before

3.4 Fire in engine compartment

shut fuel valve
throttle full open
cut ignition when engine has stopped

3.5 Landing gear extension failure

Gear operation is mechanical, so there is a little chance of failure, except by mishandling (e.g. trying to extend gear without first unlocking and thus damaging the control lever). In such case unlock the locking lever and the gear will extend halfway, apply positive "g", if necessary several times, until the gear is heard to be engaged down and locked. Stop engine before landing.

3.6 Forced Landing

Generally, except at very bad ground, landing gear and spoilers are to be extended.

On very bad ground, rough or marshy, keep landing gear retracted and make a very gentle landing. Retract spoilers just before touch down to diminish impact.

On water keep gear retracted. Touch down in a nearly stalled condition, stick back.

If there is any doubt about the ground condition extend the gear. but be prepared to retract the gear immediately - even just before touch down - if ground looks bad and "belly" on

Experience shown that the aircraft suffers little damage from a belly if engine is stopped before touch down.

3.7 System Failure

The systems (pitot/static pressure, fuel, oil, electric) are not installed in a fail safe manner. If any system fails the aircraft is to be flown in a normal way of emergency like other light aircrafts or gliders.

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In case of failure of the electric system the stall warning is inoperative. Watch the airspeed indicator and remain at a safe speed until touch down.

In case of pitot/static pressure failure check the speed by sound of airflow or by watching the angle of the wing to the horizon.

In case of fuel/oil system failure proceed as in part 3.3

Section 4 Normal Procedures

4.1 Ground Check

Remove cowling

check oil and fuel contents:

Oil: min. .27 US gallon (.27 Imp. gallons)
max. .6 US gallon (.5 Imp. gallons)

Fuel: max. 10 US gallons (38 L) (8.36 Imp. gallons)
min. 1.32 US gallons (1.1 Imp. gallons)

- for aerobatics max. fuel 4 US gallons (15 L) (3.3 Imp. gallons) recommended

- in warn weather fuel level about 1/2" (13mm) under orifice

Drain fuel filter by pushing drain button. during draining keep wings level. With fuel cock "OPEN" drain about 1/16" gallon (1/4 L) of fuel. Ensure drain valve is closed after draining.

During all checks look for cracks, deformations, signs of oxidation, unfastened screws, lost safety pins.

Tail unit: condition of joints, control cables, finish, trim tab, fairings, tail wheel, connecting springs.

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Right wing: condition of spoiler, ailerons, out riggers, stall warning.

Engine: Look for oil leaks, condition of propeller, flexible controls (cables), cowling locks, any abnormal sounds.

Left wing: condition of spoiler, ailerons, out rigger, pitot.

Landing gear: condition of tire, (cracks, pressure, skid marks) bungees, retracting device, housing.

Fuselage: fuel leaks, vent on fuel cap in correct position (positive pressure) vent MUST be forward position exactly, static pressure: orifice unobstructed.

Canopy: clean, no cracks, check normal and emergency release.

Cowling: cracks, fastened

Cabin: generally clean, check condition and fasten safety belts, parking brake, controls free movable, seat cushions, baggage compartment.

4.2 Preflight-check

Check oil and fuel contents. Ensure ground check completed as above.

4.3 Before starting the engine

Safety belts..... adjust and lock
Brake..... on
Radio..... off
Fuel Valve (cock)..... on
Flight controls..... check full travel and free
Spoilers..... check and lock closed

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4.4 Starting the engine

Choke pull out
Throttle..... full open
Ignition..... off
Turn engine by propeller or by mechanical hand
starter..... 6 compressions
Choke..... push full in
Throttle..... 1/2" (13mm) open
Ignition..... on

Starting the engine by hand or by mechanical hand
starter

When engine fires watch oil pressure, about 10 seconds
after starting it should be about 45 lb/in (3 kg/cm²).

In winter turn engine through 12 times instead of 6
compressions.

If engine does not fire it may be over primed, proceed as
follows.

- throttle..... full open
- ignition off
- choke..... push in
- decompressor (if installed)..... pull

Turn engine by the propeller against the normal direction
(backwards) several times.

- decompressor (if installed)..... push
- throttle..... closed
- ignition. on
attempt a new start

4.5 Warning-up the engine

The RECTIMO 4 AR 1200 engine derives from a VW 40hp auto engine, so warning -up is of short duration

- 5 minutes in the winter time

- time of taxing in summer or 2 minutes at 1000-1500 rpm

The oil temperature gauge is very sluggish, so a minimum temperature reading is not given.

4.6 Taxing

Parking brake..... release
(hand grip horizontal)

Taxi control..... by rudder through connection
to tail wheel

Taxi slowly, wing horizontal to spare the outriggers.
Avoid sharp turns.

4.7 Take-off and Climb

Seat cushions and safety belts..... checked
Engine run up..... 2900 RPM
Brake..... released
Throttle lever friction lock..... slackened
Spoilers..... retracted
Trim..... adjusted
Warning lights..... checked

Open throttle gently and accelerated to 53 mph (85 km/h)

Climb at 68 mph (110 km/h) at a power setting of 3000 rpm.

Stop wheel and retract main gear.

4.8 Retraction of Gear

Safety lock..... lock and pull

Gear Lever..... pull back and push
down into the retracted position

Safety lock.....check return to lock position

On unlocking the safety lock gear lever automatically swings to a position halfway between "extended" and "retracted". Complete retraction manually. You must unlock safety lock first.

Gear locks down automatically when gear lever is selected down, but check that safety has returned to locked (forward) position.

4.9 Climb

Optimum climb with gear retracted is 600 ft/min (3.0 m/s)
at 68 mph (110 km/h) and 3000 RPM.

For long climbs maintain 81 MPH (130 km/h) to ensure adequate engine cooling. If oil temperature rises too high fly level at cruise power for a few minutes.

4.10 Cruise

To reach cruising speed quickly:

- Climb about 60 ft. (20m) above selected cruising altitude
- move trim forward position for cruise (nose-down)
- reach cruise speed in shallow to selected altitude
- adjust power to 3400 RPM
- re trim

4.11 Descent

- steep descent: extend landing gear, reduce power setting, maintain speeds between 62 - 93 mph (100 - 150 km/h). Use spoilers as required.
- normal descent: landing gear retracted, reduce power until gear warning horn is about to sound, reduce speed, trim to descend at 68 mph (110 km/h).

Note: At 68 mph (110 km/h) descent can be increased by steep turns. Take care to keep engine warm.

4.12 Extension of the Landing gear

Reduce speed to 68 mph (110 km/h), maintain level flight at 2500 rpm and extend gear:

- Safety lock..... unlock and pull back
- Gear lever..... push forward into extended position
- Safety lock..... check returned to the locked position

Adopt and always use a standard procedure. Extend the gear before "Final". Down wind leg is recommended. The warning light and horn do not indicate the right moment for gear operation but only act as a reminder that a "vital action" has been overlooked. Always adopt your standard procedure to avoid a broken propeller.

4.13 Approach

- Optimum approach speed

- smooth air: 59 mph (95 km/h) spoilers retracted
- 62 mph (100 km/h) spoilers extended

rough air: about 6 mph (10 km/h) faster

- use of spoilers: to increase rate of descent, they are easy to operate without any pitching moments or other difficulties.
- Failed landing: apply full throttle, retract spoilers, maintain climbing speed 68 mph (110 km/h)

4.14 Landing

Landing is of usual "three pointer" type: reduce speed down to stall, and with stick full back tail and main wheel touch down together.

The wheel brake must be operated with caution.

4.15 Special Maneuvers

Stall:

At approach to stall the red warning light operates. It lights at about 50 mph (80 km/h) when stall is done statically. In dynamic stalls it operates at higher speeds.

The full stall is reach at about 44 mph (70 km/h). Without "usual" aerodynamic warning. There is seldom a buffeting warning.

Ailerons and rudder remains effective. Recover by moving stick gently forward. Lost of altitude is very small.

Spins:

- First method: stall the aircraft by gently moving stick backwards. Apply rudder in the direction required to spin.

The first rotation is very smooth. It accelerates when spin stabilizes.

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- Second method: stall the aircraft dynamically and cross control, i.e. aileron and rudder in opposite directions.

Recovery:

- apply opposite rudder
- ease stick forward
- ease out of dive

Guard against excessive speed and accelerations during recovery

Section 5 Performance

The performances given are based on take-off weight of 880 lbs. (400 kg.), no wind and hard surface runway (official flight test).

Take-off distance

Sea level, temperature +15 C

| | |
|---|-------------------|
| distance of ground run | 426 ft (130 m) |
| distance to \approx 50 ft (15 m) of altitude | 885 ft (270 m) |
| take-off speed | 53 mph (85 km/h) |
| speed at passing \approx 50 ft (15 m) of altitude | 68 mph (110 km/h) |

Landing distance

Sea level, temperature +15 C

| | |
|--|-------------------|
| distance of ground run | 330 ft (100 m) |
| distance from passing \approx 50 ft (15 m) | 755 ft (230 m) |
| approach speed (spoilers extended) | 62 mph (100 km/h) |

Climbing speed

Sea level, temperature + 15 C

climbing speed 690 ft (3.5 m/s)
(gear and spoilers retracted)

optimum air speed 68 mph (110 km/h)

Climbing speed (failed landing)

Sea level, temperature + 15 C

climbing speed 590 ft (3 m/s)
(gear extended and spoilers retracted)

optimum air speed 68 mph (110 km/h)

climbing 295 ft (1.5 m/s)
(gear and spoilers extended)

Stall

stalling speed 45 mph (73 km/h)
(gear and spoilers retracted)

stalling speed 46 mph (75 km/h)
(gear and spoilers extended)

Operating range

At cruising speed @ 5000 ft (1500 m) range 415 SM (670 km)

Fuel consumption

At cruising speed @ 5000 ft (1500 m) 2.56 US Gal/hr (9.7
liters/hr, 2.12 Imp gal/hr)

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Section 6 Special Operating Procedures

6.1 Economy Cruise

Power setting 2,200 RPM (throttle lock tight):

airspeed: 56 mph, 49 kts (91 km/h)

fuel consumption: 1.2 U.S. Gallon, 1 Imp. Gall. (4.45 l)

endurance: 8 hours

This configuration maximum endurance.

6.2 Gliding

The following can be practiced:

- Advanced training: precision approaches and spot landings, training for emergency landings.
- Soaring: recommended fuel contents 2.5 U.S. gall. \approx 2 imp. gall. (9.1 l) and minimal baggage.

Max. load for radio and oxygen equipment: 44 lbs.

Operate at economy cruise until lift found. Reduce power to 1,800 rpm. If lift is strong enough, cut ignition at circle at 56 mph (min. sink speed 4.25 ft/s). Best glide ratio is 20-1 with engine stopped at 62 mph.

- Landing with engine stopped: make a glide approach using spoilers as necessary. Gear warning if spoilers are extended while gear is still retracted.

6.3 Aerobatics (engine running)

The maneuvers given below are certified
(initial airspeed)

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| | |
|------------------|-----------------------------|
| Stall turn | 118 mph, 103 kts (191 km/h) |
| Loop | 112 mph, 87 kts (181 km/h) |
| Roll off the top | 130 mph, 113 kts (211 km/h) |
| Slow roll | 112 mph, 87 kts (181 km/h) |

Snap roll and all "flick" maneuvers are prohibited.

6.4 Aerobatics (engine stopped)

The maneuvers given below are certified
(initial airspeed)

| | |
|------------------|-----------------------------|
| Stall turn | 118 mph, 103 kts (191 km/h) |
| Loop | 124 mph, 108 kts (201 km/h) |
| Roll off the top | 130 mph, 113 kts (211 km/h) |
| Slow roll | 112 mph, 87 kts (181 km/h) |

6.5 Mountain Flights

- Power setting and airspeed what greater than normal (94 mph, 82 kts (152 km/h)), to give adequate control in strong wind conditions

- Approach small mountain fields at 75 mph, 65 kts (122 km/h) speed. Use spoilers only if necessary for shortening final approach.

6.6 Starting engine by decompressor for RF 4 D's without mechanical starter only

The decompressor lifts the engine valves to easier rotation.

It is strictly to make the first test of this procedure within gliding range of an airfield.

Minimum altitude for this procedure 1,300 ft (396 m) above the ground.

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- fuel valve open
- ignition off
- throttle closed (idle)
- decompression knob pull back
- airspeed dive to 112 mph, 97 kts (101 km/h)

-when propeller turns level gently out and watch RPM, release decompressor knob.

-RPM 1,500 - 2,000

- ignition ON

take care not to exceed RPM-Limit. When engine is cold (about 15 minutes after stopped) make a 5 minute warm-up at about 2,200 rpm before giving a higher power setting.

Note: A dive to 112 mph, 97 kts (101 km/h) uses 500 ft. (152 m) of altitude

6.7 Starting engine single handed (ground) for RF 4 D's without mechanical starter only

This procedure is neither dangerous nor difficult.

- parking brake set
- control stick fixed at aft position with safety belt
- choke pull
- fuel valve on
- ignition off
- throttle full open

Pilot stands at left side of cockpit by leading edge of the wing looking forward. Pilot's left hand turns propeller in its normal operating direction see section 4. page 20

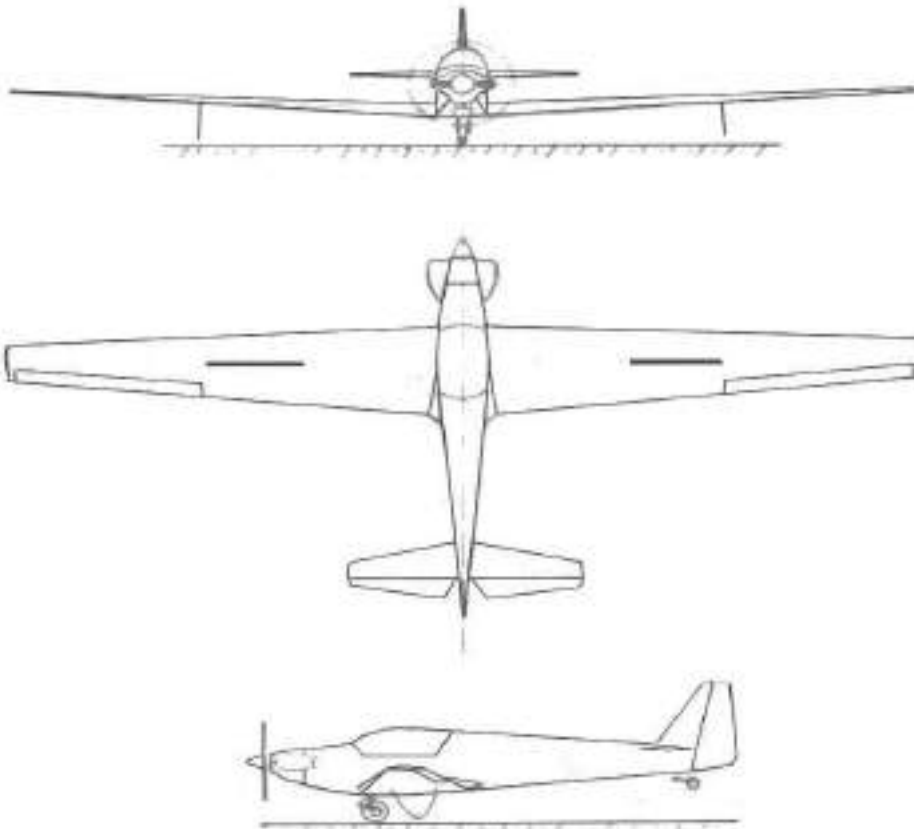
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3 - sides - view

| | | |
|--------|----------|-----------|
| Span | 41,40 ft | (11,26 m) |
| Length | 19,85 ft | (6,05 m) |
| Height | | |

| | | |
|-------------------|---------|----------|
| - flight position | 7,05 ft | (2,15 m) |
|-------------------|---------|----------|

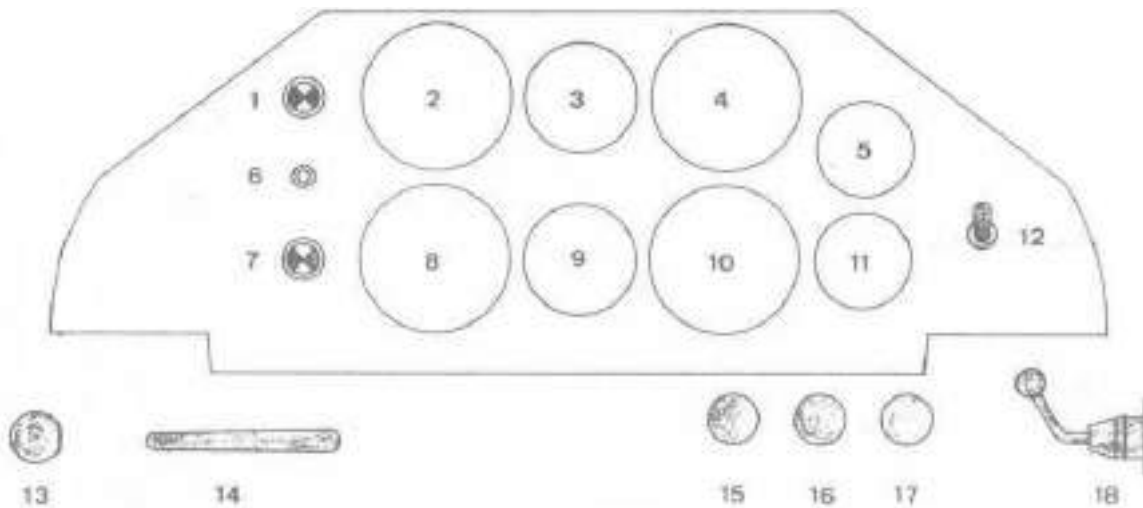
| | | |
|--------------------|---------|--------|
| - landing position | 5,15 ft | (1,57) |
|--------------------|---------|--------|



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Section 2

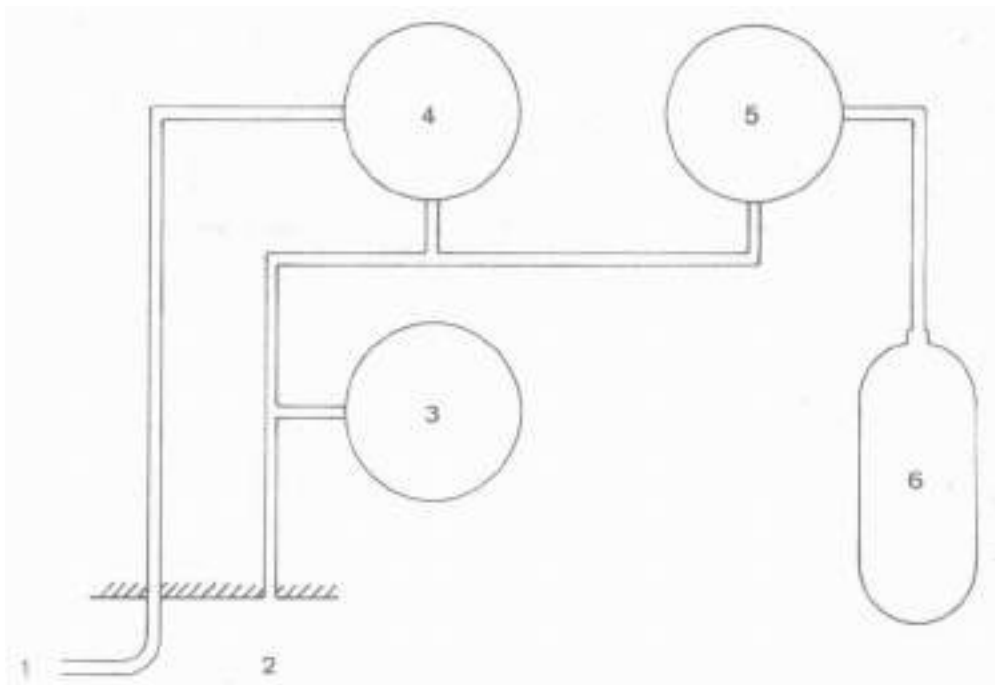
- 1 Stall warning light (red)
- 2 Airspeed indicator
- 3 Compass
- 4 Variometer
- 5 Oil Pressure indicator
- 6 Test button for warning device
- 7 Gear warning light (yellow)
- 8 Altimeter
- 9 Bank indicator
- 10 Tachometer
- 11 Oil thermometer
- 12 Ignition switch
- 13 Throttle
- 14 Parking brake
- 15 Decompressor (if installed)
- 16 Fuel valve
- 17 Choke
- 18 Trim lever



Section 3

Pitot System

- 1 Dynamic pressure (pitot tube)
- 2 Static pressure
- 3 Altimeter
- 4 Airspeed indicator
- 5 Variometer
- 6 Compensation bottle

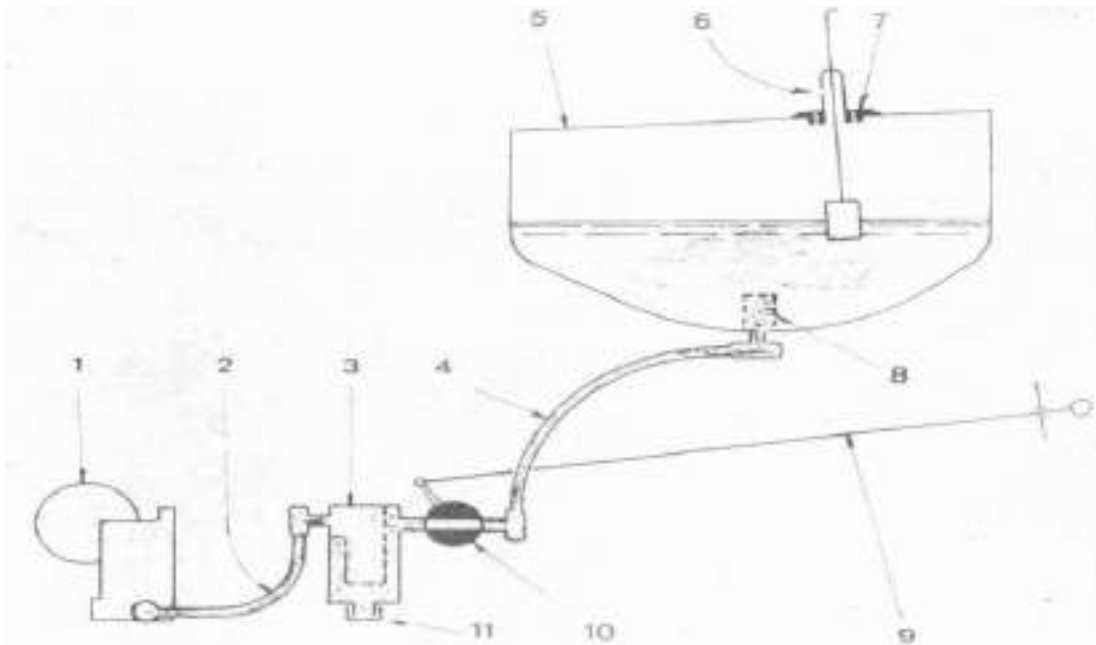


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Section 4

Fuel system

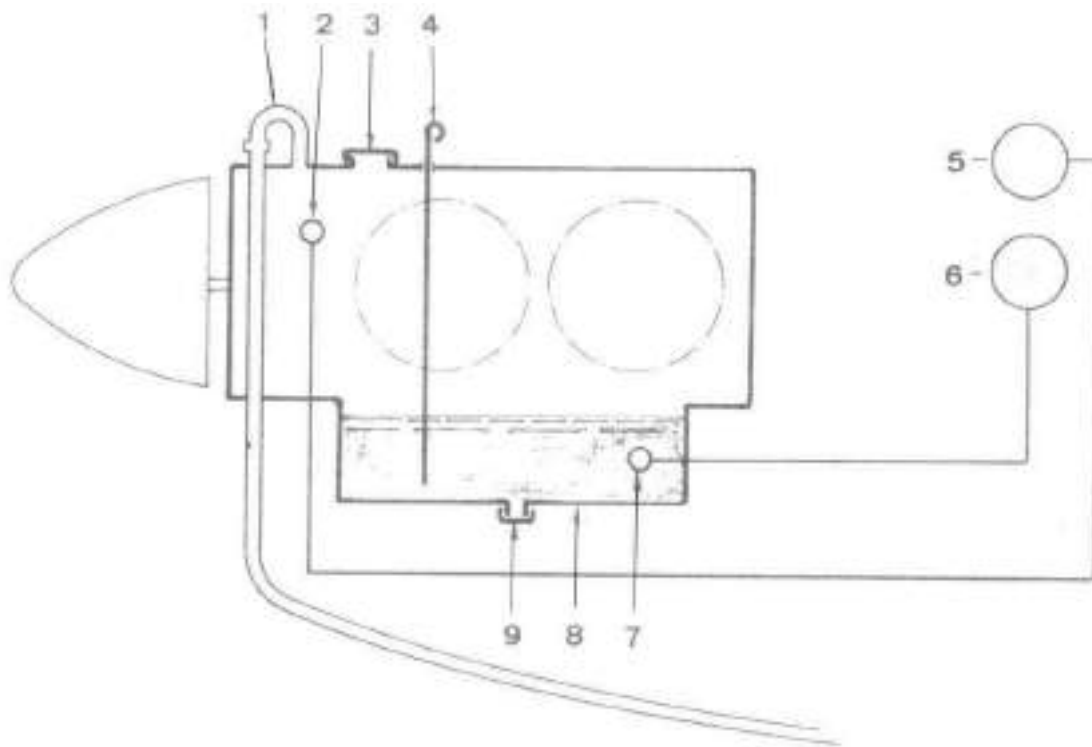
- 1 Carburetor
- 2 Flexible tube
- 3 Fuel filter
- 4 Flexible tube
- 5 Fuel tank
- 6 Small forward facing orifice (pressure) in tube the fuel cap **MUST FACE FORWARD**
- 7 Plug (Fuel cap)
- 8 Fuel sump and outlet
- 9 Fuel valve operator (lever)
- 10 Fuel valve
- 11 Drain



Section 5

Oil System

- 1 Air vent (breather)
- 2 Pressure sender
- 3 Filler orifice
- 4 Dipstick
- 5 Oil pressure indicator
- 6 Oil thermometer
- 7 Temperature sensor
- 8 Sump
- 9 Drain plug



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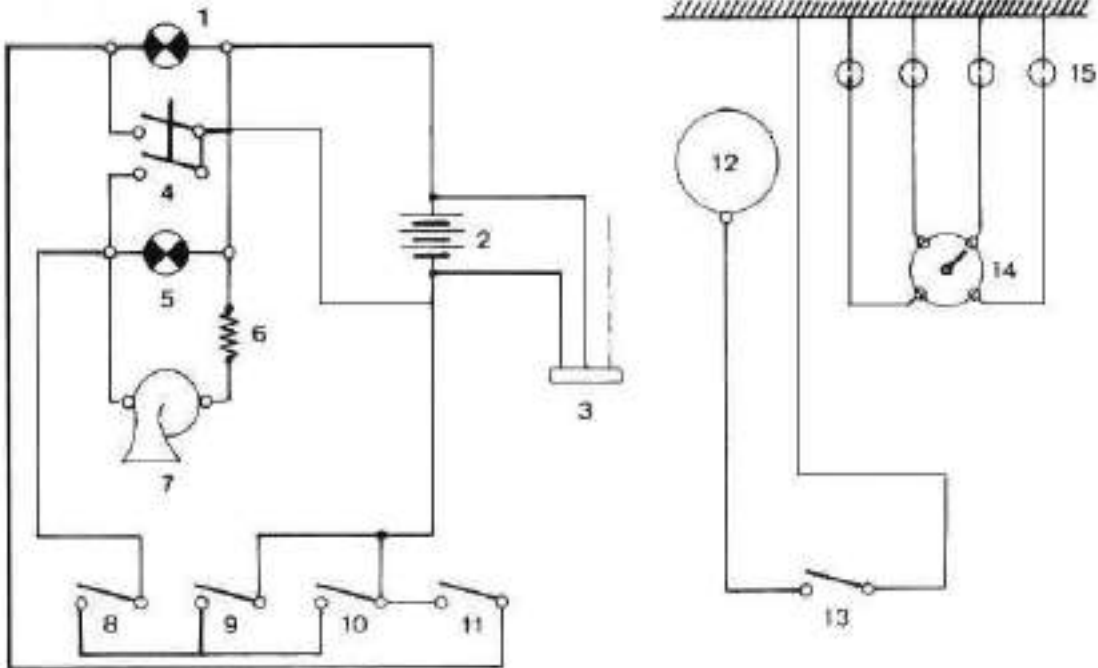
Section 6

Electric System A- safety system

- 1 Stall warning light (red)
- 2 Battery
- 3 Radio power plug
- 4 Test button
- 5 Gear warning light (yellow)
- 6 Resistor
- 7 Gear horn (buzzer)
- 8 Microswitch gear (contact: gear extended)
- 9 Microswitch spoilers (contact: spoilers extended)
- 10 Microswitch throttle (contact: throttle closed)
- 11 Stall warning detector

B- Ignition system

- 12 Magneto
- 13 Magneto switch (note: mag is hot with switch disconnected)
- 14 Distributor cap
- 15 Spark plugs

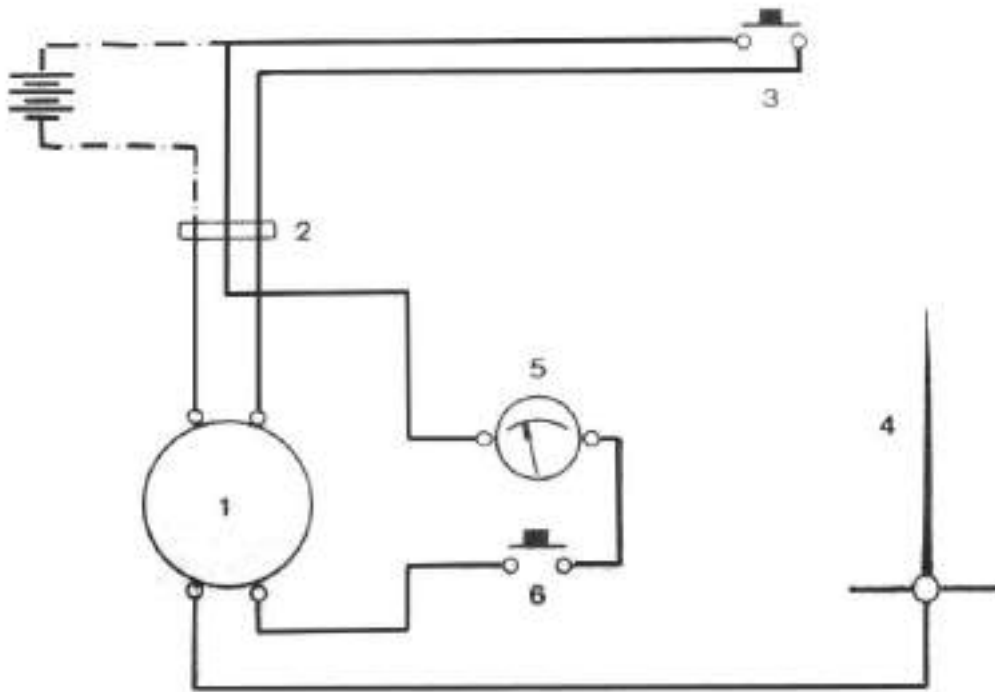


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Section 7

Radio System

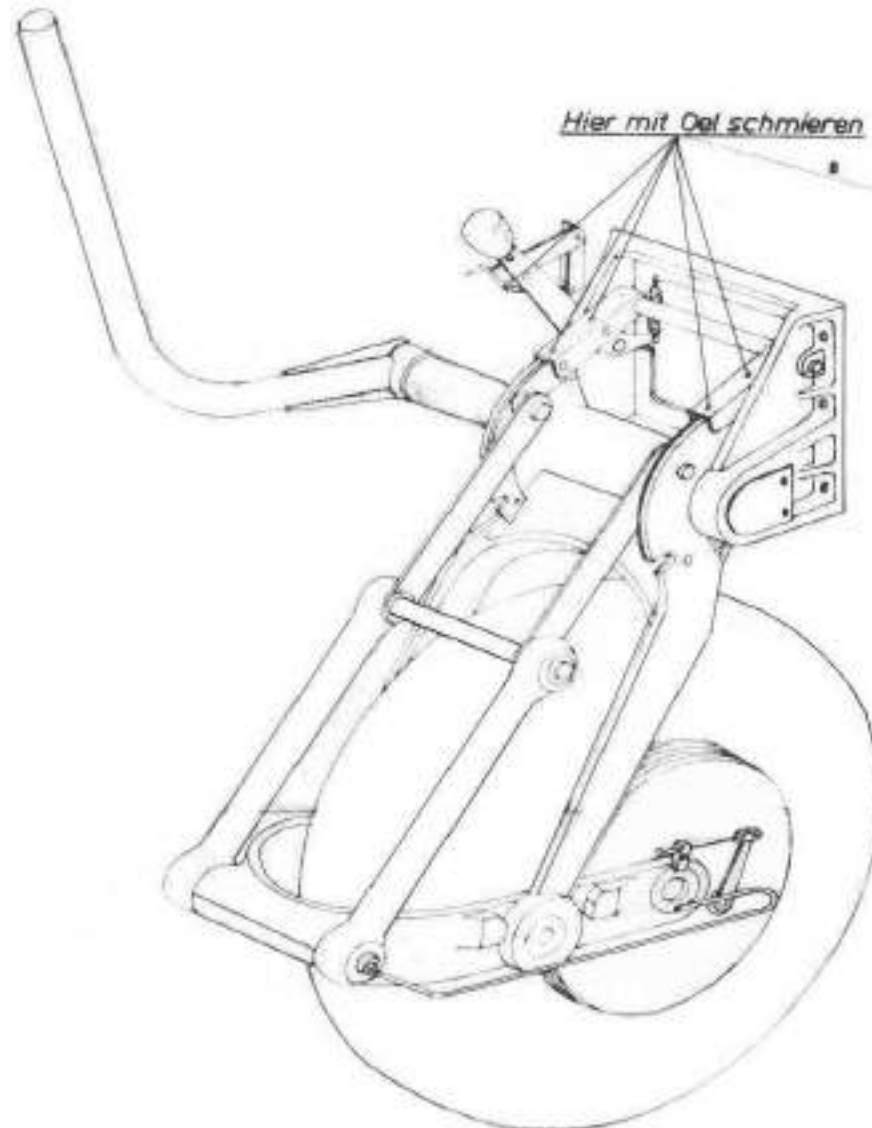
- 1 Radio AR 10 S or FGS 12
- 2 Mike connection box
- 3 Aerial
- 4 Stick button
- 5 Plug behind instrument panel



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Section 8

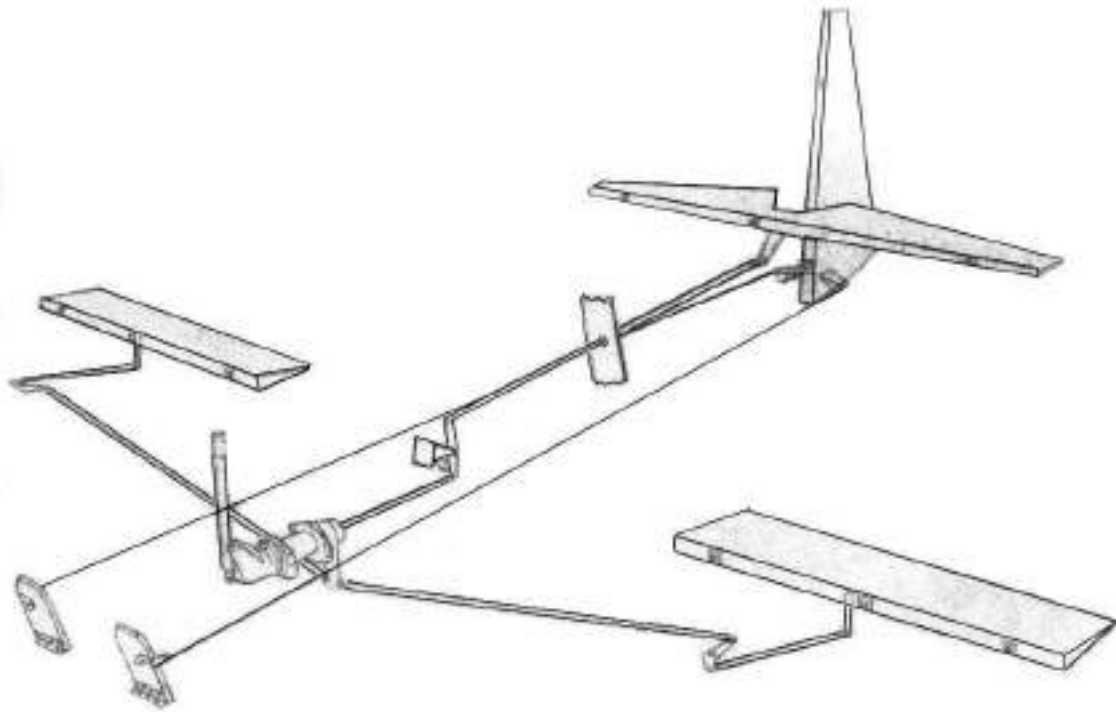
Landing Gear System



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Control System

Control System



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Maintenance Program

Every 25 hours

- change engine oil
- clean oil filter and magnetic plug at oil outlet
- clean fuel filter
- check the aircraft exactly as described in section 4, page 19

Every 50 hours

Same procedures as 25 hour check, additionally:

- check engine joints
- check bolts by special torque wrench (torque moments see schedule) but only after first 50 hours
- check condition of spark plugs, distance of electrodes .024" (0.6mm)
- clean carburetor (cleaning plug front side down)
- check and adjust engine idle speed, at throttle idle position it should be 700-800 rpm
- check and adjust engine valve clearance, clearance should be intake .008" (0.20mm) exhaust .012 - .014 (0.30 - 0.35mm)

Every 100 hours

Same procedures as 50 hour check, additionally:

- check engine compression

Every 250 hours

Same procedures as 100 hour check, additionally:

- change spark plugs (Champion L-85, Autolite AE 6, Bosch W 175)

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Magneto Check

- check condition of interrupter, if necessary change
- adjust interrupter
- adjust point on ignition

Schedule of torque moments

| | | |
|---------------------|------------------|-----------------|
| Cylinder head bolts | 22 -23 ft. lbs. | (3 - 3.2 mkg) |
| Propeller bolts | 18 ft. lbs. | (2.5 mkg) |
| Piston rod bolts | 36 ft. lbs. | (5.0 mkg) |
| Bolts 10mm | 25 - 26 ft. lbs. | (3.4 - 3.6 mkg) |
| Bolts 8mm | 15 ft. lbs. | (2.0 mkg) |
| Spark plugs 14mm | 15 ft. lbs. | (2.0 mkg) |

Lubrication

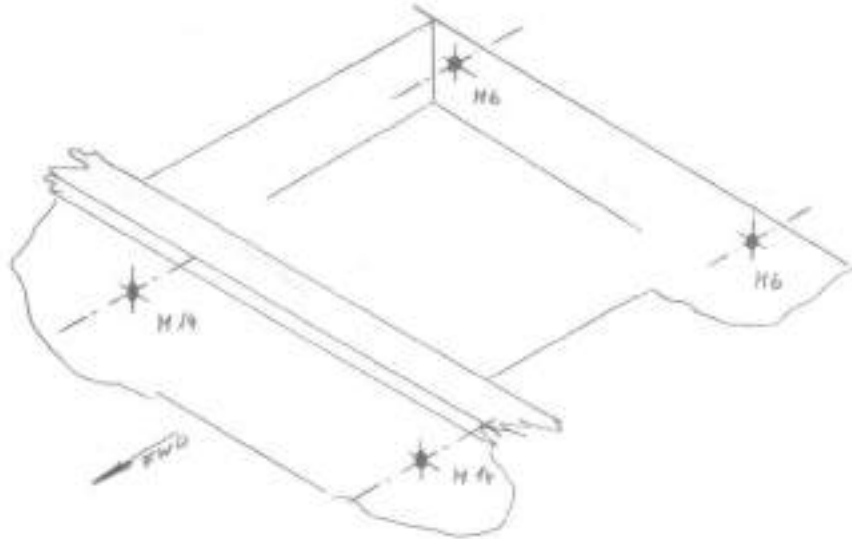
Parts; engine, carburetor swipec, magneto blanket, landing gear, control joints, stick joint

| <u>mean daily temperature</u> | <u>oil specification for engine</u> |
|-------------------------------|-------------------------------------|
| more than 68° (20° C) | SAE 30 or SAE 20w/40 |
| from 32° - 68° (0° - 20° C) | SAE 20 or SAE 10w/30 |
| less than 32° (0° C) | SAE 10w |

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Section 11: Disassembly and Assembly

11.1 Wing - Fuselage



Front connection: 2 bolts - M 14 with lock nut
Rear connection: 2 bolts - M 6 with lock nut

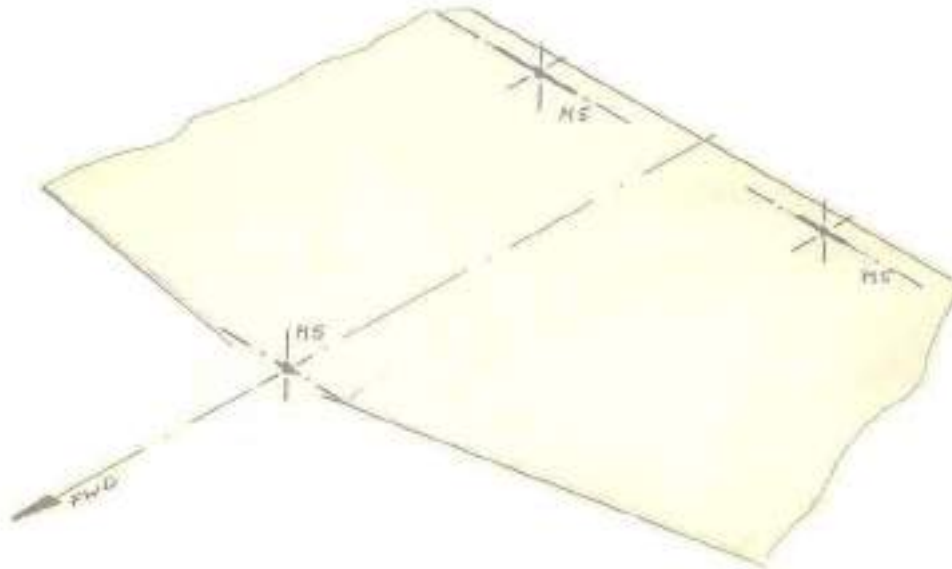
Disassembly Procedures

1. Remove left and right cowlings and plastic gear cowling inside fuselage.
2. Through opening under the fuselage disconnect elevator push rod and remove forward.
3. Disconnect stick bearings and remove forward.
4. Disconnect pitot and electric lines.
5. Remove air vents in the fuselage.
6. Remove both M 14 and M 6 lock nuts.
7. Lower trailing of wing slightly and move aft.

Assembly procedure by inverse sequence - Ensure regular - Nuts are to be tightened with a torque wrench (M 14 by max. 15 ft. lbs. 2 mkg, M 6 by max. 7 ft. lbs. 1 mkg). Care for no wood deformation of the wood!

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Section 11.2 Fuselage



Front connection: 1 bolt M 5 with lock nut
Rear connection: 2 bolts M 5 with lock nuts

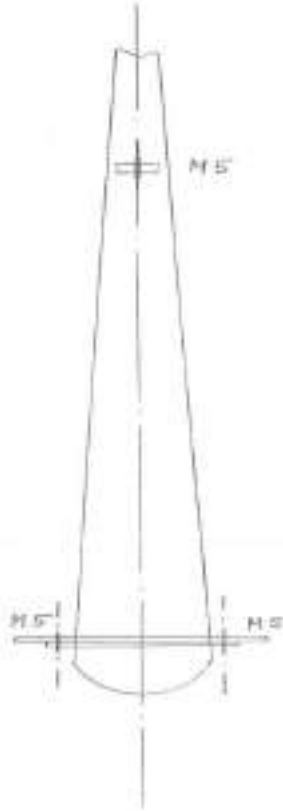
Disassembly Procedure

1. Remove cowling
2. Through opening at right side of fuselage disconnect elevator push rod
3. Disconnect trim push rod
4. Disconnect front and rear connection (for front connection special Inbus-tool is necessary).

Assembly procedure by inverse sequence. - Ensure regular securing.

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Section 11.3 Rudder - Fin



Upper connection: 1 bolt M 5 with lock nut
Lower connection: 2 bolts M 5 with lock nuts

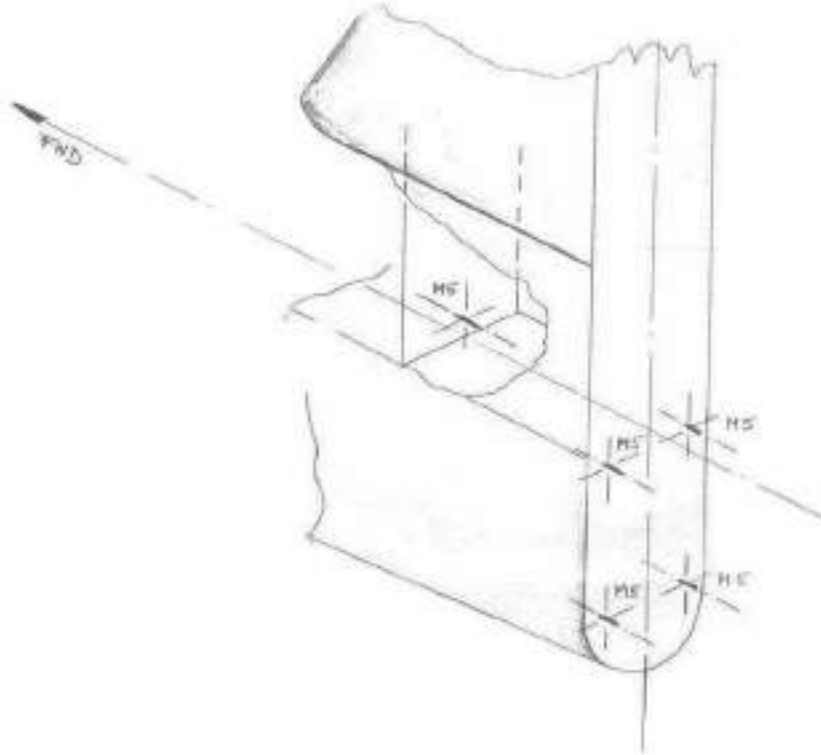
Disassembly Procedures

1. Disconnect both M 5 - bolts, which connect the rubber with the rudder - drive.
2. Disconnect upper M 5 - bolt

Assembly procedure by inverse sequence
Ensure regular securing

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Section 11.4 Fin - Fuselage



Front connection:

1 bolt M 5 with lock nut

Rear connections:

4 bolts M 5 with lock nuts

Disassembly Procedures

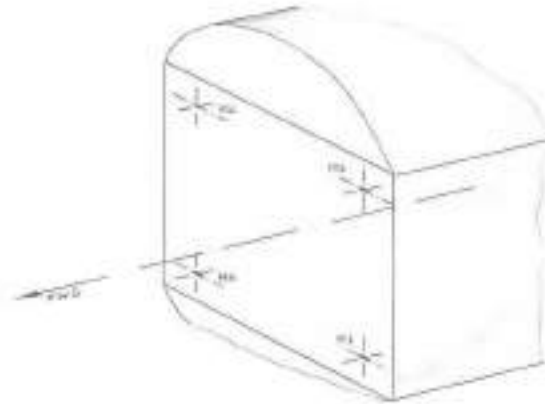
1. Remove cowling
2. Disconnect rudder cable and tail wheel springs
3. Disconnect and remove rudder (see 11.3)
4. Disconnect front and rear connections
5. Remove fin aft wards

Assembly procedures by inverse sequence

Ensure proper securing.

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Section 11.5 - Fuselage



Engine connection: 4 bolts M 6 with castle nuts and cotter pins

Disassembly Procedures

1. Remove upper and lower cowling's
2. Ignition off: Fuel cock off :
3. Remove propeller (see 11.6 - Caution! Engine ignition is on, if ignition cable is disconnected!)
4. Disconnect fuel line
5. Disconnect electric wires at carburetor (gear warning)
6. Disconnect ignition wire
7. Disconnect oil pressure and oil temperature
8. Disconnect throttle cable
9. Disconnect choke cable
10. Disconnect decompression or - if installed - starter cable
11. Disconnect tachometer - drive cable
12. Disconnect engine mount bolts and remove engine

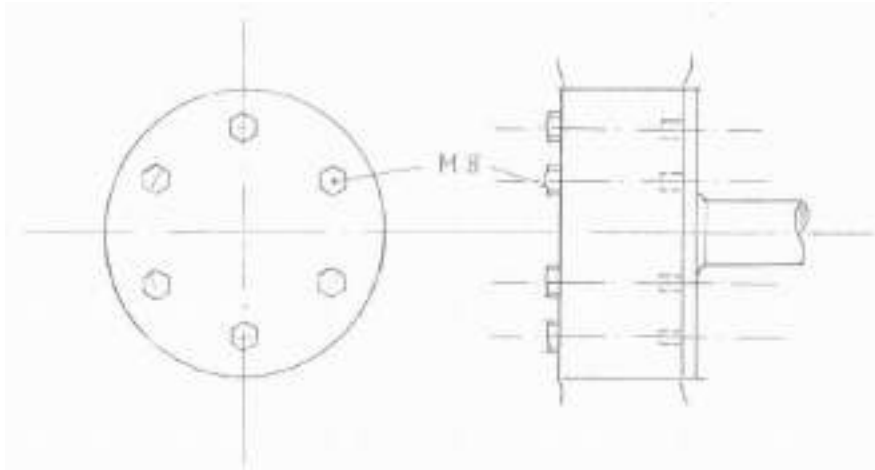
Care for stops on the fuel lines!

Transport of engine in special container only!

Assembly of engine by manufacturer or licensed shops only.

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Section 11.6 Propeller - Engine



Propeller connection: 6 bolts M 8 secured by safety wire

Disassembly Procedures

1. Remove spinner
2. Cut and remove safety wire
3. Remove the 6 bolts and propeller
Ensure safety - disc remains on the engine flange!

Transport in special container - if possible!

Assembly procedure by inverse sequence

M 8 bolts are to be tighten by torque wrench 14 - 18 ft. lbs.
(2 - 2.5 mkg) !

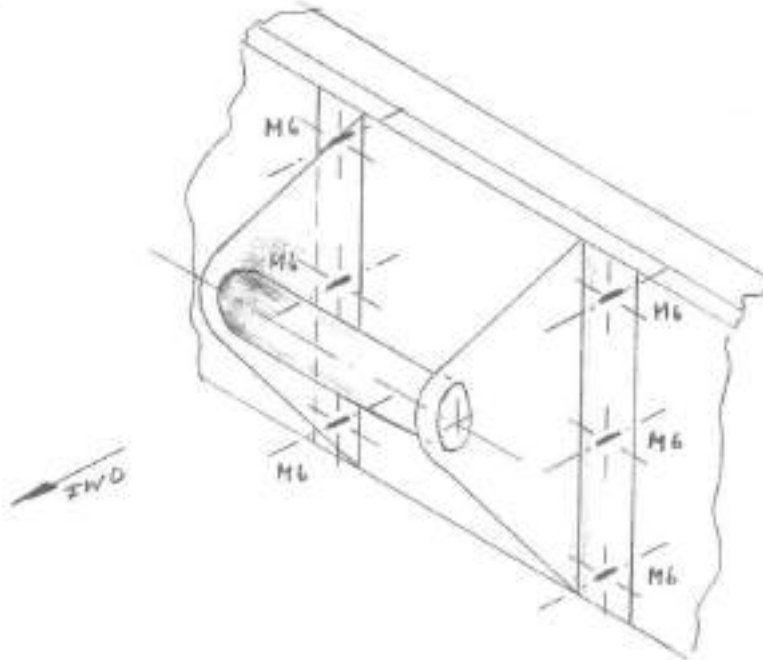
Ensure regular securing -

Check carefully the sit of the propeller:

Turn propeller through - propeller tips and trailing edges must show equal distance to a fixed point (e.g. gear claps). If there are little differences you can correct these by tighten the suitable connection bolts.

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Section 11.7 Gear - Fuselage



Gear - connection: 6 bolts M 6 with lock nuts

Disassembly Procedures

1. Aircraft free from ground, support at skids, engine and tail wheel
2. Remove gear cowling inside the fuselage
3. Disconnect elevator push - rod and stick bearings
4. Disconnect gear safety lock
5. Disconnect 6 gear nuts (bolts are secured for torsion)
6. Remove gear upwards

Assembly procedure by inverse sequence

Ensure regular securing - After assembly check proper function of gear, safety lock and warning device

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