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FLIGHT MANUAL and Maintenance Manual

SF 25 C - FALKE

motorglider

ROTAX 912 A (2)

or

~~ROTAX 912 S (1)~~

maximum all-up weight ~~580 kg / 610 kg / 650 kg / 690 kg~~

MARCH 1997



Serial no: 44643
Registration no: G-CDSC
Owner:

02 April 2009



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EASA.A.C. 11014 dated 02 April 2009
This manual is to be kept on board at all times



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Revision status of manual

Serial no.	Title	Pages affected	Date	Signature
1	Version of manual - valid for all weight versions. Instructions for use of vacuum pump	Title page, insert, 4, 5, 7, 10, 12, 13, 15, 16, 18, 25, 26, 27, 28	22.01.1998	<i>H. KlafA</i>
2	Correction to propeller drawing for MTV21A-C-F/(CF)175-05	Title page, 4, 7, 20, 21, 25, 26	31.10.1998	<i>H. KlafA</i>
3	Additional engine ROTAX 912 S () and editing change	Title page, insert, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20, 21, 22, 23, 24, 25, 26, 29	31.01.1999	<i>H. KlafA</i>
4	Following ROTAX SB 912-36R1, modification of procedure of power-setting for electr. Constant speed prop; Voltmeter instead of Ammeter	FM: Title page, 4, 8, 13, 16, 19, 26 MM: Title page, 10, 18, 19	15.01.2003	<i>H. KlafA</i>
5	New Cockpit canopy Electric Trim Servo with Position indication	FM: Title page, 4, 8, 11, 15, 24 MM: Title page, 2, 4, 15, 19, 21, 27, 28	20.05.2004	<i>H. KlafA</i>
6	Junction change of the push button switch with one piece canopy	FM: Title page, 4, 8, 16 MM: Title page, 18, 19	13.10.2005	<i>G. Nibbe</i>
7	Increase of the MTOW and the max. weight of non-lifting parts	FM: Title page, 3, 4, 5, 6, 7, 9, 10, 23, 25, 27, 29, 30 MM: Title page, 2, 22, 23, 24, 25, 26, 27, 28, 29	20.01.2009	<i>G. Nibbe</i>

The pilot is responsible for ensuring that the aircraft is operated in accordance with the Flight Manual.

The SF25C is authorised to carry a maximum of two adults.

The seating is side by side: the pilot sits on the port side.

The SF25C is ideal for training. For training purposes the instructor (P1) may sit on either side. All regulations must be observed.

The starboard control column may be removed for passenger flying.

1. Specifications and limitations

1.1. Engines

SF 25 C Engines	ROTAX 912 A (4) (2) (2) (1)	ROTAX 912 S (2) (2) (1)
Max. revs	5800 rpm	5800 rpm
Take off (full power) (max. 5 min)	Max. 5800 rpm 59.6 kW (82 PS/80bhp)	Max. 5800 rpm 72.5 kW (100 PS/98bhp)
Cruise at	Max. 4800 rpm (63 PS/62bhp)	Max. 4800 rpm (72 PS/71bhp)
and additionally	22 ins manifold pressure (only for variable pitch propellers)	
Static rpm at full power	Min. 5000 rpm \pm 100 rpm (Fixed pitch)	Min. 5600 rpm \pm 100 rpm (Fixed pitch)
	5600 rpm \pm 100 rpm (Variable pitch, fine pitch)	5600 rpm \pm 100 rpm (Variable pitch, fine pitch)
Cylinder head temperature max.	120°C	max. 120°C

1.2. Fuel

ROTAX 912 A ()	ROTAX 912 S ()
Min. ROZ 90	Min. ROZ 95
EN 228 Normal	----
EN 228 SUPER	EN 228 SUPER
EN 228 Super-Plus or	EN 228 Super-Plus or
AVGAS 100 LL	AVGAS 100 LL

Because of the higher lead content of AVGAS the valve seats are subjected to higher loads and there is increased carbon formation. Consequently AVGAS should only be used if there are vapour formation problems or if other types of fuel are not available. (see also Operating Manual for Rotax 912, section 10.2.2)

Fuel tank capacity

~~44 l (usable) or~~
~~55 l (usable) or~~
 80 l (79 l usable)

1.3. Lubricants

Branded engine oils with gear additive

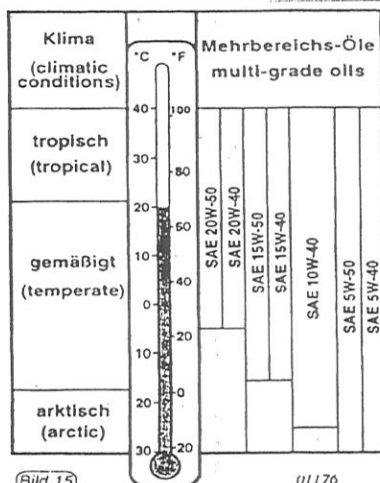
Never use unblended aviation engine oil.

Approved oils:

Use only API rated SF or SG oils. [Further details in Section 10.2.3) Lubricants in ROTAX 912 Operating Manual].

Synthetic & semi-synthetic oils should be used in preference as they are more temperature resistant and produce less residues.

- NB: If AVGAS 100LL is used, the oil must be changed more frequently. See Service Information 18 UL 97.



Oil capacity 3.0 l (minimum 2.0 l)

Oil consumption max. 0.1 l/hr

Oil pressure	<u>ROTAX 912 A ()</u>	ROTAX 912 B ()
min.	0.8 bar (< 3500 rpm)	0.8 bar (< 3500 rpm)
normal	2.0 - 5.0 bar > 3500 rpm	2.0 - 5.0 bar > 3500 rpm
max.	maximum 7.0 bar Δ Warning: Permissible for short duration on cold starting.	

Oil temperature	<u>ROTAX 912 A ()</u>	ROTAX 912 B ()
min.	50°C	min. 50°C
max.	140°C	max. 130°C
	best operating temperature approx. 90°C - 110°C	

1.4. Cooling system

Sealed cooling system with expansion and overflow vessel. The expansion vessel is sealed with a pressure cap (with excess pressure and blow valve).

Coolant: 50% antifreeze with anti-corrosion additives and 50% water, for all year round operation.

(see also ROTAX 912 Operating Manual, Section 10.2.1.)

1.5. Propeller

- 1) 2 blade fixed pitch
- a) Hoffmann HO11AHM-165130 for ROTAX 912 A(1), A(2) and A(4)
 - b) MT-Propeller MT165R130-2A for ROTAX 912 A(1), A(2) and A(4)
 - c) MT-Propeller MT170R135-2A for ROTAX 912 S(2) and S(4)
 - d) MT-Propeller MT175R130-2A for ROTAX 912 S(2) and S(4)
- 2) 2 blade variable pitch
- a) MT-Propeller MTV1A/175-05 for ROTAX 912A(2), ~~A(3), S(2), S(4)~~ ✓
 - b) MT-Propeller MTV21A-C-F/(CF)175-05 for ROTAX 912A(3), S(3)
- (factory setting of fine pitch for 912 A = $12^{\pm} 0.2^{\circ}$
for 912 S = $14^{\pm} 0.2^{\circ}$, see propeller card)

Δ ROTAX 912 A + variable pitch propeller: Not for max. A UW of 580 kg Δ

Δ ROTAX 912 S + fixed or variable pitch propeller: Only for max A UW of 650/ 690 kg Δ

1.6. Engine instrumentation and markings

Rev counter

Starting range	0 – 1400 rpm
Normal operating range	1400 - 4800 rpm (green arc)
Caution range	4800 -5800 rpm
Max. revs	5800 rpm (red line)

Engine hours counter

The engine hours counter is a revolution counter. Irrespective of the actual rpm it counts 5000 revolutions as 1 minute of operation. The first three digits represent completed hours and the last two digits show values for 1/10 and 1/100 of an hour respectively. If an electronic rev counter without engine hours counter is in use, then there must be a separate engine hours counter.

Oil pressure gauge

Minimal operating range	0.8 - 2.0 bar	
	0.8 – 1.5 bar	(for ROTAX 912 A, up to engine serial no. 4,410,266)
Normal operating range	2.0 - 5.0 bar (green arc)	
	1.5 – 5.0 bar	(for ROTAX 912 A, up to engine serial no. 4,410,266)
Permissible for short duration on cold starting	5.0 – 7.0 bar	
Maximum oil pressure	7.0 bar (red line)	

Oil temperature gauge

		ROTAX 912 A ()	ROTAX 912 S ()
Normal operating range (green arc)		50° - 140°C	50° - 130°C
Minimum temperature (red line)		50°C	50°C
Maximum oil temperature (red line)		140°C	130°C

Cylinder head temperature

Maximum cylinder head temperature (red line)	ROTAX 912 A	ROTAX 912 S
	120°C	120°C



1.7. Master switch

The master switch isolates the battery from the aircraft wiring. It is switched on at the start of the flight and off after the flight is completed. It may also be switched off whilst soaring engine-off. With engine running **only switch off in case of emergency** (e.g. short circuit, jammed starter relay or similar).

With the option "one piece cockpit canopy": (up to factory S/N 44709) If canopy lock mechanism is open, master switch is out of function. Engine is not to start, electric equipment doesn't work.

1.8. Circuit breakers

Except for the starter circuit the aircraft wiring system is protected from overload and short circuit by automatic circuit breakers.

Circuit breakers	Battery	25A
	Generator	20A

A short circuit or overload will trip the button of the circuit breaker affected, causing it to protrude. After correction of the fault the button is pressed in again to restore the circuit. As the circuit breakers get hot when they trip, they should not be pushed in again immediately.

If the battery is subject to heavy discharge (e.g. lengthy starting attempts in the winter) the alternator trip may pop out when the engine is running (e.g. in flight). If this occurs, push it in again after about 2 minutes or the battery will not be charged.

The 20 A generator fuse is in the form of a fuse switch and located next to the master switch (which isolates the battery from the aircraft wiring system, so that it can be isolated from all power sources in case of emergency. This means the alternator can be isolated from the aircraft wiring system in case of emergency by tripping the fuse switch.

1.9. Ammeter

When the engine is running, it does not usually indicate a charging current, which means that the battery is fully charged. If the battery charge is low it will indicate the battery charge (the pointer will indicate + or -).

If a large number of consumers are in operation or if there are no consumers in operation, but the engine is not running, the ammeter will indicate battery discharge (the pointer will indicate -). A continuous reading of over + 10 A indicates that the battery is no longer able to hold a charge or that the generator regulator is faulty.

Instead of this ammeter a Voltage indicator can be used together with a low voltage lamp (see MM, wiring diagram)

1.10. Antenna connection

A radio antenna is incorporated inside the fin. The antenna coax cable is routed from the fin to a position under the luggage compartment where the remaining length is coiled and secured. From there it can be routed to the radio. The appropriate regulations must be observed when fitting the radio.

1.11. Connecting other consumers.

Further circuit breakers may be added to the terminal bar for additional consumers. This applies to ACL, nav lights, VOR, transponder, encoder etc. It is important to ensure that the additional equipment is using the correct fuse rating.

The aircraft wiring system is 12 V DC, negative ground.
The appropriate regulations must be observed when fitting additional equipment.
The fuses on the firewall can be replaced with state of the art circuit breakers.
There is then no need for spare fuses and a visual check can be made to see which system has tripped out.

The appropriate regulations must be observed when fitting additional equipment.

1.12. Airspeed limitations and load factors

This table shows maximum airspeeds under different conditions:

	Speed		IAS		Comment
			Kph	knots	
V_{NE}	Maximum speed in calm conditions		190	102	Never exceed this speed. Control surface movements must be limited to one third travel.
V_{RA}	Maximum speed Rough air	max. weight 580/ 610 kg	150		Do not exceed this speed except in calm air conditions and then only with caution. See Note 1.
		max. weight 650/ 690 kg	160	86	
V_A	Manoeuvring speed	max. weight 580/ 610 kg	150		See Note 2
		max. weight 650/ 690 kg	160	86	
V_W	Winch launch speeds	max. weight 580/ 610 kg	100		Only permissible with engine stopped
		max. weight 650 kg	110		

Note 1: Rough air means conditions which may be encountered in wave rotor, cumulo nimbus clouds, whirlwinds and when flying over mountain ridges.

Note 2: At speeds in excess of V_A do not make full or abrupt control movements, as they could overstress the aircraft.

Airspeed indicator markings.

Marking	Speeds		Explanation	
	kph	knots		
green arc	max. weight 580/ 610 kg	80 - 150	43 - 80	Normal operating range, see Note 3
	max. weight 650/ 690 kg	80 - 160	43-86	
	max. weight 580/ 610 kg	150 - 190	80 - 102	Caution range see Note 4
	max. weight 650/ 690 kg	160 - 190	86-102	
red line		190	102	Maximum permissible speed for all operating modes
blue line	ROTAX 912 A	90	49	Best rate of climb
	ROTAX 912 S	95	51	
		90	49	Minimum approach speed at maximum weight

Note 3: The lower limit applies to maximum weight and most forward CG position. (V_{S1} is the minimum speed with spoilers extended)
The upper limit is the maximum rough air speed.

Note 4: In this range manoeuvres must be conducted with caution and only in calm air conditions.

Δ Warning: The following loads must not be exceeded when flying accurately:

With spoilers closed		
at manoeuvring speed:	(150 kph = 80 knots)	+5.3g
at maximum speed	(190 kph = 102 knots)	+4.0g
With spoilers extended		+3.5g

1.13. Weights

Empty weight (dependent on type of undercarriage and equipment) approx. 400kg-450kg

Permissible load including fuel approx. 200kg

Maximum permissible AUW (all up weight) *) ~~580kg/ 610kg/ 650kg/ 690kg~~

Maximum weight of non-lifting components *) ~~430kg/ 450kg/ 490kg/ 500kg~~

*) Delete as appropriate

See Maintenance Manual pp. 24 and 25

1.14. Centre of Gravity at flying weights

Aircraft position:	Wing chord rib 6 (2.2 m = 86.61" from centre line (horizontal))
Datum:	2.0 m in front of leading edge of rib 0 (0.52 m = 20.47" from the centre line)
Forward limit of CG:	2.143 m = 84.35" aft of datum
Rearward limit of CG:	2.334 m = 91.89" aft of datum

1.15. Placards

The following placards are in addition to the fireproof Nameplate and Dataplate:

1. On the port side of the cockpit by the control lever:

Spoilers
full travel operates wheel brake

2. On the instrument panel, by the controls:

Choke - pull for rich	Fuel
Ignition - on - off	Ventilation
Fuel - on - off	Starter
Master switch - on - off	Heater - pull - open
open - Cowl flap - closed or	Cowl flap pull to open
Carburettor heat	Pull - on

3. By the canopy emergency jettison handle:

Emergency canopy release: Pull on front and top handles, throw clear to the right

or by the upper knob with canopy lock

Emergency canopy release: Open the top canopy lock by turning, pull the emergency jettison handle, lift canopy and throw off to the right

4. On the rear wall of the luggage compartment

Luggage - max. 10 Kg (22 lbs.)

5. Between the seats by the trimmer lever:

nose down - Trimmer - tail down

or on the port side of the cockpit

tail down - Trimmer - nose down

or near by the Rocker switch for the Trimservo and near by the Trim position indication





6. On the fuselage near the fuel tank filler cap
for ROTAX 912 A for ~~ROTAX 912 S~~

Unleaded petrol - MOGAS Minimum ROZ 90, SUPER unleaded SUPER-Plus-unleaded or aviation fuel AVGAS 100 LL Tank capacity: 44 l, 55 l or 80 l	 SUPER unleaded MOGAS Minimum ROZ 95, SUPER-Plus-unleaded or aviation fuel AVGAS 100 LL Tank capacity: 44 l, 55 l or 80 l
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7. On the fuselage by the mainwheels if 2 wheel undercarriage or by the sprung mainwheel

2.1 bar

By the main wheel (sprung single mainwheel undercarriage)

1.8 bar

8. By the tailwheel:

2.5 bar

By the nosewheel:

1.5 bar

9. By the oil filler cap

Oil capacity 2.3 l

10. On the instrument panel:

Caution Switch off all sensitive electrical equipment before starting or stopping the engine	Caution Wet wings – see Flight Manual
--	---------------------------------------

Engine running = cowl flap open

NO SMOKING

11. Near the CG hook release:

Cable release

12. On the fabric covering above the CG hook release:
for $G_F = 650$ kg and 610 kg

Weak link max: 850 daN

for $G_F = 580$ kg

Weak link max: 500 daN



13. On the instrument panel:

PRE TAKE-OFF CHECKS
Folding wings secured (if applicable)
Harness fastened
Trimmer set
Spoilers closed
Tailwheel locked (if castoring tailwheel)
Canopy locked
Controls: full & free movement
Fuel shut-off valve: open
Fuel gauge: check
Cowl flap open
Propeller set for take-off (if variable pitch)

14. By the electric fuel gauge:

~~44 l usable~~

or

~~55 l usable~~

or

79 l usable

15. On the top of the engine cowling behind the propeller:

Δ WARNING Δ
Never turn the
propeller backwards

1.16 Approved operation

The SF 25 C „Falke“ motor glider is approved for VFR daytime operation only.

Δ Warning Δ

Not permitted: IFR flying, flying in icing conditions, aerobatics and spinning.

2. Operating instructions

2.1. General

The Falke is a self launching motor glider. It may be flown with an MGPPL (Motor Glider Private Pilot's Licence).

It is of course necessary for the pilot to have a thorough understanding of motor gliders and operating the engine.

It is obligatory to study the documentation and to gain a thorough knowledge of the motor glider and its engine.

2.2. Daily inspection

It is necessary to examine the airframe, the engine and the propeller for airworthiness before flying, especially if it has been rigged since the last flight. Essential checks:

2.2.1. Airframe

Check in particular for correct functioning, security and condition (no cracks or deformations); also check bearings and drives for lack of play.

1. Check the 4 wing attachment points, the seating and security of the main pin and check that the two rear wing attachment points are secured (only in case of folding wing).
2. Check that the aileron controls in the fuselage are connected and secured
3. Check that the spoiler controls in the fuselage are connected
4. Check the controls from the cockpit for full and free movement. Check that the starboard control column is secured
5. Check rudder pedals (and nosewheel steering if applicable). Check for correct adjustment and locking of rudder pedals
6. Check pulleys, fairleads and cables for wear and kinking
7. Check operation of spoilers from the cockpit.
8. Check correct operation and effectiveness of the wheel brakes.
9. Check the instruments and check the radio with a test transmission.
10. Pitot. There is a drain facility in the pitot, which is accessible through the handhole under the tailplane. Check especially after exposure to rain or after road transport and drain as necessary.
11. Check that the safety harness and their fittings are in proper condition and secure.
12. Any luggage must be secured by the straps provided
13. Check for foreign objects
14. Check the canopy, canopy lock, canopy jettison system and direct vision window
15. Check that the spar cover plates at the wing/fuselage interface on both sides of the fuselage are in position and secure.
16. Check that both outriggers are in good order and correctly attached (only applies in the case of single mainwheel under-carriage).
17. Check both pushrods at the ailerons
18. Check the wing folding attachments & the aileron drives at the folding points (if applicable) are secured; check that the wing joint fairings are secure
19. Check that both ailerons are attached and secured

20. Is the tailplane forward attachment tightened down and secure?
21. Check the elevator connection is locked.
22. a) Check the trimmer connection by Bowden cable at the elevator or
b) electric plug for Trim servo fitted (Diod plug)
ground function test of Trim system
23. Rudder.- Check rudder bearings and cable connections. Check the tailwheel pushrod at the rudder drive lever (with castoring tailwheel) and the tailskid, check all locking arrangements and that the rudder movement is in the correct direction.
24. Check that the tailwheel and the steering pivot are clear to rotate and do so freely.
25. Check the underside of the front of the fuselage and the fuselage underside for damage (risk of exhaust gas penetration).
26. Check the general condition of the mainwheel(s), the tailwheel or nosewheel and the outriggers (if applicable) and also all tyre pressures.
27. Check the planking, fabric covering and paintwork for damage.
28. Caution: Remove the towbar from the nosewheel (if applicable).
29. Check the operation of the CG release hook.

2.2.2. Engine (see also Engine Manual)

1. Check the engine thoroughly for missing or loose nuts, screws, bolts and locking arrangements. Check cooling ducts, ignition leads for security and condition. Look out for chafing.
2. Check that the following operate freely: throttle, choke, heating, ventilation and carburettor heating flap and engine cooling flap.
3. Check that the rubber flanges on the carburettor are undamaged (no cracks).
4. Check the oil level and top up if necessary. ⚠ Caution. Run the engine for about half a minute before checking the oil. (Before a long flight the oil level should be at least halfway up between marks on the dipstick.)
5. Check the coolant and top up if necessary. The fluid level in the overflow reservoir should be at least 2 – 3 cm when the engine is cold (see Engine Manual).
6. Check oil, fuel supply and cooling systems to ensure freedom from leaks and abrasion.
7. Operate the tank drainer before moving the motorglider.
8. Check the engine mountings and their locking arrangements.
9. Check the exhaust system for damage, leaks and general condition.
10. Check the engine compartment for foreign bodies.
11. Check the cowling for cracks, reassemble and check the patent fasteners are correctly seated.
12. Check the fuel tank level
13. Check the tank vent. Use only the original filler cap with vent (bearing the words "Patent blau").

2.2.3. Propeller (see also Propeller Handbook)

2.2.3.1. Electric Constant-Speed-Propeller MTV1A/175-05 and

~~Hydraulic Constant-Speed-Propeller MTV21A-C-F/(CF)175-05.~~

1. Check the condition of the blades and the spinner (no cracks).
2. Check for play at the propeller tips (up to 3 mm is permissible).
3. Check for play in pitch at the propeller tips (up to 2° is permissible).
4. Check propeller blades for cracks and that the leading edge protective tape is intact.
5. ~~Propeller hydraulics: operating pressure 125 psi (9.0 bar). Check every 50 hours and top up as necessary (using nitrogen if possible). Only for MTV 1A~~
6. Check propeller pitch movement with master switch on and engine off.
7. Check the commutators and brushes together with the electrical wiring.

~~2.2.3.2. Fixed pitch propeller~~

- ~~1. Check condition of the blades. (no indentations or splintering)~~
- ~~2. Check the spinner for cracks.~~
- ~~3. Is the leading edge protection intact?~~

2.3. Pre take-off checks

1. Folding wings secured (if applicable)
2. Canopy closed and locked
3. Safety harness secure
4. Trimmer set for take off
5. 360° tailwheel locked (if applicable)
6. Spoilers closed and locked
7. Check for full and free movement of the controls
8. Fuel shut-off valve open
9. Sufficient fuel in tank
10. Cowl flap open
11. Propeller set to take-off pitch (if applicable)

2.4. Starting the Motorglider

Has the pre-flight inspection been completed? Move the throttle to full power, check for freedom of movement and full travel and return to idle position.

Δ **Caution:** Wheelbrake on, ignition off

In cold weather conditions turn the propeller several times by hand before starting* and check for unusual noises and stiffness in the motor and also for even compression. (See also Engine Manual: Check the mechanical components) Before starting the engine, close the canopy. Before starting, check that all the electrical trips (but not those of sensitive electronic equipment such as radio, transponder, Avionics master switch etc.) are pressed home. After the pilot has confirmed that the propeller area is clear, start the engine.

With the option "one piece cockpit canopy" (starting from factory serial number 44710): If canopy lock mechanism is open, the push button for the engine starter is out of function. Engine is not to start

NEVER turn the propeller backwards
 Δ Also if there is a vacuum pump for gyroscopic instruments (or damage to the pump blades will result).

2.4.1. Starting the engine (see also Engine Manual)

Before starting, ensure that someone is standing to the left at the front of the machine to make sure that no-one is near the propellers.

It is essential to keep warning people about the dangers and possible fatal results of coming into contact with the propeller – especially spectators.

Starting the engine:

Parking brake:	Apply
Engine cowl flap:	Open
Fuel cock:	Open
Additional fuel pump:	On (if fitted as an option)
Choke:	Pull (no choke if engine already warm)
Carburettor heat:	Off (if fitted as an option)
Propeller setting:	Fine pitch (electric propeller set to Auto)
Throttle:	Idle (if engine cold)
Master switch:	Sensitive electrical equipment (radio etc.): Off
Ignition switch:	On (both)
Propeller clear?	Shout: "Clear prop!"
Starter button:	Press

Δ Caution: Do not press the starter button for more than ten seconds. Before trying again allow 2 minutes for cooling off.

As soon as the engine starts release the starter button and set the throttle so that the engine runs at about 2,500 rpm. Check that the oil pressure rises within 10 seconds of starting and continue to monitor it. Do not increase engine revs until the oil pressure has settled down above 2 bar. Push the choke in fully.

If the engine does not start after several attempts, refer to Section 12 of the Engine Manual (Troubleshooting).

Δ Caution: As the propeller has a reduction gear it is important to adhere to the following procedures.

To avoid a sudden load the throttle should be set to idle before starting the engine. Do not open the throttle more than 10% of its travel. For the same reason, after throttling back the engine, the engine revs should not be increased for about 3 seconds to allow the engine speed to stabilise.

When testing magneto circuits, only one circuit should be switched on or off at any one time.

Δ Caution: Never operate the starter when the engine is still turning. Wait until the engine has stopped turning.

2.4.2. Hand starting the engine

Not applicable. This would be extremely difficult in view of the reduction gearing.
The risk of injury would be too great.

2.4.3. Warming up, static rpm check (see also Engine Manual)

Warming up: Parking brake: set. Elevator: up.

During warming up: Monitor the engine instruments, let the engine run at 2,000 rpm for about 2 minutes, then continue warming up at 2,500 rpm until the oil temperature reaches 50°C. The time required will vary according to the air temperature.

Check fuel supply: brief running at maximum rpm

~~min 5,000 ± 100 rpm for the MT165R130 2A fixed pitch propeller~~

~~min 5600 ± 100 rpm for the MT170R135 2A fixed pitch propeller~~

~~MT175R130 2A~~

or: min 5,600 ± 100 rpm for variable pitch propellers

⊗ Caution: After running at maximum rpm the engine should be allowed to cool off somewhat to avoid vapour formation in the cylinder head.

The engine can also be warmed up whilst taxiing to the take-off point. The magneto test is carried out at 4,000 rpm. The maximum rpm drop for each circuit is 300 rpm. The maximum rpm difference between the two circuits must not exceed 120 rpm.

2.4.4. Taxiing

The Falke can taxi unaided and is steered on the ground with the tailwheel which is linked to the rudder (or nosewheel). Minimum turning circle about 15m with tailwheel, about 5m with nosewheel. The wheelbrake on the mainwheel is effective and will always stop the motor glider quickly. The two wheel undercarriage version of the Falke (with non adjustable pedals) is also equipped with heelbrakes for the pilot (left seat). The taxiing turning circle can be reduced by applying one heelbrake. During ground handling it is helpful for an assistant to go to the rudder and turn it to control the tailwheel. The tricycle undercarriage version can also be steered with a towing bar attached to the nosewheel.

One version of the Falke has an unlockable 360° pivot tailwheel for maximum manoeuvrability on the ground. This means the aircraft can be rotated around one mainwheel (two wheel version only). The tailwheel must be locked before take off.

2.5. Take off and climb

⊗ Caution: See also 2.12 Wet wings - warning)

Pre-flight check list (see 2.3 or the placard in the cockpit), trim neutral, spoilers closed and locked, control column central (do not push the column forwards)

Climb power (5 minutes only) max 5,800 rpm, throttle fully open
(available for take off and climb for up to five minutes)

Allow the speed to build up to 49 – 51 knots, then climb at not less than 49 knots (ROTAX 912 A) or not less than 51 knots (ROTAX 912 S).

At the longest after 5 minutes reduce to max. Continuous power and/ or rpm

~~For fixed pitch propeller: $n_{max} = 4800$ rpm~~

for Constant-Speed-Propeller: $n_{max} = 4800$ rpm and 22 inHg manifold

Continue climbing to about 1,000ft, ensuring that the airfield remains within gliding range at all times.

To avoid excessive noise, the prop speed can be reduced by about 150 rpm as soon as a safe altitude is reached (175 – 250 ft).

The engine power is not reduced in the case of variable pitch props (full power, maximum 5 minutes) but the prop speed can be reduced to 5,000 – 5,500 using the propeller speed control lever. Check the rpm, oil pressure, oil temperature and cylinder head temperature. Check they are all in the permitted green arc. A faster climb speed is preferable as the engine is cooled better at higher flying speeds, especially during hot weather. Monitor the engine temperature especially closely during a long climb and in hot weather. If the engine temperature is approaching the limit, there are two options, and both reduce the rate of climb: fly faster or reduce engine power. The cowl flap must be fully open. During cruise the optional additional fuel pump can be switched off.

2.5.1. Winch start

The SF 25 C can also be fitted with a winch launch hook. Winch launches are permitted only with the engine stopped and the propeller horizontal. The winch launch is similar to that of any other glider.

Max. winch launch speed: for $G_F = 580 kg = 54$ knots $G_F = 650 kg = 59$ knots.
Weak link: 500 daN $610 kg$ 850 daN.

The trimmer should be set slightly nose heavy.

2.5.2. Aerotow

The SF 25 C is not approved for being aerotowed by a tug. The SF 25 C can only be winch launched using the CG hook.

2.6. Cruise

Cruise is possible from 43 knots upwards (very low engine power). Best cruise: approx. 65 knots at approx. 4,400 rpm, but do not exceed max cruise rpm of 4,800 rpm.

2.7. Landing

Before starting the approach, complete the following prop adjustments:

~~⇒ hydraulic variable pitch prop: set to fine pitch (grey knob fully forwards);~~

⇒ electric variable pitch prop: turn speed control knob on control unit to:
23 \approx 2300 rpm (Prop) = 5230 rpm (engine) (P120A for ROTAX 912 A) or

~~22 \approx 2200 rpm (Prop) = 5340 rpm (engine) (P120/2400 for ROTAX 912 S).~~

Engine cowl flap: Open

electric fuel pump: On.

Carburettor heat (optional): Pull.

The SF 25 C can be landed with the engine running or stopped. Approach speed: approx. 49 knots. Control the approach angle with the spoilers. The approach can also be corrected by side slipping, though this is rarely necessary as the spoilers are effective. With spoilers fully extended the rate of sink is about 780 ft/min at 49 knots.

When landing at minimum speed (about 38 knots) the Falke will touch down tailwheel first (tricycle undercarriage version; mainwheels first). The ground run can be reduced effectively by using the mainwheel brakes and is about 100 m. The wheelbrake is operated by the last part of the travel of the spoiler lever.

Δ **Caution:** Never land with the spoilers fully extended at touchdown.

The two wheel undercarriage version of the Falke (with non adjustable pedals) is also equipped with wheelbrakes for the pilot (left seat). If the wheelbrakes are used to reduce the ground run, they must be used evenly to avoid swerving.

2.8. Stopping and starting the engine in flight

Before switching off the engine, allow it to run cooler at about 3,000 rpm for about 30 seconds, then close the throttle to idle, turn off sensitive electrical equipment and only then switch off the ignition. Speed for switching off engine in flight: 43 – 46 knots. Keep the airspeed low whilst the engine is stopping, to avoid prolonged run-on. After it has stopped the propeller can be turned to a horizontal parked position by blipping the starter motor. Switch off as many electrical consumers as possible.

Glide setting for MTV21A-C-F/(CF)175-05:

At reduced power (about 21 inches manifold pressure) set the rpm to >4,200 rpm using the prop speed control lever (grey knob on instrument panel).

Reduce to about 3,500 rpm using the throttle. Move the grey prop control knob to maximum pitch.

Ignition: switch off.

Throttle: Idle.

Glide setting for MTV1A/175-05: The lever of the electric prop pitch control unit (Take-off – Auto – Glide) should be set to glide.

Fixed pitch propeller:

Engine:

Idle.

Ignition:

Off.

Engine cowl flap:

Close.

Before starting the engine in flight:

Engine cowl flap:

Open

Ignition:

On (BOTH).

Electric fuel pump:

On (if fitted).

Sensitive electrical equipment (radio etc.):

Off

Δ CAUTION Δ

The MTV1A/175-05 electric variable pitch propeller requires about 1 minute to change from feathered glide setting to power pitch.

Operating setting for MTV1A/175-05:

Move selector lever on electric constant speed prop control unit to **Auto** and check that the green light comes on.

Turn the speed setting knob to about 21 (912A) or 20 (912S) which equates to about 4800 rpm.

Move the throttle control lever to about 10% power.

Operate the starter.

If the engine is cold, throttle on idle, choke pulled fully out.

Operating setting for MTV 21 A-C-F/(CF) 175/ 05: Push the prop speed control knob fully forward to fine pitch and then pull it out again about 2 cm (setting for about 5,000 rpm).

Δ Caution: Δ

Check that the engine does not overspeed on start up
(see Section 5.15 of the Propeller Handbook).

The rpm of the MTV 21A-C-F/(CF)175-05 hydraulic variable pitch propeller should be left at about 5,000 rpm. After starting the engine, do not use much power whilst it is warming up. Flying speed should be at least 44 – 49 knots. Do not use full power until the engine temperatures are in the green arc. The height loss during restarting is usually about 500 - 600 ft.

◆ **Warning:** If there are variations in rpm or uncontrolled pitch changes when using the MTV1A in AUTO setting:

Immediately trip the prop pitch circuit breaker.

(See also Propeller Handbook)

2.9. Flying with the engine stopped

The Falke flies well at 44–52 knots, with a sink rate of about 1.2 m/s in straight and level flight. When the engine is off, close the cowl flap to reduce drag. The engine cowl flap must be opened again before restarting the engine.

As the SF 25 C is a low wing aircraft, the airflow around the wing/fuselage transition becomes turbulent if the aircraft is not flown accurately or if it is flown slowly (less than 44 knots) - the result is reduced performance. When flying the aircraft as a glider, and especially in turns, always ensure that you are flying as accurately as possible. The most practical instrument for this purpose is still a thread, mounted in front of each cockpit seat, about 20 cm ahead of the canopy on a piano wire mast about 10 cm high. Use a thread and with a little practice the Falke can be flown cleanly with performance comparable with gliders.

2.10. Slow flying and stall characteristics

The stall speed (at max weight) is the same whether the engine is running or not: it is about 38 knots (when flown single seat about 35 knots). At this speed the airflow begins to break away at the wing roots, but the ailerons and rudder are still fully effective. With a forward CG the SF 25 C reacts to further reduction in airspeed by stalling. With rearward CG positions it is possible to continue flying in calm air in a semi-stalled state with the stick hard back and with ailerons and rudder still fully effective. In both cases, simply releasing the back pressure on the stick will restore the normal flying attitude. In rough air the SF 25 C will drop a wing on stalling. If you approach the stall with the engine running fast and continue to bring the stick back, the pitot on the fin will be in the propeller slipstream and give a spurious reading suggesting a higher airspeed than is actually the case. In this condition the ASI will oscillate violently between about 27 and 54 knots, so the stalled condition is still easy to identify.

When stalled with a 30° angle of bank the SF 25 C drops the outer wing fairly gently, such that normal flying can be resumed as the wings come level. Stall characteristics are identical whether the engine is running or stopped.

2.11. Spinning

With CG in forward and mid positions it is very difficult to make the SF 25 C spin. Even without any action on the part of the pilot, other than releasing the back pressure on the stick, the stall becomes a spiral dive. Recovery from the spiral dive presents no problems. It is not recommended that the spoilers be used in this context.

Even with rearward CG positions a fully developed spin is not possible. It is possible, however, to make it spin by bringing the stick back gradually and then crossing the controls: it will recover of its own accord from the spin after a maximum of 5 rotations, even if the controls continue to be held crossed. The SF 25 C will then yaw and it is easy to restore the normal flying attitude. If the SF 25 C pilot moves the stick in the direction of the spin, it will develop into a spiral dive from which the pilot should recover as quickly as possible to avoid excessive airspeeds. Normal recovery measures will result in recovery after half a rotation. Gently recover from the resulting dive without delay. At this stage we recommend that the spoilers be extended to avoid excessive airspeeds.

The Falke is not approved for aerobatics or spinning

2.12. Wet wings – warning

The SF 25 C uses a modern glider wing section so it is sensitive to rain on the wings. The airflow over the wings is disturbed by the rain drops, which reduces the lift available. With dry wings the minimum speed is 38 knots, but with wet wings it is about 44 – 46 knots. The stall characteristics are also affected. With dry wings, the SF 25 C is good-natured in a stall, but with wet wings it can drop a wing. When flying in rain, always fly at speeds greater than 46 knots. When taking off with wet wings, never lift off at less than 46 knots. Climb and approach at about 57 knots. Avoid steep turns and other high g force manoeuvres. Any snow or ice/ white ice on the wings must always be removed before take-off. Don't forget to clean off the tailplane too.

2.13. Cold weather flying and risk of carburettor icing

At all times of the year and especially during the cooler seasons it is important to monitor that the engine oil temperature never drops below 70° C. Intermediate settings on the cowl flap (infinitely adjustable) are effective in controlling the cooling air reaching the engine. Always ensure that the maximum cylinder head temperature never exceeds 120°C (ROTAX 912 A and ROTAX 912 S).

2.14. Operating without outriggers

(only applies to single mainwheel undercarriage version)

The SF 25 C can also be operated without the outriggers fitted. You can taxi with a wing tip holder. At take-off an assistant must run with the wing tip until the ailerons become effective. When landing the SF 25 C can be held level with ailerons virtually until it has stopped.

2.15. Safety factors and engine reliability

Never forget that any motor glider engine is designed to simpler approval specifications than other aero engines. Consequently motor glider engines are simpler and cheaper, so always plan your route with safety in mind and maintain the necessary safety heights. You should always fly within gliding reach of a good field landing opportunity.

2.16. Attachment points for parachute static release

The static release cords for automatic parachutes are hooked on to the tubular member above the seat back near the red mark, port for the port seat and starboard for the starboard seat.

2.17. Emergency canopy release

Pull the top canopy knob forwards or turn anti-clockwise, pull the front emergency release knob and throw off the canopy to the right. The emergency release knobs are colour coded red. Before opening the canopy release pull off the head sets and open the seat belts.

With the optional new one piece canopy:

1. Pull off the head sets, open the seat belts.
2. Pull the canopy release handle
3. Lift off the canopy by the two red knobs on each side of the canopy frame.

2.18. Type familiarisation

It is essential to read the Manuals/Handbooks for the SF 25 C, the engine, the propeller and the equipment.

Before flying this aircraft solo, the new pilot must have type familiarisation flights with a motorglider pilot who is familiar with the type.

The new pilot must complete a number of solo flights before starting to fly passengers. Particular attention must be paid to operation of the engine and the variable pitch propeller.

2.19. Crosswind

The Falke has been flight-tested for take-offs and landings in crosswinds up to 13 knots.

2.20. Field landings

Flight testing of the SF 25 C (tricycle undercarriage version) included proving its capability to land on unprepared soft ground by landing in a potato field along the furrows. This should be taken into account in addition to other factors such as size, slope, surface, wind, length of landing run, clear approach, etc. The procedure for landing on soft ground is the same as for a normal landing on a runway.

3. Performance data

The specifications in this section refer to the following propellers:

~~MP11A/105-130, MP165R130-2A, MP170R105-2A or MP175R130-2A~~
 MTV1A/175-05 ~~and MPV2A-0-E(CF)/175-05.~~

3.1. Take-off performance

These performance figures were obtained from type test results and can be reproduced provided that the motor glider and engine are in good condition and that the pilot is of average ability and skill

Maximum permissible AUW *)

380 kg	510 kg	650 kg	690 kg
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 *) Delete as appropriate

Level airfield with short grass in normal condition. Dry wings with a smooth surface. No wind conditions. Air pressure corresponding to normal pressure at airfield height.

Lift off speed approx. 38 knots,
 Climb speed 49 – 51 knots.

For take-off from a hard surfaced runway all values may be reduced by about 5%	Airfield height above sea level		Air temperature at ground level in °C			
			-15	0°C	+15°C	+30°C
	m	ft	m	m	m	m
Take-off run in m up to lift off	0	0	105	122	141	160
	250	820	113	132	152	174
	500	1640	123	143	165	189
	750	2460	133	155	178	205
	1000	3280	145	168	193	221
Total take-off distance in m to clear 15 m obstruction	0	0	216	241	268	297
	250	820	229	255	285	315
	500	1640	242	271	303	334
	750	2460	257	288	320	362
	1000	3280	273	306	342	391

This table applies to all previously quoted engine/propeller combinations and to all aircraft weights. Values for ground run and take-off over a 15 m obstacle are the same as or better than those in the table for the variable pitch propeller and/or the ROTAX 912 S engine.

3.2. Rate of climb

At maximum weight, at sea level and take-off performance for the specific engine/propeller combination and:

<u>ROTAX 912 A</u> and	Take off power	
MT 165 R 130 - 2A, HO11A HM - 165 130	3.5 m/s	
<u>MTV1A/ 175-05</u> / MTV21A- C- F/(CF)175-05	4.8 m/s	or 933 FPM.
		max. Continuous power/ rpm
<u>ROTAX 912 S</u>		
MT 170R130-2A, MT 175B130-2A	5.0 m/s	4.0 m/s
MTV1A/175-05, MTV21A-C-F/(CF)175-05	5.5 m/s	4.2 m/s
Rate of climb at		49 – 51 knots.

3.3. Airspeeds

	<u>ROTAX 912 A</u>	<u>ROTAX 912 S</u>
Level flight (throttled back)	>43 knots	>43 knots
Max cruising speed at 4,800 rpm	81 knots	80 knots
Best cruise at 4,200 rpm	65 knots	70 knots
Approach speed	49 knots	40 knots
Touch down speed	38 knots	38 knots

3.4. Range and endurance (zero wind conditions) excluding reserve

Engine ROTAX 912 A			Fuel 44 l usable		Fuel 55 l usable		Fuel 79 l usable	
rpm	Fuel Consumption l/hr	Airspeed knots	Duration hrs/mins.	Range nm	Duration hrs/mins.	Range nm	duration hrs/mins.	Range nm
4200	8.9	65	4:57	320	6:10	400	8:52	575
4450	11.7	73	3:46	274	4:42	342	6:45	492
4800	14.4	80	3:03	247	3:49	309	5:29	444

Engine ROTAX 912 S			Fuel 55 l usable		Fuel 79 l usable	
rpm	Fuel Consumption l/hr	Airspeed knots	Duration hrs/mins.	Range nm	duration hrs/mins.	Range nm
4200	11.8	67	4:39	314	6:41	451
4450	14.6	75	3:46	285	5:24	409
4800	18.0	89	3:03	272	4:23	391

Fuel consumption at take-off ROTAX 912 A approx. 24.0 l/h ~~ROTAX 912 S~~ approx. 27.0 l/h
 Manifold pressure at cruise setting P = $n/220$ inHg P = $n/240$ inHg

Power setting for cruise

General rule:

to reduce power: first reduce manifold pressure, then reduce rpm
 to increase power: ~~(MTV21A-C-F)~~ first increase rpm and then manifold pressure
 (MTV1A) first increase manifold pressure and then rpm

3.5. Glide performance

With engine stopped, cowl flap closed, clean wings and (if fitted) Variable pitch prop in glide configuration

Minimum rate of sink at 43 knots (single mainwheel undercarriage)	1.12 m/sec
Minimum rate of sink at 43 knots (two wheel undercarriage)	1.18 m/sec
Minimum rate of sink at 43 knots (tricycle undercarriage)	1.17 m/sec

Best glide at 49 knots (single mainwheel undercarriage) 1:22

The values are improved somewhat when the variable pitch propeller is set to glide configuration.

4. Centre of gravity and weight limits

- ⊙ Caution It is the responsibility of the pilot (P1) to ensure that the weight limits are observed.

4.1. Empty weight centre of gravity

Always ensure that the empty weight CG remains within the permitted limits, for example after major repairs, the installation of additional equipment or repainting. If necessary, ballast weights must be fitted. Should this occur, a suitably qualified inspector must be called in. Permitted empty weight CG range (see Maintenance Manual, pp 23-24).

Aircraft position: Wing chord at rib 6 (2.2 m / 86.61" from the centre line) = horizontal.

Datum: 2.0 m / 78.74" ahead of the leading edge of rib 0 (root rib),
0.52m / 20.47" from centre line.

If the empty weight CG is kept within the approved empty weight CG range, compliance with the loading chart will ensure that the flying weight CG will automatically remain within its permitted range.

4.2. Centre of gravity at flying weights

In flight the centre of gravity has a considerable influence on the handling qualities of the aircraft. For this reason it is of vital importance that the prescribed CG limits are scrupulously observed.

The following limits of CG flying weights have been tested and approved:

Applicable to: Flying weights of 580 kg, 610 kg, 650 kg and 690 kg.

max forward CG	2,143 m / 84.37" aft of datum
max. aft position of CG:	2.334 m / 91.87" aft of datum

4.3. Weight placard

Cockpit weight limits (including parachutes)

both seats combined	Max. 180 kg
	Min. 60 kg
Luggage	max. 10 kg

It is essential to ensure that the combined weight including fuel and any luggage does not exceed the maximum approved AWW (all up weight) on the placard.

Assume 0.73kg/l for the mass (weight) of fuel, which means

~~full 44 l tank = 32 kg.~~
~~full 55 l tank = 40 kg.~~
full 80 l tank = 58 kg.

The effect of permitted luggage on the centre of gravity may be disregarded.

5. Minimum equipment

Airspeed indicator (reading up to 200 kph / 108 knots or more)

Altimeter

Magnetic compass

Rev counter

Oil temperature gauge

Oil pressure gauge

Cylinder head temperature gauge

Ammeter

Fuel gauge

Engine hours counter

Four-element safety harness

2x back support cushion, to be used in the absence of parachutes,

2x Flight Manual, approved by the LBA, to be carried on board

When equipped with variable pitch propeller (electric or hydraulic) also:

Manifold pressure gauge

6. Optional auxiliary equipment

Electric fuel pump (as in TM 653- 51 Version 2)

Centre of gravity winch hook (as in TM 653- 63)

Outboard socket (as in TM 653- 9/ 76)

Avionic equipment (various: COM, VOR, GPS, XPDR, ENCODER etc.)

ELBA electronic fuel gauge

7. Additional electrical fuel pump

(Optional version TM 653-51/ 2)

An additional electric fuel pump can be installed in the motor glider as an option. This can be used for added safety:

- a) before starting the motor
- b) for take-off
- c) for the approach and the possibility of a touch and go
- d) in flight when the fuel supply may be less reliable e.g. through vapour formation at altitude, during very hot weather and in particular when climbing steeply. In normal cruise the optional electric fuel pump can be switched off. When the additional fuel pump is switched on a special warning light comes on. Please note however that this does not give any indication of the actual fuel pressure.

8. Noise reduction requirements

Only German national noise limits for: SF 25 C with the following engine / propeller combinations	Max. flying weight	Section X			Section: VI		
		Noise limit for enhanced noise abatement		Calcula- ted noise level	Noise limit for enhanced noise abatement		Calcula- ted noise level
		Up to build date 31.12 1999	From build date 2000		Up to build date 31.12 1999	From build date 2000	
ROTAX 912 A(1), A(2) or A(4) MT165R130-2A HO11AHM-165 130	580 kg	XXX	XXX	XXX	60.0 dB(A)	58.0 dB(A)	50.4 dB(A)
	610 kg	XXX	XXX	XXX	60.1 dB(A)	58.1 dB(A)	50.8 dB(A)
	650 kg	65.6 dB(A)	63.6 dB(A)	60.7 dB(A)	60.7 dB(A)	58.7 dB(A)	52.1 dB(A)
	690 kg	XXX					
ROTAX 912 A(2) or A(4) MTV1A/175-05	610 kg	64.9 dB(A)	62.9 dB(A)	55.3 dB(A)			
	650 kg	65.6 dB(A)	63.6 dB(A)	55.3 dB(A)			
	690 kg	XXX					
ROTAX 912 A(3) MTV21A-C-F/(CF)175-05	610 kg	64.9 dB(A)	62.9 dB(A)	55.3 dB(A)			
	650 kg	65.6 dB(A)	63.6 dB(A)	55.3 dB(A)			
	690 kg	XXX					

Only German national noise limits for: SF 25 C with the following engine / propeller combinations	Max. flying weight	Section X		Calculated noise level	
		Noise limit for enhanced noise abatement			
		Up to build date 31.12. 1999	From build date 2000		
ROTAX 912 S(2) oder S(4) MT170R135-2A	650 kg	65,6 dB(A)	63,6 dB(A)	55,4 dB(A)	
	690 kg				
ROTAX 912 S(2) oder S(4) MT175R130-2A	650 kg				55,6 dB(A)
	690 kg				
ROTAX 912 S(2) oder A(4) MTV1A/175-05	650 kg				57,5 dB(A)
	690 kg				
ROTAX 912 S(3) MTV21A-C-F/(CF)175-05	650 kg				57,5 dB(A)
	690 kg				

Enhanced German national noise abatement requirements will be met if the measured noise level is within the maximum values prescribed in Annex 2 of the airfield noise abatement regulation by the following amounts:

	in Section <u>VI</u>	in Section <u>X</u>
for build date before 1 January 2000 by:	min. 4 dB(A)	min. 5 dB(A)
and for build dates from 1 January 2000 by:	min. 6 dB(A)	min. 7 dB(A)

These values have been incorporated in the table above.

CIVIL AVIATION AUTHORITY

CAA CHANGE SHEET NO 1 ISSUE 1 TO THE SCHEIBE
SF 25 C 'FALKE' FLIGHT MANUAL MARCH 1997
(CAA REF: 2444/50103)



Serial No: Registration Mark:

ADDITIONAL LIMITATIONS AND INFORMATION FOR UNITED KINGDOM
CERTIFICATION

*The limitations and information contained herein either supplement or, in the case of
conflict, override those in the flight manual.*

GLIDER TOWING LIMITATION

Scheibe Supplement Edition 15.11.1999

The aircraft is only approved for towing with the fixed aerotow device,
glider towing with the retracting device is NOT approved

- End -

*To be inserted in the Flight Manual facing the Scheibe Glider Towing Supplement
and the CAA Revisions Record Sheet amended accordingly*



CIVIL AVIATION AUTHORITY

CAA SUPPLEMENT NO 1 ISSUE 1 TO THE SCHEIBE SF
25 C 'FALKE' FLIGHT MANUAL MARCH 1997

(CAA REF: 2444/49968)



Serial No:

Registration Mark:

ADDITIONAL LIMITATIONS AND INFORMATION FOR UNITED KINGDOM CERTIFICATION

The limitations and information contained herein either supplement or, in the case of conflict, override those in the flight manual.

Operating Data and Limitations.

1. This aircraft is eligible for certification in the Transport Category in performance group F. However, this particular aircraft may be restricted to another category and to some particular use, this will be stated in the Certificate of Airworthiness.
2. Operation is restricted to day/VFR flight only.
3. Flight into known or forecast icing conditions is prohibited.
4. Minimum crew is one.
5. Maximum number of occupants is two.
6. Aerobatic manoeuvres including spinning are prohibited.
7. At a normal landing speed of 80 km/h the normal landing distance does not exceed 100m.
8. Adequate control during take-off and landing has been shown in Crosswinds of up to 25 km/h (13 Kts).

- End -

To be inserted at the rear of the Flight Manual and the CAA Revisions Record Sheet amended accordingly.



CAA Approved

19.09.2000

CIVIL AVIATION AUTHORITY

CAA SUPPLEMENT NO 2 ISSUE 1 TO THE SCHEIBE SF
25 C 'FALKE' FLIGHT MANUAL MARCH 1997

(CAA REF: 2444/49969)



Serial No:

Registration Mark:

ADDITIONAL LIMITATIONS AND INFORMATION FOR UNITED KINGDOM CERTIFICATION

The limitations and information contained herein either supplement or, in the case of conflict, override those in the flight manual.

Operating Data and Limitations.

1. This aircraft is eligible for certification in the private category.
2. Operation is restricted to day/VFR flight only.
3. Flight into known or forecast icing conditions is prohibited.
4. Minimum crew is one.
5. Maximum number of occupants is two.
6. Aerobatics manoeuvres including spinning are prohibited.

- End -

*To be inserted at the rear of the Flight Manual and the CAA Revisions Record Sheet
amended accordingly*



CAA Approved

19.09.2000

SCHEIBE Flugzeugbau GmbH
LBA-amerik. Entwicklungsbetrieb I-EB 2

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Supplement
to Motorglider Flight Manual

SF 25 C

S/N: 44643

only for Category Glidertowing

- a) in combination with a towrope retraction and cutting device or
b) with fixed aerotow device with TOST- nose launching hook

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1. General

1.1 Introduction

This manual is a supplement to the „Flight Manual SF 25 C“ and is valid only for category „Glidertowing“

1.2 Certification

Glidertowing with motorglider SF 25 C is certificated in accordance with Joint Aviation Requirements JAR 22, Change 5, vom 28.10.1995 with (D) Appendix J, additional requirements for aerotowing.

1.3 Description and technical Data's

- a) Towrope retraction device „System Feuerstein“ from TOST Fluggerätebau is attached to the fuselage of the SF 25 C with special constructed mountings below the right seat and on the fuselage tail.

Emergency cutting of the towrope is possible by bowden cable with T-handle, located in the cockpit between the seats or in the console below the Instrument panel. After glider has disengaged the electric winch retracts the towrope. The winch switch is located in the console between the seats below the instrument panel. The electric winch switches off automatical if towrope is retracted complete.

•Caution• If a burl rises in towrope (if glider disengage under great tension) towrope can only partial pulled in. Check with mirrows that towrope is pulled in complete(see also 4.2.

- b) Fixed Aerotow device with TOST nose launching hook is attached to the fuselage with special constructed mountings on the fuselage tail. Glider release is possible by bowdwn cable with T-handle, located in the cockpit below the Instrument panel, between the seats or in the console between the Instrument panel. After towing towrope is to release at an overflight before the landing.

Check towrope release with the mirrow.

Approved length of towrope: **40m to 60m (130 to 196 ft).**

For aerotowing with SF 25 C two mirrows are to attach:

One outside the cabin on the L/H canopy frame

One inside the canopy above the magnetic compass.

2. Operation limitations2.1 Towing speedRemark

All speeds in this appendix are IAS.

Max. approved speed for aerotowing with SF 25 C

$$V_T = 130 \text{ km/h (70 kts/ 81 mph)}$$

But: Don't override max. towing speed of the *glider*.

Minimum towing speed = $90 \text{ km/h (49 kts/ 56 mph)}$,

but not less than $1,3 \times V_{S1}$ of the towed glider.

V_{S1} is the Stalling speed at which the glider is controllable at determined condition.

2.2 MassesCondition for aerotowing

Max. permissible all up weight of motorglider for aerotowing: **600 kg**

Cockpit weight limit minimum for aerotowing at the pilot seat is:

(aerotow device installed at full fuel tank (55/ 80 ltr.) **60 kg**

Max. all up weight of all motorglider/ engine/ propeller combinations together with glider max. mass.

Engine	Propeller	max. Glider take off mass	Max. motorglider mass at take off	Max. mass of glider and motorglider together
ROTAX 912 A	MTV1A/175 - 05 MTV21A-G-F/(CF)175-05	560 kg	640 kg / 650 kg	1120 kg
ROTAX 912 S	MT 175 R 130 - 2A MT 170 R 135 - 2A	600 kg	650 kg	1400 kg
ROTAX 912 S	MTV1A/175-05 MTV21A-G-F/(CF)175-05	640 kg	650 kg	1470 kg

Table 1

2.3 Flight crew

For Aerotowing only the pilot is on board of the motorglider.

Instruction flights for aerotowing with two pilots in the cockpit of the motorglider are possible if:

Max. all up weight (AUW) of the motorglider not exceeds: ~~640~~ 650 kg

Max. AUW of glider and motorglider together not exceeds:

1120 kg / ~~1400 kg or 1470 kg~~

See also table 1 above.

3. Emergency procedures3.1 Engine failure

a) With tow rope retracting and cutting device

If engine failure happens during tow flight, contact glider pilot by radio or other signals to to release towrope immediatly or cut the towrope by cutting device.

b) If engine failure happens during tow flight, contact glider pilot by radio or other signals to to release towrope immediately or release towrope by T-handle in the cockpit.

After that see motorglider Flight manual: Emergencies.

3.2 Other emergency situationsAbnormal horizontal position of the glider relativ to the motorglider

If motorglider is unsteerable through an abnormal position of the glider relativ to the motorglider towrope is

- a) to cut immediatly with towrope retracting and cutting device or
- b) to release towrope immideately by T-Handle in the motorglider cockpit.

If the glider is out of the 60°- cone (especially the angle between the towrope and the longitudinal axis is >20° with glider below or >40° with glider above the motorglider),

- a) to cut immediatly with towrope retracting and cutting device or
- b) to release towrope immideately by T-Handle in the motorglider cockpit.

3.3 Failure of cutting device, launching hook on the motorglider aerotow device or on the nose launching hook of the glider

Landings as an airtrain are possible, if the glider uses the spoilers and the glide angle is controlled by powersetting of the motorglider.

WARNING

During glidertowing operation with spoilers of the motorglider extended is not permitted.

4. Normal Operation Instructions

4.1 Daily Inspection:

- a) with towrope retracting and cutting device:
- b) See Operation instruction for towrope winch with cutting device of TOST-Fluggerätebau.
- c) Bowden cable connected to the cutting device and secured?
- b) with fixed aerotow device with TOST nose launching hook
 - Release cable connected to Launching hook lever?
 - Tow rope release test.
 - Launching hook clean?

4.2 Normal Operation Procedures and recommended Speeds4.2.1 Take off and Climb

~~In Germany glider towing behind a motorglider is certificated only at the nose launching hook.~~ Motorglider should not take off before the glider.

Different to the Flight Manual of the motorglider the max. continuous power setting for the whole aerotow flight is:

5500 rpm and throttle fully open

(5800 rpm are available for only 5 minutes = take off power)

Check that engine temperatures are in the green sector of the gauges (oil- and cylindertemp.) all the time (see colour markings). If not, speed up or reduce power.

Caution

For aerotowing additional electric Fuel pump must be used all the time.

Important indication

Aerotowing gliders with high wing loading motorglider has to speed up near the ground, because take off speed for gliders with high wing loading can be higher than of the motorglider.

Speed for best climb angle

95 ^{km}/h (51 kts/ 59 mph).

Speed for best climbing

105 ^{km}/h (65 kts/ 75 mph).

For towing gliders with high wing loading and/ or in turbulent air speed up to

120 ^{km}/h (65 kts/ 75 mph).

4.2.2. Approach and Landing:

- a) Towrope retract and cutting device:

After glider has released towrope the rope is to retract with the electric winch. If towrope retraction is completed, winch will stop automatically and winch switch turns to the „off“- position.

- d) Fixed Aerotow device with TOST nose launching hook:

After towrope is released by the glider it is to release from the motorglider at an overflight.

Approach and landing with towrope outside are only possible as an emergency landing with higher approach speed and with no obstacles in the approach sector.

4.2.3 End of tow procedure

Gliderpilot has to pay attention that there is no high tension on the towrope in the moment of disconnection from the glider. (Possibility of knots in the rope => tow rope retraction not more possible.

5. Performances

5.1 LBA- approved datas for SF 25 C with ROTAX 912 A and Constant-Speed-Propeller (MTV1A/175-05 or MTV21A-C-F/(CF)175-055.1.1 Take off distances

Take off distances with max. tow train mass = **1120 kg**
are stated in the following table:

Take off distance over 15m (50ft) obstacle from concret runways

~~Grey parts: Take off distance over 15m (50ft) obstacle from gras runways~~

take off distance in	Field elevation NN		Air temperature °C (OAT)															
			-15°C				0°C				+15°C				+30°C			
			m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft		
m or ft	0	0	360...1180		419...1374		484...1587		554...1817									
for overflight of 15 m (50 ft) obstacle	250	820	390...1279		454...1489		524...1719		600...1968									
	500	1640	423...1387		492...1614		567...1860		649...2129									
	750	2460	458...1502		533...1748		615...2017		703...2306									
	1000	3280	497...1630		578...1896		666...2184		762...2499									
			572...1876		665...2181		766...2512		876...2873									

•Important Notice•

Δ Wet wing take off is not permitted.Δ

Avoid take off with dirty wings.

The above values are without additional safety.

For a safe take off runway length should be the same like the take off distance over the 15 m (50ft) obstacle.

Δ Warning Δ

Dirty wings increases the take off distance important. Through this a take off can be impossible. The same through long gras and/ or soft, wet runway and tailwind. These points are to check carefully by the motorglider pilot.

Δ If you have doubts, don't take off Δ

Remarks: As an explanation: If the glider is not in the air at half of the runway, glider pilot should disconnect the towrope and give a message to the motorglider pilot.

For this decision the obstacle clearance in the departure sector is to check.

5.1.2 Additional Informations5.1.2.1 Climb performance

Max. climb rate with glider and motorglider together up to **1120 kg**
at mean sea level and Standard temperature: **315 ⁿ/_{min}**

5.2 LBA- approved datas for SF 25 C with ROTAX 912 S and Fixed Pitch Propeller
(MT175R130-2A or MT170R135-2A)

5.2.1 Take off distances

Take off distances with max. tow train mass =

1160 kg

are stated in the following table:

Take off distance over 15m (50ft) obstacle from concret runways

~~Grey parts: Take off distance over 15m (50ft) obstacle from gras runways~~

take off distance in	Field elevation NN		Air temperature °C (OAT)							
	m	ft	-15°C		0°C		+15°C		+30°C	
m or ft	0	0	m	ft	m	ft	m	ft	m	ft
			395...	1296	445...	1560	494...	1620	548...	1797
			466...	1528	525...	1722	593...	1912	647...	2122
for overflight of	250	820	420...	1378	470...	1542	524...	1719	583...	1912
15 m (50 ft)			496...	1627	554...	1817	618...	2027	688...	2256
obstacle	500	1640	445...	1560	499...	1637	558...	1830	618...	2026
			525...	1722	589...	1932	659...	2161	729...	2397
	750	2460	475...	1558	534...	1751	593...	1945	662...	2171
			560...	1837	630...	2066	700...	2296	781...	2562
	1000	3280	504...	1653	564...	1850	627...	2056	707...	2318
			595...	1952	665...	2181	740...	2427	834...	2735

•Important Notice•

Δ Wet wing take off is not permitted.Δ

Avoid take off with dirty wings.

The above values are without additional safety.

For a safe take off runway length should be the same like the take off distance over the 15 m (50ft) obstacle.

Δ Warning Δ

Dirty wings increases the take off distance important. Through this a take off can be impossible. The same through long gras and/ or soft, wet runway and tailwind. These points are to check carefully by the motorglider pilot.

Δ If you have doubts, don't take off Δ

Remarks: As an explanation: If the glider is not in the air at half of the runway, glider pilot should disconnect the towrope and give a message to the motorglider pilot.

For this decision the obstacle clearance in the departure sector is to check.

5.2.2 Additional Informations

5.2.2.1 Climb performance

Max. climb rate with glider and motorglider together up to
at mean sea level and Standard temperature:

1160 kg
350 ^{ft}/_{min}

5.3 LBA- approved datas for SF 25 C with ROTAX 912 S and Constant-Speed-Propeller (MTV1A/175-05 or MTV21A-C-F/(CF)175-055.3.1 Take off distances

Take off distances with max. tow train mass =
are stated in the following table:

1170 kg

Take off distance over 15m (50ft) obstacle from concret runways
Grey parts: Take off distance over 15m (50ft) obstacle from gras runways

take off distance in	Field elevation NN		Air temperature °C (OAT)							
			-15°C		0°C		+15°C		+30°C	
			m	ft	m	ft	m	ft	m	ft
m or ft	0	0	357...1177		399...1309		444...1456		491...1610	
for overflight of 15 m (50 ft) obstacle	250	820	422...1384	448...1469	472...1548	499...1637	525...1722	558...1830	581...1906	617...2024
	500	1640	402...1318	475...1558	449...1473	531...1742	502...1646	593...1945	554...1817	655...2148
	750	2460	426...1397	503...1650	478...1568	565...1853	531...1742	627...2056	593...1945	702...2302
	1000	3280	452...1482	534...1751	507...1663	599...1965	564...1850	667...2188	636...2086	752...2466

•Important Notice•

Δ Wet wing take off is not permitted.Δ

Avoid take off with dirty wings.

The above values are without additional safety.

For a safe take off runway length should be the same like the take off distance over the 15 m (50ft) obstacle.

Δ Warning Δ

Dirty wings increases the take off distance important. Through this a take off can be impossible. The same through long gras and/ or soft, wet runway and tailwind. These points are to check carefully by the motorglider pilot.

Δ If you have doubts, don't take off Δ

Remarks: As an explanation: If the glider is not in the air at half of the runway, glider pilot should disconnect the towrope and give a message to the motorglider pilot.

For this decision the obstacle clearance in the departure sector is to check.

5.3.2 Additional Informations5.3.2.1 Climb performance

Max. climb rate with glider and motorglider together up to
at mean sea level and Standard temperature:

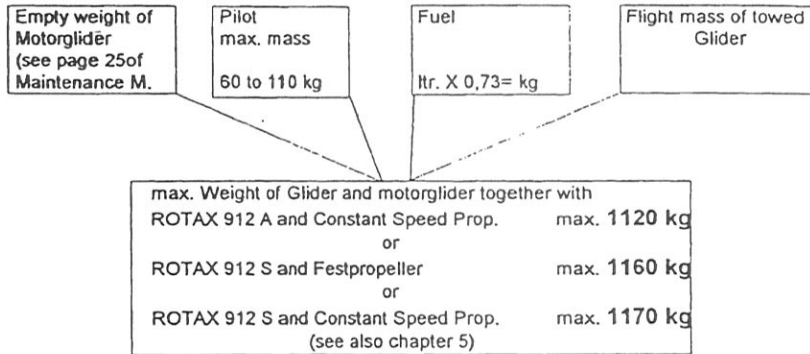
1170 kg
350 ⁿ/_{min}

6. Loading diagram and centre of gravity/ equipmentlist

6.1 Loading diagram and center of gravity

The usual empty and flight C.G. of the motorglider are still valid for category aerotow.

For the payload see chapter 2.2 and 2.3 of this supplement Flight manual.

6.2 EquipmentlistAdditional equipment for aerotowinga) with Towrope retraction and cutting device:

- 1 electric tow rope winch with cutting device System TOST
- 1 yellow/ red marked T- handle in the cockpit for cutting device
- 1 Control switch for the tow rope winch (red, illuminated)

b) with fixed device for TOST nose launching hook:

- 1 Fixed aerotow device for the fuselage tail of SCHEIBE-Flugzeugbau GmbH with TOST nose launching hook E 85, E 72 or E 75
- 1 Towrope release T-handle (yellow)

And additional

- 1 Outside mirror Cycle star, Busch & Müller, Auf dem Bamberg 1, 58540 Meinerzhagen
- 1 Inside cockpit mirror SUPER Vario Convex Weitsichtspiegel No. 187/ 97, HR Autocomfort, POB 1713, 75117 Pforzheim
- 1 additional electric fuel pump HARDI SZ 8812-3 with installation kit.
- 1 Weak link max. 500 daN or less.

7. Description of the motorglider and the systems

7.1 Cockpita) Towrope retraction and cutting device

Yellow/ red cutting device T- Handle is positioned between the seats or in the console below the instrument panel. This T- handle should have a backlash of min. 10 mm.

There is a control switch for retraction of the towrope in the instrument panel or in the console below the panel. This control switch is red illuminated if the winch is working. This T- handle should have a backlash of min. 10 mm.

b) Fixed aerotow device:

Release mechanism has a yellow T-handle in the middle and below of the instrument panel or in the console below the panel.

7.2 Placards and Warnings

a) For towrope retraction and cutting device:

Following placards are necessary, if motorglider is used for aerotowing:

Weight placard especially for aerotowing

near by the illuminated switch for the towrope winch

Tow rope retracting device

next to the yellow-red T- handle for the cutting device:

Cutting device: Only for emergency

near by the Airspeed indicator:

Caution! Before aerotowing: Check that the cutting knife bowden cable is connected!!

b) For fixed aerotow device:

Near by the release T-handle:

Towrope release

8. Operation and maintenance
- 8.1 Maintenance schedul for the motorglider.
- 8.1.1 Maintenance schedul for the towrope winch and cutting device
see point 2 of the flight manual of Towrope retract and cutting device.
- 8.1.2 Rigging and derigging of the towrope retraction and cutting device.
Towrope retract and cutting device for motorglider SF 25 C is constructed as a Quick-release and Quick-connect system if you like to tow.
- 8.1.2.1 Installation
- 8.1.2.1.1 For installation of the towrope retraction and cutting device only a screw driver is necessary.
- 8.1.2.1.2 Remove glass fibre cover of the winch below the fuselage behind the main undercarriage by opening the Camlocks.
- 8.1.2.1.3 Slide on the winch in wing direction from left to right to the two bolts behind the main undercarriage.
- 8.1.2.1.4 Connect the electric connector for the winch.
- 8.1.2.1.5 Turn up and secure the winch with the safety bolt.
- 8.1.2.1.6 Slide in the front part of the aluminium- pipe into the open ring below the fuselage, behind the winch.
- 8.1.2.1.7 •Caution•
Take care that the towrope is on the winch without a loop.
Install the below cover of the winch and secure it by Camlocks.
- 8.1.2.1.8 Slide on the Cutting device to the two bolts behind the tail wheel (against flight direction)
- 8.1.2.1.9 Secure the cutting device by the safety bolt in the front part of the cutting device.
- 8.1.2.1.10 Secure the aluminium pipe under the fuselage by two Camlocks.
- 8.1.2.1.11 Connect and secure the bowden cable on the cutting device lever (secure the bolt with a cotter pin).
- 8.1.2.1.12 Pull out the towrope round about 10 m.
- 8.1.2.1.13 Retract towrope completely by the winch.

If the towrope winch and cutting device is installed and you don't want to tow, disconnect the bowdencable from the cutting device lever. Tighten the bowden cable to the fuselage. With that unusual towrope cutting is not possible.

CAUTION: Before towing a glider check that bowdencable is connected at the cutting device lever.

See placard below airspeed indicator.

8.1.2.2 Deinstallation of towrope retract and cutting device

- 8.1.2.2.1 Pull out towrope 4 to 5 m (13 to 16 ft).
- 8.1.2.2.2 Remove bowdencable from cutting device lever and secure it to the fuselage.
- 8.1.2.2.3 Open 2 Camlocks below the fuselage (for the aluminium pipe).
- 8.1.2.2.4 Open secure and safety pin in the front part of the cutting device.
- 8.1.2.2.5 Pull cutting device in flight direction round about 15 to 20mm from the two bolts behind the tailwheel.
- 8.1.2.2.6 Pull cutting device and aluminium pipe round about 50 mm against flight direction out the the open ring below the fuselage and lay it down.
- 8.1.2.2.7 Remove glas fibre cover of towrope winch by opening the Camlocks.
- 8.1.2.2.8 Remove secure and safety pin of the winch and turn it down.
- 8.1.2.2.9 Disconnect electric wiring connector on the winch.
- 8.1.2.2.10 Slide off the winch to the left (in flight direction) from the bolts and lay it on the ground.
- 8.1.2.2.11 Close the glas fibre cover of the winch with the Camlocks.

8.2 Maintenance schedul for nose launching hook:

See maintenance and operation instruction of TOST Fluggerätebau for launching hook E 85, E 72, E 75.

8.2.1 Installation of fixed aerotow device on the fuselage tail:

The tow device is fixed on the fuselage connecting points with for screwws, washers and self confidential nuts.

Additional the release bowden cable is to secure on the launching hook lever.

9. Remarks

For category glider towing there is a special determining for in flight centre of gravity.

See Type placard in the cockpit.

Important notice

Pilot has to pay attention that the correct **WEAK LINK** is installed in the towrope. If not structur of the motorglider can be overloaded.

Approved WEAK LINKS:

300 daN (green)

400 daN (yellow)

500 daN (white) = max. permitted
WEAK LINK

