SECTION 5
PERFORMANCE

Page No.

5.1 INTRODUCTION

Section 5 provides approved data for airspeed calibration, stall speeds and take-off performance, along with additional information which does not require approval.

The data in the charts has been computed from actual flight tests with the Powered Sailplane and engine in good condition, with wheel fairings, winglets and spinner installed and using average piloting techniques.

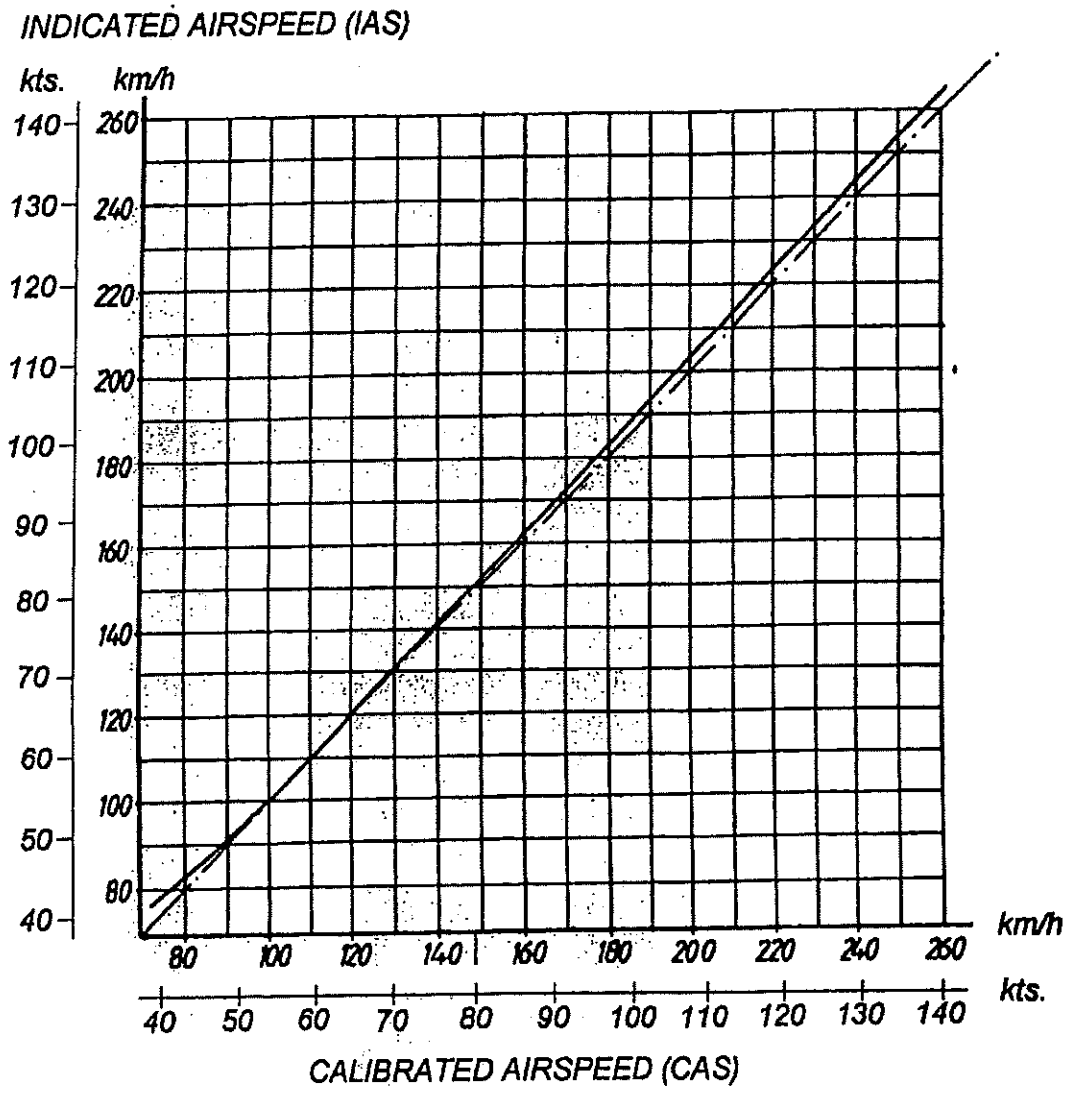
The specified airspeeds must be understood as IAS. The performance data has been evaluated using the normal procedures described in Section 4.

NOTE

A poor maintenance condition of the airplane and unfavorable external circumstances (high temperature, rain) can considerably deteriorate the specified performance values.

5.2 ACG-APPROVED DATA

5.2.1 AIRSPEED INDICATOR SYSTEM CALIBRATION



5.2.2 STALL SPEEDS

Stall speeds at different bank angles in **km/h**:

Air brakes		Bank angle 0°	30°	45°	60°
retracted	v_{SO}	78 km/h	84 km/h	93 km/h	110 km/h
extended	v_{S1}	81 km/h	87 km/h	96 km/h	115 km/h

Stall speeds at different bank angles in **kts.**:

Air brakes		Bank angle 0°	30°	45°	60°
retracted	v_{SO}	42 kts.	45 kts.	50 kts.	60 kts.
extended	v_{S1}	44 kts.	47 kts.	52 kts.	62 kts.

Stall speeds at different bank angles in **mph**:

Air brakes		Bank angle 0°	30°	45°	60°
retracted	v_{SO}	48 mph	52 mph	58 mph	69 mph
extended	v_{S1}	50 mph	54 mph	60 mph	71 mph

NOTE

Conditions such as turbulence, wet wings, or high load factors increase the stall speeds.

5.2.3 TAKE-OFF PERFORMANCE

Conditions:
- Outside air temperature: 15° C (59° F)
- Atmospheric pressure: 1013 hPa (1013 mbar (29.92 inHg))
- Calm
- Full throttle
- Maximum flight mass (max. gross weight)
- Propeller setting: TAKE-OFF
- Rotation at approximately 80 km/h (43 kts. / 50 mph)
- Lift-off speed approximately 90 km/h (49 kts. / 56 mph)
- Speed during climb approximately 97 km/h (52 kts. / 60 mph)
- Level runway, asphalt surface

Take-off roll : 182 m (597 ft.)

Take-off distance to clear a 15 m (50 ft.) obstacle : 274 m (899 ft.)

NOTE

For take-off distances under circumstances different from those described above, refer to the charts in Article 5.3.3.

WARNING

The take-off distances given here contain no safety margins. Poor maintenance condition of the airplane, deviation from the procedures prescribed in this manual and unfavorable external conditions (rain, crosswind, wind shear, rough ground and, in particular, long grass) can considerably extend the take-off distance.

5.3 ADDITIONAL INFORMATION

5.3.1 DEMONSTRATED CROSSWIND PERFORMANCE

Take-off : 15 km/h (8.1 kts. / 9.3 mph)
Landing : 15 km/h (8.1 kts. / 9.3 mph)

5.3.2 GLIDE PERFORMANCE AND FLIGHT POLAR

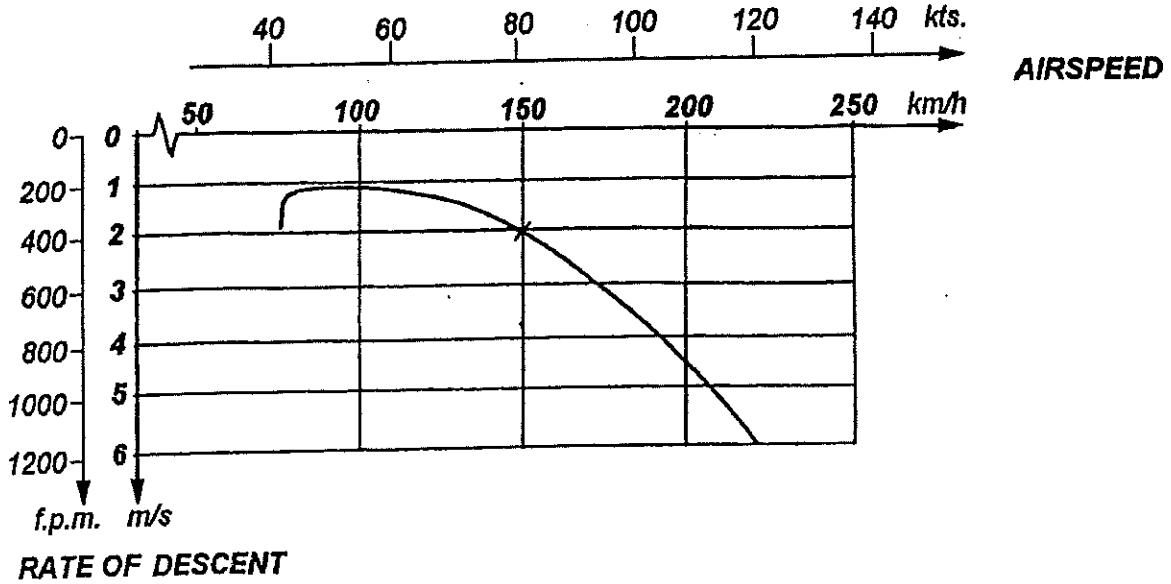
Glide performance

Conditions:
- Maximum flight mass (max. gross weight)
- Winglets, wheel fairings, and spinner installed
- Propeller feathered

Minimum rate of descent : 1.19 m/s (234 ft./min) at 97 km/h (52 kts. / 60 mph)
Maximum lift drag ratio : 27 at 105 km/h (57 kts. / 65 mph)

Flight polar

Conditions:
- Maximum flight mass (max. gross weight)
- Winglets, wheel fairings, and spinner installed
- Propeller feathered



5.3.3 TAKE-OFF CHARTS

Conditions:
- Full throttle
- Maximum flight mass (max. gross weight)
- Propeller setting: TAKE-OFF
- Lift-off speed approximately 90 km/h (49 kts. / 56 mph)
- Speed during climb approximately 97 km/h (52 kts. / 60 mph)
- Level runway, asphalt surface
- TCU on

s_1 = Take-off roll;

s_2 = Take-off distance to clear a 15 m (50 ft.) obstacle

Head-wind comp. [kts.]	OAT [° C]	Pressure altitude above MSL [m] / QFE [hPa]							
		0/1013		400/966		800/921		1200/877	
		s_1 [m]	s_2 [m]	s_1 [m]	s_2 [m]	s_1 [m]	s_2 [m]	s_1 [m]	s_2 [m]
0	0	158	244	172	260	186	277	202	297
	15	182	274	197	292	214	314	231	336
	30	208	307	225	328	251	363	282	400
5	0	129	206	141	220	153	235	167	253
	15	149	232	162	248	177	267	192	287
	30	171	261	186	280	209	309	236	344
10	0	103	171	112	183	123	197	135	212
	15	119	193	130	208	143	224	157	241
	30	137	218	150	236	170	261	193	291

Head-wind comp. [kts.]	OAT [° F]	Pressure altitude above MSL [ft.] / QFE [inHg]							
		0/29.9		1310/28.5		2620/27.2		3940/25.9	
		s_1 [ft.]	s_2 [ft.]	s_1 [ft.]	s_2 [ft.]	s_1 [ft.]	s_2 [ft.]	s_1 [ft.]	s_2 [ft.]
0	32	518	801	564	853	610	909	663	974
	59	597	899	646	958	702	1030	758	1102
	86	682	1007	738	1076	823	1191	925	1312
5	32	423	676	463	722	502	771	548	830
	59	489	761	531	814	581	876	630	942
	86	561	856	610	919	686	1014	774	1129
10	32	338	561	367	600	404	646	443	696
	59	390	633	427	682	469	735	515	791
	86	449	715	492	774	558	856	633	955

WARNING

A grass surface will extend the take-off distances by at least 20 %, depending its characteristics (softness, grass length). The take-off distances given here contain no safety margins. Poor maintenance condition of the airplane, deviation from the procedures prescribed in this manual and unfavorable external conditions (rain, crosswind, wind shear, uneven terrain and, in particular, long grass) can considerably extend the take-off distance.

PTION, CRUISING SPEED, M

NOTE

cifications for maximum flight c
ank and do not include any
ption specifications apply to
ıs and a well-maintained, corr
ation of the range, atte
e of wind, as well as safety re

gine eed	Fuel consumption		Tr 1 (3
PM]	[l/h]	[US gal./h]	
385	33	8.7	
265	27	7.1	21 117/
200	24	6.3	21 113/
100	20	5.3	19 106/
	17	4.5	18 99/1
900	14	3.7	16 91/1

NOTE

implified rule for reducing po
ous power, the manifold pressu
uced by approximately 2 inHg
eduction (propeller speed cont

5.3.4 NOISE DATA

The evaluation of noise emission was carried out according to the Noise Re
Annex 16.

Annex 16, Chapter 10:
65.9 dB(A)

Annex 16, Chapter 6 (for Austria only):
61.4 dB(A); for basic training and towing flight
(Federal Law Gazette Austria, 29 Oct 1993, 738th Decree)

5.3.5 CLIMB PERFORMANCE

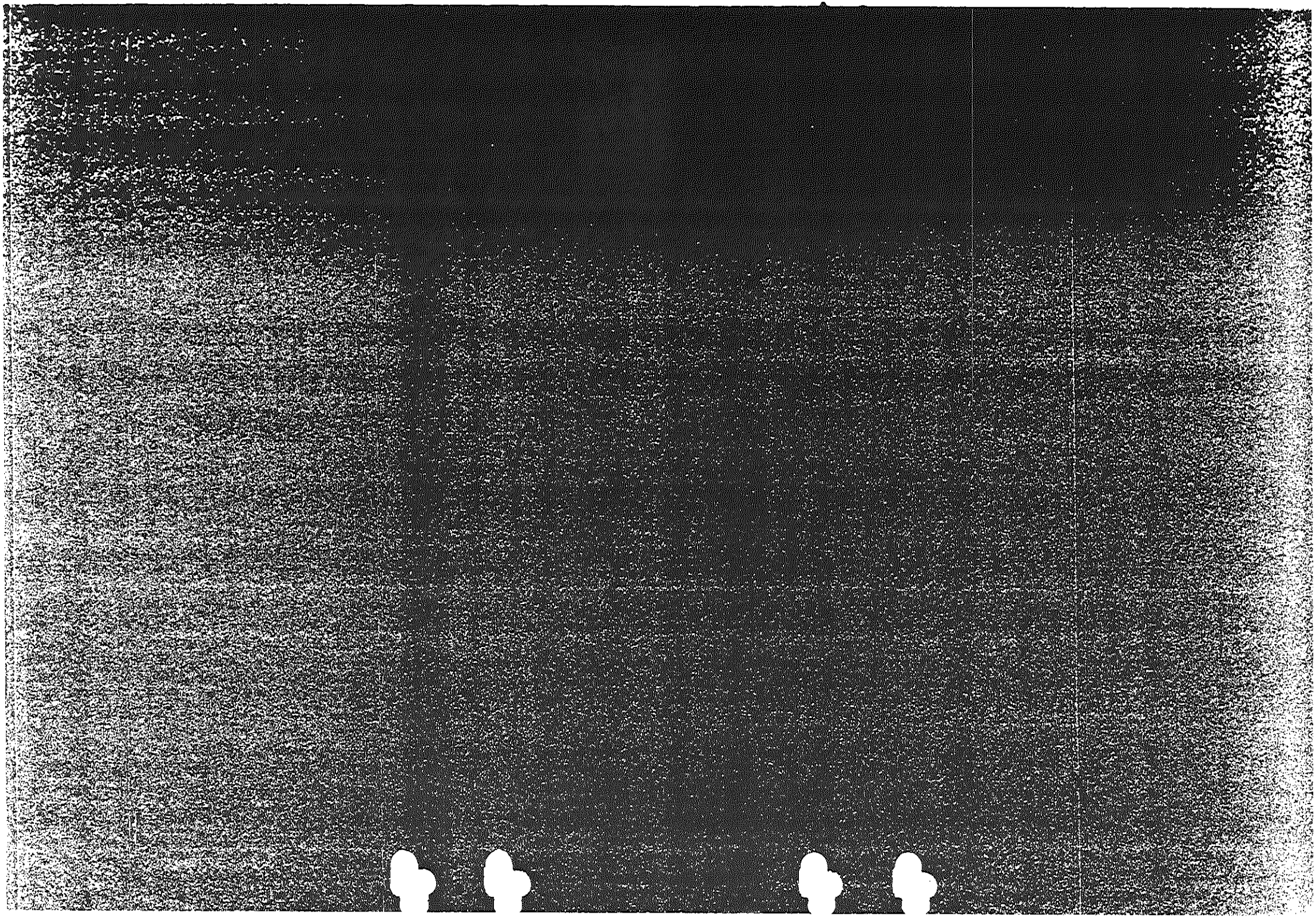
Conditions:	- Sea level - Full power - Maximum flight mass (max. gross weight)
Airspeed:	v_y = 110 km/h (59 kts. / 68 mph)
Propeller speed:	2260 RPM
Manifold pressure:	34 inHg
Max. rate of climb:	5.4 m/s (1063 ft./min)

5.3.6 SERVICE CEILING

Service ceiling is above 5000 m (16400 ft.).

NOTE

For flights at high altitude, attention should be paid to Ar
4.5.7, HIGH ALTITUDE FLIGHT.



SECTION 6

MASS (WEIGHT) AND BALANCE / EQUIPMENT LIST

6.1 INTRODUCTION

Section 6 describes the range of loading in which the HK 36 TTC can be operated safely.

Descriptions of the weighing procedure, the determination of the admissible empty mass CG range and a list of the equipment that must be present in the airplane during the weighing process are included in the Airplane Maintenance Manual, Section 4.

WARNING

Exceeding the maximum mass (maximum gross weight) can lead to overstressing of the airplane. Falling short of the minimum useful load on the seats leads to a deterioration of controllability and stability.

6.2 WEIGHING PROCEDURES

The weighing procedures are described in the Airplane Maintenance Manual, Paragraph 4.2. The purpose of weighing the airplane is to evaluate the empty mass (empty weight) and the corresponding CG lever arm (i.e. CG position). It may be carried out by authorized personnel only.

6.3 WEIGHING REPORT

The Weighing Report shows the current empty mass (empty weight) and the corresponding CG position. The Weighing Report is preserved in the Airplane Maintenance Log.

NOTE

After equipment changes, repair work, repainting, etc. the airplane must be reweighed in compliance with the Airplane Maintenance Manual by an authorized person, and the new empty mass (empty weight) CG position must be determined. The results must be entered in the Mass and Balance Form, and the new limits must be drawn on a new Mass and Balance Diagram.

6.4 BASIC EMPTY MASS (WEIGHT) AND CORRESPONDING MOMENT

The empty mass (empty weight) CG limitations are defined in the Airplane Maintenance Manual, Section 4.

These limitations guarantee that solo-pilots with a mass (weight) of at least 70 kg (154 lbs.) will not overstep the maximum rearward CG when flying with a full tank and no baggage.

The CG will not exceed the maximum forward position if no more than 220 kg (485 lbs.) useful load on the seats and 10 kg (22 lbs.) of fuel for a half hour flight are carried onboard.

6.5 MASS (WEIGHT) OF ALL NON-LIFTING PARTS

The maximum mass (weight) of all non-lifting parts is 610 kg (1345 lbs.). A list of all non-lifting parts is included in the Airplane Maintenance Manual, Paragraph 4.6.

NOTE

Due to the design of the HK 36 TTC, the mass (weight) of all non-lifting parts will not be exceeded unless the maximum flight mass (max. gross weight) of 770 kg (1698 lbs.) is overstepped.

6.6 MASS (WEIGHT) AND BALANCE FORM

The Mass and Balance Form on Page 6-6 shows the following values:

- Current empty mass
- Current empty mass CG position
- Current maximum useful load including parachute, seat cushions, fuel, and baggage
- Minimum useful load on the seats for solo flights with full tank and no baggage
- Minimum useful load on the seats for solo flights with full tank and maximum baggage mass (12 kg (26 lbs.))

Furthermore, the Mass and Balance Form is a record of all weighings carried out.

The Mass and Balance Form must be updated by an authorized person in compliance with the currently effective Weighing Report. The corresponding instructions can be found in the Airplane Maintenance Manual, Paragraph 4.7.

In addition to the Mass and Balance Form, a new Mass and Balance Diagram is filled out upon each weighing. The corresponding instructions are given in the Airplane Maintenance Manual, Paragraph 4.8.

NOTE

Weighing is carried out with the equipment shown in the Equipment Inventory installed. Airplane operation without winglets, spinner or wheel fairings is only permissible in exceptional cases (e.g. ferry flights or test flights after maintenance). The influence on the empty mass (weight) and the corresponding CG position is negligible.

MASS AND BALANCE FORM

Serial No.: _____ Call sign: _____

Date of weighing	Empty mass (weight)	Empty mass CG pos.	Max. useful load	Minimum useful load on seats with full tank		A.M.E.
				with no baggage	with max. baggage	
20.05 98	581	383	189	55	55	
Avsar	SE-	UDE	(ej	SE-UDL)		

6.7 USEFUL LOADS

6.7.1 MAXIMUM USEFUL LOAD

The useful load includes the masses (weights) of the occupants, baggage, and fuel. The maximum permissible useful load is shown in the Mass and Balance Form, in the Mass and Balance Diagram and on the placard on the instrument panel.

NOTE

The total crew mass comprises of the mass of the passengers and parachutes.

6.7.2 USEFUL LOAD ON THE SEATS

Minimum useful load on the seats

The Mass and Balance Form and the placard in the cockpit (left hand section of instrument panel) show the following data:

- Minimum useful load on the seats for solo flights with a full tank and no baggage;
- Minimum useful load on the seats for solo flights with a full tank and maximum baggage mass (12 kg (26 lbs.)).

The minimum useful load on the seats is never less than 55 kg (121 lbs.).

NOTE

Pilots with a mass (a weight) between 55 kg (121 lbs.) and the minimum useful load on the seats shown on the placard in the cockpit must install a trim weight in the case of solo flights.

Trim weights

If the minimum useful load on the seats exceeds 55 kg (121 lbs.), a trim weight fixture must be installed on the center console, 400 mm (15.75 in.) behind the firewall. A deficit in the useful load on the seats should be compensated for using the following table.

Deficit in useful load on the seats		Trim mass (weight)	
[kg]	[lbs.]	[kg]	[lbs.]
5	11	1.7	3.75
10	22	3.4	7.50
15	33	5.1	11.24

Maximum useful load on the seats

The useful load on one seat must not exceed 110 kg (243 lbs.).

Lever arm of useful load on the seats

A lever arm of 143 mm (5.63 in.) aft of datum plane is assumed for all CG computations.

6.7.3 USEFUL LOAD IN BAGGAGE COMPARTMENT

The maximum useful load in the baggage compartment is 12 kg (26 lbs.). For the preparation of the Mass and Balance Diagram, the lever arm of the baggage was assumed to be equal to the lever arm of the fuel tank (i.e. 727 mm (28.62 in.) for the standard tank or 824 mm (32.44 in.) for the long range tank).

NOTE

When loading baggage, make sure not to exceed the maximum permissible useful load.

6.7.4 FUEL LOAD

Fuel capacity

The fuel capacity is given in Paragraph 2.12.

NOTE

When refuelling, make sure not to exceed the maximum permissible useful load.

Lever arm of the fuel tank

The following lever arms are assumed for all CG computations:

Standard tank : 727 mm (28.62 in.) aft of datum plane

Long range tank : 824 mm (32.44 in.) aft of datum plane

6.8 MASS / C.G. ENVELOPES

The Mass and Balance Diagram is a supplement to the Mass and Balance Form. It informs the Pilot whether a loading is permissible, taking maximum permissible useful load and minimum useful load on the seats into account. It shows the permissible mass (weight) of fuel and baggage for a given useful load on the seats.

The diagram applies to one specific airplane. It is based on the data provided by the Mass and Balance Form and must be redrawn by an authorized person upon each empty mass and CG determination, using the broken auxiliary lines.

The corresponding instructions are laid down in the Airplane Maintenance Manual.

Use of the diagram

The permitted combinations of useful load on the seats and total mass (weight) of fuel and baggage are bounded by the hatching.

Beside the diagram there is a scale for the conversion of the fuel quantity in liters or US gallons to the fuel mass (weight) in kilograms or pounds. The following examples show how the Mass and Balance Diagram should be used.

Example A:
* Pilot: 70 kg (154 lbs.), Copilot: 82 kg (181 lbs.), total: 152 kg (335 lbs.)
* Long range tank: full (60 kg (132 lbs.)), no baggage

The corresponding point in the diagram does not touch any boundary, so the loading is permissible.

Example B:
* Pilot: 65 kg (143 lbs.), solo flight
* Long range tank: full (60 kg (132 lbs.)), baggage: 12 kg (26 lbs.), total: 72 kg (159 lbs.)

The loading oversteps the maximum rearward CG position. The Pilot must remove 15 kg (33 lbs.) (20 liters (5.3 US gal.)) of fuel.

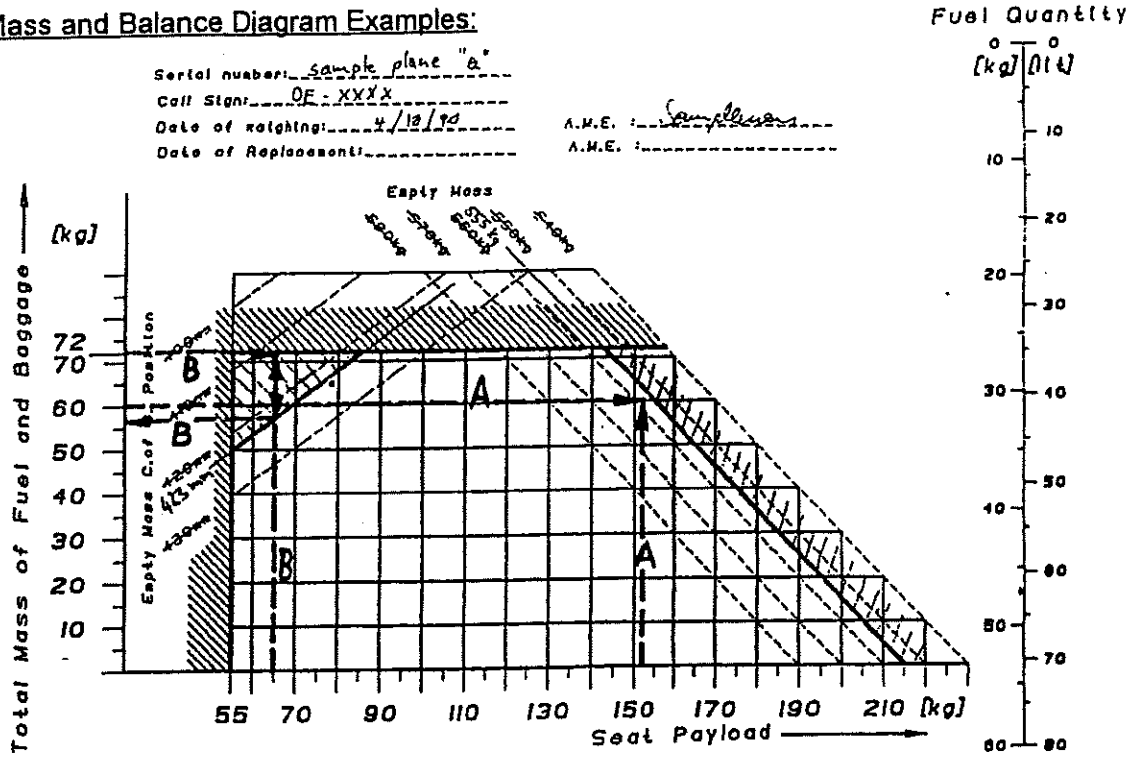
Example C:
* Pilot: 92 kg (203 lbs.), Copilot: 105 kg (231 lbs.), total: 197 kg (434 lbs.)
* Standard tank

In case they do not take any baggage aboard, they may take off with 27 kg (60 lbs.) (36 l (9.5 US gal.)) of fuel in Sample Airplane B.

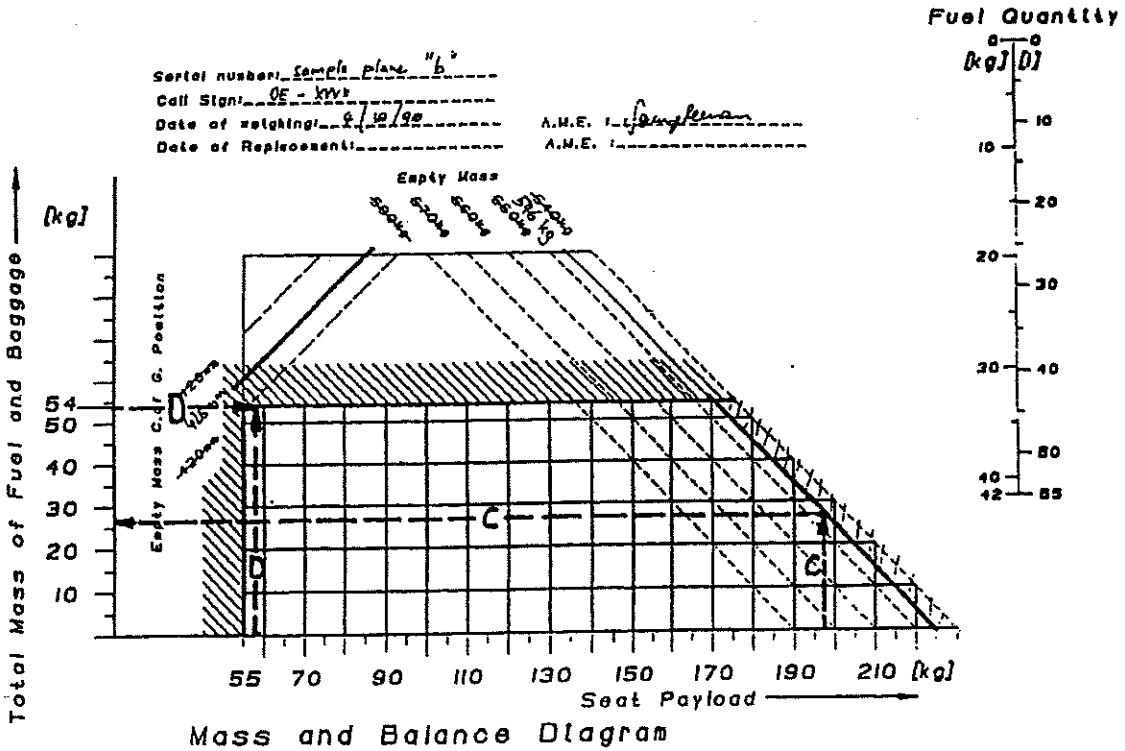
Example D:
* Pilot: 57 kg (126 lbs.), solo flight
* Standard tank: full (42 kg (93 lbs.)), baggage: 12 kg (26 lbs.) total: 54 kg (119 lbs.)

Since the maximum rearward CG position is not effective in with an empty mass CG position of 426 mm (16.77 in.), the Pilot may use the maximum mass (weight) of fuel plus baggage, which amounts to 54 kg (119 lbs.).

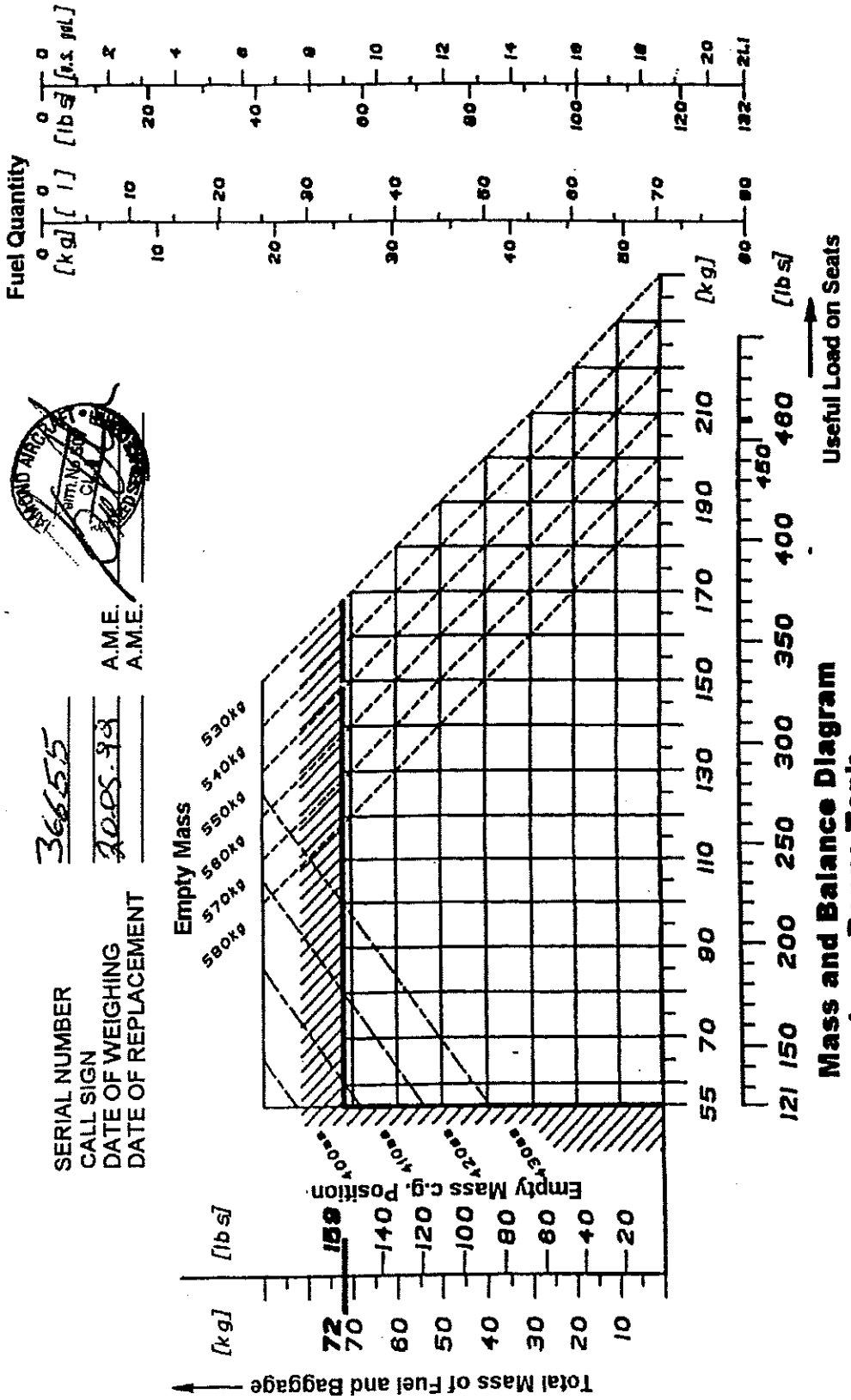
Mass and Balance Diagram Examples:



Mass and Balance Diagram
Long Range Tank (79 liters)



Mass and Balance Diagram
Standard Tank (55 liters)


Fuel Quantity
[kg] [l]
[lbs] [U.S. gal.]
Mass and Balance Diagram
Long-Range-Tank
Useful Load on Seats
[kg] [lbs]
Empty Mass
530kg
540kg
550kg
560kg
570kg
580kg
Empty Mass c.g. Position
Total Mass of Fuel and Baggage
SERIAL NUMBER 36555
CALL SIGN
DATE OF WEIGHING 20.05.98
DATE OF REPLACEMENT
A.M.E.
A.M.E.

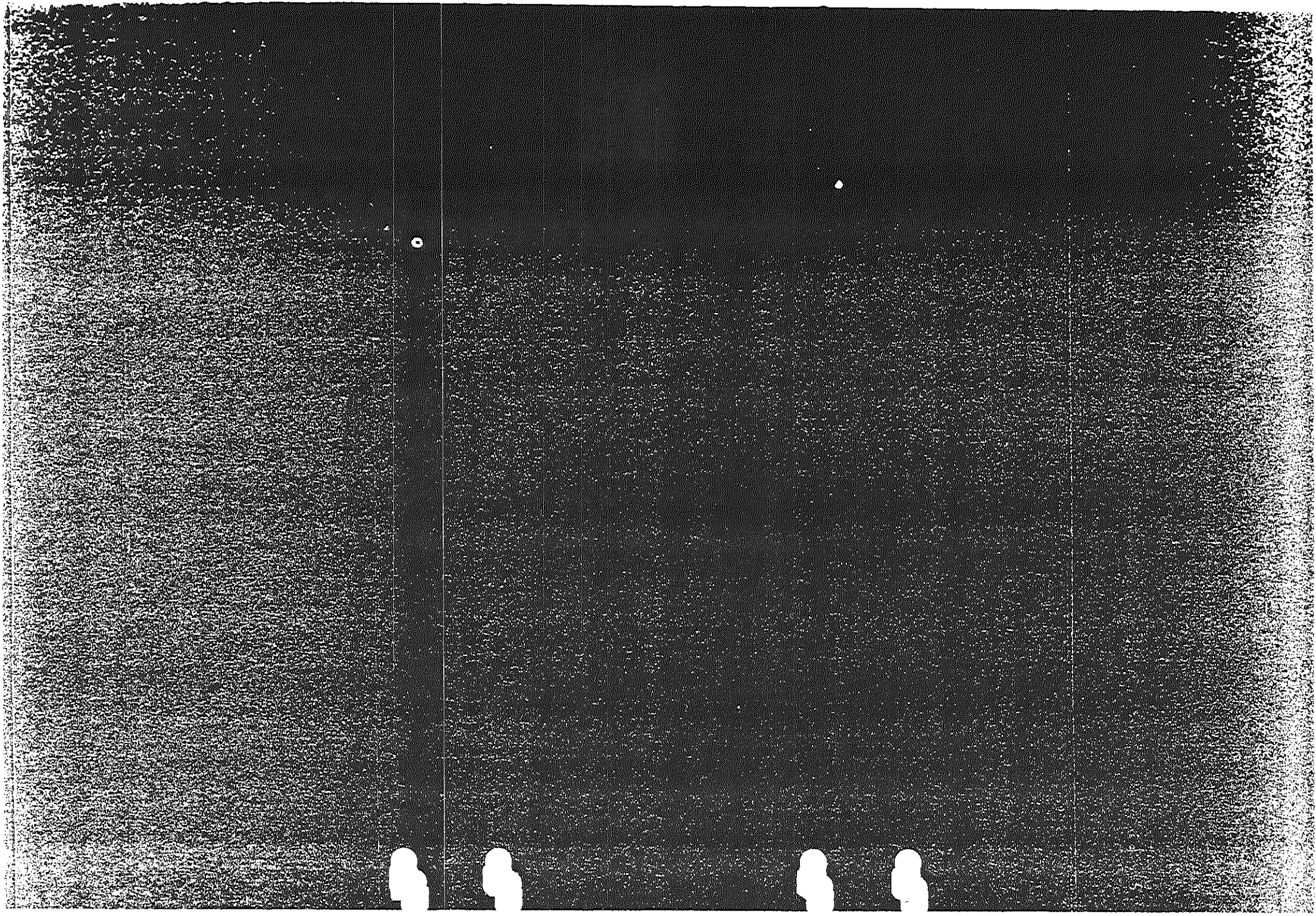
6.9 EQUIPMENT LIST

Minimum equipment (VFR)

1 Altimeter
1 Airspeed indicator
1 Magnetic compass
1 RPM indicator
1 Running time meter
1 Manifold pressure indicator
1 Oil pressure indicator
1 Oil temperature indicator
1 Cylinder head temperature indicator
1 Fuel quantity indicator
1 Ammeter
1 Deviation table
1 Manifold pressure warning light
1 Turbo caution light
1 Fuel pressure warning light
1 Generator warning light
1 Temperature caution light

Additional equipment

A list of the currently installed equipment is provided in the Equipment Inventory which is preserved in the Aircraft Maintenance Log.



SECTION 7

POWERED SAILPLANE & SYSTEMS DESCRIPTION

7.1 INTRODUCTION

Section 7 provides a description of the Powered Sailplane and its systems, together with notes for the user. Refer to Section 9, Supplements, for details of optional systems and equipment.

7.2 AIRFRAME

7.2.1 WINGS

The GFRP/CFRP wings are manufactured in semi-monocoque sandwich construction. The ailerons are made of CFRP and are attached to the wing by means of five hinges, also made of CFRP. Schempp-Hirth type air brakes are provided on the upper surface of the wings.

Each wing is connected to the fuselage by three bolts.

The winglets are manufactured from CFRP and are attached to the wing tips with two threaded bolts each.

7.2.2 FUSELAGE

The GFRP fuselage is manufactured in semi-monocoque construction. A special fire-resistant fabric sheet is sandwiched between a stainless steel barrier and the firewall. The main bulkhead is made of CFRP/GFRP.

The instrument panel is made of GFRP. The maximum permissible mass (weight) of the instrument panel, including the instruments installed, is 17 kg (37.5 lbs.).

7.2.3 TAIL PLANE

The rudder, elevator and horizontal stabilizer are manufactured in semi-monocoque sandwich construction. The folded-top COM antenna and the Pitot tube mount are located in the vertical stabilizer. The horizontal tail surfaces are attached with two bolts and a fastening screw.

7.3 FLIGHT CONTROLS

7.3.1 PRIMARY CONTROLS

The ailerons and elevator are driven by push-rods and the rudder is driven by control cables. Elevator control forces can be compensated for by means of a spring trim system.

The aileron and air brake control systems are automatically connected when the wing is installed. However, the strobe and position lights (optional equipment) must be connected. The elevator control system is not connected automatically, and must be connected by hand.

7.3.2 ELEVATOR TRIM SYSTEM

The trim lever with a green knob is located on the center console behind the throttle quadrant. To trim the airplane, unlock the knob by pulling it upwards, then move it to the desired position. The knob is spring-loaded and locks when it is released.

Knob forward = NOSE DOWN

7.3.3 RUDDER PEDAL ADJUSTMENT

CAUTION

The rudder pedals must be adjusted on the ground.

The pedals are unlocked by pulling the black T-grip in front of the control stick.

Move forward: Push pedals forward with your heels while pulling the grip. Release the grip and allow the pedals to lock perceptibly.

Move rearward: Pull pedals rearward with the grip. Release the grip, using your feet to push the pedals forward until they lock.

7.4 AIR BRAKE SYSTEM

There is a blue air brake lever on either side panel. By pulling the lever rearward, the air brakes are unlocked and extended. They may be extended at all speeds up to v_{NE}.

The air brake lever locks when the air brakes are extended half way. This position can be overtraveled in either direction with slightly increased force. To lock the air brakes, the lever must be pushed to the forward stop, overcoming the resistance which occurrs after the air brake is retracted. The air brakes have oil dampers.

WARNING

When exceeding the maximum admissible speed with the air brakes fixed in the half extended position, v_{ABF}, the air brakes can become extended by aerodynamic forces.
The extension of the air brakes produces a nose down moment which is more intense at higher airspeeds.
At v_{NE}, the air brakes must be extended slowly in order to avoid excessive deceleration.

7.5 LANDING GEAR SYSTEM

7.5.1 GENERAL

The landing gear consists of a resilient main undercarriage, with disk brakes, mounted on spring steel struts, and a resilient castering nose wheel. An elastomer damper provides suspension for the nosewheel.

7.5.2 WHEEL BRAKE

The main wheels are equipped with hydraulically actuated disk brakes which are individually operated through toe pedals.

7.5.3 PARKING BRAKE

The draw-button is located on the center console behind the trim lever. The parking brake is released when the button is in the inserted position.

To set the parking brake, draw the button to the stop and actuate the brake pedals a few times. To release the parking brake, step on the toe brakes again, in order to relieve the shut-off valve, and push the button in.

CAUTION

Pushing the button in without stepping on the toe brakes leads to overstressing of the operating circuit. Excessive wear may result.

7.6 SEATS AND SAFETY HARNESSES

The seat shells are removable in order to permit maintenance and inspection of the control system parts beneath. Jackets on the control sticks and on the air brake levers prevent foreign bodies from falling into the area of the control gear.

The seats are furnished with removable cushions. Parachutes with manual release can be used instead of the cushions. There is no fixture for the release cord of parachutes with automatic release. Therefore, these parachutes cannot be used.

Each seat is provided with a four-part harness. To fasten the harness, the end pieces must be inserted into the lock. To open the harness, turn the twist handle on the lock.

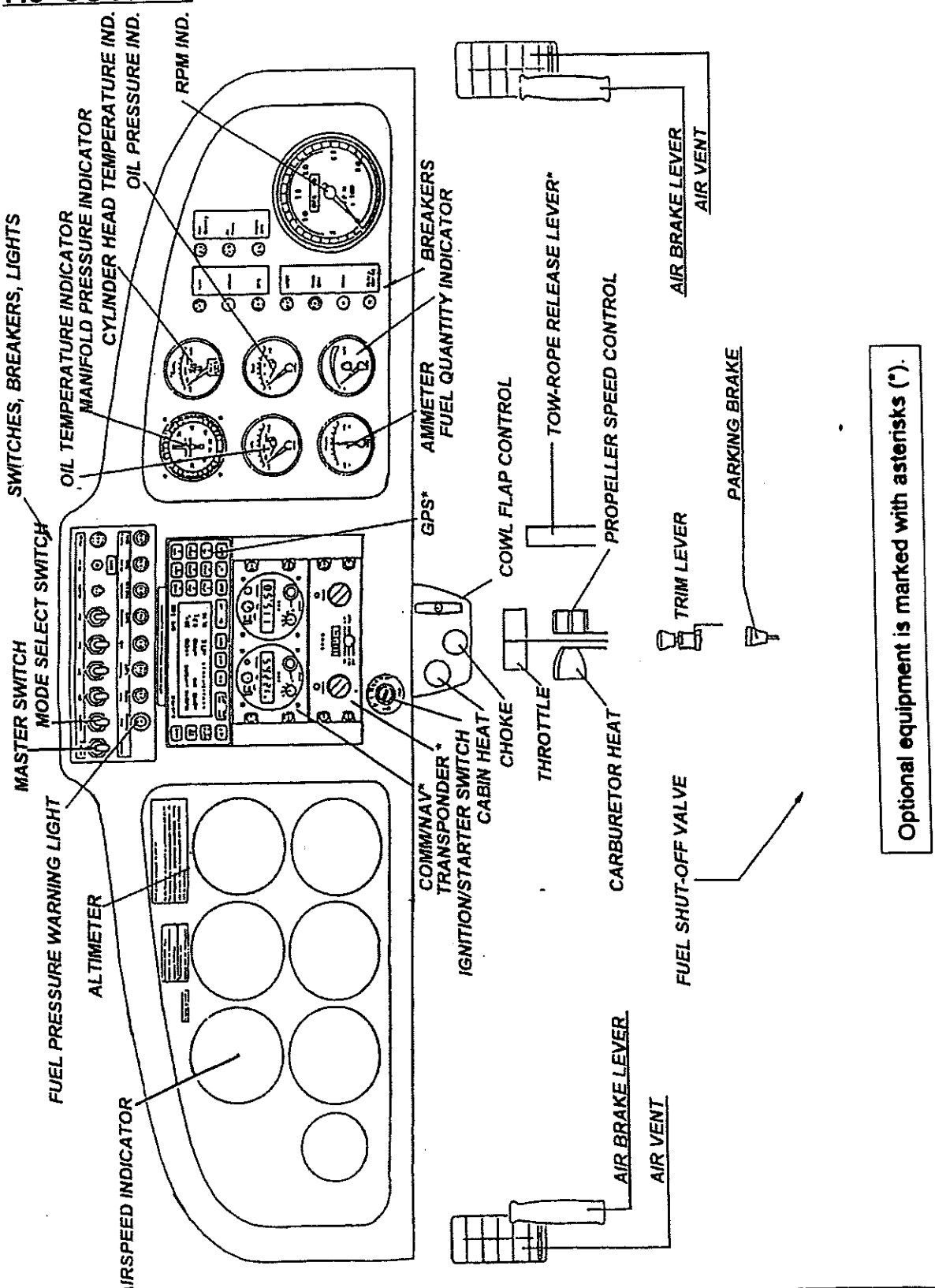
7.7 BAGGAGE COMPARTMENT

The baggage compartment is located behind the backrest above the fuel tank. Baggage pieces should be distributed evenly over the compartment. For safety reasons, the baggage pieces must be tied down.

CAUTION

Before loading the baggage compartment, pay attention to the maximum useful load, or, in case of solo flights, the minimum useful load on the seats. Refer to the Mass and Balance Form and/or the Mass and Balance Diagram.

7.8 COCKPIT


RPM IND.
OIL PRESSURE IND.
CYLINDER HEAD TEMPERATURE IND.
MANIFOLD PRESSURE INDICATOR
OIL TEMPERATURE INDICATOR
SWITCHES, BREAKERS, LIGHTS
BREAKERS
FUEL QUANTITY INDICATOR
AMMETER
GPS*
COWL FLAP CONTROL
TOW-ROPE RELEASE LEVER*
PROPELLER SPEED CONTROL
AIR BRAKE LEVER
AIR VENT
TRIM LEVER
PARKING BRAKE
MASTER SWITCH
MODE SELECT SWITCH
FUEL PRESSURE WARNING LIGHT
ALTIMETER
AIRSPEED INDICATOR
COMM/NAV*
TRANSPONDER*
IGNITION/STARTER SWITCH
CABIN HEAT
CHOKE
THROTTLE
CARBURETOR HEAT
FUEL SHUT-OFF VALVE
AIR BRAKE LEVER
AIR VENT
Optional equipment is marked with asterisks (*).

7.8.1 MODE SELECT SWITCH

When the mode select switch is in the SOARING position, only the COM equipment and the electric vertical speed indicator (optional) are supplied with battery power. All other electrical consumers are switched off.

7.8.2 TCU SWITCH

This switch is only operated in emergency procedures (see Section 3). It is used to switch the TCU off. With the TCU switched off, the manifold pressure must be set manually by the Pilot. The switch is shielded by a red cover in order to prevent accidental operation.

7.8.3 INSTRUMENTS

The flight instruments are installed in the left hand section of the instrument panel. The power-plant instruments are installed in the right hand section.

7.8.4 CABIN HEAT AND CABIN AIR

The draw-button for the cabin heat is located in the center console under the instrument panel. Pull the button to turn the cabin heat on.

The cabin can be aerated through the swivelling nozzles on the side panels. The two sliding/knockout windows in the canopy can be opened for additional aerating.

7.8.5 CANOPY

Canopy lock

To close the canopy, pull shut with the black grips located on the front of the canopy frame. The canopy is locked by pushing forward the two red levers attached to the frame on either side. To open the canopy, reverse the sequence.

CAUTION

Before starting the engine, close and lock the canopy!

Canopy jettison

By forcefully swinging the red levers 180° rearward, the canopy is disconnected from the brackets. Then the Pilot must place both hands above his/her head against the canopy and push it away in upward direction.

7.9.5 PROPELLER SPEED CONTROL

NOTE

The propeller speed control works differently from the usual systems in so far as hydraulic pressure is needed to *reduce* the blade pitch.

Small pitch is achieved by applying hydraulic pressure supplied by the governor. A spring moves the propeller to the feathered pitch position.

Propeller adjustments are made through the propeller speed control installed into the center console on the right of the throttle control. Pulling the control back to the cam (the point where the resistance increases) causes an RPM reduction. The governor keeps the selected RPM constant, independent of airspeed and throttle control position. If the engine power selected with the throttle control is not sufficient to maintain the selected RPM, the propeller blades will move to the lowest possible pitch (maximum RPM at this power setting).

If the propeller speed control is moved fully rearward over the cam (FEATHER position) and the propeller speed is higher than 800 RPM, the blades will move into the feathered pitch position. At too low RPMs, claws controlled by centrifugal force extend and keep the blades in low pitch position. Thus, it is impossible to feather the propeller at engine standstill or at very low engine speeds. During flight at a speed of 100 km/h (54 kts. / 62 mph) or more, the propeller carries on rotating due to windmilling, even with the ignition switched OFF. The propeller stops rotating only when it is feathered.

The propeller governor is flanged to the engine. It is driven directly by the engine. The propeller control circuit is part of the engine oil circuit.

In case of defects in the oil system, the propeller is supplied with hydraulic pressure from the pressure accumulator. Without the engine running, the propeller pitch change mechanism will remain operative for at least two minutes.

CAUTION

The propeller speed control must not be moved over the cam to the FEATHER position as long as the engine is running. Refer to the Normal Procedure described in Article 4.5.3

7.10 FUEL SYSTEM

7.10.1 GENERAL

The aluminum tank is located behind the backrest, beneath the baggage compartment. The standard version holds 54 liters (14.3 US gal.) and the long range version holds 77 liters (20.3 US gal.) of usable fuel. At its lowest point, the tank is connected to the fuel tank drain on the underside of the fuselage.

The fuel passes through a finger filter in the tank and through a fine filter before it reaches the electric fuel pumps. The main fuel pump works automatically as soon as the engine is running. The fuel booster pump is switched ON or OFF manually.

7.10.2 FUEL SHUT-OFF VALVE

The fuel shut-off valve is located on the left side of the center console near the Pilot's feet.

Tap in flight direction = valve OPEN

7.10.3 TANK DRAIN

To drain the tank sump, activate the spring loaded drain by pushing the brass tube in with a drain cup. The brass tube protrudes approximately 30 mm (1.2 in.) from the fuselage contour and is located on the left hand side of the fuselage underside, approximately at the same station as the fuel filler.

7.10.4 FUEL QUANTITY INDICATOR

The fuel quantity indicator is adjusted for flight attitude. On the ground, the indication may be slightly too low.

7.11 ELECTRICAL SYSTEM

The master switch is a toggle type. The mode select switch is situated to the right of the master switch.

CAUTION

Starting the engine is only possible if the mode select switch is in the POWER FLIGHT position.
In the SOARING position, all electrical consumers, except for the COM equipment and the electric vertical speed indicator (optional), are currentless.

The electric main fuel pump is supplied with current directly from the generator. The actuation of the master switch has no influence on this current supply. Failure of the generator leads to failure of the main fuel pump.

The NAV and COM equipment is located in the center section of the instrument panel. The transmit button for the radio is integrated into the control stick. The radio loudspeaker is installed in the baggage compartment. A backrest-mounted connection set for two headsets is optional.

7.12 PITOT AND STATIC SYSTEM

Static pressure, total head and the pressure for the compensation of the vertical speed indicator are measured by means of a Pitot tube which is mounted to the vertical stabilizer. The tube is removable. A safe connection of the lines is established automatically when the Pitot tube is inserted to the stop in the mount.

The lowest point in the Pitot and static lines is bridged by means of bypass lines. Water that might have entered the system can accumulate there. Removal of water must be done during scheduled inspections (refer to the Airplane Maintenance Manual).

7.13 MISCELLANEOUS EQUIPMENT

For the operation of additional avionics, refer to the manuals of the respective manufacturers.

7.14 PLACARDS / INSCRIPTIONS

The limitation placards are presented in Paragraph 2.15. A list of all placards and inscriptions is included in the Airplane Maintenance Manual.

SECTION 8

POWERED SAILPLANE HANDLING, CARE AND MAINTENANCE

Page No.

8.1 INTRODUCTION

Section 8 contains the Manufacturer's recommended procedures for proper ground handling and servicing of the Powered Sailplane. The Airplane Maintenance Manual identifies certain inspection and maintenance requirements which must be followed if the Powered Sailplane is to retain a new plane performance and reliability. It is wise to adhere to the Lubrication Schedule and perform preventative maintenance based on climatic and flying conditions encountered.

8.2 POWERED SAILPLANE INSPECTION PERIODS

Inspections are scheduled every 100, 200 and 600 hours. The respective inspection checklists are prescribed in the Airplane Maintenance Manual, Paragraph 3.1.

8.3 POWERED SAILPLANE ALTERATIONS OR REPAIRS

Alterations or repairs of the Powered Sailplane may only be carried out as prescribed in the Airplane Maintenance Manual and only by authorized personnel. In exceptional cases (e.g. ferry flights or test flights after maintenance), airplane operation without winglets, spinner, or wheel fairings is admissible.

8.4 GROUND HANDLING / ROAD TRANSPORT

For ground handling, a draw tongue which is hooked to the nose wheel should be used. Road transport using a trailer is described in the Airplane Maintenance Manual, Paragraph 1.2.

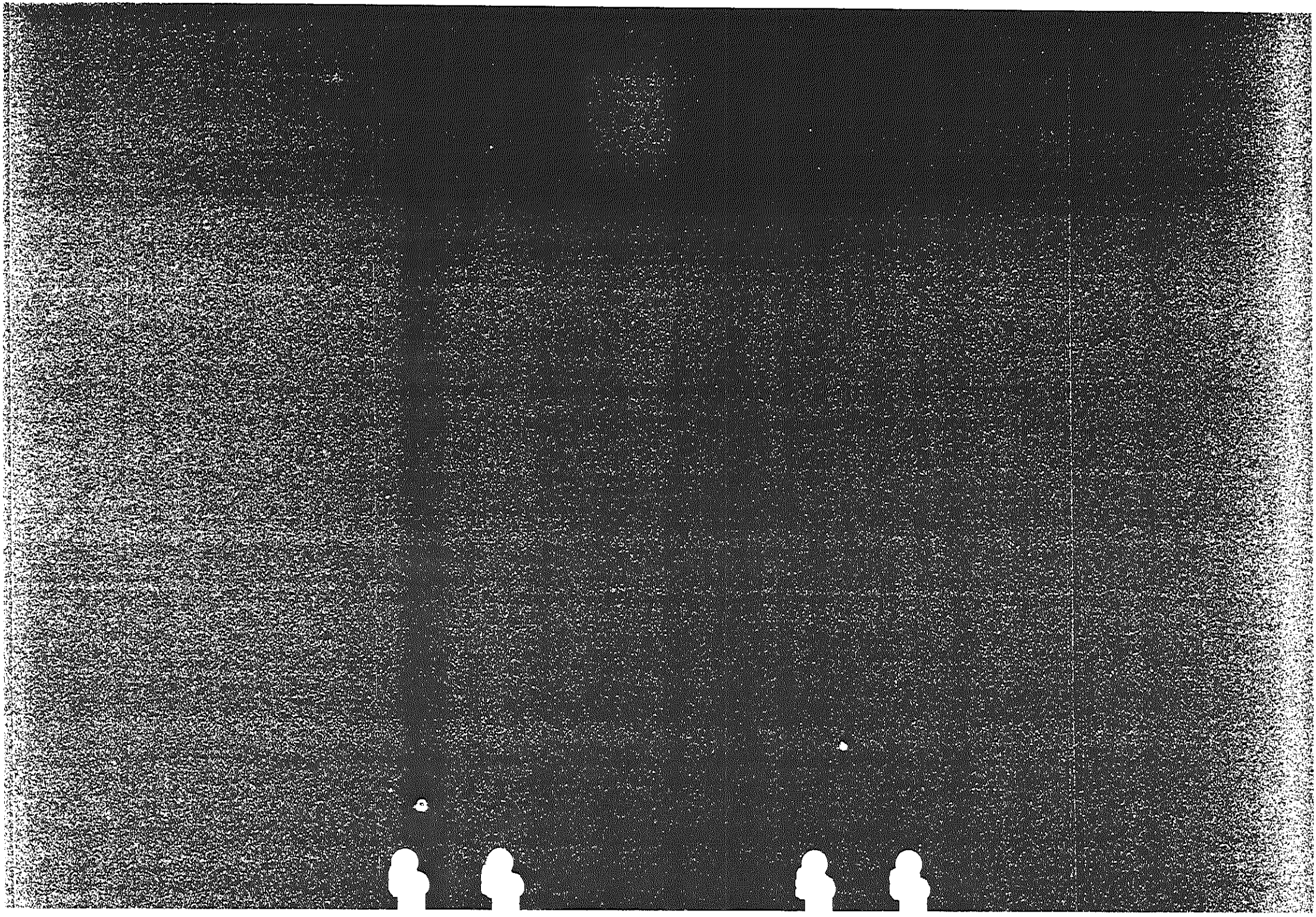
8.5 CLEANING AND CARE

It is advisable to remove insects with a wet sponge at the end of every flying day.

CAUTION

Extreme dirt accumulation degrades flight performance.

Refer to the Airplane Maintenance Manual, Paragraph 1.4, for further care measures.



SECTION 9

SUPPLEMENTS

At this time, the following Supplements are available:

Supplement No. 1

Tow-Plane Operation

Supplement No. 3

Electrical Power Socket for Additional Equipment

Diamond AIRCRAFT

SUPPLEMENT NO. 1 TO THE AIRPLANE FLIGHT MANUAL FOR THE POWERED SAILPLANE HK 36 TTC

TOW-PLANE OPERATION

Date of Issue: 03 Mar 1997

Pages identified by "ACG-appr." in the List of Effective Pages are approved by:

Authority:	AUSTRO CONTROL GmbH Abteilung Flugtechnik Außenstelle Ost A-1300 Wien-Flughafen, Hangar 2	
Signature:		
Stamp:	AUSTRO CONTROL GmbH 440	
Date of Approval:	15. [illegible] 1997	

This Powered Sailplane must be operated in compliance with the information and limitations contained herein.

Prior to operating the Powered Sailplane, the Pilot must take notice of all the information contained in this Airplane Flight Manual.

0.1 LIST OF EFFECTIVE PAGES

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0.2 TABLE OF CONTENTS

SECTION 1
GENERAL

1.1 INTRODUCTION

Pages 9-1-1 through 9-1-19 constitute Supplement No. 1 of the Airplane Flight Manual for the Powered Sailplane HK 36 TTC and are valid only for the operation of the Powered Sailplane as a tow-plane.

1.2 CERTIFICATION BASIS

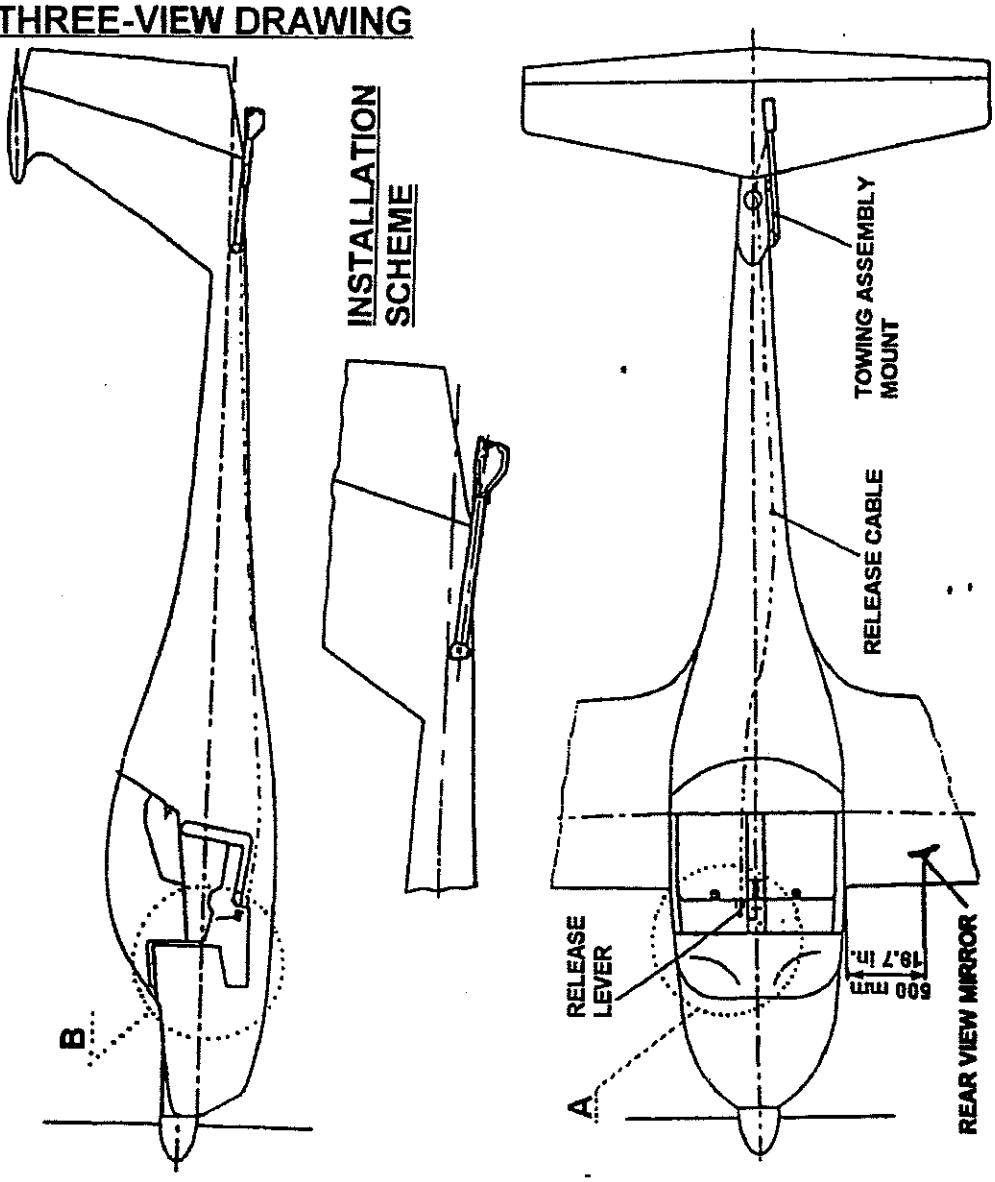
Tow-plane operation of this airplane has been approved in within the framework of Austrian type certification requirements in agreement with national operational requirements, CRI - O1, "Use as a Tow-Plane for Sailplane Towing and Banner Towing".

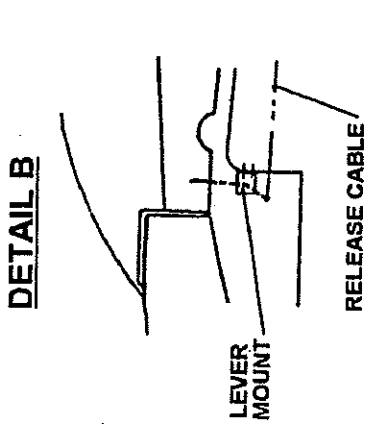
1.5 DESCRIPTIVE DATA

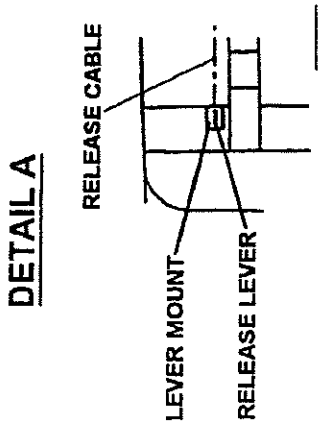
The towing device E 85, manufactured by Tost, is attached to the fuselage tube by means of a steel fitting specially designed for the HK 36 TTC. The tow-rope is released through a cable mechanism connected to a release lever in the cockpit.

For tow-plane operation, an additional rear view mirror must be attached to the left wing using two camlocs (see Paragraph 1.6, THREE VIEW DRAWING).

1.6 THREE-VIEW DRAWING







SECTION 2
LIMITATIONS

2.2 AIRSPEED

NOTE

All airspeeds given in this Supplement are to be understood as indicated airspeeds (IAS).

The maximum permissible speed for tow-plane operation is 135 km/h (73 kts. / 84 mph) or the maximum permissible towing speed of the towed sailplane, whichever is the lowest.

The minimum permissible speed for the combination is 97 km/h (52 kts. / 60 mph) or 1.2 times v_{S1} of the towed sailplane, whichever is the greatest.

The maximum permissible speed for the towed sailplane during towing must be at least 110 km/h (59 kts. / 68 mph).

2.6 MASS (WEIGHT)

For sailplane towing, the flight mass (weight) of the sailplane to be towed must not exceed 600 kg (1323 lbs.). The maximum take-off mass (weight) of the tow-plane is 720 kg (1587 lbs.).

2.10 FLIGHT CREW

When used as a tow-plane, the HK 36 TTC must be flown by a solo-pilot.

For instruction purposes, dual flight is permissible, provided that the total mass (weight) of the combination does not exceed 1320 kg (2910 lbs.).

2.14 OTHER LIMITATIONS

Sailplane towing

The towing of more than one sailplane at a time is not permitted.

A towing device approved for aerotow launching must be used on the sailplane.

During test flights, the most common sailplane models were towed without tightening the operating limitations. However, the Pilot must verify in each case whether the sailplane can be towed without exceeding the operating limitations of the tow-plane or the sailplane.

Banner towing

The drag of the banner must not exceed 70 daN (157 lbs.) at an airspeed of 135 km/h (73 kts. / 84 mph). Should no drag data be available, the banner must be tested in accordance with a test program agreed upon with the competent authority.

Low-drag banners with areas up to 40 m^2 (430 sq.ft.) have been tested.

SECTION 3

EMERGENCY PROCEDURES

3.7 ENGINE FAILURE

1. Release tow-rope or advise sailplane pilot (via radio or by giving signs) to release.
2. Proceed according to the Emergency Procedures in the main part of the Airplane Flight Manual for the Powered Sailplane HK 36 TTC.

3.9 OTHER EMERGENCIES

Abnormal Position of Towed Sailplane

If maneuverability is no longer ensured, due to an abnormal position of the towed sailplane, the tow-rope must be released immediately.

If the towed sailplane is apparently outside of a 60° cone behind the tow-plane (i.e. if the angle between the tow-rope and the longitudinal axis of the tow-plane exceeds 30°), the tow-rope must be released immediately.

WARNING

The critical configuration is usually the one in which the sailplane climbs above the tow-plane during take off and climb, especially when using a tow-rope connector located at the CG of the sailplane.

3.10 FAILURE OF THE RELEASE DEVICE ON THE SAILPLANE

Landing of the complete combination is possible with the air brakes of the sailplane fully extended and the rate of descent being controlled via the power setting of the tow-plane.

WARNING

During towing, the air brakes of the tow-plane must not be extended.

SECTION 4

NORMAL PROCEDURES

4.3 DAILY INSPECTION

1. Check towing device and release mechanism for excessive dirt and improper operation (perform release test).
2. If installed, check tow rope caution light for improper operation.
3. Check tow rope, connection rings and breaking piece for excessive wear, damage and improper arrangement.
4. Check rear view mirror for insecure attachment.

4.5 NORMAL PROCEDURES AND RECOMMENDED SPEEDS

4.5.2 TAKE-OFF AND CLIMB

CAUTION

During the acceleration phase, care must be taken to ensure that the sailplane lifts off first, and that the minimum towing speed is reached while still in close proximity to the ground.

The normal flying speed during towing is 115 km/h (62 kts. / 71 mph). If, due to the construction of the sailplane, a low flight speed is necessary, the flying speed may be reduced down to the minimum speed for towing. When towing a sailplane with a high wing loading and/or when turbulence is encountered, towing speeds up to 120 km/h (65 kts. / 75 mph) are recommended.

CAUTION

At towing speeds below 115 km/h (62 kts. / 71 mph), special attention must be paid to the engine temperatures.

CAUTION

The banner is picked up in flight with a catch rope pulled behind the tow-plane. A suitable hook must be used (with turned back ends, see Equipment List) to avoid getting caught on the ground.

4.5.5 LANDING

1. Prior to landing, drop tow-rope or banner.
2. Verify successful release (check amber caution light, if installed).
3. Proceed according to Normal Procedures in main part of the Airplane Flight Manual for the Powered Sailplane HK 36 TTC.

Landing with the tow-rope attached is only possible when an approach along an obstacle-free path at a higher airspeed is possible.

SECTION 5

PERFORMANCE

5.2 ACG-APPROVED DATA

5.2.3 TAKE-OFF PERFORMANCE

The following data does not include any safety reserve. It was determined under the following conditions:

- Maximum take-off power
- Take-off mass (weight) of tow-plane: 720 kg (1587 lbs.)
- Propeller setting: TAKE-OFF
- Lift-off speed: approximately 90 km/h (49 kts., 56 mph)
- Climb speed: approximately 97 km/h (52 kts., 60 mph)
- Level runway, short and dry grass
- No crosswind component
- Constant headwind component

CAUTION

For a safe take-off, the available length of the runway must at least be equal to the take-off distance over a 15 m (50 ft.) obstacle (s_2).

WARNING

Under unfavorable conditions such as long grass, soft or uneven ground, crosswinds or gusting winds, or wet or dirty wings, especially on the sailplane, the take-off distance can become considerably extended. Under very unfavorable conditions, a safe take-off can become impossible.

The take-off distances for the towing combination are contained in the following tables:

s_1 = Take-off roll

s_2 = Take-off distance to clear a 15 m (50 ft.) obstacle

Take-off mass (weight) of sailplane: 600 kg (1323 lbs.)

Head-wind comp. [kts.]	OAT [° C]	Pressure altitude above MSL [m] / QFE [hPa]							
		0 / 1013		400 / 966		800 / 921		1200 / 877	
		s_1 [m]	s_2 [m]	s_1 [m]	s_2 [m]	s_1 [m]	s_2 [m]	s_1 [m]	s_2 [m]
0	0	288	521	313	560	341	600	371	645
	15	334	594	364	636	396	685	432	741
	30	387	673	422	725	476	808	541	907
5	0	233	444	254	478	278	514	305	555
	15	271	507	297	546	325	589	358	638
	30	315	577	346	623	393	696	449	784

Head-wind comp [kts.]	OAT [° F]	Pressure altitude above MSL [ft.] / QFE [inHg]							
		0 / 29.9		1310 / 28.5		2620 / 27.2		3940 / 25.9	
		s_1 [ft.]	s_2 [ft.]	s_1 [ft.]	s_2 [ft.]	s_1 [ft.]	s_2 [ft.]	s_1 [ft.]	s_2 [ft.]
0	32	945	1709	1027	1837	1119	1969	1217	2116
	59	1096	1949	1194	2087	1299	2247	1417	2431
	86	1270	2208	1385	2379	1562	2651	1775	2976
5	32	764	1457	833	1568	912	1686	1001	1821
	59	889	1663	974	1791	1066	1932	1175	2093
	86	1033	1893	1135	2044	1289	2283	1473	2572

Take-off mass (weight) of sailplane: 400 kg (882 lbs.)

Head-wind comp. [kts.]	OAT [° C]	Pressure altitude above MSL [m] / QFE [hPa]							
		0 / 1013		400 / 966		800 / 921		1200 / 877	
		s_1 [m]	s_2 [m]	s_1 [m]	s_2 [m]	s_1 [m]	s_2 [m]	s_1 [m]	s_2 [m]
0	0	229	419	249	448	270	494	293	515
	15	265	473	287	509	311	544	338	586
	30	303	534	329	573	370	636	418	708
5	0	185	356	201	383	219	411	241	442
	15	214	405	234	435	256	469	280	505
	30	247	457	270	492	305	548	347	612

Head-wind comp. [kts.]	OAT [° F]	Pressure altitude above MSL [ft.] / QFE [inHg]							
		0 / 29.9		1310 / 28.5		2620 / 27.2		3940 / 25.9	
		s_1 [ft.]	s_2 [ft.]	s_1 [ft.]	s_2 [ft.]	s_1 [ft.]	s_2 [ft.]	s_1 [ft.]	s_2 [ft.]
0	32	751	1375	817	1470	886	1621	961	1690
	59	869	1552	942	1670	1020	1785	1109	1923
	86	994	1752	1079	1880	1214	2087	1371	2323
5	32	607	1168	659	1257	719	1348	791	1450
	59	702	1329	768	1427	840	1539	919	1657
	86	810	1499	886	1614	1001	1798	1138	2008

5.3 ADDITIONAL INFORMATION

5.3.5 CLIMB PERFORMANCE

When towing a sailplane with a mass of 600 kg (1323 lbs.), the maximum rate of climb is 2.3 meters per second (453 ft./min.) at sea level in Standard Atmosphere conditions.

SECTION 6

MASS (WEIGHT) AND BALANCE / EQUIPMENT LIST

6.1 INTRODUCTION

For the operation of the HK 36 TTC as a tow-plane, the permissible empty mass CG range and the permissible CG range during flight remain unchanged. The loading restrictions under 2.6 and 2.10 of this Supplement No. 1 must be observed.

6.9 EQUIPMENT LIST

Additional Equipment for Tow-Plane Operation:

1 Tost towing device E 85

1 Fitting, Drg. No. 820-2550-00-00, Sheet 2

1 Release mechanism

1 Caution light (amber), if required by national regulations.

NOTE

The following equipment, which is not taken into account for CG determination, is required for the respective kind of operation.

Sailplane Towing

1 Tow-rope[1], 30 to 50 m (100 to 165 ft.) long

1 Pair of connection rings complying with LN 65091

1 Breaking piece on Powered Sailplane: ultimate load 400 daN (899 lbs.), yellow

1 Rear view mirror

1 Breaking piece on sailplane, if required by national regulations or by sailplane manufacturer; see national regulations for required ultimate load

Banner Towing

1 Catch rope, approximately 20 m (65 ft.) long

1 Catch hook with turned back ends (Holland Aviation, Part No. 1607, or equivalent).

1 Pair of connection rings complying with LN 65091

1 Rear view mirror

CAUTION

The Pilot must ensure that the correct breaking piece (see above) is installed in the tow-rope, as the structure may otherwise become overstressed.

---

1) *Translated extract of the applicable airworthiness requirements (see Paragraph 1.2 of this Supplement No. 1):*

Tow-Rope and Breaking Piece

Only plastic ropes may be used, e.g. polyamide, polyester, polypropylene, etc. in accordance with aeronautical standards, DIN standards or factory specifications, provided that these standards (specifications) contain sufficient data and ensure delivery with continuous quality. The rope connections should be suitably covered to provide wear protection.

[...] At the permissible load on the rope, the strain of the rope should not exceed 30 %.

[...] The owner/operator of the tow-plane is responsible for the selection, use, and maintenance of the tow-rope.

SECTION 7
POWERED SAILPLANE AND SYSTEMS DESCRIPTION

7.8 COCKPIT

The release lever for the towing device is yellow and is located to the right of the throttle quadrant. It should have a dead travel of approximately 10 millimeters (0.4 inches). By pulling on the lever, the rope is released.

A caution light is installed (if required) in the instrument panel, which illuminates when the tow-rope is held by the towing device.

7.14 PLACARDS / INSCRIPTIONS

The following additional placards are installed for tow-plane operation of the HK 36 TTC:

Next to the caution light for the tow-rope (if required): Tow-Rope

On the release lever: Tow-Rope Release

On the towing assembly mount: Ultimate load of breaking point: 400 daN (899 lbs.)

SECTION 8

POWERED SAILPLANE HANDLING, CARE AND MAINTENANCE

8.2 POWERED SAILPLANE INSPECTION PERIODS

8.2.1 INSPECTION PERIODS FOR THE TOWING DEVICE

At each 100 hour inspection, the system must be cleaned, lubricated, and checked for poor condition and improper operation.

The towing device must be overhauled every 4 years or after 2000 tows, whichever comes first.

Diamond AIRCRAFT

SUPPLEMENT NO. 3 TO THE

AIRPLANE FLIGHT MANUAL

FOR THE POWERED SAILPLANE

HK 36 TTC

ELECTRICAL POWER SOCKET

FOR ADDITIONAL EQUIPMENT

Date of Issue: 03 Mar 1997

The pages within this Supplement do not require approval.

This Powered Sailplane must be operated in compliance with the information and limitations contained herein.

Prior to operating the Powered Sailplane, the Pilot must take notice of all the information contained in this Airplane Flight Manual.

DIAMOND AIRCRAFT INDUSTRIES GMBH
N.A. OTTO-STR. 5
A-2700 WIENER NEUSTADT
AUSTRIA

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0.2 TABLE OF CONTENTS

SECTION 1
GENERAL

1.1 INTRODUCTION

Pages 9 - 3 - 1 to 9 - 3 - 7 constitute Supplement No. 3 of the Airplane Flight Manual for the Powered Sailplane HK 36 TTC and are valid only for the operation of the Powered Sailplane with the additional electrical power socket fitted.

1.5 DESCRIPTIVE DATA

The electrical power socket is intended for the supply of various equipment only on the ground. This equipment must be provided with a cigarette lighter type plug.

When not in use, the socket must be closed with a cover.

SECTION 2
LIMITATIONS

The electrical power socket may only be used during ground operation, since it cannot be ruled out that the additional equipment will affect the on board electronic equipment and avionics.

During take-off, cruise and landing, use of the socket is not permitted.

The socket is protected by a 2 A fuse.

SECTION 3

EMERGENCY PROCEDURES

[Omitted.]

SECTION 4

NORMAL PROCEDURES

[Omitted.]

SECTION 5

PERFORMANCE

[Omitted.]

SECTION 6

MASS (WEIGHT) AND BALANCE / EQUIPMENT LIST

6.9 EQUIPMENT LIST

Additional equipment required for the power socket

1 Socket

1 Loom with fuse

1 Cover

SECTION 7

POWERED SAILPLANE & SYSTEMS DESCRIPTION

7.11 ELECTRICAL SYSTEM

The power socket is supplied from electrical bus No. 2 (switch panel) via a fuse. **The fuse is** located behind the instrument panel and is therefore inaccessible during flight.

7.14 PLACARDS / INSCRIPTIONS

The following placard is installed next to the additional power socket:

Power connector should be used **only** on ground. Maximum load **2 A**

SECTION 8

POWERED SAILPLANE HANDLING, CARE AND MAINTENANCE

8.2 POWERED SAILPLANE INSPECTION PERIODS

8.2.1 INSPECTION PERIODS FOR THE ELECTRICAL POWER SOCKET

At each 100 hour inspection, the system should be checked for improper operation.