

**PILOT'S OPERATING HANDBOOK
and
APPROVED AIRPLANE FLIGHT MANUAL**

DR400/I40B



Doc. Nr.: 1001588 GB



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Type certificate nr 45, dated 09.11.1975

Serial number **2598**

Registration **OO-VPE**

EASA approval

N° 2005-2531
dated
23 March 2005

Sections approved:
2, 3, 4 and Section 5 page 5.02.

This aircraft must be operated within the operating limits specified
in this flight manual.

THIS DOCUMENT MUST BE PERMANENTLY KEPT
ON BOARD THE AIRCRAFT.

This edition is applicable from s/n 2211 included.

Document nr 1001588 GB



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EASA approval: N° 2005-2531 dated 23 march 2005

LIST OF REVISIONS

Rev. nr	Description	Pages revised	Date of approval
1	Corrections of the fuel weight in the main tank, the weight and balance diagram and insertion of weight and balance calculation.	Cover page ii, iii, 2.05, 6.01 to 6.08	23 march 2005



SECTION 0

GENERAL

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LIST OF ABBREVIATIONS USED

sq ft.....	Square foot
ft.....	Foot
in.....	Inches
Nm.....	Nautic mile
km.....	Kilometer
m.....	Meter
cm.....	Centimeter
kt.....	Knot
m/s.....	Meter per second
tr/mn or rpm	Revolution per minute
Va.....	Maneuvering speed
VC.....	Calibrated airspeed
Vfe.....	Maximum Flaps Extended speed
Vne.....	Never exceed speed
Vno.....	Maximum cruising speed
Vso.....	Stalling speed landing position
Vs1.....	Stalling speed flaps up configuration
VI.....	Indicated air speed
km/h.....	Kilometer per hour
HP.....	Horse Power
hPa.....	Hectopascal
in.Hg.....	Inches of mercury
mbar.....	Millibar
Zp.....	Pressure altitude
l.....	Liter
imp gal.....	Imperial gallon
us gal.....	US gallon
psi.....	Pound per square inch
lb.....	Pound
kg.....	Kilogramme
°C.....	Degrees Celcius
°F.....	Degrees Farenheit
V.....	Volt
A.....	Ampere

LIST OF RADIO ABBREVIATIONS

ADF	Automatic Direction Finder
ATC.....	Air Traffic Control
COM	Communication Transceiver
DME.....	Distance Measuring Equipment
ELT	Emergency Locator Transmitter
IFR.....	Instrument Flight Rules
ILS	Instrument Landing System
MKR.....	Marker Beacon Receiver
NAV	Navigation Indicator and Receiver
AUDIO	Audio Control Panel
VFR.....	Visual Flight Rules
VHF	Very High Frequency
VOR.....	Visual Omni-Range (beacon)

CONVERSION FACTORS

Nautic mile.....	X.....	1.852.....	= kilometers
Feet	X.....	0.305.....	= meters
inches.....	X.....	0.0254.....	= meters
inches.....	X.....	25.4.....	= millimeters
Feet/minute.....	X.....	0.00508 ...	= meter/second
gallons (US).....	X.....	3.785.....	= liters
gallons (Imp).....	X.....	4.546.....	= liters
quarts (US).....	X.....	0.946.....	= liters
Knot.....	X.....	1.852.....	= km/h
psi.....	X.....	0.0689.....	= bar
in.Hg.....	X.....	33.86.....	= mbar
lb.....	X.....	0.453.....	= kg
(°F - 32).....	X.....	5/9.....	= °C

Kilometers.....	X.....	0.539.....	= Nautic mile
meters.....	X.....	3.281.....	= Feet
meters.....	X.....	39.37.....	= inches
millimeters.....	X.....	0.03937 ...	= inches
meter/second.....	X.....	1.97.....	= Feet/minute
liters.....	X.....	0.264.....	= gallons (US)
liters.....	X.....	0.220.....	= gallons (Imp)
liters.....	X.....	1.057.....	= quarts (US)
km/h.....	X.....	0.539.....	= Knot
bar.....	X.....	14.51.....	= psi
mbar.....	X.....	0.02953 ...	= in.Hg
kg.....	X.....	2.205.....	= lb
°C.....	X.....	9/5 + 32 .	= °F

BAROMETRIC PRESSURE CONVERSION TABLE

Below pressure in MILLIBAR or HECTOPASCAL, the pressure in INCHES of



→ mbar ou hPa
→ in. Hg

950	960	970	980	990	1000	1010	1020	1030	1040
28.05	28.35	28.64	28.94	29.23	29.53	29.63	30.12	30.42	30.71
951	961	971	981	991	1001	1011	1021	1031	1041
28.08	28.38	28.67	28.97	29.26	29.56	29.85	30.15	30.45	30.74
952	962	972	982	992	1002	1012	1022	1032	1042
28.11	28.41	28.70	29.00	29.29	29.59	29.88	30.18	30.47	30.77
953	963	973	983	993	1003	1013	1023	1033	1043
28.14	28.44	28.73	29.03	29.32	29.62	29.91	30.21	30.50	30.80
954	964	974	984	994	1004	1014	1024	1034	1044
28.17	28.47	28.76	29.06	29.35	29.65	29.94	30.24	30.53	30.83
955	965	975	985	995	1005	1015	1025	1035	1045
28.20	28.50	28.79	29.09	29.38	29.68	29.97	30.27	30.56	30.86
956	966	976	986	996	1006	1016	1026	1036	1046
28.23	28.53	28.82	29.12	29.41	29.71	30.00	30.30	30.59	30.89
957	967	977	987	997	1007	1017	1027	1037	1047
28.26	28.56	28.85	29.15	29.44	29.74	30.03	30.33	30.62	30.92
958	968	978	988	998	1008	1018	1028	1038	1048
28.29	28.58	28.88	29.18	29.47	29.77	30.06	30.36	30.65	30.95
959	969	979	989	999	1009	1019	1029	1039	1049
28.32	28.61	28.91	29.20	29.50	29.80	30.09	30.39	30.68	30.98

REMINDER:

The Standard Pressure of 1013.2 mbar or hPa equals 29.92 in.Hg

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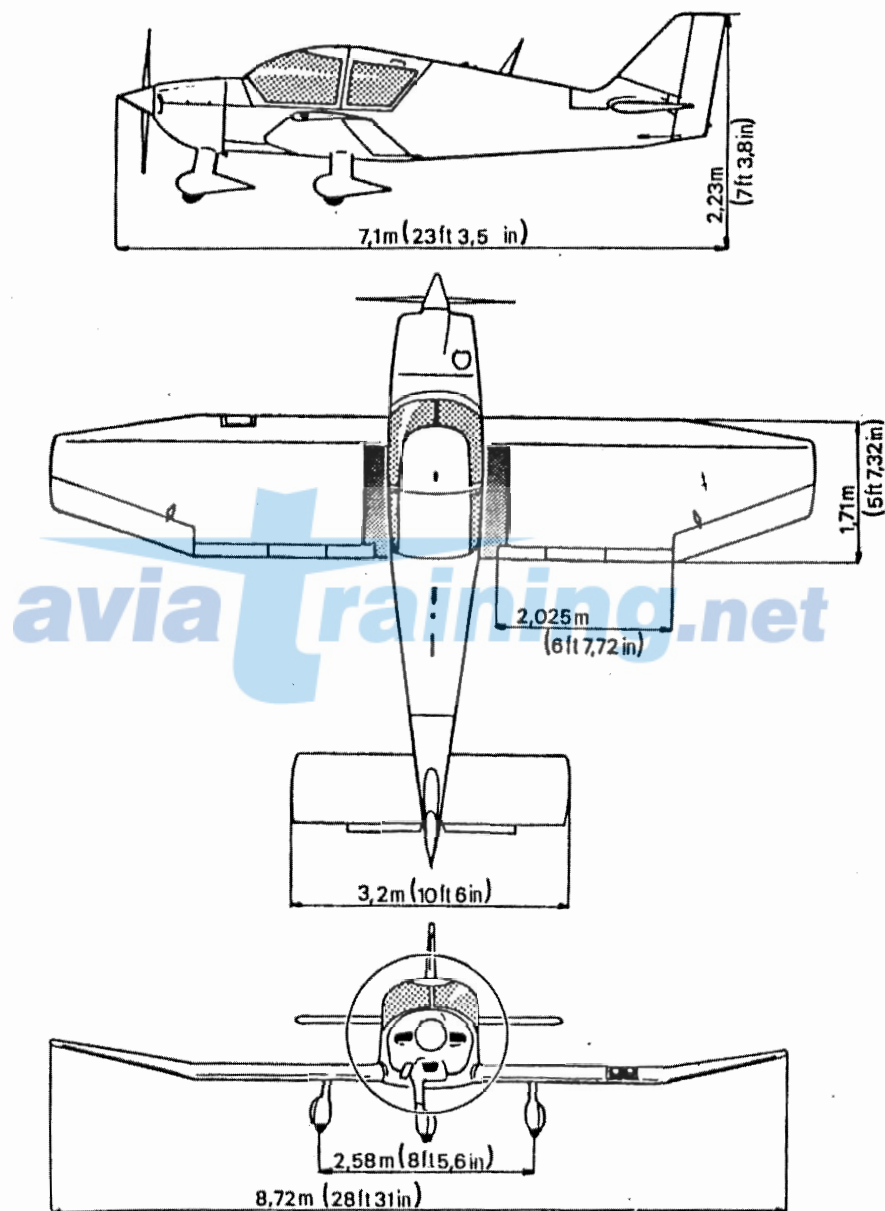


SECTION 1

DESCRIPTION

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OVERALL DIMENSIONS

Wing span (28 ft 7.3 in) 8.72 m
Overall length (23 ft 3.5 in) 7.10 m
Overall height (7 ft 3.79 in) 2.23 m
Propeller ground clearance (11 in) 0.28 m

INTERNAL CABIN DIMENSIONS

Length (5 ft 3.8 in) 1.62 m
Width (3 ft 7.3 in) 1.10 m
Height (4 ft 0.4 in) 1.23 m
4 seats, accessible from both sides by sliding canopy.

WINGS

Wing area (146.40 sq ft) 13.6 m²
Airfoil NACA 43013.5 modified
Aspect ratio 5.35
Dièdre en bout d'alle 14°

AILERONS

Surface (each) (6.13 sq ft) 0.57 m²
Span (each) (5 ft 3.8 in) 1.62 m

The ailerons are statically balanced (at 80%).

WING FLAPS (each)

Surface (3.55 sq ft) 0.33 m²
 Span (6 ft 7.72 in) 2.025 m

HORIZONTAL STABILIZER

Total control surface (31 sq ft) 2.88 m²
 of which antibalance tab (2.8 sq ft) 0.26 m²
 Span (10 ft 6 in) 3.20 m

VERTICAL STABILIZER

Surface overall (17.55 sq ft) 1.63 m²
 Stabilizer (10.76 sq ft) 1 m²
 Rudder (6.78 sq ft) 0.63 m²

LANDING GEAR

Fixed Tricycle Type

Track (8 ft 5.6 in) 2.58 m
 Wheel base (5 ft 5 in) 1.65 m
 Tyre size 380 x 150

Oil, shock struts: MIL. H. 5606 - A
 NORME AIR 3520

Nose gear

Tyre pressure (26.1 psi) 1.8 bar
 Shock strut pressure (72.55 psi) 5 bar

Maining landing gear

Tyre pressure (29 psi) 2 bar
Shock strut pressure (87 psi) 6 bar

BRAKES

The disk brakes are operated by an independant hydraulic circuit on each main gear wheel.

Hydraulic oil MIL.H.5606 - A
Norme AIR 3520

POWER PLANT**Engine**

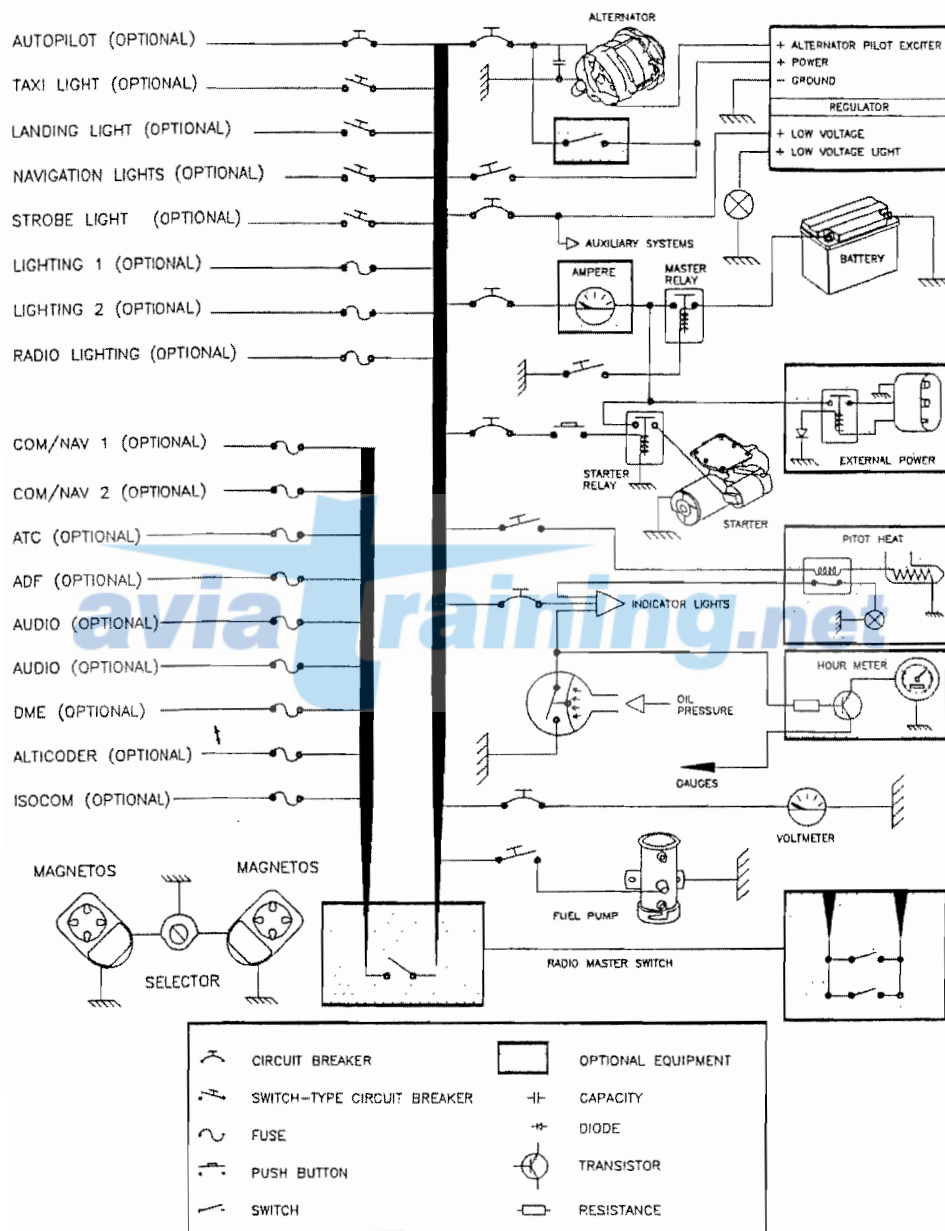
Manufacturer LYCOMING
Type O-320-D2A
Number of cylinders 4
Maximum power (160 HP) at 2700 rpm

PROPELLER

MANUFACTURER	SENSENICH
TYPE	74 DM6 S5-2-64
DIAMETER	1.83 m (72 in)*
PITCH	64 in
MINIMAL STATIC RPM FULL THROTTLE SEA LEVEL	2200

*** Any reduction in diameter during repair is forbidden**

ELECTRICAL SYSTEM



FUEL

Aviation petroleum* AVGAS 100 LL
 Fuel grade * (octane) 100 minimum
 Total fuel capacity (24.2 imp/29 us gal) 110 l
 Total usable fuel (24 imp/28.7 us gal) 109 l
 Unusable fuel (0.22 imp/0.26 us gal) 1 l

Total fuel capacity can be increased to 160 l (35.2 imp/ 42.24 us gal)
 (159 l usable (35 imp/42 us gal)) by installation of optional fuel tank of 50 l
 (11 imp/13.2 us gal).

OIL **

Total engine capacity (8 US quarts) 7.5 l
 Usable capacity (6 1/2 US quarts) 5.7 l

During the first 50 hours of operation:
 Pure mineral oil
 After the first 50 hours of operation:
 Dispersant oil

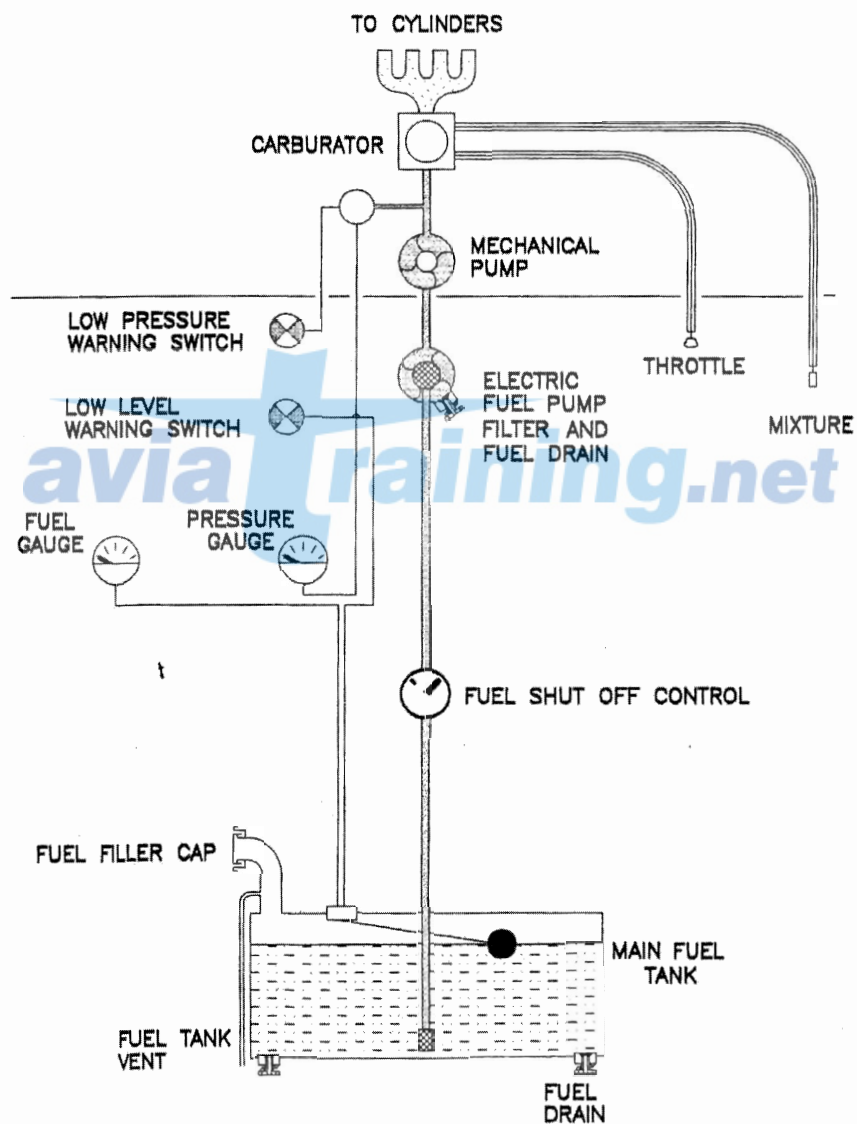
Grades

Oil	Dispersant	Pure mineral
All temperatures	SAE 15W50 or 20W50	-----
above +25°C (80°F)	SAE 60	SAE 60
above +15°C (60°F)	SAE 40 or SAE 50	SAE 50
from 0°C to +30°C (30°F to 90°F)	SAE 40	SAE 40
from -15°C to +20°C (0°F to 70°F)	SAE 40, 30 or 20W40	SAE 30
below -10°C (10°F)	SAE 30 or 20W30	SAE 20

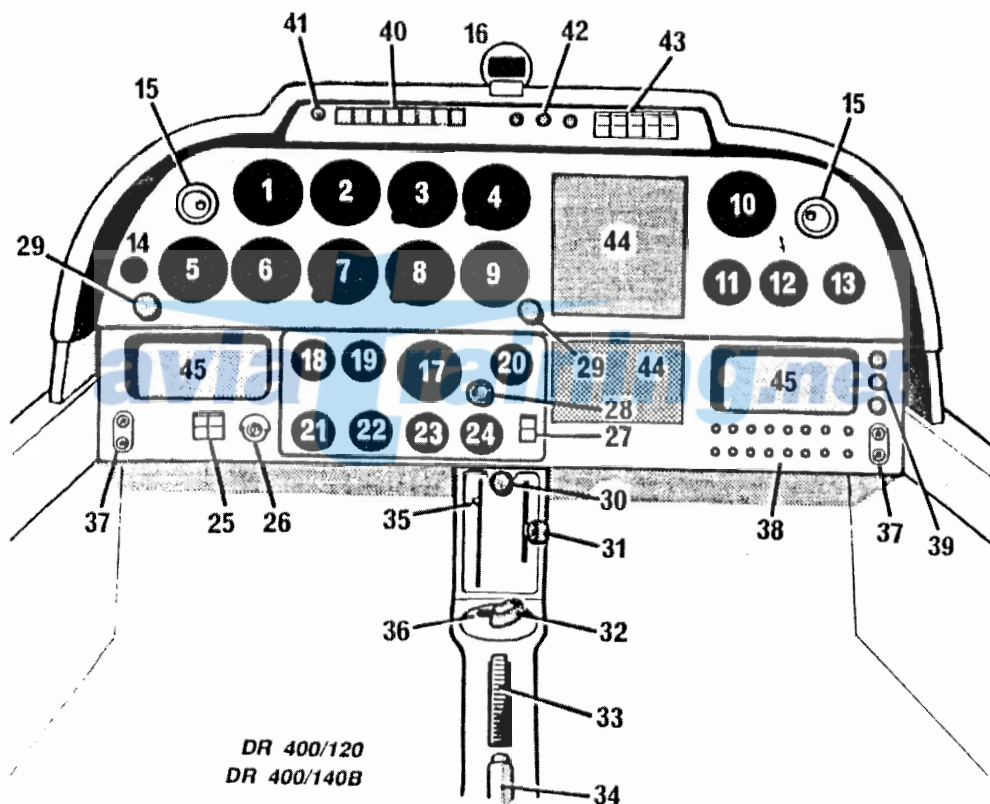
* Refer to Service Instruction Lycoming nr 1070 (last issue).

** Refer to Service Instruction Lycoming nr 1014 (last issue).

FUEL SYSTEM

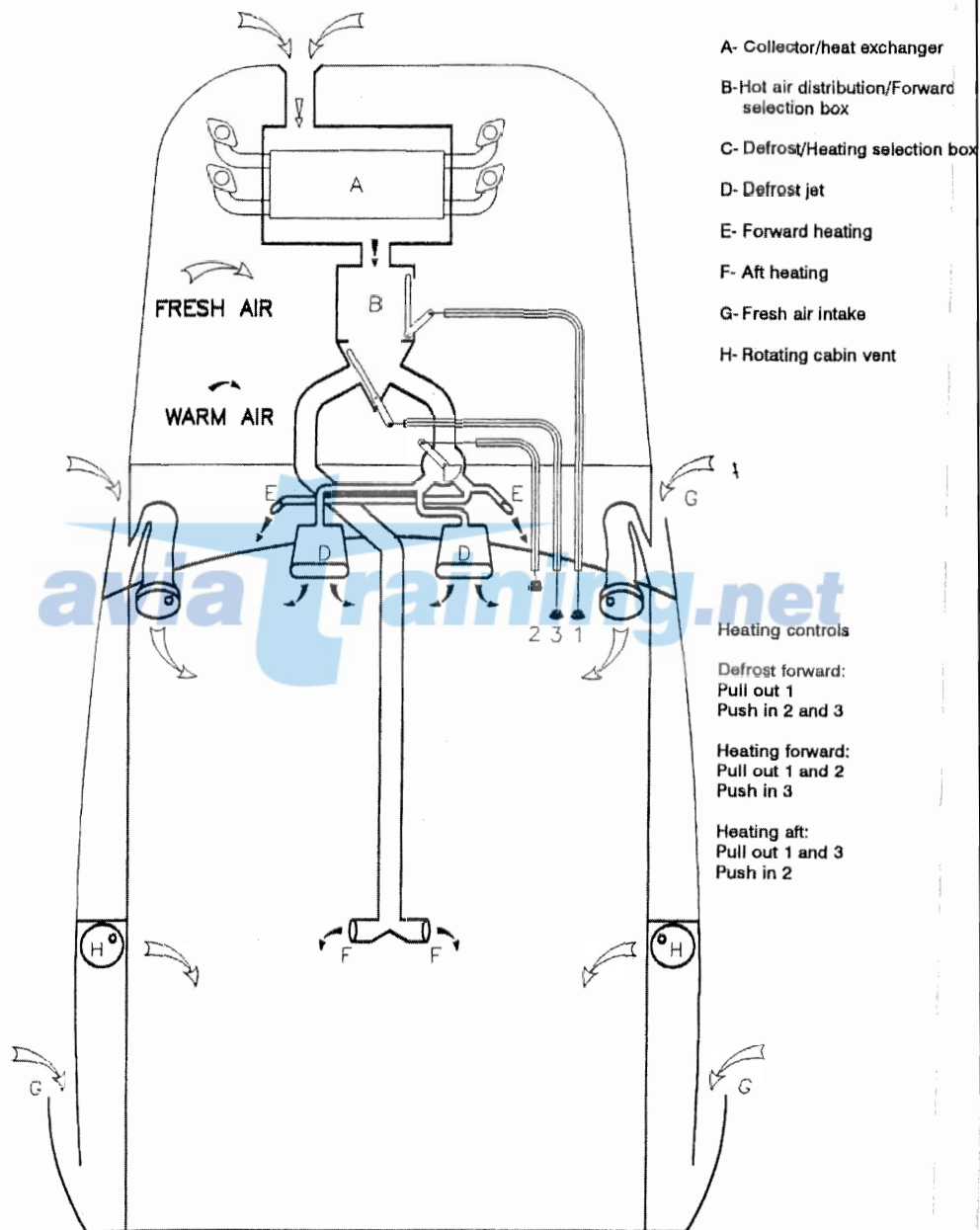


INSTRUMENT PANEL



- | | |
|--|--|
| 1.....Airspeed indicator | 29.....Throttle |
| 2.....Gyro horizon (opt.) | 30.....Parking brake locking control |
| 3.....Altimeter | 31.....Mixture level friction control |
| 4.....Optional equipment | 32.....Fuel cock |
| 5.....Optional equipment | 33.....Elevator trim tab control wheel |
| 6.....Turn and bank indicator (opt.) | 34.....Flap control lever |
| 7.....Directional gyro | 35.....Trim tab position indicator |
| 8.....Rate of climb indicator (opt.) | 36.....Starter push button |
| 9.....Optional equipment | 37.....Mike, Headset-Jack sockets (opt.) |
| 10.....Optional equipment | 38.....Fuses |
| 11.....Optional equipment | 39.....Cabin heat control |
| 12.....Optional equipment | 40.....Annunciator panel (from L to R): |
| 13.....Optional equipment | - oil pressure |
| 14.....Vacuum gauge (opt.) | - fuel pressure |
| 15.....Cabin vent | - fuel low level |
| 16.....Magnetic compass | - alternator load |
| 17.....Tachometer | - flaps extended |
| 18.....Oil pressure gauge | - pitot heat (opt.) |
| 19.....Oil temperature gauge | 41.....Day/night lighting selector |
| 20.....Fuel pressure gauge | 42.....Instrument panel lighting |
| 21.....Voltmeter | 43.....Switch type circuit breaker |
| 22.....Fuel gauge | (from L to R): |
| 23.....Optional equipment | - taxi lights (opt.) |
| 24.....Cylinder head temperature (CHT) | - landing lights (opt.) |
| 25.....Switch type circuit breaker | - strobe lights (opt.) |
| (battery, alternator) | - navigation lights (opt.) |
| 26.....Magneto switch | - pitot heat (opt.) |
| 27.....Safety switch (electric pump) | 44.....Radio equipment (opt.) |
| 28.....Carburetor heat control | 45.....Storage box (or opt. equipment) |

HEATING AND VENTILATION



SECTION 2

LIMITATIONS

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NOTE

All speeds in this manual are Indicated Air Speeds
unless otherwise specified

CERTIFICATION STANDARDS

The DR400/140B aircraft has been certified on the 09.11.75 in the "NORMAL" and "UTILITY" categories conforming to the following technical conditions:

- General conditions of regulation AIR 2052 updated 6 June 1966.
- Complementary conditions for conformity to FAR Part 23 Amendment 7.
- Special condition: the canopy must be jettisonable.

APPROVED OPERATIONS

VFR by day, in non-icing conditions

AIRSPEED LIMITATIONS		km/h	(kt)
Vne (never exceed)		308	(166)
Vno (max. cruise)		260	(140)
Va (max. maneuver)		215	(116)
Vfe (max. flaps extended)		170	(92)

AIRSPEED INDICATOR MARKINGS		km/h	kt
Red line (never exceed)	Vne	308	166
Yellow arc (operate with caution and only in "smooth air")	Vno - Vne	260 - 308	140 - 166
Green arc (normal operating range)	Vs1 - Vno	99 - 260	53 - 140
White arc	Vso - Vfe	87 - 170	47 - 92

LOAD FACTOR LIMITS AT GROSS WEIGHT

(2006 lb) 910 kg ("U" category)

Flaps up n between + 4.4 and - 2.2

Flaps down n = + 2

(2205 lb) 1000 kg ("N" category)

Flaps up n between + 3.8 and - 1.9

Flaps down n = + 2

MAXIMUM AUTHORIZED WEIGHTS

"U" Cat.

"N" Cat.

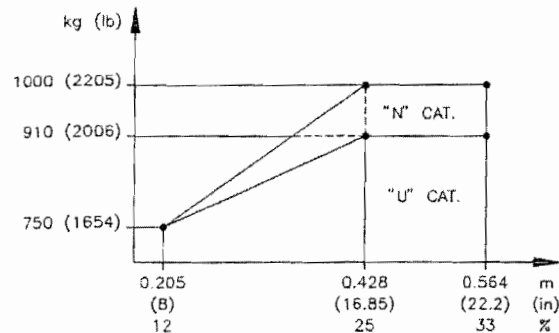
On take off (2006 lb) 910 kg

(2205 lb) 1000 kg

On landing (2006 lb) 910 kg

(2205 lb) 1000 kg

WEIGHT AND BALANCE



Levelling Upper fuselage longeron

Datum wing leading edge, rectangular section

Chord line (67.3 in) 1.71 m

LOAD PLANNING

(also refer to weight and balance chart, section 6)

The weight of engine oil, as well as unusable fuel, must be included in the empty weight of the aircraft.

	Weight kg (lb)	Arm m (in)
Front seats	2 x 77 (2 x 170)	0,36 - 0,46 (14) - (18)
Rear seats (*)	2 x 77 (2 x 170)	1,19 (47)
Fuel Main fuselage tank	78,5 (173)	1,12 (44)
Fuel optional tank (if installed)	36 (79)	1,61 (63,4)
Baggage (**)	40 (88)	1,9 (75)

* The carriage of more than two passengers (with a total weight below or equal to the maximum indicated) is authorized on the rear bench, provided that passenger seat belts are installed for each passenger, and that weight and balance are within the stated limits.

** Within the authorized weight and balance limits.

ENGINE LIMITATIONS

Continuous starter operation 30 sec.
 Maximum rpm (red line) 2700 rpm
 Maximum cylinder head temperature (red line) (500°F) 260 °C

TACHOMETER MARKINGS

Green arc 2000 to 2700 rpm
 Red line 2700 rpm

FUEL

Aviation petroleum * AVGAS 100 LL
 Grade * (octane) 100 minimum
 Maximum total capacity (24.2 imp/29 us gal) 110 l
 Usable total capacity (24 imp/28.7 us gal) 109 l
 Unusable capacity (0.22 imp/0.26 us gal) 1 l
 Normal pressure (0.5 to 8 psi) 35 to 550 mbar

Total fuel capacity can be increased to 160 l (35.2 imp/ 42.24 us gal)
 (159 l usable (35 imp/42 us gal)) by installation of auxillary fuel tank of 50 l
 (11 imp/13.2 us gal).

OIL

Maximum temperature (red line) (245°F) 118°C
 Normal temperature (green arc) (140 to 245°F) 60 to 118°C
 Normal pressure (green arc) (55 to 95 psi) 3.8 to 6.5 bar
 Minimum idle pressure (red line) (25 psi) 1.70 bar
 Maximum pressure (red line) (115 psi) 7.9 bar
 Total engine capacity (8 US quarts) 7.5 l
 Usable capacity (6 US quarts) 5.7 l
 Grades see page 1.08

* Refer to Service Instruction Lycoming n° 1070 (last issue)

LOAD LIMITS



Number of occupants:

Front seats 2

Rear seats 2

Baggage compartment:

Maximum authorized weight (88 lb) 40 kg

OPERATIONAL LIMITATIONS IN THE "U" CATEGORY

Within the limits of this category, the following manoeuvres are authorized:

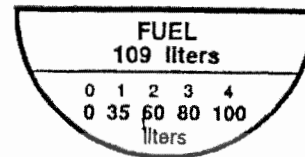
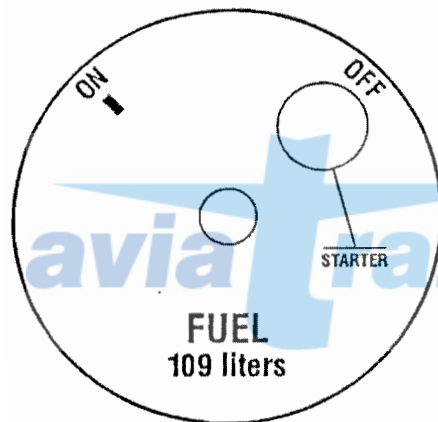
- Steep turns (60°)
- Lazy eights
- Zooms
- Flight at minimum controllable air speed

These manoeuvres must be carried out within the conditions below:

- The rear seats must be unoccupied
- Entry and exit speeds must be within the normal operating range
- Recommended entry speed: (116 kt) 215 km/h

THIS AIRCRAFT MUST BE USED FOR NORMAL OR UTILITY FLYING ONLY,
IN ACCORDANCE WITH THE APPROVED FLIGHT MANUAL. ON THIS
AIRCRAFT, ALL INDEXES, MARKINGS & PLACARDS CORRESPOND TO
NORMAL UTILISATION.
FOR UTILITY OPERATION, REFER TO THE APPROVED FLIGHT MANUAL.

VA MANEUVERING SPEED: 116 kt - 215 km/h
NO AEROBATIC MANEUVRES ALLOWED
APPROVED FOR VFR BY DAY IN NON-ICING CONDITIONS
SPINS PROHIBITED, NO SMOKING

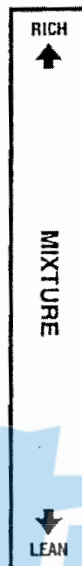
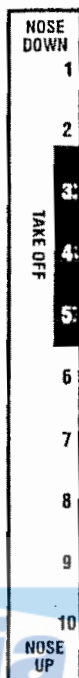


AVGAS 100LL
110 liters
24.2 imp/29 US Gal

NO HOLD

NO STEP

BATTERY	ALTERNATOR
VHF/VOR	ANCILLARY SYST
ATC	STARTER
ALTICODER	INDICATORS
ADF	WARNING LTS
AUDIO	RADIO LIGHT
INTERCOM	PANEL LIGHT 2
GPS	PANEL LIGHT 1



BAGGAGE BAY MAX. LOAD

40 kg

SEE LOADING DIAGRAM

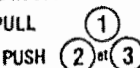
CARBU
HEAT
(PULL)



WINDSHIELD
DEMIST

PULL

PUSH



CABIN HEAT
FORWARD

PULL

PUSH



CABIN HEAT
REAR

PULL

PUSH



**PARKING
BRAKE**

BRAKE ON

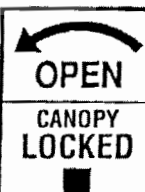
PRESS FIRMLY ON
BOTH PEDALS &
KEEP THE PRESSURE
ON WHILE PULLING
THE CONTROL

BRAKE OFF

PUSH THE CONTROL

OPEN

CLOSED



**PARKING
BRAKE**

← **CANOPY RELEASE (PULL)**

**TRAIN PRINCIPAL / MAIN GEAR / HAUPTFAHRWERK**

PNEU / TYRE / REIFEN	2 bar / 29 psi
AMORTISSEUR / SHOCK ABSORB. / STOSSDÄMFER	6 bar / 87 psi

TRAIN AVANT / NOSE GEAR / BUGRAD

PNEU / TYRE / REIFEN	1.8 bar / 26 psi
AMORTISSEUR / SHOCK ABSORB. / STOSSDÄMFER	5 bar / 73 psi

LIQUIDE DE FREINS
HYDRAULIC FLUID
BREMSFLÜSSIGKEIT

 AIR 3520
 MIL. H.5606-A
 SHELL FLUID 4
 BP Hydraulic 1 (Aero)

 MIKE
 HEADSET

 ELECTR
 PUMP

avia training.net

BAT

ALT

 ANCILLARY
 SYSTEMS

STARTER

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ENGINE FAILURE DURING TAKE OFF (ROLL)

With sufficient runway remaining:

Throttle to idle, and stop in the runway axis using brakes as required.

Without sufficient runway remaining:

Throttle	idle
Brakes	apply heavily
Mixture	idle cut-off
Fuel valve	off
Magneto switch	off
Battery switch	off

ENGINE FAILURE IMMEDIATELY AFTER TAKE OFF

Glide speed (flaps in take off position)	(73 kt) 135 km/h
Mixture	idle cut-off
Fuel valve	off
Magneto switch	off
Battery switch	off

NOTE CAREFULLY

Land straight ahead, with only small direction changes to avoid obstructions.

Never try to turn back to the runway, as altitude after take off is seldom sufficient.

ENGINE FAILURE IN FLIGHT

If altitude is evaluated to be sufficient to try an engine restart:

- Establish maximum glide speed, flaps up 145 km/h (78 kt). In these conditions, and without wind, the aircraft covers approximately 9.3 times its altitude.

- Fuel valve open
- Electric pump on
- Mixture fully rich
- Throttle 1/4 travel forward
- Magnetos switch L + R ("Both")

If the propeller still turns, the engine should restart.

If the propeller is stopped, operate the starter.

If the engine still does not start, prepare for a forced landing, following the procedure below.

POWER OFF FORCED LANDING OFF AIRFIELD

Look for a suitable landing area:

- Belts and harness tight
- Electric pump off
- Mixture idle cut-off
- Throttle to idle
- Magneto switch off
- Fuel valve off
- Alternator switch off
- Battery switch off

Final

- Flaps full down
- Canopy unlock

PRECAUTIONARY POWER LANDING OFF AIRFIELD

Fly over the choosen field several times at low speed (130 km/h - 70 kt) in order to locate the most suitable landing area, flaps in "take off" position (1st notch) then make a precautionary approach at 120 km/h (65 kt), flaps in "landing" position (2nd notch).

On final, unlock the canopy.

Before touchdown

Magneto switch	off
Battery switch	off

NOTE: IN CASE OF CANOPY JAMMING

Canopy handle in "open" position.

Free the two canopy release levers located on the arm rests, on both sides of the instrument panel, and place them in vertical position.

FIRE

Engine fire during starting

Keep the engine turning with:

Fuel valve	off
Electric pump	off
Throttle	full power
Mixture	idle cut-off

The aim of this procedure is to make the engine "swallow" the accumulated fuel in the inlet pipes (generally following an excess of fuel injection during a difficult engine start).

If the fire continues

Magneto switch off
 Battery switch off
 Alternator switch off

Abandon the aircraft, and try to extinguish the fire with the aids available: fire extinguishers, covers, clothing, or sand.

Engine fire in flight

Fuel valve off
 Throttle full power until engine stops
 Mixture idle cut-off
 Electric pump off
 Alternator switch off
 Cabin heat and ventilation off
 Establish maximum glide speed (78 kt) 145 km/h

Prepare for a forced landing off airfield, following the procedures in the chapter "Power off forced landing off airfield".

Do not attempt to restart the engine.

Cabin fire

Extinguish the fire by all means possible (optional extinguisher).

To eliminate smoke, apply maximum ventilation.

In case of an electrical fire (fumes indicating insulation burning):

Cabin ventilation reduce
 Alternator switch off
 Battery switch off
 Battery breaker pull out
 Alternator breaker pull out

Land quickly if the fire continues.

VIBRATIONS AND ENGINE ROUGHNESS OPERATION

Vibrations and engine roughness operation are generally due to (verify in this order):

- Carburetor icing: see paragraph "ICING" on next page
- Mixture set too rich or too lean: adjust the mixture (see section 4)
- Contamination in the fuel system: verify fuel pressure. Switch on the electric pump
- Ignition failure: magneto switch on "L", then on "R", then return to "Both". Select the position providing best engine operation, and fly to the nearest airfield, at reduced power, and adjust mixture control to obtain smooth operation.

LOW OIL PRESSURE

In case of low oil pressure indication, check oil temperature, and if it is too high (red arc):

- Reduce power
- Flight to the nearest airfield, and prepare for an off airfield landing

ICING

Proceed as follows when inadvertently encountering icing:

- Carburetor heat on
- Increase power in order to reduce ice built-up to minimum
- Switch on pitot heat (if installed)
- Select maximum cabin heat, and direct the total output to the windscreen (position "defrost") in order to remove the ice quickly
- Turn back, or change altitude, to obtain an outside air temperature less conducive to icing
- Plan to land at the nearest airfield

With an extremely rapid ice build-up, carry out a forced landing.

Remember that a layer of 0.5 cm (0.2 in) on the wing leading edge fairly increases stall speed. If needed, use a higher than normal approach speed: 135 km/h (73 kt).

REMARKS

If continuous carburetor heat is deemed necessary, it is imperative to adjust the mixture control to obtain normal engine operation.

Always use carburetor heat fully on or fully off, in certain cases, an intermediate position could increase icing.

ELECTRICAL POWER SUPPLY MALFUNCTION

Alternator failure is indicated when the amber "alternator failure" light on the warning panel is lit, and a progressive drop in voltage (shown on the voltmeter).

If "alternator failure" is lit

Switch off the alternator, then back on.

This operation resets the overvoltage relay which may have cut-out due to a transient overvoltage.

If the failure continues

- Switch off the alternator
- Switch off all electrical equipment not essential for continuing the flight
- Land as soon as possible, and have the electrical system inspected

NOTE

An alternator failure does not prevent the engine from operating normally.

INADVERTENT SPIN

Should a spin occur, use the following procedure:

- Throttle idle
- Rudder maximum opposite to direction of rotation
- Elevator neutral
- Ailerons neutral
- Once rotation stops, rudder to neutral position and recover within flight limitations.

NOTE

If flaps are down when spin begins, retract them immediately.

LOSS OF ELEVATOR CONTROL

In the event of loss of elevator control (accidental disconnection):

- Stabilize the aircraft in level flight, flaps up, at 130 km/h (70 kt), using the elevator trim and throttle.
- Do not change the elevator trim setting, and control the angle of descent only with throttle. Reduce power only on short final, and near to the ground.



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SECTION 4

NORMAL PROCEDURES

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Cruise	4.10
Descent	4.12
Landing	4.12
Engine shut-down	4.13
Parking brake use	4.14

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LOADING

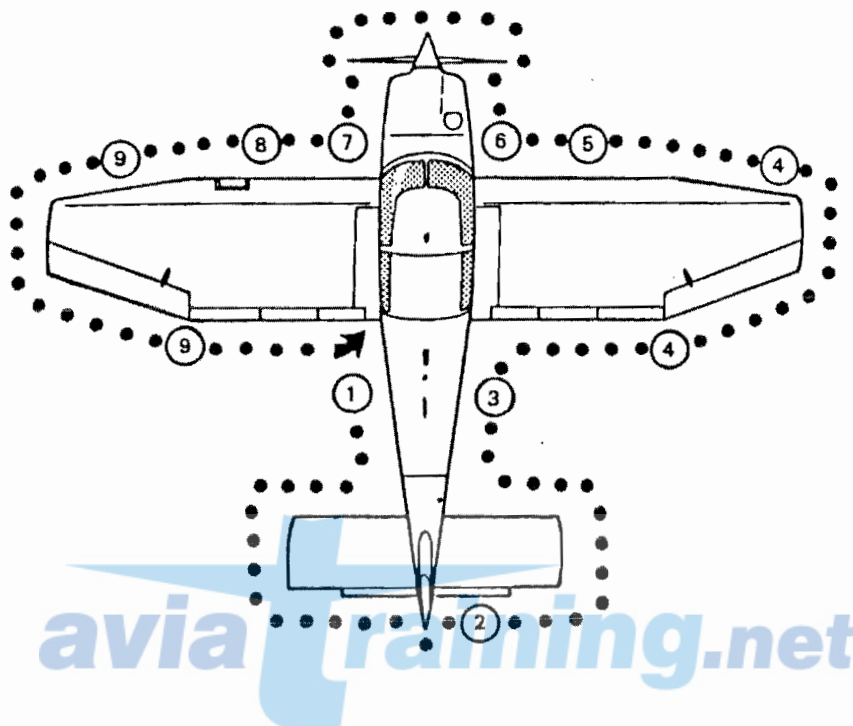
Before each flight, insure that the total weight and the load balance are within the established limits. For this, use the weight and balance chart in Section 6.

NORMAL OPERATING SPEEDS

The speeds reminded hereunder are Indicated Air Speeds recommended for normal operations.

They are based on a standard aircraft, operated at gross weight, in standard atmosphere, at sea level. They can change from one aircraft to another, depending on installed equipment, aircraft and engine condition, atmospheric conditions and pilot proficiency.

- Best rate of climb speed
 - flaps in take off position (1st notch) (78 kt) 145 km/h
 - flaps up (86 kt) 160 km/h
- Best angle of climb speed
 - flaps in take off position (1st notch) (70 kt) 130 km/h
 - flaps up (70 kt) 130 km/h
- Maximum operating speed in turbulence
 - flaps up (140 kt) 260 km/h
- Maximum speed
 - flaps in landing position (2nd notch) (92 kt) 170 km/h
- Landing speed final approach
 - flaps in landing position (2nd notch) (62 kt) 115 km/h



PRE-FLIGHT INSPECTION

To be performed before each flight.

This inspection may be reduced after intermediate on route landings.

Magneto switch	.....	"OFF"
Controls	.....	free
Flaps	.....	check operation
Battery switch	.....	on
Fuel quantity	.....	check
Battery switch	.....	off
Aircraft documents	.....	check availability on board
Baggage	.....	check stowing

Check flight controls displacements, then make an aircraft walk-around inspection (as shown above) beginning at the fuselage left side.

-
- | | | |
|---|--|---------------------|
| | Fuel filler cap | in place, locked |
| 1 | Static vent | clean, unobstructed |
| | Fuselage main tank drain valve | actuated |
| | (left or right depending on aircraft bank) | |
-
- | | | |
|---|-----------------------------|---|
| 2 | Horizontal stabilizer | surface condition, hinges without clearance |
| | Rudder | check hinges and clearance |
-
- | | | |
|---|-------------------|---------------------|
| 3 | Static vent | clean, unobstructed |
|---|-------------------|---------------------|
-
- | | | |
|---|--|----------------------------|
| 4 | Flap and aileron | check condition and hinges |
| | Wing tip and navigation light (optional) | check condition |
-
- | | | |
|---|-------------------------------|--------------------------------------|
| | Stall warning | clean, check displacement |
| 5 | Right main landing gear | check, oil cap secured, panel closed |
|  | ..... | normal shock absorber compression |
|  | ..... | tyre inflated |
-
- | | | |
|---|------------------------------|--------------------------------------|
| | Fuel drain valve | actuated |
| | Oil level | check, oil cap secured, panel closed |
| 6 | Engine cowl attachment | check |
| | Propeller | clean, in good condition |
| | Propeller spinner | no play |
| | Air inlets | clean, unobstructed |
-
- | | | |
|---|--------------------------|--|
| | Nose gear | check attachment and fairing condition |
|  | ..... | normal shock absorber compression |
| 7 | ..... | tyre inflated |
|  | ..... | tow-bar removed |
| | Exhaust pipes | rigid |
| | Canopy cleanliness | check |
-
- | | | |
|---|------------------------------|--|
| | Left main landing gear | check attachment and fairing condition |
|  | ..... | normal shock absorber compression |
| 8 | ..... | tyre inflated |
| | Pitot | clean, unobstructed |
| | Lights (optional) | glass clean |
-
- | | | |
|---|--|----------------------------|
| 9 | Wing tip and navigation light (optional) | check condition |
| | Flap and aileron | check condition and hinges |
-

Engine "flooded"

Electric pump off
 Mixture idle cut off (pull out)
 Throttle full throttle (push in)
 Starter operate for several seconds

As soon as the engine starts, advance mixture control to "rich", and resume the normal procedure, without injection.

ATTENTION

Avoid operating the starter for more than 30 seconds. Wait at least a minute before operating it again.

As soon as the engine is running, verify the engine oil pressure. If it is zero after 15 to 20 seconds, switch off and investigate the cause.

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AFTER THE ENGINE STARTS

Rpm 1200 rpm
 Electric pump off
 Alternator switch on
 Voltmeter green range
 Vacuum gauge check
 Lights test

COM/NAV, navigation instruments on, set
 Altimeter set
 Vacuum gauge if installed (optional) check

TAXIING

Parking brake unlocked
 Brakes test
 Turn and bank indicator if installed (optional) check
 Directional gyro if installed (optional) check setting
 Avoid exceeding 1200 rpm as long as oil temperature remains in the yellow range.

ENGINE RUN UP

Parking brake locked
 Oil pressure and temperature green range
 Fuel pressure green range
 Mixture full push in
 Carburetor heat full out

Magnetos check

Throttle 2000 rpm
 Magneto selection:
 Max. drop between (L) or (R) and (L + R) 175 rpm
 Max. difference between (L) and (R) 50 rpm

Carburetor heat check

Carburetor heat full on (pull out)
 Check rpm drop about 100 rpm
 Carburetor heat full out (push in)

Mixture check

Lean untill rpm reduction, then return to "full rich".

Engine idle check

Throttle 600 to 650 rpm

BEFORE TAKE OFF

Controls free
 Magneto switch L + R ("Both")
 Cabin (seats, belts, canopy) check
 Fuel shut off control on
 Electric pump on
 Elevator trim take off position
 Instruments check, set
 Flaps fully down, then return to take off position (1st notch)
 Throttle "holding" 1200 rpm

TAKE OFF

Normal take off

Take off minimum rpm 2200 rpm
 Take off speed (54 kt) 100 km/h
 Initial climb speed (65 kt) 120 km/h

After obstacle clearance,

Reduce angle of climb to obtain (78 kt) 145 km/h
 Electric pump off
 Fuel pressure check (green range)
 Flaps up

Short take off

Flaps (1st notch) take-off position
 Apply full power, brakes applied
 then release the brakes mini 2200 tr/mn
 Take off speed (54 kt) 100 km/h
 Then, if necessary (to clear an obstacle)
 best angle of climb speed (70 kt) 130 km/h

Cross wind take off

Flaps (1st notch) take off position

Ailerons into the wind

Take off at a slightly higher airspeed than normal.

Correct drift in the normal way (max. bank angle, close to the ground: 15°)

Demonstrated crosswind (22 kt) 40 km/h

CLIMB**Normal climb (flaps up)**

Set climb speed 160 km/h (86 kt); 140 km/h (75 kt) at 10 000 ft.

Above 5000 ft, adjust mixture. .

Best angle of climb

A better rate of climb is obtained at 130 km/h (70 kt), flaps in take off position (1st notch), or flaps up.

NOTE

This type of climb should only be used exceptionally,
due to poor engine cooling

CRUISE

Refer to Section 5 for rpm settings and cruise performance.

Operation of mixture control

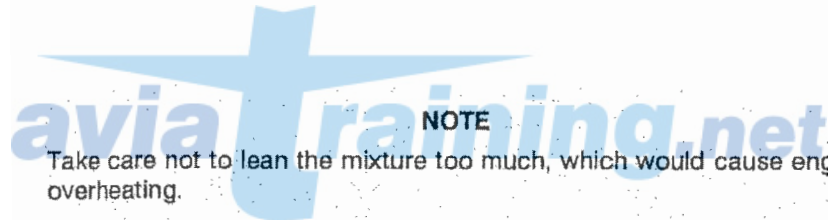
Maintain mixture control in the "full rich" position during take off and in the climb.

In certain conditions (high altitude take off, long climb above 5000 ft), this setting could be too rich, and results in irregular engine operation or loss of power.

In these cases, adjust the mixture to recover regular engine operation, and not for fuel economy.

Mixture adjustment when in stable cruise:

Progressively lean the mixture until a slight reduction in rpm is noted; then lightly enrich to re-establish power and normal engine operation.



NOTE

Take care not to lean the mixture too much, which would cause engine overheating.

ALWAYS ENRICH THE MIXTURE BEFORE AN INCREASE IN POWER.

DESCENT

Rapid descent

Power as required to maintain the desired descent path
Carburator heat as required full on or full out
Each 1500 ft, apply power to avoid excessive engine cooling and to clean the spark plugs.

Approach or down wind

Mixture fully rich (push in)
Electric pump on
Carburator heat as required full on or full out
Cabin (belts and seats) check
Flaps below 170 km/hr (92 kt) (1st notch) in take off position
Speed (81 kt) 150 km/h
Elevator trim set
Roll stabilizer or Autopilot (if installed) off

Final

Carburator heat full out (push in)
Flaps below 150 km/h (81 kt) (2nd notch) landing position
Approach speed (62 kt) 115 km/h
Elevator trim set

LANDING

Short landing

Flaps (2nd notch) landing position
Approach speed (with throttle setting) (62 kt) 115 km/h
After touch down, brake heavily keeping nose up with elevator and retracting flaps.

Landing in crosswind or gusty conditions

Flaps (1st notch) take off position
 Approach speed (70 kt) 130 km/h + 1/2 gust speed
 Drift correct in the normal way
 Demonstrated crosswind (22 kt) 40 km/h

Overshoot procedure

Carburator heat off (pushed) check
 Throttle full (push in)
 Speed (65 kt) 120 km/h
 Progressively raise flaps to the take-off position (1st notch), then establish
 normal climb speed (75 kt) 140 km/h

AFTER LANDING

Electric pump off
 Flaps up
 Navigation instruments off

ENGINE SHUT-DOWN

Parking brake tight
 Flaps down
 COM/NAV and electrical equipment off
 Magneto cut-off check at idle off, then L + R ("Both")
 Rpm 1000 rpm
 Mixture idle cut-off (pull out)

After the engine stops

Magneto switch off
 Alternator switch off
 Battery switch off
 When wheel chocks in place release the parking brake

PARKING BRAKE USE

Brake on

Press on both pedals. Keep pressure on, while pulling the parking brake control upwards. Then, release the pressure on the pedals (the parking brake control remains in the pulled position).

Brake off

Push the control down.



SECTION 5

PERFORMANCE

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Air speed installation calibration	5.02
Stall speeds	5.02
Take off performance	5.03
Climb performance	5.04
Cruise performance	5.06
Landing performance	5.07

NOISE LIMITATION

In compliance with the decree of 19.02.1987, the maximum acceptable noise level for the DR400/140B aircraft, at a certified gross weight of (2205 lb) 1000 kg is 83.2 dB(A) (ICAO Annex 16 Chapter 10).

The noise level determined under the conditions of the decree, is 74.9 dB(A) at maximum continuous power.

The DR400/140B aircraft has received noise limitation certificate nr N45.

AIRSPEED INSTALLATION CALIBRATION

VC = (VI + calibration) is substantially equal to VI

The above figures do not take into account the ASI own tolerance

NOTE

All speeds in this manual are Indicated Airspeeds
unless otherwise specified.

STALL SPEEDS

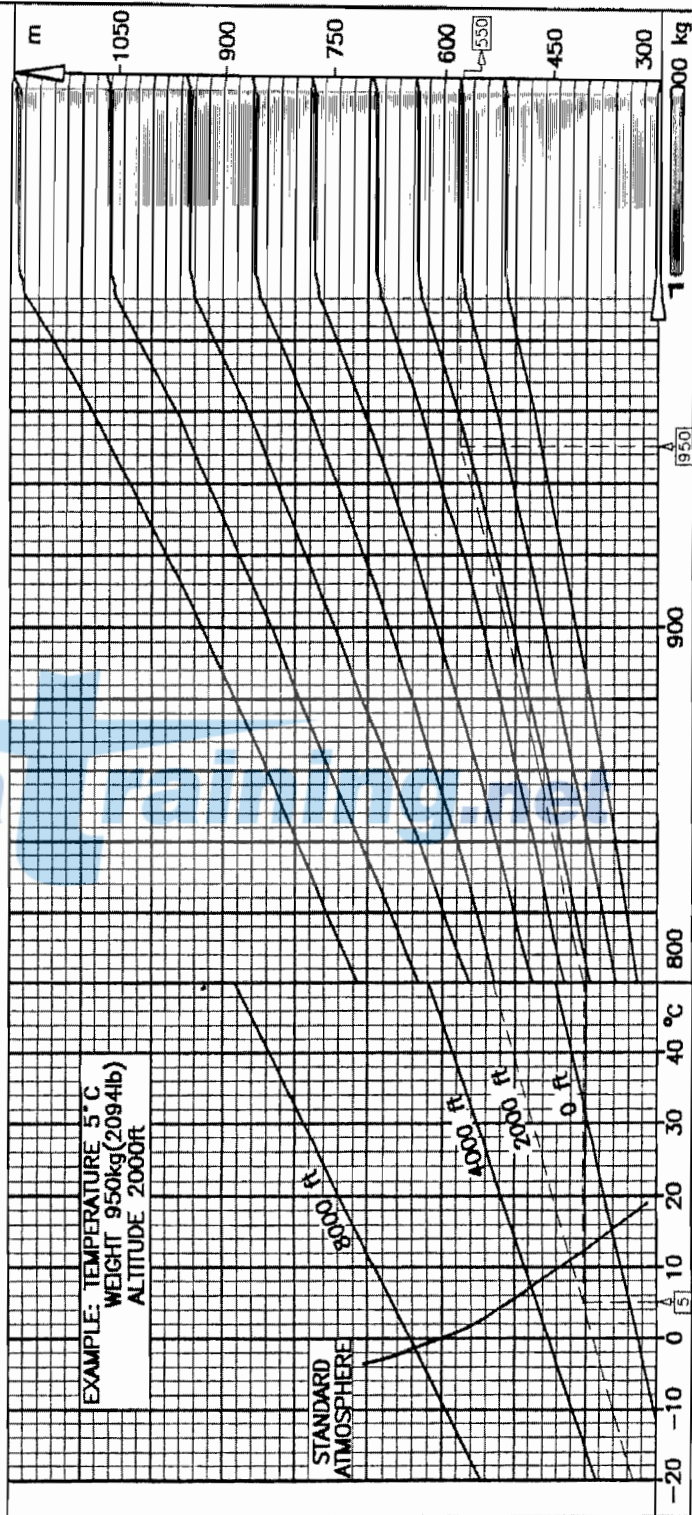
Engine idling, weight: 1000 kg (2205 lb)	km/h (kt)		
Bank angle	0°	30°	60°
Flaps up	99 (54)	106 (58)	140 (76)
Flaps 1 st notch, take off position	93 (51)	99 (54)	131 (71)
Flaps 2 nd notch, landing position	87 (47)	93 (51)	123 (67)

TAKE-OFF PERFORMANCE

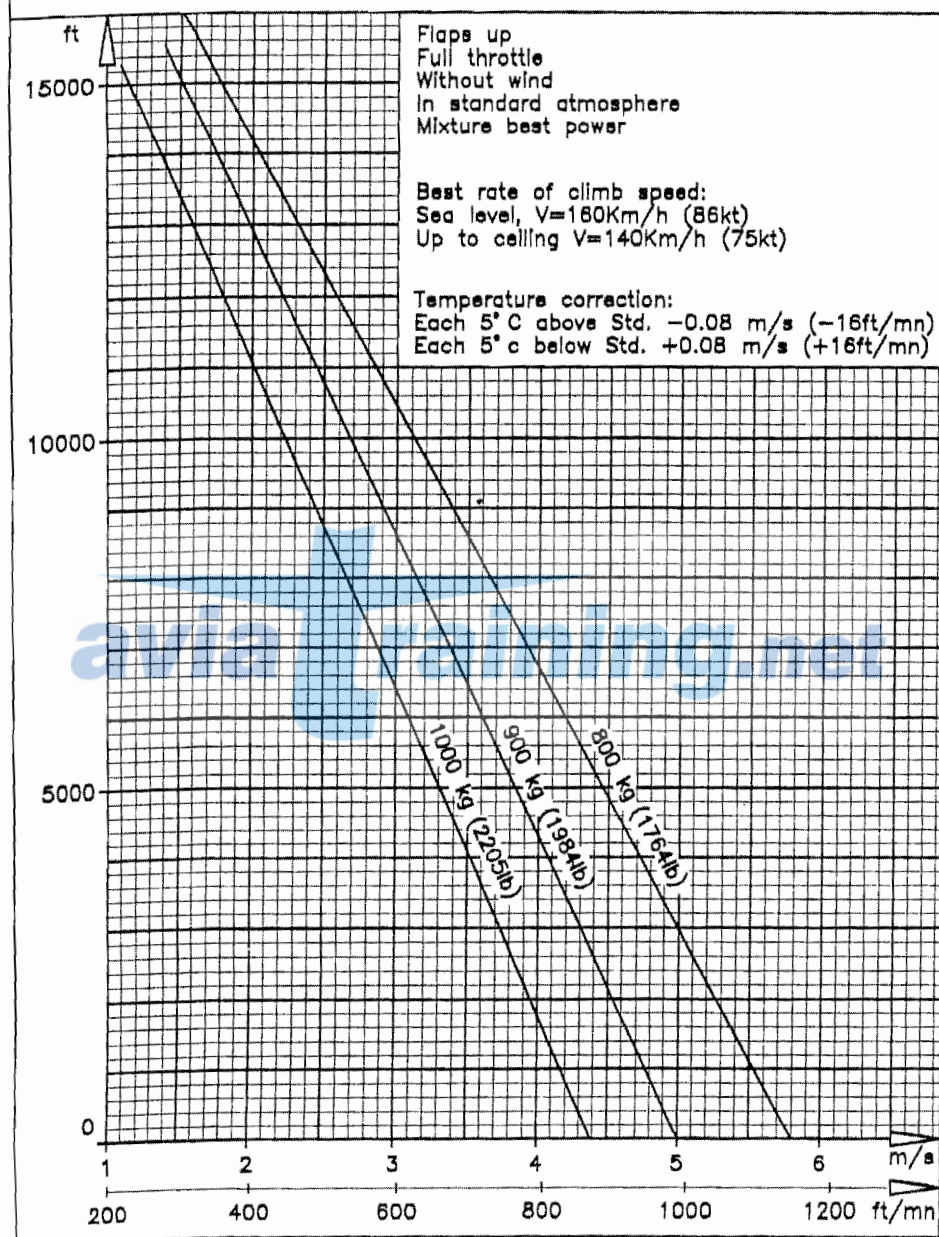
WITHOUT WIND
FLAPS IN TAKE-OFF POSITION
ENGINE FULL POWER
DRIED AND PLANE CONCRETE RUNWAY
OVER 15m(50ft) $V=120\text{km/h}$ (65kt)
TAKE-OFF $V=100\text{km/h}$ (54kt)

HEAD WIND INFLUENCE: FOR 10kt MULTIPLY BY 0.79
FOR 20kt MULTIPLY BY 0.64
FOR 30kt MULTIPLY BY 0.53
DOWN WIND INFLUENCE: ADD 10% TO DISTANCE
SECTION OF 2kt
DRIED GRASS RUNWAY: ADD 15%

EXAMPLE: TEMPERATURE 5°C
WEIGHT 950kg(2094lb)
ALTITUDE 2000ft



CLIMB PERFORMANCE



CLIMB PERFORMANCE

1) Flaps, take-off position (1st notch):

At maximum weight of 1000 kg (2205 lb) in standard atmosphere

Best rate of climb speed (78 kt) 145 km/h

Best angle of climb speed (70 kt) 130 km/h

Temperature influence:

Each 10°C above standard, lowers the ceiling by 1000 ft and reduces rate of climb by 0.24 m/s (47 ft/mn).

Glide performance

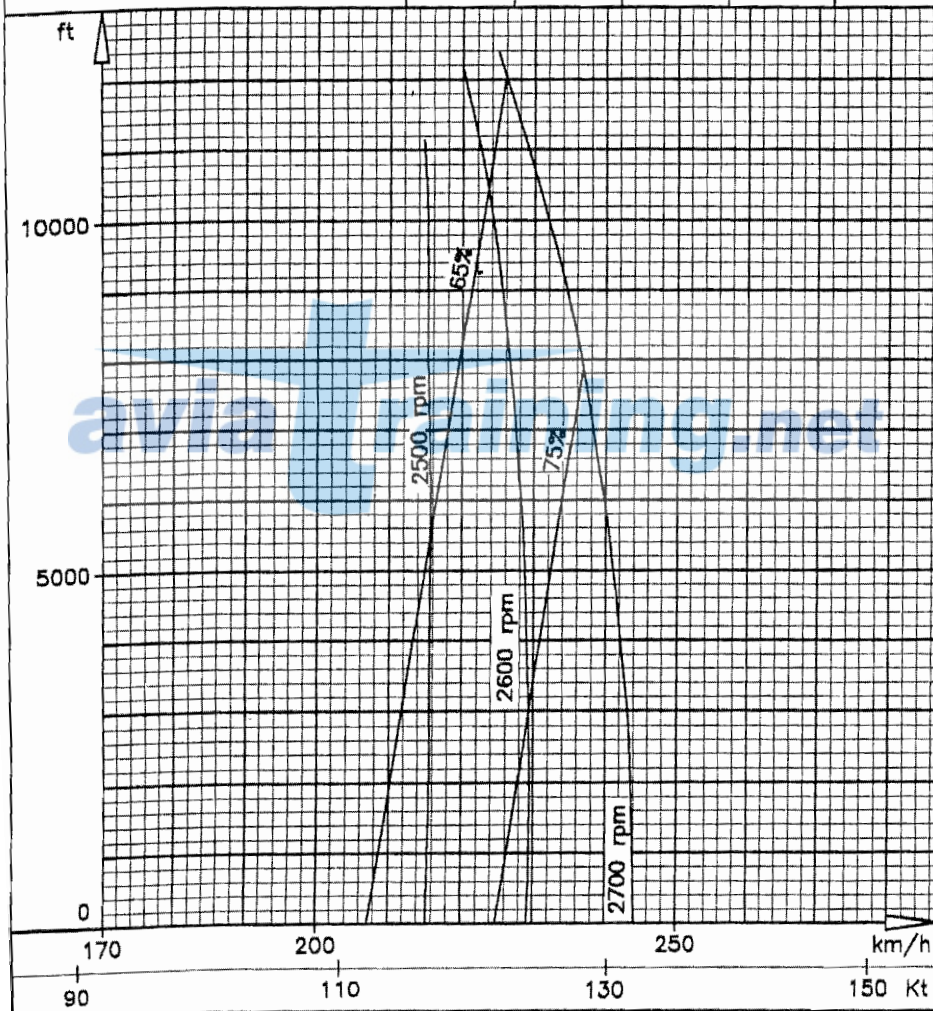
Engine off, the aircraft glides 9,3 times its height (without wind) at 145 km/h (78 kt).

Altitude and temperature do not have perceptible influence.

CRUISE PERFORMANCE

At gross weight 1000kg (2205lb)
In standard atmosphere
Without wind
Optimum mixture setting

Power	Fuel consumption l/h (us gal/h)			
	75 %		65 %	
	l/h	us gal/h	l/h	us gal/h
2700	39.3	10.3	34.7	9.1
2600	38.3	10.1	33.8	8.9
2500			33	8.7



LANDING PERFORMANCE

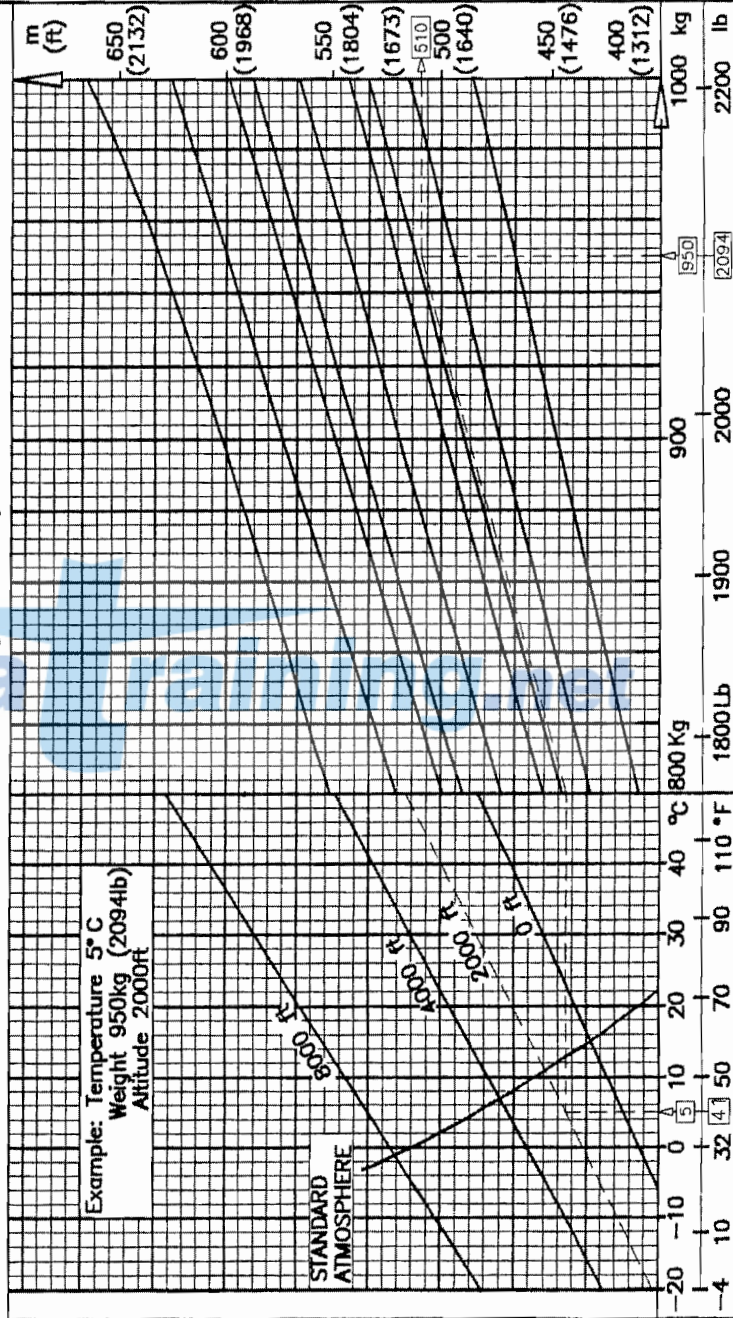
Without wind
Flaps in landing position
Engine idling
Dried and plane concrete runway
Over 15m (50ft): $V=115\text{Km/h}(62\text{kt})$
Touch down, $V=87\text{Km/h}(47\text{kt})$

Head wind influence: For 10kt multiply by 0.79
For 20kt multiply by 0.64
For 30kt multiply by 0.53

Down wind influence: Add 10% to distance per section of 2kt
Dried gross runway: Add 15%

Example: Temperature 5°C
Weight 950kg (2094lb)
Altitude 2000ft

STANDARD
ATMOSPHERE



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SECTION 6

WEIGHT AND BALANCE

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General	6.03
Weight and balance diagram	6.04
Graphic method : use of the weight and balance diagram	6.05
Calculation of weight and balance	6.06
Sample loading problem	6.07


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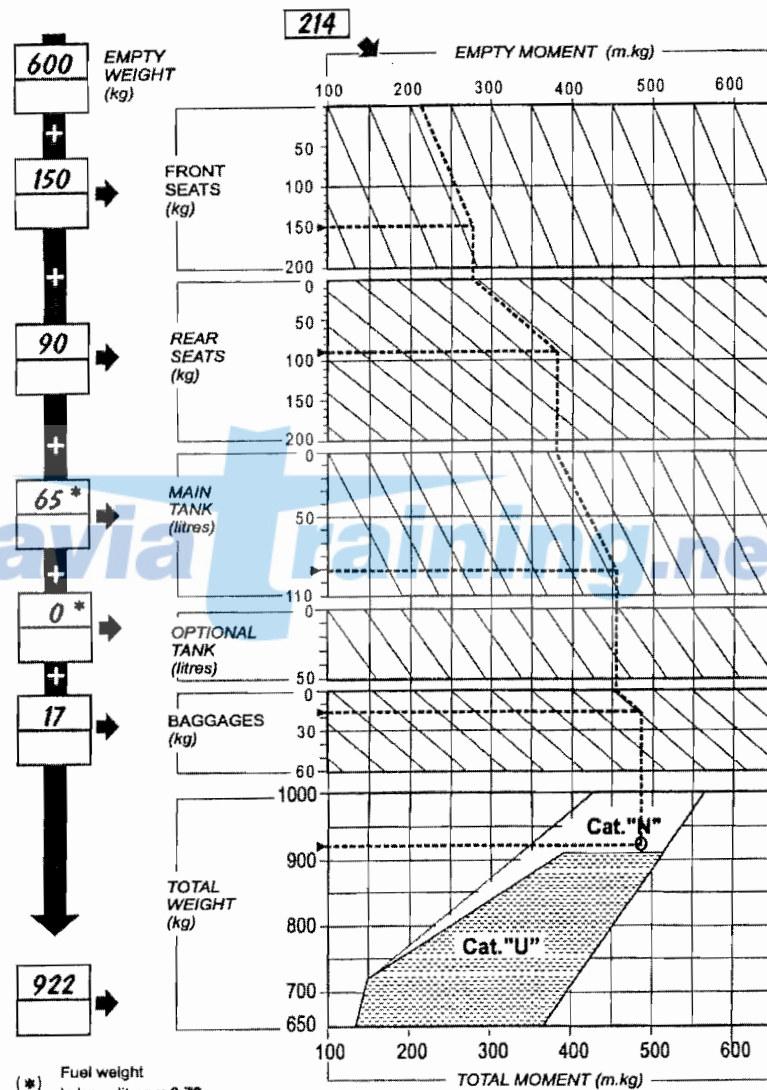
GENERAL

Two methods may be used to determine aircraft weight and balance:

- Graphic: use of weight and balance diagram
- Calculation



WEIGHT AND BALANCE DIAGRAM



GRAPHIC METHOD: USE OF WEIGHT AND BALANCE DIAGRAM

- 1) Calculate the weight of the fully loaded aircraft :
empty weight (from the Weight & Balance Data Sheet)
+ pilot and passengers weights
+ baggage weight
+ standard fuel
Make sure that the total weight does not exceed 1000 kg (2205 lb) in cat. N and 910 kg (2006 lb) in cat. U.
- 2) Place the empty aircraft moment (from the Weight and Balance Data Sheet) on the upper scale of the diagram, and proceed with your own data as in the following example, indicated by dashed line on the diagram.

EXAMPLE of loading problem (dashed line on the diagram)

Licensed empty weight (sample airplane)... (1548 ft.lb) 214 m.kg
Weight of the empty aircraft..... (1323 lb) 600 kg
Pilot & front passenger (331 lb) 150 kg
Rear passenger (198 lb) 90 kg
Fuel, main tank 90 l (24 imp/20 US gal)..... (143 lb) 65 kg
Baggage (37.5 lb) 17 kg
TOTAL WEIGHT **(2033 lb) 922 kg**

Loading is acceptable when the resulting point falls within the Center of Gravity moment envelope.

*** CAUTION**

For the calculation of the aircraft center of gravity, do not use the values of empty aircraft weight and moment indicated in the above example !

Use the values indicated in the latest licensed weight and balance data sheet of your aircraft.

1 litre AVGAS = 0.72 kg (1.6 lb)
1 US gal AVGAS = 2.7 kg (6 lb)
1 Imp gal AVGAS = 3.27 kg (7.2 lb)
1 lb = 0.453 kg
1 kg = 2.20 lb
1 foot = 0.305 m

CALCULATION OF WEIGHT AND BALANCE

	weight (kg)		Arm (m)		Moment (m.kg)
Empty weight	(*)	x	(*)	=	(*)
Front seats		x	0,360 to 0,410	=	
Rear seats		x	1,190	=	
Main tank (max. weight 78,5 kg)		x	1,120	=	
Optional tank (max. weight 36 kg)		x	1,610	=	
Baggages (max. weight 40 kg)		x	1,900	=	
Total	Pt =	kg		Mt =	m.kg

(*) Use values indicated on the latest weight and balance data sheet of your plane.

Maximum weight: 1000 kg

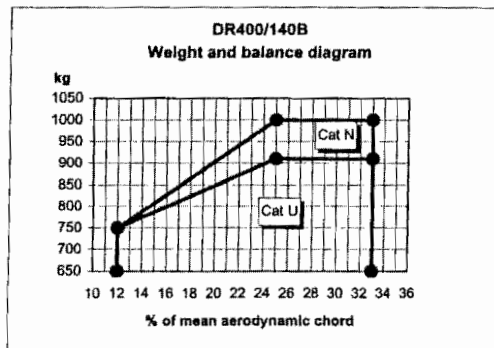
Mean Aerodynamic Chord (m.a.c.): 1,71 m

C of G lever arm: $Bt = Mt / Pt = \dots\dots\dots$ m

Balance % of m.a.c.: $(Bt / m.a.c.) \times 100 = (Bt / 1,71) \times 100$

$$\frac{\dots\dots\dots}{1,71} \times 100 = \dots\dots\dots \%$$

Loading is acceptable when the resulting point falls within the weight and balance envelope.



SAMPLE LOADING PROBLEM

	Weight (kg)		Arm (m)		Moment (m.kg)
Empty weight	600	x	0.357	=	214.02
Front seats	150	x	0.410	=	61.5
Rear seats	90	x	1.190	=	107.1
Main tank (max. weight 78,5 kg)	65	x	1.120	=	72.8
Optional tank (max. weight 36 kg)	0	x	1.610	=	0
Baggages (max. weight 40 kg)	17	x	1.900	=	32.3
Totaux	Pt = 922 kg			Mt =	487.72 m.kg

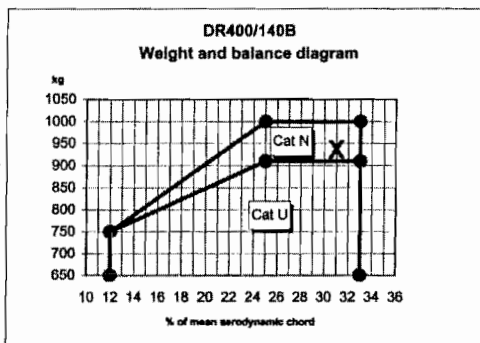
Maximum weight : 1000 kg

Mean Aerodynamic Chord (m.a.c.) : 1,71 m

C of G lever arm : $Bt = Mt / Pt = 487.72 / 922 = 0.529$ mBalance % of m.a.c.: $(Bt / m.a.c.) \times 100 = (Bt / 1,71) \times 100$

$$\frac{0.529}{1,71} \times 100 = 30.93 \%$$

Loading is acceptable since the resulting point falls within the weight and balance envelope.



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SECTION 7

SUPPLEMENTS

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Supplement 3	Century II B Autopilot	7.13
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Supplement 5	GPS	7.27

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SUPPLEMENT 1

OPTIONAL FUEL TANK

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Section 2 Limitations	7.05
Section 3 Emergency procedures	7.05
Section 4 Normal procedures	7.05
Section 5 Performance	7.05

SECTION 1 - DESCRIPTION

The auxiliary fuel tank is located on the bottom of the baggage compartment and is connected to the main fuel tank by a transfer line. Use first a sufficient quantity from the main fuel tank then refuel by pulling the auxiliary tank transfer valve control.

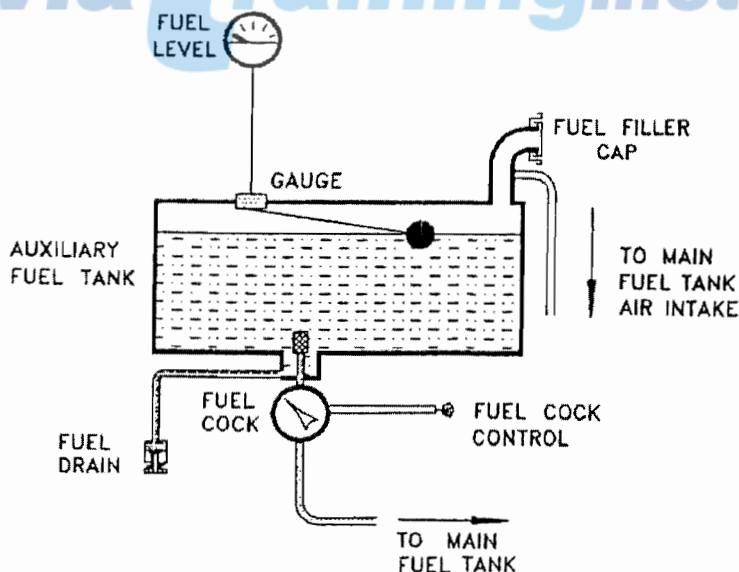
The quantity of auxiliary tank fuel is given by an independant gauge.

capacity (11 imp/3,2 us gal) 50 l
level arm (63 in) 1,61 m

NOTA

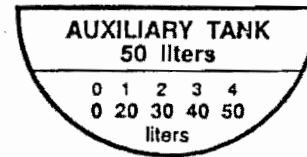
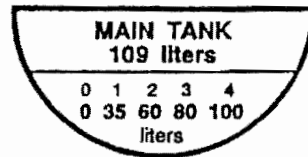
The main fuel tank must be empty enough to receive fuel quantity from the auxiliary fuel tank.

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SECTION 2 - LIMITATIONS

The maximum take off weight and the weight and balance limits are not modified by the installation of the auxiliary fuel tank. Therefore, limitations of the Section 2 are not modified. The placard "MAIN TANK" supersedes those of the 2.08 "FUEL". Following placards complete those of the pages 2.08, 2.09 and 2.10.



SECTION 3 - EMERGENCY PROCEDURES

The emergency procedures are not affected by the installation of auxiliary fuel tank.

SECTION 4 - NORMAL PROCEDURES

In addition to normal procedures actuate the auxiliary fuel tank drain valve during the pre-flight check (point 1 page 4.05).

SECTION 5 - PERFORMANCE

The performance are not affected by the installation of the auxiliary fuel tank because the maximum take off weight and the weight and balance limits are not modified.

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SUPPLEMENT 2

NIGHT VFR

TABLE OF CONTENTS

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Section 4 Normal procedures	7.10
Section 5 Performance	7.12

SECTION 1 - DESCRIPTION

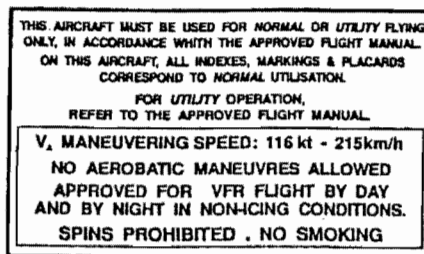
The DR400/140B aircraft can be used in VFR system in non-icing condition with application of "modification majeure n° 56". This modification installs an instrument panel lighting.

It is imperative to equip the DR400/140B Night VFR aircraft with following equipment, in addition to day VFR equipment, for a night VFR use:

- Gyro Horizon indicator
- Turn and bank indicator
- Directional gyro indicator
- Variometer
- Strobe lights
- Navigation light
- Taxi light
- Landing light
- Lighting 2
- Spare fuses
- Torch
- VHF 1 (cat. 2)
- VOR (cat. 2) or ADF (cat. 2)
- Night VFR placard

SECTION 2 - LIMITATIONS

Limitations of section 2 are not affected by Night VFR use, except the placard concerning flight conditions which must be replaced by following placard:



SECTION 3 - EMERGENCY PROCEDURES

The following emergency procedures complete those of the Section 3.

Lighting 1 failure

- lighting 2 on
- lighting 1 fuse verify

If the failure persists, the lighting 2 and the torch can be used as emergency lighting.

Light failure

- taxi light switch-type circuit breaker verify

Battery failure

If, following a complete battery failure, the alternator deactivates involving loss of power supply, proceed as follows:

- battery, alternator and radio (if installed) circuit breakers off
- battery switch on
- alternator switch on

Notice that circuits are again switched on. Reset only the switches necessary to ensure flight safety.

SECTION 4 - NORMAL PROCEDURES

These procedures complete those of the Section 4.

Preparation

Study of the meteorological report, in order to avoid flight in dangerous conditions (minima, climbing...).

Verify that fuel and oil quantities comply with regulations.

Before flight

Verify operation of:

- strobe lights verify
- navigation lights verify
- landing light verify
- taxi light verify
- lighting 2 verify
- lighting 1 verify
- day/night selector switch verify
- emergency torch on board verify

Lighting

- switch on lighting 2
- adjust with lighting 1 if necessary

Taxiing

- strobe lights on
- navigation lights on
- gyro instruments verify operation
- artificial horizon pitch index setting
- directional gyro correct rotation
- turn and bank indicator correct movement

Before take-off

- vacuum indication check
- VHF test
- VOR or ADF test
- heating defrost as necessary
- landing light on

Aligning

- directional setting

Take off

- Maintain positive climb on rate of climb indicator.
- Switch off taxi and landing lights at the end of the runway.

Climb and cruise

Above 8000 feet, there is a risk of disturbance in the pilot's night vision.

Landing

- landing light on
- taxi light on

After engine shut down

- light off

SECTION 5 - PERFORMANCE

Performance of the Section 5 are not affected.



SUPPLEMENT 3

CENTURY II B AUTOPILOT

TABLE OF CONTENTS



Section 1 Description	7.14
Section 2 Limitations	7.18
Section 3 Emergency procedures	7.18
Section 4 Normal procedures	7.19
Section 5 Performance	7.20

SECTION 1 - DESCRIPTION

The CENTURY II B is an all electric, single axis (roll) autopilot system. It provides course intercept, tracking and coupler for VOR/ILS optional equipment.

CENTURY II B COMPONENTS DESCRIPTION

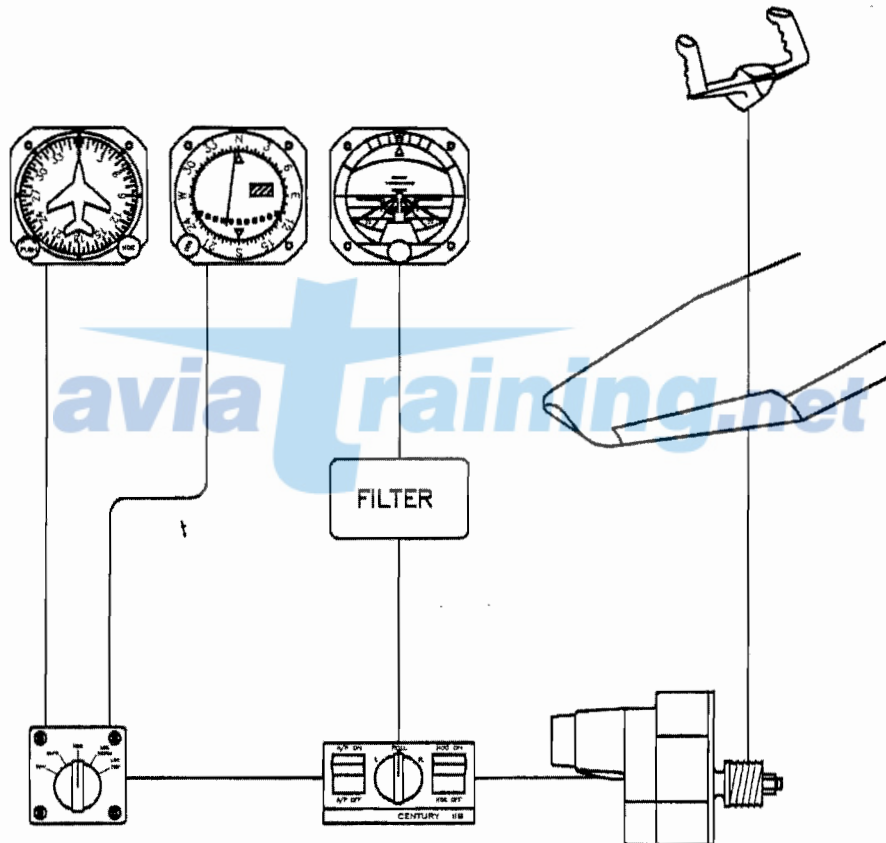
Command console

A/P ON - A/P OFF Autopilot ON-OFF rocker switch.
When only this switch is engaged (A/P ON), the autopilot is responsive to the roll command knob (ROLL) on the center of the console.

ROLL Roll manoeuvre knob up to approximately 30° of bank right or left.
The centered position represents approximate wings level flight. When the heading mode is engaged (HDG ON), action on the roll knob (ROLL) is ineffective.

HDG ON - HDG OFF Heading mode ON-OFF rocker switch.
It provides turning the aircraft to a preselect heading on the Course Selector Directional Gyro or conducting course intercepts or tracking.
When heading mode switch is engaged (HDG ON), roll knob input is replaced by the Course Selector Directional Gyro and the optional Coupler Mode Selector inputs.
The Course Selector Directional Gyro and the optional Coupler Mode Selector should be set prior to engagement of the heading mode (HDG ON).
(See Section on Coupler Mode Selector operations when optional Coupler Mode Selector is installed)

CENTURY II B AUTOPILOT INSTALLATION DIAGRAM



Course Selector Directional Gyro

Any heading may be selected, either before or after heading mode (HDG ON-HDG OFF) engagement on the command console and turns up to 160° may be programmed directly, either right or left.

If course selector indicator is rotated beyond 180° from the Directional Gyro card heading, the autopilot will turn in the shortest direction to reach the selected heading.

In normal operation the maximum bank in heading mode (HDG) is 20°.

Coupler Mode Selector

Direct the autopilot in both VOR and ILS navigation.

Nominal interception angles are 45° and an automatic 15° crosswind correction capability is provided.

"HDG" Mode It is the basic function of the CENTURY II B autopilot as described in Command console section.

"OMNI" Mode When in the "OMNI" Mode position the system is coupled to the VOR Indicator.

To select a desired course for interceptor tracking always set both the VOR Course Selector and the Directional Gyro Course Indicator to the desired course. All heading will then be controlled by the VOR signal. A full deflection on the VOR Indicator will produce a 45° interception angle.

With less than full deflection, the system will automatically direct a smooth, tangential intercept to arrive over the radial with crosswind correction established. The same dynamic intercept is accomplished whether 3 km (2 miles) or maximum reception distance from station.

Below approximately 3 km (2 miles), autopilot bank limitations will allow a slight overshoot of the selected radial.

"NAV" Mode This mode serves the same functions as "OMNI" Mode and is initiated in the same manner. The "NAV" Mode, however, incorporates an extended time delay which reduces reaction to short term VOR needle deflections. The "NAV" Mode is recommended for enroute navigation or any time autopilot response to short term VOR needle deflections becomes excessive. The "NAV" Mode should not be used for close in VOR approach work, as close in work requires the proportioned dynamic response provided by the "OMNI" Mode

"LOC NORM" Mode In the "LOC NORM" Mode, the system adjusts its sensitivity to accomodate the "Localizer" course width (5° instead of 20° for the VOR) and to provide smoother more optimum intercept and track maneuvers. Intercept angles of 45° are automatic with tangential intercepts outside the marker and automatic crosswind correction. As with the "OMNI" Mode, the Course Selector Directional Gyro must be set to correspond the desired magnetic course.

"LOC REV" Mode The features of "LOC REV" Mode are identical to the "LOC NORM" Mode except that the aircraft will fly away from the Localizer Indicator Needle instead of toward it. When using the "LOC REV" Mode the Course Selector Indicator must be set to the reciprocal of the front course heading.

SECTION 2 - LIMITATIONS

Section 2 limitations are not affected by the CENTURY II B autopilot installation.

Following autopilot specific limitations are to be added:

Minimum use height 500 ft
Maximal use speed (140 kt) 260 km/h

IMPORTANT

Do not use the autopilot in case of Directional Gyro, vacuum pump or system failure.

SECTION 3 - EMERGENCY PROCEDURES

In case of autopilot malfunction:

- 1- Manoeuvrer the stick as required in order to override the autopilot

NOTE

The autopilot may be overridden by the pilot without damage to the system.

- 2- Cut off the main autopilot switch (AP/OFF)

- 3- Pull the autopilot breaker and do not try to switch it on again

In case of vacuum system failure:

- 1- Cut off the main autopilot switch (AP/OFF)

SECTION 4 - NORMAL PROCEDURES

Preflight autopilot check with engines running and gyros erected:

- 1 - Vacuum green arc
- 2 - Autopilot switch "A/P OFF"
- 3 - Heading mode switch "HDG OFF"
- 4 - Coupler Mode Selector "HDG"
- 5 - "ROLL" knob centered
- 6 - Course Selector Directional Gyro centered
- 7 - Autopilot switch "A/P ON"
- 8 - Turn the "ROLL" knob "L" then "R"
(note that the control stick responds in the proper direction)
- 9 - Heading mode switch "HDG ON"
- 10 - Rotate the heading knob "R" then "L"
(note the autopilot response. Without aerodynamic response, servo action is unlimited)
- 11 - Override the autopilot at the control stick "R" then "L"
(Force required should be approximately 7 kg (15 lbs))
- 12 - Before take off autopilot switch "A/P OFF"

In flight autopilot engagement procedure

Aircraft flight attitude wings level
"ROLL" knob centered
Heading mode switch "HDG OFF"
Autopilot switch "A/P ON"
Coupler Mode Selector "HDG"
Heading knob centered
Heading mode switch "HDG ON"
Select desired lateral guidance mode

For more details concerning the use of available modes, refer to the CENTURY II B pilot's operating manual.

Final approach procedure

In final approach and at latest 500 ft height:

Autopilot switch "A/P OFF"

SECTION 5 - PERFORMANCE

Section 5 performance are not affected by CENTURY II B autopilot installation.

SUPPLEMENT 4: SENSENICH 74DM6S5-2-60 PROPELLER

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Section 1 Description	7.22
Section 2 Limitations	7.23
Section 3 Emergency procedures	7.23
Section 4 Normal procedures	7.23
Section 5 Performance	7.28

SECTION 1 - DESCRIPTION

The datas of the Section 1 are not modified except those hereunder:

Engine

Maximum power (155 cv) 2500 rpm
Maximum continuous power (155 cv) 2500 rpm

Propeller

MANUFACTURER	SENSENICH
TYPE	74 DM6 S5-2-60
DIAMETER	1.83 m (72 in)
PITCH	60 in
MINIMUM STATIC RPM FULL THROTTLE SEA LEVEL	2300 rpm

SECTION 2 - LIMITATIONS

The limitations of the Section 2 are not modified except those hereunder:

Engine limitations

Maximum rpm 2500
Maximum continuous rpm 2500

Tachometer markings

Green arc 2000 to 2500 rpm
Red line 2500 rpm

SECTION 3 - EMERGENCY PROCEDURES

The procedures of the Section 3 are not modified.

SECTION 4 - NORMAL PROCEDURES

The emergency procedures of the Section 4 are not modified except those hereunder:

Normal take off

Take off minimal rpm 2300

Short take off

Apply full power (brakes applied)
then release the brakes mini 2300 rpm

SECTION 5 - PERFORMANCE

Noise limitation

In compliance with the decree of 19.02.1987, the maximum acceptable noise level for the DR400/140B aircraft, at a certified gross weight of (2205 lb) 1000 kg, is 73.3 dB (A).

The noise level determined under the conditions of the decree, is 64.7 dB(A) at maximum continuous power.

The DR400/140B aircraft has received noise limitation certificate nr N45.

Take off performance

At gross weight 1000 kg (2205 lb),
Without wind, flaps in "take off position" (1st notch), engine full power

Take off speed (54 kt) 100 km/h
Over 15 m (50 ft) barrier speed (65 kt) 120 km/h

PRESSURE ALTITUDE (ft)	TEMPERATURE °C (°F)	WEIGHT 1000 kg (2205 lb)		WEIGHT 800 kg (1764 lb)	
		Take off distance	Run to clear 15m(50ft) barrier	Take off distance	Run to clear 15m(50ft) barrier
		m (ft)	m (ft)	m (ft)	m (ft)
0	- 5 (23)	215 (706)	435 (1428)	125 (411)	245 (804)
	Std = 15 (59)	245 (804)	485 (1591)	135 (443)	265 (870)
	35 (95)	270 (886)	535 (1756)	150 (493)	290 (952)
4000	- 13 (7)	290 (952)	580 (1903)	165 (542)	320 (1050)
	Std = 7 (45)	330 (1083)	645 (2117)	180 (591)	350 (1149)
	27 (81)	365 (1198)	720 (2363)	200 (657)	385 (1264)
8000	- 21 (-6)	390 (1280)	780 (2560)	225 (739)	415 (1362)
	Std = - 1 (30)	445 (1461)	870 (2855)	245 (804)	465 (1526)
	19 (66)	500 (1641)	975 (3199)	275 (903)	515 (1690)

Head wind influence: For 10 kt multiply by 0,79
For 20 kt multiply by 0,64
For 30 kt multiply by 0,53

Down wind influence: Add 10% to distance per section of 2 kt

Dried grass runway: Add 15%

Climb performance

1) Flaps take off position:

At maximum weight of 1000 kg (2205 lb) in standard atmosphere

Maximum rate of climb after take off (847 ft/mn) 4.3 m/s
reduction of 0.3 m/s (59 ft/mn) per 1000 ft
Best rate of climb speed (78 kt) 145 km/h
Best angle of climb speed (70 kt) 130 km/h

2) Flaps up:

In standard atmosphere,
Full throttle, mixture best power,

- At maximum weight of 1000 kg (2205 lb):

Maximum rate of climb after take off (867 ft/mn) 4.4 m/s
reduction of 0.25 m/s (49 ft/mn) per 1000 ft
Service ceiling 14000 ft
Best rate of climb speed after take off (81 kt) 150 km/h
up to ceiling (73 kt) 135 km/h
Best angle of climb speed (70 kt) 130 km/h

- At weight of 800 kg (1764 lb):

Maximum rate of climb after take off (1162 ft/mn) 5.9 m/s
reduction of 0.28 m/s (55 ft/mn) per 1000 ft

Temperature influence:

Each 10°C above standard, lowers the ceiling by 1000 ft and reduces rate of climb by 0.28 m/s (55 ft/mn).

Cruise performance

At gross weight 1000 kg (2205 lb), in standard atmosphere.
Optimum mixture setting, usable fuel (22 imp/26.4 us gal) 100 l.
Without reserve fuel, without wind.

Consumption and climbing time compensated with descent.

ALTITUDE	POWER	FUEL CONSUMPTION			TRUE AIR SPEED		ENDURANCE	RANGE	
		gal/h	l/h	imp	km/h	kt		km	Nm
2000	2150	25	5.5	6.6	175	94	4.00	700	375
	2400	25	5.5	6.6	206	111	4.00	825	445
	2500	28	6.2	7.4	216	116	3.35	770	415
5500	2400	25	5.5	6.6	206	111	4.00	825	445
	2500	28	6.2	7.4	216	116	3.35	770	415
8500	2400	25	5.5	6.6	206	111	4.00	825	445
	2500	28	6.2	7.4	216	116	3.35	770	415

SUPPLEMENT 5

GPS

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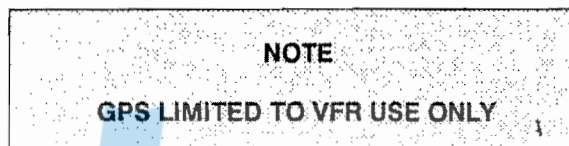
Section 1 Description	7.28
Section 2 Limitations	7.28
Section 3 Emergency procedures	7.28
Section 4 Normal procedures	7.28
Section 5 Performance	7.28

SECTION 1 - DESCRIPTION

The description of the GPS and the operational procedures are detailed in the GPS pilot's guide furnished with the instrument.

SECTION 2 - LIMITATIONS

The following placard complete those of the pages 2.08, 2.09 and 2.10:



SECTION 3 - EMERGENCY PROCEDURES

The emergency procedures of the section 3 are not modified.

SECTION 4 - NORMAL PROCEDURES

The normal procedures of the section 4 are not modified.

SECTION 5 - PERFORMANCE

The performance of the section 5 are not modified.

SECTION 6 - WEIGHT AND BALANCE

The weight and balance of the section 6 are not modified.



AIRCRAFT FLIGHT MANUAL SUPPLEMENT

GARMIN GNS 430

AIRCRAFT FLIGHT MANUAL SUPPLEMENT

GARMIN GNS 430

STAND-ALONE SYSTEM

FOR DAY VFR IN VIEW OF THE GROUND OR THE SEA

This supplement includes the information to be provided to the pilot, as required by the certification basis. The information provided supersedes or completes the one of the French "Manuel de vol" approved by "Direction Générale de l'Aviation Civile (D.G.A.C.)".

This supplement supersedes any existing supplement concerning the GARMIN GNS 430 for a day VFR in view of the ground or the sea.

Revision	Date	Description	DGAC approval
	July 22, 2003	Original issue	 BENOIT FLOU SFAC/NAB

22 JUL 2003

1. GENERAL

1.1. Applicability

Aircraft type	Manufacturer change
DR400/120	n°151
DR400/140	n°151
DR400/140B	n°151
DR400/180	n°151
DR400/180	n°151
DR400/180R	n°151
DR400/200R	n°151
DR400/500	n°151



1.2. Description

The GNS 430 System is a fully integrated instrument which contains:

- a VHF (*Very High Frequency*) communications transceiver;
- a VOR/ILS (*Visual Omni Range / Instrument Landing System*) receiver;
- and a GPS (*Global Positioning System*) Navigation computer.

The system consists of:

- a GPS antenna;
- a GPS receiver;
- a VHF/VOR/LOC/GS antenna;
- a VOR/ILS receiver;
- a VHF COMM antenna;
- a VHF Communications transceiver;
- a GI 106A Course Deviation Indicator, the input of which is selected between VOR/ILS or GPS by means of the CDI toggle key.

On the GI 106A, the appropriate annunciator lights on to indicate the selected navigation source (GPS ou VLOC).

In addition to the primary functions of communication and radio navigation, the GPS Navigation Computer allows the pilot to obtain position, velocity and time information.

The GARMIN GNS 430 GPS is approved for day VFR in view of the ground or the sea.

The integrity of the position indicated by the GPS is not guaranteed. It is therefore the responsibility of the pilot to verify the accuracy of this position by all means of navigation available.

2. LIMITATIONS

The pilot's guide and reference GARMIN reference 190-00140-00, must be on board.

2.1. GPS function of Garmin GNS 430

A placard «Use of GPS limited to day VFR in view of the ground or the sea» must be displayed in the aircraft.

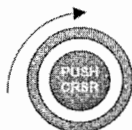
2.2. VHF Function of Garmin GNS 430

The use of VHF function of GNS 430 is limited to 25 kHz spacing.



3. ABNORMAL PROCEDURES

Return to a 25 kHz spacing in case of 8,33 kHz spacing set by mistake.



The large right knob (CRSR) is used to select between the various page groups : NAV, WPT, AUX or NST. With the on-screen cursor enabled, the large right knob allows you to move the cursor about the page.

PROCEDURE :

- Select AUX group (large knob)
- Select SETUP 2 page (small knob)
- Select «COM configuration»
- Select 25 kHz spacing
- Press « ENT » to confirm selection.

4. NORMAL PROCEDURES

No change

5. PERFORMANCE

No change

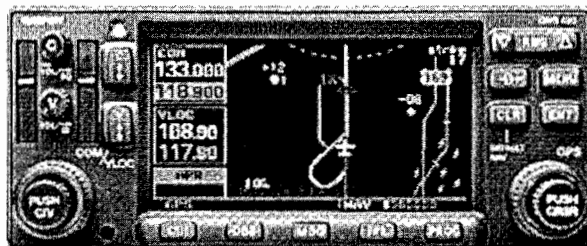
6. WEIGHT AND BALANCE

No change

7. DESCRIPTION

Refer to GARMIN Pilot's guide and reference manual for a complete description of key and knob functions.

General overview of the primary functions:





AIRCRAFT FLIGHT MANUAL SUPPLEMENT

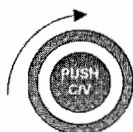
GARMIN GNS 430



The COM power/volume knob controls unit power and a communications radio volume. Press momentarily to disable automatic squelch control. **CAUTION:** SQUELCH may be left enabled by mistake.



The VLOC volume knob controls audio volume for the selected VOR/Localizer frequency. Press momentarily to enable/disable the ident tone.



The large left knob (COM/VLOC) is used to tune the megahertz (MHz) value of the standby frequency for the communications transceiver (COM) or the VLOC receiver, whichever is currently selected by the tuning cursor.



The small left knob (COM/VLOC) is used to tune the kilohertz (KHz) value of the standby frequency for the communications transceiver (COM) or the VLOC receiver, whichever is currently selected by the tuning cursor. Press this knob momentarily to toggle the tuning cursor between the COM and VLOC frequency fields.



The COM flip-flop key is used to swap the active and standby COM frequencies. Press and hold to select emergency channel (121.500 MHz).



The VLOC flip-flop key is used to swap the active and standby VLOC frequencies (i.e., make the selected standby frequency active).



The CDI key is used to toggle which navigation source (GPS or VLOC) provides output to an external CDI.



The OBS key is used to select manual or automatic sequencing of waypoints. Pressing the OBS key selects OBS mode, which will retain the current "active to" waypoint as your navigation reference even after passing the waypoint (i.e., prevents sequencing to the next waypoint). Pressing the OBS key again will return to normal operation, with automatic sequencing of waypoints. Whenever OBS mode is selected, you may set the desired course to/from a waypoint using the OBS Page, or an external OBS selector on your CDI.



AIRCRAFT FLIGHT MANUAL SUPPLEMENT

GARMIN GNS 430



The flight plan key allows you to create, edit, activate and invert flight plans, as well as access approaches, departures and arrivals.



The procedures key allows you to select and remove approaches, departures and arrivals from your flight plan.



The range key allows you to select the desired map scale.



The Direct-to key provides access to the direct-to function, which allows you to enter a destination waypoint and establishes a direct course to the selected destination.



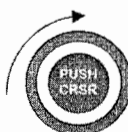
The menu key displays a context-sensitive list of options. This options list allows you to access additional features or make settings changes which relate to the currently displayed page.



The clear key is used to erase information or cancel an entry. Press and hold this key to immediately display the default Navigation Page, regardless of which page is currently displayed.



The enter key is used to approve an operation or complete data entry. It is also used to confirm information, such as during power on.



The large right knob (CRSR) is used to select between the various page groups : NAV, WPT, AUX or NST. With the on-screen cursor enabled, the large right knob allows you to move the cursor about the page.



The small right knob (CRSR) is used to select between the various pages within one of the groups listed above.
Press this knob momentarily to display the on-screen cursor. The cursor allows you to enter data and/or make a selection from a list of options.



AIRCRAFT FLIGHT MANUAL SUPPLEMENT

GARMIN GNS 430

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DR400 / 140B s/n 2598

SUPPLEMENT

INSTRUMENT PANEL

LIST OF CURRENT PAGES

Pages	Date
1 to 3	March 2006

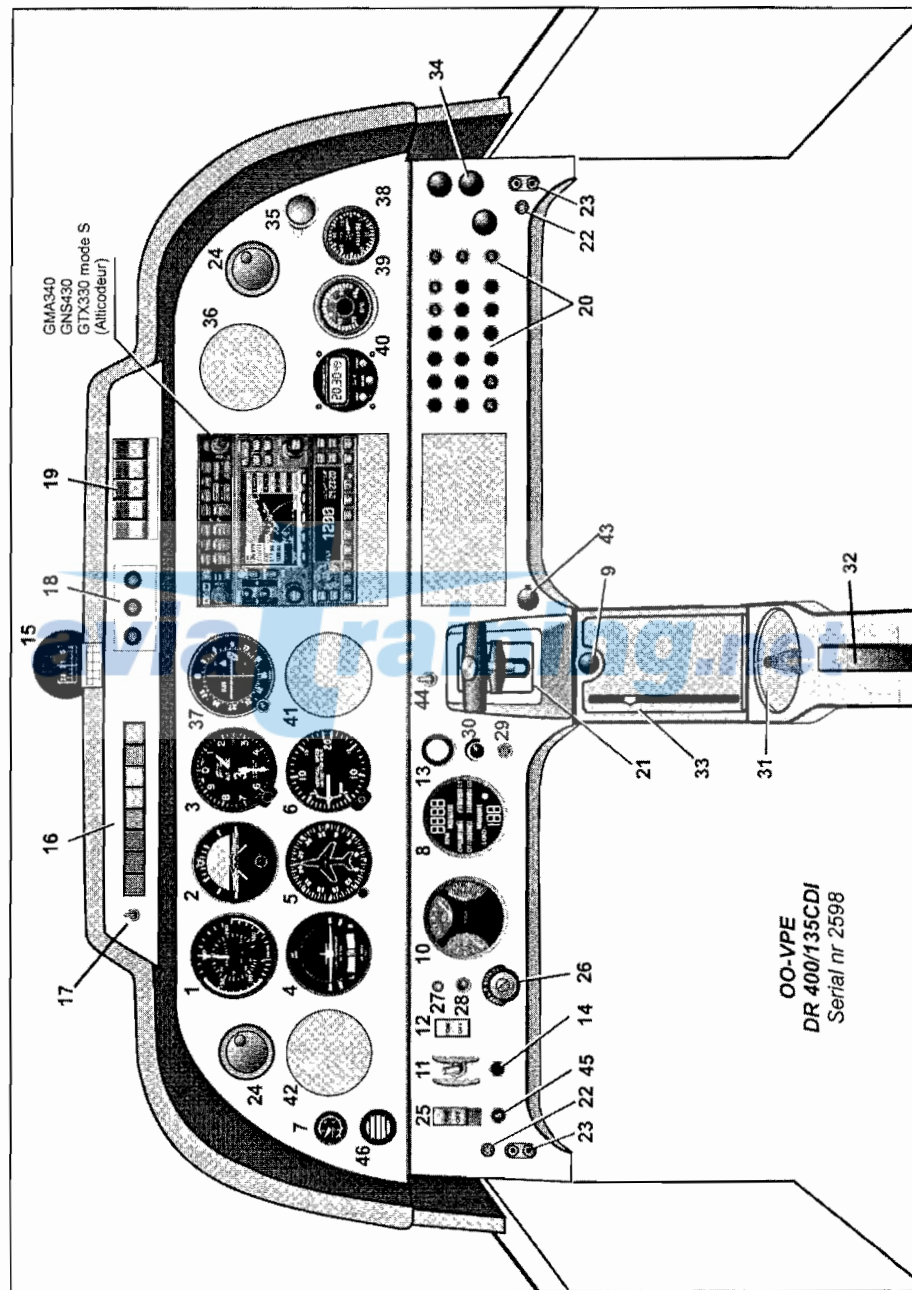
DGAC (French authority) approval:



CHRONOLOGICAL ACCOUNT OF ISSUES

Issue	Subject
1	Original instrument panel.

March 2006



1	Airspeed indicator	18	Instrument panel lighting (from LH to RH):light 1 (under glareshield), light 2 (overhead flood lights), radio (avionics integrated lighting)
2	Gyro horizon (pneumatic)	19	Safety switches (from LH to RH): Landing light, Taxi light, Strobe light, Navigation lights, Pitot heat
3	Altimeter, sensitive (ft - mb)	20	Breakers
4	Turn coordinator, electric	21	Electric throttle control
5	Directional gyro, pneumatic	22	ANR jacks
6	Rate of climb indicator, ft/min	23	Mike and headset jacks
7	Vacuum gauge	24	Fresh air vent
8	Engine indicator (CED-125)	25	Battery safety switches
9	Parking brake control knob	26	Key starter
10	Westach triple indicator :	27	Glow light
	- fuel gauge	28	Fadec test button
	- fuel temperature	29	CED test / Fadec warning switch off
	- voltmeter	30	CED-125 lighting knob
11	Fadec A & B and battery for excitation alternator switch	31	Fuel tank selector
12	Electric fuel pump control (safety switch)	32	Elevator trim control wheel
13	Alt induction air	33	Elevator trim position indicator
14	Force B switch	34	Cabin heat / windshield defrost controls
15	Magnetic compass	35	Cabin heat
16	Warning lights :	36	3-3/8" (80 mm) instrument cut-off
	- Master caution	37	VOR / LOC / GLI indicator
	- Low volt	38	Hourmeter
	- Fuel level low	39	Outside Air Temperature (OAT)
	- Fadec A	40	Clock
	- Fadec B	41 & 42	3-3/8" (80 mm) instrument cut-off
	- Flaps down	43	Auxiliary 12V
	- Pitot heat (option)	44	Avionics master switches
	- Coolant low level	45	Alternator relay breaker
17	Lights test & day / night dimmer switch	46	Stall warning

DR400 / 140B s/n 2598



March 2006

Notes



BAROMETRIC PRESSURE CONVERSION TABLE

Below pressure in MILLIBAR or HECTOPASCAL, the pressure in INCHES of MERCURY is indicated.

→ mbar ou hPa
→ in. Hg

950	960	970	980	990	1000	1010	1020	1030	1040
28.05	28.35	28.64	28.94	29.23	29.53	29.63	30.12	30.42	30.71
951	961	971	981	991	1001	1011	1021	1031	1041
28.08	28.38	28.67	28.97	29.26	29.56	29.85	30.15	30.45	30.74
952	962	972	982	992	1002	1012	1022	1032	1042
28.11	28.41	28.70	29.00	29.29	29.59	29.88	30.18	30.47	30.77
953	963	973	983	993	1003	1013	1023	1033	1043
28.14	28.44	28.73	29.03	29.32	29.62	29.91	30.21	30.50	30.80
954	964	974	984	994	1004	1014	1024	1034	1044
28.17	28.47	28.76	29.06	29.35	29.65	29.94	30.24	30.53	30.83
955	965	975	985	995	1005	1015	1025	1035	1045
28.20	28.50	28.79	29.09	29.38	29.68	29.97	30.27	30.56	30.86
956	966	976	986	996	1006	1016	1026	1036	1046
28.23	28.53	28.82	29.12	29.41	29.71	30.00	30.30	30.59	30.89
957	967	977	987	997	1007	1017	1027	1037	1047
28.26	28.56	28.85	29.15	29.44	29.74	30.03	30.33	30.62	30.92
958	968	978	988	998	1008	1018	1028	1038	1048
28.29	28.58	28.88	29.18	29.47	29.77	30.06	30.36	30.65	30.95
959	969	979	989	999	1009	1019	1029	1039	1049
28.32	28.61	28.91	29.20	29.50	29.80	30.09	30.39	30.68	30.98

REMINDER:

The Standard Pressure of 1013.2 mbar or hPa equals 29.92 in.Hg