

FLIGHT MANUAL



PARTS & SERVICES

DR400/180

S/N greater than or equal to 2669

Document n° 1002875

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FLIGHT MANUAL

For the
DR400/180

S/N greater than or equal to 2669

Type Certificate n° EASA.A367

Series N°**2758**

Registration N°.**D-EUPS**

Approval

**EASA
MINOR CHANGE APPROVAL
10071667**

This manual includes information that the certification requirements require to be provided to the pilot.

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

**THIS DOCUMENT MUST BE KEPT PERMANENTLY
IN THE AIRCRAFT**

Document n°: 1002875

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LIST OF REVISIONS

Edition/ revision	Section	Description	Date	Approval EASA
Original/0	All	Original edition	14/11/2019	EASA MINOR CHANGE APPROVAL 10071667

The edited text is indicated by a vertical line in the margin.

- ◆ **Note:** The owner is responsible for ensuring that the aircraft manual is always up-to-date. It is therefore very important to correctly incorporate all revisions in this manual as they are received.

LIST OF SECTIONS IN FORCE

Section	Edition/revision	Date
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TABLE OF CONTENTS

LIST OF REVISIONS	v
LIST OF SECTIONS IN FORCE	vi
ABBREVIATIONS.....	xii
TABLE STANDARD ATMOSPHERE.....	xiv
CONVERSION FACTORS	xv

SECTION 0 : GENERAL0-1

CONVENTIONS	0-1
-------------------	-----

SECTION 1 : DESCRIPTION1-1

GENERAL DIMENSIONS.....	1-1
POWERPLANT	1-4
PROPELLER.....	1-5
FUEL	1-5
OIL	1-6

SECTION 2: LIMITATIONS2-1

CERTIFICATION STANDARDS	2-1
TYPE OF USE.....	2-1
PRACTICAL CEILING	2-2
LOAD FACTOR LIMITS AT THE MAXIMUM AUTHORISED MASS....	2-3
MAXIMUM AUTHORISED MASSES	2-3
MASS AND BALANCE	2-4
LOAD PLANNING	2-5
LOAD LIMITS	2-5
ENGINE LIMITS	2-6
MARKING OF THE ENGINE INSTRUMENTS.....	2-7
EARTHING BEFORE AND DURING TANK FILLING	2-7
AUTHORISED FUEL GRADES.....	2-8
OPERATIONAL LIMITS IN THE "U" CATEGORY	2-8
RUNWAY SURFACE	2-8
MARKING.....	2-9

SECTION 3: EMERGENCY PROCEDURES3-1

ENGINE FAILURE OR LOSS OF POWER	3-2
At take-off and before rotation	3-2
Immediately after take-off	3-2
ENGINE FAILURE IN FLIGHT	3-3
LANDING WITHOUT ENGINE POWER	3-4
PRECAUTIONARY LANDING	3-5
FIRE	3-6
Engine fire on the ground, during starting	3-6
Engine fire in flight	3-7
Cabin fire	3-7
Electrical fire	3-8
ENGINE MALFUNCTION	3-9
Vibration and rough running.....	3-9
Oil pressure too low	3-9
Oil temperature is too high.....	3-10
ICING	3-11
BREAKDOWN OF ELECTRICAL GENERATION	3-12
If the indicator illuminates	3-12
If the fault persists.....	3-12
ELECTRICAL SYSTEM FAULT	3-12
INADVERTANT SPIN	3-13
LOSS OF ELEVATOR CONTROL	3-14
LOSS OF TRIM CONTROL	3-14
LOSS OF FLAP CONTROL.....	3-14
<u>SECTION 4 : NORMAL PROCEDURES</u>	<u>4-1</u>
LOADING	4-1
NORMAL OPERATING SPEEDS	4-1
Optimal climb speed	4-1
Maximal operating speed in turbulent air	4-1
Maximum speed with flaps.....	4-1
Landing speed (final approach)	4-1
PRE-FLIGHT INSPECTION.....	4-2
CABIN INTERIOR CHECK PRIOR TO START-UP	4-6
ENGINE STARTING	4-7
Normal procedure	4-7
Hot engine procedure	4-8

Cold weather procedure	4-8
Flooded engine procedure.....	4-8
AFTER THE ENGINE STARTS.....	4-8
TAXIING.....	4-9
BEFORE TAKE-OFF	4-10
TAKE-OFF.....	4-12
Cross-wind take-off.....	4-12
Short take-off.....	4-12
CLIMB	4-13
Normal climb (flaps retracted).....	4-13
Best angle of climb	4-13
CRUISE.....	4-14
Use of the mixture control.....	4-15
FUEL MANAGEMENT.....	4-15
DESCENT	4-16
Approach or down wind	4-16
Final 16	
LANDING	4-17
Landing on a short runway	4-17
Normal landing	4-17
Landing in crosswind or in strong gusts.....	4-18
Landing distances calculation example:.....	4-19
Going around.....	4-20
AFTER LANDING.....	4-20
ENGINE SHUT-DOWN.....	4-20
After engine shut-down.....	4-20
STALLS.....	4-21
USE OF THE PARKING BRAKE	4-22
To apply the brakes	4-22
To release the brakes.....	4-22
<u>SECTION 5 : PERFORMANCE.....</u>	<u>5-1</u>
NOISE LIMITATION	5-1
CALIBRATION OF THE AIRSPEED INSTALLATION.....	5-1
STALL SPEEDS.....	5-2
WIND COMPONENT.....	5-3

TAKE-OFF PERFORMANCE	5-4
Take-off distances.	5-5
CLIMB PERFORMANCE	5-6
Glide performance	5-6
Time of climb, distance and fuel consumption.	5-7
CRUISE PERFORMANCE	5-8
LANDING PERFORMANCE	5-9
Landing distances.	5-10

SECTION 6 : MASS AND BALANCE..... 6-1

USE OF THE NOMOGRAM	6-3
EXAMPLE of loading calculation (dotted lines on the diagram).....	6-4

SECTION 7 : SYSTEM DESCRIPTIONS..... 7-1

Airframe	7-2
Flap control switch	7-2
Elevator system	7-2
Aileron system	7-2
Rudder control	7-2
Control lock.....	7-3
Elevator trim	7-3
Roll compensation	7-3
Yaw compensation	7-3
Cabin layout.....	7-3
Panel and centre console	7-4
Canopy	7-7
Seats	7-7
Seat belts	7-8
Luggage compartment.....	7-9
Landing gear.....	7-10
Braking system	7-10
Parking brake	7-11
Use of the brakes.....	7-11
Engine	7-12

Propeller.....	7-13
Electrical system.....	7-13
Electrical circuit	7-14
Fuel / Fluids.....	7-15
Engine oil system	7-15
Fuel system	7-16
Fuel gauges.....	7-18
Fuel tank selector	7-18
Heating and ventilation	7-20
Lighting (optional).....	7-22
Stall warning system.....	7-22
Pitot and static systems	7-22
Avionics and navigation	7-22
Headset and microphone installation.....	7-22
Flight recorder (optional equipment)	7-23
Emergency locator transmitter	7-23
Hour meter	7-23
External power socket	7-24

SECTION 8 : MAINTENANCE OPERATIONS.....8-1

Introduction.....	8-1
Publications for the user	8-1
Maintenance publications	8-1
Towing.....	8-1
Parking	8-1
Long-term parking	8-2
Cleaning	8-3

SECTION 9 : REGISTER OF SUPPLEMENTS.....9-1

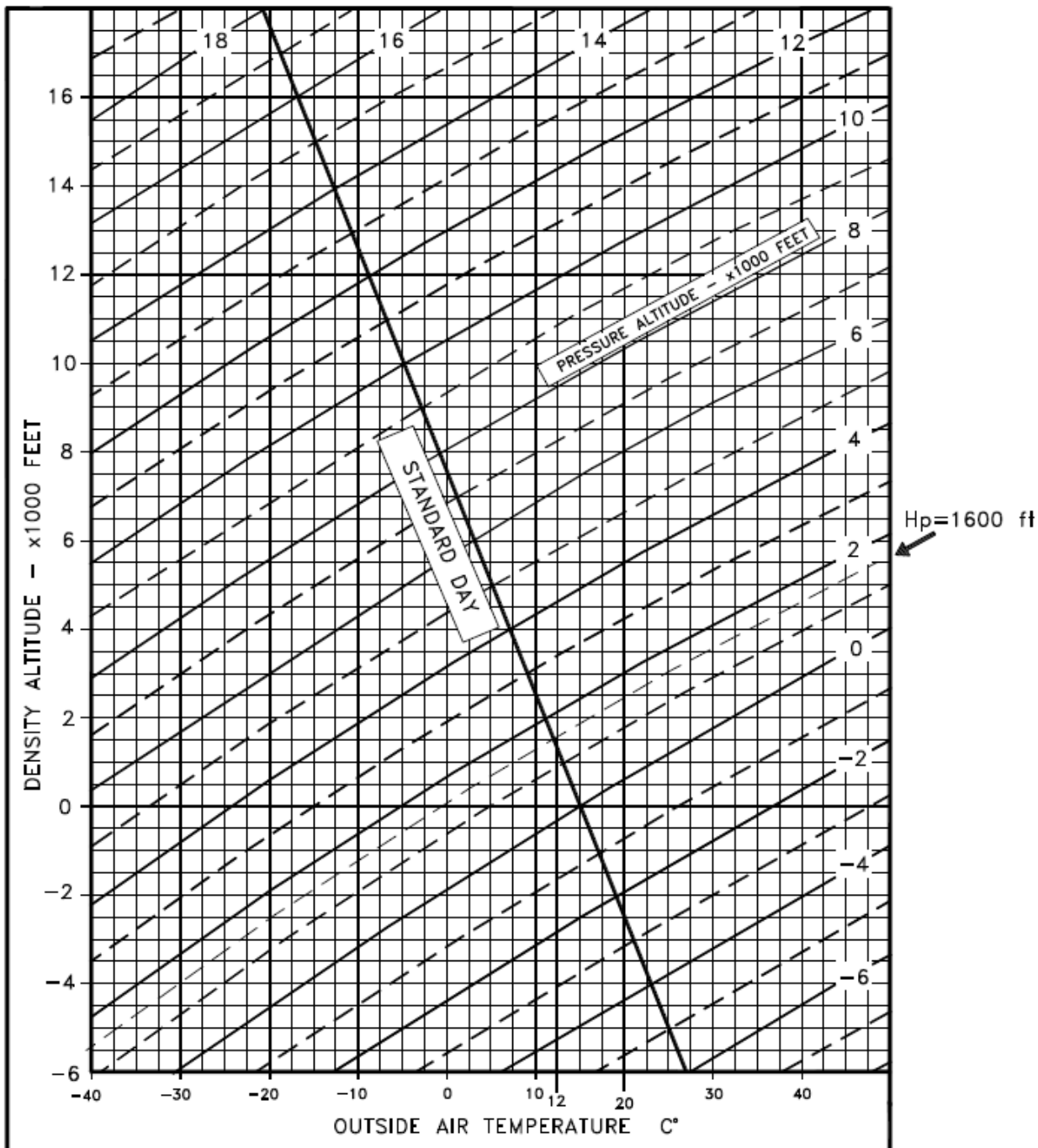
REGISTER OF SUPPLEMENTS.....	9-1
List of installed supplements.....	9-2

ABBREVIATIONS

sq. ft	Square foot
ft	Foot
In	Inch
Nm	Nautical mile
Km	Kilometre
M	Metre
cm	Centimetre
Kt.....	Knot
m/s	Metre per second
tr/mn or rpm	Revolutions per minute
Va.....	Manœuvring speed
VC	Design cruise speed
Vfe.....	Maximum flap extended speed
Vne	Never exceed speed
Vno	Maximum cruising speed
Vso.....	Stall speed in landing configuration
Vs1.....	Stall speed with flaps retracted
VI.....	Indicated airspeed
Vlof	Lift-off speed
KIAS	K not I ndicated A ir S peed
KTAS	K not T rue A ir S peed
TAS	T rue A ir S peed
Km/h	Kilometre per hour
HP	Horsepower
HPa	Hectopascal
In.Hg	Inch of mercury
Mbar.....	Millibar
Zp.....	Pressure altitude
l	Litre
Imp. gal.....	Imperial gallon
Us gal.....	US gallon
Psi	Pound per square inch
Lb	Pound
Kg.....	Kilogram

°C	Degree Celsius
°F	Degree Fahrenheit
V	Volt
A	Amp
ISA	I nternational S tandard A tmosphere
COM	Communication Transceiver
ELT	Emergency Locator Transmitter
IFR	Instrument Flight Rules
NAV	Navigation Indicator and Receiver
AUDIO	Audio Control Panel
VFR	Visual Flight Rules
VHF	Very High Frequency
CPF	Firewall
LS6	Service letter n°6

TABLE STANDARD ATMOSPHERE



Example:

Temperature = 20°C

Pressure altitude = 1600ft

Standard temperature = 12°C

CONVERSION FACTORS

nautical mile	.....	x1.852	=	kilometres
feet	.....	x0.305	=	metres
inches	.....	x0.0254	=	metres
inches	.....	x25.4	=	millimetres
feet/minute	.....	x0.00508	=	metre/second
gallons (US)	.....	x3.785	=	litres
gallons (imp.)	.....	x4.546	=	litres
quarts (US)	.....	x0.946	=	litres
knots	.....	x1.852	=	km/h
psi	.....	x0.0689	=	bar
in. Hg	.....	x33.86	=	mbar
lb	.....	x0.453	=	kg
(°F – 32)	.....	x ⁵ / ₉ - 32	=	°C
kilometres	.....	x0.539	=	nautical mile
metres	.....	x3.281	=	feet
metres	.....	x39.37	=	inches
millimetres	.....	x0.03937	=	inches
metre/second	.....	x197	=	feet/minute
litres	.....	x0.264	=	gallons (US)
litres	.....	x0.220	=	gallons (imp)
litres		x1.057	=	quarts (US)
km/h		x0.539	=	knots
bar		x14.51	=	psi
mbar		x0.02953	=	in. Hg
kg		x2.205	=	lb
°C		x ⁹ / ₅ + 32	=	°F

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SECTION 0 :

GENERAL

CONVENTIONS

This document uses the following conventions and warnings. They must be strictly followed in order to avoid injuries to persons, damage to equipment, decreased operational safety of the aircraft or breakdowns that may result from abnormal operation.

- ▲ **WARNING:** Failure to observe these safety rules can result in injury or even death.
- **REMARK:** Failure to observe these particular notes and safety procedures may result in damage to the engine or to other equipment.
- ◆ **Note:** Information for a better understanding of an instruction.

THIS DOCUMENT IS FOR DR400 AIRCRAFT FROM AND INCLUDING SERIAL NUMBER 2669.

UPDATE AND REVISION OF THE DOCUMENT

- ▲ **WARNING:** Only an up to date flight manual allows safe operation. The current editions and revisions of this manual are available in the LS6 C.E.A.P.R
- ◆ **Note:** The edition of this manual is indicated on the first page.

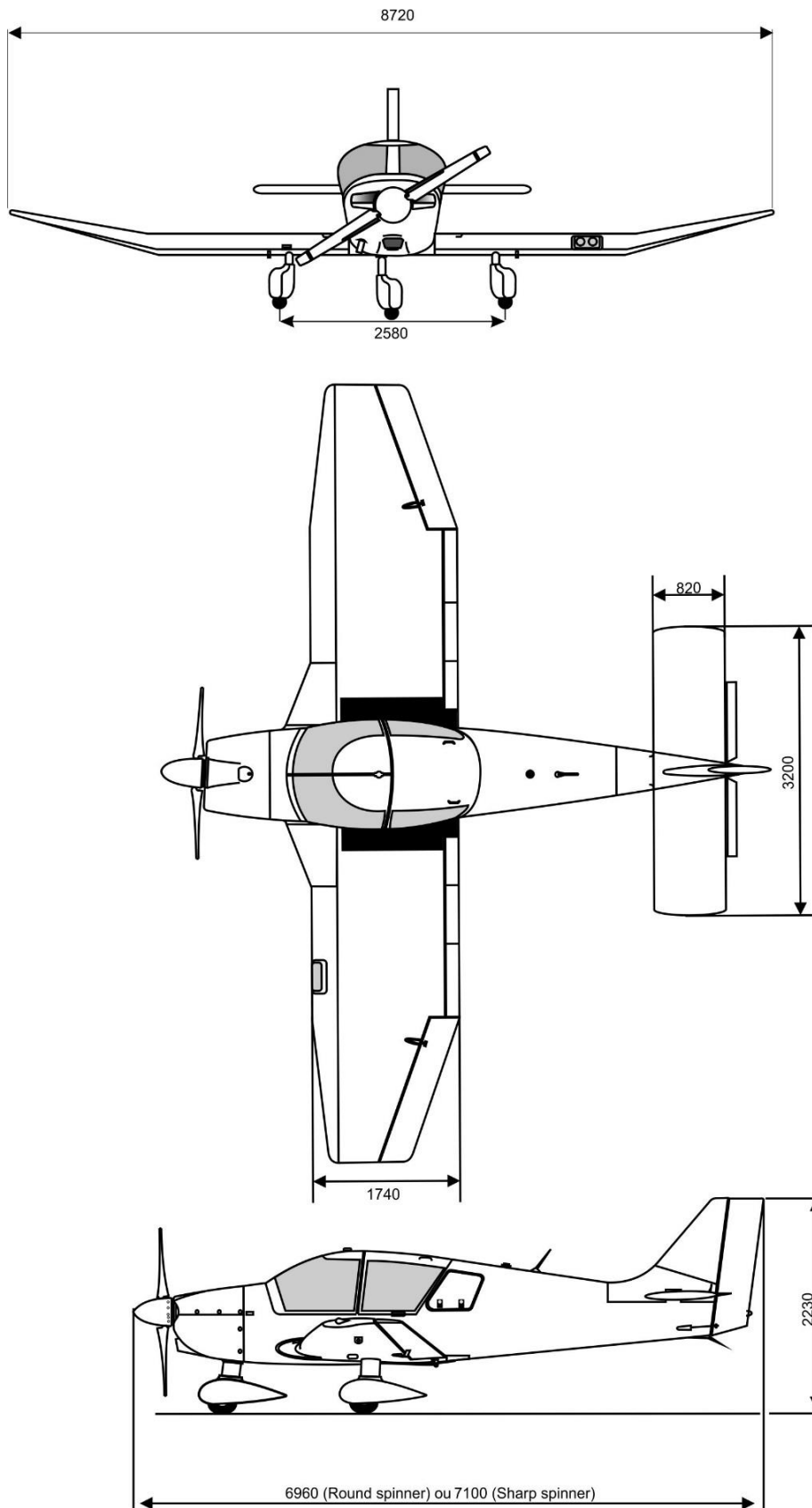
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SECTION 1 :

DESCRIPTION

GENERAL DIMENSIONS

Maximum span	(28 ft 7·3 in)	8·72 m
Total length.....	(23 ft 3·53 in)	7·10 m
Total height.....	(7 ft 3·79 in)	2·23 m
Propeller ground clearance.....	(9·84 in)	0·25 m



CABIN INTERIOR DIMENSIONS

Length (5 ft 3·8 in) 1·62 m
Width (at shoulders) (3 ft 11·2 in) 1·20 m
Width (at armrests) (3 ft 7·3 in) 1·10 m
Height (4 ft 0·4 in) 1·23 m
4 places, accessible from both sides via the sliding canopy.

WING

Surface area (152·85 sq ft) 14·2 m²
Profile NACA 23013·5 modified
Aspect ratio 5·35
Dihedral at the wingtips 14°

AILERONS

Surface area (per aileron) (6·13 sq ft) 0·57 m²
Span (per aileron) (5 ft 3·8 in) 1·62 m
The ailerons are statically balanced.

FLAPS

Surface area (per flap) (3·55 sq ft) 0·33 m²
Span (per flap) (6 ft 7·72 in) 2·025 m

HORIZONTAL TAILPLANE

Surface area (stabilator) (31 sq ft) 2·88 m²
Total surface area including trim tab (2·8 sq ft) 0·26 m²
Span (10 ft 6 in) 3·20 m

VERTICAL TAILPLANE

Total surface area (17·55 sq ft) 1·63 m²
Surface area of the fin (10·76 sq ft) 1 m²
Surface area of the rudder (6·78 sq ft) 0·63 m²

LANDING GEAR

Type Tricycle, Fixed

Track (8 ft 5·6 in) 2·58 m
 Wheelbase (5 ft 5 in) 1·65 m
 Tyre size 380 x 150 or 500 - 5
 Shock absorber oil: MIL. H. 5606 - A
 NORME AIR 3520

Nose landing gear

Tyre pressure (26 psi) 1·8 bar
 Shock absorber pressure (73 psi) 5 bar

Main landing gear

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

BRAKES

The disc brakes are operated by independent hydraulic circuits on each main landing gear wheel.

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

POWERPLANT

Number of engines 1
 Number of cylinders 4
 Engine manufacturer: LYCOMING
 Engine model: O-360-A3A ou O-360-A1A ou O-360-A1P
 Configuration of engine Flat 4, boxer
 Maximum power 180 HP at 2700 rpm
 Maximum continuous power 180HP at 2700 rpm

◆ **Note:** Avoid using the continuous engine speed between 2150 rpm and 2350 rpm.

PROPELLER

- ◆ **Note:** All performances in this manual are given with the 76 EM8 S5-0-64 propeller. For other approved propellers, report to the documentation associated with the propeller.

Manufacturer SENSENICH

Model	76 EM8 S5-0-64
Diameter	1,93 m (76 in)
Number of	2
Pitch	64 in
Minimal rate Full throttle Sea level	2200 tr/min

**For propeller data,
refer to section 9
Register of Supplements**

- **REMARK:** Any reduction in diameter for repair is prohibited.

FUEL

Total capacity 190 litres / 50.16 US gal / 41.8 Imp gal

Total usable fuel volume 189 litres / 49.10 US gal / 41.58 Imp gal

Unusable fuel volume 1 litre / 0.26 US gal / 0.22 Imp gal

Approved fuel types are described in SECTION 2 of this manual.

The total capacity of the tanks can be increased to 240 l (63.36 us gal / 52.8 imp) (139 l usable (63.09 us gal / 52.58 imp)) with the installation of an optional additional tank of 50 l (13.2 us / gal 11 imp).

Main tank:

Total capacity 110 litres / 29 US gal / 24.2 Imp gal

Wing tanks:

Right: Total capacity 40 litres / 10.5 US gal / 8.8 Imp gal

Left: Total capacity 40 litres / 10.5 US gal / 8.8 Imp gal

Optional (long-range) tank:

Total capacity 50 litres / 13.2 US gal / 11 Imp gal

OIL

Total engine capacity: (8 US quarts) 7.5 litres

Usable capacity: (6 US quarts) 5.7 litres

Approved types: See Section 2 - Limitations

■ **REMARK:** Only use an approved oil of the exact denomination!

The approved grades of oil are described in SECTION 2 of this manual.

SECTION 2:

LIMITATIONS

CERTIFICATION STANDARDS

The DR 400/180 aircraft has been certified on the 10/05/72 in the "NORMAL" and "UTILITY" categories conforming to the following technical conditions:

- General Conditions of regulation AIR 2052 updated 6 June 1966.
- Additional Conditions for conformity with FAR Part 23 Amendement 7.
- Special conditions for the canopy release.

TYPE OF USE

The aircraft is approved for the following:

- VFR by day in non-icing conditions.
- VFR by night in non-icing conditions with optional supplementary equipment.
- IFR by day and by night in non-icing conditions with optional supplementary equipment.

NOTE

All speeds are indicated speeds unless otherwise indicated.

AUTHORISED USE

LIMITING SPEEDS	km/h	KIAS
Vne, never exceed	308	166
Vno, maximum in normal use	260	140
Va, maximum manoeuvring	215	116
Vfe, maximum with flaps extended	170	92

Table 2-1 - Limiting speeds

AIRSPEED INDICATOR MARKINGS		km/h	KIAS
Red line (never exceed)	Vne	308	166
Yellow arc (Operate with caution and only in calm air)	Vno-Vne	260-308	140-166
Green arc (Normal operation range)	Vs ₁ -Vno	105-260	56-140
White arc (Range with flaps extended)	Vso-Vfe	95-170	51-92

Table 2-2 - Airspeed indicator markings

PRACTICAL CEILING

The practical ceiling of the DR400/180 is 14720 ft.

▲ WARNING: You must comply with current regulations regarding maximum flight altitudes and take into account that high altitude flight can cause problems due to lack of oxygen.

LOAD FACTOR LIMITS AT THE MAXIMUM AUTHORISED MASS

(2095 lb) 950 kg (category "U"):

Flaps retracted n between -2.2 and $+4.4$

Flaps extended..... $n = +2$

(2425 lb) 1100 kg (category "N"):

Flaps retracted n between -1.9 and $+3.8$

Flaps extended..... $n = +2$

▲ WARNING : Voluntary flight under negative g-loads is prohibited.
Prolonged negative g-loads (a few seconds) may damage the propeller control and the engine by loss of oil pressure.

MAXIMUM AUTHORISED MASSES

	Cat. "U"	Cat. "N"
At take-off	(2095 lb) 950 kg	(2425 lb) 1100 kg
At landing	(2095 lb) 950 kg	(2304 lb) 1045 kg

Table 2-3 - Maximum authorised masses

MASS AND BALANCE

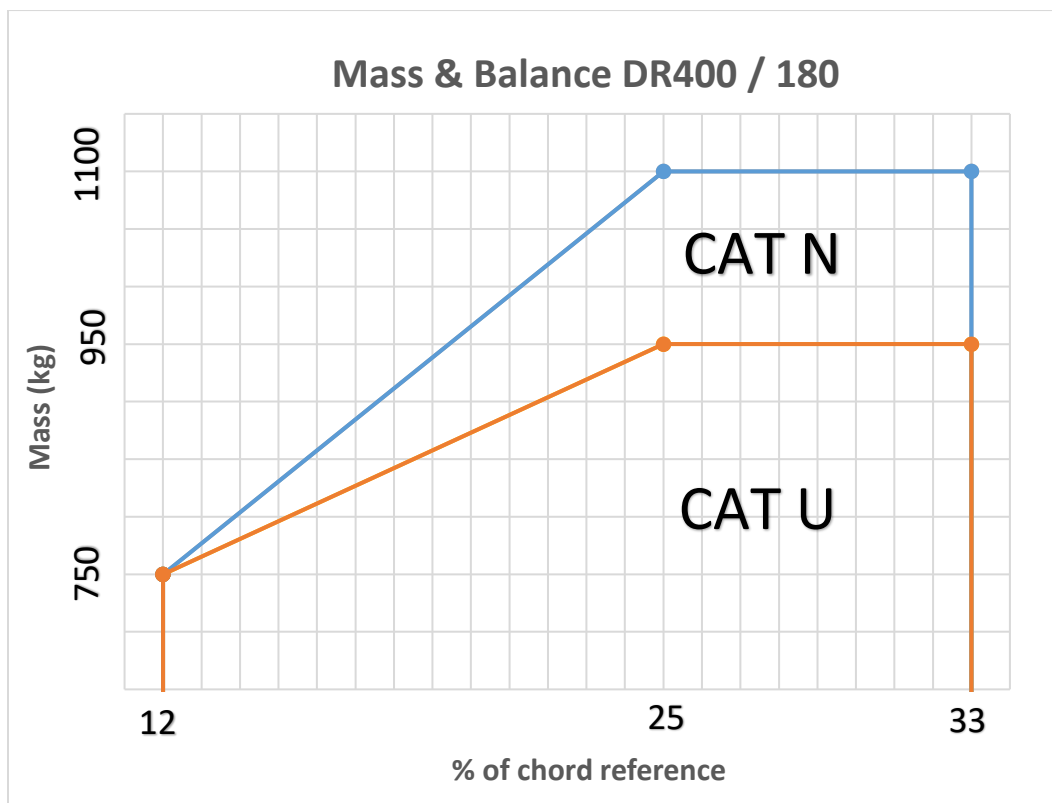


Figure 2-1 Mass and balance envelope

Normal Category

Front limit (12 % ref.): 0.205 m behind the reference plane at 750 kg

Intermediate limit (25 % ref.): 0.428 m behind the reference plane at 1100 kg

Rear limit (33 % ref.): 0.564 m behind the reference plane at 1100 kg

Utility Category

Front limit (12 % ref.): 0.205 m behind the reference plane at 750 kg

Intermediate limit (25 % ref.): 0.428 m behind the reference plane at 950 kg

Rear limit (33 % ref.): 0.564 m behind the reference plane at 950 kg

Reference plane: Leading edge of the rectangular part of the wing.

Reference chord: 1.71 m (5.61 ft)

LOAD PLANNING

(See also the nomogram, SECTION 6)

The mass of the engine oil and the unusable fuel must be included in the unladen mass of the aircraft.

	Mass kg (lb)	Lever 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 tank	78,5 (173)	1,12 (44)
Fuel, wing tanks	57,6 (127)	0,1 (3,9)
Fuel, supplementary tank (if installed)	36 (79)	1,61 (63,4)
Luggage (*)	60 (132)	1,9 (75)

Table 2-4 - Loading plan

* The position of the luggage has a very important influence on the balance because of the length of its lever arm. Be careful to assess the mass and balance accurately.

LOAD LIMITS

Number of occupants :

Front seats 2

Rear seats 2

Luggage compartment :

Maximum authorised mass (132 lb) 60 kg

ENGINE LIMITS

ManufacturerLYCOMING
 Model..... O-360-A3A ou O-360-A1A ou O-360-A1P
 Maximum take-off and continuous power..... 134 kW (180 HP)
 Maximum take-off and continuous rpm 2700 rpm
 Maximum using starter continuously30s
 Maximum cylinder head temperature260°C (500°F)

◆ Note : Unless otherwise specified, in this document all the values of rpm refer to the rotational speed of the propeller.

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 6.6 bar
 Minimum idle pressure (red line)..... (25 psi) 1.7 bar
 Maximum pressure when cold and for take-off (red line). (115 psi) 7.9 bar
 Total capacity of the engine(8 us quarts) 7.5 l
 Usable capacity(6 us quarts) 5.7 l

Specifications

Air Temperature	Ashless disperant (AD) grades	Pure mineral grades
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
0°C to +30°C (30°F to 90°F)	SAE 40	SAE 40
-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

During the first 50 hours of operation: pure mineral oil.

After the first 50 hours of operation: AD grades.

Refer to the latest edition of the the Lycoming Service Instruction n°1014

MARKING OF THE ENGINE INSTRUMENTS

The operating ranges of the various engine parameters are given in the following table:

Instrument	Red zone	Yellow zone	Green zone	Yellow zone	Red line
Tachometer (rpm)	2150-2350		2350 – 2700		2700
Oil pressure: bar (psi)		1.7-3.8 (25-55)	3.8 - 6.6 (55-95)	6.6 – 7.9 (95-114)	Min : 1.70 (25) Max : 7.9 (115)
Oil temperature : °C (°F)			60 – 118 (140-245)		118 (245)
Fuel pressure: .....hPa .....(psi)			80-350 (1.1-5.1)		Min : 80 (1.1) Max : 350 (5.1)
Cylinder head temperature: °C (°F)			65-260 (149-500)		260 (500)

Table 2-6 - Marking of the engine instruments

EARTHING BEFORE AND DURING TANK FILLING

Ground the exhaust system to eliminate electrostatic charges.

**For tachometer limits,
refer to section 9
Register of Supplements**

AUTHORISED FUEL GRADES

▲ WARNING: The use of unapproved fuels and additives can cause dangerous malfunction of the engine.

Aviation fuel*..... AVGAS 100 LL
Octane rating*..... (octane) 100 minimum

* Refer to the latest edition of the Lycoming Service Instruction n°1070

OPERATIONAL LIMITS IN THE "U" CATEGORY

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

- Steep turns (60°)
- Lazy eights
- Chandelles (zoom)
- Stalls (maximum pitch 20°, wings horizontal, balanced flight)

These manoeuvres must be carried out under the following conditions:

- Rear seats must be unoccupied
- Entry and exit speeds must be within the normal range
- Maximum recommended entry speed : (116 kt) 215 km/h.

▲ WARNING: Intentional spins are prohibited!

▲ WARNING: Intentional negative g manoeuvres are prohibited!

RUNWAY SURFACE

This aircraft can take-off and land on any runway surface.

■ REMARK: unprepared or rough runways may have holes, bumps or stones that could damage the propeller, the fairings or other projecting parts.

MARKING

The diagrams below represent the markings that must be displayed. These markings can be placards or directly printed on the desk. The shape, size, typeface and colours may vary.



Figure 2-2 - Near the cap of the main tank : 110 litres AVGAS.



Figure 2-3 - Near the caps of the wing tanks: 40 litres AVGAS.



Figure 2-4 - Near the cap of the supplementary tank, if installed.

AVIATION OIL	DISPERSANT		MINERAL	
	SAE	GRADE	SAE	GRADE
ALL TEMPERATURE	15W50 20W50			
ABOVE +25°C (80°F)	60	120	60	120
ABOVE +15°C (60°F)	40 ou 50	80 ou 100	50	100
0°C to +30°C (30°F à 90°F)	40	80	40	80
-15°C to +20°C (0°F à 70°F)	30, 40 ou 20W40	80 ou 65	30	65
BELOW - 10°C (10°F)	30 ou 20W30	65	20	55
See Lycoming Service Instruction n° 1014 for more information				

Figure 2-5 - On the inside of the oil-filler access hatch.



Figure 2-6 - Near the distress beacon.



Figure 2-7 - On the access hatch of the ground power socket (if installed) on the starboard side of the aircraft.

◆ Note : The socket is non-reversible to prevent polarity inversion.



Figure 2.8 - On the stabilator trim tabs.

On the flaps.



Figure 2-8 - Adjacent to the annunciator panel.



Figure 2-9 - Near the respective switches.

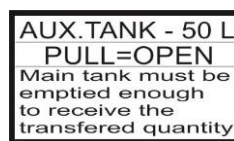


Figure 2-10 - Near the transfer plunger if the supplementary fuel tank is installed.



Figure 2-11 - On the central console, near the appropriate switches.

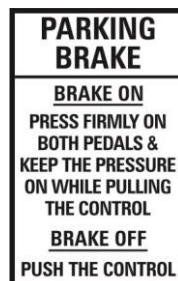


Figure 2-12 - Near the parking brake knob.

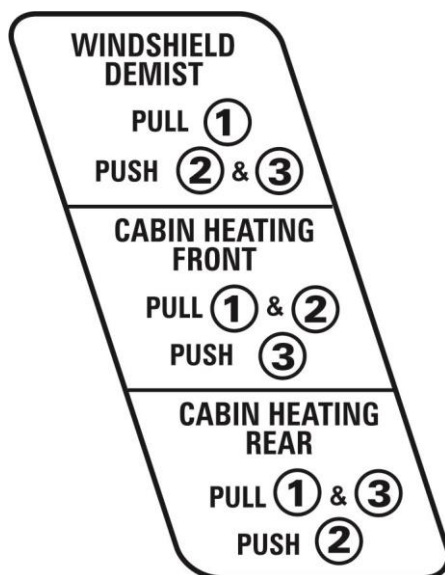


Figure 2-13 - On the right side of the cabin.



Figure 2-14 - On the heater controls.

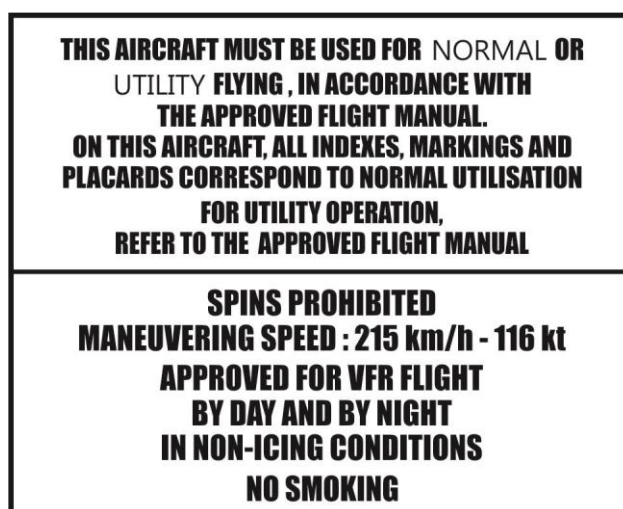


Figure 2-15 - On the ceiling of the sliding canopy.

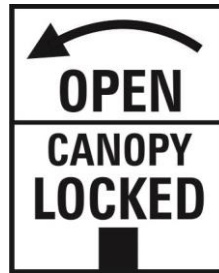


Figure 2-16 - Near the canopy locking handle.



Figure 2-17 - On the arm-rests, near the canopy emergency release.

DR400/160 - DR400/180(R) TRAIN PRINCIPAL / MAIN GEAR		DR400/160 - DR400/180(R) TRAIN AVANT / NOSE GEAR	
PNEU / TYRE	2 bar / 29 psi	PNEU / TYRE	1,8 bar / 26 psi
AMORTISSEUR SHOCK ABSORB.	6 bar / 87 psi	AMORTISSEUR SHOCK ABSORB.	5 bar / 73 psi

Figure 2-18 - On the fairings of the main wheels and of the nose wheel.



Figure 2-19 - In the luggage compartment or on the door of the compartment.

**IL EST RECOMMANDE DE VERROUILLER A CLEF LES LOQUETS
DE PORTE DE COFFRE A BAGAGES AVANT LES VOLS
LOCKING THE LUGGAGE DOOR LATCHES WITH KEY
IS RECOMMENDED BEFORE FLIGHT**

Figure 2-20 - On the inside of the luggage compartment door.

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SECTION 3:

EMERGENCY PROCEDURES

CHECKLISTS

ENGINE FAILURE OR LOSS OF POWER.....	3-2
At take-off	3-2
Immediately after take-off	3-2
During flight	3-3
FORCED LANDING AFTER ENGINE FAILURE	3-5
FIRE	3-7
Engine fire on the ground	3-7
Engine fire in flight	3-8
Fire in the cabin	3-8
Electrical fire	3-9
ENGINE MALFUNCTION	3-11
Vibration and rough engine operation	3-11
Low oil pressure	3-11
Oil temperature too high	3-12
ICING	3-12
ALTERNATOR FAILURE	3-13
ELECTRICAL SYSTEM FAILURE.....	3-13
INADVERTANT SPIN.....	3-14
LOSS OF ELEVATOR CONTROL.....	3-15
LOSS OF TRIM CONTROL.....	3-15
LOSS OF FLAP CONTROL.....	3-15

ENGINE FAILURE OR LOSS OF POWER

At take-off and before rotation

1. Throttle control reduce
2. Brake and avoid obstacles
3. Mixture lean (pull back)
4. Fuel selector valve off
5. Magneto switches off
6. Battery master OFF
7. Emergency evacuation if necessary

Immediately after take-off

1. Level out
(Attitude approximately 5° nose-down)
Flaps in take-off position 78 KIAS (145 km/h)
2. Land straight ahead with only minor heading corrections to avoid obstacles.

When landing is inevitable:

3. Mixture lean (pull back)
4. Fuel selector valve off
5. Magneto switches off
6. Flaps take-off or landing position
7. Battery master OFF
8. On short final UNLOCK THE CANOPY
9. Land at the minimum speed
10. When the aircraft has stopped evacuate immediately

▲ WARNING : Never turn back to the runway because the altitude after take-off is rarely sufficient.

ENGINE FAILURE IN FLIGHT

1. Establish glide speed :

Flaps retracted81 KIAS (150 km/h).
(In these conditions, without wind, the aircraft's glide range is approximately nine times its height above the ground). Locate a suitable landing area.

◆ **Note :** Under these conditions the descent rate will be 850 to 900 ft/min.

▲ **WARNING:** A windmilling propeller will increase the rate of descent and thus severely reduce the glide range.

If the height is sufficient to attempt a restart:

2. Fuel selector valveTO THE FULLEST TANK
3. Electric pump ON
4. Mixture Fully RICH
5. Throttle..... $\frac{1}{4}$ open
6. Magneto switch on L+R BOTH

If the propeller is still turning then the engine should restart.

If the propeller is stopped, operate the starter

If the starter does not operate and the engine does not start :

7. Switch "battery" and "alternator" check ON

If the starter operates but the engine does not restart:

8. Annunciator panel and fuel levels troubleshooting

If the main tank is empty but there is fuel in the supplementary tank (If installed)

Fuel selector ValveOn MAIN TANK
Transfert valve OPEN

If the propeller does not turn:

9. StarterOPERATE

If the engine or the propeller is seized, do not operate the starter.

If the motor does not function normally, prepare for a "landing without engine power".

LANDING WITHOUT ENGINE POWER

Choose an appropriate landing area:

1. Speed 81 KIAS (150 km/h) flaps retracted
..... 78 KIAS (145 km/h) flaps in take-off position
2. Seat belts and harnessessecure
3. Transmit a MAYDAY, giving your location and intent, on the frequency of the local ATC or AFIS or, failing that, transmit on 121.500 MHz.
4. TransponderSQUAWK 7700
5. Emergency locator beaconACTIVATE

Before landing:

6. Electric fuel pumpOff
7. Mixture Weak (pull backward)
8. Throttle Closed
9. Magneto switchesOff
10. Fuel selector valve Closed
11. Alternator switchOff
12. Flaps, when it is certain that the landing area can easily be reached Take-off or landing
13. Battery masterOff
14. CanopyUnlocked
15. Touch-down at the lowest possible speed
16. Brake As required
17. When the aircraft has stoppedDisembark immediately

▲ WARNING: If the canopy is jammed then use the emergency release :
Canopy handle in « open » position.
Release the two levers on the armrests, either side of the panel, and pull them upright.

PRECAUTIONARY LANDING

1. Survey the chosen landing area, making several low-speed passes if necessary 81 kt (150 km/h), flaps in take-off position (first stage);
2. Then make a precautionary approach at 67 kt (125 km/h), flaps in landing position (2nd stage);
3. On final, unlock the canopy.

After touch-down

4. Mixture Fully weak (rearward)
5. Fuel selector valve CLOSED
6. Battery master off

▲ **WARNING:** If the canopy is jammed then use the emergency release :
Canopy handle in « open » position.
Release the two levers on the armrests, either side of the panel, and pull them upright.

FIRE

Engine fire on the ground, during starting

Let the engine run with:

1. Fuel selector valveCLOSED
2. Electric pump OFF
3. Throttle..... FULL THROTTLE
4. Mixture Fully weak (rearward)

◆ **Note :** This manoeuvre is intended to burn the fuel that has accumulated in the engine manifold (usually due to excessive fuel injection during a difficult start-up).

5. Emergency evacuation..... if necessary

Extinguish the flames with an extinguisher, fire blanket or sand.

▲ **WARNING:** Have an authorised person or workshop inspect the damage caused by the fire and repair or replace any damaged equipment before the next flight.

Engine fire in flight

1. Fuel selector valve OFF
2. Throttle Full throttle
..... **Until the engine stops**
3. Mixture fully weak (rearward)
4. Electric fuel pump OFF (if it is on)
5. Alternator switch Off
6. Cabin heating and ventilation CLOSED
7. Glide speed 81 KIAS (150 km/h)
8. Extinguisher (if available and if the fire has spread to the cabin)
..... Use as required

Do not attempt to restart the engine.

◆ Note : Continue by following the procedures described in the chapter « landing without engine power ».

Cabin fire

Extinguish the fire using whatever means are available (extinguisher optional).

To eliminate the fumes, fully open the air vents.

Electrical fire

◆ **Note :** In the case of an electrical fire (combustion of insulation produces a characteristic odour):

1. Electrical equipment and radio (after a quick call)..... OFF
2. Magneto switches(BOTH) ON
3. Battery master OFF
4. Alternator switch OFF
5. Cabin ventilation..... OPEN
6. Cabin heat.....CLOSED
7. Extinguisher (if available).....use as required

If the fire persists: Make an emergency landing.

See « *Landing without engine power* ».

▲ **WARNING :** If the battery master is off then the flaps cannot operate.

If the fire is extinguished: land at the nearest available aerodrome.

8. Cabin ventilation..... OPEN
9. Check the circuit breakers **do not reset if open**
10. Switch off all electrical equipment that is unnecessary for continued flight.
11. Battery master ON
.....Wait and check that there are no problems
12. Alternator switch ON
.....Wait and check that there are no problems
13. Avionics master ON
14. Only operate the equipment that is necessary to continue the flight.

Reset the circuit breakers that have not been disconnected and whose function is necessary to continue the flight, one at a time, waiting a little between each to check for problems.

▲ **WARNING:** Breakers that were found to be switched off must not be reset. If the system has tripped the problem is overload or short-circuit. Reconnecting the circuit may result in resumption of the fire.

ENGINE MALFUNCTION

Vibration and rough running

Vibrations and rough running of the engine are usually due to the following:

1. Carburettor icing See the "ICING" paragraph
2. The mixture set too rich or too lean Adjust the mixture
3. Impurities in the fuel system Check the fuel pressure
..... Switch on the electric fuel pump
4. An ignition failure Switch magneto to L
..... Switch magneto to R

Select the position that provides the best engine operation and fly to the nearest airfield at reduced speed.

Mixture Adjust to achieve smooth running

Oil pressure too low

1. Reduce power as quickly as possible if conditions permit.

◆ Note : After a loss of oil pressure, maximum power should only be used when flying close to the ground and only for the duration necessary to regain altitude in order to make a safe landing or to determine the cause of the pressure loss.

2. Check the oil temperature: if the oil temperature is high or is close to the operating limit :
 - i. Land as soon as possible at the next aerodrome;
 - ii. Be ready for a forced landing;
 - iii. Expect an engine failure.

Oil temperature is too high

1. Reduce power and increase airspeed (nose down) as soon as possible.

◆ Note : If the oil temperature is too high, full power should only be used when flying close to the ground and only for the duration necessary to regain altitude in order to make a safe landing or to determine the cause of the excessive temperature.

2. Check the oil pressure. If the oil pressure is lower than normal:

- i. Land at the next available aerodrome;
- ii. Be ready for a forced landing;
- iii. Expect an engine failure.

3. If the oil pressure is within the normal range:

- i. Land at the next available aerodrome.

◆ Note : When operating in hot weather or in low-speed climbs, the engine temperature may rise. Avoid overheating of the engine as follows:

1. Increase airspeed by reducing the rate of climb;
2. Reduce the power if the engine temperature approaches the red zone.

ICING

- ▲ **WARNING :** Flight in icing conditions is prohibited.
Icing seriously degrades the aerodynamics of the aircraft and increases the stall speed.

If you experience icing then proceed as follows:

1. Carburettor heat.....Warm (backward)
2. Pitot heat..... ON (if installed)
Without Pitot heat then consider the airspeed indication to be unreliable;
3. Immediately leave the area where icing has occurred. If possible, change altitude so as to achieve exterior temperature and conditions less likely to cause icing.
4. Heating / cabin de-icing.....as required
5. Increase power, and make rapid changes of power from time to time, to reduce frost accumulation on the propeller blades.

Plan a landing at the nearest aerodrome. In the case of very rapid ice formation, execute a forced landing.

- ◆ **Note :** A layer of 0.5 cm (0.2 in) on the leading edge of the wing will significantly increase the stall speed. If necessary, adopt an approach speed greater than normal : 78 KIAS (145 km/h). Do not use flaps.

If it is necessary to keep the carburettor heat on.

6. Adjust the mixture to have a regular engine operation.

- ◆ **Remark:** Only use the carburettor heat in “warm” or “cold” position. An intermediate position can cause more icing under certain conditions.

BREAKDOWN OF ELECTRICAL GENERATION

Alternator failure results in illumination of the «charge» warning light on the annunciator panel and a progressive reduction of the battery voltage (indicated by the voltmeter).

If the indicator illuminates

1. Alternator..... switch off and then on again

◆ **Note :** The purpose of this operation is to reset the over-voltage relay that can disconnect after a transient overvoltage.

If the fault persists

1. Alternator switchOff
2. Turn off all electrical equipment that is not essential for the continuation of the flight;
3. Land as soon as possible at the nearest available aerodrome.

ELECTRICAL SYSTEM FAULT

1. Check the relevant circuit breaker switch;
2. If the system is necessary for the continuation of the flight, reset it once. If the circuit breaker trips again then do not try again as the equipment has failed.

▲ **WARNING:** **Do not reset a circuit breaker more than once.** A circuit breaker is a safety system. If the breaker has tripped, the problem is overload or short circuit. Resetting the breaker could cause a fire.

INADVERTANT SPIN

In the event of an unexpected spin, apply the following procedures:

1. Throttle close (pull back)
2. Rudder fully **AGAINST** the direction of rotation
3. Elevator..... neutral
4. Ailerons..... neutral
5. When rotation has stopped, centralise the rudder and recover within flight limitations.

◆ Note : If the flaps are deployed at the start of the spin, retract them immediately.

LOSS OF ELEVATOR CONTROL

In the event of loss of elevator control:

- Stabilise the aircraft in level flight, flaps up, at 81 kt (150 km/h) using the rudder trim and the throttle.
- Do not change the elevator trim and control the angle of descent only with the throttle. Only reduce power on short final, near the ground.

LOSS OF TRIM CONTROL

In the event of failure of the electric elevator trim control:

1. Counter using the elevator as required
2. Pull the circuit breaker for the electric elevator
3. Do not try to reset the breaker in flight
4. Reduce speed to minimise the effort necessary to operate the elevator
5. Conserve the configuration to allow a safe landing with the minimum effort.

LOSS OF FLAP CONTROL

FLAPLESS APPROACH.

Approach speed 74 KIAS (137 km/h)

Short final 68 KIAS (126 km/h)

In the event of a flapless landing, the landing distance will be increased by 30%.

SECTION 4 :

NORMAL PROCEDURES

LOADING

Before every flight, ensure that the total mass and centre of gravity are within the prescribed limits. For these, refer to SECTION 6.

NORMAL OPERATING SPEEDS

The speeds listed below are the indicated airspeeds recommended for normal operation of the aircraft.

They apply to a standard aircraft, at maximum take-off mass, in standard atmosphere, at sea level.

They can vary from one aircraft to another, according to the equipment installed, the condition of the aircraft and the engine, the atmospheric conditions and the skill of the pilot.

Optimal climb speed

Flaps in take-off position (1st stage)81 KIAS (150 km/h)
Flaps retracted92 KIAS (170 km/h)

Maximal operating speed in turbulent air

Flaps retracted140 KIAS (260 km/h)

Maximum speed with flaps

Flaps in landing position (2nd stage).....92 KIAS (170 km/h)

Landing speed (final approach)

Flaps in landing position (2nd stage).....68 KIAS (125 km/h)

PRE-FLIGHT INSPECTION

To be done before each flight:

During all exterior inspections, inspect all the joints, the pivot pins and the bolts; check that the fabric is not damaged, that it is in good condition and that there are no dents or tears; check that all control surfaces are moving correctly and that there is no excessive play; check that there are no leaks near the fuel tanks or fuel lines. In general, identify and report anything abnormal.

In cold weather, remove all frost, ice and snow from the fuselage, the fixed surfaces and the control surfaces. Check that there is no ice or debris that could interfere with the movement of the control surfaces. Check that there is no accumulation of snow or ice in the wheel fairings.

If so equipped, check that the pitot probe heater is working by turning on the pitot heat for less than 30 seconds.

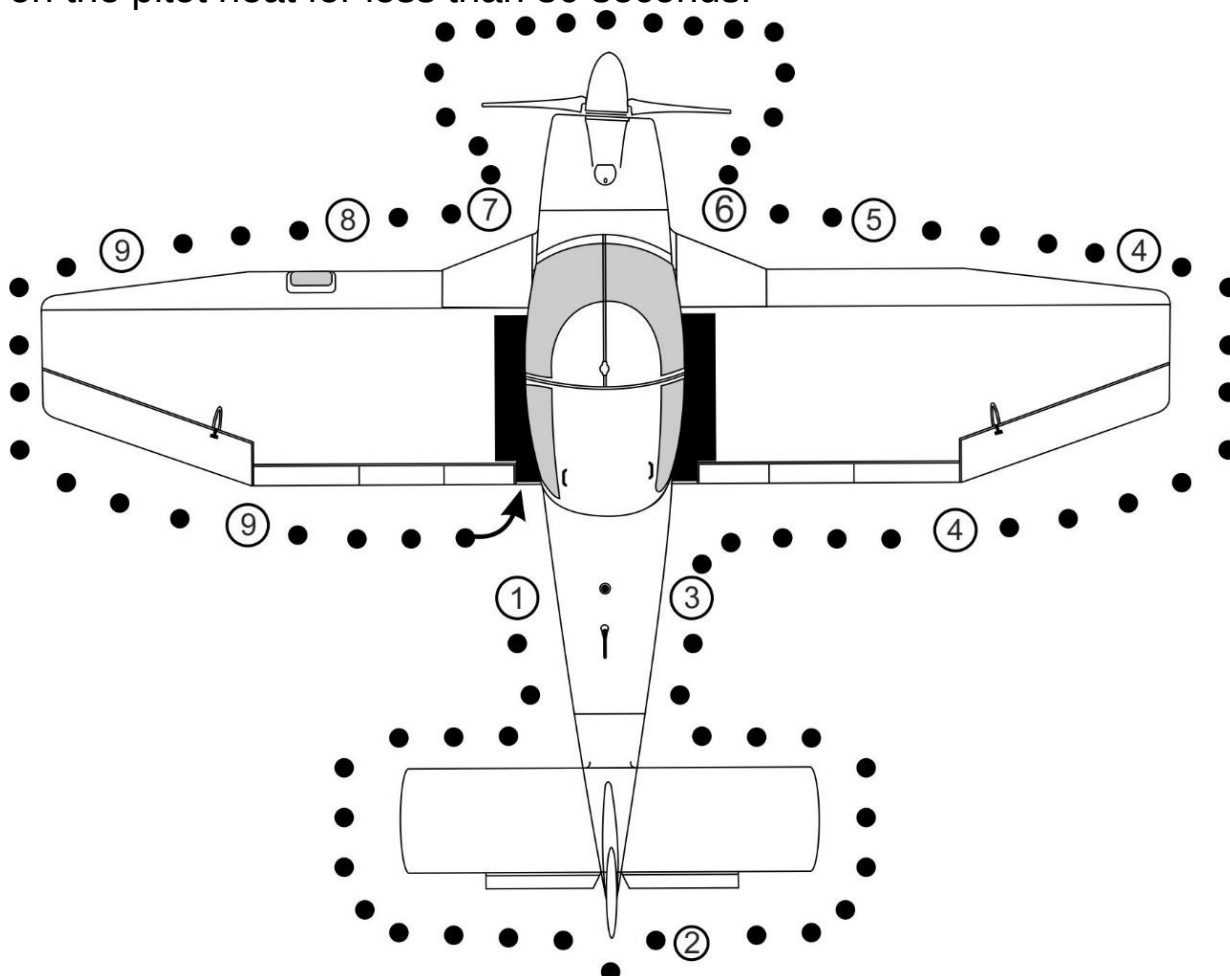


Figure 4-1 - Pre-flight inspection

Magneto switch OFF
Throttle CLOSED
Mixture LEAN (pull back)
Avionics / radio (if so equipped) OFF
Flight controls free with movement in the correct direction
Battery master ON

▲ WARNING : When the battery master is on, when using ground power, or when turning the propeller, treat the propeller as live.

Flapscheck operation
Trimcheck operation
Fuel quantity check
Fuel gauge conforms to dip-stick (if so equipped) check
Oil pressure indicator Illuminated
Battery master OFF
Aircraft documentson board
Luggageproperly stowed

Check the travel of the control surfaces, then circle the aircraft, starting with the left side of the fuselage (see figure 4-1).

1

- a) Fuel cap..... in place, locked
- b) Fuel tank vents (underneath) unobstructed
- c) Fuel drain (main tank)
Fuel drain (supplementary tank) (if so equipped)
.....strain and inspect samples
- d) Static portclean, unobstructed

▲ WARNING: Testing the fuel is essential to ensure that there are no impurities nor water in the tanks.
To perform a reliable test the aircraft must be on a horizontal surface and have been immobile for about 30 minutes.
(These conditions are usually fulfilled before the first flight of the day).
The sample must be taken in a clean container intended for the purpose and which allows the identification of impurities and water.

▲ WARNING: Make sure that the type of fuel is correct (AVGAS 100LL: the colour must be blue)

2

- a) Stabilatorcondition of the surface, correct movement
- b) Rudder.....full and correct movement

3

- a) Static portclean, unobstructed

4

- a) Flaps, aileronscheck condition and hinges
- b) Wing-tip and navigation lights (if fitted) check operation

5

- a) Stall warnerinspect and test

◆ Note : With the battery master switched on, test the stall warner to make sure that the warning signal is activated when the tab is lifted.

- b) Right main undercarriage check fairing attachment and condition

shock absorber compression normal

tyre condition: inflation and wear

check for accumulation of debris inside the fairings

c) Sample the right wing tankstrain and inspect the sample

d) Right wing tank cap in place, locked

6

a) Fuel pump drainstrain and inspect the sample

b) Engine oil check level, cap secured, hatch closed

c) Exhaust pipes..... rigid

d) Engine cowlings secured..... check

e) Propeller..... clean, in good condition

f) Propeller spinner no play

g) Air intakes clean, no obstructions

7

a) Front undercarriage check fairing attachment and condition

shock absorber compression normal

tyre condition: inflation and wear

check for accumulation of debris inside the fairings

tow-bar removed

b) Canopy cleanliness check

8

a) Left main undercarriage..... check fairing attachment and condition

shock absorber compression normal

tyre condition: inflation and wear

check for accumulation of debris inside the fairings

b) Sample the left wing tankstrain and inspect the sample

c) Left wing tank cap in place, locked

d) Pitot.....clean, unobstructed

e) Lights (if fitted)..... clean lenses

9

a) Wing-tip and navigation lights (if fitted) check condition

b) Flaps, ailerons check and condition and hinges

CABIN INTERIOR CHECK PRIOR TO START-UP

1. Canopy..... closed, unlocked
2. Parking brake ON
3. Front seatsadjusted and secured
4. Belts and harnesses.....adjusted and fastened
5. Flight controls.....free, without play or excessive friction,
move in the correct direction, (check rudder during taxiing)
6. Battery master ON
7. Alternator switch..... OFF
8. Annunciator panelTest, set DAY/NIGHT
as needed
9. Circuit breakersCLOSED
10. Elevator trim movement and direction verified, then returned to
take-off position
11. Fuel quantitycheck that it is sufficient for the flight

◆ Note : Check that the fuel gauge reading concurs with the visible fuel level in the tanks and/or the documentation in the journey log.

12. All electrical and avionics switches..... OFF

■ REMARK: The avionics master switches must be off during engine start-up to avoid possible damage to the on-board electronic equipment.

◆ Note : It is preferable to retract the flaps fully or to the take-off position before starting to avoid any projection.

ENGINE STARTING

Normal procedure

1. Canopy closed
2. Strobe ON
3. Carburettor heat..... cold (forward)
4. Mixturerich (forward)
5. Gauges check
6. Fuel selector valvecheck operation, OPEN
7. Electric pump ON
8. Throttle..... 2 or 3 injections then $\frac{1}{4}$ open
9. Propeller areaclear
10. StarterENGAGE (30 seconds maximum)
11. When the engine starts release the starter
and return the magneto switch to L+R (Both)
12. Oil pressure warning lightextinguished

■ **REMARK:** Avoid continuously operating the starter for more than 30 seconds. Wait one minute before retrying. After six attempts, let the starter cool down for 30 minutes.

■ **REMARK :** As soon as the engine is running, check the oil pressure. If the oil pressure warning light is not extinguished or the pressure is zero after 15 to 20 seconds, stop the engine immediately and find the cause.

■ **REMARK:** If the red « Starter » warning light on the annunciator panel is illuminated then the starter is still engaged. Stop the engine immediately and find the cause.

▲ **WARNING:** If the main battery is not capable of operating the starter, perform the maintenance necessary to have an operational battery.

Hot engine procedure

Same as « normal procedure » without injection.

Cold weather procedure

Same as « normal procedure » but advance the throttle in successive movements to achieve 900 to 1,000 rpm.

Flooded engine procedure.

1. Electric pump..... OFF
2. MixtureFully weak (move backwards)
3. Throttle Fully open
4. StarterACTIVATE

As soon as the engine is running, return the mixture to “RICH”, then resume the normal procedure.

AFTER THE ENGINE STARTS

1. Rotational speed 1200 rpm
2. Electric pump OFF
3. AlternatorOn
4. ALT light (charge)..... check that it is EXTINGUISHED
5. Oil pressure..... Check
6. Vacuum gauge (if installed)..... Check
7. CanopyCLOSED AND LOCKED
8. Harnesses and beltsBUCKLED
9. Avionics master switch (if installed)..... ON
- 10.COM / NAV inst. Radionavigation..... ON, set
- 11.Altimeter Set QNH/QFE
12. Horizon, directional giro (if fitted) Set
13. FlapsRETRACT

TAXIING

1. Parking brake..... disengaged
2. Brakes test
3. During changes of direction:
 - a. Turn indicator (if fitted) check
 - b. Directional gyro (if fitted)check operation
 - c. Magnetic compass check

■ **REMARK:** When taxiing, steer with the rudder pedals, it is not necessary to brake to change direction. Speed should be moderate and at the minimum power required to move forward without using the brakes. Continuous or excessive braking can cause overheating or damage to the brakes and surrounding systems.

It is recommended to avoid exceeding 1200 rpm as long as the oil temperature is outside the green range.

BEFORE TAKE-OFF

1. Parking brakeENGAGED
2. Canopy CLOSED AND LOCKED
3. Flight controls..... free and moving in the correct direction
4. Flight and navigation instruments..... check, set
5. Cabin heateras required
6. Fuel selector valve OPEN
7. Fuel volumecheck that it is sufficient for the flight
8. Elevator trim circuit breaker..... Engaged
9. Electric elevator trim control down/up
.....check that the movement is in the correct direction
10. Elevator trim take-off position

◆ Note : Do not use the electric trim during take-off and initial climb.

◆ Note : The power check must be carried out in a clean area (without debris) to minimise the risk of damage to the propeller or other parts of the aircraft.

11. Oil temperature and pressuregreen zone
12. Fuel pressure (if equipped).....green zone
13. Mixture Fully rich (push forward)
14. Carburettor heat Cold (push forward)

Checking magnetos

15. Throttle for 2000 rpm
16. Magneto selection
 - Maximum drop between L or R and L+R 175 rpm
 - Maximum difference between L and R 50 rpm

**For propeller
runup procedures,
refer to section 9
Register of Supplements**

Carburettor heat check

17. Carburettor heat Warm (backward)

Verify an engine speed drop (100 rpm)

18. Carburettor heat Cold (Forward)

Mixture check

19. Mixture Lean until engine rpm falls, then return to fully rich

Engine idle check

20. Throttle close

..... Engine speed 600 to 650 rpm

21. Throttle Increase until engine speed is steady at 1200 rpm

22. Engine instruments CHECK

23. Flaps fully down, then return to take-off position

24. Electric pump ON

25. Radios and avionics ON, and set

26. Parking brake RELEASE

TAKE-OFF

Cross-wind take-off

1. Flaps (1st stage) take-off position
2. Ailerons into wind

◆ Note : Take-off at a speed slightly greater than for a normal take-off. Correct for drift as usual (maximum bank near the ground 15°).

Demonstrate cross-wind limit..... 22 KT (40 km/h).

Short take-off

1. Flaps(1st stage) take-off position
2. Full throttle against the brakes, then release the brakes
minimum 2200 rpm
3. Rotation speed54 KIAS (100 km/h)
Initial climb speed70 KIAS (130 km/h)
4. Speed after clearing obstacles 81KIAS (150 km/h)
5. FlapsRETRACT
6. Electric pump OFF

CLIMB

Normal climb (flaps retracted)

Best rate of climb speed 92 KIAS (170 km/h), 86 KIAS (160km/h) on the ceiling.

When the best rate of climb is not required, a higher speed will improve forward visibility.

1. Throttle Full power (push forward)
2. Mixture Fully rich (push forward)

Best angle of climb

Minimum 8.3%, at sea level, standard atmosphere, maximum mass, rotating at 70 KIAS (130 km/h), flaps in take-off position (1st stage). 76 KIAS (140km/h) without flaps.

▲ WARNING: This type of climb should only be used if it is essential to clear obstacles (because of poor cooling of the engine).

1. Throttle Full power (push forward)
2. Mixture Fully rich (push forward)

CRUISE

◆ Note : For the settings and performance in cruise, refer to Section 5.

1. Power.....Maximum 100 % (maximum continuous power)
Recommended : 75 %
2. Elevator trim..... SET
3. Oil temperature and pressure..... MONITOR REGULARLY
4. Fuel level (Fuel gauge and warning light)
..... MONITOR REGULARLY

◆ Note : If the aircraft is equipped with a supplementary tank, it is essential that there is sufficient capacity in the main tank to receive the contents of the supplementary tank before transferring the fuel in the supplementary tank into the main tank. Otherwise, the excess fuel will be lost.

Use of the mixture control

Keep the mixture control fully rich during take-off, best angle of climb and best rate of climb.

In some conditions (take-off at high altitude, or prolonged climb above 5,000 ft) this setting may be too rich and lead to irregular engine operation or loss of power.

In these situations, adjust the mixture for regular engine operation and not for best fuel economy.

Mixture adjustment in stable cruise:

Set the fuel flow according to section 5 or progressively lean the mixture until the engine runs irregularly, then slightly enrich the mixture to regain the previous rpm again.

- **REMARK:** Be careful not to over-lean the mixture to avoid engine overheating.
- **REMARK:** Always enrich the mixture before increasing power and/or changing altitude.
- ◆ **Note :** Depending on the on-board instrumentation, refer to the relevant equipment manual for instruction regarding mixing (for example: EGT).

FUEL MANAGEMENT

Switch on the electric pump when changing tanks.
Select the fullest tank before take-off or landing.

DESCENT

1. Mixture Rich
2. Carburettor heat..... on demand, warm or cold
3. Power..... as required to achieve the desired slope/speed

Approach or down wind

1. Fuel select the fullest tank
2. Mixturefully rich (push forward)
3. Electric pump ON
4. Carburettor heat..... on demand, warm or cold
5. Cabin (seats, belts) check
6. Flaps below de 92 KIAS (170 km/h),
Take-off position (1st stage)
7. Speed81 KIAS (150 km/h)
8. Elevator trim.....ADJUST

Final

1. Carburettor heat..... Cold (push forward)
2. Flapsrecommended below 81 KIAS (150 km/h)
Landing position (2nd stage)
3. Approach speed68 KIAS (125 km/h)

◆ Note : The approach speed can be increased by up to 73 KIAS (135 km/h) to improve manoeuvrability. This can increase the landing distance.

4. Elevator trim.....ADJUST

◆ Note : Do not use the electric elevator trim on short final and during roundout.

LANDING

Landing on a short runway

- ◆ **Note :** The landing distances in section 5 are obtained with the following procedure

To make a landing on a short runway, in calm weather, make an approach at 67 KIAS (125 km/h) with the flaps in the landing position.

When passing 50 ft (15 m) start to reduce engine power. Touch down must be without engine power and on the main wheels first.

Immediately after the main wheels touch, apply the brakes as fully as possible without locking the wheels until the aircraft has stopped.

Keep the stick back during braking to put the load on the main wheels (so as to maximise braking efficiency).

Normal landing

In general, the normal landing procedure is used when optimum landing performance is not required.

- ▲ **WARNING:** Ensure that the landing distance available is at least 1.5 times the landing distance given in section 5.

Normal landings are made with full flap and from an approach speed between 67 KIAS (125km/h) and 73 KIAS (135 km/h).

Surface wind and turbulence are generally the main factors that determine a comfortable approach speed.

- ◆ **Note :** approach speeds greater than 67 KIAS (125 km/h) result in longer distances, so be sure that the distance available is at least 1.5 times the landing distance in section 5.

Touchdown is made with no engine power and on the main wheels to reduce both the landing speed and the required braking force.

Gently lower the nose wheel onto the runway after the aircraft slows down. When the nose-wheel is straight, its shock absorber must be allowed to compress so as to unlock the nose gear and allow nose-wheel steering.

Smoothly return the stick to the neutral position.

Apply the brakes as required.

- ◆ **Note:** If landing with the flaps retracted, the landing distance required will be increased by 30%.

Landing in crosswind or in strong gusts

1. Flaps (1st stage) take-off position recommended
2. Approach speed 70 kt (130 km/h) + 1/2 gust speed
3. Drift correct in the conventional manner

Touch down on the main wheels first.

Avoid rolling on the main wheels and let the nose-wheel down as quickly and smoothly as possible in order to compress the shock absorber and unlock the nose-gear (see SECTION 7) to allow nose-wheel steering.

Insufficient force on the nose-gear may cause it to remain locked in the longitudinal axis of the aircraft, thus preventing nose-wheel steering.

Push the stick in the direction of the wind.

Demonstrate cross wind limit 22 kt (40 km/h)

- ◆ **Note :** To compensate for the greater approach speed and the use of only one stage of flap, assume that the landing distance will be increased by 50%.
- **WARNING:** For strong gusts, the speed and flap position must be adjusted so that the V_{fe} is not exceeded.

Landing distances calculation example:

- Headwind : 10KT
- Air temperature : 15°C
- Altitude : 0 ft
- Paved and dry runway
- Weight: 1045 kg (max.landing weight)

Landing distance with landing on short runway procedure.

Reminder: The landing distance is the distance from the 15m (50ft) to the complete stop.

Table 5-10 section 5

Landing distance without wind correction = **530m**

Correction of the Headwind influence section 5

Corrected distance = $530 * 0.85 = \mathbf{451\ m}$

Landing distance with normal landing procedure.

Same as above but with 1.5 coefficient

Distance to consider = $1.5 * 451 = \mathbf{677\ m}$

Landing distance in crosswind or strong gusts

- Crosswind : 20KT full crosswise

Flaps: take-off position (1st stage)

Approach speed = 70 KIAS (130 km/h)

Safety distance = $1.5 * 530 = \mathbf{795\ m}$

- Gust wind : 20KT

Flaps: take-off position (1st stage)

Approach speed = 70KIAS (130 km/h) + 10KT (18.5 km/h) = 80KIAS (148.5 km/h)

Safety distance = $1.5 * 530 = \mathbf{795m}$

Going around

1. Pitch.....take-off
2. Carburettor heat..... Cold (forward)
3. Throttle.....Full (forward)
4. Mixture Fully rich, CHECK
5. Speed67 KIAS (125 km/h)
6. Return the flaps to the take-off position (1st stage), then adjust the speed for a normal climb: 78 KIAS (145 km/h)

AFTER LANDING

1. Electric pump OFF
2. Flaps UP
3. Navigation instruments..... OFF

ENGINE SHUT-DOWN

1. Parking brake ON
2. Throttle..... IDLED
3. Flaps DOWN
4. Avionics master switch OFF
5. Idle cut-off tests at idle speed.....cut, then L+R (Both)
6. Engine speed 1,000 rpm
7. Mixture Fully weak (pull back)

After engine shut-down

1. Magneto switch OFF
2. Alternator switch..... OFF
3. Battery master..... OFF
4. After placing the wheels chocks release the parking brake

STALLS

The stall characteristics of the DR400 are traditional. Power-off stalls are accompanied by a slight floating of the nose if the stick is held fully back. The power-off stall speeds at maximum mass are given in section 5, Performance.

During a stall at altitude, while the indicated speed decays slowly it is possible to feel a slight vibration of the cabin and to hear the stall warner sound at 5 to 10 kt before the stall. Normally, the stall is indicated by a slight yaw and it is possible to hold the wings level or in a bank by co-ordinated use of the ailerons and rudder. When the stall warner sounds, to recover, push the stick forward to allow the aircraft to accelerate, apply full throttle if necessary and bring the wings level with co-ordinated use of the controls.

▲ WARNING: Extreme caution must be exercised to avoid uncoordinated, abrupt or extreme manoeuvres near the stall, especially near the ground.

USE OF THE PARKING BRAKE

To apply the brakes

Press both pedals. Maintain the pressure and pull the parking brake plunger control upward.

Release the pressure on the pedals; the parking brake control must remain in the pulled (extended) position.

Or

Pull the parking brake plunger control up.

Press both pedals firmly, then release the pedals. The parking brake control must remain in the pulled (extended) position.

To release the brakes

Push the parking brake plunger fully down.

▲ WARNING: Do not pull the parking brake control during flight. If landing with the parking brake engaged, the brakes will be fully applied as soon as the toe-brake pedals are pressed. This can lock the wheels and cause a tyre burst or a fire.

SECTION 5 :

PERFORMANCE

- ◆ Note : All performance figures in this manual are with the 76 EM8 S5-0-64 propeller.

NOISE LIMITATION

The noise levels below have been determined according to ICAO Annex 16, Volume 1, Chapter 10 (10.4a).

The admissible noise level for the DR400/180 aircraft corresponding to the total mass of (2425 lb) 1100 kg is 84.6 dB(A).

- Propeller 76 EM8 S5-0-64 - silencer CEAPR standard 01	76.4 dB
- Propeller 76 EM8 S5-0-64 - silencer CEAPR standard 01 + additional silencer APR	76.2 dB

- ◆ Note: For all other configurations, refer to EASA database (Light propeller driven aeroplanes noise database) in the last version.

CALIBRATION OF THE AIRSPEED INSTALLATION

Correction of the air speed indicator

$VC = (VI + \text{calibration})$ is practically equal to VI

The above formula does not take into account the air speed indicator's own tolerance.

Altitude correction

The altitude correction is practically equal to zero. The altimeter's own tolerance is not taken into account.

- ◆ Note : All speeds in this manual are indicated speeds unless otherwise specified.

PARAMETERS AFFECTING THE PERFORMANCE

The calculated performance data in this section are based on data derived from flight tests, with the aircraft and engine in good condition and utilising average piloting skills. Unless otherwise indicated, the ambient conditions are those of a standard atmosphere.

◆ Note : Whenever possible, choose the most conservative values of the following data so as to have a greater safety margin and to face up unforeseen events during the flight.

A conservative value for performance can be established by taking the next highest values for mass, altitude and temperature.

STALL SPEEDS

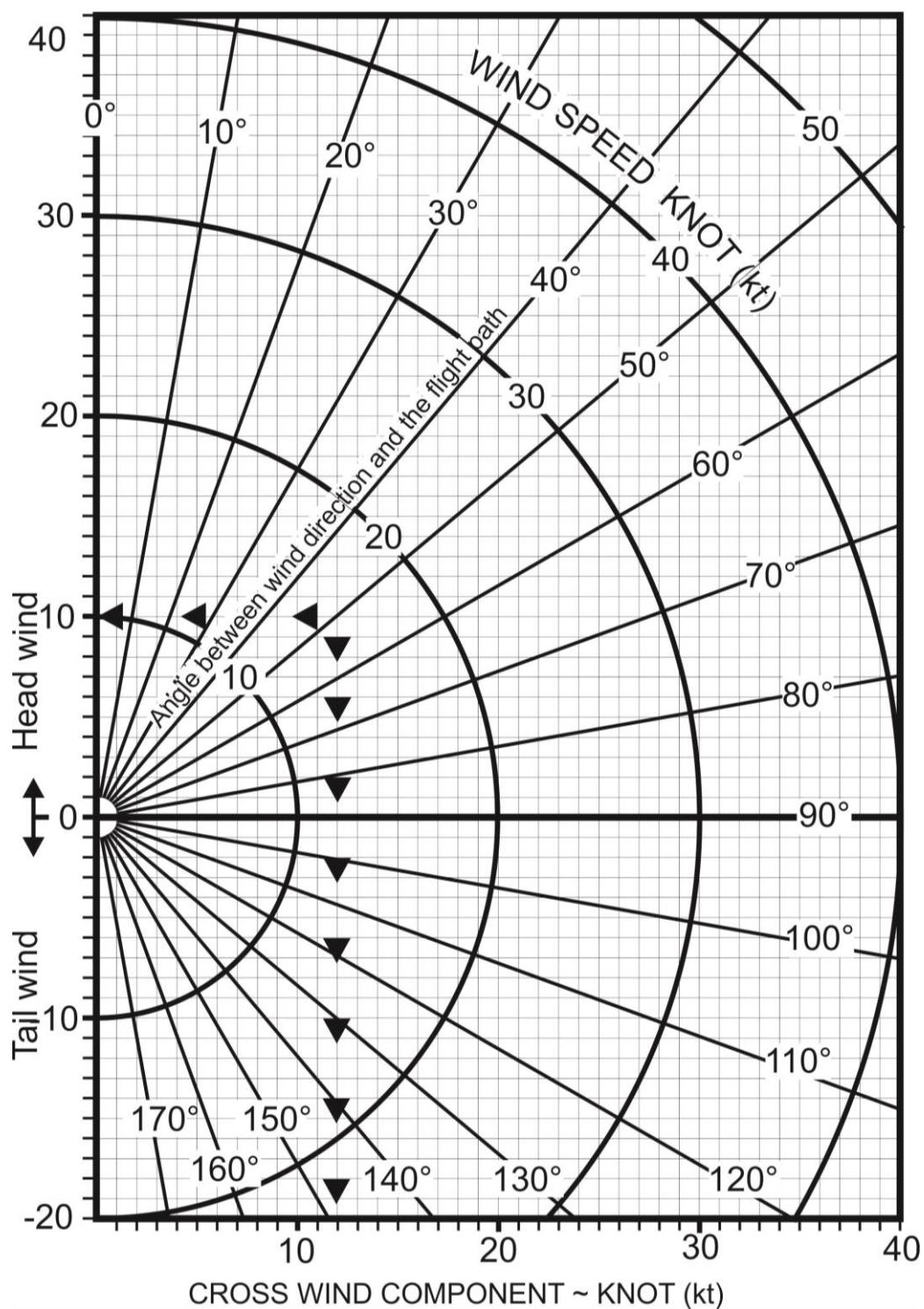
Engine idle Mass 1100 kg (2425 lb)	KIAS (km/h)		
Pitch	0°	30°	60°
Flaps retracted	57 (105)	61 (113)	80 (148)
Flaps 1 st stage, take-off position	53 (99)	57 (106)	76(140)
Flaps 2 nd stage, landing position	51 (95)	55 (102)	72 (134)

Tableau 5-1 - Stall speeds

WIND COMPONENT

Example:

Heading =	10°	Wind direction vs heading	50°
Wind direction =	60°	Crosswind	11Kt
Wind speed =	15 Kt	Headwind =	10Kt



TAKE-OFF PERFORMANCE

Influence of head wind:

- for 10 KIAS, multiply by 0.85
- for 20 KIAS, multiply by 0.65
- for 30 KIAS, multiply by 0.55

Influence of tail wind:

- Add 10 % to the distance for each 2kt increase in tail wind.

◆ Note : So as to limit take-off distances, it is not recommended to attempt to take off with a tailwind in excess of 10 kts.

Grass runway:

- Add 15 % for short, dry, grass.

◆ Note : If the runway is covered with snow or slush, remember that the take-off distance will be considerably increased as the thickness of the snow or slush increases. The thickness and consistency of the surface layer may be sufficient to make take-off impossible.

Sloping runway:

An upward slope of 2% (2m in 100m) increases the take-off distance by 10%. The effect on the ground roll may be greater.

◆ Note : The following data gives the take-off performance of a clean, insect-free and dry, aircraft, on a horizontal runway, as a function of temperature and pressure altitude. It is possible to establish conservative distances by reading the next higher value for mass, altitude and temperature.
If the brakes are not applied during the engine run-up, the effective distance begins where full power is obtained.

Take-off distances.

Conditions:

- Maximum take-off weight 1100 kg.
- No wind, flaps in take-off position (1st stage), full power before releasing the brakes.
- Runway hard, dry and flat.
- Take-off speed V_{lof}.....54 KIAS (100 km/h)
- Speed on passing 15 m (50 ft.).....70 KIAS (130 km/h)

ALTITUDE (ft)	TEMPERATURE °C (°F)	MASS 1100kg (2425 lb)				MASS 900kg (1984 lb)			
		Run distance		Passing 15m (50ft)		Run distance		Passing 15m (50ft)	
		m	ft	m	ft	m	ft	m	ft
0	-5 (23)	215	700	445	1450	120	395	250	820
	Std = 15 (59)	250	815	515	1690	140	460	290	955
	35 (95)	290	945	600	1955	165	535	340	1105
2500	-10 (14)	260	860	540	1780	150	485	310	1005
	Std = 10 (50)	305	1005	635	2085	175	565	360	1175
	30 (86)	355	1165	735	2415	200	655	415	1360
5000	-15 (5)	330	1075	680	2225	185	605	385	1255
	Std = 5 (41)	385	1260	795	2610	215	710	450	1475
	25 (77)	445	1465	925	3035	250	825	520	1710
8000	-21 (5)	430	1410	890	2925	245	795	505	1650
	Std = -1 (30)	505	1660	1050	3445	285	940	590	1945
	19 (66)	590	1935	1225	4010	335	1095	695	2265

Table 5-2
Take-off distances (m et ft)

CLIMB PERFORMANCE

At sea level

At maximum weight of 1100kg (2425 lb) in standard atmosphere.

Practical ceiling.....14720ft

Best angle of climb speed (V_x)

Flaps in take-off position (1st stage)70 KIAS (130 km/h)

Flaps retracted.....76 KIAS (140 km/h)

Best rate of climb speed (V_y)

Flaps in take-off position (1st stage)81 KIAS (150 km/h)

Flaps retracted.....92 KIAS (170 km/h)

Max.vertical speed (1100kg)

Flaps in take-off position (1st stage)827ft/mn (4.2m/s)

.....Reduction of 47ft/mn (0.24m/s) for 1000ft

Flaps retracted.....885ft/mn (4.5m/s)

.....Reduction of 47ft/mn (0.24m/s) for 1000ft

Max.vertical speed (900kg)

Flaps retracted.....1200ft/mn (6.1m/s)

.....Reduction of 51ft/mn (0.26m/s) for 1000ft

Influence of the temperature

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

Glide performance

Engine cut, without wind, the aircraft glides 9 times its height above the ground at 81 KIAS (150 km/h)

Altitude and temperature have no perceptible influence.

Time of climb, distance and fuel consumption.

Standard atmosphere.

At maximum take-off weight 1100kg (2425lb)

Flaps retracted, full power, at the best rate of climb speed.

Starting and taxiing included.

ALTITUDE Zp	Time	Fuel consumption			Distance	
ft	Min	l	imp	Us gal	Km	Nm
3000	4	4,5	1	1,2	9,3	5
5500	7,5	8	1,8	2,1	17,6	9,5
8500	16,5	15	3,3	4,	38,8	21

Table 5-3 - Time, climb distance and fuel consumption at 1100 kg (maximum take-off weight CAT N)

CRUISE PERFORMANCE

In standard atmosphere.

At maximum take-off weight of 1100kg (2425 lb).

Range and endurance calculations don't take into account any fuel reserve at the destination.

It is assumed that higher consumption during climb is compensated for by decreased consumption during descent.

Range assumes no wind.

Standard capacity.

Standard tanks:189 litres usable.

Distributed as follows:

Main tank	110 litres
Right wing tank	40 litres
Left wing tank	40 litres

The capacity can be increased by means of an optional tank.

Standard tanks + optional tank :239 litres usable.

Optional tank 50 litres

◆ Note : Range and distance values in the table below do not take into account the use of the auxiliary tank.

ALTITUDE	Engine speed		Fuel consumption			SPEED		RANGE	DISTANCE	
ZP (ft)	%	rpm	l/h	imp/h	us gal/h	km/h	kt	h,min	km	Nm
0	75	2500	38	8,4	10,2	237	128	4,55	1178	636
	65	2350	33	7,5	8,8	220	119	5,4	1248	674
2500	Cruise Performance and Fuel Consumption: refer to section 9 Register of Supplements					243	131	4,55	1208	652
						225	121	5,4	1288	696
4500						248	134	4,55	1233	666
						230	124	5,4	1317	711
6500						254	137	4,55	1263	682
						235	127	5,4	1345	727
8500						257	139	4,55	1278	690
	65	2550	33	7,5	8,8	240	130	5,4	1375	742
10500	65	2580	33	7,5	8,8	245	132	5,4	1402	757

LANDING PERFORMANCE

Influence of head wind:

- for 10 KIAS, multiply by 0,85
- for 20 KIAS, multiply by 0,65
- for 30 KIAS, multiply by 0,55

Influence of tail wind:

- Add 10 % to the distance for each 2kt increase in tail wind.

◆ Note: So as to limit landing distances, it is not recommended to attempt to take off with a tailwind in excess of 10 kts.

Grass runway:

- Add 15 % for short, dry, grass.

Sloping runway:

A downward slope of 2% (2m in 100m) increases the landing distance by approximately 10%. The effect on the ground roll may be greater.

◆ Note: The following data gives the landing performance of a clean, insect-free and dry, aircraft, on a horizontal runway, as a function of temperature and pressure altitude. It is possible to establish conservative distances by reading the next higher value for mass, altitude and temperature.
If the brakes are not applied during the engine run-up, the effective distance begins where full power is obtained.

Landing distances.

At maximum landing mass of 1045 kg (2304 lb),

No wind, flaps in landing position, engine idle.

Runway hard, dry and flat.

Passing 15 m (50 ft.): V = 68 KIAS (125 km/h)

Touch down: V = 51 KIAS (95 km/h)

ALTITUDE (ft)	TEMPERATURE °C (°F)	MASS 1045kg (2304 lb)				MASS 845kg (1863 lb)			
		Run distance		Passing 15m (50ft)		Run distance		Passing 15m (50ft)	
		m	ft	m	ft	m	ft	m	ft
0	-5 (23)	230	755	500	1641	190	623	425	1394
	Std = 15 (59)	250	820	530	1739	200	656	450	1476
	35 (95)	270	886	560	1837	215	705	475	1558
4000	-13 (7)	260	853	550	1805	210	689	465	1526
	Std = 7 (45)	280	919	585	1919	230	755	495	1624
	27 (81)	300	984	620	2034	240	787	520	1706
8000	-21 (-6)	295	968	610	2001	240	787	510	1673
	Std = -1 (30)	320	1050	650	2133	260	853	545	1788
	19 (66)	340	1116	690	2264	275	902	575	1887

SECTION 6 :

MASS AND BALANCE

The nomogram that follows is used to determine the balance of the DR400.

The pilot must ensure that the aircraft is loaded correctly.

- ◆ Note : Due to the rearward position of the main tank (and the supplementary tank if fitted), the centre of gravity moves forward as fuel is used.
- ◆ Note : If the supplementary fuel tank is fitted, it is necessary to be sure that there is sufficient space in the main tank to take all the fuel contained in the supplementary tank before transferring the fuel from the supplementary tank into the main tank.

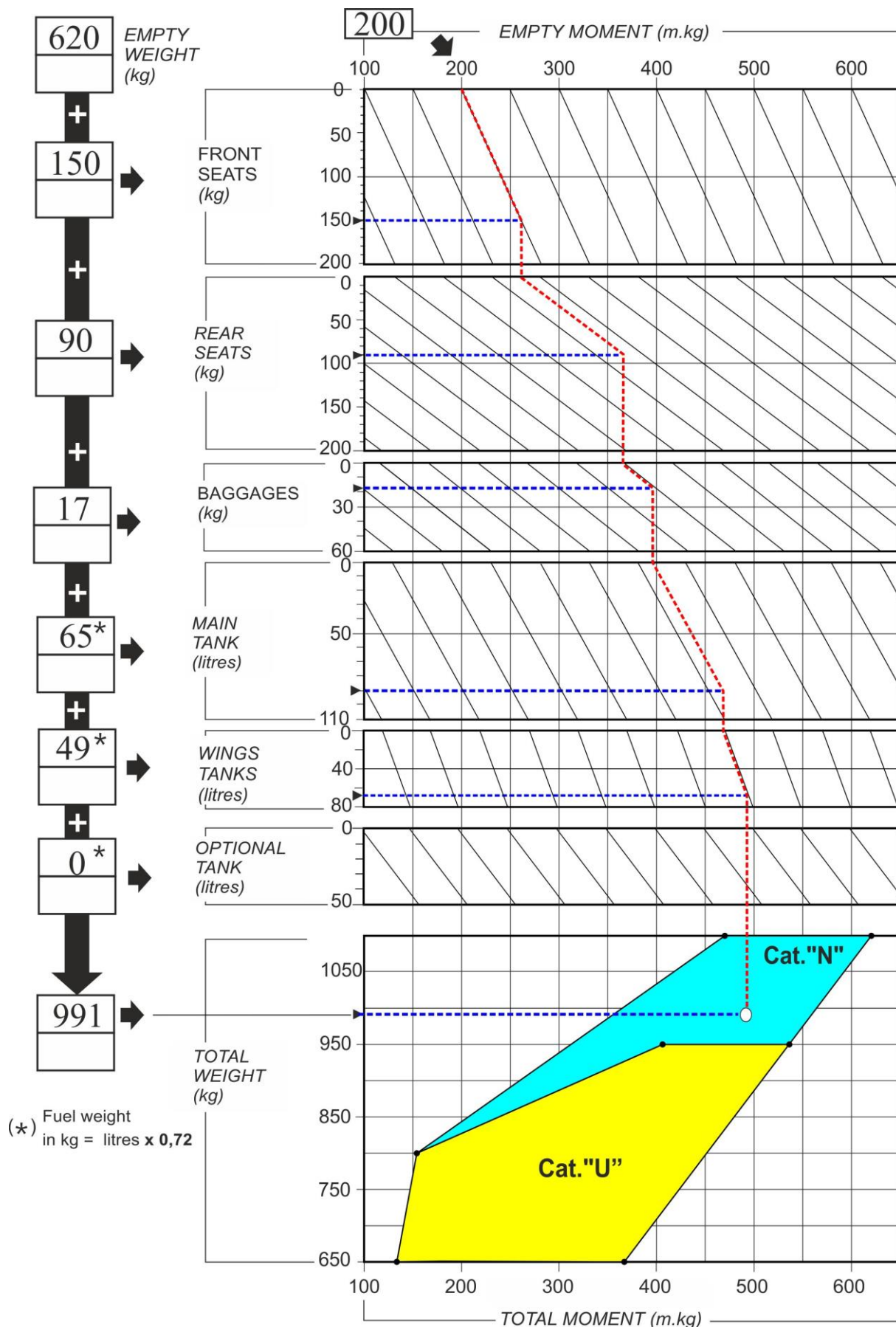


Figure 6-1 - Mass and balance

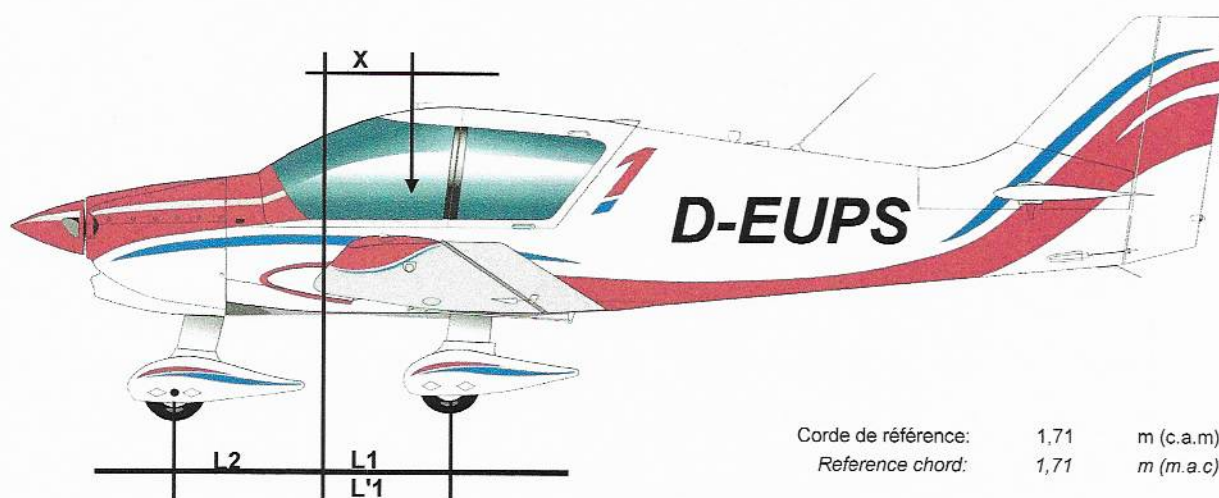
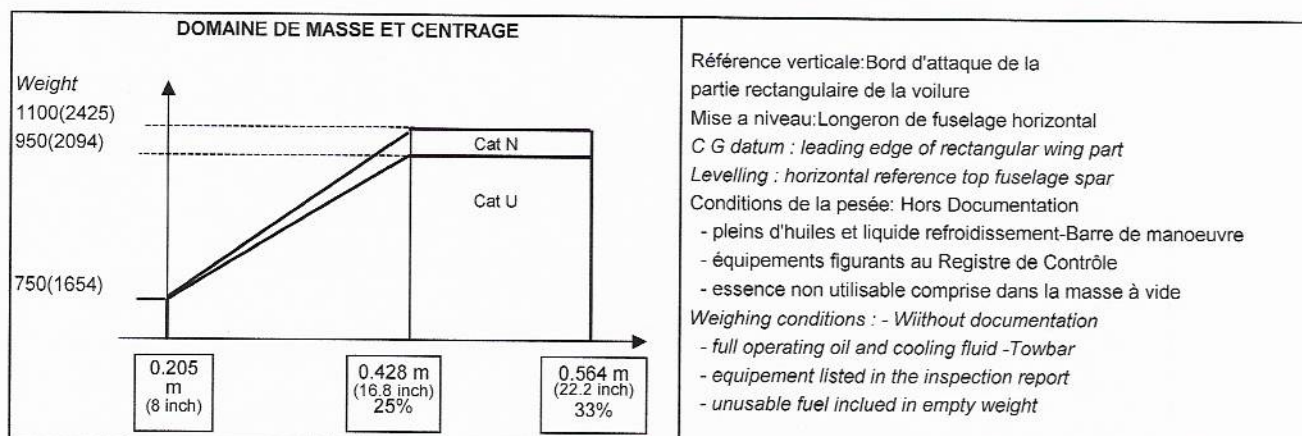


AIRCRAFT PROCES VERBAL DE PESEE ET DE CENTRAGE

TYPE : DR 400/180

N° DE SERIE / Serial number 2758

IMMATRICULATION / Registration D-EUPS



MASSE ET CENTRAGE A VIDE Weight and balance-Empty aircraft

		Masse(kg)	Bras de Levier(m)	Moment(m*kg)
ROUE PPALE D Main R wheel	L1	232	0,828	192,096
ROUE PPALE G Main L wheel	L'1	232,5	0,828	192,510
ROUE AV Front wheel	L2	187	0,819	-153,153
Essence non utilisable Unusable fuel		0,72	1,120	0,806
Avion vide Empty aircraft		652,22	0,356	232,259
CENTRAGE Balance		20,82%	c.a.m m.a.c	

A Darois, le : 31 mai 2021

Visa ROBIN AIRCRAFT : R. RADOUKAW

USE OF THE NOMOGRAM

- 1) Calculate the total weight of the aircraft:
Empty weight (see the weighing sheet)
+ weight of pilot and passengers
+ weight of luggage
+ fuel (1 litre 100LL = 0.72 kg)
Ensure that the total weight does not exceed 1100 kg (2425 lb) for category N and 950 kg (2095 lb) for category U.
- 2) Enter the empty weight of the aircraft (see the weighing sheet) in the appropriate box of the nomogram, then proceed to enter your data according to the example, extending the dashed lines as appropriate.

The final point must be within the relevant mass-moment area for the loading to be acceptable.

▲ WARNING : In calculating the balance of your aircraft, **do not use** the values of empty weight and empty moment given in the preceeding example!
Instead, use the values from the latest weighing sheet of your aircraft.

EXAMPLE of loading calculation (dotted lines on the diagram)

Empty weight moment (for example)(1447 ft.lb) 200 m.kg
 Empty weight(1367 lb) 620 kg
 Pilot + front seat passenger(331 lb) 150 kg
 Rear passenger(198 lb) 90kg
 Luggage (37.5 lb) 17 kg

This gives mass and balance without rear seat occupants and with empty tanks.

Fuel (full main tank) 90L (24imp/20us gal)(143 lb) 65 kg
 Fuel (wings) 68L (15imp/18us gal)(108 lb) 49kg
 Fuel (empty optional tank) 0L (0imp/0us gal) (0 lb) 0 kg

TOTAL WEIGHT (2185 lb) 991 kg

Balance: within the prescribed area.

◆ Note :

1 litre AVGAS 0.72 kg (1,6 lb)
 1 imp gal AVGAS..... 3.27 kg (7.2 lb)
 1 US gal AVGAS 2.7 kg (6 lb)

SECTION 7 :

SYSTEM DESCRIPTIONS

This section provides a description of the basic operating procedures for the standard aircraft and its systems. The optional equipment described in this section is identified as optional.

- ◆ Note : Some optional equipment, particularly avionics systems, may not be covered in this section. For descriptions and procedures not described in this section, refer to SECTION 9: « **Supplements** ».

Airframe

The DR400 is a four seat, single-engine, low-wing, monoplane aircraft with wing-tip dihedral, a one-piece horizontal tail and a fixed tricycle landing gear. The structure is mainly of reinforced or covered wood. Some parts are made of laminated composites, or aluminium alloys. The mechanical sub-assemblies are generally made of steel.

Flap control switch

The flaps are controlled by a multifunction unit which actuates the electric jack and controls the annunciator lights.

The control switch has three positions (retracted, take-off and landing)

The take-off position is indicated by the middle green light. The landing position is indicated by the middle and the bottom lights.

When the flaps are retracted, all the lights are extinguished.

The lights flash when the flaps are moving.

The system is protected by a specific circuit breaker.

At power-up, the system runs a self-test:

If the red light remains illuminated then there is a fault. In this case, disconnect and then reconnect the circuit breaker to reset the system. If the fault persists, contact your maintenance organisation.

The system can also be reset in flight if the red light comes on.

Elevator system

The elevator control transmits movements to the stabilator by means of cables directly connecting the stick to an articulated joint (of monobloc type).

Aileron system

The ailerons are controlled directly by cables attached to the stick.

Rudder control

The rudder is turned by cables connected directly to the rudder pedals.

Control lock

The DR400 is not equipped with a control locking. If parking outside, it is advisable to prevent aileron and rudder movement by securing the **pilot's seat belt** around the stick.

Elevator trim

The elevator trim consists of an electric jack connected to the trim tab, a control switch and a position indicator on the centre console, and a circuit breaker.

A control switch is on both the pilot's and the co-pilot's stick.

Roll compensation

Roll adjustment can only be done in the workshop by fitting a trim tab under one aileron. The system is set for cruise at 75% power.

Yaw compensation

Yaw adjustment can only be done in the workshop by adjusting the rudder control cable tensioners. The system is set for cruise at 75% power.

Cabin layout

The following paragraphs give a general description of the cabin, the instruments and the controls. Details of the instruments, switches, circuit breakers and controls on the upper and lower and annunciator panels, and the central console are given in the supplement for the panel of the specific aircraft.

Panel and centre console

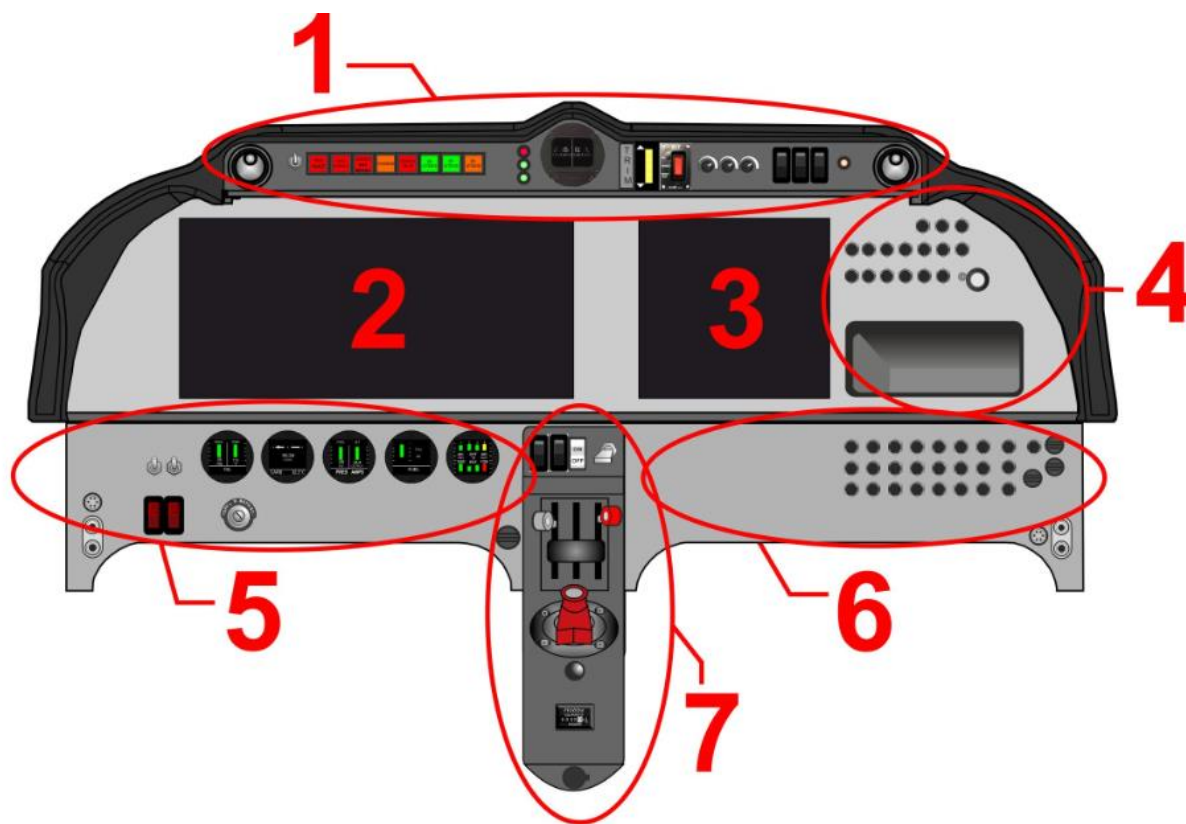


Figure 7-1

- Part 1 = upper panel (ventilator / lights / compass / ELT)
- Part 2 = flight instrument area (according to the equipment specified)
- Part 3 = area for radio / navigation equipment
- Part 4 = circuit breakers and storage box
- Part 5 = engine instruments
- Part 6 = area for radio / NAV, circuit breakers
- Part 7 =
- Controls for fuel pump, landing and taxiing lights, flaps
 - Control for engine
 - Control for carburettor heat
 - Fuel selector valve
 - Parking brake control
 - Hour meter
 - 12 V supply socket

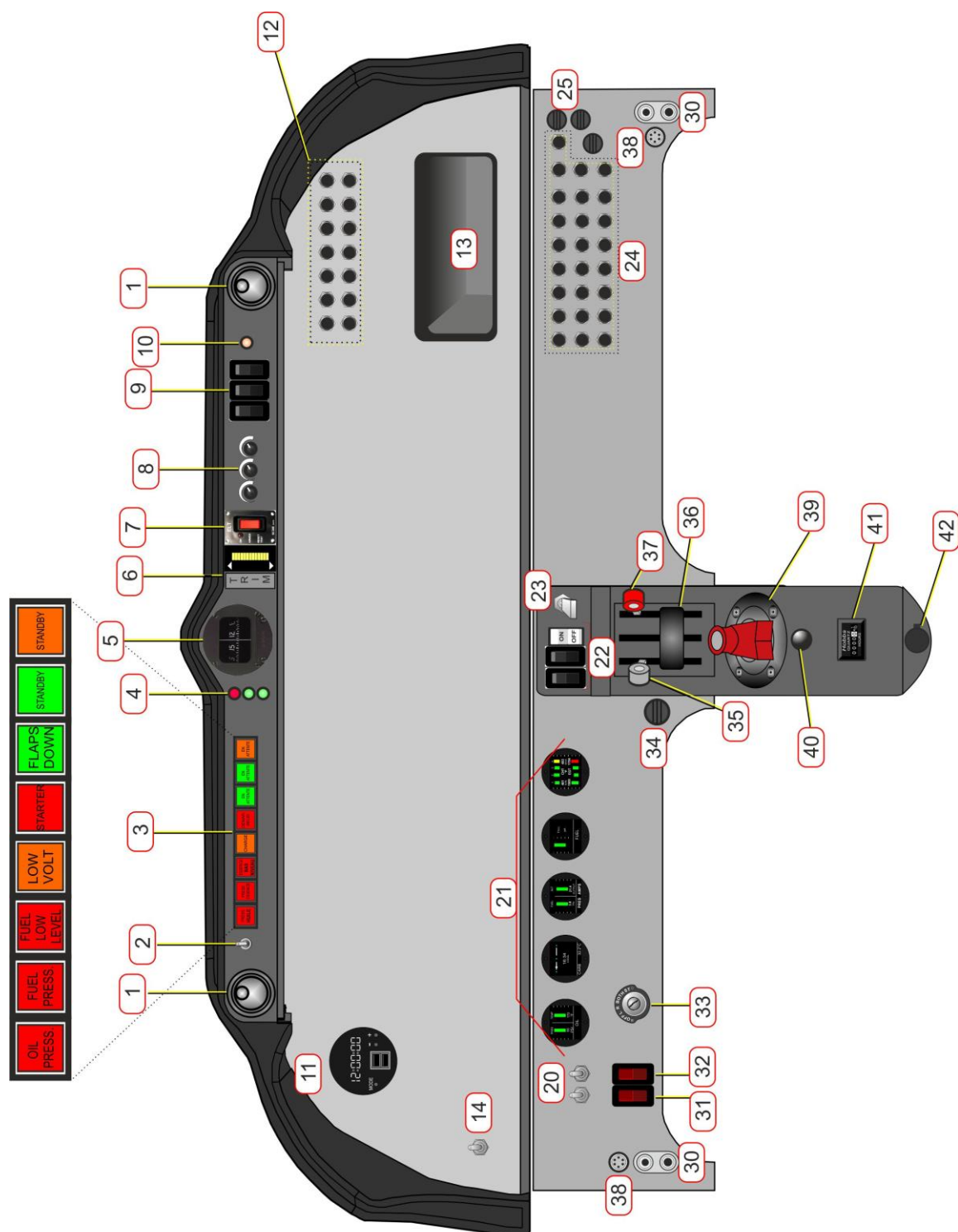


Figure 7-2 Panel

- ◆ Note : Refer to the panel supplement (SECTION 9) for the avionics and radio layout.

Table 7-1 Index for the panel figure 7-2

Pos	Function	Pos	Function
1	Adjustable ventilators	24	Circuit breakers
2	Switch to test lights and change brightness for day/night	25	Heating / demisting controls
3	Annunciator lights: (from left to right) Oil pressure (red) Fuel pressure (red) Low fuel level (red) Alternator (orange) Starter (red) Not in use Not in use Not in use	30	Microphone / headphone jacks
		31	Battery master
		32	Alternator relay switch
		33	Key operated starter switch
		34	Auxillary fuel tank transfer control (option)
		35	Carburettor heat control
		36	Throttle
		37	Mixture control
		38	LEMO jack (optionnel)
4	Flap indicator lights	39	Fuel selector valve
5	Magnetic compass	40	Parking brake control lever
6	Elevator trim indicator	41	Hour meter
7	ELT switch	42	12 V power socket
8	Panel lighting controls - 1 : under glare-shield - 2 : directional ceiling light - 3 : radio and instruments		
9	Switches: Strobe Navigation light Pitot heater (option)		
10	Flight recorder indicator light (option)		
11	Clock / stopwatch		
12	Avionics circuit breakers		
13	Storage box		
14	Alternate static switch		
20	Avionics master and emergency switches		
21	Engine monitor		
22	Switches: Landing light Taxiing light Electric fuel pump		
23	Electric flap control switch		

Canopy

The canopy opens by sliding forward allowing access to the seats. To prevent the canopy striking the oil filler hatch, ensure the hatch is closed and locked before moving the canopy. The operating handle is located at the top, in the centre of the canopy. The exterior part of the handle is fitted with a key-operated lock. The interior part of the handle is accessible by the pilot and the co-pilot. In case of need, the canopy is equipped with a release system consisting of two levers located on the armrests, either side of the panel. The levers release the canopy from its rails, allowing it to be lifted free.

Seats

The DR400 is equipped with seats that simultaneously adjust for height and reach by means of a lever (labelled '2' in figure 7-3) situated at the front left of the pilot's seat and the front right of the co-pilot's seat.

There are four different positions, from the lowest and furthest from the panel to the highest and nearest.

Whilst supporting your weight on the handle attached to the armrest and the panel using your outboard hand, move the seat control lever from right to left for the pilot seat or from left to right for the co-pilot seat with the other hand. Then pull forward or let back using the armrest handle to make the adjustment.

The seat control levers also allow the front seats to be tilted fully forward to give access to the rear seats.

A ring located at the rear of the front seats (labelled '2' in figure 7-3) allows the rear seat occupants to tilt the front seats fully forward.

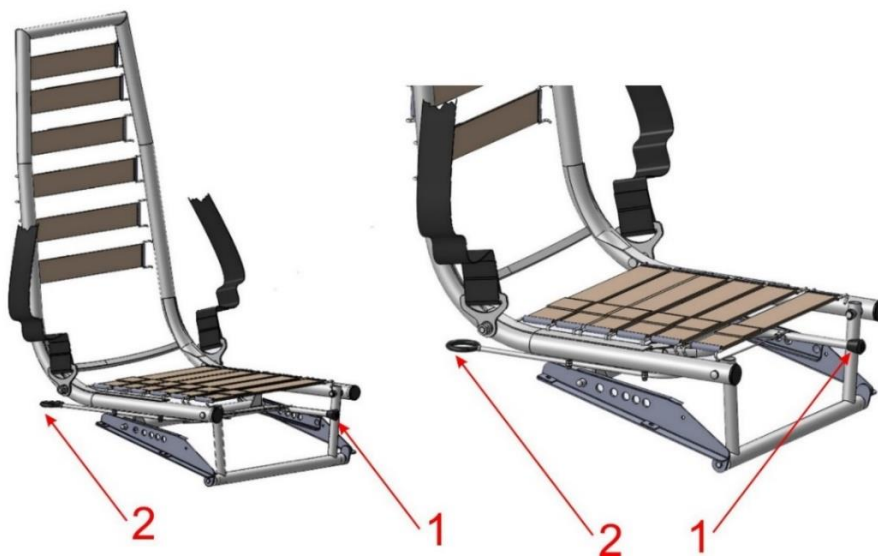


Figure 7-3 (pilot's seat frame)

Seat belts

There is 2 different systems:

System n°1: On aircrafts before serial number n°2718

The belts for the front seats consist of three straps, two of which are adjustable and one of which is tensioned by a retractor (see figure 7-4) (optional for the rear seats).

Clip the shoulder strap (labelled 1) onto the stud (labelled 2) of the belt, and then lock the eye (labelled 3) into the buckle (labelled 4). Then tighten the two straps.

Lift the buckle (labelled 4) to release the belt.

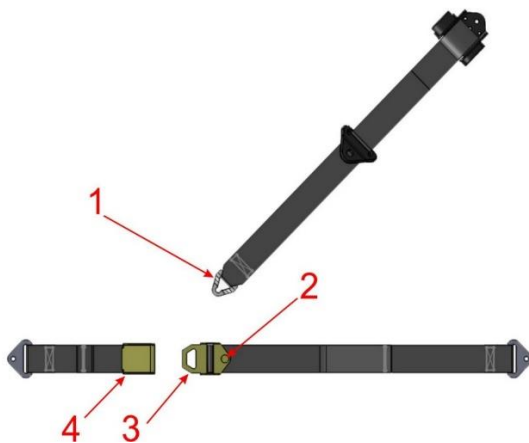


Figure 7-4 (Example: pilot's [left side] belt)

System n°2: On aircrafts since serial number n°2718.

This system consists of a single harness with retractor, to fulfill the functions of ventral belt and shoulder. 3-point belt with car buckle.



Figure 7-5 (Harness example)

Luggage compartment

The luggage compartment of the DR400 is behind the rear seats. It is accessible from the outside by a door secured by two, key-lockable, compression latches.

The hatch is unlocked by pressing the push-buttons (labelled 1 in fig 7-5) of each latch, after which the door is opened upwards.

The hatch is held open by means of a self-locking strut.

To close the hatch, pull forward on the hinge of the strut and let the door down. Then actuate the push-buttons to compress the seal and lock the latches.

It is recommended that both latches are locked by key before flight.

The baggage compartment floor is fitted with four elastic ropes for securing the luggage.

During flight, the luggage must be evenly distributed in the compartment so as to maintain the balance of the aircraft and must be secured using netting or straps attached to the fixing eyes on the compartment floor.

It is imperative to check the total weight and the centre of gravity of the aircraft when carrying luggage.

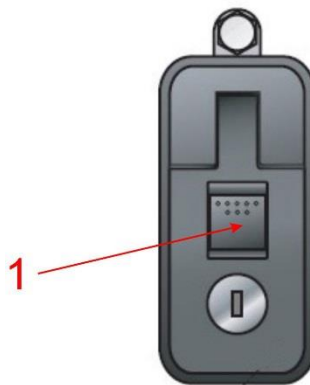
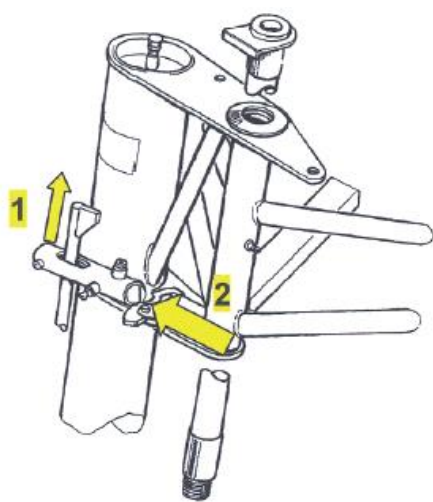


Figure 7-6 Compression latch

Landing gear

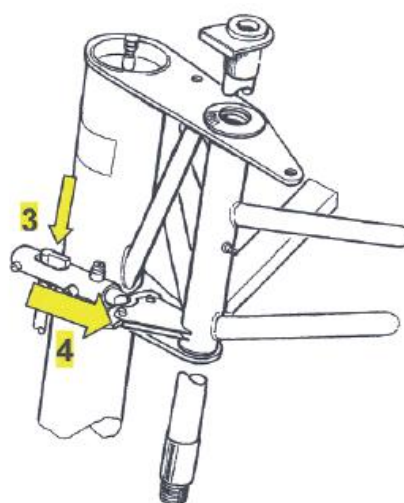
The DR400 is equipped with a fixed tricycle landing gear with oleo-pneumatic dampers, with the front wheel steerable using the rudder pedals. The nose gear is equipped with an anti-shimmy device.

The nose gear is equipped with a locking system that keeps the wheel in the axis of the aircraft during flight and allows steering on the ground.



On the ground: unlocking the nose gear.

The compression of the nose damper during the run (parking, landing) causes the rise of the cam (1). This action releases the finger (2) which moves back and leaves the groove of the paddle of the engine frame and releases the nose gear.



In flight: locking the nose gear.

The expansion of the nose damper during the take-off or the flight causes the descent of the cam (3) into the housing. This action pushes the finger (4) into the groove of the paddle of the engine frame and immobilizes the nose gear.

Braking system

The brake master-cylinders are secured against the inside of the firewall by a bracket on which the parking brake valve is also fixed. The master-cylinders are actuated by hinged tubes located in the angle between floor and firewall and controlled by connecting rods attached to the pedals. Each brake (right or left) is operated independently from the pilot's or the co-pilot's position.

Braking is independent of steering.

Parking brake

The aircraft is equipped with a parking brake which allows pressure to be maintained in the master cylinders, thus locking the wheels.

When the aircraft is stationary, depress the brake pedals and maintain pressure. Pull the parking brake plunger and then release the pedals. The parking brake is now actuated.

To release the brake, simply push the plunger downwards.

▲ WARNING: Do not pull the parking brake plunger during flight. In the event of landing with the parking brake valve engaged, any braking force applied using the pedals will be maintained even if the pedals are released. This can lock the wheels and cause a tyre burst or a fire.

Use of the brakes

The braking system of an aeroplane is not intended to be permanently activated. To prevent the system overheating, it is important to:

- During the pre-flight inspection, make sure that the braking system is not locked
- Taxi using minimum power. Once in motion, on hard ground, idle power should be sufficient to keep the aircraft moving. The need to continuously taxi with power can indicate a problem (brake binding, residual pressure in the brake system, low tyre pressure...).
- Do not taxi with power and control the speed with the brakes.
- Be careful not to apply permanent pressure on the top of the pedals (thus applying the brakes). Lower your feet so as not to activate the brakes continuously.
- Brake intermittently rather than continuously to allow the brakes to cool between applications.
- Taxi at a moderate speed; it is safer both for you and for other users of the airfield.

Engine

The DR400/180 is equipped with a four cylinder O-360-A3A or O-360-A1A ou O-360-A1P Lycoming engine, with a power of 180 hp at 2700 rpm. Ignition is by double magnetos.

Engine cooling

The engine is cooled by air passing both through the oil cooler and around the engine. The cooling air enters the engine compartment through two ports in the cowling. The heated air exits the engine compartment under the cowling.

Carburettor

The carburettor delivers the air / fuel mixture necessary for the engine to operate.

It also adjusts the fuel flow according to the position of the throttle lever operated by the pilot. The manual mixture control allows precise adjustment of the proportion of fuel in the mixture, and for the fuel supply to be cut completely.

Movement of the throttle lever causes the butterfly valve to rotate, thus changing the quantity of air / fuel mixture entering the cylinders.

In case of carburettor icing, the carburettor heat control opens a flap that ducts hot air into the carburettor to suppress ice formation. The supply of hot, less dense, air causes a decrease in engine power.

It is recommended to use the carburettor heat control fully on or fully off to avoid ice formation.

Engine air intake system

Air enters the engine compartment through the front left port of the cowling and passes through the inlet filter.

If the filter becomes clogged, the pilot can apply carburettor heat to allow the engine to continue to operate.

Be vigilant, however, because the air is now only coarsely filtered, so do not apply hot air continuously or on the ground.

Engine ignition

Ignition of the fuel / air mixture is achieved by two magnetos driven by the engine energising two spark plugs per cylinder.

Engine exhaust

After leaving the cylinders, the exhaust gases pass through the exhaust manifold and silencer and exit through the lower right side of the cowling. A sleeve-type heat exchanger, placed around the silencer, provides cabin heating.

Propeller

The aircraft is fitted with a fixed pitch propeller.
The propeller is driven directly by the engine output shaft.

■ **REMARK:** Do not move the aeroplane by pushing on the spinner.

Electrical system

The electrical system is equipped with the following displays and controls:

1. “Battery” master switch
Connects the battery in normal operation
2. “Alternator” switch
Turns the alternator off. The alternator must be left “on” during normal operation
3. “Starter” key
This control is to select the magnetos and to operate the starter (the spring-loaded position at the clockwise limit = starter).
4. “Charge” indicator light
This illuminates when the voltage is too high or too low (below 12.1 V or above 16V). The light is normally on when the engine is stopped with the battery master “on”. With the engine running, the light should be extinguished after turning on the alternator switch.

The diagram illustrates the electrical architecture of an aircraft, organized into several functional sections:

- Power Source & Distribution:** The main power source is the **BATTERY**, which feeds into a **BATTERY RELAY**. An **EXTERNAL POWER PLUG (option)** is also shown. The system includes a **BAT** (battery) terminal and a **STARTER RELAY** for the **STARTER** motor.
- Ignition & Starting:** The **IGNITION SWITCH** controls the **MAGNETOS** and the **STARTER** motor.
- Alternator & Charging:** The **ALTERNATOR** generates power, regulated by a **REGULATOR / OVERVOLTAGE RELAY** and a **FAILURE DETECTOR**. It also provides power to the **ALT** (alternator) terminal and the **ANCILLARY SYSTEMS**.
- Ancillary Systems:** These include the **STALL WARNING SYSTEM** and **OPTIONAL EQUIPMENT (EGT, CHT, T/C...)**.
- Warning & Monitoring:** The system includes **WARNING LIGHTS** for **FUEL, LOW LEVEL** and **FUEL, LOW PRESS.**, as well as an **OIL LOW PRESSURE WARNING LT** and an **OIL PRESSURE PROBE**.
- Avionics & Communication:** The **AVIONICS** section includes **COM / NAV**, **ATC**, **ALTICODER**, and **INTERCOM** systems. It also shows **AVIONICS** and **AIRPLANE** terminals.
- Lighting & Control:** The system controls **LANDING LIGHT**, **TAXY LIGHT**, **STROBE LIGHT**, **NAVIGAT. LIGHT**, and **PITOT** lights. It also includes **PITOT HEAT (optional)** and **ELECTRICAL FLAPS CONTROL**.
- Trim & Indicators:** The system controls the **TRIM** and includes **INDICATORS** for **VOLTMETER, OIL PRESS. & TEMP., FUEL PRESS. & FUEL GAUGE(S)**.

The diagram uses a variety of symbols to represent different electrical components, which are defined in the legend below:

SWITCH TYPE	FUSE	SWITCH
CIRCUIT BREAKER		
BREAKER		
DIODE		
CAPACITOR		
WARNING LIGHT		
TRANSISTOR		
RESISTOR		

Figure 7-7 Simplified circuit diagram

Fuel / Fluids

The approved fuels and fluids are given in « SECTION 2 – Limitations » of this Flight Manual.

- ▲ **WARNING :** Under no circumstances should the engine be started if the level is too low ;

- ▲ **WARNING:** Fuel straining must be done to ensure that there is no water or impurities in the tanks.
For an effective test under good conditions, ensure that the aircraft has been stationary for at least 30 minutes on a horizontal surface
(These conditions are usually met before the first flight of the day).
Fuel straining must be done with a clean container intended for the purpose and which allows water to be identified.

- ▲ **WARNING:** Ensure the correct type of fuel (AVGAS 100LL: the colour must be blue)

- **REMARK:** Use of non-approved fuels can cause damage to the engine and the fuel system, eventually causing engine failure.

Engine oil system

The engine is equipped with a wet sump oil system, for lubricating and cooling the engine. The engine oil is drawn from the crankcase, passed through a strainer, and is sent to the oil cooler mounted on the fire-wall. A control valve puts the oil in bypass if the temperature of the oil is low or the pressure drop is greater than a threshold value. The bypassed or cooled oil is then passed through an oil filter and then into the engine lubrication system.

The oil is also sent to the propeller regulator to regulate the pitch of the propeller.

The oil filler cap and the dipstick are located at the rear of the right side of the engine. The oil filler caps and dipstick are accessed via a hatch on the upper right side of the engine cowling.

Fuel system

The fuel system consists of a single main tank and two wing tanks. Each tank is equipped with a fuel level sensor with visual display, and an independent low fuel level visual that is linked to the position of the fuel selector valve.

The 110 litres main tank is situated under the rear seats.

The wing tanks are situated right and left in the leading edges at the wing root.

The fuel flows from the tank to the fuel selector valve under the floor and then to the electric pump. The fuel then passes from the electric pump to the mechanical pump.

The fuel selector valve has four positions: LEFT, MAIN, RIGHT and OFF.

The mechanical pump supplies fuel under pressure to the carburettor, then the carburettor feeds the air / fuel mixture to the engine.

The electric fuel pump enables:

- Increased fuel supply for priming and to prevent vapour formation;
- Ensures the supply of fuel in case of failure of the mechanical pump;

The electric pump is operated by a switch located on the centre console.

Tank	Usable fuel	Unusable fuel
Main	109 litres 28.7 US gal 24 imp gal	1 litre 0.26 US gal 0.22 imp gal
Right wing	40 litres 10.5 US gal 8.8 imp. gal	0 litres
Left wing	40 litres 10.5 US gal 8.8 imp. gal	0 litres

Table 7-2 Fuel volumes

The total fuel capacity can be increased to a total of 240 litres (52.8 Imp. gal / 63.4 US gal), giving a usable volume of 239 litres (52.6 Imp. gal / 63.1 US gal), by installing the optional 50 litres (11 Imp. gal / 13.2 US gal) tank.

Optional tank

The 50 litre optional tank feeds into the main tank. A valve directly attached to the outlet of the tank is operated by a plunger on the panel.

The optional tank is installed in the fuselage behind the rear seat. The fuel contained in the optional tank can be transferred to the main tank by pulling the handle of the plunger situated on the panel.

▲ **WARNING :** The optional tank has a fuel level gauge but does not have a low-level warning.

◆ **Note :** The main tank must have sufficient space to accept the amount being transferred from the optional tank before starting the transfer.

Fuel gauges

Levels of fuel in the main tank and the supplementary tank (if installed) are indicated by gauges on the instrument panel (depending on the configuration of the panel).

- ◆ **Note** Indication of fuel levels in the tanks is a complex problem because the fuel is moving in the tanks. The fuel moves with turbulence and the manoeuvres of the aircraft.
Always check that the gauges and your monitoring of fuel usage correspond. Use of the fuel gauges is not a substitute for proper preparation for flight, pre-departure fuel level checks, and in-flight fuel management techniques.
- ◆ **Note** The fuel level indication in the tanks is reliable and usable only when the aircraft is in level pitch, wings level, and in symmetrical flight.

Fuel tank selector

The fuel tank selector (and fire-wall valve) is situated in the centre console. Moving the selector to or from the « OFF » position requires a locking/unlocking action (pull up on the arrow-shaped control handle before turning it).

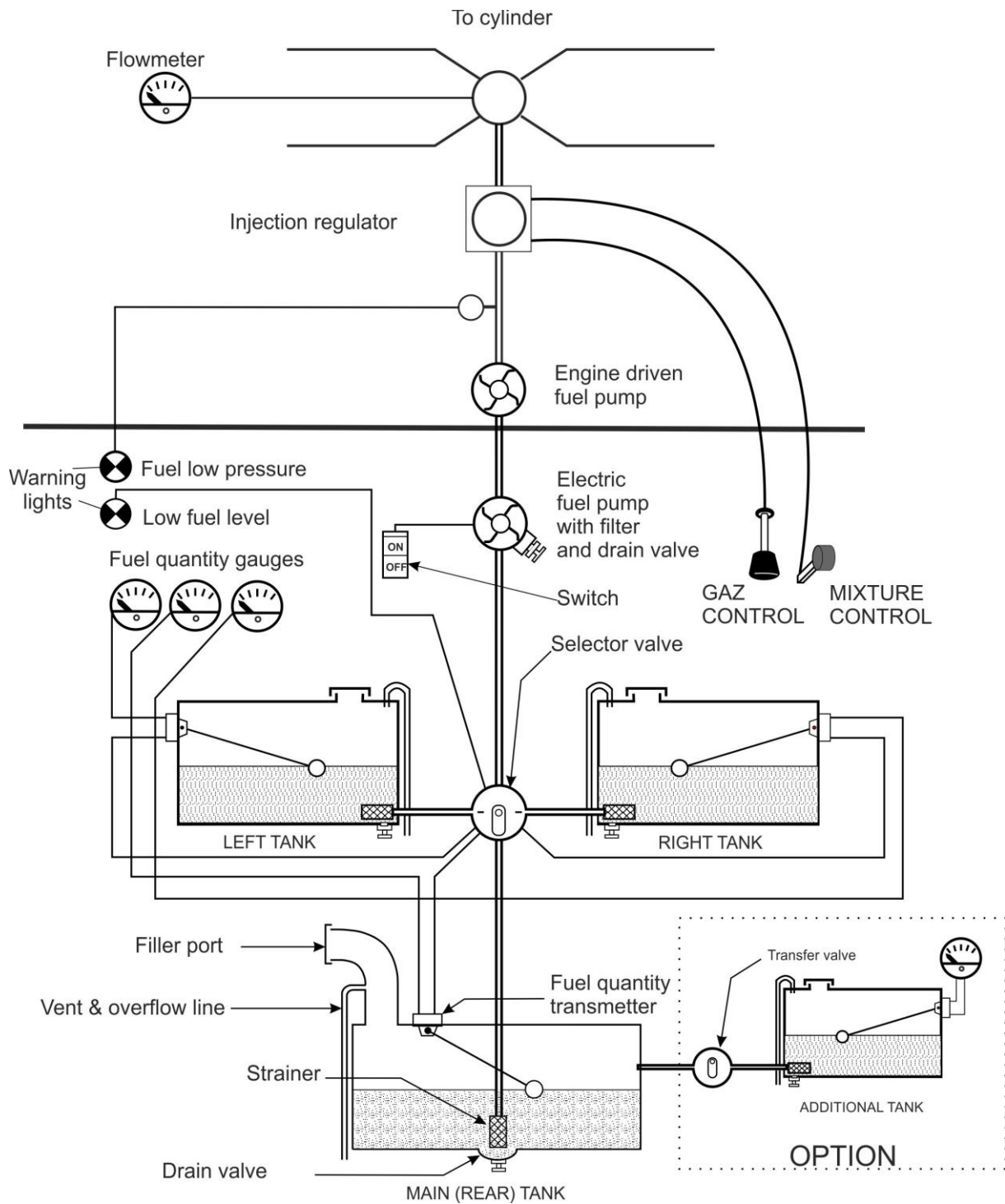


Figure 7-8 Simplified diagram of the fuel system

Heating and ventilation

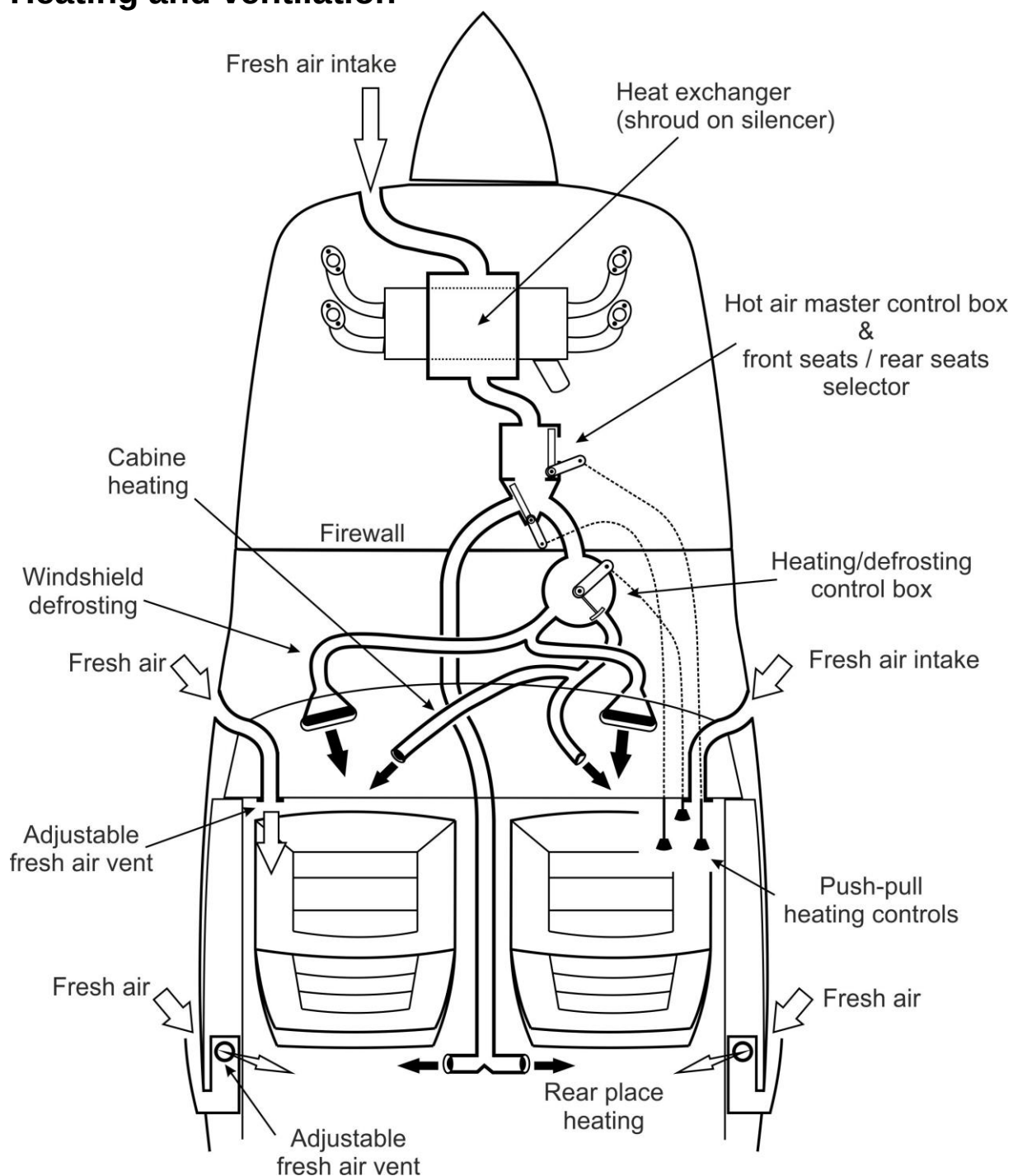


Figure 7-9 Heating and ventilation

Management of heating/demisting plungers			
	Function	Pull	Push
Control 1	Heating	YES	NO
Control 2	Heating / demisting selection	HEATING FRONT	WINDSHIELD DEMISTING
Control 3	Front / rear selection	BACK	FRONT

Table 7-3 - Heating control positions

- ◆ **Note :** distribution of heat (front / demisting or front / rear) can be adjusted by moving the controls 2 and 3 more or less.

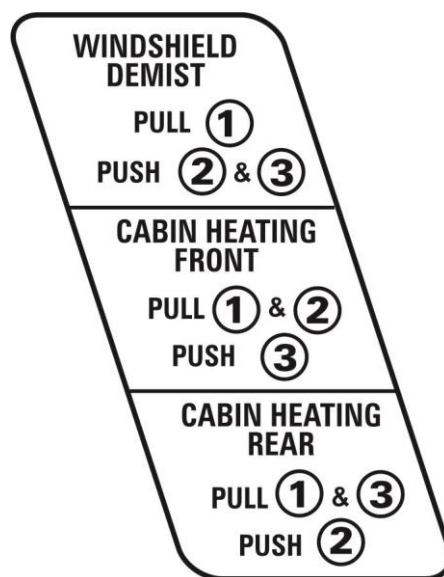


Figure 7-10 Heating control lable, right wall of the cabin.

Lighting (optional)

Optionally, the aircraft can be equipped with:

- Wingtip lights that combine navigation lights and anti-collision strobe lights;
- Taxiing and landing lights in the left leading edge of the wing;
- Adjustable interior lighting (panel, instruments and cabin).

Stall warning system

The aircraft is fitted with a stall warner that operates by detecting angle of attack. Whatever the configuration of the aircraft, the stall warner will trigger between 5 and 10 kts before the stall.

Pitot and static systems

The airspeed indicator, the vertical speed indicator and the altimeter all rely on the pressure system (for static pressure: 2 ports situated on either side of the fuselage; and for dynamic pressure: "PITOT", positioned under the wing on the left side of the aircraft).

The aircraft may be fitted with an optional pitot heater.

Avionics and navigation

The instruments installed depend on the configuration chosen. Refer to section 9 « Supplements » for specific items.

An avionics switch allows all the avionics equipment to be switched off together. This switch can be duplicated, in which case activating either will turn the avionics on or off. If one switch fails, the other will always operate (they are connected in parallel). When the switch is duplicated, only one switch must be turned ON.

Headset and microphone installation

The aircraft is equipped with microphone and headset jacks for each person. Optional, panel powered « Bose » (Lemo) jacks can be installed. A loudspeaker is located in the ceiling of the cabin to allow listening without headphones.

Flight recorder (optional equipment)

Safety Plane System, installed under STC

The aircraft is equipped with a flight recorder which registers the flight parameters. Its operation is automatic and it does not need user intervention.

The system has a LED to indicate its operation, located on the upper panel, and a dedicated circuit breaker on the middle or lower panel.

These components are labelled: « SafetyR ».

- ◆ **Note :** If the LED light remains on after the engine has started then this implies a malfunction of the Safety Plane **and the safety of the flight is not guaranteed.**

In the event of a malfunction, see document 1002560 *Flight recorder user manual associated with the Robin airframe warranty* for a description of actions to be taken.

For other information, refer to the manufacturer's documentation.

Emergency locator transmitter

The aircraft is equipped with an autonomous emergency locator transmitter (ELT). The radio beacon and the antenna are located immediately behind the rear bulkhead of the cabin, to the left of the aircraft axis.

The main switch of the beacon, marked 'on', 'off', 'armed' is in the 'armed' position for normal operation. A remote control and an indicator panel are mounted on the upper panel. The radio beacon is mounted longitudinally in the aircraft and will detect a deceleration of greater than 3.5 ft/s. If a rapid deceleration is detected, the radio beacon transmits on the VHF band, alternately at 121.5 MHz and 406.0 MHz, approximately every 0.5 seconds.

Hour meter

The hour meter, mounted as standard, is located on the rear part of the centre console. It counts whenever the engine is running and totals the hours of operation of the engine.

Although fitted as standard, the hour meter is not mandatory equipment and, on request, it may be omitted during the building of the aircraft.

External power socket

The aircraft may be fitted with an optional external power socket located on the right side of the fuselage behind the wing.

The connection of a ground power unit to the power socket allows the following operations:

- Engine start;
- Demonstration of the electrical systems (eg the avionics) without draining the main battery;
- Recharging the battery.

The external power socket allows the aircraft electrical circuits to be directly powered whilst bypassing the aircraft's battery (the power source is downstream of the battery relay and supplies power directly to the electrical systems).

▲ WARNING: When the external power source is connected, the electrical buses are powered even if the battery master is switched OFF.

Before connecting the external power source, ensure that the starter circuit breaker is pulled to avoid the risk of the propeller spinning.

▲ WARNING: If the main battery is not able to start the engine, carry out the necessary maintenance operations to make the battery operational.

Start-up / Cockpit demonstration

Start-up and cockpit demonstrations are performed as if using the aircraft's battery.

Recharging the aircraft battery

Charging the aircraft's battery can be done as follows:

- pull the circuit breaker for the main and subsidiary buses (no systems should be supplied);
- connect a suitable charger (limited to 5A) to the external power socket;
- turn the battery master on;
- the battery is charging.

■ REMARK: Recharging takes a maximum of 12 hours; do not leave unattended for longer.

■ REMARK: The aircraft electrical circuit requires 14V. Ensure that the external power unit supplies DC regulated at 14V.

SECTION 8 :

MAINTENANCE OPERATIONS

Introduction

This section provides general guidelines for servicing the DR400. To ensure the safe and efficient operation of the aircraft, it is necessary to maintain contact with the authorised service centre of the aircraft to obtain the most recent relevant information.

Publications for the user

The approved flight manual is supplied with the aircraft, and is available for download with subscription.

Maintenance publications

Maintenance publications are available on subscription.

Towing

On the ground, the aircraft can be moved using a tow bar that is stored in the luggage compartment. To engage the tow, insert it into the tube on the left side of the front wheel.

In case of resistance, if the nose gear steering is locked, apply moderate pressure on the root of a propeller blade (do not push on the spinner), or lift the fuselage under the tail. If the nose wheel does not unlock then desist and consult the engineer in charge of maintenance.

Parking

The aircraft must be parked so as to protect it from the weather and to prevent it becoming a risk to other aircraft. The parking brake can release spontaneously or cause stresses due to overheating during braking or during large temperature changes. It is, therefore, necessary to secure the aircraft if it is left unattended or outdoors overnight.

- Park the aircraft nose to wind if possible;
- Retract the flaps;
- Lock the stick using the pilot's seat belt;
- Chock the main wheels;

- Do not apply the parking brake for prolonged parking;
- Secure the aircraft according to the procedures in this section;
- Fit the pitot cover and insert the static pins;
- Lock the canopy and the luggage compartment;
- Fit a canopy cover.

Long-term parking

The aircraft must be parked in a way that ensures that it is immobile, safe and protected.

- Orientate the aircraft nose to wind if possible;
- Retract the flaps;
- Chock the wheels;
- Attach tie-down ropes to the wing and tail tie-down rings at an angle of approximately 45° to the ground. If using non-synthetic rope, leave sufficient slack to avoid damage to the aircraft if the ropes shrink.

Cleaning

Cleaning the exterior surfaces

- ◆ **Note :** Before cleaning, position the aircraft in a shaded area to keep the surfaces cool.

The aircraft should be washed with mild soap and water. Strong, abrasive or alkaline soaps or detergents can scratch painted or plastic surfaces and can corrode metal. Cover areas where the cleaning solution could cause damage.

- **REMARK:** Do not use a pressure washer; use a bucket of cleaning solution and a sponge.

- Rinse off loose dirt with water;
- Apply the cleaning solution with a soft cloth, a sponge or a brush with soft bristles;
- To remove exhaust residue, allow the cleaning solution to soak in for a while;
- Thoroughly rinse all the surfaces.

A good quality automobile wax, not containing silicones, can be applied to the painted surfaces for protection. Use soft cloths or a chamois leather to avoid scratching the surfaces during cleaning and polishing.

Windscreens and windows

Before cleaning the acrylic windows, rinse all loose dirt off before applying a cloth or chamois leather. Acrylic should never be rubbed dry. It is possible to remove scratches with a special polishing paste intended for acrylic.

- **REMARK:** Only use a product intended for acrylic, non abrasive, anti-static, solvent free, for cleaning the windows.
Only use a non-abrasive cotton cloth or real chamois leather to clean the acrylic windows.
Paper towels and newspaper are very abrasive and will leave scratches.

Cleaning the interior surfaces

Vacuum clean the seats, carpets, trim panels and headlining at regular intervals to remove dirt and surface dust. During vacuuming, use a fine nylon brush to help dislodge the dust.

■ **REMARK:** Remove any sharp objects from pockets and clothing to avoid damaging the internal panels and the trim.

Panels and electronic display screens

Simply wipe the panels, control knobs and plastic surfaces with a soft, damp, cloth. Multifunction display screens, primary flight display, and other electronic displays must be cleaned according to the manufacturer's instructions.

Carpet

To clean the carpets, remove dirt with a brush or vacuum cleaner. For stains, use a non-flammable dry cleaning product.

SECTION 9 :

REGISTER OF SUPPLEMENTS

REGISTER OF SUPPLEMENTS

List of installed supplements

Document N°	TITLE	Installed	
		yes	no
—	Panel	☒	☐
1001114	Garmin GNS 430	☐	☒
1001168	S-TEC System 20&30 autopilot	☐	☒
1001287	GPS GARMIN 100AVD for VFR use in sight of the surface	☐	☒
1001305	GPS GARMIN 150XL for VFR use in sight of the surface	☐	☒
1001306	BENDIX/KING KMD 150 for VFR use in sight of the surface	☐	☒
1001840	Night VFR	☒	☐
1002299	Towing procedure	☒	☐
1002504	GPS GARMIN 695	☐	☒
1002530	GPS/SBAS GTN625, 635, 650, 725, 750	☐	☒
1003082	G500 Txi	☐	☒
1002545	GARMIN GTN 750	☐	☒
1002554	S.A.M	☐	☒
1002559	IFR	☐	☒
1002571	S-TEC System 55X autopilot	☐	☒
1002606	Fire extinguisher	☐	☒
1002618	ASPEN 1000	☐	☒
1001246	CO Detector	☒	☐
1002594	Cable winch (cable winder)	☐	☒

List of installed supplements

Document N°	TITLE	Installed	
		yes	no
1002867	GARMIN GTX335_345 Transponder	☒	☐
1002900	Operation without wheel spat	☐	☒
1002812	EDM900	☒	☐
1003082	G500Txi	☒	☐
1003225	GTN750_650Xi	☒	☐
E614	Propeller MTV22	☒	☐

SUPPLEMENT

INSTRUMENT PANEL

D-EUPS

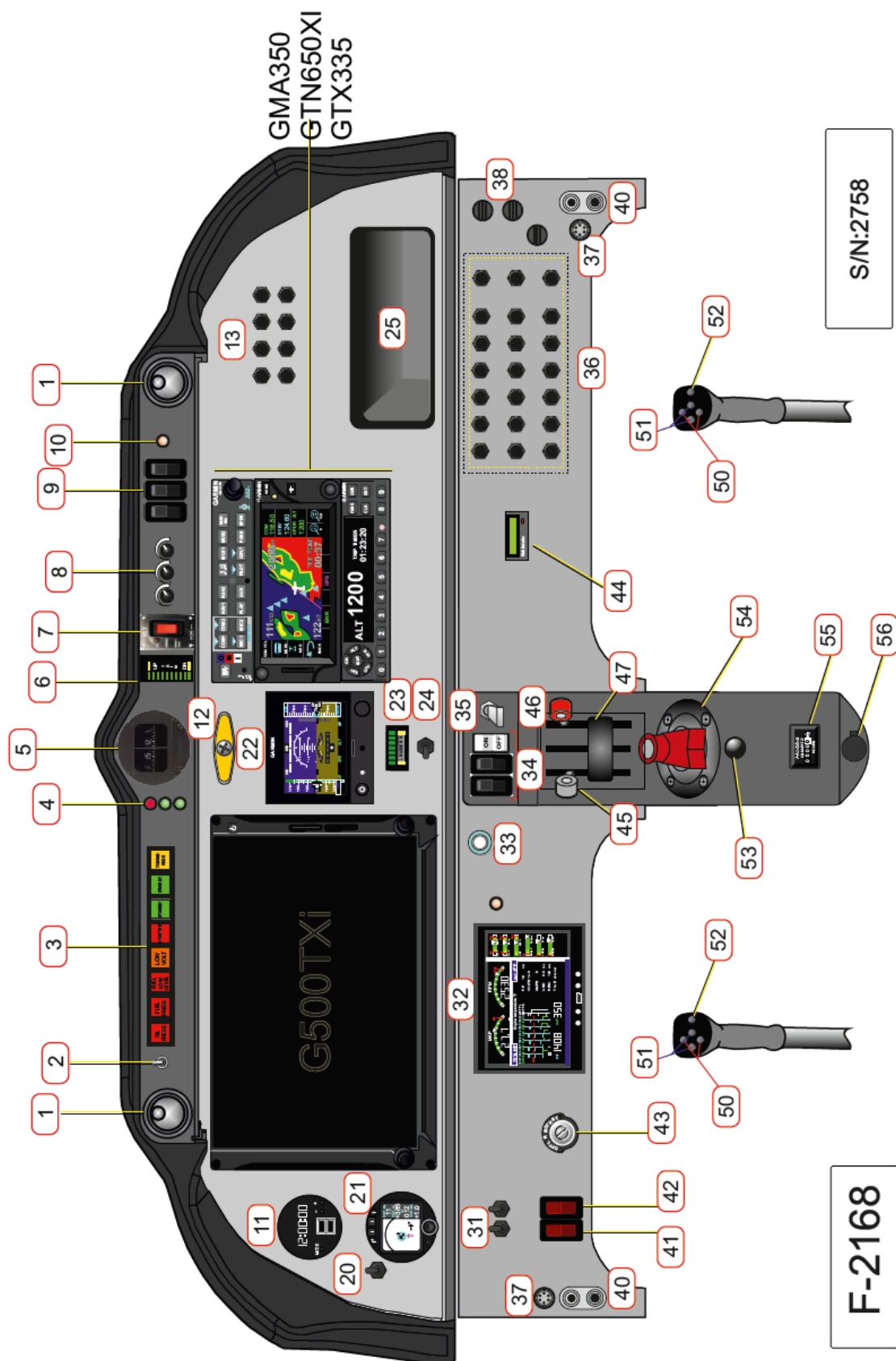
Serial nr: 2758

LIST OF CURRENT PAGES

Pages	Date
1 to 4	May 2021

CHRONOLOGICAL ACCOUNT OF ISSUES

Issue	Subject
1	Original instrument panel.



1	Fresh air vent	23	Rudder trim indicator
2	Light test & day/night dimmer switch	24	Alternate static source switch
3	Warning lights	25	Storage rack
	Oil pressure low	30	"Reserved"
	Fuel pressure low	31	Avionic master switch
	Fuel low level	32	EDM900
	Low Volt	33	Propeller control
	Starter motor engaged	34	Safety interbreakers (from LH to RH)
	Option		Landing light
	Option		Taxiing light
	Towing Hook		Electric fuel pump control
4	Flaps position indicator lights	35	Electric flaps control lever
5	Magnetic compass	36	Breakers
6	Elevator trim position indicator	37	Bose headset jack (front & rear)
7	ELT remote control	38	Cabin heat/windshield defrost control
8	Instrument panel lighting (from LH to RH)	40	Standard headset jacks
	Light 1: panel lights	41	Battery master switch
	Light 2: Overhead flood lights	42	Alternator switch
	Light 3: radio & instruments lights	43	Starter key
9	Safety interbreakers (from LH to RH)	44	Digital Horameter
	Navigation light	45	Carburetor heat control
	Strobe light	46	Mixture control
	Pitot heating	47	Throttle control
10	Flight recorder light	50	Elevator trim control
11	Stopwatch	51	Rudder trim control
12	Towing cable release grip	52	Push to talk
13	Avionics breakers	53	Parking brake control knob
20	TCAS mute switch	54	Fuel tank selector
21	TCAS	55	Horameter
22	Gyro horizon	56	Auxiliary 12V socket

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AIRCRAFT FLIGHT MANUAL SUPPLEMENT

NIGHT VFR

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 approved French "Manuel de vol".

This supplement supersedes any existing supplement concerning Night VFR.

Applicability

Aircraft type and model	Manufacturer change
DR400/120 DR400/140B DR400/160 DR400/180 DR400/180R DR400/200R	Dossier d'Evolution Technique DET n°060602R1
DR400/500	Dossier d'Evolution Technique DET n°061204

List of current pages

Pages	Date
1	November 26 th , 2010
2	November 26 th , 2010
3	November 26 th , 2010
4	November 26 th , 2010
5	November 26 th , 2010

Approval

Amendment	Date	Description	Approval
O	December 04 th , 2006	Original issue	EASA.A.C.05014
1	April 16 th , 2007	Insertion of DR400/500	EASA.A.C.05887
2	November 26 th , 2010	Logo of manufacturer	EASA AFM Approval 10033448 20.01.2011



AIRCRAFT FLIGHT MANUAL SUPPLEMENT

The sections of the aircraft flight manual are affected as follows.

SECTION 0. DESCRIPTION

Not affected.

SECTION 1. DESCRIPTION

The DR400/120, DR400/140B, DR400/160, DR400/180, DR400/180R, DR400/200R and DR400/500, equipped with a proper instrument panel lighting, can be used for V.F.R. flight in non-icing condition.

For a night VFR flight, the DR400/120, DR400/140B, DR400/160, DR400/180, DR400/180R, DR400/200R and DR400/500 must be equipped with following required equipment:

Flight and navigation

- one air-speed indicator
- one sensitive adjustable altimeter, with a 1 000 feet (304,80 mètres) per turn scale and with a barometric reference pressure indicator in hectopascal
- one compensable magnetic compass
- one vertical speed indicator (variometre)
- one artificial horizon (attitude gyros)
- a second artificial horizon or a gyroscopic rate-of-turn indicator with and integrated slip indicator (turn and bank indicator) separately supplied from the first artificial horizon
- one slip indicator when the airplane is equipped with two artificial horizons
- one directional gyro
- one VOR or one ADF depending on the planned route or one GPS class A, B or C approved
- one torch
- one set of spare fuses
- a navigation light system
- Strobe lights
- a landing light
- a lighting device for instrument panel and for safety equipment
- a watch displaying hours and minutes
- a night V.F.R. placard

Communication

- VHF radio equipment corresponding to the stipulations in equipments required by the the Air Traffic Authorities.

Surveillance

- Surveillance equipment corresponding to the stipulations in equipments required by the the Air Traffic Authorities.



AIRCRAFT FLIGHT MANUAL SUPPLEMENT

SECTION 2. LIMITATIONS

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

THIS AIRCRAFT MUST BE USED FOR <i>NORMAL OR UTILITY</i> FLYING, IN ACCORDANCE WITH THE APPROVED FLIGHT MANUAL. ON THIS AIRCRAFT, ALL INDEXES, MARKINGS AND PLACARDS CORRESPOND TO NORMAL UTILISATION FOR UTILITY OPERATION, REFER TO THE APPROVED FLIGHT MANUAL
SPINS PROHIBITED MANEUVERING SPEED : 215 km/h - 116 kt APPROVED FOR VFR FLIGHT BY DAY AND BY NIGHT IN NON-ICING CONDITIONS NO SMOKING

SECTION 3. EMERGENCY PROCEDURES

The following emergency procedures complete those of the section 3.

Lighting 1 and/or 3/radio failure

- Lighting 2..... on
- Lighting 1 fuse..... verify
- Lighting 3/radio 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 (not applicable to DR400/135CDI)

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 supplied again. Reset only the switches necessary to ensure flight safety.



AIRCRAFT FLIGHT MANUAL SUPPLEMENT

SECTION 4. NORMAL PROCEDURES

These procedures complete those of 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
- Landing light 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 gyro setting

Take-off

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



AIRCRAFT FLIGHT MANUAL SUPPLEMENT

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

- Lightoff

SECTION 5. PERFORMANCE

Not affected

SECTION 6. WEIGHT AND BALANCE

Not affected

SECTION 7. OPTIONAL EQUIPMENT

Any "VFR flight" supplement is cancelled and replaced by this supplement.



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TOWING PROCEDURE

This supplement includes the information to be provided to the pilot, as required by the certification basis.

This flight manual supplement must be included in the flight manual when the airplane is operated as a tow-plane (tug).

The information provided supersedes or completes the one of the approved flight manual.

Applicability

Type et model	Modification
DR400/180 DR400/180R DR400/180S	Major modification n°9 Major modification n°62

Effective pages

Pages	Date
1 à 11	11 april 2008

Approval

The technical information included in this document are approved under DOA EASA.21J.213

GENERAL

Your DR400/180 is modified with :

- A structural reinforcement installed at the manufacturer's;
- A tube mount equipped with an AERAZUR or a TOST hook;
- A release handle at pilot level on the instrument panel;
- An operating placard located next to the release handle

APPROVED PROPELLER FOR TOWING

- ◆ Note: For any approved configuration, ensure that it meets the ICAO Standard Annex 16, Volume 1, noise level regulations. A propeller can not be installed without noise measurement.

Glider towing

Manufacturer:..... SENSENICH

Model	76 EM8 S5-0-58	76 EM8 S5-0-54
Diameter	1,93 m (76 in)	1,93 m (76 in)
Number of blades	2	2
Pitch	58 in	54 in
Minimal rate Full throttle Sea level	2400 rpm	2500 rpm

- REMARK: Any reduction in diameter for repair is prohibited.

Manufacturer:..... HOFFMANN

Model	HO 27 HM 180/138
Diameter	1,80 m (71 in)
Number of blades	2
Pitch	54 in
Minimal rate Full throttle Sea level	2400 rpm

Banner towing

Manufacturer:..... SENSENICH

Model	76 EM8 S5-0-58(*)	76 EM8 S5-0-54
Diameter	1,93 m (76 in)	1,93 m (76 in)
Number of blades	2	2
Pitch	58 in	54 in
Minimal rate Full throttle Sea level	2400 rpm	2500 rpm

■ REMARK: Any reduction in diameter for repair is prohibited.

(*) The propeller 76 EM8 S5-0-58 falls into critical engine speed when towing banner.

◆ Note: Avoid using the continuous engine speed between 2150 rpm and 2350 rpm.

Manufacturer:..... HOFFMANN

Model	HO 27 HM 180/138
Diameter	1,80 m (71 in)
Number of blades	2
Pitch	54 in
Minimal rate Full throttle Sea level	2400 rpm

GLIDER TOWING PROCEDURE

In addition to the usual procedures:

1. Towing hook on the aircraft OPERATE
2. Towing hook on the glider OPERATE

Towing configuration

Climb

1. Throttle Full power (forward)
2. Mixture Fully rich (forward)
3. Flaps 1st stage (take-off)
4. Max. Speed 76 KIAS (140 km/h)

■ REMARK: Retract the flaps above $V_i = 76$ KIAS (140km/h)

Descent

1. Speed 135 KIAS (250km/h)

■ REMARK: Do not close throttle below 2500rpm in order to avoid the engine cooling being too quick.

TOWING SPEED

Glider:

Any speed is possible between the minimum aircraft towing speed V_r and the maximum authorized speed for the glider on tow.

The optimum climbing speed depends on characteristics of the glider: for the gliders with a low wing loading (m^2) and a medium glide ratio, the optimum speed is V_r whereas it may exceed 70 KIAS (130km/h) for gliders with a high wing loading and high glide ratio.

A climbing speed higher than the optimum may be necessary in case of critical engine cooling.

BANNER TOWING PROCEDURES

In addition to the usual procedures:

1. Towing hook on the aircraft OPERATE
2. Attach the cable to the aircraft and to the banner.
3. Lay the folded banner on the ground in front of the aircraft to such a distance it has reached a sufficient speed when lifting the banner.

Pick up hooking in flight

1. Approched speed of the aircraft 57 KIAS (105 km/h)

Banner towing speed

1. Speed close to V_b

◆ Note: V_b = Minimum banner towing speed
See table « Limit of use in banner towing »

■ REMARK : For banner towing at slow speed under warm weather conditions, it is advised, if necessary, to install the cooling flap on the inferior engine cowl for better engine cooling. This flap belongs to the option equipment of the aircraft.

LIMIT OF USE

Limit of use in glider towing

The next table represent the characteristics for towing glider in different case:

Case n°1: Normal use (1 pilot + 110L of fuel)

Case n°2: Case of training pilots schooling for towing.

Case n°3: Exceptionnal case (Passanger transport with light glider on tow)

	CASE N°1	CASE N°2	CASE N°3
Weight of the towing aircraft	760kg (1676 lb)	850 kg (1874 lb)	1000kg (2205 lb)
Minimum glider towing speed : Vr	62 KIAS (115 km/h)	65 KIAS (120 km/h)	70 KIAS (130 km/h)
Maximum authorized speed for the glider on tow	76 KIAS (140 km/h)	78 KIAS (145 km/h)	86 KIAS (160 km/h)
Maximum glider weight Vz = 0,7 m/s à Vr	915 kg (2017 lb)	710 kg (1565 lb)	370 kg (816 lb)
Maximum glider weight Vz = 1,7 m/s à Vr	710 kg (1565 lb)	555 kg (1224 lb)	295 kg (650 lb)

Limit of use in banner towing

The following table represents the characteristics for towing banner in different case:

Case n°1: Normal use (1 pilot + 110L of fuel)

Case n°2: Case of training pilots schooling for towing.

Case n°3: Exceptionnal case (Passanger transport with leaflets dropping with a reduced banner)

	CASE N°1	CASE N°2	CASE N°3
Weight of the towing aircraft	760kg (1676 lb)	850 kg (1874 lb)	1000kg (2205 lb)
Minimum banner towing speed : Vb	54 KIAS (100 km/h)	57 KIAS (105km/h)	65 KIAS (120km/h)
100 Cx.S maximum of the banner	190	125	45

TOWING CABLE

Breaking resistance:

- Maximum : 1000 daN
- Minimum: 0.8 time the weight of the glider.

MARKINGS AND PLACARDS

The diagrams below represent the markings that must be displayed. These markings can be placards or directly printed on the desk. The shape, size, typeface and colours may vary.

**FOR TOWING INSTRUCTIONS
SEE APPROVED FLIGHT MANUAL**

On the panel, in pilot sight.

**TOWING HOOK
PULL TO
RELEASE CABLE**

Near the towing cable emergency release.

**MAX. BAGGAGE LOAD
60 kg (132 lb)
SEE LOADING DIAGRAM**

In the luggage compartment or on the door of the compartment.

TOWING PERFORMANCE

Stalling speed

- Flap : 1st stage (Take-off)

	Weight of towing aircraft		
	760kg (1676 lb)	850 kg (1874 lb)	1000kg (2205 lb)
Stalling speed	47 KIAS (87 km/h)	50 KIAS (92 km/h)	54 KIAS (100 km/h)

Table 5-6 : Stalling speeds in towing conditions

Climbing speed

Glider towing :

- At sea level
- Flap : 1st stage (Take-off)
- Speed : Vr

Climbing speed Vz	Weight of towing aircraft		
	760kg (1676 lb)	850 kg (1874 lb)	1000kg (2205 lb)
With glider under extreme conditions	2,75 m/s (541 ft/min)	2,9 m/s (571 ft/min)	3,15 m/s (620 ft/min)
Without glider	7,2 m/s (1417 ft/min)	6,2 m/s (1220 ft/min)	4,9 m/s (965 ft/min)

Climbing speeds on glider towing conditions

Banner towing :

- At sea level
- Flap : 1st stage (Take-off)
- Speed : Vb

Climbing speed Vz	Weight of towing aircraft		
	760kg (1676 lb)	850 kg (1874 lb)	1000kg (2205 lb)
With extreme banner	2,75 m/s (541 ft/min)	2,9 m/s (571 ft/min)	3,15 m/s (620 ft/min)
Without banner	6,3 m/s (1240 ft/min)	5,4 m/s (1063 ft/min)	4,4 m/s (866 ft/min)

Climbing speeds on banner towing conditions

TAKE-OFF PERFORMANCE ON GRASS RUNWAY WITH A GLIDER EQUIPPED WITH A WHEEL.

Take off: total distance in meters from the stop to pass 15 m (50 ft) at $V = 1.3 V_{s1}$.

Rolling: rolling distance in meters to reach $1.1 V_{s1}$.

Weight of towing aircraft: 760 kg (1676 lb)

ALTITUDE (ft)	TEMPERATURE °C (°F)	Glider weight 300 kg (661 lb)				Glider weight 600 kg (1323lb)			
		Run distance		Passing15m (50ft)		Run distance		Passing15m (50ft)	
		m	ft	m	ft	m	ft	m	ft
0	Std = 15 (59)	225	738	410	1345	330	1083	580	1903
	35 (95)	255	837	455	1493	375	1230	650	2133
4000	Std = 7 (45)	320	1050	555	1821	480	1575	810	2657
	27 (81)	360	1181	620	2034	550	1804	910	2985

Take-off performance, towing aircraft weight 760kg

Weight of towing aircraft: 850 kg (1874 lb)

ALTITUDE (ft)	TEMPERATURE °C (°F)	Glider weight 300 kg (661 lb)				Glider weight 600 kg (1323lb)			
		Run distance		Passing15m (50ft)		Run distance		Passing15m (50ft)	
		m	ft	m	ft	m	ft	m	ft
0	Std = 15 (59)	285	935	505	1657	415	1362	710	2329
	35 (95)	325	1066	560	1837	470	1542	795	2608
4000	Std = 7 (45)	410	1345	695	2280	615	2018	1005	3297
	27 (81)	465	1526	775	2543	705	2313	1135	3724

Take-off performance, towing aircraft weight 850kg

Weight of towing aircraft: 1000 kg (2205 lb)

ALTITUDE (ft)	TEMPERATURE °C (°F)	Glider weight 300 kg (661 lb)			
		Run distance		Passing 15m (50ft)	
		m	ft	m	ft
0	Std = 15 (59)	415	1362	700	2297
	35 (95)	470	1542	780	2559
4000	Std = 7 (45)	600	1969	985	3232
	27 (81)	690	2264	1110	3642

Take-off performance, towing aircraft weight 1000kg

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AIRCRAFT FLIGHT MANUAL SUPPLEMENT
INSTALLATION OF A CO DETECTEUR INSIDE THE COCKPIT

This document is a courtesy translation of its original French version.
In case of any difficulty, reference should be made to the French original issue.

AIRCRAFT FLIGHT MANUAL SUPPLEMENT

CARBONE (CO) MONOXIDE DETECTOR

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 approved aircraft flight manual.

This supplement supersedes any existing supplement concerning the CO detector.

Revision	Date	Description	Approval
////////	13 May 2008	Original issue	EASA.A.C.04710
1	26 November 2010	Logo of manufacturer CAP aircraft applicability suppressed	EASA AFM Approval 10033448 20.01.2011

APPLICABILITY

Type of airplane	Models	Manufacturer change
DR300	all models	no.041204
DR400	all models	no.041204
ATL	all models	no.041204
R3000	all models	no.041204
DR220	all models	no.041204
DR221	all models	no.041204
DR200		no.041204
DR250	all models	no.041204
DR253	all models	no.041204
HR100	all models	no.041204
R1180T - R1180TD		no.041204



The sections of the aircraft flight manual are affected as follows:

1. GENERAL

Carbon monoxide is a colourless, odourless and tasteless toxic gas.

The symptoms of CO poisoning are, in order of appearance and of intensity: sensation of lethargy, heat, cranial tension;

- headache, pressure or beating in temples, whistling in ears;
- severe headache, chronic fatigue, dizzinesses and progressive decline of the visual acuteness;
- loss of any muscular force, vomits, convulsion and coma.

CO is particularly found in exhaust gases of the plane. The cabin being warmed by the air which circulated around the exhaust pipes, a creek in these pipes can result in penetration of CO into the cabin.

As a safety precaution, a CO detector is recommended inside the cabin, in the field of vision of the pilot.

1. LIMITATIONS

No change

2. EMERGENCY PROCEDURES

If the indicator of CO's detector changes colour; or if it smells exhaust gas in the cabin; or moreover if one or some of the symptoms of CO poisoning (see above) appears, apply at once the following:

- Close the cabin heating system
- Open all the sources of fresh air
- Land as soon as possible

Before resuming the flight, the plane must be examined by an authorized mechanic.

3. NORMAL PROCEDURES

PRE FLIGHT INSPECTION

If installed, check expiry date of CO's detector.

4. PERFORMANCE

No change.

5. WEIGHT AND BALANCE

No change.

TRANSPONDEURS GARMIN

GTX335/345 avec ADS-B

GARMIN TRANSPONDERS

GTX335/345 with ADS-B

Ce supplément au manuel de vol contient les informations que les conditions de certifications exigent de fournir au pilote.

Ces informations remplacent ou complètent celles du manuel de vol approuvé.

Le manuel de vol reste valide pour toutes les limitations et procédures opérationnelles ainsi que les performances non incluses dans ce supplément.

This supplement includes the information to be provided to the pilot, as required by the certification basis.

The information either supplements or overrides those in the approved flight manual.

The flight manual remains valid for what concerns limitations and operating procedures as well as performance not included in this supplement.

Applicabilité

Applicability

Type et modèle d'avion <i>Aircraft type and model</i>		Modification constructeur <i>Manufacturer change</i>
DR400 & DR3XX	Tous modèles <i>All models</i>	DET 161202

Approbation

Approval

AVERTISSEMENT

WARNING

Ce supplément au manuel de vol est une traduction française de courtoisie, des informations jugées nécessaires de fournir au pilote.

Il est rédigé sur la base des suppléments approuvés FAA (190-00734-15 Rev.2) et EASA (190-00734-16 Rev.1) en vigueur à la date de publication de ce document.

This flight manual supplement is a courtesy French translation of information deemed necessary to provide of the pilot.

This AFMS is based on approved FAA (190-00734-15 Rev.2) and approved EASA (190-00734-16 Rev.1) flight manual supplements in the publication date of this document.

Les suppléments approuvés par la FAA (190-00734-15) et l'EASA (190-00734-16) dans leur dernière version doivent être insérés dans le manuel de vol approuvé lorsqu'un transpondeur GARMIN GTX3x5 est installé dans l'aéronef pour une utilisation de la fonction ADS-B.

La mise à jour de la documentation est de ce fait, à la charge du propriétaire ou de l'exploitant de l'aéronef.

Ce supplément CEAPR peut être utilisé en lieu et place des suppléments FAA et EASA approuvés, sous la seule responsabilité du propriétaire ou de l'exploitant de l'aéronef.

FAA Approved Supplement (190-00734-15) and EASA Approved Supplement (190-00734-16) in their latest version must be included in the approved flight manual when a GARMIN GTX3x5 transponder is installed in the aircraft for use of the ADS-B function.

The up to date of the documentation is therefore at the expense of the owner or operator of the aircraft.

This CEAPR supplement may be used instead of approved FAA and EASA supplements, under the responsibility of the owner or operator of the aircraft.

Liste des pages en vigueur

List of effective pages

Pages	Date
1 à <i>(to)</i> 10	Dec. 2017

INTRODUCTION

Ce supplément au manuel de vol permet de renseigner les différentes données liées à l'utilisation en ADS-B d'un transpondeur de type GTX3x5.

This Supplement allows to describe data due to the use of GTX3x5 transponders in ADS-B mode.

MODIFICATION

Les sections du manuel de vol sont affectées de la façon suivante :

The sections of the aircraft flight manual are affected as follow:

0. GENERALITES

Section non affectée.

0.GENERAL

No change.

1. DESCRIPTION

Section non affectée.

1.DESCRPTION

No change.

2. LIMITATIONS

2.1 Général

Le GTX335 ou GTX345 doit être utilisé conformément au manuel d'utilisation Garmin.

Le manuel d'utilisation de référence 190-01499-00 Rév.C dans sa dernière version doit être disponible à bord de l'aéronef.

2. LIMITATIONS

2.1 General

The GTX335 or GTX345 must be used in accordance the Garmin owner's manual.

The pilot's reference guide 190-01499-00 Rev.C in is latest revision must be available on board of the aircraft.

2.2 Equipement minimum

Les GTX33X et GTX3X5 doivent avoir les systèmes suivant totalement fonctionnel afin de répondre aux exigences 14 CFR 91.227 pour une utilisation en ADS-B Out (Automatic Dependent Surveillance – Broadcast) :

2.2 Minimum Equipment

The GTX33X and GTX3X5 must have the following system interfaces fully functional in order to be compliant with the requirements for 14 CFR 91.227

ADS-B Out (Automatic Dependent Surveillance-Broadcast) operations:

Equipements requis <i>Interfaced Equipment</i>	Nombre installé <i>Number Installed</i>	Nombre requis <i>Number required</i>
Source de pression altitude <i>Uncorrected Pressure Altitude Source</i>	1	1
Source de position GPS <i>GPS SBAS Position Source</i>	1 ou plus <i>1 or more</i>	1
Système de contrôle d'affichage à distance (pour les transpondeurs équipés) <i>Remote Control Display (for remotely mounted transponders)</i>	1 ou plus <i>1 or more</i>	1

2.3 ADS-B Out

Les GTX33X et GTX3X5 répondent aux exigences du paragraphe 14 CFR 91.227 pour une utilisation de l'ADS-B OUT seulement lorsque toutes les fonctions requises sont opérationnelles. Lorsque le système n'est pas opérationnel, un message d'erreur ADS-B Out sera affiché sur l'interface de commande à distance ou sur l'interface du transpondeur GTX.

2.4 Affichage du trafic TIS avec l'angle de navigation de l'utilisateur

L'affichage du trafic TIS à partir d'un GTX33/330 ou GTX335 n'est pas autorisé avec une interface d'affichage à distance configurée pour ce type d'utilisation.

2.3 ADS-B Out

The GTX33X and GTX3X5 only comply with 14 CFR 91.227 for ADS-B Out when all required functions are operational. When the system is not operational, ADS-B Out transmit failure messages will be present on the remote control display interface, or the GTX330 or GTX3X5 panel display.

2.4 TIS Traffic Display with User Navigation Angle

Display of TIS traffic from a GTX33/330 or GTX335 is not permitted with an interfacing display configured for a navigation angle of "user".

2.5 Logiciel système applicable

Les GTX335 ou GTX345 doivent utiliser les dernières versions approuvées des logiciels suivant :

- GTX335 : Logiciel principal version 8.02 (ou version ultérieure)
- GTX345 : Logiciel principal version 2.02 (ou version ultérieure)

La version du logiciel principal du GTX est affichée sur l'écran de démarrage durant la mise en fonction du GTX ou sur la page système de l'affichage de commande à distance pour les transpondeurs GTX équipés.

2.6 Arrêt de la diffusion des informations de pression altitude

Lors d'un vol dans un espace aérien nécessitant un émetteur ADS-B Out conforme au paragraphe 14 CFR 91.227, l'arrêt de la diffusion des informations de pression altitude ne doit être réalisé que sur demande du contrôle de la circulation aérienne. Il est possible d'arrêter de transmettre ces informations en sélectionnant le mode ON du transpondeur.

2.7 Affichage des données météo.

N'utilisez pas les informations météo données par l'instrument lors d'un vol dans, près ou autour de zones météorologiques dangereuses. Les informations fournies par l'instrument peuvent ne pas décrire avec précision les conditions météorologiques actuelles.

N'utilisez pas les informations de temps ou de durée indiqués par l'instrument pour déterminer l'état d'un événement météorologique, en raison du retard inhérent à la collecte et au traitement des données météo. L'information météorologique donnée par l'instrument peut être significativement plus âgé que l'événement météo actuel.

2.5 Applicable system software

The GTX335 or GTX345 must use the latest approved versions of following softwares.

- GTX335 Main SW Version : 8.02 (or later)
- GTX345 Main SW Version : 2.02 (or later)

The Main GTX software version is displayed on the splash screen during start up for the GTX panel mounted units, or System page on the interfaced remote control display for remotely mounted GTX transponders.

2.6 Pressure Altitude Broadcast Inhibit (PABI)

Pressure Altitude Broadcast Inhibit shall only be enabled when requested by Air Traffic Control while operating within airspace requiring an ADS-B Out compliant transmitter per 14 CFR 91.227. PABI is enabled by selecting the GTX to ON mode.

2.7 Datalinked Weather Display (GTX345 Only)

Do not use datalink weather information for maneuvering in, near, or around areas of hazardous weather. Information provided by datalink weather products may not accurately depict current weather conditions.

Do not use the indicated datalink weather product age to determine the age of the weather information shown by the datalink weather product. Due to time delays inherent in gathering and processing weather data for datalink transmission, the weather information shown by the datalink weather product may be significantly older than the indicated weather product age.

2.8 Appareils électroniques portatifs.

La fonctionnalité Bluetooth dans les avions de classe IV n'est pas approuvée en vertu du STC EASA et doit être désactivée. Une approbation supplémentaire est requise pour activer la fonctionnalité Bluetooth pour cette classe d'aéronef.

L'interface déportée et les données fournies par le GTX à l'appareil portatif ne sont pas approuvées pour remplacer l'équipement aéronautique requis. Les données présentées sur l'appareil portatif peuvent ne pas être suffisamment précises pour être la seule source d'information permettant de prendre des décisions tactiques ou stratégiques.

L'utilisation d'un appareil d'affichage électronique portatif pendant les phases critiques du vol par le pilote est interdite.

2.8 Portable Electronic Devices

Bluetooth functionality in Class IV aircraft is not approved under this STC and must be disabled. Additional approval is required to enable Bluetooth functionality for this class of aircraft.

The Connex interface and data provided by the GTX to a PED is not approved to replace required aircraft equipment. The data presented on the PED may not have the required integrity to be used as the sole source of information to base tactical or strategic decision making.

Use of the Connex interface during critical phases of flight by the pilot flying is prohibited.

3. PROCEDURES D'URGENCES

Les pannes du système ou les conditions anormales sont indiquées par l'apparition d'un message délivré par l'équipement. L'ensemble des messages de pannes ou conditions anormales sont répertoriés et expliqués dans le manuel d'utilisation GARMIN 190-01499-00 RevC, § 7 « TROUBLESHOOTING »

3.1 Perte des données de position GPS/SBAS.

Si le récepteur GPS/SBAS n'est plus opérant ou si l'information de position GPS n'est pas disponible ou est invalide, le transpondeur GTX va arrêter de transmettre les données ADS-B Out assez rapidement.

Cas d'un GTX 3X5 :

Affichage du message « NO 1090 TX »

- Source de position GPS.....Vérifiée valide

Cas d'un GTX33 ou GTX3X5R :

Se référer à la documentation pour connaître le message d'erreur affiché.

- Source de position GPS.....Vérifiée valide

3.2 Cas d'une installation à double transpondeur GTX3XR avec G950/1000.

Si le transpondeur #1 tombe en panne et que le transpondeur #2 est activé par le pilote, un message d'alerte s'affichera sur l'affichage du G1000 jusqu'à ce que l'alimentation du transpondeur #1 soit coupé.

Transpondeur #1 en panne, transpondeur #2 actif

- Breaker transpondeur #1.....Tiré

3: EMERGENCY PROCEDURES

The GTX 3X5 display system sends messages to the flight crew when trouble or otherwise abnormal conditions are detected. All trouble messages or abnormal conditions messages are listed on the GARMIN "Pilot's guide" 190-01499-00 RevC §7 "TROUBLESHOOTING"

3.1 LOSS OF GPS/SBAS POSITION DATA

When the GPS/SBAS receiver is inoperative or GPS position information is not available or invalid, the GTX will no longer be transmitting ADS-B Out data.

For GTX 3X5 installations:

NO 1090ES TX annunciator illuminated:

- *Interfaced GPS position sources
..... VERIFY VALID POSITION*

For GTX 33 and GTX 3X5R installations:

*Reference Display Device
documentation for applicable
annunciation:*

- *Interfaced GPS position sources
..... VERIFY VALID POSITION*

3.2 Dual GTX 3X5R Transponders in a G950/1000 installation

If Transponder #1 fails and Transponder #2 is activated by the pilot, the G1000 display will provide nuisance alerts unless power is removed from Transponder #1.

Transponder #1 Failed, Transponder #2 Active

- *Transponder #1 Circuit Breaker
..... PULL*

4. PROCEDURES NORMALES

Les procédures normales sont décrites dans le manuel d'utilisation des transpondeurs GTX335/345 référencé 190-01499-00 RevC.

A la mise en route du système.

1. Mode GTX..... « ALT » vérifié
2. Message « NO 1090ES TX »
.....vérifié

Vérifier que le mode du transpondeur est sur « ALT » et prendre en considération le message « NO 1090ES TX » le cas échéant. (Ces messages peuvent apparaître lors de la mise en route du système et lorsque celui-ci commence à recevoir les informations des systèmes externes.)

Avant le décollage.

1. 1090ES TX CTL..... « ON » Vérifié
2. « NO 1090ES TX ».....Eteint

Le 1090ES TX CTL doit être en fonctionnement «ON » et le message « NO 1090ES TX » (ou tout autre message associé) ne doit pas apparaître.

5. PERFORMANCE

Section non affectée.

6. MASSE ET CENTRAGE

Section non affectée.

4 : NORMAL PROCEDURES

Normal procedures are described on the « Pilot's guide » 190-01499-00 RevC.

Unit Power ON

1. GTX Mode..... *VERIFY ALT*
2. NO 1090ES TX..... *CONSIDERED*

Check the GTX mode on "ALT" position and consider the "NO 1090ES TX" or "NO ADS-B" annunciation.(The NO ADS-B or NO 1090ES TX annunciation (or associated display annunciations) may illuminate as the unit powers on and begins to receive input from external systems, to include the SBAS position source.)

Before Takeoff

1. 1090ES TX CTL..... *VERIFY ON*
2. NO 1090ES TX ...*EXTINGUISHED*

1090ES TX CTL must be turned on and NO 1090ES TX Annunciation (or associated display annunciations) must be EXTINGUISHED

5. PERFORMANCES

No change

6. WEIGHT AND BALANCE

No change.

7. DESCRIPTION SYSTEMES

Transpondeur GTX335

Caractéristiques :

- ADS-B Out (*Automatic Dependant Surveillance Broadcast*) Diffusion automatique des données (immatriculation, altitude, vitesse, angle...) aux autres aéronefs et aux stations au sol.
- Affichage du trafic (TIS) et alerte oral.
- Alerte d'écart d'altitude.
- Timer : Chrono, compte à rebours, vol, voyage.
- Affichage de la température extérieure.(option)
- Altitude / pression
- GPS interne (option)

Transpondeur GTX345

Lorsqu'il est connecté aux équipements adaptés, le GTX345 permet d'avoir accès aux fonctionnalités ADS-B In (Réception des données des autres aéronefs et contrôle au sol).

- ADS-B Out
- ADS-B In (Réception des données d'autres aéronefs et des stations au sol) et alerte oral.
- Prise en compte du système de conseil de trafic TCAD/TAS/TCAS I
- Affichage des données météo et informations de vol (FIS-B/Flight Information Services-Broadcast) (METAR, TAF, NOTAM ...).
- Alerte d'écart d'altitude
- Timer : Chrono, compte à rebours, vol, voyage.
- Affichage de la température extérieure.(option)
- Altitude / pression
- GPS interne (option)

7. SYSTEMS DESCRIPTION

GTX335 Transponder

GTX335 Features:

- *ADS-B Out (Automatic Dependant Surveillance Broadcast), transmission of Flight ID, Altitude, Speed, angle...*
- *TIS traffic display output and aural alerting*
- *Altitude deviation alerting*
- *Timers: count up, count down, flight, trip*
- *Static (Outside) air temperature display (Optional)*
- *Density and pressure altitude display*
- *Internal GPS (Optional)*

GTX345 Transponder

The GTX 345 includes ADS-B In functionality, when connected to a suitable display.

GTX345 Features:

- *ADS-B Out*
- *Dual-band ADS-B In traffic display output and aural alerting*
- *Integration with TCAD/TAS/TCAS I traffic systems*
- *FIS-B weather and flight information display output (METARs, TAFs, NOTAMs,...)*
- *Bluetooth interface provides traffic, weather, and attitude data to a Portable Electronic Device (PED)*
- *Altitude deviation alerting*
- *Timers: count up, count down, flight, trip*
- *Static (Outside) air temperature display (optional)*
- *Density and pressure altitude display*
- *Internal GPS (Optional)*

8. MANŒUVRE ENTRETIEN
MAINTENANCE

Section non affectée

8. MAINTENANCE
PROCEDURE

No change

EDM900

Système de gestion des paramètres moteur *Primary engine data management system*

Ce supplément au manuel de vol contient les informations que les conditions de certifications exigent de fournir au pilote. Ces informations remplacent ou complètent celles du manuel de vol approuvé.

This Aircraft Flight Manual Supplement (AFMS) includes the material required to be furnished to the pilot and additional information provided by the manufacturer.

Ce supplément annule et remplace tout additif au manuel de vol concernant l'EDM900.

The information contained herein supplements or supersedes any existing supplement concerning the EDM900.

Applicabilité

Applicability

Type et modèle d'avion <i>Aircraft type and model</i>		Modification constructeur <i>Manufacturer change</i>
DR400 & DR3XX	Tous modèles. HORS DR400 modifiés par STC EASA 10014219 <i>All models Excepted DR400 modified by EASA STC 10014219</i>	Dossier d'Evolution Technique DET 160701

Approbation

Approval

Amendement <i>Amendment</i>	Date	Description	Approbation <i>Approval</i>
/////	19.01.2018	Edition originale <i>Original issue</i>	E.A.S.A. MAJOR Change approval n°10064412

Liste des pages en vigueur

List of effective pages

Pages	Date
1 à (to) 4	Jan. 2018

INTRODUCTION

Ce supplément au manuel de vol permet de renseigner les différentes données liées à l'installation d'un système d'affichage électronique multifonction, qui affiche simultanément les paramètres moteur et les systèmes d'aéronef, type EDM900 sur des avions de type DR3XX et DR400.

MODIFICATION

Les sections du manuel de vol sont affectées de la façon suivante.

0. GENERALITES

Section non affectée.

1. DESCRIPTION

Section non affectée.

2. LIMITATIONS

- A. L'EDM-900 peut remplacer les indicateurs RPM, MAP, EGT, CHT, CDT, TIT, OIL T. OIL P, F-P, FF, CDT et Jauges réservoirs requis par la conception du type d'avion ou les limites d'exploitation.
- B. L'EDM-900 ne doit pas être utilisé comme indicateur principale si le RAL (voyant d'alarme déporté) ne fonctionne pas.

INTRODUCTION

This Supplement allows to describe data due to the installation of a combined electronic indicating system, which simultaneously displays to the pilot powerplant and aircraft systems operating parameters type EDM900 on aircraft type DR3XX or DR400.

The sections of the aircraft flight manual are affected as follows.

0. GENERAL

No change.

1. DESCRIPTION

No change.

2. LIMITATIONS

- A. The EDM-900 may replace any existing RPM, MAP, EGT, CHT, CDT, TIT, OIL T. OIL P, F-P, FF, CDT and Fuel Quantity indicators required by the aircraft type design or operating limits.
- B. The EDM-900 must not be used as primary if the RAL is not working.

3. PROCEDURES D'URGENCES

A. Perte d'affichage d'un paramètre individuel:

1. Continuez d'utiliser le moteur normalement en vous référant aux paramètres affichés restants. Notez que le RAL indiquera les alarmes même si l'affichage est défaillant et que le reste de l'instrument est fonctionnel.

B. Perte d'affichage total (Panne électrique):

1. Évitez d'utiliser le moteur à un régime élevé ainsi que les changements brusques de puissance;
2. Enrichir les mélanges pour maintenir un fonctionnement normal du moteur;
3. Atterrir dès que possible en toute sécurité.
4. Reportez-vous au Manuel de Vol de l'avion pour obtenir d'éventuelles informations supplémentaires sur la panne de l'instrument moteur

4. PROCEDURES NORMALES

A FONCTIONS PRINCIPALES

Avant chaque vol, au démarrage, vérifiez que le RAL fonctionne, il doit clignoter en Rouge et Jaune.

A chaque mise sous tension, l'EDM-900 effectue une procédure d'autotest. Une croix rouge affichée sur un paramètre indiquera que ce dernier ne fonctionne pas. La zone de message, située sous l'affichage EGT / CHT, affichera des sondes/les paramètres en fonctionnement. L'EDM doit continuer de fonctionner lors du démarrage du moteur.

B. MIXTURAGE DU MOTEUR

Reportez-vous au Guide du pilote de l'EDM-900 pour obtenir des instructions détaillées sur le réglage de la richesse.

Après avoir établi la puissance de croisière souhaitée (65 à 75% de puissance), appuyez sur le bouton LF pour activer le mode « Lean Find » (recherche de la meilleure richesse). Appauvrir le mélange progressivement, à un certain moment la colonne d'un cylindre commencera à clignoter; indiquant que la température de gaz d'échappement (EGT) pour ce cylindre a atteint son maximum. Continuez la

3. EMERGENCY PROCEDURES

A. Loss of individual display parameter:

1. Continue normal engine operation by referring to the remaining parameters displayed. Note the RAL will indicate limits even if the display fails and the rest of the unit is functional.

B. Loss of all displays (Electrical Failure):

1. Avoid high engine power settings and rapid power changes;
2. Enrichen mixtures to maintain smooth engine operation;
3. Arrange to terminate the flight safely and as soon as practicable.
4. Refer to your original airplane AFM for possible additional engine instrument failure information.

procédure, en ré-enrichissant la mixture comme recommandé par le constructeur de l'avion, tout en surveillant les principaux instruments moteur. Une fois la procédure de mixture terminée, appuyez brièvement sur la touche EXIT pour quitter le mode « Lean Find » et entrez dans le mode « Monitor ».

MISE EN GARDE

Se conformer aux procédures de mixturage du manuel de vol de l'avion.
Ne pas dépasser les limites applicables du moteur ou de l'aéronef.

4. NORMAL PROCEDURES

A. PRIMARY FUNCTIONS

Before each flight on startup, verify that the RAL is working it should flash Red and Yellow. Whenever main electrical power is turned on the EDM-900 performs a self-test procedure. Gauges not functioning will have a red x across them which identifies as inoperative. The message area, located below the EGT/CHT display will display open probes. The EDM must maintain functionality upon cranking the engine.

B. ENGINE MIXTURE LEANING

Refer to the EDM-900 Pilot's Guide' for detailed instructions on 'rich of peak' and 'lean of peak' operation.

After establishing desired cruise-power (65 to 75% power), depress the LF button to activate the Lean Find Mode. As the mixture is leaned, one cylinder's column will begin blinking; indicating the EGT for that cylinder has peaked. Continue with the leaning procedure, enriching as recommended by the aircraft manufacturer while monitoring the primary engine instruments. Once the leaning procedure has been completed, depress the EXIT button briefly to exit the Lean Find Mode and enter the Monitor Mode.

CAUTION

***Comply with manufacturer's Airplane Flight Manual leaning procedures.
Do not exceed applicable engine or aircraft limitations***

5. PERFORMANCES

Section non affectée.

6. MASSE ET CENTRAGE

Section non affectée.

5. PERFORMANCES

No change.

6. WEIGHT AND BALANCE

No change.

7. DESCRIPTION SYSTEMES

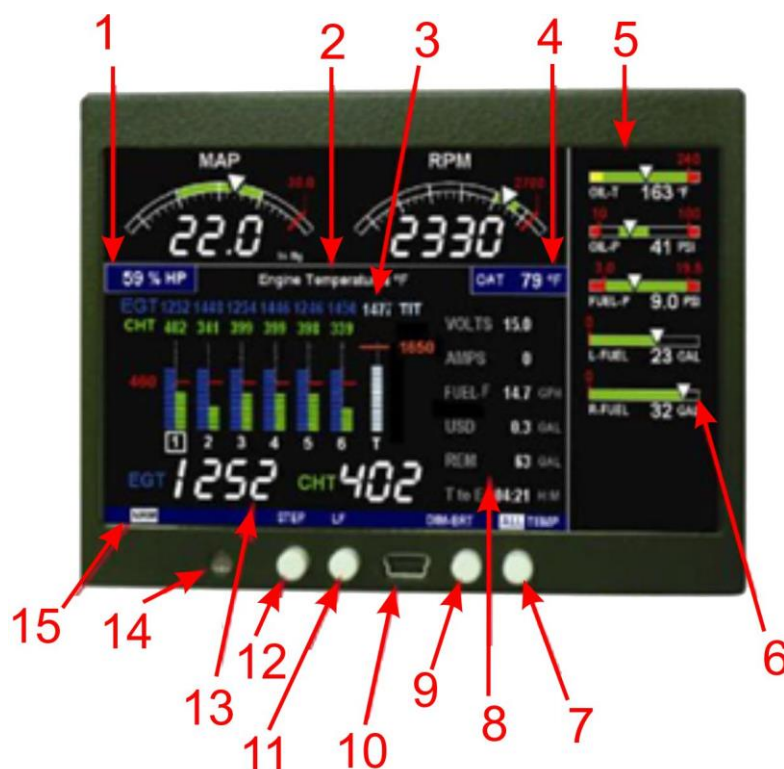
L'EDM-900 est un système d'affichage électronique multifonction, qui affiche simultanément les paramètres moteur et les systèmes d'aéronef en remplaçant les précédents appareils numériques et / ou analogiques primaires. Le tableau ci-dessous reprend les différentes abréviations utilisées sur l'affichage de l'EDM900 (Les abréviations correspondantes aux paramètres affichés dans la zone de message, sont indiquées dans la deuxième colonne du tableau.)

7. SYSTEME DESCRIPTION

The EDM-900 is a combined electronic indicating system, which simultaneously displays to the pilot powerplant and aircraft systems operating parameters. It includes the following indicating systems; replacing previous primary digital and/or analog instruments. (The label of the parameter shown on the EDM-900 display message area is indicated in the second column. The message is located below the CHT/EGT display.

Fonctions des jauges	<i>Gauge Function</i>	Zone de Message	<i>Message Area</i>
		Abréviation	<i>Alarm Abbreviation</i>
Principales	<i>Primary</i>	Principales	<i>Primary</i>
Vitesse de rotation du moteur <i>Engine rotational speed</i>		RPM xxxx	
Pression du collecteur <i>Engine Manifold Pressure</i>		MAP xx.x in hg	
Température de la culasse <i>Engine Cylinder Head Temp</i>		CHT2 xxx °F	
Température d'huile moteur <i>Engine Oil Temperature</i>		O-T xxx °F	
Pression d'huile moteur <i>Engine Oil Pressure</i>		O-P xxx °F	
Pression essence <i>Fuel Pressure</i>		F-P xx PSI	
Débitmètre <i>Fuel Flow to engine</i>		F-F xx.x GPH	

Fonctions des jauges	<i>Gauge Function</i>	Zone de Message	<i>Message Area</i>
		Abréviation	<i>Alarm Abbreviation</i>
Secondaires	<i>Non-Primary</i>	Secondaires	<i>Non-Primary</i>
Température des gaz d'échappement <i>Exhaust Gas Temp.</i>		EGT2 xxxx °F	
Variation température de cylindre <i>Shock Cooling of CHT</i>		CLD xx °/MIN	
Ecart de température EGT <i>Differential Temp. of EGT</i>		DIF xx °F	
Tension du bus <i>Bus Voltage</i>		Volts xx.x	
Charge <i>Amperage Load</i>		AMPS xx	
Température extérieur <i>Outside Air Temp.</i>		OAT xx °F	
Estimation autonomie restante <i>Estimated Time to Empty</i>		Est. T to E xx:xx H:M	
Carburant utilisé <i>Fuel used to date</i>		USED xx.x GAL	
Estimation carburant restant <i>Estimated Remaining fuel</i>		Est. REM xx GAL	
Estimation carburant nécessaire jusqu'au prochain point tournant <i>Estimated Fuel required to Waypoint</i>		Est. WP REQ xx GAL	
Estimation carburant restant au prochain point tournant <i>Estimated Fuel Remaining at Waypoint</i>		Est. WP RES xx GAL	
Miles nautique par gallon <i>Nautical Miles per Gallon</i>		ECON xx.x MPG	
Contrôle de la luminosité de l'affichage <i>Brightness, Dim control</i>		DIM/BRT	



Voyant d'alarme déportée
(RAL)
*Remote Annunciate Light
(RAL)*

1	Pourcentage de la puissance	<i>Percent of HorsePower</i>
2	Température moteur (°F ou °C)	<i>All engine Temp's (°F or °C)</i>
3	Temp. pour les moteurs à turbine	<i>TIT</i>
4	Temp. extérieure (°F ou °C)	<i>Outside Air (°F or °C)</i>
5	Jauges principales uniquement	<i>Primary gauge only</i>
6	La zone noire sur la jauge carburant indique la quantité utilisée	<i>Note black area on fuel level showing used fuel</i>
7	Bouton de sélection TOUT/TEMP/CARBURANT	<i>Select button ALL/TEMP/FUEL</i>
8	Jauges secondaires uniquement	<i>Non-primary gauges digital only</i>
9	Réglage de la luminosité	<i>Dim</i>
10	Port USB sans alimentation	<i>USB port no power</i>
11	Recherche richesse	<i>Lean find</i>
12	Bouton de seuils d'affichage	<i>Step</i>
13	Zone de message EGT/CHT Débitmètre	<i>Message area EGT/CHT Fuel flow</i>
14	Graduation manuel par le biais de CD	<i>Manual dimming with CD Cell bias</i>
15	Normaliser	<i>Normalize</i>

AFFICHAGE

Les fonctions secondaires telles que: la température d'air d'admission, la température carburateur, l'EGT (température de gaz d'échappement), la tension du bus, la charge (ampérage), la variation de température des cylindres, le carburant restant, le carburant requis, la réserve de carburant, la MPG, l'endurance et le carburant utilisé ont des limites d'alarme programmables. CHT, TIT, EGT, FP, FF et MAP peuvent ne pas être primaires sur certaines installations. N'importe laquelle de ces fonctions non primaires est programmable par le pilote. Les fonctions primaires ne peuvent pas être modifiées.

Le côté droit de l'EDM-900 comporte un ensemble de bandes horizontales avec des valeurs numériques limites.

Les fonctions indiquées dans cette partie sont : température d'huile (OT), pression d'huile (OP), pression essence (FP), (ou CDT, pour les installations du moteur ayant une température de décharge du compresseur primaire), le débit de carburant (FF) et l'affichage possible du niveau de carburant pour un maximum de deux réservoirs principaux et deux réservoirs auxiliaires (QTY-LF / RT Main, QTY-LF / RT Aux).

Les indicateurs MAP et RPM du moteur sont présentés dans le coin supérieur gauche de l'instrument avec des jauges circulaires de type analogique.

L'EGT, le CHT et le TIT sont présentés dans le coin inférieur gauche.

Au-dessous des colonnes EGT / CHT se trouve une «zone de message» qui affiche les valeurs numériques de l'EGT / CHT / TIT et des fonctions supplémentaires telles que la variation de température des cylindres et les messages d'alarme. L'OAT est affiché dans une case en degrés Celsius (°C) ou Fahrenheit (°F). La touche 4 permet de basculer entre ALL / TEMP / FUEL suivant les indications que vous souhaitez afficher.

(1 ^{er})	(2 ^{ème})	(3 ^{ème})	(4 ^{ème})
STEP LF	DIM	ALL/TEMP/FUEL	
●	●	●	●

Les valeurs spécifiques d'EGT, CHT (et TIT) sont affichées numériquement au-dessus des échelles verticales de ces paramètres, à l'exception du mode portrait où seules les valeurs CHT (et TIT) sont affichées. Le nombre encadré sous les échelles indique quel cylindre est sélectionné et donc quels renseignements sont affichés dans la zone "Message" ou quel cylindre est concerné par l'alarme indiquée.

DISPLAY

Non-primary functions such as: Induction air temperature, carburetor inlet temperature, EGT Span, bus voltage, Amps, Shock Cooling, Fuel Remaining, Fuel Required, Fuel Reserve, MPG, Endurance, and Fuel Used have programmable alarm limits. CHT, TIT, EGT, FP, FF, and MAP may not be primary on some installations. Any of these non-primary functions are programmable by the pilot. Primary functions cannot be changed.

The right hand side the EDM-900 has horizontal tape scales with digital values below each scale. The functions: OIL-Temperature (O-T), OIL-Pressure (O-P), FUEL-Pressure (F-P), (or CDT, for engine installations having a primary Compressor Discharge Temperature), Fuel Flow (FF), and two main and two Aux fuel tank quantities (QTY-LF/RT Main, QTY-LF/RT Aux). The engine MAP and RPM are presented in the upper left corner of the instrument with analog-type circular gauges. The EGT, CHT and TIT are presented in the lower left corner. Below the EGT/CHT columns is a "Message area" that displays the digital values of the EGT/CHT/TIT and additional functions like shock cooling and limit alarm messages. OAT is displayed in a box in degrees C or F. A soft switch is located above button 4 and toggles between ALL/TEMP/FUEL.

(1 ^{er})	(2 ^{ème})	(3 ^{ème})	(4 ^{ème})
STEP LF	DIM	ALL/TEMP/FUEL	
●	●	●	●

Specific values for each parameter are displayed digitally above the vertical scale displays of EGT, CHT, and TIT, except for the portrait mode where only the CHT and TIT values are shown. The boxed number below the columns indicates which cylinder's digital information is being displayed in the "Message Area" or displayed as an alarm in the Message Area.

PROGRAMMATION

En appuyant simultanément sur les boutons LF et STEP, vous accédez au mode « programme » pour, entrer les quantités de carburant (pour le débit de carburant uniquement), le taux de balayage des informations, choisir l'affichage OAT en ° F ou ° C, l'échelle d'affichage EGT à 1 ou 10° et d'autres paramètres de configuration.

Quittez en appuyant sur la touche NEXT jusqu'à ce qu'EXIT soit affiché, puis appuyez sur EXIT. Si les boutons STEP ou LF ne sont pas poussés pendant trois minutes, l'EDM-900 revient au mode de balayage automatique (1 à 9 secondes ou 0 sans balayage). En appuyant sur le bouton STEP, vous arrêtez le mode automatique et l'appareil revient en mode manuel. Reportez-vous au Guide du pilote EDM-900 au dernier indice de révision pour plus d'informations.

Le guide du pilote doit être mis à la disposition du pilote pour toutes les opérations de vol.

Voyant d'alarme à distance (RAL) pour EDM 900

Le voyant d'alarme à distance affiche une lumière rouge ou jaune en fonction de l'état de l'alarme. L'EDM900 intègre un voyant qui avertit le pilote qu'un paramètre est sorti de la zone d'utilisation normal ou a atteint une limite. Cette lumière est montée devant le pilote, étiquetée «MOTEUR».

La lumière clignote en fonction de la condition "Avertissement" (Rouge) ou "Attention" (Jaune). Toutes les Alertes et Alarmes seront affichées dans la "Zone de message" de l'afficheur.

Lors du démarrage initial ou chaque fois que l'alimentation est activée, les mots « EDM-900 PRIMARY » sont affichés dans la zone de message, suivis de la marque et du modèle de l'avion avec des informations STC pour lesquelles les limites principales ont été définies.

PROGRAMMING

Depressing the LF and STEP buttons simultaneously enters the program mode to enter fuel quantities (for fuel flow only), display scan rate, OAT display to °F or °C, EGT digital display resolution to 1 or 10° and other setup parameters. Exit by pressing the NEXT button until EXIT is displayed, then press EXIT. If either the STEP or LF buttons are not pushed for three minutes, the EDM-900 will revert to automatic scan mode (1 to 9 seconds or 0 no scan). Depressing the STEP button will stop the automatic mode and revert to manual mode. Refer to the EDM-900 Pilot's Guide Rev. IR or later for additional operating information. This Pilot's Guide must be available to the pilot for all flight operations.

Remote Alarm Light (RAL) for EDM 900

The remote alarm light is a red or yellow light depending on the alarm condition. The EDM-900 incorporates a light that alerts the pilot that a parameter has reached a caution range or limit. This light is mounted in front of the pilot, labeled "ENGINE". The light flashes depending on the condition "Warning" (Red) or "Caution" (Yellow). All Alert and Alarms will be displayed in the "Message Area" of the Display.

On initial startup or whenever power is turned on, the words EDM-900 PRIMARY" are displayed in the Message Area, followed by the make and model of the aircraft with STC information for which the primary limits were set.

LIMITES D'ALARMES

Les limites d'alarme primaires pour chaque modèle d'avion sont définies par JPI et ne sont pas programmables par le pilote. Les fonctions principales de votre installation sont indiquées sur l'étiquette à l'arrière de l'instrument et sont identiques à celles spécifiées dans le Manuel de vol approuvé de l'avion (AFM) ou le manuel d'utilisation du pilote (POH).

Chaque fois qu'un paramètre atteint une limite, l'affichage et le "RAL" clignotent en rouge. De plus, l'indication "CLEAR" apparaît sur l'afficheur en face de l'une des touches. En appuyant sur la touche "CLEAR", vous confirmez avoir pris connaissance de l'alerte et éteignez les avertissements clignotants rouge sur l'écran et sur le RAL. Si une autre alarme de priorité inférieure existe, elle sera alors affichée dans la zone de message, mais le paramètre principal incriminé reste rouge. Chaque pression sur le bouton CLEAR permet d'afficher une alarme de priorité inférieure, présentant ainsi à chaque fois au pilote l'alarme de priorité la plus importante dans l'ordre de priorité. Si un paramètre principal a une zone de précaution jaune, le RAL (jaune) se déclenchera si cette zone est atteinte. "CLEAR" désactivera cette alarme jusqu'à ce que le paramètre soit réinitialisé et remis en fonction.

Hiérarchie des alarmes pour l'EDM-900

1 OILP_LO	6 MAP	14 CLD	18 AMPS
2 OILT_HI	7 RPM	15 OILT_LO	19 RES
3 CHT	8 CDT	16 VOLTS	20 EGT
4 TIT	9 FP_LO	17 OILP_HI	21 Fuel Flow
5 FLVL	10 REM		

MISE EN GARDE

Les lumières d'alertes n'indiquent pas si la limite atteinte est une limite haute ou basse, le pilote doit l'affichage de l'EDM-900 pour déterminer si le dépassement concerne une limite haute ou basse.

ALARM LIMITS

Primary alarm limits for each specific aircraft model are set by JPI and are not programmable by the pilot. The primary functions for your installation are shown on the Primary label on the back of the instrument and are identical to those specified in the FAA Approved (AFM) Airplane Flight Manual or (POH) Pilot's Operating Handbook.

Whenever a parameter reaches an alarm limit, the display and the "RAL" will flash red. Also a soft key label "Clear" will appear. Tapping the CLEAR soft key will acknowledge and extinguish the soft key label, the red display warnings on the main display and on the RAL. If another lower priority alarm exists, it will then be displayed in the Message Area but the offending primary parameter remains red. Each press of the CLEAR button will allow any lower priority alarm to be displayed, thus presenting the pilot with the highest priority alarm condition. If the primary gauge has a yellow caution area it will activate the RAL (yellow) if that parameter is reached. Clear will deactivate this alarm until the parameter is reset and reactivated again.

Alarm hierarchy for the EDM-900

1	OILP_LO	6	MAP	14	CLD	18	AMPS
2	OILT_HI	7	RPM	15	OILT_LO	19	RES
3	CHT	8	CDT	16	VOLTS	20	EGT
4	TIT	9	FP_LO	17	OILP_HI	21	Fuel Flow
5	FLVL	10	REM				

CAUTION

Alerts Lights do not indicate high or low, pilots must crosscheck the EDM-900 to determine whether a high limit exceedance has changed to a low limit exceedance or vice versa.

Luminosité de l'affichage.

L'affichage de l'EDM900 est pourvu d'un système de régulation automatique de la luminosité. Ce réglage peut également être effectuée manuellement, en appuyant sur le troisième bouton (identifié DIM / BRT) vous augmentez ou diminuez le pourcentage de luminosité de l'affichage. Le réglage manuel annule la fonction de réglage automatique de la luminosité. A la mise sous tension de l'EM900, le système se met par défaut en réglage automatique et en luminosité maximale.

Dimming

Automatic dimming is provided to dim the panel display. Dimming can also be accomplished manually. Tapping the third button (labeled DIM/BRT) puts you in the increase or decrease brightness mode showing LCD % brightness. Manual dimming overrides the automatic dimming feature. When switching electrical power off and on, the system defaults to automatic dimming at full bright.

8. MANOEUVRE ENTRETIEN
MAINTENANCE

Section non affectée.

8.MAINTENANCE
OPERATIONS

No change

GARMIN G500 TXi

Ce supplément au manuel de vol contient les informations que les conditions de certifications exigent de fournir au pilote. Ces informations remplacent ou complètent celles du manuel de vol approuvé.

This Aircraft Flight Manual Supplement (AFMS) includes the material required to be furnished to the pilot and additional information provided by the manufacturer. The information contained herein supplements or supersedes any existing supplement concerning the approved Aircraft Flight Manual.

Applicabilité

Applicability

Type et modèle d'avion <i>Aircraft type and model</i>		Modification constructeur <i>Manufacturer change</i>
Avions ROBIN	DR400/100 ; DR400/2+2 ; DR400/120 ; DR400/120A ; DR400/120D ; DR400/125 ; DR400/125i ; DR400/140 ; DR400/140B ; DR400/160 ; DR400/160D ; DR400/180 ; DR400/180R ; DR400/180S ; DR400/200R ; DR400/200i ; DR400/140B avec STC EASA 10014219	DET190103

Approbation

Approval

AVERTISSEMENT

Ce supplément au manuel de vol est une traduction française de courtoisie, des informations jugées nécessaires de fournir au pilote.

Il est rédigé sur la base du supplément approuvé FAA et EASA (190-01717-B2 Rev.2) en vigueur à la date de publication de ce document.

WARNING

This flight manual supplement is a courtesy French translation of information deemed necessary to provide of the pilot.

This AFMS is based on approved FAA and EASA (190-01717-B2 Rev.2) flight manual supplement in the publication date of this document.

Le supplément approuvé par la FAA et l'EASA (190-01717-B2) dans sa dernière version doit être inséré dans le manuel de vol approuvé lorsqu'un GARMIN G500TXi est installé dans l'aéronef.

La mise à jour de la documentation est de ce fait, à la charge du propriétaire ou de l'exploitant de l'aéronef.

Ce supplément CEAPR peut être utilisé en lieu et place du supplément FAA et EASA approuvé, sous la seule responsabilité du propriétaire ou de l'exploitant de l'aéronef.

FAA and EASA Approved Supplement (190-01717-B2) in his latest version must be included in the approved flight manual when a GARMIN G500TXi is installed in the aircraft.

The up to date of the documentation is therefore at the expense of the owner or operator of the aircraft.

This CEAPR supplement may be used instead of approved FAA and EASA supplement, under the responsibility of the owner or operator of the aircraft.

Liste des pages en vigueur

List of effective pages

Pages	Date
1 à <i>(to)</i> 14	Juillet 2019

INTRODUCTION

Ce supplément au manuel de vol permet de renseigner les différentes données liées à l'installation d'un GARMIN G500TXi.

This Aircraft Flight Manual Supplement (AFMS) allows to describe data due to the installation of a GARMIN G500TXi.

MODIFICATION

Les sections du manuel de vol sont affectées de la façon suivante.

The sections of the aircraft flight manual are affected as follows.

0. GENERALITES

Section non affectée.

0. GENERAL

No change.

1. DESCRIPTION

Section non affectée.

1. DESCRIPTION

No change.

2. LIMITATIONS

2.1 Version logiciel minimum

La version du logiciel suivante ou les futures versions du logiciel doivent être installées pour que ce supplément soit applicable.

2. LIMITATIONS

2.1 Minimum software version

The following or later software versions must be installed for this AFMS revision to be applicable to the installation:

Component	Identification	Software Version
GDU (afficheur / display)	PFD, MFD and/or EIS*	2.20

(*) PFD : Primary Flight Display
MFD : Multi-Functionnal Display
EIS : Engine Indicating system

2.2 Zone d'utilisation AHRS (Attitude & Heading Reference System)

L'utilisation en IFR est interdite au nord de 72°N et au sud de 70°S. De plus, l'utilisation en IFR est interdite dans les régions suivantes :

- 1) Au Nord de la latitude 65°N entre les longitudes 75°W et 120°W.
- 2) Au Nord de la latitude 70°N entre les longitudes 70°W et 128°W.
- 3) Au Nord de la latitude 70°N entre les longitudes 85°E et 114°E

2.2 AHRS (Attitude & Heading Reference System) Operational Area

IFR Operations are prohibited north of 72°N and south of 70°S latitudes. In addition, IFR operations are prohibited in the following four regions:

- 1) North of 65° North latitude between longitude 75° W and 120° W
- 2) North of 70° North latitude between longitude 70° W and 128° W
- 3) North of 70° North latitude between longitude 85° E and 114° E

- 4) Au Sud de la latitude 55°S entre les longitudes 120°E et 165°E

Une perte des données peut se produire à proximité des pôles.

2.3 Zone d'utilisation soumise à des variations magnétiques.

L'utilisation en IFR est interdite dans les zone ou la variation magnétique est supérieure à 99.9 degrés Est ou Ouest.

2.4 Angle de navigation

L'angle de navigation magnétique / vrai (sélectionné dans la page système de l'instrument) doit correspondre à l'angle de navigation sélectionné sur tous les navigateurs GPS/SBAS interfacés.

2.5 Mode d'utilisation normal ADAHRS et AHRS.

Le vol en condition IMC n'est autorisé que si l'ADHARS ou l'AHRS reçoit des données GPS et des données de vol valide. Le G500TXi surveille en permanence la réception de ces données et avise le pilote en cas de non réception.

2.6 Instrument de secours digital.

Le fonctionnement de la batterie de secours doit être vérifié avant chaque vol sinon les instruments de secours seront considérés comme inopérants.

2.7 Vision synthétique

La vision synthétique ne doit pas être utilisée comme seule référence pour le contrôle de l'aéronef (sans références aux instruments de vol primaires) et pour la navigation ou l'évitement d'obstacles/relief/trafic.

Si le système TAWS ou Terrain alerting installé est inopérant, l'écran de vision synthétique du PFD doit être désactivé.

- 4) South of 55° South latitude between longitude 120° E and 165° E*

Loss of attitude and heading may occur near the poles.

2.3 Magnetic variation operational Area

IFR operations are prohibited in areas where the magnetic variation is greater than 99.9 degrees East or West.

2.4 Navigation Angle

The Magnetic/True Navigation Angle (as selected on the System Units page) must match the navigation angle selected on all interfaced GPS/SBAS navigators.

2.5 ADAHRS and AHRS Normal Operating Mode.

Flight in IMC is not authorized unless the ADAHRS or AHRS is receiving valid GPS and valid Air Data. The G500 TXi system monitors these integrity systems automatically and will advise the pilot when the ADAHRS or AHRS is not receiving GPS or Air Data.

2.6 Electronic Standby Instrument power.

The independent power source for electronic standby instrument(s) must be verified to be operational before flight, or the electronic standby(s) must be considered inoperative.

2.7 Synthetic Vision

The synthetic vision presentation must not be used as the sole reference for aircraft control (without reference to the primary flight instruments) and navigation or obstacle/terrain/traffic avoidance.

If the installed TAWS or Terrain Alerting system is inoperative, the synthetic vision display on the PFD must be selected off.

2.8 Carte interactive

L'affichage de la carte interactive (position de l'avion sur la carte) ne doit pas être utilisé comme moyen primaire de navigation.

2.9 Déconnexion du pilote automatique.

Le bouton « AP DISC » affiché dans le menu test PFD (si installé) doit déconnecter le pilote automatique lorsqu'il est actionné. Si le bouton ne permet pas la déconnexion alors le pilote automatique ne doit pas être utilisé.

2.10 Affichage terrain.

Les manœuvres ou les navigations ne doivent pas être effectuées en se basant uniquement sur les données de terrain ou d'obstacle indiquées par l'afficheur / l'instrument.

2.11 Alertes Terrain / TAWS (Terrain Awareness and Warning System)

Les alertes terrains / TAWS doivent être déconnectées lors de l'atterrissage sur un aérodrome ne figurant pas dans la base de donnée.

2.12 Affichage du trafic.

L'affichage du trafic est une aide à l'acquisition visuelle et ne doit pas être utilisé comme unique moyen de détection du trafic pour les manœuvres de l'appareil.

2.13 Débit carburant

Les indications de débit de carburant peuvent être erronées jusqu'à 15% si l'étalonnage du facteur K a mal été réalisé. Ne vous fiez pas uniquement à l'indication du débit de carburant pour déterminer le carburant utilisé ou la réserve de carburant.

2.8 Moving Map

Moving map displays (ownship position relative to map features) must not be used as the primary or sole means of navigation or course guidance.

2.9 Autopilot Disconnect

The "AP DISC" button in the PFD Test Menu (if present for the installation) must disconnect the autopilot when pressed. If the button does not disconnect

the autopilot when pressed, then the autopilot must not be used.

2.10 Terrain display

Maneuvers and navigation must not be based solely on the display of terrain, obstacles, or wires on the moving map terrain displays.

2.11 Terrain / TAWS (Terrain Awareness and Warning System) alerts.

Terrain/TAWS alerts must be inhibited when landing at an airport that is not in the airport database.

2.12 Traffic Display

The display of traffic is intended as an aid to visual acquisition and must not be used as the sole basis for aircraft maneuvering.

2.13 Fuel flow

Fuel flow values may be in error by as much as 15% if the K factor calibration is improperly set. Do not depend solely on the fuel flow indication to determine fuel used, fuel remaining, or fuel reserves.

2.14 Calculateur carburant.

Les fonctions de calcul de carburant ne doivent pas être utilisées comme moyen de détermination de la quantité de carburant dans les réservoirs.

2.15 Maintenance requise.

Il est interdit de débiter un vol lorsque l'indication « Service Required » apparaît sur l'affichage PFD, MFD ou EIS.

2.14 Fuel Computer

The fuel computer functions must not be used as the means of determining the quantity of fuel in the tanks.

2.15 Service Required

It is prohibited to initiate flight when a "Service Required" advisory is present on the PFD, MFD, or EIS display.

3. PROCEDURES D'URGENCES

3.1 Panne de PFD (instruments de vol primaires).

Une défaillance du PFD est indiquée par la perte des informations indiquées sur l'afficheur PFD, notamment un affichage vide ou ne répondant pas.

1. Utiliser les instruments de secours (anémomètre, altimètre, indicateur de virage ou horizon artificiel).
2. Reportez-vous directement à la source des données de navigation (GPS par exemple)
3. Recherchez des conditions de vol VFR et atterrissez dès que possible.

Si le pilote automatique est activé :

4. Vérifier le mode du pilote automatique et vérifier les données de vol par recoupement.

3.2 Panne AHRS.

Une panne AHRS est indiquée par la suppression des informations d'inclinaison/cap et par une croix rouge sur l'indication du taux de virage sur l'afficheur PFD. Une défaillance de l'affichage du cap se produira également.

1. Utiliser l'indicateur de virage de secours.
2. Rechercher des conditions de vol VFR ou atterrissez dès que possible.

Si plusieurs sources AHRS sont installées :

3. Sélectionner la seconde source AHRS à l'aide du menu capteur PFD.

3. EMERGENCY PROCEDURES

3.1 PFD Failure.

PFD failure is indicated by the loss of displayed information on the PFD, including a blank, frozen, or unresponsive display.

- 1. Use standby flight instruments for attitude, airspeed, altitude, and heading reference.*
- 2. Refer directly to the navigation source for navigation information (such as GPS).*
- 3. Seek VFR conditions or land as soon as practical.*

If autopilot is engaged:

- 4. Verify autopilot mode and cross check against standby flight and navigation data.*

3.2 AHRS Failure.

AHRS failure is indicated by the removal of the attitude/heading information and a red X on the PFD. Rate-of-turn information (heading trend vector) will not be available. A heading failure will also occur.

- 1. Use Standby Attitude Indicator.*
- 2. Seek VFR conditions or land as soon as practical.*

If multiple AHRS sources are installed:

- 3. Select operative AHRS using the PFD Sensors menu*

3.3 Panne ADC (Air Data Computer)

Une panne ADC est indiquée par :

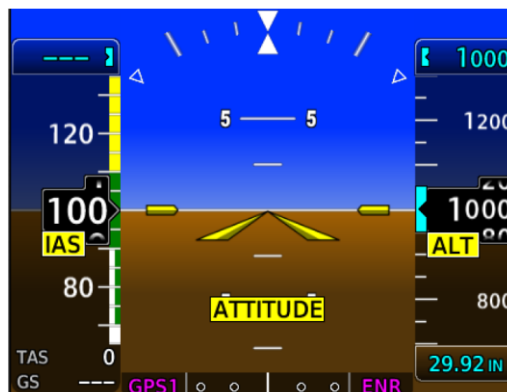
- Une croix rouge sur les champs d'altitude et de vitesse.
- Une croix jaune sur le champ vitesse verticale.
- Des pointillés dans les champs OAT et TAS.

Les calculs du vent seront également indisponibles. Si une source GPS est disponible, le PFD affichera automatiquement l'altitude calculée par le GPS par rapport au niveau de la mer. L'altitude GPS est affichée en haut du champ altitude.

1. Utilisez l'altimètre et anémomètre de secours.
2. Recherchez des conditions de vol VFR ou atterrissez dès que possible.
3. Sélectionnez la seconde source ADC dans le menu capteur du PFD (si installé)

3.4 Alerte inclinaison, altitude ou vitesse indiquée.

Si un alerte « ATTITUDE », « ALT » ou « IAS » s'affiche en jaune sur l'horizon artificiel ou les champs altitude/vitesse :



1. Croisez les informations avec d'autres instruments ou indications pour déterminer quelles indications sont correctes.
2. Recherchez des conditions de vol VFR ou atterrissez dès que possible.

3.3 ADC Failure. (Air Data Computer)

ADC failure is indicated by:

- *Red X over the airspeed and altitude tapes*
- *Yellow X over the vertical speed tape*
- *Dashed out TAS and OAT fields*

Wind calculations will also be unavailable. If valid GPS data is available, the PFD will automatically revert to display GPS calculated altitude relative to mean sea level. GPS altitude is displayed at the top of the altitude tape.

1. *Use Standby Airspeed Indicator and Altimeter*

2. *Seek VFR conditions or land as soon as practical*

If multiple ADC sources are installed:

3. *Select operative ADC using the PFD Sensors menu*

3.4 ATTITUDE, ALT, or IAS monitor CAUTION.

If an ATTITUDE, ALT, or IAS monitor CAUTION is displayed in amber on the attitude display or airspeed/altitude tape:

1. *Cross check flight instruments against all available information to determine which indications are correct*
2. *Seek VFR conditions or land as soon as practical*

3.5 Panne du système électrique de l'avion.

En cas de panne générale du système électrique de l'avion, le G500 TXi cessera de fonctionner, excepté pour les afficheurs équipés d'une batterie de secours.

3.6 Panne d'indication instruments moteur (si EIS équipé)

Une panne d'indication des instruments moteur est indiquée par une perte de l'affichage sur l'EIS, un vide ou des paramètres ne répondants pas.

1. Positionner les commandes du moteur de manière à garantir un fonctionnement du moteur dans les limites autorisées.

3.7 Alertes Terrain / TAWS

3.5 Aircraft Electrical System Failure.

In the event of a total loss of aircraft electrical power, the G500/G600 TXi system will cease to operate, except for displays which are equipped with an optional backup battery.

3.6 EIS (Engine Indicating System) Failure (if equipped)

EIS failure is indicated by the loss of displayed information on the EIS, including a blank, frozen, or unresponsive display of EIS parameters.

1. *Position engine controls to ensure operation within engine limitations.*

3.7 TAWS/Terrain Alerts

Alertes vocales / <i>Aural Alert</i>	Alertes Visuelles / <i>Visual Alert</i>	Action
"Terrain, Terrain Pull up, Pull up" -OR- "Obstacle, Obstacle Pull up, Pull up" -OR- "Wire, Wire Pull up, Pull up" -OR- "Warning, Terrain, Terrain" -OR- "Warning, Obstacle, Obstacle" -OR- "Warning, Wire, Wire" -OR- "Pull up"	PULL UP -OR- TERRAIN -OR- OBSTACLE -OR- WIRE	Déconnecter le pilote automatique et initier une montée de performance (puissance de décollage maximale et meilleure angle de montée) <i>Disconnect autopilot and initiate maximum performance climb (maximum takeoff power and best angle of climb airspeed)</i>

Alertes vocales / <i>Aural Alert</i>	Alertes Visuelles / <i>Visual Alert</i>	Action
"CAUTION, Terrain" -OR- "CAUTION, Obstacle" -OR- "CAUTION, Wire"	TERRAIN -OR- OBSTACLE -OR- WIRE	Prenez l'action corrective adéquate en fonction de l'alerte rencontrée. Utilisez les informations disponibles pour déterminer la meilleure action, changez de route, de direction en arrêtant de monter, descendre ou de tourner. <i>Take corrective action until the alert ceases. Using all available information to determine the appropriate action, alter the flight path away from the threat by stopping descent, climbing, and/or turning.</i>
"Too low, Terrain"	TERRAIN	Montez à l'altitude minimale requise pour la position actuelle. <i>Establish climb to the minimum altitude for present position/procedure</i>
"Sink Rate"	TERRAIN	Diminuez le taux de descente. <i>Decrease rate of descent</i>
"Don't sink"	TERRAIN	Etablir un taux de montée positif <i>Establish a positive rate of climb</i>

3.8 Procédures anormales

3.8.1 Panne d'affichage du cap (heading)

Une panne de cap est indiquée par la suppression de l'affichage de cap magnétique sur le HSI et l'affichage du message « **HDG FAIL** » rouge.

Si le guidage GPS est disponible, il sera automatiquement affiché à la place du cap. Le curseur de cap et le pointeur de route continueront à fonctionner normalement, en utilisant le guidage GPS comme référence au lieu du cap magnétique.

3.8 Abnormal Procedures

3.8.1 Heading Failure

Heading failure is indicated by removal of the digital magnetic heading display on the HSI and a red "HDG FAIL" annunciation.

If GPS ground track is available, it will automatically be displayed in place of heading. The heading bug and course pointer will continue to function normally, using GPS ground track as a reference instead of magnetic heading.

Si le guidage GPS n'est pas disponible :

1. Utilisez le compas de secours pour la référence du cap.

Note : Sans cap magnétique ni guidage GPS, le CDI ne fournit aucune information directionnelle. Seules les informations sur les écarts de route sont présentées et l'orientation du CDI est basée sur les routes choisies, quel que soit le cap de l'avion. Les indications de déviation de route se comporteront comme un CDI traditionnel. Les écarts de VOR seront relatifs à la route sélectionnée avec une indication TO / FROM.

3.8.2 Panne de ventilateur de l'écran.

Une panne du ventilateur est indiqué par l'affichage du message « **FAN FAIL** » sur l'écran. Sans refroidissement, l'écran surchauffera et s'éteindra.

1. Se prépare à l'extinction de l'écran.

3.8.3 Perte des données GPS.

Une perte des données GPS peut être indiquée par l'un ou tous les éléments suivants :

- Perte de la barre de déflexion GPS sur le HSI.
- Affichage du message « **LOI** » sur le PFD
- Affichage du message « **DG** » sur le PFD
- Affichage du message « **NO GPS POSITION** » sur la carte interactive.
- Perte d'affichage des repères de cheminement et/ou de distance.

1. Sélectionner une autre source GPS (si disponible), en appuyant sur la touche « CDI » du PFD.

Si aucune autre source n'est disponible :

2. Sélectionner une autre source de navigation (VOR, LOC ou ADF si disponible) ou se reporter à une source de navigation externe.

If GPS track is not available:

1. Use standby compass for heading reference.

NOTE: Without magnetic heading or GPS track, the CDI provides no directional information. Only course deviation information is presented, and the orientation of the CDI is based on the selected course, regardless of aircraft heading. Course deviation indications will behave like a traditional CDI. VOR deviations will be relative to the selected course with a TO/FROM indication.

3.8.2 Display Fan Failure

Display fan failure is indicated by an amber "**FAN FAIL**" annunciation on the affected display. Without fan cooling, the affected display will overheat and shutdown.

1. Prepare for loss of the affected display.

3.8.3 GPS Data Failure

GPS data failure may be indicated by any or all of the following:

- Loss of GPS course deviation information on HSI
- Amber "**LOI**" text on the PFD
- Amber "**DG**" text on the PFD
- Amber "**NO GPS POSITION**" text on the moving map
- Loss of waypoint bearing/distance information

1. Select alternate GPS source, if available, by pressing "CDI" button on PFD.

If alternate GPS source is not available:

2. Select alternate navigation source (VOR, LOC, or ADF, if available) or refer directly to external navigation data.

3.8.4 Perte des données de navigation (VOR/LOC/GS/ADF)

La perte des données de navigation peut être indiquée par l'un ou tous les éléments suivants :

- Perte des barres de déflexion sur le PFD
- Perte d'informations sur l'alignement / trajectoire de descente sur le PFD
- Perte du pointeur de relèvement sur l'HSI

1. Sélectionnez une autre source de navigation ou reportez-vous directement aux données de navigation externes.

3.8.5 Dysfonctionnement de la vision synthétique

Si la représentation de vision synthétique est connue ou soupçonnée d'être inexacte ou de ne pas fonctionner correctement :

1. Désactivez la fonction terrain synthétique à l'aide du menu PFD Terrain / SVT.

3.8.6 Délestage électrique

Les équipements suivants sont considérés comme non essentiels. S'il devient nécessaire de réduire la consommation électrique (par exemple, perte de génération électrique ou d'alternateur), les équipements peuvent être déconnectés dans l'ordre suivant :

1. Breaker adaptateur PFD (si installé).....Tiré

Note : La déconnection de l'adaptateur (GAD43) peut résulter en la perte de fonction du pilote automatique et/ou la perte de certaines données de navigation (VOR/LOC, ADF, DME, altimètre radar)

2. PFD CTRL breaker (si installé).....Tiré

3.8.4 Navigation Data Failure (VOR/LOC/GS/ADF)

Navigation data failure may be indicated by any or all of the following:

- *Loss of course deviation information on PFD*
- *Loss of glide slope/glide path information on PFD*
- *Loss of bearing pointer on HSI*

1. *Select alternate navigation source or refer directly to external navigation data.*

3.8.5 Synthetic Vision Malfunction

If the synthetic vision depiction is known or suspected to be inaccurate or malfunctioning:

1. *Turn off synthetic terrain using the PFD Terrain/SVT menu.*

3.2.6 Electrical Load Shedding

The following equipment is considered non-essential. If it becomes necessary to reduce electrical load (for example, during loss of generators or alternators), power to these units may be removed in the order listed.

1. *PFD ADAPTER circuit breaker(s) [if installed]PULL*

Note: *When the PFD ADAPTER is shed, this may result in the loss of autopilot function and/or loss of some navigation data on the PFD (VOR/LOC, ADF, DME, radar altimeter).*

2. *PFD CTRL circuit breaker(s) [if installed]PULL*

3.8.7 Alignement AHRS

Si le message « AHRS ALIGN / Keep Wings Level » s'affiche sur l'indicateur d'attitude en vol, limiter l'utilisation de l'avion à :

- Roulis $\pm 10^\circ$
- Tangage $\pm 5^\circ$
- Moins de 200KIAS

Attention : Dépasser ces valeurs entraînera un délai ou l'empêchement de l'alignement de l'AHRS

3.8.8 Panne de l'affichage des paramètres moteur.

La panne est indiquée par un X rouge ou jaune sur l'indicateur concerné et l'absence d'indication. (Se référer à la procédure Panne EIS en cas de panne totale de la fonction EIS).

1. Surveiller les paramètres restants et régler les commandes moteur afin de rester dans les limites de fonctionnement.

3.8.7 AHRS ALIGN

If an "AHRS ALIGN / Keep Wings Level" annunciation is displayed on the attitude indicator in flight, limit aircraft operation to:

- $\pm 10^\circ$ bank
- $\pm 5^\circ$ pitch
- 200 KTAS or less

CAUTION: *Exceeding these values may delay or prevent AHRS alignment.*

3.8.8 EIS Display Parameter Failure

Indicated by individual parameters having a red or yellow X drawn through the gauge and data removed (see EIS failure procedure for loss of entire EIS function).

1. *Monitor remaining parameters and set engine controls to operate within limitations.*

4. PROCEDURES NORMALES

4.1 Avant décollage.

1. Vérifier qu'aucun message d'alerte ou d'avertissement anormal n'est affiché.
2. Si un système d'alerte terrain / TAWS est installé, assurez-vous que le test audio d'alerte peut être entendu clairement. (Un clip audio de test est lu durant l'autotest de démarrage)

5. PERFORMANCE

Section non affectée.

6. MASSE ET CENTRAGE

Section non affectée.

7. DESCRIPTION SYSTEMES

Section non affectée.

8. MANŒUVRE ENTRETIEN MAINTENANCE

Section non affectée.

4. NORMAL PROCEDURES

4.1 Before Take-off

1. Review displays for any abnormal warning, caution, or advisory indications.
2. If equipped with a TAWS/Terrain warning system, ensure that the terrain alert audio test can be heard clearly (a system test audio clip is played during the start up self-test).

5. PERFORMANCES

No Change.

6. WEIGHT AND BALANCE

No change.

7. SYSTEMS DESCRIPTION

No change

8. MAINTENANCE PROCEDURE

No change

GARMIN GTN750/650 Xi

Ce supplément au manuel de vol contient les informations que les conditions de certifications exigent de fournir au pilote. Ces informations remplacent ou complètent celles du manuel de vol approuvé.

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Applicabilité

Applicability

Type et modèle d'avion <i>Aircraft type and model</i>		Modification constructeur <i>Manufacturer change</i>
EASA A 367 DR300 DR400	DR315; DR340; DR360; DR380; DR300/108; DR300/120; DR300/125; DR300/140; DR300/180R; DR400/100 ; DR400/2+2 ; DR400/120 ; DR400/120A ; DR400/120D ; DR400/125; DR400/125i ; DR400/140 ; DR400/140B ; DR400/160 ; DR400/160D ; DR400/180 ; DR400/180R ; DR400/180S ; DR400/200R ; DR400/200i ; DR400/RP ; DR400/NGL ; DR400/500 ; DR400/140B avec STC EASA 10014219	DET200301

Approbation

Approval

AVERTISSEMENT

Ce supplément au manuel de vol est une traduction française de courtoisie des informations jugées nécessaires de fournir au pilote.

Il est rédigé sur la base des suppléments approuvés FAA (190-01007-C2) et EASA (190-01007-E3) en vigueur à la date de publication de ce document.

WARNING

This flight manual supplement is a courtesy French translation of information deemed necessary to provide of the pilot.

This AFMS is based on approved FAA (190-01007-C2) and EASA (190-01007-E3) flight manual supplement in the publication date of this document.

Les suppléments approuvés par la FAA (190-01007-C2) et l'EASA (190-01007-E3) dans leur dernière version doivent être insérés dans le manuel de vol approuvé lorsqu'un GARMIN GTN650Xi ou GTN750Xi est installé dans l'aéronef.

La mise à jour de la documentation est de ce fait, à la charge du propriétaire ou de l'exploitant de l'aéronef.

Ce supplément CEAPR peut être utilisé en lieu et place des suppléments FAA et EASA approuvés, sous la seule responsabilité du propriétaire ou de l'exploitant de l'aéronef.

FAA (190-01007-C2) and EASA (190-01007-E3) approved supplements in their latest version must be included in the approved flight manual when a GARMIN GTN650Xi or GTN750Xi is installed in the aircraft.

The up to date of the documentation is therefore at the expense of the owner or operator of the aircraft.

This CEAPR supplement may be used instead of approved FAA and EASA supplements, under the responsibility of the owner or operator of the aircraft.

Liste des pages en vigueur

List of effective pages

Pages	Date
1 à (to) 27	Mars 2020

INTRODUCTION

Ce supplément au manuel de vol permet de renseigner les différentes données liées à l'installation d'un GARMIN GTN650Xi ou GTN750Xi.

This Aircraft Flight Manual Supplement (AFMS) allows to describe data due to the installation of a GARMIN GTN650Xi or GTN750Xi.

MODIFICATION

Les sections du manuel de vol sont affectées de la façon suivante.

The sections of the aircraft flight manual are affected as follows.

0. GENERALITES

Section non affectée.

0. GENERAL

No change.

1. DESCRIPTION

Section non affectée.

1. DESCRIPTION

No change.

2. LIMITATIONS

2.1 Type d'opération

Ce supplément ne permet pas d'approuver l'utilisation d'un aéronef en IFR s'il est limité en VFR.

2. LIMITATIONS

2.1 Kinds of Operation

This AFM supplement does not grant approval for IFR operations to aircraft limited to VFR operations.

2.2 Equipement minimum

Les équipements suivants doivent être pleinement opérationnels pour pouvoir utiliser le GTN Xi comme instrument de navigation primaire en IFR :

2.2 Minimum Equipment

The GTN Xi must have the following system interfaces fully functional in order to be used for primary navigation during IFR operations:

Equipement interface / Interfaced Equipment	Nombre installé / Number installed	Nombre requis pour l'IFR / Number required for IFR
HSI/CDI/EHSI Externe / External HIS/CDI/EHSI	1 ou plus / 1 or more	1
Annonciateur GPS Externe / External GPS Annunciator	Voir Note 1 / See Note 1	1

HSI (Horizontal Situation Indicator)

CDI (Course Deviation Indicator)

EHSI (Electronic Horizontal Situation Indicator)

Equipement requis pour l'utilisation de la navigation GPS en IFR : 1 GTN Xi Navigator uniquement.

2.3 Planification des vols

Aux fins de planification des vols, dans les zones où la couverture SBAS (Satellite Based Augmentation System) n'est pas disponible, l'équipage de conduite doit vérifier la disponibilité du RAIM (Receiver Autonomous Integrity Monitoring). Un moyen de conformité acceptable pour le programme de prédiction FDE (Fault Data Exclusion) est d'utiliser un service certifié qui répond aux exigences FAA AC 20-138D et FAA AC 90-105A pour la prévision.

Le tableau suivant décrit certains des programmes de prédiction RAIM disponibles.

Required Equipment for IFR operations utilizing GPS navigation: Single GTN Xi Navigator.

2.3 Flight Planning

For flight planning purposes, in areas where SBAS (Satellite Based Augmentation System) coverage is not available, the flight crew must check RAIM (Receiver Autonomous Integrity Monitoring) availability. An acceptable means of compliance for FDE (Fault Data Exclusion) prediction programs is to use a certified service which meets the requirements of FAA AC 20-138D and FAA AC 90-105A for prediction.

The following table describes some of the available RAIM prediction programs.

Programme de prévision / <i>Prediction program</i>	Adresse internet ou détails du programme / <i>Internet address or program details</i>	Zone de couverture / <i>Coverage Area</i>
Garmin RAIM Prediction Tool	https://fly.garmin.com/flygarmin/support/raim/	Mondiale / <i>Worldwide</i>
Garmin WFDE Prediction program	PC-based program included in GTN trainer v3.00 – 6.30. Instructions provided via Garmin part number 190-00643-01	Mondiale / <i>Worldwide</i>
AUGER GPS RAIM Prediction Tool	http://augur.ecacnav.com/augur/app/home	Espace aérien CEAC seulement (Europe) / <i>ECAC Airspace only</i>

Cette exigence de disponibilité RAIM n'est pas nécessaire si la couverture SBAS est disponible sur l'ensemble de l'itinéraire de vol.

A des fins de planification de vol au sein de l'espace aérien européen RNAV/RNAV5 et P-RNAV, si plus d'un satellite est considéré comme hors service alors la disponibilité GPS RAIM doit être confirmée pour la durée du vol prévu (itinéraire et temps). En cas de perte continue prévue de RAIM de plus de cinq minutes, pour une partie quelconque du vol prévu, le vol doit être reporté, annulé ou dévié sur une route où les exigences RAIM peuvent être satisfaites.

2.4 Utilisation du système

Les seules sources de trajectoire approuvées sont celles de l'indicateur CDI, HSI externe ou de l'afficheur EHSI. La carte interactive et la représentation CDI sur l'afficheur du GTN Xi sont pour information seulement et ne sont pas approuvées en tant que guidage.

Si les GTN Xi est couplé avec un indicateur externe capable de réaliser sa propre sélection de source, la fonction CDI du GTN sera désactivée. Le GTN Xi affichera « GPS » même si l'indicateur externe a sélectionné VLOC (VOR / Localizer).

2.5 Version logiciel minimum

Ce supplément est applicable aux versions de logiciel indiquées dans le tableau suivant.

Les versions du logiciel principal et GPS sont affichées sur la page de démarrage immédiatement après le démarrage. Toutes les versions des logiciels présentés dans le tableau ci-dessous peuvent être affichées dans la page système – état du système ou configuration.

This RAIM availability requirement is not necessary if SBAS coverage is confirmed to be available along the entire route of flight.

For flight planning purposes for operations within European B-RNAV/RNAV-5 and P-RNAV airspace, if more than one satellite is scheduled to be out of service, then the availability of GPS RAIM shall be confirmed for the intended flight (route and time). In the event of a predicted continuous loss of RAIM of more than five minutes for any part of the intended flight, the flight shall be delayed, canceled, or rerouted on a track where RAIM requirements can be met.

2.4 System Use

The only approved sources of course guidance are on the external CDI, HSI, or EHSI display. The moving map and CDI depiction on the GTN Xi display are for situational awareness only and are not approved for course guidance.

If the GTN Xi is interfaced with an external indicator capable of performing its own source selection, the GTN CDI Key will be disabled. The GTN Xi will display "GPS" even when the external indicator has VLOC (VOR / Localizer) selected.

2.5 Minimum software version

This AFMS is applicable to the software versions shown in Table below.

The Main and GPS software versions are displayed on the start-up page immediately after power-on. All software versions displayed in Table below can be viewed on the System – System Status or Connex Setup pages.

Logiciel / Software Item	Version logiciel / Software Version
Version logiciel principal / Main SW Version	20.01
Version Logiciel GPS / GPS SW Version	8.0
Version logiciel COM / COM SW Version	2.00
Version logiciel NAV / NAV SW Version	2.01

2.6 Cartes SD de base de données

Il est nécessaire que la carte SD de base de données soit présente en permanence dans le GTN. Cette carte ne doit en aucun cas être extraite ou insérée durant un vol ou lorsque le GTN est démarré.

2.7 Base de données de Navigation

La navigation IFR en route, océanique et terminale basée sur les données GPS/SBAS est interdite, sauf si l'équipage de conduite vérifie et utilise une base de donnée de navigation à jour, valide et compatible, ou vérifie la précision de chaque point de navigation « waypoints » en se référant à des données de navigation à jour.

Les approches aux instruments « GPS », « or GPS » et « RNAV (GPS) » utilisant le système de navigation Garmin, est interdit sauf si l'équipage de conduite vérifie et utilise une base de donnée de navigation à jour. Les approches aux instruments basées sur les données GPS doivent être effectuées conformément à une procédure d'approche aux instruments approuvée chargée depuis la base de données de navigation.

2.6 SD Database Cards

It is required that the SD database card or Flight Stream 510 (MMC) be present in the GTN at all times. The SD or MMC device must not be removed or inserted during flight or while the GTN is powered on.

2.7 Navigation Database

GPS/SBAS based IFR enroute, oceanic, and terminal navigation is prohibited unless the flight crew verifies and uses a valid, compatible, and current navigation database or verifies each waypoint for accuracy by reference to current approved data.

“GPS”, “or GPS”, and “RNAV (GPS)” instrument approaches using the Garmin navigation system are prohibited unless the flight crew verifies and uses the current navigation database. GPS based instrument approaches must be flown in accordance with an approved instrument approach procedure that is loaded from the navigation database.

Les anomalies qui invalident une procédure doivent être signalées à Garmin International. Il est interdit d'utiliser la procédure concernée dans la base de donnée de navigation jusqu'à ce qu'une nouvelle base de donnée de navigation soit installée dans l'avion et que les anomalies aient été corrigées. Les anomalies de base de données de navigation peuvent être signalées sur FlyGarmin.com en sélectionnant « Aviation Data Report ». L'équipage et les utilisateurs peuvent voir les alertes de base de données de navigation sur le site FlyGarmin.com dans la section « NavData Alerts ».

Si le cycle de la base de données de navigation change durant le vol, l'équipage doit s'assurer de l'exactitude des données de navigation, y compris la pertinence des données de navigation utilisées pour définir les itinéraires et les procédures de vol. Si une carte modifiée, affectant les données de navigation est publiée pour la procédure, la base de données ne doit pas être utilisée pour mener cette procédure.

2.8 Opérations au sol

N'utilisez pas les fonctions SafeTaxi ou ChartView comme référence pour manœuvrer au sol. Les fonctions SafeTaxi et ChartView ne sont pas conformes aux exigences de l'AC 20-159 et ne sont pas qualifiés pour être utilisés comme carte d'aéroport interactive (AMMD : Airport moving map display). SafeTaxi et ChartView peuvent uniquement être utilisés par l'équipage pour s'orienter ou améliorer la connaissance de la situation durant les opérations au sol.

Discrepancies that invalidate a procedure should be reported to Garmin International. The affected procedure is prohibited from being flown using data from the navigation database until a new navigation database is installed in the aircraft and verified that the discrepancy has been corrected. Navigation database discrepancies can be reported at FlyGarmin.com by selecting "Aviation Data Error Report." Flight crew and operators can view navigation database alerts at FlyGarmin.com then select "NavData Alerts."

If the navigation database cycle will change during flight, the flight crew must ensure the accuracy of navigation data, including suitability of navigation facilities used to define the routes and procedures for flight. If an amended chart affecting navigation data is published for the procedure, the database must not be used to conduct the procedure.

2.8 Ground Operations

Do not use SafeTaxi or ChartView functions as the basis for ground maneuvering. SafeTaxi and ChartView functions do not comply with the requirements of AC 20-159 and are not qualified to be used as an airport moving map display (AMMD). SafeTaxi and ChartView are to be used by the flight crew to orient themselves on the airport surface to improve flight crew situational awareness during ground operations.

2.9 Approches aux instruments

a) Les approches aux instruments utilisant le guidage GPS ne peuvent être effectuées que si le GTN Xi fonctionne en mode approche. (LNAV, LNAV+V, L/VNAV, LPV, LP ou LP+V)

b) Lors des approches aux instruments ayants pour référence le Nord Vrai, l'angle « NAV Angle » de la page « System – Unit » doit être défini sur « True ».

c) L'équipement de navigation requis pour rejoindre et exécuter une procédure d'approche aux instruments est indiqué par le titre de la procédure et les notes sur la carte IAP.

La navigation dans le segment d'approche finale (segment depuis le point d'approche final jusqu'au point d'approche interrompu) d'une approche ILS, LOC, LOC-BC, LDA, SDF, MLS, VOR, TACAN, ou tout autre type d'approche non approuvée par GPS, n'est pas autorisé par guidage GPS.

Le guidage GPS ne peut être utilisé que pour les procédures d'approches indiquant GPS ou RNAV dans leur titre.

Lors de l'utilisation des récepteurs Garmin LOC/GS pour effectuer le segment d'approche finale, les données de navigation LOC/GS doivent être sélectionnées et affichées sur l'affichage CDI du pilote aux commandes.

Lors de l'utilisation des récepteurs VOR ou ADF pour effectuer le segment d'approche finale d'une approche VOR ou NDB, le GPS peut être la source de navigation sélectionnée tant que la station VOR ou NDB est opérationnelle et que le signal est surveillé lors de l'alignement du segment d'approche finale.

2.9 Instrument Approaches

a) Instrument approaches using GPS guidance may only be conducted when the GTN Xi is operating in the approach mode. (LNAV, LNAV +V, L/VNAV, LPV, LP, or LP +V)

b) When conducting instrument approaches referenced to true North, the NAV Angle on the System -Units page must be set to True.

c) The navigation equipment required to join and fly an instrument approach procedure is indicated by the title of the procedure and notes on the IAP chart.

Navigating the final approach segment (that segment from the final approach fix to the missed approach point) of an ILS, LOC, LOC-BC, LDA, SDF, MLS, VOR, TACAN approach, or any other type of approach not approved for GPS, is not authorized with GPS navigation guidance.

GPS guidance can only be used for approach procedures with GPS or RNAV in the procedure title.

When using the Garmin LOC/GS receivers to fly the final approach segment, LOC/GS navigation data must be selected and presented on the CDI of the pilot flying.

When using the VOR or ADF receiver to fly the final approach segment of a VOR or NDB approach, GPS may be the selected navigation source so long as the VOR or NDB station is operational and the signal is monitored for final approach segment alignment.

d) Les informations d'écart de guidage vertical sont fournies lorsque le GTN Xi est utilisé en mode LNAV+V ou LP+V. Les informations de guidage vertical affichées sur le VDI dans ce mode ne sont qu'une aide à la conduite pour aider l'équipage à se conformer aux restrictions d'altitude. Lors de l'utilisation du guidage vertical, l'équipage doit utiliser l'altimètre barométrique principal pour garantir le respect de toutes les restrictions d'altitude.

e) Les procédures d'approche aux instruments (IAP) publiées ne figurent pas toutes dans la base de données de navigation. Les équipages de conduite qui prévoient d'effectuer une approche aux instruments RNAV doivent s'assurer que la base de données de navigation contient la procédure d'approche aux instruments RNAV nécessaire et que cette procédure d'approche est chargée depuis la base de données de navigation, dans le plan de vol du système GTN Xi, par son nom. Il est interdit aux pilotes de voler sur toute trajectoire d'approche contenant des points de cheminement entrés manuellement.

f) Les approches IFR sont interdites dès lors qu'une obstruction physique ou visuelle restreint la vue du pilote ou l'accès au GTN Xi et / ou au CDI.

2.10 Vol au QFE

Lors des procédures de vol nécessitant l'utilisation des paramètres barométriques QFE, le pilote doit s'assurer que le paramètre barométrique de la source interfacée avec le GTN Xi est réglé sur QFE. Le GTN Xi ne prend pas en charge le VNAV barométrique pour les utilisations au QFE.

d) Advisory vertical guidance deviation is provided when the GTN Xi announces LNAV + V or LP +V. Vertical guidance information displayed on the VDI in this mode is only an aid to help flight crews comply with altitude restrictions. When using advisory vertical guidance, the flight crew must use the primary barometric altimeter to ensure compliance with all altitude restrictions.

e) Not all published Instrument Approach Procedures (IAP) are in the navigation database. Flight crews planning to fly an RNAV instrument approach must ensure that the navigation database contains the planned RNAV Instrument Approach Procedure and that approach procedure must be loaded from the navigation database into the GTN Xi system flight plan by its name. Pilots are prohibited from flying any approach path that contains manually entered waypoints.

f) IFR approaches are prohibited whenever any physical or visual obstruction (such as a throw-over yoke) restricts pilot view or access to the GTN Xi and/or the CDI.

2.10 QFE Barometric Setting

When flying procedures requiring the use of QFE barometric settings, the pilot must ensure that the barometric setting for the source interfaced with the GTN Xi is set to QFE as appropriate. GTN Xi does not support barometric VNAV for QFE operations.

2.11 Couplage du pilote automatique

L'équipage de conduite peut effectuer toutes les phases de vol en fonction des informations de navigation présentées; cependant, tous les modes ne peuvent pas être couplés au pilote automatique. Tous les pilotes automatiques peuvent être couplés en modes océanique (OCN), en route (ENR) et terminal (TERM).

Cette installation est limitée à:

- Couplage latéral uniquement pour les approches GPS. Le couplage à la trajectoire verticale pour les approches GPS n'est pas autorisé.

Il est possible de créer des séquences de points de cheminement de plan de vol, y compris des modèles de recherche et de sauvetage, qui dépassent les capacités d'angle d'inclinaison du pilote automatique. Le pilote doit surveiller les performances du pilote automatique en ce qui concerne la déviation de la trajectoire de vol.

2.12 Fonction d'alerte de terrain (toutes les unités)

Les informations de terrain, d'obstacle ponctuel et d'obstacle filaire apparaissent sur les pages d'affichage de la carte et du terrain sous forme de terrain, d'obstacles ou de câbles rouges et ambrés et sont représentées à titre indicatif uniquement. Les manœuvres et la navigation des aéronefs ne doivent pas être fondées sur l'utilisation de l'affichage du terrain. Les informations sur le terrain, les obstacles et les câbles sont fournies à titre indicatif uniquement et ne sont pas équivalentes aux avertissements fournis par TAWS. L'affichage du terrain est destiné à servir uniquement d'outil de connaissance de la situation. En soi, il peut ne fournir ni l'exactitude ni la fidélité sur lesquelles baser les décisions et planifier les manœuvres pour éviter le terrain ou les obstacles.

2.11 Autopilot Coupling

The flight crew may fly all phases of flight based on the navigation information presented to the flight crew; however, not all modes may be coupled to the autopilot. All autopilots may be coupled in Oceanic (OCN), Enroute (ENR), and Terminal (TERM) modes. This installation is limited to:

- *Lateral coupling only for GPS approaches. Coupling to the vertical path for GPS approaches is not authorized.*

It is possible to create flight plan waypoint sequences, including Search and Rescue patterns, which exceed the autopilot's bank angle capabilities. The pilot shall monitor autopilot performance with regard to flight path deviation.

2.12 Terrain Alerting Function (All Units)

Terrain, point obstacle, and wire obstacle information appears on the map and terrain display pages as red and amber terrain, obstacles, or wires and is depicted for advisory use only. Aircraft maneuvers and navigation must not be predicated upon the use of the terrain display. Terrain, obstacle and wire information is advisory only and is not equivalent to warnings provided by TAWS. The terrain display is intended to serve as a situational awareness tool only. By itself, it may not provide either the accuracy or the fidelity on which to base decisions and plan maneuvers to avoid terrain or obstacles.

2.13 Fonction TAWS (Option)

Les équipages de conduite sont autorisés à s'écarter de leur autorisation ATC en cours dans la mesure du nécessaire pour se conformer aux avertissements TAWS. La navigation ne doit pas être basée sur l'utilisation de la fonction TAWS.

La fonction TAWS doit être désactivée lors de l'atterrissage dans un aéroport qui n'est pas inclus dans la base de données aéroport ou n'est pas désigné comme aéroport utilisateur dans le GTN XI.

Si un panneau annonceur TAWS externe est installé dans l'avion, ce panneau annonceur doit être entièrement fonctionnel pour pouvoir utiliser le système TAWS.

2.14 Utilisation dans les cercles polaires.

L'utilisation du GTN Xi comme instrument de navigation primaire dans les latitudes supérieures à 89,00 ° N et inférieures à 89,00 ° S, est interdite.

2.15 Fonctions de planificateur de vol

La page Planification du carburant utilise le carburant à bord ou le débit de carburant reçu d'un totalisateur de carburant à bord, tel qu'entré par le pilote au démarrage du système, ou tel qu'il est entré par le pilote sur la page Planification du carburant. Ce n'est pas une indication directe du débit de carburant réel de l'avion ou du carburant à bord et ces valeurs ne sont utilisées que pour la page Planification du carburant. Le carburant requis pour la destination n'est qu'une valeur calculée et prédite basée sur les données entrées dans le planificateur. Il ne s'agit pas d'une indication directe de la quantité de carburant que l'avion aura lorsqu'il atteindra sa destination.

2.13 TAWS Function (Optional)

Flight crews are authorized to deviate from their current ATC clearance to the extent necessary to comply with TAWS warnings. Navigation must not be predicated upon the use of TAWS.

TAWS shall be inhibited when landing at an airport that is not included in the airport database or is not designated as a User Airport in the GTN XI.

If an external TAWS annunciator panel is installed in the aircraft, this annunciator panel must be fully functional in order to use the TAWS system.

2.14 Polar Operations

Use of the GTN Xi for primary navigation for latitudes above 89.00° N and below 89.00° S is prohibited.

2.15 Flight Planner/Calculator Functions

The Fuel Planning page uses Fuel on Board or Fuel Flow as received from an on board fuel totalizer, as entered by the pilot at system startup, or as entered by the pilot when on the Fuel Planning page. This is not a direct indication of actual aircraft fuel flow or fuel on board and those values are only used for the Fuel Planning page. The fuel required to destination is only a calculated and predicted value based on the data entered into the planner. It is not a direct indication of how much fuel the aircraft will have upon reaching the destination.

2.16 Cercles de rayon d'action

Les cercles de rayon d'action affichés sur la carte mobile sont destinés à la connaissance de la situation et ne représentent pas une indication directe de l'endurance ou du carburant restant. La distance entre l'anneau de réserve vert et l'anneau de carburant épuisé jaune est de 45 minutes par défaut. La valeur de réserve peut être modifiée à partir du menu de configuration de la carte du GTN Xi.

Les données sur la consommation de carburant sont dérivées des données du totalisateur de carburant interfacé. Les données saisies dans les pages Planification du carburant ne mettront pas à jour les cercles de rayon d'action.

2.17 Utilisation de gants / doigts couverts

Aucun équipement couvrant les doigts ne doit être utilisé pour faire fonctionner le GTN Xi à moins que la procédure de qualification des gants figurant dans le Guide du pilote de la série GTN Xi n'ait été menée à bien. La procédure de qualification des gants est spécifique aux combinaisons pilote / gant / GTN 750Xi ou GTN 650Xi.

2.18 Mode démonstration

Le mode démonstration ne doit en aucun cas être utilisé en vol.

2.19 Son du téléphone

Le son du téléphone ne doit pas être distribué au pilote ou au copilote à moins qu'un appel téléphonique ne soit actif.

2.20 Base de données des obstacles filaires

Seule la base de données «Obstacle / HOT Line» peut être utilisée. L'utilisation de la base de données «Obstacle / Wire» est interdite. La version de la base de données peut être consultée sur les pages de vérification de la base de données de démarrage ou les pages System - System Status.

2.16 Fuel Range Rings

The fuel range rings displayed on the moving map are intended for situational awareness and do not represent a direct indication of endurance or fuel remaining. The distance between the segmented green reserve ring and the yellow zero fuel ring is 45 minutes by default. The reserve value can be changed from the GTN Xi map setup menu.

Fuel range data is derived by the interfaced fuel totalizer data. Data entered in the Fuel Planning pages will not update the fuel range ring.

2.17 Glove Use / Covered Fingers

No device may be used to cover fingers used to operate the GTN Xi unless the Glove Qualification Procedure located in the GTN Xi Series Pilot's Guide has been successfully completed. The Glove Qualification Procedure is specific to a pilot / glove / GTN 750Xi or GTN 650Xi combinations.

2.18 Demo Mode

Demo mode may not be used in flight under any circumstances.

2.19 Telephone Audio

Telephone audio must not be distributed to the pilot or co-pilot unless a phone call is active.

2.20 Wire Obstacle Database

Only the "Obstacle/HOT Line" database may be used. Use of the "Obstacle/Wire" database is prohibited. The database version can be viewed on the start-up database verification or System- System Status pages.

2.21 Mises à jour de la base de données

Les mises à jour de la base de données via une carte MMC / SD ou des transferts sans fil Flight Stream doivent être effectuées lorsque l'avion est au sol et à l'arrêt. Les transferts ou mises à jour de bases de données en vol sont interdits sauf si une partie de la fonction Database SYNC qui se produit en arrière-plan permet de déplacer des bases de données d'un LRU à l'autre.

2.22 Reconnaissance vocale.

Les pilotes ne peuvent pas utiliser la fonction ASR (Automatic Speech Recognition = Reconnaissance vocale) pour faire fonctionner le GTN Xi / GMA à moins d'avoir réussi la procédure de qualification ASR figurant dans le Guide du pilote de la série GTN Xi. La procédure de qualification ASR est spécifique à chaque combinaison pilote / casque / avion.

2.23 Mode OBS

L'utilisation du mode OBS pour les segments de plan de vol supérieurs à 250 NM est interdite. Le mode OBS n'est pas disponible entre le FAF et le MAP d'une approche aux instruments.

2.24 Conseils visuels d'approche

Toutes les approches à vue doivent être effectuées en VMC. Les conseils visuels d'approches sont destinés à être utilisés pour aider à la connaissance de la situation et ne garantissent pas le dégagement du terrain ou des obstacles le long de la trajectoire d'approche. L'utilisation des conseils visuels d'approche en IMC est interdite.

2.21 Database Updates

Database updates via MMC / SD card or Flight Stream wireless transfers must be done while the aircraft is on the ground and stationary. In-flight database transfers or updates are prohibited in flight unless part of the Database SYNC function that occurs in the background to move databases from one LRU to another.

2.22 Automatic Speech Recognition

Pilots may not use the ASR function to operate the GTN Xi/GMA unless they have completed the ASR Qualification Procedure located in the GTN Xi Series Pilot's Guide successfully. The ASR Qualification Procedure is specific to each pilot / headset / aircraft combination.

2.23 OBS Mode

Use of OBS mode for flight plan segments greater than 250NM is prohibited. OBS Mode is not available between the FAF and MAP of any instrument approach.

2.24 Advisory Visual Approaches

All advisory visual approaches shall be conducted in VMC. Advisory visual approaches are intended to be used as an aid to situational awareness and do not guarantee terrain or obstruction clearance along the approach path. Use of advisory visual approaches in IMC is prohibited.

2.25 Affichage de la distance par rapport au waypoint

Lors de l'installation, le GTN a été configuré pour afficher la distance jusqu'au waypoint actuel sur la page Carte (GTN7XX ou GTN7XX Xi) ou la page de navigation par défaut (GTN6XX ou GTN6XX Xi). L'emplacement d'affichage de la distance par rapport au waypoint actuel ne doit pas être modifié ou supprimé de ces pages.

2.26 Suppression des paramètres visuels du téléphone / SMS

Pendant l'installation, le GTN a été configuré pour supprimer les alertes visuelles pendant l'approche, l'approche interrompue et les phases finales pour les fonctions GSR 56 Iridium Phone et SMS. Le paramètre suppression des alertes visuels sur la page Service-Phone ne doit pas être modifié de «On During APR / MAPR / TERM».

2.27 Contraintes de vitesse

Le GTN n'affiche pas les contraintes de vitesse qui peuvent être requises lors d'un SID, STAR ou une approche. L'équipage de conduite est chargé d'examiner les cartes afin d'identifier les contraintes de vitesse qui pourraient être nécessaires et de gérer la vitesse de l'aéronef conformément à ces contraintes.

2.25 Display of Distance to Waypoint

During installation, the GTN was configured to display distance to current waypoint on the Map Page (GTN 7XX or GTN 7XX Xi) or Default Navigation Page (GTN 6XX or GTN 6XX Xi). The display location of distance to current waypoint must not be altered or removed from these pages.

2.26 Phone/SMS Suppress Visuals Setting

During installation, the GTN was configured to suppress visual alerts during approach, missed approach, and terminal operations for the GSR 56 Iridium Phone and SMS features. The Suppress Visuals setting on the Service-Phone page must not be changed from "On During APR/MAPR/TERM".

2.27 Speed Constraints

The GTN does not display speed constraints that may be required on a SID, STAR or Approach. The flight crew is responsible for reviewing charts to identify any speed constraints that may be required and for managing the aircraft speed in compliance with those constraints.

3. PROCEDURES D'URGENCES

3.1 ALERTE TAWS

Message d'alerte rouge et «PULL UP» sonore:

Pilote automatique.....

.....DECONNECTE

Commandes de l'aéronef.....

..... PUISSANCE

MAXIMALE DE MONTEE

Vitesse VITESSE DE

MEILLEUR ANGLE DE MONTÉE

Après la fin de l'avertissement:

Altitude

MONTER ET MAINTENIR UNE

ALTITUDE SÉCURITAIRE

Informez l'ATC de l'écart d'altitude, le cas échéant.

NOTE

Seules les manœuvres verticales sont recommandées, sauf si l'on opère dans des conditions météorologiques de vol à vue (VMC), ou si l'équipage de conduite détermine, sur la base de toutes les informations disponibles, que le virage en plus de la manœuvre d'évacuation verticale est le plan d'action le plus sûr.

NOTE

Les annonceurs TAWS externes au GTN Xi peuvent ne pas indiquer la menace exacte à l'origine de l'alerte. Exemple: les alertes WIRE peuvent être annoncées comme TERR ou OBSTACLE sur les appareils externes.

3. EMERGENCY PROCEDURES

3.1 TAWS WARNING

Red annunciator and aural "PULL UP":

Autopilot..... DISCONNECT

Aircraft Controls

INITIATE MAXIMUM POWER CLIMB

Airspeed BEST ANGLE OF CLIMB SPEED

After Warning Ceases:

Altitude CLIMB

AND MAINTAIN SAFE ALTITUDE

Advise ATC of Altitude Deviation, if appropriate.

NOTE

Only vertical maneuvers are recommended, unless either operating in visual meteorological conditions (VMC), or the flight crew determines, based on all available information, that turning in addition to the vertical escape maneuver is the safest course of action, or both.

NOTE

TAWS annunciators external to the GTN Xi may not indicate the exact threat causing the alert. Example: WIRE alerts may be annunciated as TERR or OBSTACLE on external devices.

3.2 Procédures Anormales

3.2.1 PERTE DE DONNÉES DE NAVIGATION GPS / SBAS

Lorsque le récepteur GPS / SBAS est inopérant ou que les informations de navigation GPS ne sont pas disponibles ou invalides, le GTN Xi entrera dans l'un des deux modes: mode « Dead Reckoning » (DR) ou « Loss of integrity » (LOI). Le mode est indiqué sur le GTN par un «DR» et / ou «LOI» ambré. Si l'annonce « LOI » s'affiche, utilisez un autre moyen de navigation adapté à l'itinéraire et à la phase de vol. Si « LOI » se produit alors que le GTN Xi est en phase de vol ENR ou OCN, il peut également afficher « DR ». Si l'annonce « DR » s'affiche, la carte continuera à s'afficher avec un «DR» ambré remplaçant l'icône de propriété. Les instructions de guidage seront supprimées sur le CDI. La position de l'avion sera basée sur la dernière position GPS valide, puis estimée par les méthodes Dead Reckoning. Les changements de vitesse, d'altitude, de cap ou de vent réels en altitude peuvent affecter considérablement la position estimée.

Si d'autres sources de navigation (ILS, LOC, VOR, DME, ADF) sont disponibles:

Navigation

UTILISEZ DES SOURCES
ALTERNATIVES

Si aucune autre source de navigation n'est disponible:

MODE DEAD RECKONING (DR):

Navigation
UTILISER GTN Xi

NOTE

Toutes les informations normalement dérivées du GPS deviendront moins précises avec le temps.

3.2 Abnormal Procedures

3.2.1 LOSS OF GPS/SBAS NAVIGATION DATA

When the GPS/SBAS receiver is inoperative or GPS navigation information is not available or invalid, the GTN Xi will enter one of two modes: Dead Reckoning mode (DR) or Loss Of Integrity mode (LOI). The mode is indicated on the GTN by an amber "DR" and/or "LOI". If the LOI annunciation is displayed, revert to an alternate means of navigation appropriate to the route and phase of flight. If LOI occurs while the GTN Xi is in the ENR or OCN phase of flight, it may also display DR. If the DR annunciation is displayed, the map will continue to be displayed with an amber "DR" overwriting the ownship icon. Course guidance will be removed on the CDI. Aircraft position will be based upon the last valid GPS position, then estimated by Dead Reckoning methods. Changes in true airspeed, altitude, heading, or winds aloft can affect the estimated position substantially.

If Alternate Navigation Sources (ILS, LOC, VOR, DME, ADF) Are Available:
Navigation

.....
USE ALTERNATE SOURCES

If No Alternate Navigation Sources Are Available:

DEAD RECKONING (DR) MODE:

Navigation
USE GTN Xi

NOTE

All information normally derived from GPS will become less accurate over time.

**MODE LOSS OF INTEGRITY (LOI)
(pas de DR annoncé sur le GTN Xi):**

Navigation VOLER VERS
LES CONDITIONS VISUELLES
CONNUES

NOTE

Toutes les informations dérivées du GPS seront supprimées.

NOTE

Le symbole d'avion est supprimé de toutes les cartes. La carte restera centrée sur la dernière position connue. "NO GPS POSITION" sera annoncé au centre de la carte.

3.2.2 APPROCHE GPS REDUITE

Pendant une approche LPV, LP + V, LNAV / VNAV ou LNAV + V, si les exigences de précision GPS ne peuvent pas être satisfaites par le récepteur GPS, le GTN Xi déclassera l'approche. Le déclasserement supprimera l'indication de déviation verticale du VDI et changera l'annonce d'approche en LNAV. L'approche peut être poursuivie en utilisant uniquement les minimums LNAV. Si l'approche VISUAL est déclassée, le GTN Xi supprimera l'indication d'écart vertical du VDI, mais continuera d'annoncer VISUAL en ambré.

Pendant une approche GPS dans laquelle les exigences de précision GPS ne peuvent pas être satisfaites par le récepteur GPS pour tout type d'approche GPS, le GTN Xi signalera tous les guidages CDI et affichera un message système «ABORT APPROACH - l'approche GPS n'est plus disponible». Immédiatement après l'indication du message, l'appareil revient aux limites d'alarme du mode de navigation finale. Si l'intégrité de la position se situe dans ces limites, le guidage latéral sera rétabli et le GPS pourra être utilisé pour exécuter l'approche interrompue, sinon d'autres moyens de navigation doivent être utilisés.

**LOSS OF INTEGRITY (LOI) MODE (no
DR announced on the GTN Xi):**

Navigation FLY
TOWARDS KNOWN VISUAL
CONDITIONS

NOTE

All information derived from GPS will be removed.

NOTE

The airplane symbol is removed from all maps. The map will remain centered at the last known position. "NO GPS POSITION" will be announced in the center of the map.

3.2.2 GPS APPROACH DOWNGRADE

During a LPV, LP +V, LNAV/VNAV, or LNAV +V approach, if GPS accuracy requirements cannot be met by the GPS receiver, the GTN Xi will downgrade the approach. The downgrade will remove vertical deviation indication from the VDI and change the approach annunciation to LNAV. The approach may be continued using the LNAV only minimums. If the VISUAL approach is downgraded, the GTN Xi will remove the vertical deviation indication from the VDI, but continue to annunciate VISUAL in amber.

During a GPS approach in which GPS accuracy requirements cannot be met by the GPS receiver for any GPS approach type, the GTN Xi will flag all CDI guidance and display a system message "ABORT APPROACH-GPS approach no longer available". Immediately upon viewing the message, the unit will revert to Terminal navigation mode alarm limits. If the position integrity is within these limits lateral guidance will be restored and the GPS may be used to execute the missed approach, otherwise alternate means of navigation must be utilized.

3.2.3 PERTE DE FONCTIONS DE RÉGLAGE DE LA RADIO COM

Si un autre COM est disponible:

Communications

.....UTILISER COM ALTERNATIF

Si aucun autre COM n'est pas disponible:

Touche COM RMT XFR (si installée)
..... APPUYER ET MAINTENIR
PENDANT 2 SECONDES

NOTE

Cette procédure réglera la radio COM active sur la fréquence d'urgence 121,5, quelle que soit la fréquence affichée sur le GTN Xi. Certaines pannes du système de réglage régleront automatiquement 121,5 sans action de l'équipage de conduite.

3.2.4 PERTE DE FONCTIONS AUDIO (GMA 35 uniquement)

Breaker audio
.....TIRER

NOTE

Cette procédure forcera l'audio panel à basculer en mode sans échec qui fournit uniquement les communications au pilote et uniquement sur une seule radio COM. Si un équipement COM hors GTN 750Xi est installé, la communication se fera uniquement sur cette radio. Si seul un GTN 750Xi est installé dans l'avion, le pilote ne disposera que du GTN 750Xi COM. Aucune autre fonction du panneau audio, y compris l'alerte sonore et l'interphone de l'équipage et des passagers ne fonctionnera.

3.2.3 LOSS OF COM RADIO TUNING FUNCTIONS

If alternate COM is available:

Communications

..... USE ALTERNATE COM

If no alternate COM is available:

COM RMT XFR key (if installed)
.....PRESS AND HOLD FOR 2
SECONDS

NOTE

This procedure will tune the active COM radio the emergency frequency 121.5, regardless of what frequency is displayed on the GTN Xi. Certain failures of the tuning system will automatically tune 121.5 without flight crew action.

3.2.4 LOSS OF AUDIO PANEL FUNCTIONS (GMA 35 Only)

Audio Panel Circuit Breaker
.....PULL

NOTE

This procedure will force the audio panel into fail safe mode which provides only the pilot with communications and only on a single COM radio. If any non GTN 750Xi COM is installed, communication will be only on that radio. If only a GTN 750Xi is installed in the aircraft, then the pilot will have only the GTN 750Xi COM available. No other audio panel functions including aural alerting and the crew and passenger intercom will function.

3.2.5 AVERTISSEMENT TAWS (Terrain ou Obstacle Ahead, Sink Rate, Don't Sink)

Lorsqu'un AVERTISSEMENT TAWS se produit, prenez des mesures correctives jusqu'à ce que l'alerte cesse.

Arrêtez de descendre ou initiez une montée ou un virage, ou les deux selon les besoins, en fonction de l'analyse de tous les instruments et informations disponibles.

NOTE

Les annonceurs TAWS externes au GTN Xi peuvent ne pas indiquer la menace exacte à l'origine de l'alerte. Exemple: les alertes WIRE peuvent être annoncées comme TERR ou OBSTACLE sur les appareils externes.

3.2.6 INHIBITION DE LA FONCTION TAWS

Les fonctions d'évitement de terrain (FLTA) et d'alertes de descente (PDA) TAWS peuvent être inhibées pour empêcher l'alerte, si vous le souhaitez. Reportez-vous au guide du pilote du GTN Xi pour plus d'informations.

Pour inhiber les fonctions TAWS:

Bouton d'accueilPRESSE
Bouton TerrainPRESSE
Bouton de menu..... PRESSE
Bouton d'interdiction TAWS.....
..... PRESSE POUR ACTIVER

3.2.7 TER N/A et TER FAIL

Si l'indication ambré TER N/A ou TER FAIL est affiché, le système ne fournira plus d'alerte TAWS ni n'affichera le terrain relatif et les obstacles. L'équipage doit respecter les procédures garantissant une séparation minimale du terrain et des obstacles.

3.2.5 TAWS CAUTION (Terrain or Obstacle Ahead, Sink Rate, Don't Sink)

When a TAWS CAUTION occurs, take corrective action until the alert ceases.

Stop descending or initiate either a climb or a turn, or both as necessary, based on analysis of all available instruments and information.

NOTE

TAWS annunciators external to the GTN Xi may not indicate the exact threat causing the alert. Example: WIRE alerts may be annunciated as TERR or OBSTACLE on external devices.

3.2.6 TAWS INHIBIT

The TAWS Forward Looking Terrain Avoidance (FLTA) and Premature Descent Alerts (PDA) functions may be inhibited to prevent alerting, if desired. Refer to GTN Xi Series Pilot's Guide for additional information.

To Inhibit TAWS:

Home HardkeyPRESS
Terrain Button PRESS
Menu Button..... PRESS
TAWS Inhibit Button
.....PRESS TO ACTIVATE

3.2.7 TER N/A and TER FAIL

If the amber TER N/A or TER FAIL status annunciator is displayed, the system will no longer provide TAWS alerting or display relative terrain and obstacle elevations. The crew must maintain compliance with procedures that ensure minimum terrain and obstacle separation.

3.2.8 SOURCE DE DONNÉES – HEADING SOURCE INOPÉRANTE

Sans source de cap (Heading source) vers le GTN Xi, les limitations suivantes s'appliquent:

- La direction ne sera pas fournie au pilote automatique pour les tronçons de navigation. Le pilote automatique doit être placé en mode HDG pour diriger.
- La carte ne peut pas être orientée dans le cap souhaité « Heading Up ».
- Les données de trafic superposées à partir d'un appareil TAS / TCAS I ou Garmin ADS-B-IN interfacé à un système de trafic embarqué ne seront pas affichées sur l'affichage principal de la carte. L'équipage de conduite doit utiliser la page dédiée au trafic sur le système GTN pour afficher les données de trafic TAS / TCAS I ou Garmin ADS-B-IN.

3.2.9 PERTE DE LA COMMANDE TACTILE GTN

Dans le cas où le GTN Xi devient inutilisable en raison de changements de page non commandés, la fonction ASR (Commande vocale) peut être la source.

Pour désactiver ASR:

Disjoncteur du panneau audio
..... TIRER
Bouton Home PRESSE
Bouton système APPUYER
Bouton de commandes vocales
..... APPUYER
Bouton d'activation des commandes
vocales OFF
Disjoncteur de panneau
audio..... POUSSER

3.2.10 SOURCE DE DONNÉES – SOURCE D'ALTITUDE PRESSION INOPÉRANTE

Si le GTN Xi est utilisé pour transmettre l'altitude-pression à un transpondeur, le transpondeur ne recevra pas l'altitude-pression du GTN tant que ce message sera présent.

3.2.8 DATA SOURCE - HEADING SOURCE INOPERATIVE

Without a heading source to the GTN Xi, the following limitations apply:

- *Roll steering will not be provided to the autopilot for heading legs. The autopilot must be placed in HDG mode for heading legs.*
- *Map cannot be oriented to Heading Up.*
- *Overlaying traffic data from a TAS/TCAS I or Garmin ADS-B-IN unit interfaced to an on board traffic system will not be displayed on the main map display. The flight crew must use the dedicated traffic page on the GTN system to display TAS/TCAS I or Garmin ADS-B-IN traffic data.*

3.2.9 LOSS OF GTN TOUCH CONTROL

In the event the GTN Xi becomes unusable due to uncommanded page changes, the ASR function may be the source.

To Disable ASR:

Audio Panel Circuit Breaker.....
..... PULL
Home Hardkey..... PRESS
System Button..... PRESS
Voice Commands Button PRESS
Voice Commands Enable Button
..... TOGGLE OFF
Audio Panel Circuit Breaker
..... PUSH

3.2.10 DATA SOURCE – PRESSURE ALTITUDE SOURCE INOPERATIVE

If the GTN Xi is being used to forward pressure altitude to a transponder, the transponder will not be receiving pressure altitude from the GTN while that message is present.

3.2.11 REDÉMARRAGE DU GTN EN VOL.

En cas de redémarrage du GTN Xi en vol, l'équipage doit utiliser le bouton CANCEL si l'écran de mise à jour de la base de données s'affiche après le redémarrage du GTN Xi.

Cela garantira la restauration des fonctions de navigation dès que possible.

3.2.14 ÉCHEC D'ENTRÉE BARO-ALT

L'altitude barométrique est requise pour la fonctionnalité de descente VNAV et le séquençage automatique de l'altitude de chaque étape terminale. Si l'entrée d'altitude BARO du GTN Xi a échoué, le VNAV barométrique en route ne sera pas disponible. Le pilote devra également séquencer manuellement toutes les étapes terminales en altitude.

3.2.15 PANNE D'ENTRÉE DE TEMPÉRATURE

Une entrée de température est requise pour la fonctionnalité de transition à l'approche VNAV. En cas de défaillance de l'entrée de température, la transition VNAV vers l'approche doit être ignorée. L'équipage doit s'assurer que le guidage vertical de la descente VNAV au guidage d'approche est approprié et que si un pilote automatique est utilisé, l'équipage intercepte le guidage vertical d'approche par le bas.

3.2.11 IN-AIR RESTART OF GTN

In the event of a GTN Xi restart in the air, the crew should utilize the CANCEL button if presented with the database update screen after the GTN Xi is restarted.

This will ensure restoration of the navigation functions as soon as possible.

3.2.14 BARO-ALT INPUT FAILURE

Barometric altitude is required for descent VNAV functionality and automatic sequencing of altitude terminated legs. If the BARO altitude input to the GTN Xi has failed, enroute barometric VNAV will not be available. The pilot will also be required to manually sequence any altitude terminated legs.

3.2.15 TEMPERATURE INPUT FAILURE

Temperature input is required for the VNAV Transition to Approach functionality. In the event of a temperature input failure, VNAV transition to approach should be disregarded. The crew must ensure that vertical guidance from descent VNAV to approach guidance is appropriate and that if an autopilot is in use, the crew intercepts the approach vertical guidance from below.

3.3 MESSAGES D'ALERTE

3.3 WARNING MESSAGES

Type d'alerte / <i>Alert Type</i>	Message d'alerte / <i>Alert Annunciation</i>	Message vocal / <i>Aural Message</i>	Action du pilote / <i>Pilot Action</i>
<i>FLTA Terrain Warning</i>	PULL UP	« <i>Terrain Ahead, Pull Up ; Terrain Ahead Pull Up</i> » Or « <i>Terrain, Terrain ; Pull Up, Pull Up</i> »	Monter immédiatement à la vitesse d'évitement des obstacles <i>Immediately execute a climb at obstacle clearance speed</i>
<i>FLTA Obstacle Warning</i>	PULL UP	« <i>Obstacle Ahead, Pull Up ; Obstacle Ahead Pull Up</i> » Or « <i>Obstacle, Obstacle ; Pull Up, Pull Up</i> »	Monter immédiatement à la vitesse d'évitement des obstacles <i>Immediately execute a climb at obstacle clearance speed</i>
<i>FLTA Wire Warning</i>	PULL UP	« <i>Wire Ahead, Pull Up ; Wire Ahead Pull Up</i> »	Monter immédiatement à la vitesse d'évitement des obstacles <i>Immediately execute a climb at obstacle clearance speed</i>

3.4 MESSAGES D'AVERTISSEMENT

3.4 CAUTION MESSAGES

Type d'alerte / <i>Alert Type</i>	Message d'alerte / <i>Alert Annunciation</i>	Message vocal / <i>Aural Message</i>	Action du pilote / <i>Pilot Action</i>
<i>FLTA Terrain Caution</i>		« Terrain Ahead; Terrain Ahead » Or « Caution Terrain, Caution Terrain ; »	Monter à la vitesse d'évitement des obstacles <i>Execute a climb at obstacle clearance speed</i>
<i>FLTA Obstacle Caution</i>		« Obstacle Ahead, Obstacle Ahead » Or « Caution Obstacle, Caution Obstacle »	Monter à la vitesse d'évitement des obstacles <i>Execute a climb at obstacle clearance speed</i>
<i>FLTA Wire Caution</i>		“ Wire Ahead ”	Monter à la vitesse d'évitement des obstacles <i>Execute a climb at obstacle clearance speed</i>
<i>Premature Descent Alert</i>		“ Too Low, Terrain ”	Monter à la vitesse d'évitement des obstacles <i>Execute a climb at obstacle clearance speed</i>
<i>Traffic Alert</i>		“ Traffic ”	Rechercher le Traffic pour voir et éviter <i>Visually acquire the traffic to see and avoid</i>

3.5 MESSAGES DE PANNE

3.5 FAILURE MESSAGES

Message de panne / <i>Failure message</i>	Position de l'alerte / <i>Alert Location</i>	Cause	Action du pilote / <i>Pilot Action</i>
<i>"No GPS Position"</i>	Affiché sur toutes les pages avec la carte interactive <i>Displayed on all pages with a moving map</i>	Perte de position GPS <i>Loss of GPS Position</i>	Utiliser une autre source de navigation <i>Use other source of navigation</i>
<i>"Dead Reckoning"</i>	Affiché sur toutes les pages avec la carte interactive <i>Displayed on all pages with a moving map</i>	Perte de position GPS <i>Loss of GPS Position</i>	Utiliser une autre source de navigation <i>Use other source of navigation</i>
<i>LOI</i>	Barre de Tâche <i>Status Bar</i>	Perte de position GPS <i>Loss of GPS Position</i>	Utiliser une autre source de navigation <i>Use other source of navigation</i>
<i>Red "X"</i>	Par-dessus la fonction inopérante <i>Over affected equipment interface</i>	Perte de données de l'équipement <i>Loss of data from equipment</i>	Utiliser les procédures de panne <i>Use inoperative equipment procedure</i>
<i>TAWS N/A TAWS FAIL TER N/A TER FAIL</i>	Barre de Tâche <i>Status Bar</i>	Perte de position GPS ou Erreur de données de terrain <i>Loss of GPS Position or Terrain Database Error</i>	Rester vigilant, les alertes de terrain ne sont plus annoncées <i>Use vigilance, Terrain Alerts no longer provided</i>

4. PROCEDURES NORMALES

Reportez-vous au « GTN Xi Pilot's Guide » section 7.1 pour les procédures de fonctionnement normales et la liste complète des messages du système et des actions de l'équipage de conduite associées. Cela comprend toutes les opérations GPS, la communication VHF et la navigation, le trafic, la météo liée aux données, StormScope®, TAWS et les informations d'affichage multifonction.

Le GTN Xi nécessite un degré de familiarisation raisonnable pour éviter de devenir trop absorbé, au détriment du vol aux instruments de base en IMC et de la notion de base voire et éviter en VMC. Garmin fournit des outils de formation avec le Guide du pilote et un simulateur sur PC. Les pilotes doivent tirer pleinement parti de ces outils de formation pour améliorer la familiarisation avec le système.

5. PERFORMANCE

Section non affectée.

6. MASSE ET CENTRAGE

Section non affectée.

7. DESCRIPTION SYSTEMES

Section non affectée.

8. MANŒUVRE ENTRETIEN MAINTENANCE

Section non affectée.

4. NORMAL PROCEDURES

Refer to the GTN Xi Pilot's Guide defined in Section 7.1 for normal operating procedures and a complete list of system messages and associated flight crew actions. This includes all GPS operations, VHF communication and navigation, traffic, data linked weather, StormScope®, TAWS, and Multi-Function Display information.

The GTN Xi requires a reasonable degree of familiarity to avoid becoming too engrossed at the expense of basic instrument flying in IMC and basic see-and-avoid in VMC. Garmin provides training tools with the Pilot's Guide and PC based simulator. Pilots should take full advantage of these training tools to enhance system familiarization.

5. PERFORMANCES

No Change.

6. WEIGHT AND BALANCE

No change.

7. SYSTEMS DESCRIPTION

No change

8. MAINTENANCE PROCEDURE

No change

DEFINITIONS

DEFINITIONS

ADF:	Automatic Direction Finder
ADS-B:	Automatic Dependent Surveillance Broadcast
AEG:	Aircraft Evaluation Group (FAA)
APR:	Approach
ASR:	Automated Speech Recognition
ATK:	Along Track
CDI:	Course Deviation Indicator
DME:	Distance Measuring Equipment
ECAC:	European Civil Aviation Conference
EFB:	Electronic Flight Bag
EGNOS:	European Geostationary Navigation Overlay Service
EHSI:	Electronic Horizontal Situation Indicator
FPA:	Flight Path Angle
FIS-B:	Flight Information Services Broadcast
GAGAN:	GPS Aided GEO Augmented Navigation
GDU:	Garmin Display Unit
GMA:	Garmin Multimedia Audio
GNSS:	Global Navigation Satellite System
GPA:	Glidepath Angle
GPS:	Global Positioning System
GPSS:	GPS Roll Steering
GTN:	Garmin Touchscreen Navigator
HOT:	Hazardous Obstacle Transmission wires
HSI:	Horizontal Situation Indicator
IAP:	Instrument Approach Procedure
IFR:	Instrument Flight Rules
ILS:	Instrument Landing System
IMC:	Instrument Meteorological Conditions
LDA:	Localizer Directional Aid
LNAV:	Lateral Navigation
LNAV +V:	Lateral Navigation with advisory Vertical Guidance
L/VNAV:	Lateral/Vertical Navigation
LOC:	Localizer
LOC-BC:	Localizer Backcourse
LP:	Localizer Performance
LPV:	Localizer Performance with Vertical Guidance
LP +V:	Localizer Performance with Advisory Vertical Guidance
MLS:	Microwave Landing System
MMC:	Multi-Media Card
NOTAM:	Notice to Airmen
OBS:	Omni Bearing Selector
PED:	Portable Electronic Device
PTC:	Push-To-Command
RAIM:	Receiver Autonomous Integrity Monitoring
RF Leg:	Radius-To-Fix Leg of a Charted Instrument Procedure
RFL:	Reverse Frequency Lookup

RMT:	Remote
RNAV:	Area Navigation
RNP:	Required Navigational Performance
SAR:	Search and Rescue
SBAS:	Satellite Based Augmentation System
SD:	Secure Digital
SDF:	Simplified Directional Facility
SUSP:	Suspend
TACAN:	Tactical Air Navigation System
TAS:	Traffic Awareness System
TAWS:	Terrain Awareness and Warning System
TCAS:	Traffic Collision Avoidance System
TCH:	Threshold Crossing Height
TFR:	Temporary Flight Restriction
TIS:	Traffic Information Service
VHF:	Very High Frequency
VFR:	Visual Flight Rules
VGSI:	Visual Glide-Slope Indicator
VLOC:	VOR/Localizer
VMC:	Visual Meteorological Conditions
VNAV:	Vertical Navigation
VOR:	VHF Omnidirectional Range
VRP:	Visual Reporting Point
WAAS:	Wide Area Augmentation System
WFDE:	WAAS Fault Data Exclusion
XFR:	Transfer



**Courtesy
Translation of**

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for the hydraulic 4-Blade-Constant-Speed Propeller

MTV-22-B/174-12

on the airplane

Robin DR 300/180R
Robin DR 400/180R
Robin DR 400/180S
Robin DR 400/180
Robin DR 253
Robin DR 253B

possible mufflers:

Gomolzig 74-0301

Hirth FVA 23-V2
(not for Robin DR 253, DR253B)

Robin Modification No.: 89 S.B. 129
(not for Robin DR 300/180R, DR 253, DR253B)

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Edition of 03.03.1999



Page 1 of 7
Supplement to the Original Flight Manual No. E-614
Edition March 3, 1999

This Supplement to the Original Flight Manual belongs to the aircraft:

Aircraft registration No: _____

Serial No.: _____

Year of manufacture: _____

This Supplement to the Original Flight Manual contains all supplemental information to operate the aircraft with the Constant Speed Propeller MTV-22-B/174-12.

The information contained in the Original Flight Manual remains valid further on, provided that there are no amendments in this Supplement.

List of revisions			
Edition/ Revision No.	Page Date	Description	approved
1	Pages 1 to 8 and cover page Nov. 11, 1999	Courtesy Translation	



Page 2 of 7
Supplement to the Original Flight Manual No. E-614
Edition March 3, 1999

1. GENERAL

Information concerning the propeller: MTV-22-B/174-12 see Section 2.
Propeller Spinner: MT-Propeller No.: P-274-A

2. LIMITATIONS

Diameter:	174 cm (68.5 in) no cut-off allowed
Blade angle:	at station cm 61 (24,0 in) : low pitch: $11,5^{\circ} \pm 0,2$ high pitch: $30,0^{\circ} \pm 0,1^{\circ}$
Propeller Speed:	MTV-22-B/174-12 max. allowable take-off power 2.700 RPM (5 minutes) max. allowable continuous power: 2.500 RPM
Markings at the tachometer :	green arc 500 to 2.200 and 2.400 to 2.500 RPM yellow arc 2.200 to 2.400 and 2.500 to 2.700 RPM red radial line 2.700 RPM

The airplane may be operated without spinner as well. In this case remove filler plates.

For DR 400/180S:

The a. m. operation limitations are valid. The restrictions to 2.600 RPM becomes obsolete.

Placards:

Close to the tachometer, there is a placard with the following contense:

Avoid manifold pressure over 18 inch Hg
between 2.200 RPM and 2.400 RPM

If the offset of the tachometer can not be corrected to a value below 30 rpm, a placard with the rpm offset at 2200 rpm, 2300 rpm and 2400 rpm has to be installed close to the tachometer.

The installation of the manifold pressure gauge is marked as follows:

Manifold Pressure

The installation of Propeller lever is marked as follows:

Propeller control



Page 3 of 7
Supplement to the Original Flight Manual No. E-614
Edition March 3, 1999

3. EMERGENCY PROCEDURES

Malfunction of the propeller pitch control:

In case of oil pressure loss in the propeller control system, or if the pitch control fails, the propeller will return to low pitch position (take-off position).

Push Propeller Control to maximum and hold propeller-speed below 2700 RPM by the power lever.

Select lower air speed, if applicable.

Monitor oil pressure and oil temperature.

4. NORMAL PROCEDURES

Daily Control

Before every flight, check condition of blades and Spinner. Blade tip play up to 3 mm is allowed, blade angel play up to 2mm is allowed.

No unallowable cracks in blades (refer to Installation and Operation Manual E-124)

Erosion sheets may not be loose. PU Tape has to be installed and o.k., in other case replace it in the next 10 operation hours after last check. No oilleakage allowed.

Starting the engine: Propeller position low pitch

Before take off:	Throttle	2000 RPM
	Propeller lever	high pitch
	Cycle Prop	to 1500 RPM then low pitch
	if engine is cold	repeat 3 times

Move the Propeller lever slowly, because the propeller MTV-22 is equipped with light natural composite blades and responds faster to pitch changes than propellers with metal blades.

After take off and after reaching the safety height, reduce rpm to a value within the green arc of the tachometer at full throttle, for noise reduction.



Page 4 of 7
Supplement to the Original Flight Manual No. E-614
Edition March 3, 1999

5. PERFORMANCE

The performance data in the original Flight Manual remain valid except the information provided in this Supplement to the Original Flight Manual.

Take off distances:

The table take off distances in this Supplement of the Original Flight Manual is valid.

Take off Distances

Flapposition „Take off“, Propeller MTV-22-B/174-12, no Wind

Aircraft DR 300/180R	refer to original AFM
Aircraft DR 400/180R	refer to original AFM
Aircraft DR 253	refer to original AFM
Aircraft DR 253 B	refer to original AFM

Aircraft DR 400/180 and DR 400/180S

Altitude feet	Temp. °C	Take off distances at 1100 kg				Take off distances at 900 kg			
		Concrete Runway (m)		Grass Runway (m)		Concrete Runway (m)		Grass Runway (m)	
		over 15 m Obstacle	roll	over 15 m Obstacle	roll	over 15 m Obstacle	roll	over 15 m Obstacle	roll
0	- 5	419	247	492	331	274	159	309	199
	+15	465	278	553	379	305	177	347	225
	+ 35	515	309	617	428	335	199	381	252
4000	- 13	560	331	666	477	362	212	419	278
	+ 7	629	371	781	547	404	238	473	318
	+ 27	701	419	880	627	446	265	526	357
8000	- 21	770	450	999	715	484	282	583	397
	- 1	869	512	1 147	834	545	322	663	459
	+19	976	574	1 319	971	608	362	747	525

Climb Performance:

For Type DR 300/180R: The climb performance data for the Propeller Sensenich 76EM8S5-0-58 according to the Original Flight Manual remain valid.

For type DR400/180R: The information given in the Original Flight Manual remain valid (Propeller Sensenich 76EM8S5-0-58)

For type DR400/180 bzw. DR 400/180S: The information given in the Original Flight Manual remain valid except:

Propeller speed: 2.500 RPM
Optimum speed: 160 km/h low Altitudes
150 km/h at 15.500 ft



Page 5 of 7
Supplement to the Original Flight Manual No. E-614
Edition March 3, 1999

Cruise Performance				20°C below standard temp.				standard temperature standard OAT [°C]=15-AL.T(ft)/504,7				20°C above standard temp.			
		MAP["]	nP(RPM)	%PWR	C[ph]	TAS[km/h]	%PWR	C[ph]	TAS[km/h]	%PWR	C[ph]	TAS[km/h]	%PWR	C[ph]	TAS[km/h]
				Std-20°C	Std-20°C	Std-20°C	Std	Std	Std	Std+20°C	Std+20°C	Std+20°C	Std+20°C	Std+20°C	Std+20°C
ALT(ft)															
10000	Robin DR400/180	20,5		73	43,8	221	70	41,0	215	68	38,5	209			
10000	Robin DR400/180R	19	2500	68	36,1	205	65	33,5	199	63	31,2	194			
10000	Robin DR400/180S	18		64	34,4	196	61	31,9	191	59	29,7	186			
10000	Robin DR300/180R														
10000	Robin DR 253														
10000	Robin DR 253 B														
10000	Engine	20,5	2200	68	34,6	200	66	33,6	197	65	32,8	195			
10000	Lycoming	19		62	32,2	192	59	31,4	189	57	30,8	187			
10000	O-360-A (Serien)	18		58	30,8	187	55	30,1	184	53	29,6	182			
8000	Propeller:	22,5		81	44,0	235	78	41,9	229	75	40,0	224			
8000	MTV-22-B/174-12	21	2500	74	39,3	219	72	37,3	214	69	35,6	209			
8000	Conditions	19		66	33,5	201	63	31,7	196	61	30,2	192			
8000	Mixture "Best Power"	22,3		75	37,5	224	72	36,2	223	70	35,2	217			
8000	max. Take off weight	21	2200	69	34,7	210	66	33,7	208	64	32,9	203			
8000	flaps clean	19		62	33,7	194	60	32,9	193	58	32,2	190			
6000		24		86	46,4	245	83	44,2	237	80	42,2	230			
6000	Fuel capacity	22	2500	77	43,0	232	74	41,1	225	72	39,3	218			
6000		21		69	34,6	197	66	32,9	191	64	31,3	185			
6000		23,5		77	38,5	237	75	37,2	230	72	36,1	222			
6000		22	2200	71	35,7	217	68	34,6	211	66	33,7	203			
6000		21		67	34,0	194	64	33,1	192	62	32,3	185			
4000	DR400/180	26		93	52,1	245	89	49,3	239	86	46,8	234			
4000	DR400/180S	24	2500	85	44,1	231	82	41,5	226	79	39,2	221			
4000	DR253 B	23		76	38,4	214	73	36,1	201	71	34,0	205			
4000	190 Liter														
4000															
4000	DR300/180R	23	2200	73	36,6	213	72	35,5	206	70	36,6	199			
4000	110 Liter	22		69	34,9	188	66	33,9	181	59	29,4	175			
2000		26		92	50,0	244	90	49,0	238	87	48,0	225			
2000		24,5	2500	85	46,0	224	82	45,0	218	80	44,0	207			
2000		23		80	43,0	205	78	42,0	198	76	41,0	190			
2000															
2000		24	2200	75	37,5	211	73	36,3	206	73	41,3	201			
2000		22		69	34,9	197	67	33,9	191	68	37,3	187			
2000		21		63	32,6	184	64	31,8	179	57	31,1	175			



Page 6 of 7
Supplement to the Original Flight Manual No. E-614
Edition March 3, 1999

6. WEIGHT AND BALANCE; LIST OF EQUIPMENT

Original equipment:

Standard propeller (Sensenich 76EM8S5-0-()) with spinner: weight = 19,35 kg
arm = 1,38 m
mass moment = 26,7 kgm

Engine Lycoming O-360-A3A weight = 131,0 kg
arm = 0,957 m
mass moment = 125,36 kgm

intended changes:

Propeller MTV-22 with Spinner weight = 19,0 kg
arm = 1,4 m
mass moment = 16,6 kgm

Engine Lycoming O-360-A1P weight = 132,45 kg
arm = 0,957 m
mass moment = 126,75 kgm

Hydraulic Propeller Governor weight = 1,15 kg
arm = 1,187m
mass moment = 1,365 kgm

Vernier Control Cable 05-10460 weight = 0,7 kg
arm = 0,55 m
mass moment = 0,350 kgm

Manifold Pressure 7-100-12 weight = 0,13 kg
arm = 0,1 m
mass moment = 0,013 kgm

The empty mass moment with Lycoming O.360-A1P and the propeller MTV-22... is 3,38 kg higher than with the original Sensenich propeller.

The empty mass with Lycoming O-360-A1P and the propeller MTV-22... is 3,08 kg higher than with the original Sensenich propeller.



Page 7 of 7
Supplement to the Original Flight Manual No. E-614
Edition March 3, 1999

Section 7 Description of System and Function

The propeller is equipped with an infinitely variable hydraulic pitch change mechanism operated by a hydraulic propeller governor.

Once a propeller speed is set, the governor keeps the propeller speed constant, independently of manifold pressure and flight speed.

Propeller pitch is operated by a propeller pitch change knob on the instrument panel.

Pulling the knob results in a decrease of rpm.

The set rpm is kept constant by the governor, independent from air speed and throttle setting. If the engine power is not sufficient to hold the selected Propeller speed, the propeller pitch changes to low pitch.

The propeller governor is flanged to the engine. It is driven directly by the engine.

The propeller governor oil supply is part of the engine oil system.

In case of oil pressure loss due to a failure in the governor oil system, the propeller sets to low pitch.

Section 8 Additional Instructions

Check of tachometer:

During the annual check of the airplane, the accuracy of the tachometer has to be checked. If the offset of the tachometer can not be corrected to a value below 30 rpm, a placard with the rpm offset at 2200 rpm, 2300 rpm and 2400 rpm has to be installed close to the tachometer.

Procedure for towing with hydraulic constant speed propeller:

The Propeller MTV-22.... is approved for towing gliders and banner.

Procedure for towing gliders:

Take off with full throttle and propeller speed set to 2700 rpm, or 2500 rpm if the airfield conditions allow.

After reaching the safety height, propeller speed has to be reduced to 2500 rpm.

Full throttle remains until releasing the glider.

Climbing with reduced propeller speed, reduces the noise emission.

Descend with propeller speed set to 2000 rpm and power setting between 15 and 18 inch manifold pressure.

Select a descend speed in a way, that a decrease of the cylinder head temperature of 28°C/min (50°F/min) will not be exceeded.

All other information remain valid.
