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Supplement
Pilot´s Operating Handbook

for the
DR400/120D
DR400/140B
DR400/180R
DR400/200R
DR400/RP

Equipped with TAE 125 Installation

MODEL No. _____
SERIAL No. _____
REGISTER No. _____

This supplement must be attached to the Pilot´s Operating Handbook of the DR400/120D, DR400/140B, DR400/180R, DR400/200R or DR 400/RP when the TAE 125-01 or TAE 125-02-99 installation has been installed in accordance with STC EASA.A.S.01380 or EASA STC 10036446.

The information contained in this supplement supersedes or adds to the information published in the EASA approved Pilot´s Operating Handbook only as set forth herein.
For limitations, procedures, performance and loading information not contained in this supplement, consult the EASA approved Pilot´s Operating Handbook.

This supplement Pilot‘s Operating Handbook is approved with EASA STC 10036446.

Doc.Nr. : 60-0310-60022

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APPROVAL

The content of approved sections is approved by EASA.
All other content is approved by TAE under the authority of EASA DOA No. EASA.21J.010 in accordance with Part 21.

LOG OF REVISIONS

Issue/ Rev.	Section	Description	Approval	
			Date	Endorsed
2/0	all	New Issue	Sept., 2011	EASA Approval No. 10036446

The parts of the text which changed are marked with a vertical line on the margin of the page.

LIST OF EFFECTIVE SECTIONS

Section	Issue/ Revision	Date
0	2/0	Sept., 2011
1	2/0	Sept., 2011
2	2/0	Sept., 2011
3	2/0	Sept., 2011
4	2/0	Sept., 2011
5	2/0	Sept., 2011
6	2/0	Sept., 2011

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ABBREVIATIONS

TAE	Thielert Aircraft Engines GmbH, developing and manufacturing company of the TAE 125-01 and TAE 125-02-99 engine
FADEC	Full Authority Digital Engine Control
CED 125	Compact Engine Display of TAE 125 Multifunctional instrument for indication of engine data of the TAE 125-01 and TAE 125-02-99 engine

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SECTION 0
GENERAL

CONVENTION IN THIS HANDBOOK

This manual contains the following convention and warnings. They should be strictly followed to rule out personal injury, property damage, impairment to the aircraft´s operating safety or damage to it as a result of improper functioning.

▲ **WARNING:** Non-compliance with these safety rules could lead to injury or even death.

■ CAUTION: Non-compliance with these special notes and safety measures could cause damage to the engine or to the other components.

◆ Note: Information added for a better understanding of an instruction.

FOR DR400 AIRCRAFT FROM SERIAL NUMBER 2500 AND UP

This supplement is valid if the TAE 125-01 or TAE 125-02-99 aircraft engine is installed.

UPDATE AND REVISION OF THE MANUAL

▲ **WARNING:** A safe operation is only assured with an up to date POH supplement. Information about actual POH supplement issues and revisions are published in the TAE Service Bulletin TM TAE 000-0004.

◆ Note: The TAE-No. of this POH supplement is published on the cover sheet of this supplement.

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SECTION 1
DESCRIPTION

OVERALL DIMENSIONS

Wing span ..... (28 ft 7.3 in) 8.72 m
Overall length ..... (23 ft 8 in) 7.20 m
Overall height ..... (7 ft 3.79 in) 2.23 m
Propeller ground clearance ..... (9.5 in) 0.26 m

ENGINE

Engine manufacturer ..... Thielert Aircraft Engines GmbH
Engine models ..... TAE 125-01 or TAE 125-02-99

The TAE 125-02-99 is the successor of the TAE 125-01. Both engine variants have the same power output and the same propeller speeds but different displacement. While the TAE 125-01 has 1689 ccm, the TAE 125-02-99 has 1991 ccm. Both engine variants are liquid-cooled in-line four-stroke 4-cylinder engines with DOHC (Double OverHead Camshaft) and are direct Diesel injection engines with common-rail technology and turbocharging. Both engine variants are controlled by a FADEC system. The propeller is driven by a built-in gearbox (i = 1.69) with mechanical vibration damping and overload release. The engine variants have an electrical self starter and an alternator.

▲ **WARNING:** The engine requires an electrical power source for operation. If the main battery and alternator fail simultaneously, the engine will operate for a very limited time on FADEC backup battery power (TAE-125-02-99 installation).
Therefore, it is important to pay attention to indications of alternator failure.

Due to the specific characteristic of the TAE 125 engine, all of the information from the the original DR400 flight manual recognized by EASA are no longer valid with the reference to:

- carburetor and carburetor pre-heating,
- ignition magnetos and spark plugs, and
- mixture control and priming system.

PROPELLER

Manufacturer ..... MT Propeller Entwicklung GmbH
Model MTV-6-A/187-129
Number of blades 3
Diameter 1.87m
Type ..... Constant Speed

NOISE LIMITATION

In compliance with the regulation ICAO, annex 16, Volume I, Part II, Chapter X, the maximum acceptable noise level for the DR400/120D, DR400/140B, DR400/180R, DR400/200R, DR400/RP at a certified max. take-off weight of 980 kg (2161 lb) is 78.4 dB(A).

For the TAE 125-01 installation:
The noise level determined under the conditions of the above-mentioned regulation, with the MT Propeller MTV-6-A-187/129 propeller together with "Akrapovic type for TAE-125" muffler, is 70.9 dB(A).

The noise level detrmined under the conditions of the above mentioned regulation, with the MT Propeller MTV-6-A-187/129 propeller with no installed muffler, is 74.4 dBA.

For the TAE 125-02-99 installation:
The noise level determined under the conditions of the above-mentioned regulation, with the MT Propeller MTV-6-A-187/129 propeller together with "Akrapovic type for TAE-125" muffler, is 70.2 dB(A).

The noise level determined under the conditions of the above-mentioned regulation, with the MT Propeller MTV-6-A-187/129 propeller together with "Langer LA 44" muffler, is 69.1 dB(A).

ELECTRICAL SYSTEM

The electrical system of the TAE 125 installation differs from the previous installation and is equipped with the following operating and display elements:

1. Rocker Switch "Battery"
   The battery must be switched ON in normal operation.
2. The Circuit Breaker below the Rocker Switch “Battery“
   Disables the alternator. The alternator can be left ON always.
3. Key Switch "Starter"
   This switch controls the starter motor only.
4. Voltmeter
5. Warning lamp "Alternator".
   Illuminates when the power output of the alternator is too low or the Circuit Breaker “Alternator“ (Switch resp.) is switched off. Normally, this warning lamp always illuminates when the “Engine Master“ (“IGN“ resp.) is switched on without revolution and extinguished immediately after starting the engine.
6. Switch "Engine Master"
   The Engine Master switch controls the two redundant FADEC components, and the back-up alternator excitation battery, with three independent contacts. It is protected against unintentional switching with a pull-to-actuate mechanism and a guard. The alternator excitation battery is used to ensure that the alternator continues to function in any circumstances even if the main battery fails.
7. Switch "FORCE B"
   If the FADEC does not automatically switch from A-FADEC to the B-FADEC in case of an emergency despite of obvious necessity, this switch allows to switch manually to the B-FADEC.

8. FADEC Backup Battery (TAE-125-02-99 installation) The backup battery ensures power supply to A-FADEC only when supply from main battery and alternator is interrupted. This allows continued engine operation for limited time only.

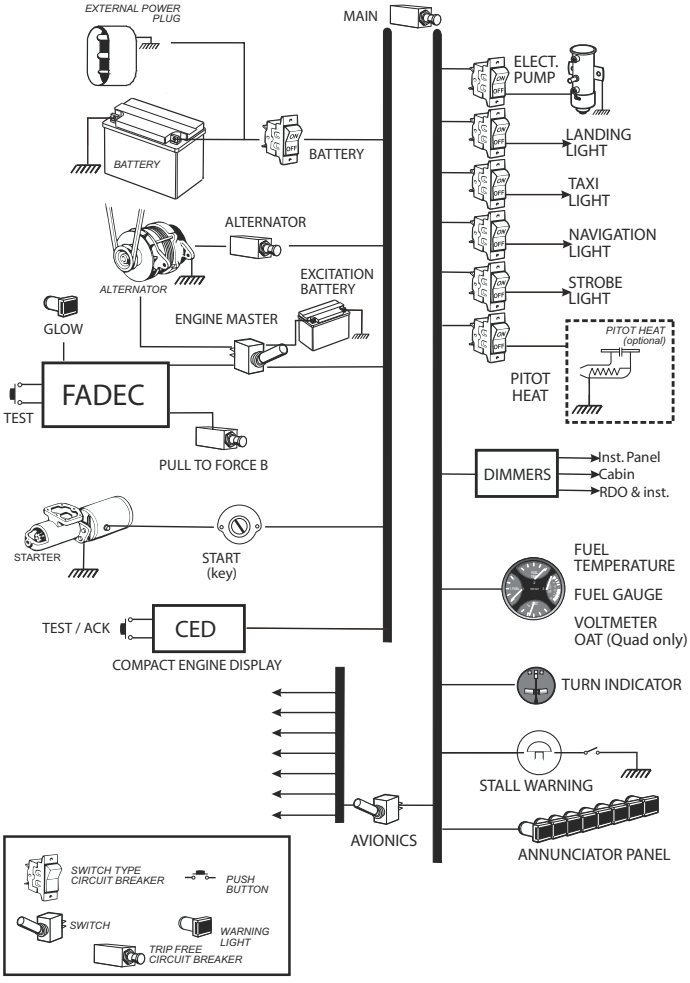

Figure 1-1 Simplified Block Diagram

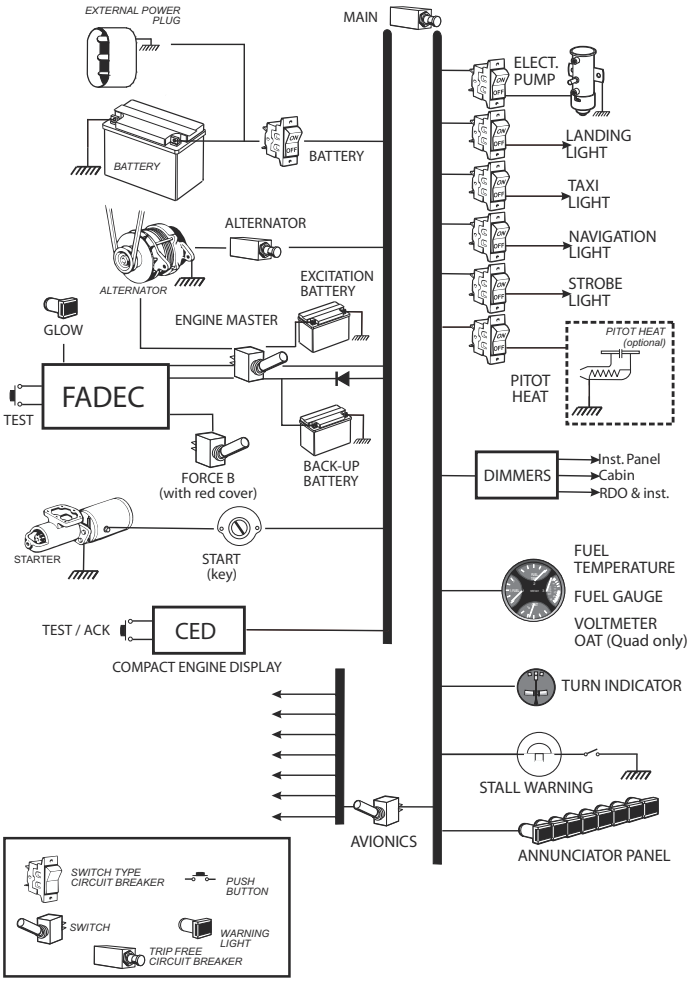

Figure 1-2 Simplified Block Diagram with FADEC backup battery installed

FADEC-RESET

In case of a FADEC-warning, one or both FADEC warning lamps are flashing. If then the "FADEC" Test Knob is pressed for at least 2 seconds:

a) the active warning lamps will extinguish if it was a LOW category warning.

b) the active warning lamps will be illuminated steady if it was a HIGH category warning.

■ CAUTION: If a FADEC-warning occurred, contact your service center. Next flight is not permitted.

When a high category warning occurs the pilot should land as soon as practical, since the affected FADEC ECU has diagnosed a severe fault. A low category fault has no significant impact on engine operation.
Refer also to the engine manual OM-02-01 or OM-02-02 for additional information.

FUELS, OILS and LIQUIDS

Approved fuels, oil and liquids are published in Section 2 - Limitations of this POH Supplement

▲ **WARNING:** The engine must not be started if the oil or coolant level is too low.

■ CAUTION: Use of unapproved fuels, oil and coolant may result in damage to the engine and fuel system components, resulting in possible engine failure.

■ CAUTION: Normally it is not necessary to fill the cooling liquid or gearbox oil between maintenance intervals. If the level is too low, please notify the service department immediately.

ENGINE OIL

Oil quantity between dipstick min and max indication:..... 1 liter
Total engine capacity including
filters and coolers:..... 6.7 liters
Approved grades:.....Refer to Section 2 - Limitations

■ CAUTION: Use the approved oil with exact declaration only!

FUEL SYSTEM

The fuel system of the TAE 125 installation includes a variant of the original standard tank of the DR400, plus a level sender and display, and an independent low-level warning light. An additional sensor and display for fuel temperature is installed.

The fuel flows out of the tank to the Fuel Selector Valve which has positions ON and OFF.

The electrically driven fuel pump supports the fuel flow to the filter module if required. Upstream to the fuel filter module a thermostat-controlled fuel pre-heater is installed. Then, the engine-driven feed pump and the high-pressure pump supply the rail, from where the fuel is injected into the cylinders depending upon the position of the thrust lever and regulation by the FADEC.

Surplus fuel flows to the filter module and then through the fuel selector valve back into the tank. A temperature sensor in the filter module controls the heat exchange between the fuel feed and return. Since Diesel fuel tends to form paraffin at low temperatures, the information in Section 2 “Operating Limits“ pertaining to fuel temperature have to be observed. The fuel return ensures a quicker warm up of the fuel in the tank.

If Diesel fuel is used, Diesel fuel according DIN EN 590 has to be used exclusively.

◆ Note: There are differences in the national supplements to EN 590. Approved are Diesel fuels with the addition DIN EN 590.

Fuel capacity			
Tank	Total usable fuel	Total unusable fuel	Total capacity
	109 l / 28.7 US gal / 24 imp gal	1 l / 0.26 US gal / 0.22 imp gal	110 l / 29 US gal / 24.2 imp gal

Table 1-1 Fuel Capacity

OPTIONAL EXTENDED RANGE TANK

▲ **WARNING** The optional tank is only approved for Jet-A1

The total fuel capacity can be increased to 160 l / 35.2 Imp gal / 42.24 US gal (159 l / 35 Imp gal / 42 US gal usable) by installing an optional fuel tank of 50 l / 11 Imp gal / 13.2 US gal.
The optional tank is located in the fuselage, aft of the rear seat. The fuel from the optional tank can be transfered into the main tank by pulling the transfer valve control, located on the instrument panel. The fuel temperature and the fuel level of the optional tank are displayed either on the triple indicator or on the quad indicator (depending on the instrument panel model) when a momentary switch is pushed (warning LED signal).

◆ Note: The main fuel tank must be empty enough to receive full quantity from the optional fuel tank.

Since the optional fuel tank is not heated, it is limited to the use of JET A-1 only to prevent a potentional clogging of Diesel Fuel to low temperatur.

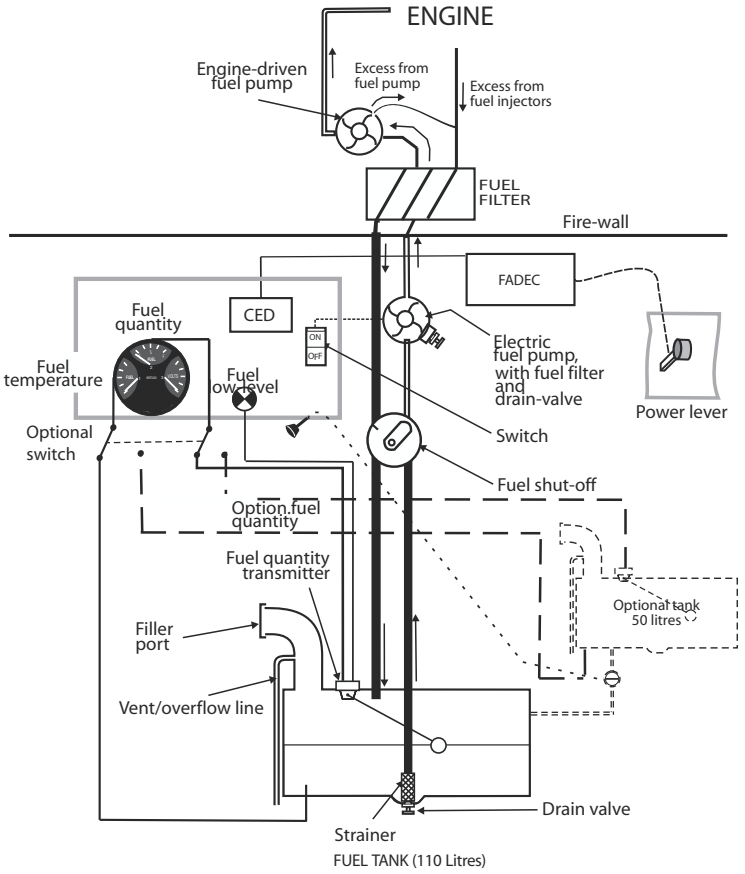

Figure 1-3/1 Fuel system simplified diagram (Instrument panel models #1 and #2)

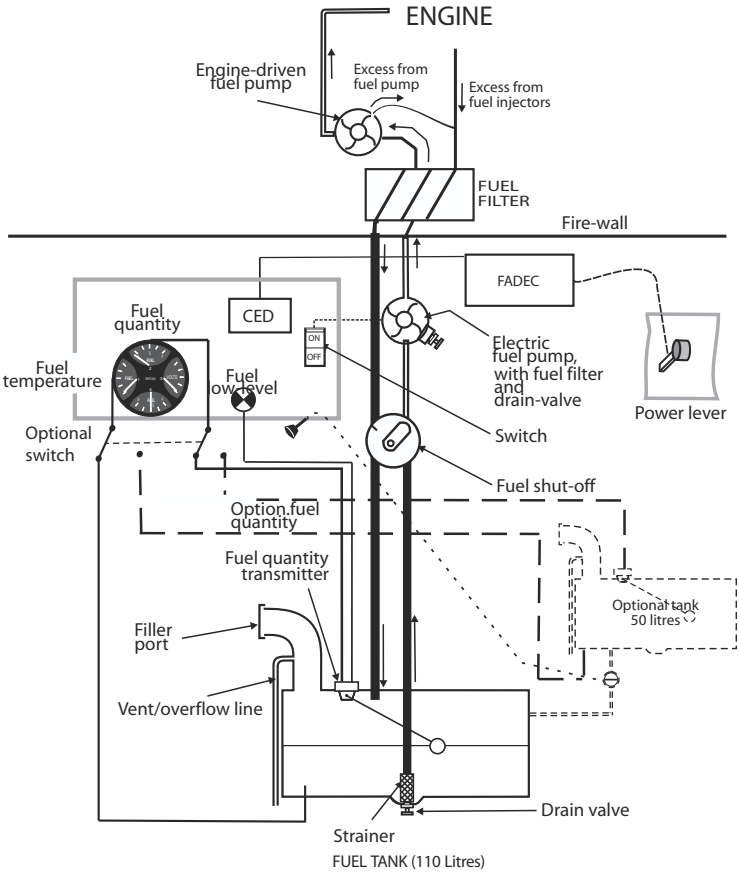

Figure 1-4/2 Fuel system simplified diagram (Instrument panel model#3)

INSTRUMENT PANEL

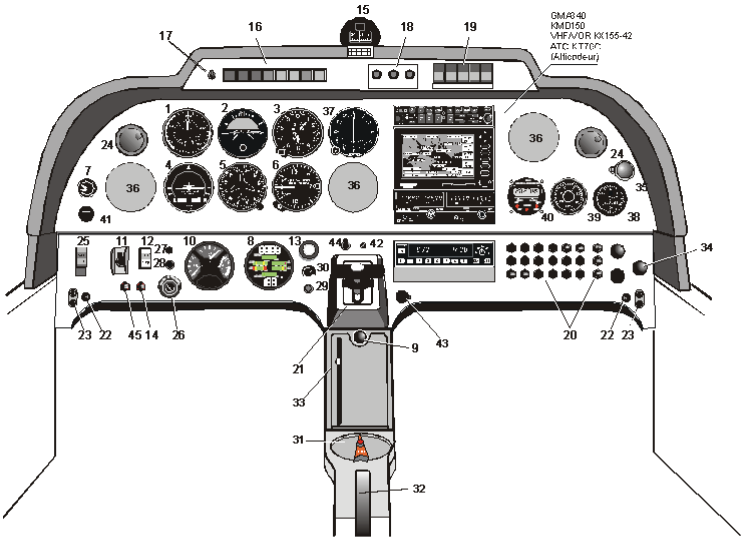

Figure 1-5 Instrument panel model #1

◆ Note: The avionics instrument panel is shown as an example only.

Instrument Panel Model #1					
POS	FUNCTION in English	POS	FUNCTION in English	POS	FUNCTION in English
1	Airspeed indicator	16	Warning lights	31	Fuel tank valve
2	Gyro horizon	17	Lights test & day/ night dimmer switch	32	Elevator trim control valve
3	Altimeter	18	Instrument panel light	33	Elevator trim position indicator
4	Turn coordinator	19	Safety switches: landing light, taxi light, strobe light navigation light, pitot heat	34	Cabin heat / windshield defrost control
5	Directional gyro	20	Circuit breakers	35	Cabin Heat
6	Rate of climb indicator	21	Electric throttle control	36	Instrument cut-off
7	Vacuum gauge	22	ANR jacks	37	VOR/LOC indicator
8	Engine indicator CED-125	23	Mic and headset jacks	38	Hourmeter
9	Parking break control knob	24	Fresh air vent	39	Outside air temperature (OAT)
10	Westach triple indicator	25	Battery safety switch	40	Clock / chronometer
11	FADEC & alternator excitation battery	26	Key starter	41	Stall warning
12	Electrical fuel pump control	27	Glow light	42	Music jack
13	Alt induction air	28	FADEC test button	43	Auxillary 12V
14	Force FADEC B	29	CED test / warning switch off	44	Avionics Master switch
15	Magnetic compass	30	CED-125 lighting knob	45	Alternator relay breaker

Table 1-2 Instrument panel model #1 description

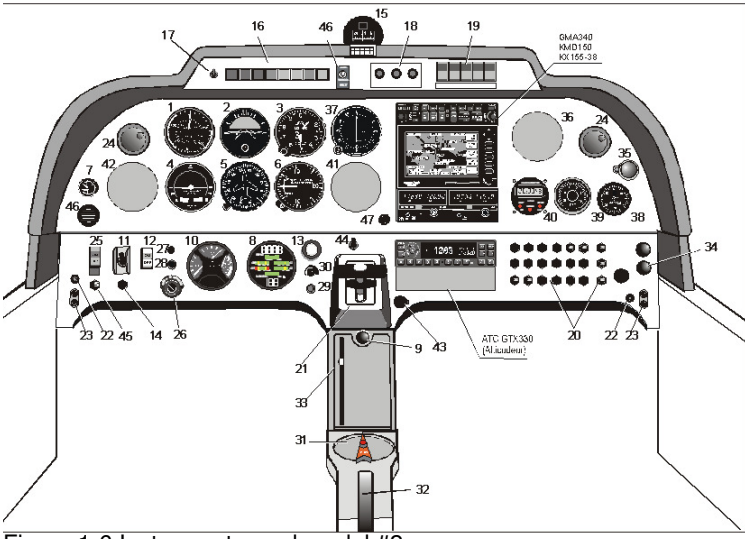

Figure 1-6 Instrument panel model #2

◆ Note: The avionics instrument panel is shown as an example only.

Instrument Panel Model #2					
POS	FUNCTION in English	POS	FUNCTION in English	POS	FUNCTION in English
1	Airspeed indicator	17	Lights test & day/ night dimmer switch	33	Elevator trim position indicator
2	Gyro horizon	18	Instrument panel light	34	Cabin heat / windshield defrost control
3	Altimeter	19	Safety switches: landing light, taxi light, strobe light navigation light, pitot heat	35	Cabin Heat
4	Turn coordinator	20	Circuit breakers	36	Interphone on board
5	Directional gyro	21	Electric throttle control	37	VOR/LOC indicator
6	Rate of climb indicator	22	ANR jacks	38	Hourmeter
7	Vacuum gauge	23	Mic and headset jacks	39	Outside air temperature (OAT)
8	Engine indicator CED-125	24	Fresh air vent	40	Clock / chronometer
9	Parking break control knob	25	Battery safety switch	41	Instrument cut-off
10	Westach triple indicator	26	Key starter	42	Instrument cut-off
11	FADEC & alternator excitation battery	27	Glow light	43	Auxillary 12V
12	Electrical fuel pump control	28	FADEC test button	44	Avionics master switch
13	Alt induction air	29	CED test / warning switch off	45	Alternator relay breaker
14	Force FADEC B	30	CED-125 lighting knob	46	Stall Warning
15	Magnetic compass	31	Fuel tank valve	47	Music jack
16	Warning lights	32	Elevator trim control valve		

Table 1-3 Instrument panel model #2 description

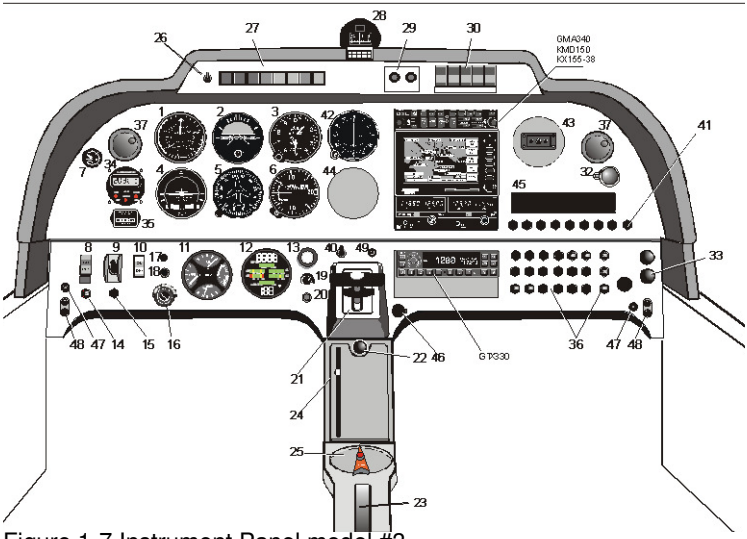

Figure 1-7 Instrument Panel model #3

◆ Note: The avionics instrument panel is shown as an example only.

Instrument Panel Model #3					
POS	FUNCTION in English	POS	FUNCTION in English	POS	FUNCTION in English
1	Airspeed indicator	17	Glow light	34	Clock / chronometer
2	Gyro horizon	18	FADEC test button	35	Hourmeter
3	Altimeter	19	CED-125 lightning knob	36	Circuit breakers
4	Turn coordinator	20	CED test / warning switch off	37	Fresh vent air
5	Directional gyro	21	Electrical throttle control	40	Avionics master switch
6	Rate of climb indicator	22	Parking brake control knob	41	Avionics circuit breakers
7	Vacuum gauge	23	Elevator trim control	42	VOR/LOC indicator
8	Battery safety switch	24	Elevator trim position indicator	43	ELT (optional)
9	FADEC & alternator excitation battery	25	Fuel tank valve	44	Instrument cut-off
10	Electrical fuel pump control	26	Lights test & day/night dimmer switch	45	Instrument cut-off
11	Westach quad indicator	27	Warning lights	46	Auxillary 12V
12	Engine indicator CED-125	28	Magnetic compass	47	ANR jacks
13	Alt induction air	29	Instrument panel light	48	Mic and headset jacks
14	Alternator relay breaker	30	Safety switches: landing light, taxi light, strobe light, navigation light, pitot heat	49	Music jack
15	Force FADEC B	32	Cabin heat	56	Transfer valve control (optional)
16	Key starter	33	Cabin heat / windshield defrost control	57	Tank Fuel T°C & level display select push-button (optional)

Table 1-4 Instrument panel model #3 description

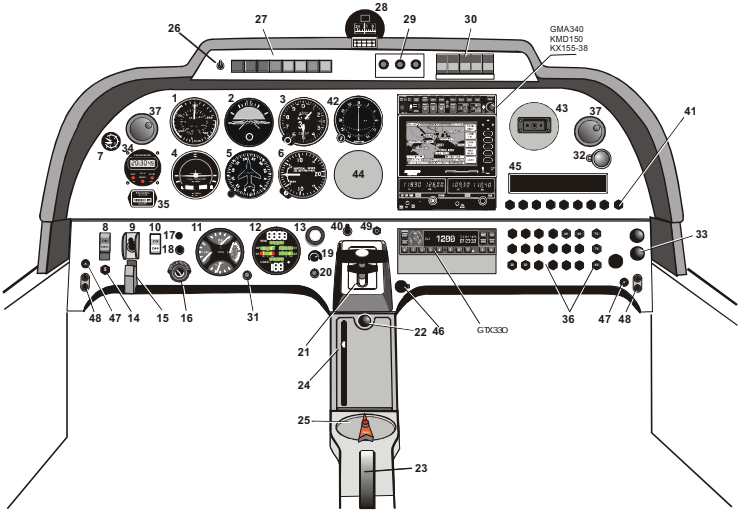

Figure 1-8 Instrument Panel model #4

◆ Note: The avionics instrument panel is shown as an example only.

Instrument Panel Model #4					
POS	FUNCTION in English	POS	FUNCTION in English	POS	FUNCTION in English
1	Airspeed indicator	17	Glow light	33	Cabin heat / windshield defrost control
2	Gyro horizon	18	FADEC test button	34	Clock / chronometer
3	Altimeter	19	CED-125 lightning knob	35	Hourmeter
4	Turn coordinator	20	CED test / warning switch off	36	Circuit breakers
5	Directional gyro	21	Electrical throttle control	37	Fresh vent air
6	Rate of climb indicator	22	Parking brake control knob	40	Avionics master switch
7	Vacuum gauge	23	Elevator trim control	41	Avionics circuit breakers
8	Battery safety switch	24	Elevator trim position indicator	42	VOR/LOC indicator
9	FADEC & alternator excitation battery	25	Fuel tank valve	43	ELT (optional)
10	Electrical fuel pump control	26	Lights test & day/night dimmer switch	44	Instrument cut-off
11	Westach quad indicator	27	Warning lights	45	Instrument cut-off
12	Engine indicator CED-125	28	Magnetic compass	46	Auxillary 12V
13	Alt induction air	29	Instrument panel light	47	ANR jacks
14	Alternator relay breaker	30	Safety switches: landing light, taxi light, strobe light, navigation light, pitot heat	48	Mic and headset jacks
15	Force FADEC B	31	Optional tank fuel T°C Qty display select.	49	Music jack

Table 1-5 Instrument panel model #4 description

„Three-display“ and „four-display“ instruments

Example Of the Westach triple indicator installed on models #1 and #2

Example of the Westach quad indicator installed on model #3

Compact Engine Display CED-125

Figure 1-9 CED-125 detail

HEATING AND VENTILATION

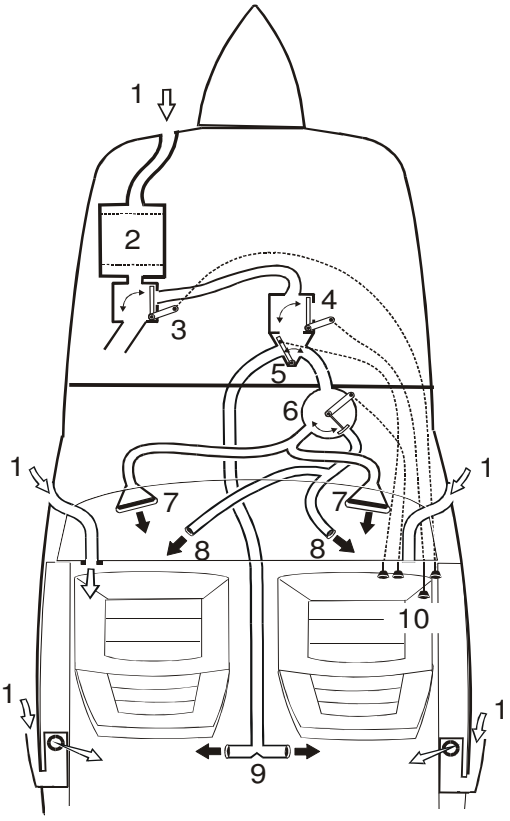

Figure 1-10 Heating and Ventilation

1 Fresh Air Intake
2 Heat Exchanger
3 Warm Air Distribution Box
4 Warm Air Distribution Box
5 Forward / Aft Selection
6 Defrost / Heating Selection Box
7 Defrost Jet
8 Forward Heating
9 Aft Heating
10 Heating Controls

Heating Control Settings			
	Function	Pulled	Pushed
Control 0 - Button Lock	Heat ON/OFF	ON	OFF
Control 1	Heating ON/OFF	ON	OFF
Control 2	Defrost / Heating	FRONT HEATING	WINDSHIELD DEFROST
Control 3	Front / Rear select.	REAR	FRONT

Table 1-6 Heating Control Settings

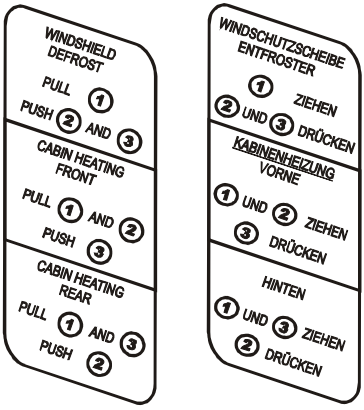

Figure 1-11 Heat Control Placard, Right Cabin Side Wall (English, German)

This STC installation has a fourth control (Control 0 in table above). It must be OFF (Push) when cabin heat is not required (hot outside air temperature)

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SECTION 2
LIMITATIONS

APPROVED OPERATION

AIRSPEED LIMITATIONS	km/h	kt
v_{ne}, never exceed	270	146
v_{no}, normal operation	260	140
v_a, moneuvering speed	215	116
v_{fe}, flaps extended limit speed	170	92

Table 2-1 Airspeed Limitations

AIRSPEED INDICATOR MARKINGS		km/h	kt
Red line (never exceed)	v_{ne}	270	146
Yellow arc (operate with caution and only in "smooth air")	v_{on}-v_{ne}	260 - 270	140 - 146
Green arc (normal operating range)	v_{s1}-v_{on}	99 - 260	53 - 140
White arc	v_{so}-v_{fe}	87 - 170	47 - 92

Table 2-2 Airspeed Indicator Markings

MAXIMUM ALTITUDE

The DR400 with TAE 125-01 or TAE 125-02-99 engine installation has been qualified up to 16.500 ft.

FLIGHT LOAD FACTOR LIMITS AT MAXIMUM WEIGHT

(2006 lb) 910 kg (category “U“):
Flaps up ..... n between +4.4 and -2.2
Flaps down..... n = +2

(2161 lb) 980 kg (category "N"):
Flaps up ..... n between + 3.8 and - 1.9
Flaps down..... n = + 2

■ CAUTION: Avoid extended negative g-loads duration. Extended negative g-loads can cause propeller control and engine problems.

◆ Note: The load factor limits for the engine must also be observed. Refer to the Operation & Maintenance Manual for the engine.

MAXIMUM AUTHORIZED WEIGHTS

	Cat. "U"	Cat. "N"
On Takeoff	(2006 lb) 910 kg	(2161 lb) 980 kg
On Landing	(2006 lb) 910 kg	(2161 lb) 980 kg

Table 2-3 Maximum Authorized Weights

WEIGHT AND BALANCE

Levelling..... upper fuselage longeron
Datum .....wing leading edge, rectangular section
Chord reference .....(67.3 in) 1.71 m

LOAD PLANNING

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

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

	Weight kg (lb)	Arm m (in)
Front Seats	2 x 77 (2 x 170)	0.36 - 0.46 (14 - 18)
Rear Seats (*)	2 x 77 (2 x 170)	1.19 (47)
Fuel, main fuselage tank	88 (194)	1.12 (44)
Baggage (**)	40 (88)	1.9 (75)

Table 2-4 Load Planning

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

** Within the authorized weight and balance limits.

ENGINE OPERATING LIMITS

Engine manufacturer..... Thielert Aircraft Engines GmbH
Engine model..... TAE 125-01 or TAE 125-02-99
Takeoff and max. continuous power..... 99 kw (135 HP)
Takeoff and max. continuous RPM.....2300

◆ Note: In the absence of any other explicit statements, all of the information on RPM in this supplement to the Pilot´s Operating Handbook are propeller RPM.

Engine operating limits for takeoff and continuous operation

▲ **WARNING:** It is not allowed to start the engine outside of these temperature limits.

◆ Note: The operating limit temperature is a temperature limit below which the engine may be started, but not operated at the takeoff RPM. The warm-up RPM to be selected can be found in Section 4 of this supplement.

Oil temperature:

Minimum engine starting temperature: .....-32 °C
Minimum operating limit temperature:.....50 °C
Maximum operating limit temperature:.....140 °C

Coolant temperature:

Minimum engine starting temperature: .....-32 °C
Minimum operating limit temperature:.....60 °C
Maximum operating limit temperature:.....105 °C

Gearbox temperature:

Minimum operating limit temperature:.....-30 °C
Maximum operating limit temperature:.....120 °C

Oil pressure:

Minimum oil pressure.....1.2 bar
Minimum oil pressure (at take-off power).....2.3 bar
Minimum oil pressure in flight .....2.3 bar
Maximum oil pressure.....6.0 bar
Maximum oil pressure (cold start <20 sec.) .....6.5 bar
Maximum oil consumption ..... 0.1 l/h

Min. fuel temperature limits in the fuel tanks:

Fuel	Minimum permissible fuel temperature in the fuel tank before takeoff	Minimum permissible fuel temperature in the fuel tank during the flight
Jet A-1	- 30°C	- 35°C
Diesel	Greater than 0°C	- 5°C

Table 2-5 Min. Fuel Temperature Limits in the fuel tank

▲ **WARNING:** The following applies to Diesel and Jet A-1 mixtures in the tank:
As soon as the proportion of Diesel in the tank is more than 10%, the fuel temperature limits for Diesel operation must be observed. If there is uncertainty about which fuel is on the tank, the assumption should be made that it is Diesel.

ENGINE INSTRUMENT MARKINGS

The engine data of the TAE 125 installation to be monitored are integrated in the combined engine instrument CED-125.
The ranges of the individual engine monitoring parameters are shown in the following table.

Instrument	Red Range	Amber Range	Green Range	Amber Range	Red Range
Tachometer [rpm]	-	-	0-2300	-	> 2300
Oil Pressure [mbar]	0-1.1	1.2-2.2	2.3-5.2	5.3-6.0	> 6.0
Coolant temperature [°C]	< -32	-32... +59	60-100	101-105	> 105
Oil Temperature [°C]	< -32	-32... +49	50-124	125-140	> 140
Gearbox Temperature [°C]	-	-	< 115	115-120	> 120
Load [%]	-	-	0-100	-	-

Table 2-6 Markings of the Engine Instruments

◆ Note: If an engine reading is in the yellow or red range, the "Caution" lamp is activated. It only extinguishes when the "CED-Test/ confirm" button is pressed. If this test button is pressed longer than one second, a selftest of the instrument is initiated.

GROUNDING (EARTHING) BEFORE AND DURING FUELING

Use the engine exhaust pipe for draining static charge.

PERMISSIBLE FUEL GRADES

■ CAUTION: Using non-approved fuels and additives can lead to dangerous engine malfunctions.

Fuel: .....JET A1 (ASTM 1655)
Alternative: ..... Diesel (DIN EN 590)
Fuel additive for Diesel . Liqui Moly „Diesel Fliess Fit“ No. 5130

MAXIMUM FUEL QUANTITIES

Standard tank:
Total capacity.....110 l / 29 US gal / 24.2 imp gal
Total usable fuel.....109 l / 28.7 US gal / 24 imp gal
Total unusable fuel.....1 l / 0.26 US gal / 0.22 imp gal

Optional extended range tank (JET A-1 fuel only)
The total fuel capacity can be increased to 160 l / 35.2 imp gal / 42.24 US gal (159 l / 35 imp gal / 42 US gal usable) by installing an optional fuel tank of 50 l / 11 imp gal / 13.2 US gal, which flows into the main tank on command, most safely when the main tank can receive 50 liters. The fuel level in the optional tank may be displayed on the instrument panel fuel gauge indicator by pressing on the push-button switch.

PERMISSIBLE OIL GRADES

■ CAUTION: Use approved oil with exact designation only!

Engine oil: ..... AeroShell Oil Diesel Ultra
.....Shell Helix Ultra 5W-30
.....Shell Helix Ultra 5W-40
..... AeroShell Oil Diesel 10W-40

Gearbox oil:..... Shell Spirax S6 GXME 75W-80
..... Shell Spirax S4 G 75W-90
..... Shell Getriebeöl EP 75W-90 API GL-4
.....Shell Spirax GSX 75W-80 GL-4

PERMISSIBLE COOLING LIQUID

Coolant:.....Water/Radiator Protection at a ratio of 50:50
Radiator Protection: ..... BASF Glysantin Protect Plus/G48
..... Mobil Antifreeze Extra/G48
.....ESSO Antifreeze Extra/G48
..... Comma Xstream Green - Concentrate/G48
..... Zerex Glysantin G48

LOAD LIMITS

No change

OPERATIONAL LIMITATIONS IN THE "U" CATEGORY

■ CAUTION: Intentionally initiating negative G maneuvers is prohibited!

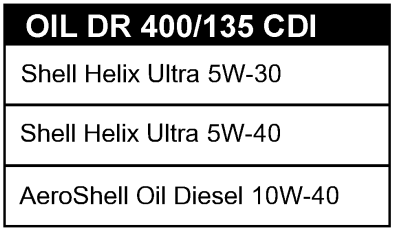
Refer to original Pilot's Operating Handbook.

Intentionally initiating spins and negative G maneuvers is prohibited

PLACARDS

Figure 2-1 Near the Fuel Tank Caps: 110 liters JET/Diesel Fuel

Figure 2-2 Optional Extended Range Tank



or

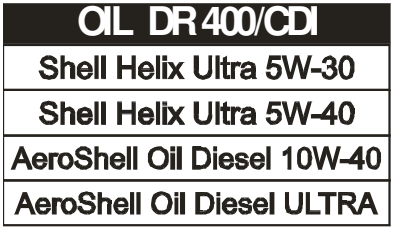
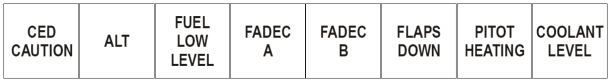


Figure 2-3 On the oil funnel or at the engine cowling access door

Figure 2-4 Near the CED

Figure 2-5 Near their respective gauges or switches

For Centurion 1.7 installation



For Centurion 2.0 installation

Figure 2-6 Annunciator Lights at the Top of the Instrument Panel

Figure 2-7 If installed, at the access door to the external power receptacle behind the wing on the aircraft's right side.

◆ Note: The receptacle has "one way only" feature for polarity protection.

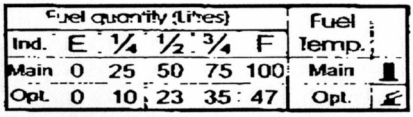


Figure 2-8 If optional extended range fuel tank is installed, placard must be placed near to the fuel gauge.

Figure 2-9 If optional extended range fuel tank is installed, placard must be placed near to the fuel transfer control.

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SECTION 3
EMERGENCY PROCEDURES

INDEX OF CHECKLISTS

ENGINE FAILURE OR LOSS OF POWER

a) During takeoff roll

(1) Thrust Lever ..... IDLE
(2) Apply brakes and hold direction. Avoid obstructions.
(3) Engine Master switch ..... OFF
(4) Battery and ALT CB ..... OFF
(5) Fuel selector ..... OFF
(6) Emergency ground egress ..... As required

b) Immediately after takeoff

(1) Establish glide
Speed (flaps retracted) ..... (78 KIAS) 144 km/h
Speed (flaps T/O position) ..... (75 KIAS) 139 km/h
(2) Land straight ahead, with only small direction changes to avoid obstructions.
(3) If complete engine failure:
FADEC A/B Switch ..... Force B
(4) Battery and ALT CB ..... Check ON

When landing inevitable:

(5) Engine Master ..... OFF
(6) Battery and ALT CB ..... OFF
(7) Fuel selector ..... OFF
(8) Wing flaps ..... T/O or Landing recommended
(9) Touch down with minimum speed
(10) When aircraft has stopped ..... Emergency ground egress

▲ **WARNING:** Never try to turn back to the runway, as altitude just after takeoff is seldom sufficient.

During flight

(1) Establish glide:
Flaps retracted.....(78 KIAS) 144km/h
(In these conditions, without wind, the aircraft covers approx. 8 times its height above ground). Locate suitable field.
If altitude is sufficient to restart:

(2) Electric fuel pump .....ON

(3) FADEC A/B switch..... Force B
if this doesn't improve engine operation, return switch to "Auto"

(4) If no restart..... Reset Engine Master (OFF then to ON)

(5) Battery and ALT CB..... Check ON

(6) Engine and fuel level gauges / alarm panel ..... Check for cause of failure

(7) FADEC A, B circuit breakers ..... Check ON

(8) In case the tank has been run to empty with still some fuel available in the auxiliary tank (if so equipped) ..... Open aux. tank transfer valve

If the propeller does not turn:

(9) Starter .....ON
The propeller will normally continue to turn as long as the airspeed is above 65 KIAS. Should the propeller stop at an airspeed of more than 65 KIAS or more, the reason for this should be found out before attempting a restart. If it is obvious that the engine or propeller is blocked, do not use the Starter.

If power is not restored, prepare for "landing without engine power".
If the tank has been run to empty, both FADEC lights will be flashing.

▲ **WARNING:** The engine high pressure pump must be checked before the next flight.

LANDING WITHOUT ENGINE POWER

Look for a suitable landing area:

(1) Airspeed..... (78 KIAS) 144 km/h flaps retracted
(75 KIAS) 139 km/h flaps T/O

(2) Seat belts and harness ..... Tight

Before landing:

(3) Electric pump ..... OFF

(4) Fuel selector ..... OFF

(5) Engine master switch..... OFF

(6) Battery + Alternator switches ..... OFF

(7) Flaps, when field can easily
be reached: ..... T/O or Landing

(8) Touch down with minimum speed

(9) Brakes..... As required

(10) When aircraft has stopped..... Emergency ground egress

Restart after engine failure

◆ Note: If altitude permits and a restart is possible.

(1) Airspeed.....Flaps retracted (78 KIAS) 144km/h [max. 100 KIAS, min. 70 KIAS]
(2) Reliable restart altitude ..... Below 13000 ft
(3) Battery and ALT CB ..... Check ON
(4) Fuel selector .....OPEN
(5) Electric fuel pump .....ON
(6) Power lever ..... max. Power
(7) Engine master switch..... OFF, then ON
if the propeller does not turn, the starter may be used.

■ Caution: If the propeller is jammed, operate the starter briefly.

If it is obvious that the engine or propeller is blocked (speed has been maintained above 70 KIAS all the time), do not use the starter.

(8) Engine parameters .....Check
(9) Power lever, once engine runs smoothly at idle ..... Adjust
(10) Engine operation.....Check available power / engine parameters

◆ Note: If the engine still does not start, prepare for "Landing without Engine Power". Refer to page 3-4.

FADEC malfunction in flight

◆ Note: The FADEC consists of two components that are independent of each other: FADEC A and FADEC B. In case of malfunctions in the active FADEC, it automatically switches to the other.

a) One FADEC Lamp is flashing

(1) Press FADEC-Testknob at least 2 seconds

(2) FADEC Lamp extinguished (LOW category warning):

a) Continue flight normally

b) Inform service center after landing.

(3) FADEC Lamp steady illuminated (HIGH cat. warning):

a) Observe the other FADEC lamp,

b) Land as soon as practical,

c) Airspeed should be below 100 KIAS / 115 mph,

d) Inform service center after landing.

b) Both FADEC Lamps are flashing

◆ Note: The Load Display may not correspond to the current value.

(1) Press FADEC-Testknob at least 2 seconds (refer to Section 1 "FADEC-Reset")
(2) FADEC Lamps extinguished (LOW):
  a) Continue flight normally,
  b) Inform service center after landing.
(3) FADEC Lamps steady illuminated (HIGH):
  a) Check the available engine power,
  b) Expect engine failure.
  c) Flight can be continued, however the pilot should
    i) Select an airspeed below 100 KIAS
    ii) Land as soon as possible
    iii) Be prepared for an emergency landing.
(4) Inform service center after landing.

c) Abnormal engine behavior

◆ Note: The FADEC system normally switches automatically between FADEC A and B in case of malfunction, in order to select the "healthiest" component.
If this automatic switching doesn't work, it is possible to manually force the system to switch to FADEC B only, and check for improvement in engine behavior.

(1) Maximum airspeed .....(100 KIAS) 185 km/h
(2) "FADEC A/B" switch ..... FORCE B
(3) If no engine operation improvement..... Return switch to "Auto"

◆ Note: The switching from one FADEC to the other one is usually accompanied by a short RPM fluctuation.

ENGINE SHUT-DOWN IN FLIGHT

◆ Note: If it is necessary to shut down the engine in flight (for instance, abnormal engine behavior does not allow continued flight, fuel leak, fire, etc.):

(1) Reduce speed.....Below (100 KIAS) 185 km/h
(2) Engine master switch.....OFF
(3) Fuel selector valve.....OFF
(4) Electric fuel pump ..... OFF (if in use)
(5) If the propeller has also to be stopped (for instance, due to excessive vibrations) .....Reduce airspeed to 60 - 65 KIAS, flaps T/O
(6) When the propeller is stopped ..... Continue to glide at 70 - 75 KIAS, flaps T/O

FIRE

Engine fire on the ground, during starting

(1) Engine master switch.....OFF
(2) Fuel selector .....OFF
(3) Electric fuel pump .....OFF
(4) Battery + alternator switches .....OFF
(5) Emergency ground egress.....As required

Extinguish the flames with a fire extinguisher, wool blankets or sand.
Have fire damage thoroughly examined and appropriate repairs made before the next flight.

Engine fire in flight

(1) Power lever.....Reduce
(2) Reduce speed.....Below (100 KIAS) 185km/h
(3) Engine master switch.....OFF
(4) Fuel selector .....OFF
(5) Electric fuel pump .....OFF (if in use)
(6) Battery + alternator switches (after radio calls) .....OFF
(7) Cabin heat .....OFF
(8) Glide speed.....(78 KIAS) 144 km/h
(9) Adjust cabin ventilation for lowest smoke in the cabin
(10) Fire extinguisher (if available).....Use as required

◆ Note: Proceed with "landing without engine power"

Electrical fire

◆ Note: In case of an electrical fire (smell of fumes indicating wire insulation burning):

(1) All electrical equipment and c
(after brief call).....OFF
leave Alternator, Battery and Engine Master ON
(2) Cabin ventilation .....OFF
(3) Cabin heat .....OFF
(4) Fire extinguisher (if available).....Use as required

▲ **WARNING:** After the fire extinguisher has been used, make sure that the fire is extinguished before exterior air is used to remove smoke from the cabin

(5) If there is evidence of continued electrical fire, consider turning OFF Battery and Alternator

▲ **WARNING:** If both Battery and Alternator are turned OFF, the engine will continue to operate using the FADEC backup battery for limited time (TAE 125-02-99 installation).
- Perform emergency landing. Refer to page 3-4.
- do not switch the „FORCE-B“ switch, this will shut down the engine!

If the fire has been extinguished:

(6) Cabin ventilation .....ON
(7) Check circuit breakers, do not reset if open
(8) Avionics Master Switch.....ON
(9) Turn ON only electrical equipment required to continueflight depending on the situation and land as soon as practical.
Do only switch ON one at a time, with delay after each.

ROUGH ENGINE OPERATION

Oil pressure too low (< 2,3 bar in cruise or <1,2 bar at idle power)

(1) Reduce power as quickly as possible

(2) Check oil temperature: If the oil temperature is high or near operating limits,

i) Land as soon as possible

ii) Be prepared for an emergency landing

iii) Expect engine failure

◆ Note: During warm-weather operation or longer climbouts at low airspeed engine temperatures could rise into the amber range and trigger the "Caution" light. This warning allows the pilot to avoid overheating of the engine as follows:

(3) Increase the climbing airspeed, reduce angle of climb

Reduce power, if the engine temperatures approach the red area.

Oil temperature too high

(1) Increase airspeed and reduce power as quickly as possible

(2) Check oil pressure. If the oil pressure is lower than normal (<2.3 bar in cruise or <1.2 bar at idle),

i) Land as soon as possible

ii) Be prepared for an emergency landing

iii) Expect engine failure

(3) If the oil pressure is in teh notnal range

i) Land as soon as practical

◆ Note: During hot weather operation or prolonged climbs at low airspeed, engine temperatures could rise into the yellow range and trigger the caution light. This warning allows the pilot to avoid overheating of the engine as follows:

1. Increase the climbing airspeed
2. Reduce power if the engine temperature approaches the red area.

Coolant temperature too high

(1) Check coolant level light

(2) Increase airspeed and reduce the power.

(3) Check cabin heat ..... OFF

If coolant level light is on, or an obvious malfunction is suspected (because airspeed was maintained above Vy, non hot weather conditions, cabin heat OFF) or if this does not cause the coolant temperature to drop,

i) Land as soon as practical

ii) Beprepared for an emergency landing

iii) Expect an engine failure

“Cool level“ light illuminates

(1) Increase airspeed and reduce the power
(2) Cabin heat .....OFF
(3) Monitor coolant temperature
(4) Monitor oil temperature
(5) If coolant temperature and/or oil temperature are rising into amber and towards red range:
    i) Land as soon as practical
    ii) Be prepared for an emergency landing
    iii) Expect an engine failure

Gearbox temperature too high

(1) Reduce power..... 55% - 75%
(2) Land as soon as practical

Fuel temperature too low

(1) Change to altitude with higher outside air temperature
(2) If the fuel temperature remains too low:
    i) Land as soon a practical

Propeller RPM too high

◆ Note: If propeller RPM above 2300 (red range):

(1) Reduce power
(2) Reduce airspeed below 100 KIAS (185 km/h) or as appropriate to prevent propeller overspeed
(3) Set power as required to maintain altitude and land as soon as practical.

◆ Note: If the propeller speed control fails, climb flights can be performed at 120 km/h (65 KIAS) and a power setting of 100%. In case of overspeed the FADEC will reduce the engine power at higher airspeeds to avoid propeller speeds above 2500rpm.

Fluctuations in propeller RPM

If the propeller RPM fluctuates by more than ± 100 RPM with a constant power lever position:

(1) Change the power setting and attempt to find a power setting where the propeller RPM no longer fluctuates.
(2) If unsuccessful power lever full forward at airspeed < 185 km/h (100 KIAS) until propeller speed stabilizes
(3) If normal operation is resumed, continue the flight
(4) If problem continues, select a power setting where the propeller RPM fluctuations are minimum. Fly at an airspeed below 185 km/h (100 KIAS) and land as soon as practical.

ICING

▲ **WARNING:** It is prohibited to fly in known icing conditions.
Icing has a very strong negative effect on the aerodynamic characteristics of the aircraft. Stalling speed increases.

Proceed as follows when inadvertently encountering icing:

(1) Pitot heat switch..... ON (if installed)
If no pitot heat installed, expect airspeed indications to become unreliable

(2) Immediately leave the region in which the icing occurred. If possible change the altitude to obtain an outside air temperature that is less conductive to icing

(3) Cabin heat / defrost .....As required

(4) Alternate induction air .....OPEN

(5) Increase power, make quick power changes from time to time to try to clear ice from the propeller blades.

Plan to land at the nearest airfield. If the build-up of ice is extremely fast, execute an off-airfield forced landing.

◆ Note: A layer of 0.5 cm (0.2 in) on the leading edge of the wing substantially increases the stalling speed. If needed, use a higher than normal approach speed:
145 km/h (78 KIAS). Do not use flaps.

ELECTRICAL POWER SUPPLY MALFUNCTION

◆ Note: The TAE 125 requires an electrical power source for its operation. If the alternator fails, the only power source will be provided by the battery. The time the engine can run on battery alone will depend on total electrical consumption supported by the battery, i.e. the load of the electrical equipment kept in use.
The pilot should turn off all nonessential items and supply power only to equipment which is absolutely necessary for continued flight depending upon the situation.

If the FADEC Backup Battery is installed (TAE 125-02-99 installation):

▲ **WARNING** When both main battery and alternator have failed, the engine will continue to operate using the FADEC backup battery for limited time. In this case, all electrical equipment will not operate:
- land immidiately
- do not switch the „FORCE-B“ switch, this will shut down the engine.

The failure of the alternator is indicated by:

- "ALT" light is ON
- Voltmeter shows too low or too high voltage (red range)
- Ammeter (if installed) shows battery discharge for more than 5min

If the “ALT“ light is lit or the ammeter shows battery discharge during normal engine operation for more than 5 minutes

(1) Circuit breaker Alternator ..... Check ON

■ CAUTION If the FADEC was supplied by battery only until this point, the RPM can momentarily drop, when the alternator will be switched on. In any case: leave the alternator switched ON !

(2) Check "ALT" light and voltmeter indications

(3) If normal operation has not resumed:
Alternator .....OFF

(4) Switch OFF all electrical equipment not essential for continuation of flight

(5) Land as soon as possible

INADVERTENT SPIN

Should a spin occur, apply the following procedure:

(1) Power Lever ..... Idle (pull)
(2) Rudder ..... Full opposite to direction of rotation
(3) Elevator ..... Neutral
(4) Ailerons ..... Neutral
(5) Once the rotation is stopped, bring rudder to neutral position and recover within flight limitations.

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

LOSS OF ELEVATOR CONTROL

No change, refer to original POH

SECTION 4
NORMAL PROCEDURES

NORMAL OPERATING SPEEDS

The speeds listed below are indicated airspeeds recommended for normal operation of the aircraft.
These speeds are based on a standard aircraft, operated at max. take-off weight, in standard atmosphere and at sea level. They may vary from one aircraft to another depending on the equipment installed, the conditions of the aircraft and of the engine, the atmospheric conditions and the skills of the pilot.

Best rate of climb speed

Flaps in takeoff position (1st notch).....(76 KIAS) 141 km/h
Flaps up .....(78 KIAS) 144 km/h

Best angle of climb speed

Flaps in takeoff position (1st notch).....(65 KIAS) 120 km/h
Flaps up .....(65 KIAS) 120 km/h

Maximum operating speed in turbulent air

Flaps up .....(140 KIAS) 260 km/h

Maximum speed

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

Landing speed, final approach

Flaps in landing position (2nd notch).....(62 KIAS) 115 km/h

PRE-FLIGHT INSPECTION

To be performed before each flight.
This inspection may be shortened for intermediate landings on route.

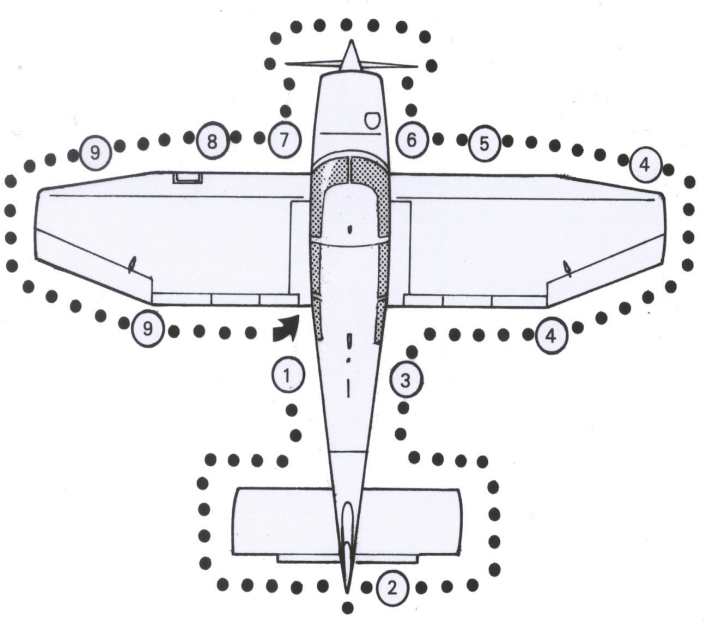

Figure 4-1 Pre-flight inspection

Master engine switch ..... OFF
Avionics master switch (if equipped) ..... OFF
Controls ..... Free and correct
Battery switch ..... ON

▲ **WARNING:** When turning on the battery switch, using an external power source, or pulling the propeller through by hand, treat the propeller as if the Engine Master switch was on.

Flaps ..... Check operation
Fuel quantity ..... Checked
Fuel temperature ..... Checked
Water level ..... Light OFF
Battery switch ..... OFF
Aircraft documents ..... On board
Baggage ..... Securely stowed

Check flight controls displacements, then make an aircraft walk around inspection starting at the fuselage left side.
See Figure 4-1.

(1)

a) Fuel filler cap ..... in place, secured
b) Static vent ..... clean, unobstructed
c) Main tank drain valve ..... actuated
d) Optional tank (when installed) drain valve ..... actuated

◆ Note: Left or right depending on airplane bank attitude. Check for water, sediment and the right type of fuel (Diesel or JET A-1 versus Avgas [should not be blue!])

(2)

a) Horizontal stabilizer ..... Surface condition, hinge wear in tolerance

b) Rudder .....Check hinge wear in tolerance

(3)

a) Static vent .....Clean, unobstructed

(4)

a) Flap and aileron .....Check condition and hinges

b) Wing tip and navigation lights (optional) ... Check condition

(5)

a) Stall warning .....Clean, check actuation

b) Right main landing gear .....Check, oil cap secured, panel closed, normal shock absorber compression, tire inflated

(6)

a) Fuel drain valve .....Actuated

b) Oil level ..... Checked, oil cap secured, panel closed

c) Exhaust pipe .....Rigid

d) Engine cowl attachments .....Check

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

f) Propeller spinner.....No play

g) Air inlets .....Clean, unobstructed

h) Gear box oil level .....Check

◆ Note: The oil has to cover at least half of the inspection glass

(7)

a) Nose gear .....Check attachment and condition of fairing, normal shock absorber compression, tire inflated, tow bar removed

b) Canopy cleanliness.....Check

(8)

a) Left main landing gear .....Check attachment and condition of fairing, normal shock absorber compression, tire inflated

b) Pitot.....Clean, unobstructed

c) Lights (optional) ..... Glass clean

(9)

a) Wing tip and navigation light (optional)..... Check condition

b) Flap and aileron .....Check condition and hinges

CABIN INTERIOR CHECK BEFORE START-UP

(1) Canopy ..... Closed and locked

(2) Parking brake..... Locked

(3) Front seats.....Adjusted and locked

(4) Belts and harnesses ..... Adjusted and fastened

(5) Flight controls .....Free, without play or excessive friction, correct action (check rudder during taxiing)

(6) Elevator trim.....Check travel, then return to takeoff position

(7) Battery switch .....ON

(8) CED lights autotest ..... Monitor

(9) ALT CB .....ON

(10) Alarm panel.....Test, set DAY / NIGHT as appropriate

(11) Circuit breakers.....ON

◆ Note: The electronic engine control needs an electrical power source for its operation. For normal operation, battery switch and alternator circuit breaker have to be ON. Separate switching is only allowed for tests and in event of emergencies.

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

■ CAUTION: The avionics power switch must be off during engine start to prevent possible damage to avionics.

STARTING THE ENGINE

(1) Canopy .....Closed
(2) Strobe light.....ON
(3) Fuel level / fuel temperature .....Check
(4) Fuel selector ..... Check operation, ON
(5) Alternate induction air .....Closed
(6) Electric pump .....ON
(7) Thrust Lever.....IDLE
(8) Propeller area ..... Clear
(9) Master Engine switch.....ON,
(10) FADEC lights .....Check OFF
(11) Glow Control light ..... Wait until OFF
(12) Starter .....ON

◆ Note: Release when engine starts, leave Thrust Lever in idle position

■ CAUTION: It is not allowed to start up the engine using external power!

(13) Check.....Oil pressure / Idle RPM 890

■ CAUTION: If after 3 seconds the minimum oil pressure of 1 bar is not indicated, shut down the engine immediately!

(14) „Engine“ resp. „CED“ Caution light .....Acknowledge
(15) ALT light.....Check OFF
(16) Ammeter (if equipped) ..... Check for positive charging current
(17) FADEC lights .....Check OFF
(18) Vacuum gauge.....Check

AFTER ENGINE START

(1) Electrical fuel pump .....OFF

If FADEC Backup battery installed (TAE 125-02-99 installation):

a) Alternator ..... OFF, engine must operate normally
b) Battery ..... OFF, engine must operate normally
c) Battery .....ON
d) Alternator .....ON

▲ **WARNING:** It must be ensured that both battery and alternator are ON!

(2) Avionics power switch (if equipped).....ON
(3) COM / NAV, navigation instruments .....ON, set
(4) Altimeter.....Set
(5) Horizon / Directional gyro .....Set

WARM UP

(1) Cabin heat can be pulled to facilitate quicker coolant warming.

(2) Let the engine warm up about 2 minutes at idle.

(3) Increase to not more than 1400 RPM until oil temperature minimum 50 °C, coolant temperature minimum 60 °C (All CED LEDs.....green).

TAXIING

(1) Parking brakes ..... Unlocked

(2) Brakes ..... Test

(3) Do not exceed 1400 RPM when CED shows yellow LED for oil and coolant temperature

(4) During taxi / turns:

a) Turn and bank indicator / Horizon (option) ..... Check

b) Directional gyro (option)..... Check operation

c) Standby compass ..... Check

BEFORE TAKEOFF

(1) Parking brake ..... SET

(2) Canopy ..... CLOSED AND LOCKED

(3) Flight controls ..... Free and correct

(4) Flight and navigation instruments ..... Check and Set

(5) Cabin heat ..... Set as required
(OFF if heating is not desired)

(6) Fuel selector valve ..... ON

(7) Fuel quantity ..... Verify sufficient for flight

(8) Elevator trim ..... Set for takeoff

(9) FADEC self-check:

a) Thrust Lever..... IDLE (both FADEC lamps should be OFF)

b) FADEC test button..... PRESS and HOLD button for entire test

c) Both FADEC lamps..... ON, RPM increases

◆ Note: If the FADEC test does not start, verify if the thrust lever is in IDLE position. If not, set to IDLE position and try again to start FADEC test

▲ **WARNING:** If the FADEC lamps do not come on at this point, it means that the test procedure has failed and takeoff should not be attempted.

d) The FADEC automatically switches to B-component (only FADEC B light is on).

e) The propeller control is excited, RPM decreases momentarily

f) The FADEC automatically switches to channel A (only FADEC A light is ON)

g) The propeller control is excited, RPM decreases momentarily

h) FADEC A lamp goes off, RPM goes back to idle RPM, the test is completed.

i) FADEC test button..... RELEASE

▲ **WARNING:** If there are prolonged engine misfires or the engine shuts down during the test, takeoff must not be attempted.

▲ **WARNING:** The whole test procedure has to be performed without any discrepancy. In case the engine shuts down or the FADEC lamps are flashing, takeoff is PROHIBITED. This applies even if the engine seems to run without failure after the test.

◆ Note: If the test button is released before the self test is fully completed, the FADEC immediately resumes normal operation.

◆ Note: While switching from one FADEC to another, it is normal to hear and feel a momentary surge in the engine.

(10) Thrust Lever..... FULL FORWARD,
RPM must be stablised
load display minimum 94%
RPM 2240 - 2300

◆ Note: The power check should be performed at a place which is free of debris to minimize risk of damage to propeller or other parts.

(11) Thrust Lever.....IDLE
(12) Engine instruments and Voltmeter..... CHECK
(13) Vacuum gauge..... CHECK
(14) Flaps .....Full down, then back to takeoff position
(15) Electrical fuel pump .....ON
(16) Radios and avionics.....ON, set
(17) Thrust Lever friction control ..... SET as desired
(18) Brakes..... RELEASE
(19) CED ..... CHECK all LEDs GREEN

TAKEOFF

Normal takeoff

(1) Thrust Lever ..... FULL FORWARD
(2) Takeoff RPM before rotation ..... 2300 RPM
(3) Takeoff speed ..... (57 KIAS) 106 km/h
(4) Initial climb speed ..... (65 KIAS) 120 km/h
(5) After obstacles clearance,
Reduce angle of climb to reach ..... (78 KIAS) 145 km/h
(6) Electric pump ..... OFF
(7) Flaps ..... Up

Short takeoff

(1) Flaps ..... (1st notch) takeoff position
(2) Apply full power, brakes applied
then release the brakes ..... 2300 RPM
before rotation
(3) Rotation speed ..... (52 KIAS) 96 km/h
(4) Lift-off speed ..... (57 KIAS) 106 km/h
(5) If needed to clear an obstacle,
proceed at best angle of climb speed .. (61 KIAS) 113 km/h

Crosswind takeoff

(1) Flaps ..... (1^{st} notch) take-off position
(2) Ailerons ..... into the wind

◆ Note: Takeoff at a slightly higher airspeed than normal. Correct drift in the normal way (max bank angle close to the ground: 15°).

(3) Demonstrated crosswind capability ..... (22 KIAS) 40 km/h

CLIMB

Normal climb (flaps up)

Best rate of climb:
78 KIAS from 0 to 9500 ft,
75 KIAS up to 11500 ft,
72 KIAS above 11500 ft

A climb at higher speed, when best rate is not required, will provide for more forward visibility.

(1) Thrust Lever..... Full forward

Best angle of climb

A better angle of climb is obtained at (65 KIAS) 120 km/h, flaps in takeoff position or flaps up.

◆ Note: In case that oil temperature and/or coolant temperature are approaching the upper limit:

- Verify that cabin Heat is OFF.
- Continue at a lower climb angle and higher speed for better cooling if possible.

CRUISE

◆ Note: Refer to Section 5 for RPM settings and cruise performance.

(1) Power.....Maximum load 100 % (maximum continuous power) Recommended: 75 % or less

(2) Elevator trim..... ADJUST

(3) Compliance with limits for oil pressure, oil temperature, coolant temperature and gearbox temperature (CED 125 and caution lamp) .....MONITOR constantly

(4) Fuel quantity and temperature
(display and low level warning lamp) ..... MONITOR

▲ **WARNING:** If fuel temperature falls below allowable minimum, expect engine failure. Fuel in tank is actively heated by the returning injector overflow, so too low fuel temperature is an extreme condition.

(5) FADEC warning lamp ..... MONITOR

DESCENT

(1) Power ..... As required to maintain the desired descent path

(2) Pull cabin heat to keep the coolant warm if power setting is low. If coolant temperature in amber range and engine caution lamp iluminated, increase power to recover green coolant temperature range.

Approach or down wind

(1) Electric fuel pump ..... ON

(2) Cabin (seats, belts) ..... Check

(3) Flaps ..... Below (92 KIAS) 170 km/h (1^{st} notch) in takeoff position

(4) Speed ..... (81 KIAS) 150 km/h

(5) Elevator trim ..... SET

Final

(1) Flaps ..... Below (81 KIAS) 150 km/h (2^{nd} notch) landing position

(2) Approach speed ..... (62 KIAS) 115 km/h

◆ Note: The approach speed may be increased to 70 KIAS (130 km/h) to improve manoeuvrability. This can increase the landing distance.

(3) Elevator trim ..... SET

LANDING

Short landing

(1) Flaps .....(2nd notch) landing position
(2) Approach speed, with
Thrust Lever setting .....(62 KIAS) 115 km/h

After touchdown, brake heavily keeping nose up with elevator and retracting the flaps.

Overshoot procedure

(1) Thrust Lever..... Full power (push)
(2) Speed .....(65 KIAS) 120 km/h
(3) Progressively raise flaps to
the "takeoff position" (1st notch),
then establish normal climb speed .....(75 KIAS) 140 km/h

AFTER LANDING

(1) Electric fuel pump .....OFF
(2) Wing flaps ..... UP
(3) Navigation instruments .....OFF

ENGINE SHUT-DOWN

(1) Parking brake..... SET
(2) Thrust Lever..... IDLE
(3) Wing flaps .....DOWN
(4) COM/NAV and electrical equipment .....OFF
(5) Engine Master switch.....OFF

After the engine stops

(1) Battery .....OFF
(2) When wheel chocks in place .... Release the parking brake

PARKING BRAKE USE

Brake on

Press on both pedals. Keep pressure on while pulling the parking brake control.
Release the pressure on the pedals, the parking brake control must remain in pulled position.

or

Pull the parking brake control.
Press on both pedals, then release the pressure on the pedals.
The parking brake control must remain in the pulled position.

Brake off

Push the parking brake control down

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SECTION 5
PERFORMANCE

AIRSPEED INSTALLATION CALIBRATION

No change

STALL SPEEDS

Weight 980 kg (21261 lb) engine idle	km/h (kt)		
Bank angle	0°	30°	60°
Flaps up	99 (54)	106 (58)	140 (76)
Flaps, takeoff position	92 (50)	98 (53)	130 (70)
Flaps, landing position	87 (47)	93 (51)	123 (67)

Table 5-1 Stall speeds

TAKEOFF PERFORMANCE

At max. take-off weight 980 kg (2161 lb), without wind, flaps in takeoff position, engine full power.

Conditions

- No wind, flaps in takeoff position, engine full power on brakes before release
- Level, dry, asphalt runway
- Rotation speed v_r ..... (52 kt) 96 km/h
- Lift off speed v_{lof} ..... (57 kt) 105 km/h
- Speed at 15 m (50 ft) height obstacle clearance ..... (61 kt) 113 km/h

Pressure Altitude (ft)	Takeoff distance (m) at 980 kg (MTOW)					
	ISA condition		ISA +10°C		ISA +20°C	
	to lift-off	to 50 ft height	to lift-off	to 50 ft height	to lift-off	to 50 ft height
0	240	440	260	480	280	520
1000	260	470	270	500	290	540
2000	270	490	290	530	310	570
3000	280	510	300	550	320	590
4000	300	540	320	580	340	630
5000	310	580	330	620	360	670
6000	330	620	350	660	380	720
7000	360	690	380	730	400	790
8000	390	760	410	810	430	880
9000	410	810	430	850	450	930

Table 5-2 Takeoff distance (m) at 980 kg (MTOW)

Pressure Altitude (ft)	Takeoff distance (m) at 880 kg					
	ISA condition		ISA +10 °C		ISA +20 °C	
	to lift-off	to 50 ft height	to lift-off	to 50 ft height	to lift-off	to 50 ft height
0	190	350	210	380	220	410
1000	200	370	220	390	230	430
2000	210	390	230	410	250	450
3000	220	400	240	430	260	460
4000	240	430	250	460	270	490
5000	250	450	270	480	290	520
6000	270	490	290	520	310	560
7000	290	540	310	570	330	620
8000	310	590	330	620	350	680
9000	330	630	350	660	370	720

Table 5-3 Takeoff distance (m) at 800 kg

Headwind influence:

- For 10 kt, multiply by 0.85
- For 20 kt, multiply by 0.65
- For 30 kt, multiply by 0.55

Tailwind influence:

- Add 10 % to distance for each additional 2 kt

Dried grass runway:

- Add 15 %

CLIMB PERFORMANCE

At sea level

	Flaps Takeoff	Flaps retracted
Best angle of climb	(65 kt) 120 km/h	(65 kt) 120 km/h
Best rate of climb	(76 kt) 141 km/h	(78 kt) 144 km/h

Table 5-4 Climb performance at sea level

Rate of climb, Flaps retracted, 980 kg (MTOW)

Climb speeds:

- 78 kt from 0 to 9500 ft
- 75 kt up to 11500 ft
- 72 kt above

Pressure Altitude (ft)	Rate of Climb (ft/min) at 980 kg (MTOW)		
	ISA condition	ISA +10°C	ISA +20°C
0	680	660	630
500	680	660	630
1000	680	660	630
1500	675	660	630
2000	675	660	630
2500	675	660	630
3000	670	660	630
3500	660	650	610
4000	650	640	600
4500	630	620	580
5000	620	610	570
5500	600	590	560
6000	580	570	540
6500	570	560	530
7000	550	540	510
7500	540	530	500
8000	520	510	480
8500	490	490	450
9000	490	480	450
9500	480	480	450
10000	370	370	350
10500	350	350	340
11000	340	340	330
11500	320	320	310
12000	300	300	300
12500	280	280	280
13000	260	260	260
13500	230	230	230
14000	210	210	210
14500	190	190	190
15000	170	170	170
15500	150	150	150
16000	130	130	130

Table 5-5 Rate of climb at 980 kg (MTOW)

Rate of climb, Flaps retracted, 880 kg

Pressure Altitude (ft)	Rate of Climb (ft/min) at 880 kg		
	ISA condition	ISA +10 °C	ISA +20 °C
0	910	900	860
500	910	900	860
1000	910	900	860
1500	910	900	860
2000	910	900	860
2500	910	900	860
3000	910	900	860
3500	900	890	850
4000	890	880	840
4500	870	860	820
5000	860	850	820
5500	840	830	800
6000	820	810	780
6500	810	800	770
7000	790	780	750
7500	780	770	740
8000	760	750	720
8500	730	720	690
9000	720	720	690
9500	720	720	690
10000	600	600	580
10500	580	580	570
11000	570	570	570
11500	550	550	550
12000	540	540	540
12500	520	520	520
13000	500	500	500
13500	460	460	460
14000	450	450	450
14500	420	420	420
15000	400	400	400
15500	380	380	380
16000	350	350	350
16500	310	310	310

Table 5-6 Rate of climb at 880 kg

Time to climb, Flaps retracted, 980 kg

Climb speeds:

- 78 kt from 0 to 9500 ft
- 75 kt up to 11500 ft
- 72 kt above

Pressure Altitude (ft)	Time to Climb (min) at 980 kg (MTOW)		
	ISA condition	ISA +10°C	ISA +20°C
0			
500	0,7	0,8	0,8
1000	1,5	1,5	1,6
1500	2,2	2,3	2,4
2000	2,9	3,0	3,2
2500	3,7	3,8	4,0
3000	4,4	4,5	4,8
3500	5,2	5,3	5,6
4000	5,9	6,1	6,4
4500	6,7	6,9	7,2
5000	7,5	7,7	8,1
5500	8,3	8,5	8,9
6000	9,1	9,3	9,8
6500	10,0	10,2	10,8
7000	10,9	11,1	11,7
7500	11,8	12,0	12,7
8000	12,7	13,0	13,7
8500	13,7	13,9	14,7
9000	14,7	15,0	15,8
9500	15,7	16,0	17,0
10000	16,8	17,1	18,1
10500	18,1	18,4	19,5
11000	19,5	19,8	21,0
11500	21,0	21,3	22,5
12000	22,6	22,9	24,1
12500	24,2	24,5	25,8

Table 5-7 Time to climb (mn) at 980 kg (MTOW), 0 - 12500 ft

Pressure Altitude (ft)	Time to Climb (min) at 980 kg (MTOW)		
	ISA condition	ISA +10 °C	ISA +20 °C
13000	26,0	26,3	27,5
13500	27,9	28,2	29,5
14000	30,1	30,4	31,6
14500	32,5	32,8	34,0
15000	35,1	35,4	36,7
15500	38,1	38,4	39,6
16000	41,4	41,7	42,9
16500	45,2	45,5	46,8

Table 5-8 Time to climb (mn) at 980 kg (MTOW), 13000 - 16500 ft

Rate of climb, Flaps in takeoff position

Pressure Altitude (ft)	Time to Climb (min) at 880 kg		
	ISA condition	ISA +10 °C	ISA +20 °C
0			
500	0,5	0,6	0,6
1000	1,1	1,1	1,2
1500	1,6	1,7	1,7
2000	2,2	2,2	2,3
2500	2,7	2,8	2,9
3000	3,3	3,3	3,5
3500	3,8	3,9	4,1
4000	4,4	4,5	4,7
4500	5,0	5,0	5,3
5000	5,5	5,6	5,9
5500	6,1	6,2	6,5
6000	6,7	6,8	7,1
6500	7,3	7,4	7,7
7000	7,9	8,0	8,4
7500	8,6	8,7	9,1
8000	9,2	9,3	9,7
8500	9,9	10,0	10,4
9000	10,6	10,7	11,1

Table 5-9 Time to climb (mn) at 880 kg, 0 - 9000 ft

Pressure Altitude (ft)	Time to Climb (min) at 880 kg		
	ISA condition	ISA +10°C	ISA +20°C
9500	11,3	11,4	11,9
10000	11,9	12,1	12,6
10500	12,8	12,9	13,5
11000	13,6	13,8	14,3
11500	14,5	14,6	15,2
12000	15,4	15,6	16,1
12500	16,4	16,5	17,1
13000	17,3	17,4	18,0
13500	18,3	18,4	19,0
14000	19,4	19,5	20,1
14500	20,5	20,6	21,2
15000	21,7	21,8	22,4
15500	23,0	23,1	23,7
16000	24,3	24,4	25,0
16500	25,7	25,8	26,4

Table 5-10 Time to climb (mn) at 880 kg, 9500 - 16500 ft

Rate of climb, Flaps in takeoff position

Best rate of climb:
Subtract 10% from the flaps retracted rates of climb in the above tables.

Maximum angle of climb:
8,3% at sea level, standard atmosphere, MTOW, and 120km/h (65 kt).

Glide performance

Engine off, the aircraft glides 8 times its altitude above ground (without wind) at 145 km/h (78 kt).
Altitude and temperature do not have perceptible influence.

CRUISE PERFORMANCE

At maximum max. take-off weight 980 kg (2161 lb), in standard atmosphere.
Range and endurance calculations take into account 45 min. reserve (at 55% load) at destination.
Assumption is made that higher consumption for climb is compensated by a cruise descent.
Range assumes no wind.

Standard Tank .....109 liters usable

Standard and Auxiliary Tanks .....159 liters usable

Press. Alt. (ft)	ISA Conditions				Standard Tank		Std. + Aux. Tank	
	%				109 liters		159 liters	
	Load	KCAS	KTAS	Lt/h	NM	Hours	NM	Hours
2000	75	108	111	21,2	496	4,5	758	6,8
2000	70	104	107	19,6	516	4,8	788	7,4
2000	65	100	103	18,1	537	5,2	821	8
2000	60	95	98	16,7	555	5,7	848	8,7
2000	55	88	91	15,3	562	6,2	859	9,5
2000	50	79	81	13,9	554	6,8	846	10,4
4000	75	107	114	21,2	508	4,5	776	6,8
4000	70	103	109	19,6	526	4,8	804	7,4
4000	65	99	105	18,1	548	5,2	837	8,0
4000	60	94	99	16,7	564	5,7	862	8,7
4000	55	87	92	15,3	570	6,2	871	9,5
4000	50	78	82	13,9	561	6,8	857	10,4
6000	75	107	117	21,2	520	4,5	794	6,8
6000	70	102	112	19,6	537	4,8	821	7,4
6000	65	98	107	18,1	559	5,2	854	8,0
6000	60	93	101	16,7	576	5,7	880	8,7
6000	55	85	93	15,3	579	6,2	885	9,5
6000	50	76	84	13,9	569	6,8	870	10,4

Table 5-11 Cruise performance, 2000 - 6000 ft

Press. Alt. (ft)	ISA Conditions				Standard		Std. + Aux.	
					109 liters		159 liters	
	% Load	KCAS	KTAS	Lt/h	NM	Hours	NM	Hours
8000	75	106	120	21,2	533	4,5	815	6,8
8000	70	101	114	19,6	548	4,8	838	7,4
8000	65	97	109	18,1	571	5,2	872	8,0
8000	60	91	103	16,7	582	5,7	890	8,7
8000	55	84	95	15,3	587	6,2	897	9,5
8000	50	75	85	13,9	575	6,8	880	10,4
10000	75	105	122	21,2	545	4,5	833	6,8
10000	70	100	116	19,6	560	4,8	856	7,4
10000	65	96	112	18,1	582	5,2	890	8,0
10000	60	91	106	16,7	601	5,7	918	8,7
10000	55	83	97	15,3	598	6,2	915	9,5
10000	50	74	86	13,9	586	6,8	895	10,4
12000	75	104	125	21,2	557	4,5	851	6,8
12000	70	99	119	16,6	572	4,8	875	7,4
12000	65	95	114	18,1	595	5,2	909	8,0
12000	60	90	108	16,7	613	5,7	937	8,7
12000	55	82	98	15,3	610	6,2	933	9,5
12000	50	73	88	13,9	596	6,8	912	10,4

Table 5-12 Cruise performance, 8000 - 12000 ft

LANDING PERFORMANCE

At max. take-off weight 980 kg (2161 lb),
Without wind, flaps in landing position, engine at idle.
Concrete, flat and dried runway

Altitude	Temperature		Weight 980 kg (2161 lb)			
			Landing Distance (Ground Touch)		Landing Distance from 15 m (50 ft)	
ft (m)	°C	°F	m	(ft)	m	(ft)
0	-5	23	266	873	479	1570
	Std=15	59	282	925	507	1663
	35	95	298	976	535	1755
2000 (610)	-9	16	277	909	498	1635
	11	52	294	964	528	1733
	31	88	310	1018	558	1830
3000 (914)	-11	12	284	931	510	1674
	9	48	301	987	541	1775
	29	84	318	1043	572	1875
4000 (1219)	-13	9	291	953	527	1728
	7	45	308	1011	559	1833
	27	81	326	1069	591	1937

Table 5-13 Landing performance

Headwind influence:

- For 10 kt, multiply by 0.85
- For 20 kt, multiply by 0.65
- For 30 kt, multiply by 0.55

Tailwind influence:

- Add 10 % to distance for each additional 2 kt

Dried grass runway:

- Add 15 %

SECTION 6
WEIGHT AND BALANCE

The following nomograph is used to determine balance of the DR400.

Remember that diesel and JET FUEL are heavier than AVGAS, and they carry more energy per volume. Because the fuel in the Robin series is in an aft location, fuel consumption shifts the CG forward.

The DR400 delivers greater range and, at altitude, greater speed, than AVGAS-powered Robin of equivalent sea-level power ratings, for a given volume of fuel.

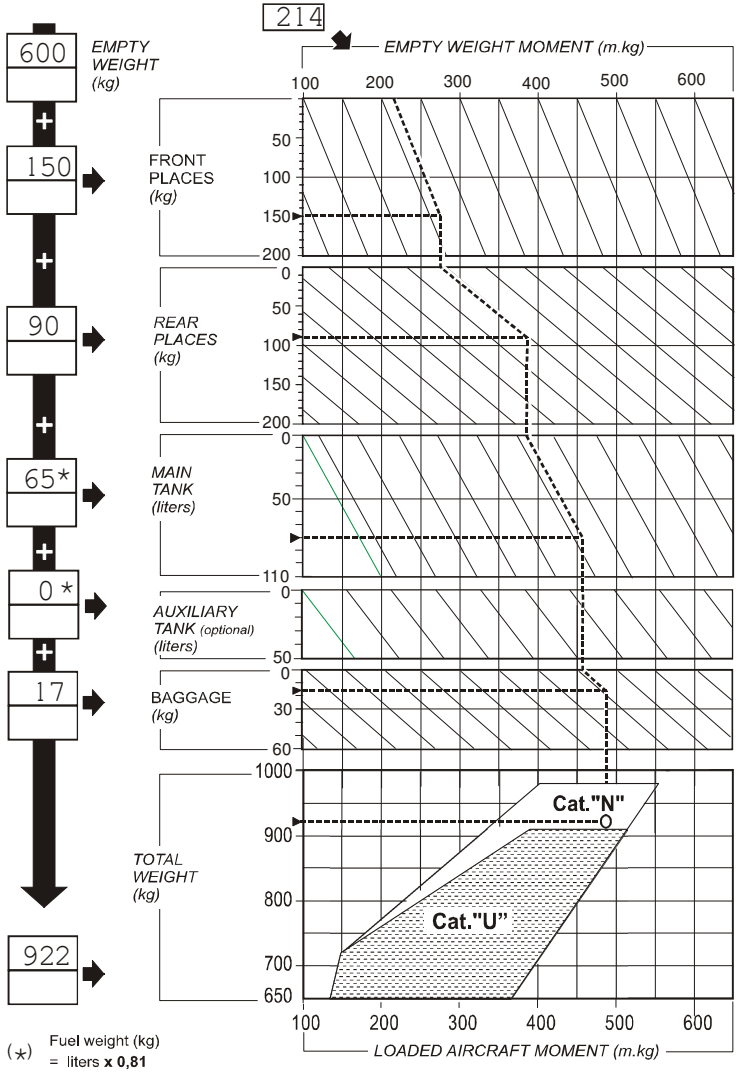

Figure 6-1 Weight and Balance

USE OF WEIGHT AND BALANCE DIAGRAM

1. Calculate the weight of the fully loaded aircraft:
   Empty weight (from the Weight & Balance Data Sheet)
   + pilot and passengers weights
   + baggage weight
   + standard fuel (1 liter JET A-1 = 0.81 kg)
   Make sure that the total weight does not exceed 980 kg (2161 lb) in cat. N and 910 kg (2006 lb) in cat. U.
2. Place the empty aircraft moment (from the Weight and Balance Data Sheet) on the upper scale of the diagram, and proceed with your own data as in the following example, indicated by dashed line on the diagram.

Loading is acceptable when the resulting point falls within the C of G moment envelope (white area).

Example of loading problem (dashed line on the diagram)

Licenced empty moment (sample airplane) ..... (1548 ft.lb)
214m.kg

Weight of the empty aircraft ..... (1323 lb) 600 kg

Pilot & front passenger ..... (331 lb) 150 kg

Rear passenger ..... (198 lb) 90 kg

Fuel, main tank 80 L (17.6 imp/21.1 US gal) ..... (143 lb) 65 kg

Baggage ..... (37.5 lb) 17 kg

TOTAL WEIGHT ..... (2033 lb) 922 kg

Centre of gravity within the envelope.

1 liter JET A-1 ..... 0.81 kg (1.79 lb)

1 Imp gal JET A-1 ..... 3.69 kg (8.13 lb)

1 US gal JET A-1 ..... 3.07 kg (6.77 lb)

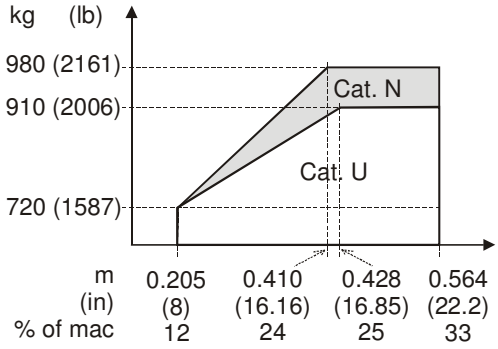

Figure 6-2 Use of Weight and Balance Diagram

▲ **WARNING:** For the calculation of the aircraft center of gravity, do not use the values of empty aircraft weight and moment indicated in the above example!
Use the values indicated in the latest licensed weight and balance data sheet of your aircraft