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Supplement
Pilot´s Operating Handbook

for the
Cessna172 R&S

Equipped with TAE 125 Installation

Issue 2

MODEL No. ______________
SERIAL No. ______________
REGISTER No. ______________

This supplement must be attached to the Pilot s Operating Handbook when the TAE 125 installation has been installed in accordance with STC EASA. A.S.01527 or LBA STC SA 1295.

The information contained in this supplement supersede or add to the Pilot´s Operating Handbook approved by the LBA only as set forth herein.
For limitations, procedures, performance and loading information not contained in this supplement, consult the Pilot´s Operating Handbook approved by the LBA.

EASA Approved | EASA. A.S. 01527 Rev. 2

Braunschweig, 21.08.2006
Luftfahrtbundesamt

TAE-Nr.: 20-0310-22022

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This supplement is a translation of the LBA-approved supplement to German version of the Pilot´s Operating Handbook.

LOG OF REVISIONS

Revision	Page	Description	Approved	
			Date	Endorsed

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

General remark

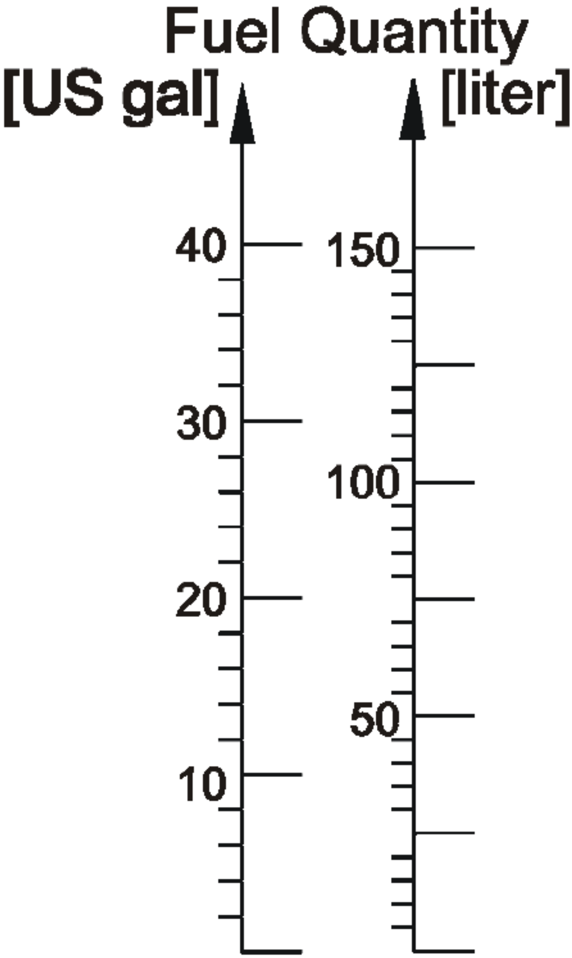
The content of this POH supplement is developed on basis of the LBA-approved POH. The content of the LBA- approved POH is equivalent to the original, FAA-approved POH.

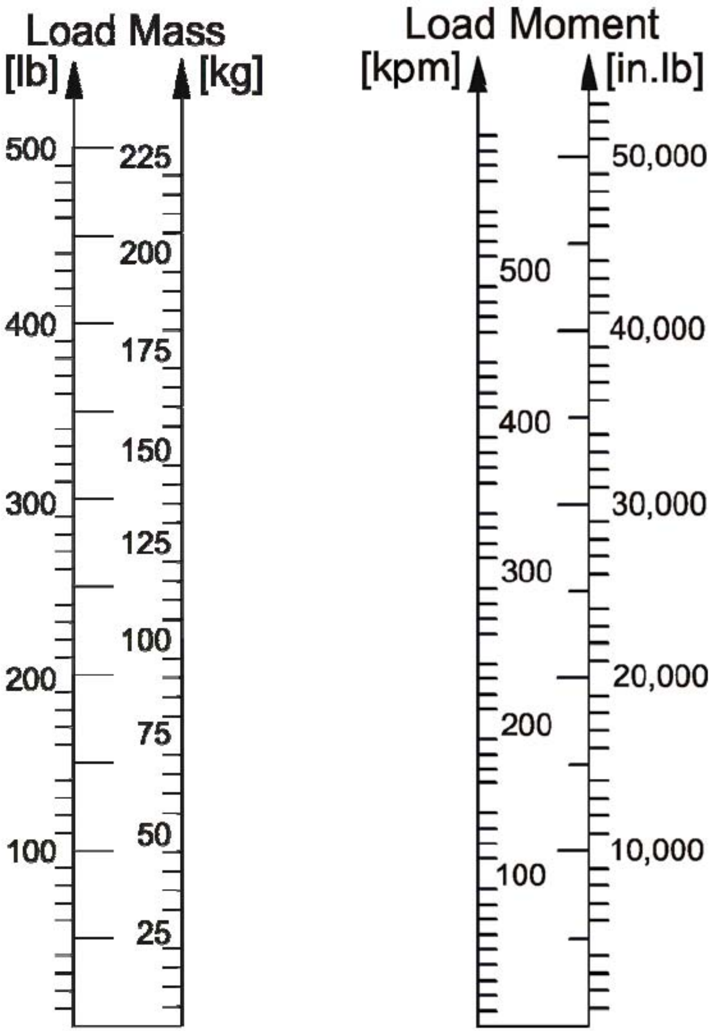
TABLE OF CONTENTS

CONVERSION TABLES

VOLUME		
Unit [Abbr.]	Conversion factor SI to US / Imperial	Conversion factor US / Imperial to Si
Liter [l] US gallon [US gal] US quart [US qt] Imperial gallon [lmp gal] Cubic inch [in^3]	[l] / 3,7854 = [US gal] [l] / 0,9464 = [US qt] [l] / 4,5459 = [[lmp gal] [l] x 61,024 = [in^3]	[US gal] x 3,7854 = [l] [[US qt] x 0,9464 = [l] [[lmp gal] x 4,5459 = [l] [in^3] / 61,024 = [l]
TORQUE		
Unit [Abbr.]	Conversion factor SI to US / Imperial	Conversion factor US / Imperial to Si
Kilopondmeter [kpm] Foot pound [ft.lb] Inch pound [in.lb]	[kpm] x 7,2331 = [ft.lb] [kpm] x 86,7962 = [in.lb]	[ft.lb] / 7,2331 = [kpm] [in.lb] / 86,7962 = [kpm]
TEMPERATURE		
Unit [Abbr.]	Conversion factor SI to US / Imperial	Conversion factor US / Imperial to Si
Degree Celsius [ºC] Degree Fahrenheit [ºF]	[ºC] x 1,8 + 32 = [ºF]	([ºF] - 32) / 1,8 = [ºC]
SPEED		
Unit [Abbr.]	Conversion factor SI to US / Imperial	Conversion factor US / Imperial to Si
Kilometers per hour [km/h] Meters per second [m/s] Miles per hour [mph] Knots [kts] Feet per minute [fpm]	[km/h] / 1,852 = [kts] [km/h] / 1,609 = [mph] [m/s] / 196,85 = [fpm]	[mph] x 1,609 = [km/h] [kts] x 1,852 = [km/h] [fpm] / 196,85 = [m/s]

PRESSURE		
Unit [Abbr.]	Conversion factor SI to US / Imperial	Conversion factor US / Imperial to Si
Bar [bar] Hectopascal [hpa] =Millibar [mbar] Pounds per square inch [psi] inches of mercury column [inHg]	[bar] x 14,5038 = [psi] [hpa] / 33,864= [inHg] [mbar] / 33,864 = [inHg]	psi] / 14,5038 = [bar] [inHg] x 33,864 = [hPa] [inHg] x 33,864 = [mbar]
MASS		
Unit [Abbr.]	Conversion factor SI to US / Imperial	Conversion factor US / Imperial to Si
Kilogramm [kg] Pound [lb]	[kg] / 0,45359 = [lb]	[lb] x 0,45359 = [kg]
LENGTH		
Unit [Abbr.]	Conversion factor SI to US / Imperial	Conversion factor US / Imperial to Si
Meter [m] Millimeter [mm] Kilometer [km] Inch [] Foot [] Nautical mile [nm] Statute mile [sm]	[m] / = 0,3048 [ft] [mm] / = 25,4 [in] [km] / = 1,852 [nm] [km] / = 1,609 [sm]	[in] x = [mm] [ft] x = [m] [nm] x = [km] [sm] x = [km]
FORCE		
Unit [Abbr.]	Conversion factor SI to US / Imperial	Conversion factor US / Imperial to Si
Newton [N] Decanewton [daN] Pound [lb]	[N] / 4,448 = [lb] [daN] / 0,4448 = [lb]	[lb] x 4,448 = [N] [lb] x 0,4448 = [daN]


Fuel Quantity
[US gal]
[liter]
40
30
20
10
150
100
50


Load Mass
[lb]
[kg]
500
400
300
200
100
225
200
175
150
125
100
75
50
25
Load Moment
[kpm]
[in.lb]
500
400
300
200
100
50,000
40,000
30,000
20,000
10,000

ABBREVIATIONS

TAE	Thielert Aircraft Engines GmbH, developing and manufacturing company of TAE 125
FADEC	Full Authority Digital Engine Control
CED 125	Compact Engine Display of TAE 125 Multifunctional instrument for indication of engine data of TAE 125
AED 125	Auxiliary Engine Display Multifunctional instrument for indication of engine and airplane data

SECTION 1
GENERAL

CONVENTIONS IN THIS HANDBOOK

This manual contains following conventions 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.

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.

ENGINE

Engine manufacturer:............... Thielert Aircraft Engines GmbH

Engine model:................................ TAE 125-01 or TAE 125-02

The TAE 125-02 is the successor of the 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 has 1991 ccm. Both TAE 125 engine variants are liquid cooled in-line four-stroke 4-cylinder motor 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.

■ CAUTION: The engine requires an electrical power source for operation. If the battery and alternator fail simultaneously, this leads to engine stop. Therefore, it is important to pay attention to indications of alternator failure.

Due to this specific characteristic, all of the information from the flight manual recognized by LBA are no longer valid with 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: ....1.87 m

Type:..constant speed

FUELS

■ CAUTION: If non-approved fuels are used, this may lead to dangerous engine malfunctions.

Fuel: ....JET A-1 (ASTM 1655)
Alternative: .... JET A (ASTM D 1655)
....Fuel No.3 (GB6537-94)
.... Diesel (**DIN** EN 590)

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

Gearbox oil:.....................................Shell EP 75W-90 API GL-4
....Shell Spirax GSX 75W-80

Coolant:................Water/Radiator Protection at a ratio of 50:50

Radiator Protection: .... BASF Glysantin Protect Plus/G48

◆ Note: The ice flocculation point of the coolant is -36°C.

■ 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.

▲ **WARNING:** The engine must not be started under any circumstances if the level is too low.

Quantity of fuel:

◆ Note: The maximum permissible tank capacity has been reduced due to the higher specific density of Jet A-1 and Diesel compared to AVGAS

Total capacity:..............................47,6 US gallons (180.2 litres)
Total capacity of usable fuel: ....44,6 US gallons (168,8 litres)

Total capacity each tank: ....23,8 US gallons (90,1 litres)
Total capacity of usable fuel
each tank: ....22,3 US gallons (84,4 litres)

WEIGHT LIMITS

C172 R & S normal category (C 172 S reduced):

Maximum Ramp Weight: .... 1112 kg
Maximum Takeoff Weight: .... 1111 kg
Maximum Landing Weight .... 1111 kg

C172 R utility category:

Maximum Ramp Weight: .... 954 kg
Maximum Takeoff Weight: .... 953 kg
Maximum Landing Weight .... 953 kg

C172 S utility category:

Maximum Ramp Weight: .... 1000 kg
Maximum Takeoff Weight: .... 999 kg
Maximum Landing Weight .... 999 kg

SECTION 2
LIMITATIONS

ENGINE OPERATING LIMITS

Engine manufacturer:............... Thielert Aircraft Engines GmbH
Engine model: .... TAE 125-01 or TAE 125-02
Take-off and Max. continuous power:.............. 99 kW (135 HP)
Take-off 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:

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

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

Min. oil temperature (engine starting temperature): .... - 30 °C
Min. oil temperature (minimum operating limit temperature): 50 °C
Maximum oil temperature: ....140 °C
Min. cooling water temp. (engine starting temperature): .... - 30 °C
Min. cooling water temp. (min. operating limit temperature): .60 °C
Max. cooling water temperature: ....105 °C
Min. gearbox temperature .... -30 °C
Max. gearbox temperature: ....120 °C

Min. fuel temperature limit in the fuel tank:

Fuel	Minimum permissible fuel temperature in the fuel tank before Take-off	Minimum permissible fuel temperature in the fuel tank during the flight
JET A-1, JET-A, Fuel No.3	-30°	-35°
Diesel	greater than 0°	-5°

Table 2-3a Minimum fuel temperature limits in the fuel tank

▲ **WARNING:** The fuel temperature of the fuel tank not used should be observed if it´s later use is intended.

▲ **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% Diesel, the fuel temperature limits for Diesel operation must be observed. If there is uncertainty about which fuel is in the tank, the assumption should be made that it is Diesel.

Minimum oil pressure: .... 1.0 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

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	Yellow range	Green range	Yellow range	Red range
Tachometer	[RPM]	-----------	--------------	0-2300	-------	> 2300
Oil pressure	[mbar]	0-1200	1200-2300	2300-5200	5200-6000	> 6000
Coolant temperature	[°C]	< -32	-32 ...+60	60-101	101-105	> 105
Oil temperature	[°C]	< -32	-32 ...+50	50-125	125-140	> 140
Gearbox temperature	[°C]	----------	----------	< 115	115-120	> 120
Load	[%]	---------	----------	0-100	----------	----------

Table 2-3b 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 button is pressed longer than a second, a selftest of the instrument is initiated.

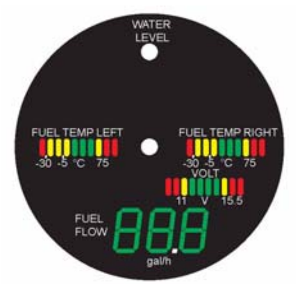


Figure 2-1a AED 125

Figure 2-1b CED 125

WEIGHT LIMITS

C172 R & S normal category (C 172 S reduced):

Maximum Ramp Weight: .... 1112 kg
Maximum Takeoff Weight: .... 1111 kg
Maximum Landing Weight .... 1111 kg

C172 R utility category:

Maximum Ramp Weight: .... 954 kg
Maximum Takeoff Weight: .... 953 kg
Maximum Landing Weight .... 953 kg

C172 S utility category:

Maximum Ramp Weight: .... 1000 kg
Maximum Takeoff Weight: .... 999 kg
Maximum Landing Weight .... 999 kg

MANEUVER LIMITS

Normal Category: No change

Utility Category: The following maneuvers are prohibited:

- intentionally initiating spins
- intentionally initiating negative-G flights

◆ Note: This change of the original aircraft is certified up to an altitude of 17,500 ft.

PERMISSIBLE FUEL GRADES

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

Kraftstoff:...JET A-1 (ASTM 1655)
Alternativ: .... JET-A1 (ASTM D 1655)
....Fuel No.3 (GB6537-94)
.... Diesel (**DIN EN** 590)

MAXIMUM FUEL QUANTITIES

Due to the higher specific density of Kerosene and Diesel in comparison to Aviation Gasoline (AVGAS) with the TAE 125 installation the permissible tank capacity has been reduced.

2 tanks: .... each 23,8 US gallons (90,1 litres)
Total capacity: .... 47,6 US gallons (180.2 litres)
Total usable fuel: .... 44,6 US gallons (168,8 litres)
Total unusable fuel: .... 3 US gallons (11.4 litres)

■ CAUTION: To prevent air from penetrating into the fuel system avoid flying the tanks dry. As soon as the "Low Level" Warning Lamp illuminates, switch to a tank with sufficient fuel or land.

■ CAUTION: With ¼ tank or les, prolonged uncoordinated flight is prohibited when operating on either left or right tank.

■ CAUTION: In turbulent air it is strongly recommended to use the BOTH position.

◆ Note: The tanks are equipped with a Low Fuel Warning. If the fuel level is below 5 US gal (19 l) usable fuel in one of the tanks, the "Fuel L" or "Fuel R" Warning Lamp illuminates respectively.

PLACARDS

On fuel selector:
LEFT/ RIGHT/ BOTH

Near the fuel tank caps:

FUEL

JET A-1 / DIESEL
"CAP. 84,4 LITERS (22,3 US GALLONS)
USABLE TO BOTTOM OF FILLER INDICATOR TAB"

On the oil funnel or at the flap of the engine cowling:

"Oil, see POH supplement"

Next to the Alternator Warning Lamp:

"Alternator"

If installed, at the flap of the engine cowling to the External Power Receptacle:

„ATTENTION 24 V DC OBSERVE CORRECT POLARITY“

All further placards contained in this section of the LBA-approved POH remain valid.

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SECTION 3
EMERGENCY PROCEDURES

INDEX OF CHECKLISTS

GENERAL

▲ **WARNING:** Due to an engine shut-off or a FADEC diagnosed failure there might be a loss propeller valve currency which leads in a low pitch setting of the propeller. This might result in overspeed.
Airspeeds below 100 KIAS are suitable to avoid overspeed in failure case. If the propeller speed control fails, climb flights can be performed at 65 KIAS / 75 mph and a powersetting of 100%.

ENGINE MALFUNCTION

DURING TAKE-OFF (WITH SUFFICENT RUNWAY AHEAD)

- Take-off abort -

(1) Thrust Lever - IDLE
(2) Brakes - APPLY
(3) Wing flaps (if extended) - RETRACT to increase the braking effect on the runway
(4) Engine Master ("IGN" resp.) - OFF
(5) Alternator Circuit Breaker (Switch resp.) and Switch "Battery" - OFF
(6) Fuel Shut-off Valve - CLOSED

IMMEDIATELY AFTER TAKE-OFF

- Take-off abort -

If there is an engine malfunction after take-off, at first lower the nose to keep the airspeed and attain gliding attitude. In most cases, landing should be executed straight ahead with only small corrections in direction to avoid obstacles.

▲ **WARNING:** Altitude and airspeed are seldom sufficient for a return to the airfield with a 180° turn while gliding.

(1) Airspeed................................ 65 KIAS (wing flaps retracte)
............................60 KIAS (wing flaps extended)
(2) Fuel Shut-off Valve - CLOSED
(3) Engine Master ("IGN" resp.) - OFF
(4) Wing flaps - as required (30° recommended)
(5) Alternator Circuit Breaker (Switch resp.), and Switch "Battery" - OFF

DURING FLIGHT

◆ Note: Flying a tank dry activates both FADEC lamps flashing.

In case that one tank was flown dry, at the first signs of insufficient fuel feed proceed as follows:

(1) Immediately switch the Fuel Selector to BOTH
(2) Electrical Fuel Pump - ON
(3) Check the engine (engine parameters, airspeed/altitude change, whether the engine responds to changes in the Thrust Lever position).
(4) If the engine acts normally, continue the flight to the next airfield or landing strip.

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

RESTART AFTER ENGINE FAILURE

Whilst gliding to a suitable landing strip, try to determine the reason for the engine malfunction . If time permits and a restart of the engine is possible, proceed as follows:

(1) Airspeed between 65 and 85 KIAS (maximal 100 KIAS)
(2) Glide below 13,000 ft
(3) Fuel Selector switch to BOTH
(4) Electrical Fuel Pump - ON
(5) Thrust Lever -IDLE
(6) Engine Master ("IGN" resp.) OFF and then ON
(if the propeller does not turn, then additionally Starter ON)

◆ Note: If the Engine Master ("IGN" resp.) is in position OFF, the Load Display shows 0% even if the propeller is turning.

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. <u>If it is obvious that the engine or propeller is blocked, do not use the Starter.</u>

(7) Check the engine power: Thrust lever 100%, engine parameters, check altitude and airspeed

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 (refer to Section 7 "FADEC-Reset")
2. FADEC Lamp extinguished (LOW warning category) :
   a) Continue flight normally,
   b) Inform service center after landing.
3. FADEC Lamp steady illuminated (HIGH warning category)
   a) Observe the other FADEC lamp,
   b) Fly to the next airfield or landing strip,
   c) Select an airspeed to avoid engine overspeed
   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 7 "FADEC-Reset")
2. FADEC Lamps extinguished (LOW warning category):
   a) Continue flight normally,
   b) Inform service center after landing.
3. FADEC Lamps steady illuminated (HIGH warning category):
   a) Check the available engine power,
   b) Expect engine failure.

c) Flight can be continued, however the pilot should
   i) Select an airspeed to avoid engine overspeed
   ii) Fly to the next airfield or landing strip
   iii) Be prepared for an emergency landing

d) Inform service center after landing.

In case a tank was flown empty, proceed at the first signs of insufficient fuel feed as follows:

(1) Immediately switch the Fuel Selector to BOTH
(2) Electrical Fuel Pump - ON
(3) Select an airspeed to avoid engine overspeed
(4) Check the engine (engine parameters, airspeed/altitude change, whether the engine responds to changes in the Thrust Lever position).
(5) If the engine acts normally, continue the flight to the next airfield or landing strip.

c) Abnormal Engine Behavior

If the engine acts abnormally during flight and the system does not automatically switch to the B-FADEC, it is possible switch to the B-FADEC manually.

▲ **WARNING:** It is only possible to switch from the automatic position to B-FADEC (A-FADEC is active in normal operation, B-FADEC is active in case of malfunction). This only becomes necessary when no automatic switching occurred in case of abnormal engine behavior.

(1) Select an appropriate airspeed to avoid engine overspeed
(2) "FADEC-Force" switch to B-FADEC
(3) Flight may be continued, but the pilot should:
   i) Select an airspeed to avoid engine overspeed
   ii) Fly to the next airfield or landing strip
   iii) Be prepared for an emergency landing

FIRES

ENGINE FIRE WHEN STARTING ENGINE ON GROUND

(1) Engine Master ("IGN" resp.) - OFF
(2) Fuel Shut-off Valve CLOSED
(3) Electrical Fuel Pump - OFF
(4) Switch "Battery" - OFF
(5) Extinguish the flames with a fire extinguisher, wool blankets or sand
(6) Examine the fire damages thoroughly and repair or replace the damaged parts before the next flight

ENGINE FIRE IN FLIGHT

(1) Engine Master ("IGN" resp.) - OFF
(2) Fuel Shut-off Valve CLOSED
(3) Select an airspeed to avoid engine overspeed
(4) Electrical Fuel Pump - OFF (if in use)
(5) Switch "Main Bus" - OFF
(6) Cabin heat and ventilation OFF (except the fresh air nozzles on the ceiling)
(7) Perform emergency landing (as described in the procedure "Emergency Landing With Engine Out")

ELECTRICAL FIRE IN FLIGHT

The first sign of an electrical fire is the smell of burned cable insulation. In this event proceed as follows:

(1) Switch "Main Bus" - OFF
(2) Avionics Power Switch - OFF
(3) Fresh air jets - OPEN
(4) Shut-off Cabin Heat - OFF (push for OFF)
(5) Land as quickly as possible

ENGINE SHUT DOWN IN FLIGHT

If it is necessary to shut down the engine in flight (for instance, abnormal engine behavior does not allow continued flight or there is a fuel leak, etc.), proceed as follows:

(1) Select an appropriate airspeed to avoid engine overspeed
(2) Engine Master ("IGN" resp.) - OFF
(3) Fuel Shut-off Valve CLOSED
(4) Electrical Fuel Pump - OFF (if in use)
(5) If the propeller also has to be stopped (for instance, due to excessive vibrations)
   i) Reduce airspeed below 55 KIAS
   ii) When the propeller is stopped, continue to glide at 65 KIAS

EMERGENCY LANDING

EMERGENCY LANDING WITH ENGINE OUT

If all attempts to restart the engine fail and an emergency landing is immanent, select suitable site and proceed as follows:

(1) Airspeed
   i) 65 KIAS (flaps retracted)
   ii) 60 KIAS (flaps extended)
(2) Fuel Shut-off Valve CLOSED
(3) Engine Master ("IGN" resp.) - OFF
(4) Wing Flaps - as required (30° is recommended)
(5) Alternator Circuit Breaker (Switch resp.) and Switch "Battery" - OFF
(6) Cabin Doors - unlock before touch-down
(7) Touch-down - slightly nose up attitude
(8) Brake firmly

◆ Note: Gliding Distance. Refer to Figure 3-1 "Maximum Glide" in the approved Pilot´s Operating Handbook

FLIGHT IN ICING CONDITIONS

▲ **WARNING:** It is prohibited to fly in known icing conditions.

In case of inadvertent icing encounter proceed as follows:

(1) Pitot Heat switch - ON (if installed)
(2) Turn back or change the altitude to obtain an outside air temperature that is less conducive to icing.
(3) Pull the cabin heat control full out and open defroster outlets to obtain maximum windshield defroster airflow. Adjust cabin air control to get maximum defroster heat and airflow.
(4) Advance the Thrust Lever to increase the propeller speed and keep ice accumulation on the propeller blades as low as possible.
(5) Watch for signs of air filter icing and pull the"Alternate Air Door" control if necessary. An unexplaned loss in engine power could be caused by ice blocking the air intake filter. Opening the "Alternate Air Door" allows preheated air from the engine compartment to be aspirated.
(6) Plan a landing at the nearest airfield. With an extremely rapid ice build up, select a suitable "off airfield" landing side.
(7) With an ice accumulation of 0.5 cm or more on the wing leading edges, a significantly higher stall speed should be expected.
(8) Leave wing flaps retracted. With a severe ice build up on the horizontal tail, the change in wing wake airflow direction caused by wing flap extension could result in a loss of elevator effectiveness.
(9) Open left window, if practical, scrape ice from a portion of the windshield for visibility in the landing approach.
(10) Perform a landing approach using a forward slip, if necessary, for improved visibility.
(11) Approach at 65 to 75 KIAS depending upon the amount of the accumulation.
(12) Perform a landing in level attitude.

RECOVERY FROM SPIRAL DIVE

If a spiral is encountered in the clouds, proceed as follows:

(1) Retard Thrust Lever to idle position

(2) Stop the turn by using coordinated aileron and rudder control to align the symbolic airplane in the turn coordinator with the horizontal reference line.

(3) Cautiously apply elevator back pressure to slowly reduce the airspeed to 80 KIAS.

(4) Adjust the elevator trim control to maintain an 80 KIAS glide.

(5) Keep hands off the control wheel, using rudder control to hold a straight heading.

(6) Re-adjust the rudder trim (if installed) to relieve the rudder of asymmetric forces.

(7) Clear the engine occasionally, but avoid using enough power to disturb the trimmed glide.

(8) Upon breaking out of clouds, resume normal cruising flight and continue the flight.

ELECTRICAL POWER SUPPLY SYSTEM MALFUNCTIONS

◆ Note: The TAE125 requires a voltage source for its operation. If the alternator fails, the engine's further running time is dependant upon the battery and switched-on equipment. A remaining engine operating time of about 120 minutes has been shown for an old battery based upon the following assumptions:

Equipment		Time switched on in [min]	Time switched on in [%]
NAV/COM 1 receiving	ON	120	100
NAV/COM 1 transmitting	ON	12	10
NAV/COM 2 receiving	OFF	0	0
NAV/COM 2 transmitting	OFF	0	0
Annunciator	ON	120	100
Transponder	ON	120	100
Fuel Pump	OFF	0	0
AED-125	ON	120	100
Battery Ignition Relay	ON	120	100
CED-125	ON	120	100
Landing Light	ON	12	10
Flood Light	ON	1,2	1
Pitot Heat	ON	24	20
Wing Flaps	ON	1,2	1
Interior Lighting	OFF	0	0
Nav Lights	OFF	0	0
Beacon	OFF	0	0
Strobes	OFF	0	0
ADF	OFF	0	0
Intercom	OFF	0	0
Turn Coordinator	OFF	0	0
Engine Control	ON	120	100

Table 3-1a

◆ Note: This table only gives a reference point. The pilot should select equipment, which is not absolutely necessary, depending upon the situation. If deviated from this recommendation, the remaining engine operating time may change.

ALTERNATOR WARNING LAMP ILLUMINATES DURING NORMAL ENGINE OPERATION.

(1) Ammeter - CHECK.

(2) Circuit Breaker (Switch resp.) "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 !

(3) Nonessential Electrical Equipment (eg. Blower, Lights, Heater, Autopilot) : OFF

(4) Flight may be continued, but the pilot should:

- i) Fly to the next airfield or landing strip.
- ii) Be prepared for an emergency landing.
- iii) Expect an engine failure.

AMMETER SHOWS BATTERY DISCHARGE DURING NORMAL ENGINE OPERATION FOR MORE THAN 5 MINUTES

(1) Circuit Breaker (Switch resp.) "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) Nonessential Electrical Equipment - OFF.
(3) Flight may be continued, but the pilot should:
   i) Fly to the next airfield or landing strip
   ii) Be prepared for an emergency landing
   iii) Expect an engine failure

ROUGH ENGINE OPERATION OR LOSS OF POWER

DECREASE IN POWER

(1) Push Thrust Lever full forward (Take-off position)
(2) Fuel Selector to tank with sufficient fuel quantity and temperature
(3) Electrical Fuel Pump - ON
(4) Reduce airspeed to 65-85 KIAS (max. 100 KIAS)
(5) Check engine parameters (FADEC lamps, oil pressure and temperature, fuel quantity)

If normal engine power is not achieved, the pilot should:
   i) Fly to the next airfield or landing strip
   ii) Be prepared for an emergency landing
   iii) Expect an engine failure

SOILED SPARK PLUGS

- N/A, since this is a Diesel engine -

IGNITION MAGNET MALFUNCTIONS

- N/A, since this is a Diesel engine -

OIL PRESSURE TOO LOW
(< 2.3 BAR IN CRUISE OR < 1.2 BAR AT IDLE):

(1) Reduce power as quickly as possible
(2) Check oil temperature: If the oil temperature is high or near operating limits,
    i) Fly to the next airfield or landing strip
    ii) Be prepared for an emergency landing
    iii) Expect an engine failure

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

(1) Increase the climbing airspeed
(2) Reduce power, if the engine temperatures approache the red area.

OIL TEMPERATURE "OT" TOO HIGH (RED RANGE):

(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) Fly to the next airfield or landing strip
    ii) Be prepared for an emergency landing
    iii) Expect an engine failure
(3) If the oil pressure is in the normal range:
    i) Fly to the next airfield or landing strip

COOLANT TEMPERATURE "CT" TOO HIGH (RED RANGE):

(1) Increase airspeed and reduce power as quickly as possible
(2) Cabin Heat - COLD
(3) If this reduces the coolant temperature to within the normal operating range quickly, continue to fly normally and observe coolant temperature. Cabin heat as required.
(4) As far as this does not cause the coolant temperature to drop,
    i) Fly to the next airfield or landing strip
    ii) Be prepared for an emergency landing
    iii) Expect an engine failure

LAMP "WATER LEVEL" ILLUMINATES

(1) Increase airspeed and reduce power as quickly as possible
(2) Coolant temperature "CT" check and observe
(3) Oil temperature "OT" check and observe
(4) As far as coolant temperature and/or oil temperature are rising into yellow or red range,
    i) Fly to the next airfield or landing strip
    ii) Be prepared for an emergency landing
    iii) Expect an engine failure

GEARBOX TEMPERATURE "GT" TOO HIGH (RED RANGE):

(Antifriction bearing temperature of the propeller shaft is too high)

(1) Reduce power to 55% - 75% as quickly as possible
(2) Fly to the next airfield or landing strip

PROPELLER RPM TOO HIGH:

With propeller RPM between 2,400 and 2,500 for more than 10 seconds or over 2,500:

(1) Reduce power
(2) Reduce airspeed below 100 KIAS
(3) At reduced propeller RPM and engine power fly to the next airfield or landing strip

◆ Note: If the propeller speed control fails, climb flights be performed at 65KIAS / 75 mph 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 Thrust Lever position:

(1) Change the power setting and attempt to find a power setting where the propeller RPM no longer fluctuates.
(2) If this does not work, set the maximum power at an airspeed < 100 KIAS until the propeller speed stabilizes.
(3) If the problem is resolved, continue the flight
(4) If the problem continues, reduce power to 55% - 75% or select a power level where the propeller RPM fluctuations are minimum and fly to the next airfield or landing strip at an airspeed below 100 KIAS.

SECTION 4
NORMAL PROCEDURES

PREFLIGHT INSPECTION

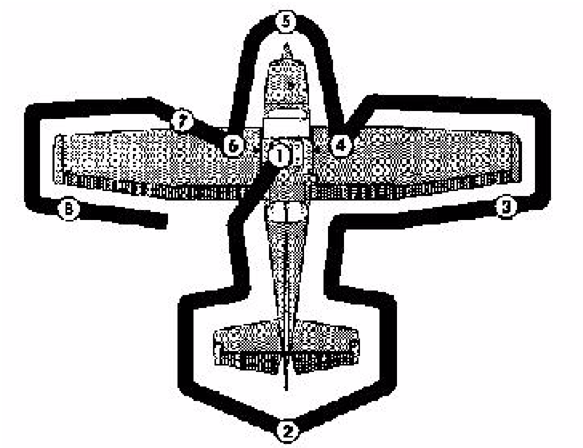

Figure 4-1a Preflight Inspection

◆ Note: Visually check airplane for general condition during walk around inspection. In cold weather, remove even small accumulations of frost, ice or snow from wing, tail and control surfaces. Also, make sure that control surfaces contain no internal accumulations of ice or debris. Prior to flight, check that pitot heater (if installed) is warm to touch within 30 seconds with battery and pitot heat switches on. If a night flight is planned, check operation of all lights, and make sure a flashlight is available.

(1) CABIN

(1) Pitot Tube Cover - REMOVE. Check for pitot stoppage
(2) Pilot´s Operating Handbook - AVAILABLE IN THE AIRPLANE.
(3) Airplane Weight and Balance- CHECKED.
(4) Parking Brake- SET.
(5) Control Wheel Lock - REMOVE.
(6) Engine Master ("IGN" resp.) - OFF.
(7) Avionics Master Switch - OFF.

▲ **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 ("IGN") was on.

(8) Battery- ON,
(9) Fuel Quantity Indicators and Fuel Temperature- CHECK and ENSURE LOW FUEL ANNUNCIATORS (L LOW FUEL R) ARE EXTINGUISHED
Lamp "Water Level" - CHECK OFF.
(10) Avionics Master Switch- ON, CHECK Avionics Cooling Fan audibly for operation.
(11) Avionics Master Switch- OFF.
(12) Static Pressure Alternate Source Valve- OFF.
(13) Annunciator Panel Test Switch- PLACE AND HOLD IN TST POSITION and ensure all annunciators illuminate
(14) Annunciator Panel Test Switch- RELEASE. Check that appropriate annunciators remain on.

◆ Note When Battery is turned ON, some annunciators will flash
for about 10 seconds before illuminating steadily. When panel TST switch is toggled up and held in position, all remaining lights will flash until the switch is released.

(15) Fuel Selector Valve- BOTH (CHECK fuel temperature)
(16) Fuel Shut-off Valve- ON(Push Full In).
(17) Shut-off Cabin Heat- OPEN.
(18) Flaps- EXTEND.
(19) Pilot Heat- ON(Carefully check that the pilot tube is warm to the touch within 30 seconds.).
(20) Pilot Heat- OFF.
(21) Battery- OFF.
(22) Baggage Door- CHECK, lock with key.

(2) EMPENNAGE

(1) Rudder Gust Lock- REMOVE.
(2) Tail Tie-Down- DISCONNECT.
(3) Control Surfaces- CHECK freedom of movement and security.
(4) Trim Tab- CHECK security.
(5) Antennas- CHECK for security of attachment and general condition.

(3) RIGHT WING Trailing Edge

(1) Aileron - CHECK freedom of movement and security.
(2) Flap- CHECK for security and condition.

(4) RIGHT WING

(1) Wing Tie-Down - DISCONNECT.
(2) Main Wheel Tire - CHECK for proper inflation and general condition (weather checks, tread depth and wear, etc.).

▲ **WARNING** If, after repeated sampling, evidence of contamination still exists, the airplane should not be flown. Tanks should be drained and system purged by qualified maintenance personnel. All evidence of contamination must be removed before further flight.

(3) Fuel Tank Sump Quick Drain Valves- DRAIN at least a cupful of fuel (using sampler cup) from each sump location to check for water, sediment and the right type of fuel (Diesel or JET-A1) before each flight and after each refueling. If water is observed, take further samples until clear and then gently rock wings and lower tail to the ground to move any additional contaminants to the sampling points. Take repeated samples from all fuel drain points until all contamination has been removed. If contaminants are still present, refer to above WARNING and do not fly airplane.

(4) Fuel Quantity - CHECK VISUALLY for desired level and not above bottom of filler indicator tab.

(5) Fuel Filler Cap- SECURE.

(5) NOSE

(1) Oil Level - CHECK, do not take off with less than 4.5 l.

(2) Reservoir-tank Quick Drain Valve- DRAIN at least a cupful of fuel (using sampler cup) from valve to check for water, sediment and proper fuel grade (Diesel or JET-A1) before each flight and after each refueling. If water is observed, take further samples until clear and then gently rock wings and lower tail to the ground to move any additional contaminants to the sampling point. Take repeated samples until all contamination has been removed.

(3) Fuel Filter- Before first flight of the day and after each refuelinh- DRAIN the Fuel Strainer Quick Drain Valve with the sampler cup to remove water and sediment from the screen. Ensure that the screen drain is properly closed again. If water is discovered, there might be even more water in the fuel system. Therefore, take further samples from Fuel Strainer and the Tank Sumps.

(4) Landing Light - CHECK for condition and cleanliness.

(5) Engine Oil Dipstick/Filler Cap- CHECK oil level, then check dipstick/filler cap SECURE. Do not take off with less than 4.5 l.

(6) Engine Cooling Air Inlets- CLEAR of obstructions.

(7) Propeller and Spinner- CHECK for nicks and security.

(8) Nose Wheel Strut and Tire- CHECK for proper inflation of strut and general condition (weather checks, tread depth and wear, etc.) of tire.

(9) Left Static Source Opening- CHECK for stoppage.

(6) LEFT WING

(1) Fuel Quantity - CHECK VISUALLY for desired level and not above bottom of filler indicator tab.

(2) Fuel Filler Cap - SECURE.

(3) Fuel Tank Sump Quick Drain Valves- DRAIN at least a cupful of fuel (using sampler cup) from each sump location to check for water, sediment and the right type of fuel (Diesel or JET-A1) before each flight and after each refueling. If water is observed, take further samples until clear and then gently rock wings and lower tail to the ground to move any additional contaminants to the sampling points. Take repeated samples from all fuel drain points until all contamination has been removed. If contaminants are still present, refer to above WARNING and do not fly airplane.

(4) Main Wheel Tire- CHECK for proper inflation and general condition (weather checks, tread depth and wear, etc.)

(7) LEFT WING Leading Edge

(1) Fuel Tank Vent Opening- CHECK for stoppage.

(2) Stall Warning Opening - CHECK for stoppage. To check the system, place a clean handkerchief over the vent opening and apply suction; a sound from the warning horn will confirm system operation.

(3) Wing Tie-Down- DISCONNECT.
(4) Landing/Taxi Light(s)- CHECK for condition and cleanliness of cover.

(8)LEFT WING Trailing Edge

(1) Aileron- CHECK freedom of movement and security.
(2) Flap- CHECK for security and condition.

BEFORE STARTING ENGINE

(1) Preflight Inspection- COMPLETE .
(2) Passenger Briefing- COMPLETE.
(3) Seats, and Seat Belts - ADJUST and LOCK. Ensure inertia reel locking.
(4) Brakes- TEST and SET.
(5) Circuit Breakers- CHECK IN.
(6) Electrical Equipment, Autopilot (if installed)- OFF.

■ CAUTION: The Avionics Power Switch must be off during engine start to prevent possible damage to avionics.

(7) Avionics Master Switch- OFF.
(8) Fuel Selector Valve- BOTH (CHECK fuel temperature).
(9) Fuel Shut-off Valve- ON (Push Full In).
(10) Avionics Circuit Breakers- CHECK IN.
(11) Circuit Breaker Alternator- CHECK IN.
(12) Alternate Air Door- CLOSED.
(13) Battery, Switch Alternator (if installed)- ON, Fuel Quantity and Temperature - CHECK.

■ CAUTION: The electronic engine control needs an electrical power source for its operation. For normal operation Battery, Alternator and Main Bus have to be switched on. Separate switching is only allowed for tests and in the event of emergencies.

(14) Thrust Lever - CHECK for freedom of movement.

(15) Load Display - CHECK 0% at Propeller RPM 0.

STARTING ENGINE

(1) Electrical Fuel Pump (if installed)- ON.

(2) Thrust Lever - IDLE.

(3) Propeller Area - CLEAR.

(4) Engine Master ("IGN" resp.)- ON , wait until the Glow Control Lamp extinguishes.

(5) Starter- ON
Release when engine starts, leave Thrust Lever in idle.

(6) CED Test Knob- PRESS (to delete Caution Lamp).

(7) Oil Pressure- CHECK..

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

(8) Ammeter- CHECK, positive charging current.

(9) Navigation Lights and Flashing Beacon- ON (as required).

(10) Avionics Master Switch- ON.

(11) Radios- ON.

(12) Electrical Fuel Pump- OFF.

(13) Flaps- RETRACT.

WARM UP

(1) Let the engine warm up about 2 minutes at 890 RPM.

(2) Increase RPM to 1,400 until Oil Temperature 50°C, Coolant Temperature 60°C.

BEFORE TAKE-OFF

(1) Parking Brake - SET.

(2) Passenger Seat Backs - MOST UPRIGHT POSITION.

(3) Seats and Seat Belts - CHECK SECURE.

(4) Cabin Doors and Windows - CLOSED and LOCKED.

(5) Flight Controls - FREE and CORRECT.

(6) Flight Instruments - CHECK and SET.

(7) Fuel quantity - CHECK.

(8) Fuel Selector Valve - SELECT BOTH position.

(9) Elevator Trim and Rudder Trim (if installed) - SET for Take-off.

(10) FADEC and propeller adjustment function 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.

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

  d) The FADEC automatically switches to B-component (only FADEC B lamp is ON).

  e) The propeller control is excited, RPM decreases.

  f) The FADEC automatically switches to channel A (only FADEC A lamp is ON), RPM increases.

  g) The propeller control is excited, RPM decreases.

  h) FADEC A light goes OFF, idle RPM is reached, the test is completed.

i) FADEC Test Button - RELEASE.

◆ Note: If the test button is released before the self test is over, the FADEC immediately switches over to normal operation.

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

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

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

(11) Thrust Lever - FULL FORWARD, load display min. 94%, RPM 2240 - 2300.

(12) Thrust Lever - IDLE.

(13) Suction gage - CHECK.

(14) Engine Instruments and Ammeter - CHECK.

(15) Annunciator Panel - Ensure no annunciators are illuminated.

(16) Electrical Fuel Pump - ON.

(17) Thrust Lever Friction Lock - ADJUST.

(18) Strobe Lights - AS DESIRED.

(19) Radios and Avionics - SET.

(20) Autopilot (if installed) - OFF.

(21) Wing Flaps - SET for Take-off (0° or 10°).
(22) Brakes - RELEASE.

TAKE-OFF

NORMAL TAKEOFF

(1) Wing Flaps - 0° or 10°.
(2) Thrust Lever - FULL FORWARD.
(3) Elevator Control - LIFT NOSE WHEEL (at 55 KIAS).
(4) Climb Speed - 65 to 80 KIAS.

SHORT FIELD TAKEOFF

(1) Wing Flaps - 10°.
(2) Brakes - APPLY.
(3) Thrust Lever - FULL FORWARD.
(4) Brakes - RELEASE.
(5) Elevator Control - SLIGHTLY TAIL LOW.
(6) Climb Speed - 58 KIAS (until all obstacles are cleared).

AFTER TAKEOFF

(1) Altitude about 300 ft, Airspeed more than 65 KIAS: Wing Flaps - RETRACT.
(2) Electrical Fuel Pump - OFF.

CLIMB

(1) Airspeed - 70 to 85 KIAS..

◆ Note: If a maximum performance climb is necessary, use speeds shown in the "Maximum Rate Of Climb" chart in Section 5. In case that Oil Temperature and/or Coolant Temperature are approaching the upper limit, continue at a lower climb angle for better cooling if possible.

(2) Thrust Lever - FULL FORWARD.

CRUISE

(1) Power - maximum load 100% (maximum continuous power): 75% or less is recommended.
(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 lamps) - MONITOR. Select the other fuel tank approximately every 30 minutes to empty and heat both tanks equally. (observe Section 2 „ Operating Limits“ Capter „Engine Operating Limits“). The described LEFT, RIGHT alternating operation can also have benefits, even if the optional BOTH position is installed, in slip or skids flight conditions to ensure a balanced emptying of the fuel tanks and a balanced fuel warming in Diesel operation.

■ CAUTION: Do not use any fuel tank below the minimum permissible fuel temperature!

■ CAUTION In turbulent air it is strongly recommended to use the BOTH position.

■ CAUTION With ¼ tank or less prolonged or uncoordinated flight is prohibited when operating on either the left or right tank.

(5) FADEC Warning Lamps - MONITOR.

DESCENT

(1) Fuel Selector Valve - SELECT BOTH position.
(2) Power - AS DESIRED.

BEFORE LANDING

(1) Pilot and Passenger Seat Backs - MOST UPRIGHT POSITION.
(2) Seats and Seat Belts - SECURED and LOCKED.
(3) Fuel Selector Valve - SELECT BOTH position.
(4) Electrical Fuel Pump - ON.
(5) Landing / Taxi Lights -ON.
(6) Autopilot (if installed) - OFF.

LANDING

<u>NORMAL LANDING</u>

(1) Airspeed - 69 to 80 KIAS (wing flaps UP).
(2) Wing Flaps - AS DESIRED (0°-10° below 110 KIAS; 10°- 40° below 85 KIAS).
(3) Airspeed -60 to 70 KIAS (Flaps DOWN).
(4) Touchdown - MAIN WHEELS FIRST.
(5) Landing Roll - LOWER NOSE WHEEL GENTLY.
(6) Brakes - MINIMUM REQUIRED.

SHORT FIELD LANDING

(1) Airspeed - 69 to 80 KIAS (Flaps UP).
(2) Wing Flaps - FULL DOWN (30°).
(3) Airspeed 62 KIAS (until flare).
(4) Power - REDUCE to idle after clearing obstacles.
(5) Touchdown - MAIN WHEELS FIRST.
(6) Brakes - APPLY HEAVILY.
(7) Wing Flaps - RETRACT.

BALKED LANDING

(1) Thrust Lever - FULL FORWARD.
(2) Wing Flaps - RETRACT TO 20°.
(3) Climb Speed - 58 KIAS.
(4) Wing Flaps - 10° (until all obstacles are cleared).
(5) Wing Flaps - RETRACT after reaching a safe altitude and 65 KIAS.

AFTER LANDING

(1) Wing Flaps - UP.
(2) Electrical Fuel Pump - OFF.

SECURING AIRPLANE

(1) Parking Brake - SET.
(2) Thrust Lever - IDLE.
(3) Avionics Power Switch, Electrical Equipment, Autopilot (if installed) - OFF.
(4) Engine Master ("IGN" resp.) - OFF.
(5) Switch Alternator (if installed) and Switch Battery - OFF.
(6) Control Lock - INSTALL.

AMPLIFIED PROCEDURES

STARTING ENGINE

The TAE 125 is a direct Diesel injection engine with common-rail technology and a turbocharger. It is controlled automatically by the FADEC, which makes a proper performance of the FADEC test important for safe flight operation.
All information relating to the engine are compiled in the CED 125 multifunction instrument.
Potentiometers within the Thrust Lever transmit the load value selected by the pilot to the FADEC.
With the Engine Master ("IGN" resp.) in position ON the glow relay is triggered by the FADEC and the Glow Plugs are supplied with electrical power, in position OFF the Injection Valves are not supplied by the FADEC and stay closed.
The switch "Starter" controls the Starter.

TAXIING

When taxiing, it is important that speed and use of brakes be held to a minimum and that all controls be utilized (Refer to Figure 4-2, Taxiing Diagram) to maintain directional control and balance.
The Alternate Air Door Control should be always pushed for ground operation to ensure that no unfiltered air is sucked in.
Taxiing over loose gravel or cinders should be done at low engine speed to avoid abrasion and stone damage to the propeller tips.

BEFORE TAKE-OFF

WARM UP

Let the engine run at propeller RPM of 1,400 to ensure normal operation of the TAE 125 until it reaches an Engine Oil Temperature of 50°C and a Coolant Temperature of 60°C.

<u>MAGNETO CHECK</u>

N/A since this is a Diesel engine.

<u>ALTERNATOR CHECK</u>

Prior to flights where verification of proper alternator and alternator control unit operation is essential (such as night and instrument flights), a positive verification can be made by loading the electrical system momentarily (3 to 5 seconds) with the landing light or by operating the wing flaps during the engine runup (20% load). The ammeter will remain within a needle width of zero if the alternator and alternator control unit are operating properly.

TAKE-OFF

<u>POWER CHECK</u>

It is important to check full load engine operation early in the takeoff roll. Any signs of rough engine operation or sluggish engine acceleration is good cause for discontinuing the takeoff. If this occurs, you are justified in making a thorough full load static runup before another takeoff is attempted.
After full load is applied, adjust the Thrust Lever Friction Control to prevent the Thrust Lever from creeping back from a maximum power position. Similar friction lock adjustments should be made as required in other flight conditions to maintain a fixed Thrust Lever setting.

<u>WING FLAP SETTINGS</u>

Flap deflections greater than 10° are not approved for normal and short field takeoffs. Using 10° wing flaps reduces the ground roll and total distance over a 15 m obstacle by approximately 10%.

CLIMB

Normal climbs are performed with flaps up and full load and at speeds 5 to 10 knots higher than best rate-of-climb speeds for the best combination of engine cooling, climb speed and visibility. The speed for best climb is about 69 KIAS. If an obstruction dictates the use of a steep climb angle, climb at 62 KIAS and flaps up.

◆ Note: Climbs at low speeds should be of short duration to improve engine cooling.

CRUISE

As guidance for calculation of the optimum altitude and power setting for a given flight use the tables in Figure 5-8a. Observe the various rates of consumption with Diesel or Jet A-1-operation.

LANDING

<u>BALKED LANDING</u>

In a balked landing (go around) climb, reduce the flap setting to 20° immediately after full power is applied. If obstacles must be cleared during the go-around climb, reduce wing flap setting to 10° and maintain a safe airspeed until the obstacles are cleared. After clearing any obstacles, the flaps may be retracted as the airplane accelerates to the normal flaps up climb speed.

COLD WEATHER OPERATION

Special attention should be paid to operation of the aircraft and the fuel system in winter or before any flight at low temperatures. Correct preflight draining of the fuel system is particularly CAUTION and will prevent the accumulation of water.
The following limitations for cold weather operation are established due to temperature."Operating limits".
(Refer Section 2 „Limitations“ also)

Fuel	Minimum permissible fuel temperature in the fuel tank before Take-off	Minimum permissible fuel temperature in the fuel tank during the flight
JET A-1, JET-A, Fuel No.3	-30°	-35°
Diesel	greater than 0°	-5°

Figure 4-1 Minimum fuel temperature limits in the fuel tank

▲ **WARNING:** The fuel temperature of the fuel tank not in use should be observed if it is intended for later use.

▲ **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% Diesel, the fuel temperature limits have to be observed for Diesel operation. If there is uncertainty about the type of fuel in the tank, the assumption should be made that it is Diese.

◆ Note: It is advisable to refuel before each flight and to enter the type of fuel filled and the additives used in the log-book of the airplane.

If snow or sluch covers the take-off surface, allowance must be made for take-off distances which will be increasingly extended as snow or slush depth increases. The depth and consistency of this cover can, in fact, prevent take-off in many instances.

When using an External Power Source, the Battery Switch must be in the OFF position before connecting the External Power Source to the airplane receptacle.

Cold weather starting procedures are the same as the normal starting procedures. Use caution to prevent inadvertent forward movement of the airplane during starting when parked on snow or ice.

HOT WEATHER OPERATION

◆ Note: Engine temperatures may rise into the yellow range and activate the "Caution" Lamp when operating in hot weather or longer climbouts at low speed. This warning gives the pilot the opportunity to keep the engine from possibly overheating by doing the following:

i) increase climbing speed
ii) reduce power, if the engine temperatures approach the red range.

Should the seldom case occur that the fuel temperature is rising into the yellow or red range, switch to the other tank.

SECTION 5
PERFORMANCE

SAMPLE PROBLEM

The following sample flight problem utilizes information from the various tables and diagrams of this section to determine the predicted performance data for a typical flight.
Assume the following information has already been determined:

AIRPLANE CONFIGURATION

Takeoff Weight	1,111 kg
Usable Fuel	168,8 l (44,6 US gal)
Type of Fuel Selected	JET A-1

TAKEOFF CONDITIONS

Field Pressure Altitude	1,500ft
Temperature	28°C (16°C above ISA temperature)
Wind Component along Runway	12 Knot Headwind
Field Length	1,070 m

CRUISE CONDITIONS

Total Distance	852 km (460 NM)
Pressure Altitude	5,500 ft
Temperature	20°C (16°C above ISA temperature)
Expected Wind Enroute	10 Knot Headwind

LANDING CONDITIONS

Field Pressure Altitude	2000 ft
Temperature	25°C
Field Length	915 m

TAKEOFF

The takeoff distance chart, Figure 5-5a (Takeoff Distance), should be consulted, keeping in mind that distances shown are based on the short field technique. Conservative distances can be established by reading the chart at the next higher value of weight, temperature and altitude. For example, in this particular sample problem, the takeoff distance information presented for a weight of 1,111 kg, pressure altitude of 2000 ft and a temperature of ISA+20°C should be used and results in the following:

Ground Roll	347 m
Total Distance to clear a 15 m obstacle	671 m

These distances are well within the available takeoff field length. However, a correction for the effect of wind may be made based on Note 2 of the takeoff chart. The correction for a 12 Knot Headwind is:

$$\frac{12KN}{9KN} \times 10\% \ = \ 13\% \quad \text{Decrease}$$

This results in the following distances, corrected for wind:

Ground Roll, zero wind		347 m
Decrease at 12 Knot Headwind	(347m x 13%)=	- 45 m
Corrected Ground Roll		302 m
Total Distance to clear a 15 m obstacle, zero wind		671 m
Decrease at 12 Knot Headwind	(671 m x 13%)=	- 87 m
Corrected Total Distance to clear a 15 m obstacle		584 m

CRUISE

The cruising altitude should be selected based on a consideration of trip length, winds aloft and the airplanes performance. A typical cruising altitude and the expected wind enroute have been given for this sample problem. However, the power setting selection for cruise must be determined based on several considerations. These include the cruise performance characteristics presented in Figures 5-8a. Considerable fuel savings and longer range result when lower power settings are used.

Figure 5-8a shows a range of 879 NM at zero wind with Jet A-1 fuel, a power setting of 70% and altitude of 6,000 ft.

With an expected headwind of 10 Knot at 5,500 ft altitude the range has to be corrected as follows:

Range at zero wind (standard tanks)	879 NM using JET A-1
Reduction due to Headwind	(9 h x 10 Knots) = 90 NM
Corrected Range	789 NM

This shows that the flight can be performed at a power setting of approximately 70% with full tanks without an intermediate fuel stop.

Figure 5-8a is based upon a pressure altitude of 6,000 ft and a temperature of 16°C above ISA temperature, according to Note 2 true airspeed and maximum range are increased by 1,6 %.

The following values most nearly correspond to the planned altitude and expected temperature conditions. Engine Power setting chosen is 70%.

The resultants are:

Engine Power:	70%
True Airspeed:	102 Knot
Fuel Consumption in cruise:	19,4 l/h (5,1 US gal/h) JET A-1

FUEL REQUIRED

The total fuel requirement for the flight may be estimated using the performance information in Figures 5-7a and 5-8a. For this sample problem, Figure 5 7a shows that a climb from 1,000 ft to 6,000 ft requires 4.55 l (1.2 US gal) of fuel. The corresponding distance during the climb is 10,9 NM. These values are for a standard temperature and are sufficiently accurate for most flight planning purposes.

However, a further correction for the effect of temperature may be made as noted in Note 2 of the climb chart in Figure 5-7a. An effect of 10°C above the standard temperature is to increase time and distance by 10% and the time by 5% due to the lower rate of climb.

In this case, assuming a temperature 16°C above standard, the correction would be:

$$\frac{16°C}{10°C} \times 10\% \; = \; 16\% \text{ Increase}$$

With this factor included, the fuel estimate would be calculated as follows:

Fuel to climb, standard temperature:

4,55 l (1,2 US gal) of JET A-1

Increase due to non-standard temperature:

4,55 l (1,2 US gal) x 16% = 0,73 l (0,19 US gal)

Corrected fuel to climb:

5,28 l (1,39 US gal) of JET A-1

Using a similar procedure for the distance to climb results in 12,6 NM.

The resultant cruise distance is:

Total Distance	460,0 NM
Climbout Distance	- 12,6 NM
Cruise Distance	447,4 NM

With an expected 10 Knot headwind, the ground speed for cruise is predicted to be:

102 Knot
- 10 Knot
92 Knot

Therefore, the time required for the cruise portion of the trip is:

$$\frac{447,4NM}{92KN} = 4,9h$$

The fuel required for cruise is:t:

4,9 h x 19,4 l/h = 95,06 L (25,1 US gal)

The total estimated fuel required is as follows:

Engine Start, Taxi and Takeoff	1,00 l (0,30 US gal)
Climb	+ 5,28 l (1,39 US gal)
Cruise	+ 95,06 l (25,10 US gal)
Total fuel required	101,34 l (26,79 US gal)

This gives with full tanks a reserve of::

168,80 l (44,60 US gal)
- 101,34 l (25,79 US gal)
67,02 l (17,81 US gal)

Once the flight is underway, ground speed checks will provide a more accurate basis for estimating the time enroute and the corresponding fuel required

TAKE-OFF DISTANCE

SHORT FIELD TAKEOFFS

Conditions:

Flaps 10°
Full Power Prior to Brake Release
Paved, level, dry runway
Zero Wind

Lift Off:	51 KIAS
Speed at 15 m:	57 KIAS

Notes:

(1) Short field technique

(2) Decrease distances 10% for each 9 Knot headwind. For operation with tailwinds up to 10 Knot increase distances by 10% for each 2 Knot.

(3) For operation on dry, grass runway, increase distances by 15% of the "ground roll" figure.

(4) Consider additionals for wet grass runway, softened ground or snow

Takeoff Distance at 1111 kg

Pressure Altitude (ft)	ISA Ground Roll (m)	ISA Total Distance to clear a 15m (m)	ISA +10°C Ground Roll (m)	ISA +10°C Total Distance to clear a 15m (m)	ISA +20°C Ground Roll (m)	ISA +20°C Total Distance to clear a 15m (m)	ISA +30°C Ground Roll (m)	ISA +30°C Total Distance to clear a 15m (m)
NN	280	541	296	573	314	606	331	640
1000	294	569	312	602	33	637	348	673
2000	309	598	328	634	347	671	366	708
3000	326	629	345	667	366	706	385	744
4000	343	662	363	702	385	744	405	783
5000	361	697	383	739	406	784	427	825
6000	380	734	403	779	427	826	449	868

Figure 5-5a Takeoff Distance at take-off w eight 1,111 kg

Takeoff Distance at 973 kg

Pressure Altitude (ft)	ISA Ground Roll (m)	ISA Total Distance to clear a 15m (m)	ISA +10°C Ground Roll (m)	ISA +10°C Total Distance to clear a 15m (m)	ISA +20°C Ground Roll (m)	ISA +20°C Total Distance to clear a 15m (m)	ISA +30°C Ground Roll (m)	ISA +30°C Total Distance to clear a 15m (m)
NN	171	360	181	381	192	403	202	426
1000	180	378	190	401	201	424	213	448
2000	189	398	200	422	212	446	224	471
3000	199	419	211	444	223	470	235	495
4000	209	440	222	467	235	495	248	521
5000	220	464	234	492	248	521	261	549
6000	232	488	246	518	261	550	274	578

Figure 5-5b Takeoff Distance at take-off weight 973 kg

TIME, FUEL AND DISTANCE TO CLIMB AT 1,111 KG

Conditions:

Takeoff weight 1,111 kg
Climb speed vy = 70 KIAS
Flaps Up
Full Power
Standard Temperature

Notes :

(1) Add 1 l (0.3 US gal) of fuel for engine start, taxi and takeoff allowance.

(2) Increase time and distance by 10% for 10°C above standard temperature. Above 10,000 ft. Increase time by 5%.

(3) Distances shown are based on zero wind.

(4) Time, distance and fuel required are only valid from the point where the airplane climbs at vy = 70 KIAS.

B

Press. Alt.	Temp.	Rate of Climb	From Sea Level			
			Time	Dist.	**DIESEL**	**JET-A1**
(ft)	(°C)	(ft/min)	(min)	(NM)	(l)	(l)
SL	15	595	0,0	0	0,00	0,00
1000	13	582	1,7	2,0	0,85	0,84
2000	11	566	3,5	4,0	1,69	1,69
3000	9	548	5,2	6,1	2,55	2,55
4000	7	507	7,0	8,2	3,44	3,44
5000	5	485	9,0	10,5	4,41	4,40
6000	3	462	11,1	12,9	5,40	5,40
7000	1	438	13,2	15,5	6,44	6,43
8000	-1	414	15,5	18,1	7,52	7,52
9000	-3	390	17,9	20,9	8,61	8,63
10000	-5	365	20,5	23,9	9,77	9,75
11000	-7	340	23,2	27,1	10,92	10,93
12000	-9	314	26,2	30,6	12,13	12,11

Figure 5-7a Time, Fuel and Distance to Climb at 1,111 kg

◆ Note Observe the differences in fuel consumption for Diesel or JETA-1 operation

CRUISE PERFORMANCE, RANGE AND ENDURANCE

Conditions:

Takeoff weight 1,111 kg

Flaps Up

Zero wind

Notes:

(1) Endurance information are based on 168,8 l (44,6 US gal) usable fuel. No reserve.

(2) Increase true airspeed (KTAS) and maximum range (NM) by 1% per 10°C above ISA temperature.

Press.Alt. [ft]	Load [%]	KTAS	FF[l/h] Jet-A1	NM	Hours	FF[l/h] Diesel	NM	Hours
2000	60	90	17,4	873	9,7	16,9	899	10,0
2000	70	98	19,4	853	8,7	19,0	871	8,9
2000	80	104	22,1	794	7,6	21,9	802	7,7
2000	90	110	25,6	725	6,6	25,5	728	6,6
4000	60	92	17,4	893	9,7	16,9	919	10,0
4000	70	99	19,4	861	8,7	19,0	880	8,9
4000	80	106	22,1	810	7,6	21,9	817	7,7
4000	90	112	25,6	739	6,6	25,5	741	6,6
6000	60	93	17,4	902	9,7	16,9	929	10,0
6000	70	101	19,4	879	8,7	19,0	897	8,9
6000	80	108	22,1	825	7,6	21,9	832	7,7
6000	90	114	25,6	752	6,6	25,5	755	6,6
8000	60	94	17,4	912	9,7	16,9	939	10,0
8000	70	102	19,4	888	8,7	19,0	906	8,9
8000	80	110	22,1	840	7,6	21,9	848	7,7
8000	90	116	25,6	765	6,6	25,5	768	6,6

Press.Alt. [ft]	Load [%]	KTAS	FF[l/h] Jet-A1	NM	Hours	FF[l/h] Diesel	NM	Hours
10000	60	95	17,4	922	9,7	16,9	949	10,0
10000	70	104	19,4	905	8,7	19,0	924	8,9
10000	80	111	22,1	848	7,6	21,9	856	7,7
10000	90	118	25,6	778	6,6	25,5	781	6,6
12000	60	97	17,4	941	9,7	16,9	969	10,0
12000	70	105	19,4	914	8,7	19,0	933	8,9
12000	80	113	22,1	863	7,6	21,9	871	7,7
12000	90	120	25,6	791	6,6	25,5	794	6,6

Figure 5-8a Flying Cruise performance, range Range and Endurance

POWER DIAGRAM

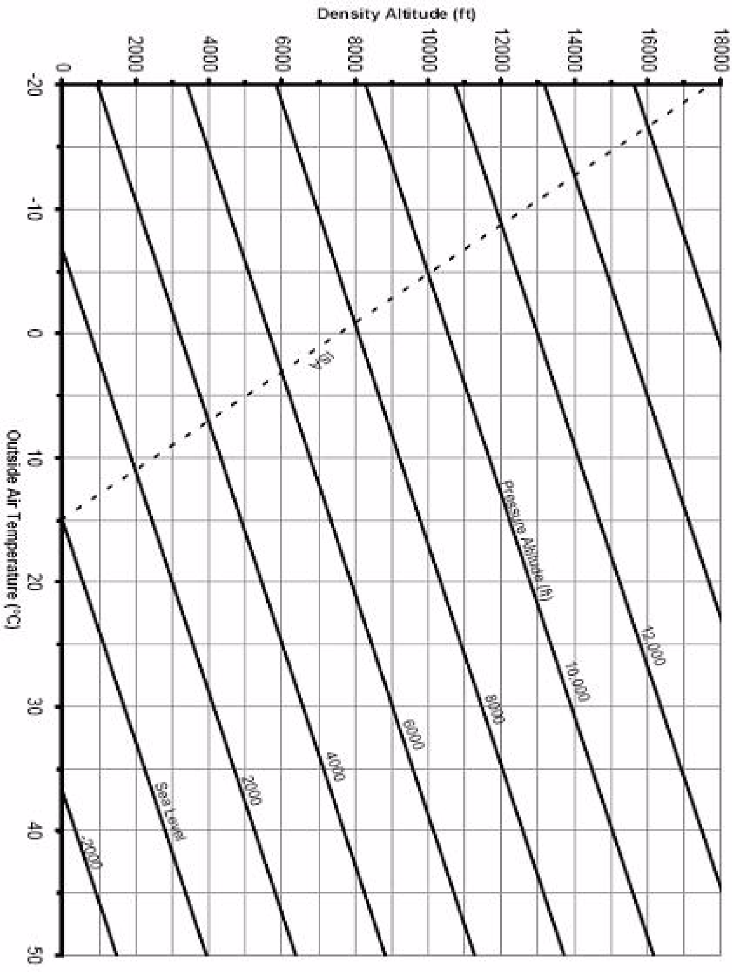

Figure 5-9a Adjustable Engine Power

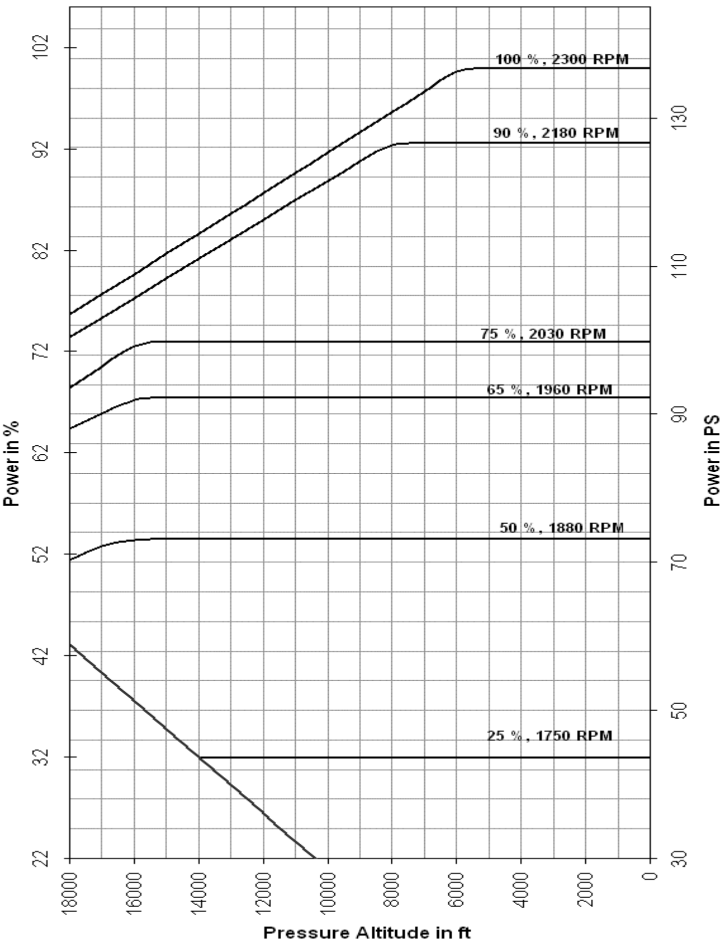

Figure 5-10a Engine Power Over Altitude

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SECTION 6
WEIGHT & BALANCE

Item	Weight x Arm = Moment		
	(kg)	(m)	(mkp)
Empty Weight (from table 6-1)			
plus Engine Oil (6 l to 0.9 kg/l)		-0.31	
plus Gearbox Oil (1 l to 0.9 kg/l)		-0.69	
plus unusable fuel (11.4 l to 0.84 kg/l)		1.17	
plus Coolant (4 l to 1.0 kg/l)		-0.26	
Changes in Equipment			
Basic Empty Weight			

Figure 6-2a Calculating the Basic Empty Weight

		Your aircraft	
		Mass kg	Moment mkp
Calculation of the loaded condition	**1. Basic Empty Weight::** Use the values for your airplane with the present equipment. Unusable fuel, engine oil, gearbox oil and coolant are included.		
	2. Usable Fuel (at 0,84 kg/l), max. 168,8l		
	3. Pilot and Front Passenger (Station 0,86 to 1,17 m)		
	4. Rear Passenger		
	5. *Baggage Area 1 or Passenger on the children‘s seat (Station 2,08 to 2,74; max.54kg)		
	6. *Baggage Area 2 (Station 2.74 to 3.61; max.23kg)		
	7. Ramp Weight and Miment		
	8. Fuel allowance for engine start, taxi and runup		
	9. Take-off Weight and Moment max. 1111 kg. (Substrakt Step 8 from Step 7)		
	10.Locate this point in Figure 6-7 for the Load Moment in mkp. Check if its within the envelope.		

*Maximum allowable combined weight capacity for Baggage Areas 1 and 2 is 54kg

Figure 6-5a

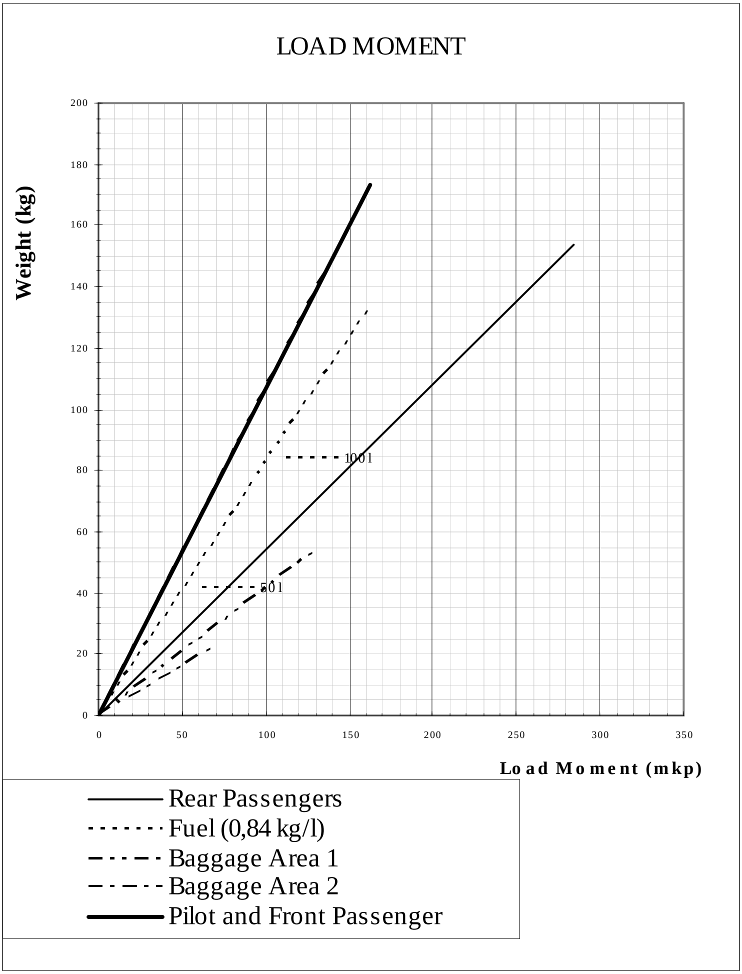

Figure 6-6a Load Moment

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SECTION 7
AIRPLANE AND SYSTEMS DESCRIPTION

INSTRUMENT PANEL

The following information relate to Figure 7-2 "The instrument panel" of the Pilot´s Operating Handbook approved by the LBA. Components of the new installation can be seen as example in the following Figures 7-2a (with Circuit Breaker Alternator) and 7-2b (with Switch Alternator) respectively.
Some installations are equipped with a key switch for the starter instead of the push button and the switch "Engine Master" is designated "IGN". For these installations, the appropriate note in brackets (Switch resp.), ("IGN" resp.) is added subsequently throughout the entire supplement for the Pilot´s Operating Handbook

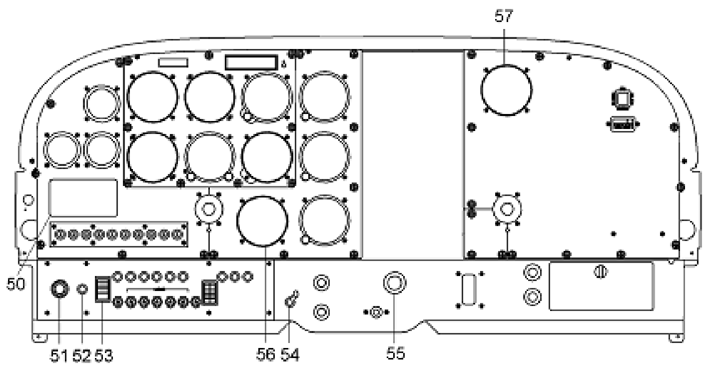

Figure 7-2a Example of Instrument panel with TAE 125 installation with circuit breaker Alternator

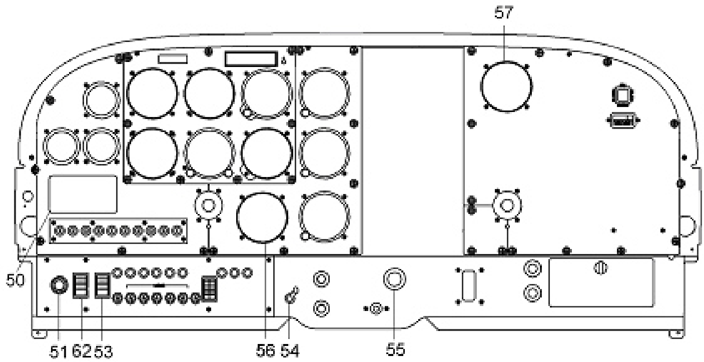

Figure 7-2b Example of Instrument panel with TAE 125 installation with switch Alternator

50. Lightpanel with:
    "Force B" switch for manually switching the FADEC
    "FADEC" test knob
    "A FADEC B" Warning Lamps for FADEC A and B
    "AED" Lamp (yellow) for AED 125
    "CED" Lamp (yellow) for CED 125
    "CED/AED" Test/Confirm Knob for CED 125, AED 125 and Caution Lamps
    "Glow" Glow Control Lamp (yellow)
51. "Starter" - Push Button (Switch resp.) for Starter
52. "ALT" - Circuit Breaker for Alternator
53. "BAT"- Switch for Battery
54. "Engine Master" ("IGN" resp.) - Switch electrical supply FADEC
55. "Alt. Air Door" Alternate Air Door
56. CED 125 (Tachometer -N/A-)
    The Compact Engine Display contains indication of Propeller Rotary Speed, Oil Pressure, Oil Temperature, Coolant Temperature, Gearbox Temperature and Load.

57. AED 125 SR with indication of Fuel Temperature, Voltage and a warning lamp "Water Level" (yellow) for low coolant level for Figure 7-2b only:
62. "ALT" - Switch for Alternator

FUEL SYSTEM

The fuel system of the TAE 125 installation includes the original tanks of the Cessna 172. Additional sensors for Fuel Temperature are installed.
The fuel flows out of the tanks to the Fuel Selector Valve with the positions LEFT, RIGHT and BOTH, through a reservoir tank to the fuel shut-off valve and then via the electrically driven Fuel Pump to the fuel filter.
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 pre-selected 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 in use.
Diesel 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.

Total capacity:.............................. 47,6 US gallons (180.2 litres)
Total capacity of usable fuel: .... 44,6 US gallons (168,8 litres)

Total capacity each tank: .... 23,8 US gallons (90,1 litres)
Total capacity of usable fuel
each tank: .... 22,3 US gallons (84,4 litres)

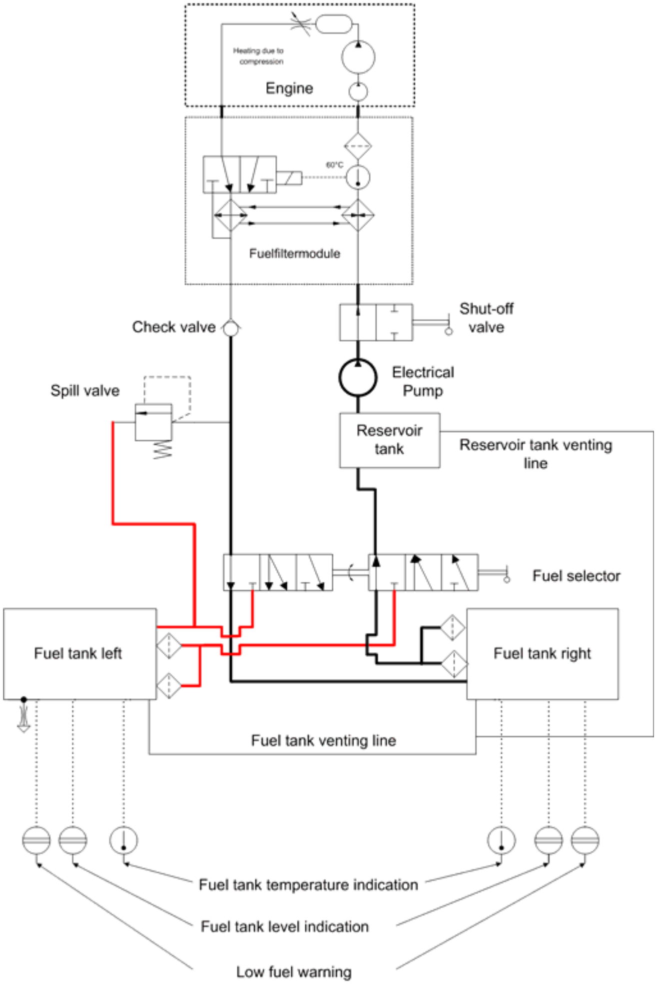

Bild 7-6a Scheme of the Fuel System

ELECTRICAL SYSTEM

The electrical system of both TAE125 installations differs from the previous installation and is equipped with the following operating and display elements:

1. Circuit Breaker (Switch resp.) "Alternator"
   Controls the alternator.
2. Switch "Battery"
   Controls the Battery.
3. Push Button (Switch resp.) "Starter"
   Controls the magneto switch of the starter.
4. Ammeter
   The Ammeter shows the charging or discharging current to/from the battery.
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 extinguishes immediately after starting the engine.
6. Switch "Fuel Pump" (if installed)
   This switch controls the electrical fuel pump.
7. Switch "Engine Master" ("IGN" resp.)
   Controls the two redundant FADEC components and the Alternator Excitation Battery with two independent contacts. The Alternator Excitation Battery is used to ensure that the Alternator continues to function properly even if the main battery fails.
8. 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.

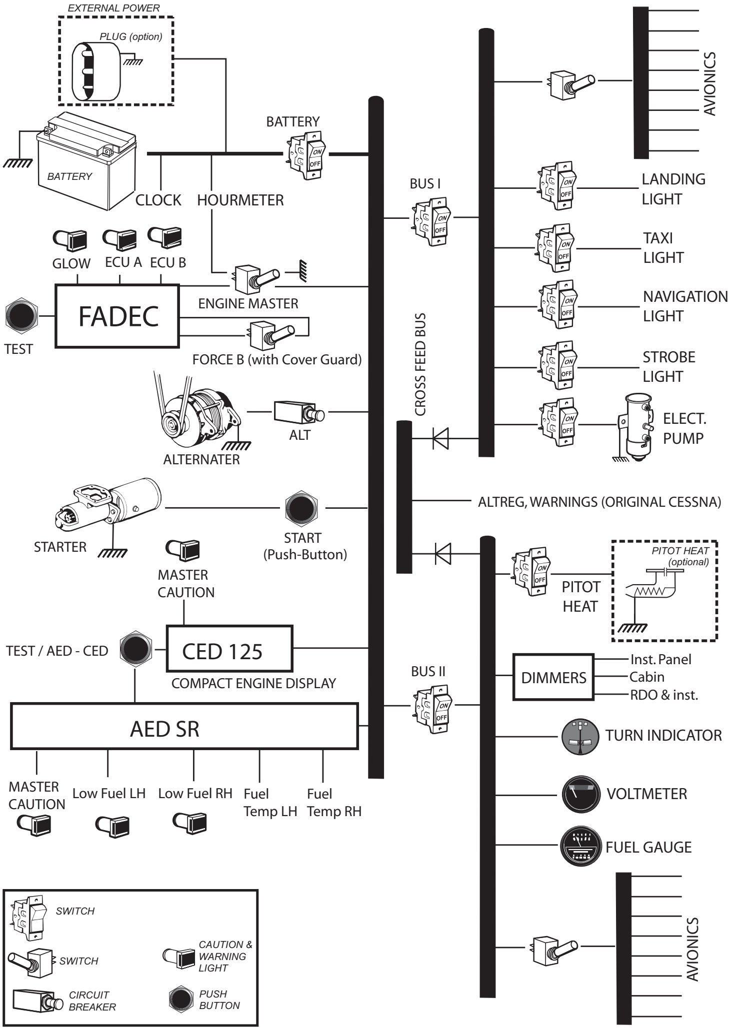

Bild 7-7a Basic Wiring of the Electrical System

FADEC-RESET (from Software 2.7 on and following)

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 accurred, contact your service center.

COOLING

The TAE 125 variants are fitted with a fluid-cooling system whose three-way thermostat regulates the flow of coolant between the large and small cooling circuit.
The coolant exclusively flows through the small circuit up to a cooling water temperature of 84°C and then between 84°C and 94°C both through the small and the large circuit.
If the cooling water temperature rises above 94°C, the complete volume of coolant flows through the large circuit and therefore through the radiator. This allows a maximum cooling water temperature of 105°C.
There is a sensor in the expansion reservoir which sends a signal to the warning lamp "Water level" on the instrument panel if the coolant level is low.
The cooling water temperature is measured in the housing of the thermostat and passed on to the FADEC and CED 125.
The connection to the heat exchanger for cabin heating is always open; the warm air supply is regulated by the pilot over the heating valve. See Figure 7-8a.
In normal operation the control knob "Shut-off Cabin Heat" must be OPEN, with the control knob "Cabin Heat" the supply of warm air into the cabin can be controlled.
In case of certain emergencies (refer to section 3), the control knob "Shut-off Cabin Heat" has to be closed according to the appropriate procedures.

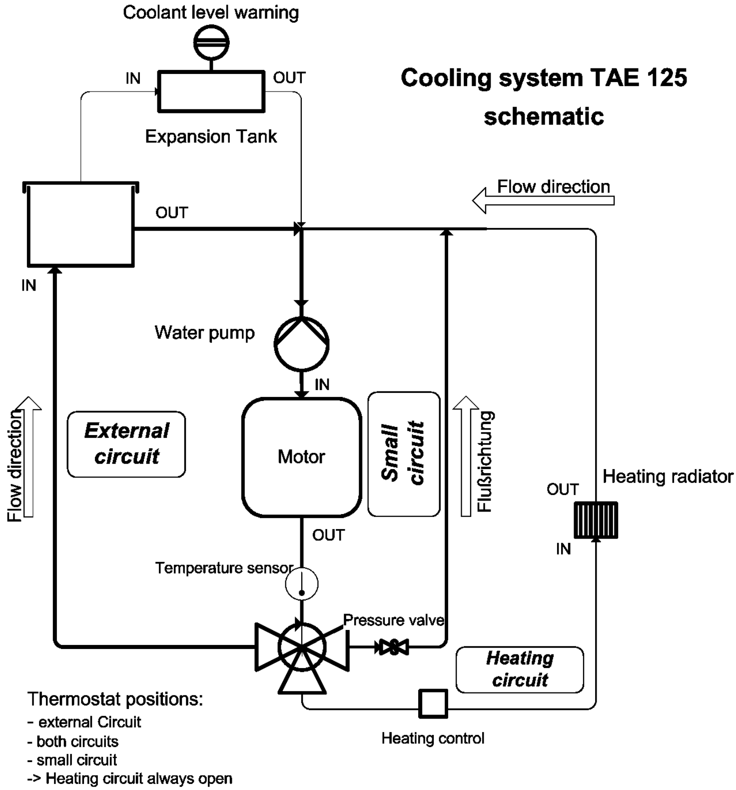

Bild 7-8a Cooling System TAE 125

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SECTION 8
AIRPLANE HANDLING, SERVICE AND MAINTENANCE

■ CAUTION: Normally, a refill of coolant or gearbox oil between service intervals is not necessary. In case of low coolant or gearbox oil levels, iinform the maintenance company iimmediately.

▲ **WARNING:** Do not start the engine in any case when filling levels are below the corresponding minimum marking.

ENGINE OIL

Both TAE 125 engine variants are filled with 4.5 - 6 l engine oil (refer to section 1 of this supplement for specification).
A dip stick is used to check the oil level. It is accessible by a flap on the upper right-hand side of the engine cowling.
Notice that on warm engines 5 minutes after engine shut-off there are 80% of the entire engine oil in the oil pan and therefore visible on the oil dipstick. On warm engines oil should be added if the oil dip stick shows oil levels below 50%. After 30 minutes the real oil level is visible on the dip stick.
The drain screw is located on the lower left-hand outside of the oil pan, the oil filter is on the upper left-hand side of the housing.
The oil system has to be checked for sealing after the first 5 operating hours (visual inspection).
Checks and changes of oil and oil filter have to be performed regularly according to the Operation and Maintenance Manual.
See OM-02-01 for the TAE 125-01 engine or OM-02-02 for the TAE 125-02 engine.
The Supplement of the Aircraft Maintenance Manual has to be considered as well.
See AMM-20-01 for the TAE 125-01 engine or OM-20-02 for theTAE 125-02 engine.

GEARBOX OIL

To ensure the necessary propeller speed, both TAE 125 engine variants are equipped with a reduction gearbox filled with 1,0 l gearbox oil. (refer to section 1 of this supplement for specification)
The level can be checked through a viewing glass on the lower leading edge of the gearbox. To do so, open the flap on the left front side of the engine cowling.
The drain screw is located at the lowest point of the gearbox. A filter is installed upstream of the pump, as well as microfilter in the Constant Speed Unit. Check the gearbox for sealing after the first 5 hours of operation (visual inspection). Regular checks as well as oil and filter changes have to be performed in accordance with the Operation and Maintenance Manual.
See OM-02-01 for the TAE 125-01 engine or OM-02-02 for the TAE 125-02 engine.
The Supplement of the Aircraft Maintenance Manual has to be considered as well. See AMM-20-01 for the TAE 125-01 engine or OM-20-02 for theTAE 125-02 engine.

FUEL

Both TAE 125 engine variants can be operated with kerosene (JET A-1, Jet A, Fuel No.3) or Diesel fuel. Due to the higher specific density of turbine engine fuel or Diesel in comparison to aviation gasoline (AVGAS) the permissible capacity for standard tanks was reduced as mentioned in Section 1. Appropriate placards are attached near the fuel filler connections. For temperature limitations refer to Section 2 "Limitations" and Section 4 "Normal Operation".

It is recommended to refuel before each flight and to enter the type of fuel into the log-book.

COOLANT

To cool the engine a liquid cooling system was installed with a water/BASF Glysantin Protect Plus/G48 mixture at a ratio of 1:1. A heat exchanger for cabin heating is part of the cooling system. Check the cooling system for sealing after the first 5 hours of operation (visual inspection).

The coolant has to be changed in accordance with the Operations and Maintenance Manual. See OM-02-01 for the TAE 125-01 engine or OM-02-02 for the TAE 125-02 engine. The Supplement of the Aircraft Maintenance Manual has to be considered as well. See AMM-20-01 for the TAE 125-01 engine or OM-20-02 for theTAE 125-02 engine.

◆ Note: The ice flocculation point of the coolant is -36°C.

■ CAUTION: The water has to satisfy the following requirements:

(1) Visual appearance: colorless, clear and no deposits allowed
(2) pH-value: 6.5 to 8.5
(3) maximum water hardness: 2.7 mmol/l
(4) maximum hydrogen carbonate concentration: 100 mg/l
(5) maximum chloride concentration: 100 mg/l
(6) maximum sulfate concentration: 100 mg/

◆ Note: The waterworks also provide information. In general, tap water may be diluted with distilled water.
Pure distilled water may not be used to mix with BASF Glysantin Protect Plus/G48.

■ CAUTION

Between scheduled maintenance topping-up coolant or gearbox oil should not be necessary. If low coolant or low gearbox oil level is detected, inform your service centre immediately.

▲ **WARNING**

It is not allowed to start the engine with low level coolant or gearbox oil.