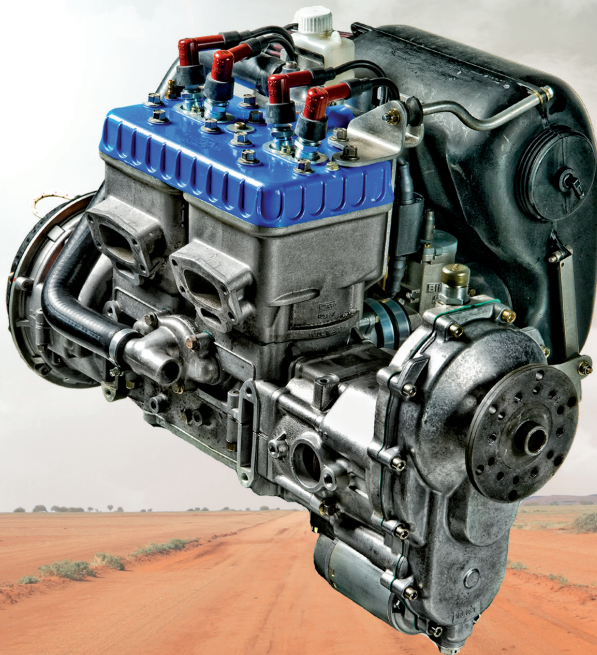


# OPERATORS MANUAL

FOR ROTAX<sup>®</sup> ENGINE TYPE 582 UL SERIES



**ROTAX<sup>®</sup> 582 UL DCDI Mod. 99** WITH OPTIONS

**ROTAX<sup>®</sup> 582 UL DCDI Mod. 17** WITH OPTIONS

 **WARNING**

**Before starting the engine, read the Operators Manual, as it contains important safety relevant information. Failure to do so may result in personal injuries including death. Consult the original equipment manufacturer's handbook for additional instructions!**

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In any case the original text in English language and the metric units are authoritative.

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## NOTES

# INTRO) Introduction

## Topics in this chapter

### **Foreword**

BRP-Rotax GmbH & Co KG (hereinafter “BRP-Rotax”) provides “Instructions of Continued Airworthiness”, which are based on the design, the tests and certification of the engine and its components. These instructions apply only to engines and components supplied by BRP-Rotax.

Before operating the engine, read this Operators Manual carefully. If any passages of the Manual are not clearly understood or in case of any questions, please contact our ROTAX® Authorized Distributors or their independent Service Centers.

This Operators Manual contains important information about safe operation of the engine together with descriptions of the systems, technical data, operating media and the operational limits of the engine.

The specified information and procedures apply only to the engine and not to specific applications in particular aircraft. The aircraft manufacturers Operators Manual is therefore definitive in terms of the operation of the engine, as it contains all of the aircraft-specific instructions

BRP-Rotax wishes you much pleasure and satisfaction flying your aircraft powered by this ROTAX® aircraft engine.

### **Document structure**

The structure of the Manual follows whenever it is possible the structure of the „GAMA Specification #1 for Pilot’s Operating Handbook“.

## NOTES

## LEP) LIST OF EFFECTIVE PAGES

Chapter	Page	Date	Chapter	Page	Date
	cover page			5	Jan. 01 2018
				6	Jan. 01 2018
INTRO	1	Jan. 01 2018	3	1	Jan. 01 2018
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	2	Jan. 01 2018

Chapter	Page	Date
	rear page	



## TOA) Table of amendments

### Approval\*

The technical content of this document is approved under the authority of  
DOA ref. EASA.21J.048.

current no.	chapter	page	date of change	remark for approval	date of approval from authorities	date of inclusion	signature
0	INTRO	all	Jan. 01 2018	DOA*			
0	LEP	all	Jan. 01 2018	DOA*			
0	TOA	all	Jan. 01 2018	DOA*			
0	1 up to 10	all	Jan. 01 2018	DOA*			

## Summary of amendments

Summary of the relevant amendments in this context, but without any claim to completeness.

current no.	chapter	page	date of change	comments
0	1 up to 10	all	Jan. 01 2018	new layout and change of company name

# 1) General note

## Topics in this chapter

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## 1.1) General

### **Purpose**

The purpose of this Operators Manual is to familiarize the owner / operator of this aircraft engine with basic operating instructions and safety information.

For detailed information related to aircraft and aircraft/engine installation, maintenance, safety or flight operation, consult the documentation provided by the aircraft manufacturer and/or its dealer.

For additional information on engines, maintenance or parts, you can also contact your nearest ROTAX® authorized aircraft engines distributor or their independent Service Center.

### **Engine serial number**

When making inquiries or ordering parts, always indicate the engine serial number. Due to continuous product improvement, engines of the same engine type might require different support and spare parts.

The engine serial number is located on the top of the crankcase, magneto side or ignition cover.

## 1.2) Abbreviations and terms

Abbreviations	Description
*	Reference to another section
AC	Alternating current
AKI	Anti knock index
API	American Petrol Institute
ASTM	American Society for Testing and Materials
bar	Bar
°C	Degrees Celsius (Centigrade)
CAN	Controller Area Network
cm <sup>3</sup>	Cubic centimeter
cm <sup>3</sup> /h	Cubic centimeter per hour
CGSB	Canadian General Standards Board
cyl.	Cylinder
DCDI	Dual Capacitor Discharge Ignition
DOA	Design Organisation Approval
EASA	European Aviation Safety Agency
EGT	Exhaust Gas Temperature
EN	European Norm
°F	Degrees Fahrenheit
ft.lbf	Foot-pound force
GAMA	General Aviation Manufacturers Association
g/kWh	Gram per kilowatt hour
HAC	High Altitude Compensation
hp	Horsepower
in	Inch
in <sup>3</sup>	Cubic inch
in <sup>3</sup> /h	Cubic inch per hour
INTRO	Introduction
ISA	International Standard Atmosphere

kg	Kilograms
kW	Kilowatt
lb	Pound
lb/hph	Pound per horsepower hour
LEP	List of Effective Pages
l/h	Liter per hour
MAG	Magneto Side
MM	Maintenance Manual
mm	Millimeter
N	Newton
Nm	Newtonmeter
psi	Pounds per square inch
PTO	Power Take Off
Rev.	Revision
RON	Research Octane Number
ROTAX®	Is a trademark of BRP-Rotax GmbH & Co KG
rpm	Revolutions per minute
SAE	Society of Automotive Engineers
SB	Service Bulletin
SI	Service Instruction
SL	Service Letter
TC	Type certificate
TOA	Table Of Amendment
US gal/h	US gallon per hour
V	Volt
VFR	Visual Flight Rules
W	Watt

## 1.3) Safety

Although reading such information does not eliminate any hazards, it promotes the understanding and application the information will promote correct use of the engine. Always apply common workshop safety rules.

The information and descriptions of components and systems contained in this Manual are correct at the time of publication. BRP-Rotax maintains a policy of continuous improvement of its products without imposing upon itself any obligation to retrofit products previously manufactured.

### Revisions

BRP-Rotax reserves the right to remove, replace or discontinue any design, specification, feature or other at any time, and without incurring obligation.

### Measurement

Specifications are given in the SI metric system with the imperial and US customary measurement system equivalents in parenthesis.

### Symbols used

This Manual uses the following symbols to emphasize particular information. This information is important and must be observed.

#### **⚠ WARNING**

**Identifies an instruction which, if not followed, may cause serious injury or even fatal injury.**

#### **⚠ CAUTION**

**Identifies an instruction which, if not followed, may cause minor or moderate injury.**

#### **ATTENTION**

**Identifies an instruction which, if not followed, may severely damage the engine or could void any warranty.**

### **NOTE**

*Indicates supplementary information which may be needed to fully complete or understand an instruction.*

**ENVIRONMENTAL NOTE**

**Environmental notes give you tips on environmental protection.**

A revision bar outside the page margin indicates a change to text or graphic.



## 1.4) Safety information

### General safety instructions

#### **⚠ WARNING**

##### **Non-compliance can result in serious injuries or death!**

This engine, by its design, is subject to sudden stoppage. Engine stoppage can result in crash landings, forced landings or no power landings. Such crash landings can lead to serious bodily injury or death.

#### **⚠ WARNING**

##### **Non-compliance can result in serious injuries or death!**

This is not a certificated aircraft engine. It has not received any safety or durability testing, and conforms to no aircraft standards. It is for use in experimental, uncertificated aircraft and vehicles only in which an engine failure will not compromise safety. User assumes all risk of use, and acknowledges by his use that he knows this engine is subject to sudden stoppage.

- Unless in a run up area, never run the engine with the propeller turning while on the ground. Do not operate engine if bystanders are close.
- Never leave your aircraft or other vehicle unattended while the engine is running. If operated by someone else you could be sued even if the use was unauthorized by you.
- Consult your aircraft dealer or manufacturer and obtain the necessary information, especially before flying in new areas.
- Never mix fuel in an enclosed area, or where fumes could reach an ignition point.
- Never refuel if fuel could be spilled on hot engine components. Use only safety approved fuel containers and never transport fuel in an unsafe manner.

### Use for intended purpose

#### **⚠ WARNING**

##### **Non-compliance can result in serious injuries or death!**

Never fly the aircraft equipped with this engine at locations, air speeds, altitudes or in other situations which do not allow a successful no-power landing after sudden engine stoppage.

Aircraft equipped with this engine must only fly in DAYLIGHT VFR conditions.

- This engine is not suitable for acrobatics (inverted flight, etc.).
- It should be clearly understood that the choice, selection and use of this particular engine on any aircraft is at the sole discretion and responsibility of the aircraft manufacturer, assembler and owner/user.
- Due to the varying designs, equipment and types of aircraft, BRP-Rotax grants no warranty on the suitability of its engines use on any particular aircraft. Further, BRP-Rotax grants no warranty on this Engine's suitability with any other part, components or system which may be selected by the aircraft manufacturer, assembler or user for aircraft application.
- Certain areas, altitudes and conditions present greater risk than others. The engine may require carburetor recalibration or humidity or dust/sand preventative equipment, or additional maintenance may be required.
- You should be aware that any engine may seize or stall at any time. This could lead to a crash landing and possible severe injury or death. For this reason, we recommend strict compliance with the maintenance and operation and any additional information which may be given to you by your dealer.

## **Training**

- Whether you are a qualified pilot or a novice, complete knowledge of the aircraft, its controls and operation is mandatory before a solo flight. Flying any type of aircraft involves a certain amount of risk. Be informed and prepared for any situation or hazard associated with flying.
- A recognized training program and continued education for piloting an aircraft is absolutely necessary for all aircraft pilots. Make sure you also obtain as much information as possible about your aircraft, its maintenance and operation from your dealer.
- Engine-specific training courses are provided by the authorized ROTAX® aircraft engine distributors according to manufacturer specifications (iRMT).

## **Regulations**

- Respect all legal requirements or local rules pertaining to flight operation in your flying area. Only fly when and where conditions, topography, and airspeeds are safest.

- Instrumentation**
- Select and use proper aircraft instrumentation. This instrumentation is not included in the ROTAX® engine package. Only approved instrumentation may be installed.
- Engine log book**
- Keep an engine log book and respect engine and aircraft maintenance schedules. Keep the engine in top operating condition at all times. Do not operate any aircraft which is not properly maintained or has engine operating irregularities which have not been corrected.
  - Keep an engine log and enter any unusual engine behavior. Do not fly unless you have corrected a given problem and recorded the correction in the log.
- Maintenance (iRMT)**
- Since special training, tools and equipment are required, engine servicing shall only be performed by an authorized ROTAX® aircraft engine distributor or their independent Service Center. BRP-Rotax requires that any service or maintenance work be carried out and verified by a technician that has a current iRMT rating.
  - Check for fuel contamination, air cleaners, etc. Protect engine while not in use from any contamination entering fuel or carburetors system, but be sure to remove storage protection before starting engine.
  - When the engine will not be operated for a longer period protect the engine and fuel system from contamination and environmental exposure.
  - Periodically verify level of coolant.
  - Check engine suspension frequently as well as the drive components, fuel lines, wiring, and fuel and air filters.
- Engine operation**
- Make sure all engine controls are operative, that you know ON and OFF positions of throttle and ignition, that they are easily accessible, and that you can operate them instinctively without hesitation.
  - Before flight, ensure that all engine controls are operative. Make sure all controls can be easily reached in case of an emergency.
  - Never operate the engine without sufficient quantities of operating fluids (oil, coolant, fuel).
  - Never exceed the maximum permitted operational limits.
  - In the interest of safety, the aircraft must not be left unattended while the engine is running.

- To eliminate the risk of injury or damage, ensure any loose equipment or tools are properly secured before starting the engine.
- Allow the engine to cool at idle for several minutes before turning off the engine.

## 1.5) Technical documentation

These documents form the instructions ensuring continued airworthiness of ROTAX® aircraft engines.

The information contained herein is based on data and experience that are considered applicable for authorized mechanics (iRMT, see Maintenance Manual Line) under normal conditions. Due to the fast technical progress and fulfillment of particular specifications of the customers it may occur that existing laws, safety prescriptions, constructional and operational regulations may not be sufficient or cannot be transferred completely to the object bought, in particular for special constructions.

### Documentation

- Installation Manual
- Operators Manual
- Maintenance Manual (Line and Heavy Maintenance)
- Illustrated Parts Catalog
- Alert Service Bulletins
- Service Bulletins
- Service Instructions
- Service Letters



### Status

The status of Manuals can be determined by checking the table of amendments. The first column of this table indicates the revision status which should be compared with the revision provided on the ROTAX®-Website: [www.FLYROTAX.com](http://www.FLYROTAX.com) Amendments and current versions can be downloaded free of charge.

### Replacement pages

Furthermore the Manual is constructed in such a way that single pages can be replaced instead of the complete document. The list of effective pages is given in the chapter LEP. The particular edition and revision number is given on the footer of each page.

### Reference

Any reference to a document refers to the latest edition issued by BRP-Rotax if not stated otherwise.

### Illustrations

The illustrations in this Manual are merely sketches and show typical arrangements. They may not represent full detail or the exact shape of the parts but should outline the same or similar function. Therefore deriving dimensions or other details from illustrations is not permitted.  
TYPICAL indicates a general view which may not represent exact details.

## NOTE

*The Illustrations in this Manual are stored in a graphic data base system and are provided with a consecutive irrelevant number.*

*This number (e.g. AE 2St\_001) is of no significance for the content.*

## 1.6) Description of design

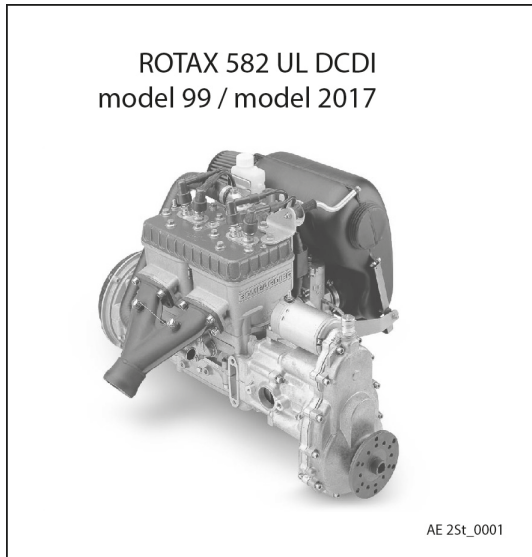


Figure 1

## 1.6.1) 582 UL DCDI mod. 99 / mod. 17

- Two stroke engine, 2 cylinder in line with rotary valve inlet.
- Liquid cooled cylinder head and cylinders.
- Integrated water pump.
- Fuel mixture lubrication or oil injection lubrication.
- Dual ignition of a breakerless magneto capacitor discharge design (DCDI).
- 2 piston type carburetors.
- 1 pneumatic fuel pump.
- Propeller drive via flange connected gearbox with incorporated torsional shock absorber.
- Exhaust system: standard version (48 kW).
- Rewind starter or optional electric starter
- Integrated AC generator (12 V 170 W) with external rectifier-regulator as optional extra.
- Air filter.
- Intake silencer, **optional extra**.

### ATTENTION

**At fitting of this intake silencer the carburetor must be re-calibrated by an authorized person**

- After muffler, **optional extra**.
- Radiator (one-piece or two-piece radiator set).

### NOTE

*582 UL DCDI mod. 99 and 582 UL DCDI mod. 17 are only available as 48 kW version.*

## 1.7) Type description

The type description consists of the following:

e.g. **ROTAX**      **582**                      **UL**                      **DCDI**                      **mod. 99 / mod. 17**

\_\_\_\_\_

type                      certification                      ignition                      model

### Designation

Designation		Description
Type	582	Two stroke engine, 2 cylinder in line with rotary valve inlet.
Certification	UL	Non-certified aircraft engines
Ignition	DCDI	Dual Capacitor Discharge Ignition
Model	mod. 99 / mod. 17	Model year

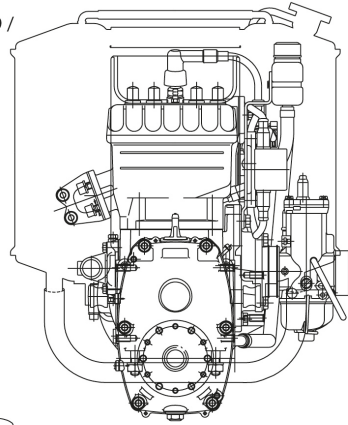


## 1.8) Engine components, engine views, cylinder designation

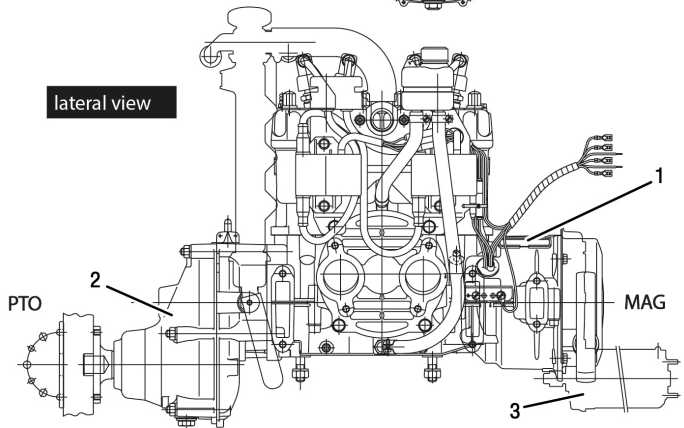
### 582 UL DCDI

ROTAX 582 UL DCDI mod. 99 /  
mod. 2017

PTO view



lateral view



NOTE: Figure shows 582 UL DCDI engine with B-gearbox.

AE 25t\_0004

Figure 2

1 Engine serial number

2 Propeller gearbox

3 Electric starter

PTO Power take off side

MAG Magneto side

## 1.9) Technical data

### 1.9.1) Dimensions

Description	582 UL DCDI / mod. 99 / mod. 17
Bore	76 mm (2.99 in)
Stroke	64 mm (2.52 in)
Displacement	580.70 cm <sup>3</sup> (35.44 in <sup>3</sup> )
Compression ratio theoretical	11.5 : 1
Compression ratio effective	5.75 : 1

### 1.9.2) Weights

#### NOTE

*The stated weights are dry weights (without operating fluids) and are guide values only.*

**Without:** exhaust system and radiator.

Further weight information relating to the equipment can be found in the current Installation Manual.

Type	582 UL DCDI mod. 99 / mod. 17
Weight	29.1 kg (64.0 lb)

Type	582 UL DCDI / mod. 99 / mod. 17
Exhaust system	5.1 kg (11.2 lb)
2 carburetor	1.8 kg (4 lb)
Propeller speed reduction unit "B"	4.5 kg (9.9 lb)
Propeller speed reduction unit "C"	8 kg (17.6 lb)
Propeller speed reduction unit "E"	11.2 kg (24.7 lb)
Electric starter	3.5 kg (7.7 lb)

### 1.9.3) Fuel consumption

Fuel consumption	582 UL DCDI / mod. 99 / mod. 17
at take-off performance	26.5 l/h (7 US gal/h)
at 75 % continuous performance	20.5 l/h (5.4 US gal/h)
specific fuel consumption	425 g/kWh (0.7 lb/hph)

## 1.9.4) Direction of rotation

Direction of rotation

Direction of rotation on propeller shaft: clockwise, viewed from the front.

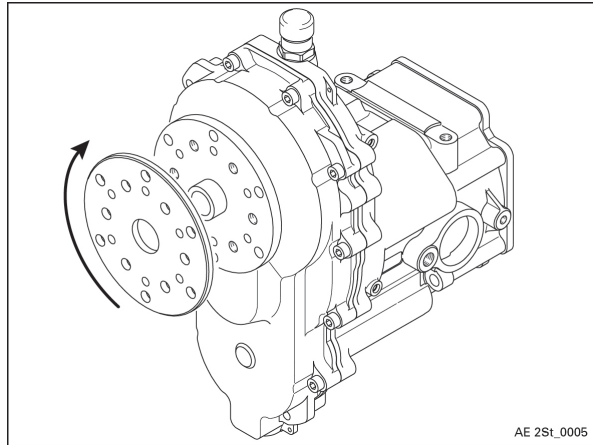


Figure 3: Normal direction of propeller rotation

## NOTES

## 2) Operating instructions

### Topics in this chapter

2.1 Operating limits .....	1
2.2 Operating media - Coolant .....	3
2.3 Operating media – Fuel.....	4
2.4 Operating media - Lubricants .....	6

#### Introduction

This chapter of the Operators Manual contains the operating limits that must be observed to ensure the ROTAX® aircraft engine and standard systems operate safely.

### 2.1) Operating limits

#### Speed

Take-off speed	6800 rpm (max. 5 min.)
Cruising speed	6500 rpm
Idle speed	approx. 2000 rpm

#### Performance

Performance data relate to ISA (International Standard Atmosphere) conditions.

<b>582 UL DCDI mod. 99 / mod. 17</b>
48 kW

#### Lubrication

Oil capacity of oil injection lubrication at 1500 rpm pump speed per outlet.

<b>582 UL DCDI mod. 99 / mod. 17</b>
max. 135 cm <sup>3</sup> /h (8.2 in <sup>3</sup> /h)

#### Cylinder head temperature

Reading at spark plug seat.

	<b>582 UL DCDI mod. 99 / mod. 17</b>
Max.	150 °C (302 °F)
Normal	110 to 130 °C (230 to 266 °F)
Difference between cyl. 1 and 2	Max. 10 °C (Max. 16 °F)

**Exhaust gas temperatures:**

	<b>582 UL DCDI mod. 99 / mod. 17</b>
Max.	650 °C (1202 °F)
Normal	500 to 620 °C (932 to 1148 °F)
Difference between cyl. 1 and 2	Max. 25 °C (Max. 43 °F)

**Engine start, operating temperature**

Max.	50 °C (120 °F)
Min.	-25 °C (-13 °F)

**Coolant temperature**

Max.	80 °C (175 °F)
Min.	65 °C (150 °F)

**Fuel pressure**

Max.	0.4 bar (5.8 psi)
Min.	0.2 bar (2.9 psi)

## 2.2) Operating media - Coolant

**Mixing ratio anti-freeze / water**

50 % antifreeze concentrate with additives against corrosion and  
50 % pure water, or use of an equivalent premixed coolant.

### ATTENTION

**Obey the operating media manufacturer's instructions!**

Satisfactory results were achieved with "BASF Glysantin Anti-corrosion". Use this or an equivalent coolant.

### NOTE

*If problems are encountered with boiling coolant after engine stop, increase percentage of antifreeze gradually.*

In all cases, antifreeze to water ratios should not exceed the antifreeze manufacturer's recommendations. Exceeding the antifreeze manufacturers recommended ratios can lead to the formation of particulates in the coolant solution or inadequate protection against freezing.

### ATTENTION

**Particulate formation may be harmful to cooling system components and may restrict coolant flow to and from overflow bottle.**

### NOTE

*At verification of the coolant level replenish coolant at radiator cap (radiator or expansion tank). The coolant level in the overflow bottle should be between min. and max. mark.*

## 2.3) Operating media – Fuel

The following fuels can be used:

European standard	American standard	Canadian standard
Min. RON 91		Min. AKI 87
EN 228 regular	ASTM D 4814	CAN/CGSB-3,5
EN 228 premium		Quality 1
EN 228 premium plus		
AVGAS 100 LL		

Due to its high lead content AVGAS forms increased deposits in the combustion chamber and lead sediments in the oil system. Therefore use AVGAS only if you encounter problems with vapour lock or if the other fuel types are not available,

or

equivalent fuels according to this chapter.

### ATTENTION

**Use only fuel suitable for the respective climatic zone.**

### NOTE

*Risk of vapor formation when using winter fuel for summer operation.*

### ATTENTION

**If the engine is not equipped with injection lubrication, a 2 % Super two stroke oil must be added to the fuel.**



## Mixing procedure

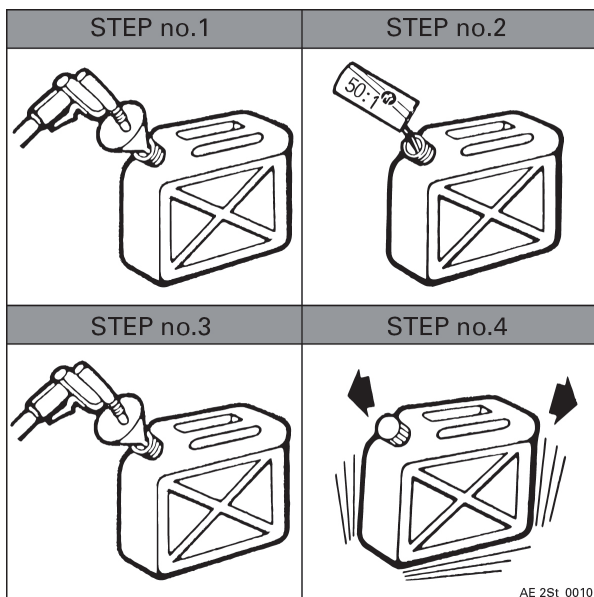


Figure 1

Step	Procedure
1	Use a clean approved container of known volume. To help predilute the oil, pour a bit of fuel into the container.
2	Fill known amount of oil into container. Oil must be approved for air cooled engines at 50:1 mixing ratio. Agitate slightly to dilute oil with gasoline.
3	Add gasoline to obtain desired mixture ratio (use fine mesh screen).
4	Replace container cap and shake the container thoroughly. Then using a funnel with a fine mesh screen to prevent the entry of water and foreign particles, transfer mixture from container into the fuel tank.

### **⚠ WARNING**

**Non-compliance can result in serious injuries or death!**  
 At refueling use only metal containers and ground the aircraft in accordance with the grounding specifications to avoid electrostatic charging.

## 2.4) Operating media - Lubricants

**Mixture lubrication** Super two stroke oil ASTM/CEC standards, API-TC classification.

**Oil injection lubrication** Optional extra on 582 UL DCDI mod. 99 / mod. 17.

Oil as specified above.

### ATTENTION

**The pour point of the oil must be at least 10°C below the ambient temperature.**

**Gearbox lubrication** Gear oil API-GL5 or GL6, SAE 140 EP, or 85 W - 140 EP.

**Rotary valve drive lubrication** Super two stroke oil (same as used for engine lubrication).

### 3) Standard operation

#### Topics in this chapter

3.1 Daily checks .....	2
3.2 Before engine start .....	2
3.3 Pre-flight checks .....	2
3.4 Engine start .....	3
3.5 After engine start .....	5
3.6 Operation in flight .....	6
3.7 Special operating conditions .....	6

#### Introduction

To warrant reliability and efficiency of the engine, meet and carefully observe all the operating and maintenance instructions.

The following description of procedures depends on the respective type of installation in the aircraft and shall therefore only be seen functionally.

#### **NOTE**

*The control elements mentioned in this chapter are only symbolic and should support the understanding of the procedures. The execution of control elements is in the responsibility of the aircraft manufacturer.*

### 3.1) Daily checks

### 3.2) Before engine start

Carefully read and comply with the following guidelines:

- Daily checks (section 3.1)
- Pre-flight checks (section 3.3)
- Start

The life span of the engine depends to a great extent on compliance with these guidelines.

#### NOTE

*Prior to engine start verify that installation is complete and make sure that all engine controls are easily accessible and that you can operate them instinctively without hesitation.*

#### NOTE

*Secure the area accordingly.*

### 3.3) Pre-flight checks

#### ⚠ WARNING

**Non-compliance can result in serious injuries or death!**  
Repair as necessary all discrepancies and shortcoming before flight.

#### Safety

#### ⚠ WARNING

**Non-compliance can result in serious injuries or death!**  
Verify ignition "OFF".

#### ⚠ WARNING

**Non-compliance can result in serious injuries or death!**  
Do not start the engine if any person is near the engine.

#### Operating media

- Check fuel content
- Verify oil tank content (oil injection engines)
- Inspect for coolant leaks
- Inspect engine and gearbox for oil leaks

#### Ignition system

- Verify spark plug connectors for security

## Propeller

- Check operation of both ignition circuits
- Inspect propeller for splits and chips. If any damage, repair and/or rebalance before use
- Verify security of propeller mounting

## Engine, gearbox, power pack

- Inspect engine and gearbox for loose or missing nuts, bolts and screws. Verify security of gearbox to engine mounting
- Check throttle, oil injection pump and choke actuation for free and full movement
- Inspect exhaust for cracks, security of mounting, springs and hooks for breakage and wear, verify safety wiring of springs
- Check operation of all engine instruments during warm up
- If possible, visually check engine and exhaust for excessive vibration during warm up (indicates propeller out of balance)
- Verify that engine reaches full power rpm during take off roll

### 3.4) Engine start

#### **⚠ WARNING**

**Non-compliance can result in serious injuries or death!**  
Do not start the engine if any person is near the engine.

On cold engine, apply choke fully. Ensure idle position of throttle valves as opening throttle will greatly reduce choke effect resulting in hard starting.

Make sure ignition switches are on and that you can shut them off instantly if necessary. Pull starter until firmly engaged and then pull smartly through.

#### **ATTENTION**

**Activate electric starter for max. 10 sec. (without interruption), followed by a cooling period of 2 minutes.**

Above procedure should be repeated until engine begins to "fire". As soon as engine starts, shift the throttle slowly to low speed and remove choke as soon as possible. Prolonged use of choke can cause engine to flood.

If the engine fails to start or operates only on one cylinder, check whether the ignition wiring is correctly connected to the spark plug connectors, check spark plugs and check the ignition is in ON position.

**ATTENTION**

**Ensure ignition switch is in correct position and wired correctly.**

### 3.5) After engine start

#### ⚠ WARNING

**Non-compliance can result in serious injuries or death!**  
Do not start the engine if any person is near the engine.

#### Warming up period

Step	Procedure
1	Start warming up period at approx. 2000 rpm for approx. 2 minutes.
2	Continue at 2500 rpm, duration depending on ambient temperature, until operating temperatures are reached.
3	Check temperatures and pressure.

#### Throttle response

#### ATTENTION

**After a full-load ground test allow a short cooling run at idle speed to prevent vapour formation in the cylinder head.**

Step	Procedure
1	<b>Short</b> full throttle ground test (consult Aircraft Operators Manual since engine speed depends on the propeller used).

#### Ignition check

Step	Procedure
1	Operate the engine at <b>3000 to 3500 rpm</b> .
2	Alternately ignition system 1 and 2 must be switched off.
3	Speed drop with only one ignition circuit must not exceed <b>300 rpm</b> .

## 3.6) Operation in flight

It is recommended to use full throttle during take-off and climb, if not specified otherwise, slight throttle reduction may create a leaner mixture and should be avoided. Select a cruising speed where the engine is running smooth.

### **⚠ WARNING**

**Non-compliance can result in serious injuries or death!**  
Monitor Operating limits. Limits must not be exceeded.

During cruise and descending it is very important not to create a lean condition with high rpm and low throttle opening. The less fresh charge the engine gets, the more hot residual gas remains in the cylinder. This raises the temperatures to a critical level. For this reason, you may also experience higher exhaust gas and cylinder head temperatures at reduced throttle openings.

Minimum engine idle speed is 2000 engine rpm. Higher idle rpm. setting will reduce enrichment action of starting circuit in carburetor (choke) making cold starting difficult.

Prior to shutdown, engine should be run until latent heat build-up from previous high power settings has been dissipated (approx. 3000 rpm or at nearest smooth running rpm for a minimum of two minutes followed by a short period of idle - 2000 rpm.).

Do not idle for prolonged periods as normal rich condition is present at this power setting can cause unnecessary carbon deposits and spark plug fouling. Additional shock loads present at idle cause gear box, propeller, and/or drive train to operate in conditions which should be avoided whenever possible.

## 3.7) Special operating conditions

### **Water**

There are dangers to your engine that you may not experience on land. Some of these dangers are water ingestion on take-off or landing due to spray and splash, corrosion, electrolysis, and, worst of all, unintentional submersion.

Bearings, crankshaft etc., are highly susceptible to corrosion. Synthetic oils, although good lubricants, often attract moisture rather than repel it.

A well designed and well maintained air intake system (e.g. RO-TAX® intake silencer with K & N oil impregnated air filter) will help to prevent water ingestion.



**Noise**

The air intake silencer kit will provide significant engine noise reduction. Further noise reduction may be obtained by the use of an after-muffler kit. Be aware that modifications will require a different carburetor setting.

Enquire at your dealer for more information, and consult authorized ROTAX® aircraft engines distributor or their independent Service Center.

**Winter**

Winter can create additional problems such as carburetor icing, frozen fuel lines, higher air densities etc., which may affect carburetor calibration and require longer warm-up periods.

**Carburetor icing**

Distinguish between two kinds of carburetor icing.

- Icing due to water in fuel

Water in fuel will accumulate at the lower parts of the fuel system and leads to freezing of fuel lines, filters or jets.

- Icing because of high air humidity

Carb icing due to humidity may occur on the fuel exit and on the carb piston and lead to performance loss by changes to the mixture. Effective remedy is possible only by preheating intake air.

**Remedies**

- Fuelling without traces of water (use deerskin as filter).
- Generously sized water trap.
- Fuel line routing inclined.
- Prevent condensation of humidity, i.e. avoid temperature differences between aircraft and fuel.

**ATTENTION**

**Fuels containing alcohol always carry a small amount of water in solution. In case of temperature changes or increase of alcohol content, water or a mixture of alcohol and water may settle and could cause troubles.**

## NOTES

## 4) Abnormal operation

### Topics in this chapter

<b>4.1 Re-Start during flight</b> .....	<b>2</b>
<b>4.2 Exceeding max. admissible engine speed</b> .....	<b>2</b>
<b>4.3 Temperature</b> .....	<b>2</b>
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4.3.2 Exceeding of max. admissible exhaust gas temperature .....	2
<b>4.4 Fuel pressure</b> .....	<b>3</b>
4.4.1 Too low fuel pressure .....	3
<b>4.5 Trouble shooting</b> .....	<b>4</b>

### Introduction

#### **⚠ WARNING**

**Non-compliance can result in serious injuries or death!**  
At unusual engine behaviour conduct checks as per Maintenance  
Manual before the next flight.

#### **NOTE**

*Further checks - see Maintenance Manual.*

The following description of procedures depends on the respective type of installation in the aircraft and shall therefore only be seen functionally.

## 4.1) Re-Start during flight

### ⚠ WARNING

**Non-compliance can result in serious injuries or death!**  
At unusual engine behaviour conduct checks as per following section and according to the relevant section in the Maintenance Manual.

**Engine stop** Starting procedure same as on ground, however, on a warm engine without choke.

## 4.2) Exceeding max. admissible engine speed

**Exceeding engine speed** Reduce the engine speed. Any exceeding of the max. admissible engine speed has to be entered by the pilot into logbook, stating duration and extent of over engine speed.

## 4.3) Temperature

### ATTENTION

**Reduce engine power setting to the minimum necessary and carry out precautionary landing.**

### 4.3.1) Exceeding of max. admissible cyl. head temperature

**Cylinder head temperature max.** Any exceeding of the max. admissible cylinder head temperature has to be entered by the pilot into the logbook, stating duration and extent of over-temperature condition.

### 4.3.2) Exceeding of max. admissible exhaust gas temperature

**Exceeding exhaust gas temperature max.** Any exceeding of the max. admissible exhaust gas temperature must be entered by the pilot into the logbook, stating duration and extent of excess-temperature condition.

## 4.4) Fuel pressure

### ATTENTION

Reduce engine power setting to the minimum necessary and carry out precautionary landing.

### 4.4.1) Too low fuel pressure

### ⚠ WARNING

**Non-compliance can result in serious injuries or death!**  
Repair as necessary all discrepancies and shortcoming before flight.

## 4.5) Trouble shooting

### ⚠ WARNING

**Non-compliance can result in serious injuries or death!**  
Only qualified staff (experienced two stroke mechanics) trained on this particular engine, are allowed to carry out maintenance and repair work.

### ATTENTION

**If the following hints regarding remedy do not solve the problem, contact an authorized workshop. The engine must not be operated until the problem is rectified.**

Your ROTAX engine requires basically two essentials to run. Spark and correct fuel/ air mixture. The majority of problems quite often are a simple lack of one or the other.

Follow an organized method of troubleshooting. This will facilitate the identification of discrepancies or shortcomings.

**Fuel** Start by checking the supply (tank), fittings (loose?), filter (plugged?), float chamber (fouled?).

**Spark** Try new spark plugs.

Problems of a more complex nature are best left to a ROTAX® engine technician: See your ROTAX® Authorized Distributor or their independent Service Centers.

### Knocking under load

Possible cause	Remedy
Octane rating of fuel too low.	Use fuel with higher octane rating.
Fuel starvation, lean mixture.	Check fuel supply.

## 5) Performance and Fuel consumption

### Topics in this chapter

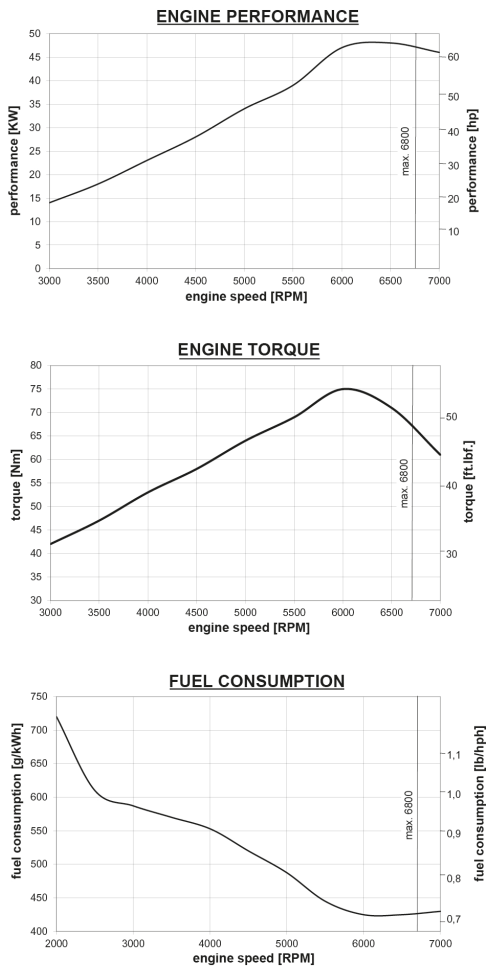
<b>5.1 Performance data .....</b>	<b>2</b>
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#### **Introduction**

The performance and fuel information shown in this chapter are intended to give an indication on the expected power output and fuel consumption of these engines. The actual power and fuel consumption is highly dependent on the installation, the compliance to predefined maintenance events and the way the engine is operated. Those values need to be determined and provided by the aircraft manufacturer.

## 5.1) Performance data

582 UL DCDI  
mod.99 /  
mod. 17



AE 2St\_0014

Figure 1



# 7) System Description

## Topics in this chapter

7.1 Cooling system .....	2
7.2 Fuel system .....	3
7.3 Lubrication system .....	3
7.4 Electric system.....	5
7.5 Propeller gearbox .....	6

### Introduction

This chapter of the Operator Manual contains information about the general engine specification as well as a description of cooling system, fuel system, lubrication system, electric system and the propeller gearbox.

The system description refers only to the engine and not to a specific application in a particular aircraft. The aircraft manufacturers Operators Manual is therefore definitive in terms of the operation of the engine, as it contains all the aircraft specific instructions.

The design shown in this chapter does not represent a specified execution but should support the understanding of the system.

## 7.1) Cooling system

Engine cooling is performed by liquid cooled cylinders and cylinder head.

The cooling system is in a two circuit arrangement.

The cooling liquid is supplied by a integrated pump in the engine through the cylinders and the cylinder head to the radiator. The cooling system has to be installed such that vapour coming from the cylinders and the cylinder head can escape to top via a hose either into the water tank of the radiator or to an expansion chamber.

The expansion tank is closed by a pressure cap (with excess pressure valve and return valve). At temperature rise of the coolant the excess pressure valve opens and the coolant will flow via a hose at atmospheric pressure to the transparent overflow bottle. When cooling down, the coolant will be sucked back into the cooling circuit.

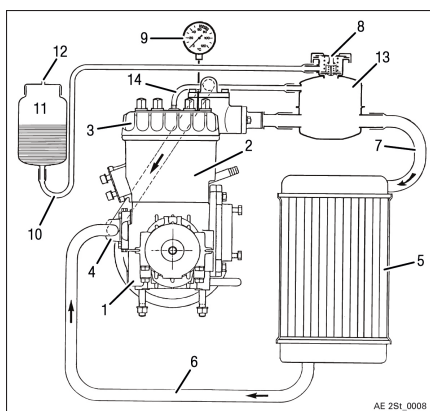


Figure 1

- |   |  |    |  |
|---|--|----|--|
| 1 | <i>Crankcase</i>                           | 2  | <i>Cylinder</i>  |
| 3 | <i>Cylinder head</i>                       | 4  | <i>Water pump</i>  |
| 5 | <i>Radiator</i>                            | 6  | <i>Hose from radiator to water pump</i>                                |
| 7 | <i>Hose from cylinder head to radiator</i> | 8  | <i>Radiator screw cap, with excess pressure valve and return valve</i> |
| 9 | <i>Temperature gauge for cooling water</i> | 10 | <i>Overflow hose</i>   |

---

11 *Overflow bottle*

12 *Bottle venting*

13 *Expansion tank*

14 *Cylinder head venting hose*

## 7.2) Fuel system

Generally, the engines are planned to run on a gasoline-oil mixture of 50:1. This mixture supplies proper engine lubrication.

If the engine has been assembled for oil injection lubrication, the carburetors are supplied with pure gasoline.

The integrated oil pump will deliver the exact amount of oil required for engine lubrication.

Make sure that adequate amount of oil is in the oil tank before putting engine into service.

### **NOTE**

*For fuel refer to section 2.3.*

## 7.3) Lubrication system

### **Lubrication**

Generally the engines are designed to run on a gasoline-oil mixture of 50:1 unless equipped with optional ROTAX® oil injection system. For preparation of fuel-oil mixture refer to section 2.3.

### **Oil injection lubrication**

The oil pump driven by the crankshaft via cross shaft feeds the engine with fresh oil. The oil pump is a piston type pump with metering system. Via diffuser jets in the intake cover respectively intake socket each cylinder is supplied with exactly proportioned quantity of Super two-stroke oil. The oil quantity is defined by the engine rpm and the oil pump lever position. This lever is actuated via a Bowden cable connected to the throttle cable. The oil comes to the pump from an oil tank by gravity. See Fig. 2.

**⚠ WARNING**

**In case of fresh oil injection, the carburetors are fed with pure gasoline (no oil/gasoline mixture).**

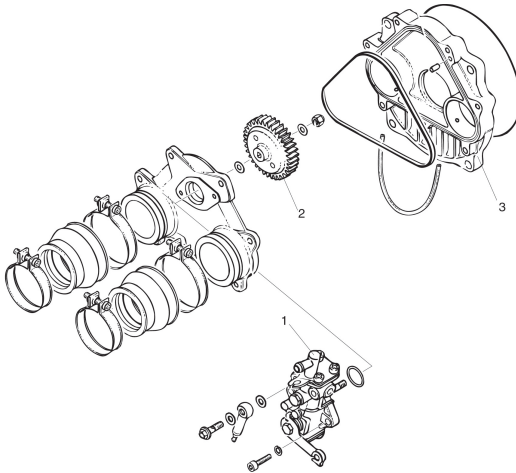


Figure 2

- 1 Oil pump
- 2 Oil pump gear
- 3 Rotary valve cover assy.

**Lubrication of the rotary valve drive**

A 90° spiral gear situated in the crankcase and running in oil bath drives the rotary valve.

**Gearbox lubrication**

Gearbox lubrication operates with its own oil filled into gearbox housing.

**ATTENTION**

**Never operate engine with a dry gearbox.**

**NOTE**

*For lubricants refer to section 2.4.*

## 7.4) Electric system

The engine types 582 UL DCDI mod. 99 / mod. 17 are equipped with a breakerless dual capacitor discharge ignition unit with integrated generator.

The ignition unit is completely free of maintenance and needs no external power supply.

Two charging coils fitted on the generator stator and independent from each other feed one each ignition circuit. The energy supplied is stored in the ignition capacitor. At the moment of ignition the external triggers supply an impulse to the control circuits and the ignition capacitors are discharged via the primary winding of the ignition coil. The secondary winding supplies the high voltage for the ignition spark.

### NOTE

*The grey cable is provided for a rev-counter signal.*

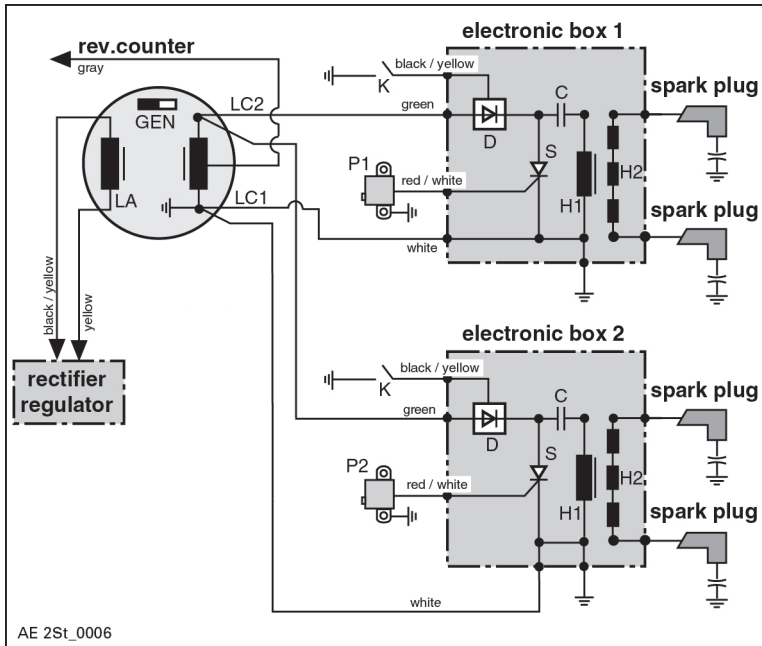


Figure 3

## 7.5) Propeller gearbox

There are three different gearboxes available as optional extras:

### Type "B" gearbox

Available gear ratios	
Crankshaft : propeller shaft	2.00 : 1
	2.24 : 1
	2.58 : 1

### Type "C" gearbox

Available gear ratios	
Crankshaft : propeller shaft	2.62 : 1
	3.00 : 1
	3.47 : 1
	4.00 : 1

#### NOTE

*This type of gearbox designated as CL is also available with an incorporated lighting generator.*

### Type "E" gearbox

Available gear ratios	
Crankshaft : propeller shaft	2.62 : 1
	3.00 : 1
	3.47 : 1
	4.00 : 1

#### NOTE

*This type of gearbox designated as EL is also available with an incorporated lighting generator.*

# 8) Checks

## Topics in this chapter

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8.1.3 At out of service periods or storage of engine for longer than 4 weeks up to 1 year .....	2

### **Safety**

All checks to be carried out as specified in the current Maintenance Manual Line (last revision).

#### **⚠ WARNING**

**Non-compliance can result in serious injuries or death!**  
Only qualified staff (experienced two stroke mechanics) trained on this particular engine, are allowed to carry out maintenance and repair work.

#### **ATTENTION**

**Carry out all directives of Service Bulletins (SB), according to their priority. Observe applicable Service Instructions (SI) and Service Letter (SL).**

## 8.1) Engine preservation

If the engine is not going to be used for an extended period of time, certain measures must be taken to protect engine against heat, direct sun light, corrosion and formation of residues and ingress of contaminants.

In particular the water bonded by the alcohol in the fuel causes increased corrosion problems at engine stops or storage. Especially affected are essential engine components such as crankshaft bearings and conrod bearings as well as crank pins and piston pins.

### 8.1.1) After each flight

- Activate choke for a moment before stopping engine  
This will draw a richer fuel/air mixture along with additional lubrication into the engine. This additional lubrication will aid in protecting internal engine components from corrosion.
- Close all engine openings like exhaust pipe, carburetor and fuel tank vents, venting tube and air filter to prevent entry of contamination and humidity.

### 8.1.2) At engine stoppage of 1 to 4 weeks

- Let the engine run at increased idle speed
- Shut engine down and secure against inadvertent engine start
- Remove air filters and inject approx. 3 cm<sup>3</sup> of preservation oil or equivalent oil into the air intake of each carburetor
- Restart engine and run at increased idle speed for 10 - 15 seconds
- Shut engine down and secure against inadvertent engine start
- Close all engine openings such as exhaust pipe, carburetor and fuel tank vents, venting tube and air filter to prevent entry of contamination and humidity.

### 8.1.3) At out of service periods or storage of engine for longer than 4 weeks up to 1 year

- Let the engine run at increased idle speed
- Remove air filters and inject approx. 6 cm<sup>3</sup> of preservation oil or equivalent oil into the air intake of each carburetor
- Stop engine and secure against inadvertent engine start



**⚠ WARNING**

**Non-compliance can result in serious injuries or death!**  
Verify ignition "OFF".

- Remove spark plugs and inject approx. 6 cm<sup>3</sup> preservation oil or equivalent oil into each cylinder and slowly turn crankshaft 2 to 3 turns by hand to lubricate top end parts. Refit spark plugs
- Drain gasoline from float chambers, fuel tank and fuel lines

**ENVIRONMENTAL NOTE**

**Protect the environment!**

Generally comply with standard rules for handling of chemicals. Dispose of chemicals as per local environmental regulations.

- Lubricate all carburetor linkages
- Close all openings of the engine like exhaust end pipe, carburetor and fuel tank vents, venting tube and air intake to prevent entry of dirt and humidity
- Spray all external steel parts with engine oil or appropriate preservation oil

## NOTES

## 9) Supplement

### Authorized Distributor

Overview of ROTAX® Authorized Distributor or their independent Service Center.  
Refer to the official ROTAX® AIRCRAFT ENGINES Website  
[www.FLYROTAX.com](http://www.FLYROTAX.com).

## NOTES

## 10) Proper disposal

### **ENVIRONMENTAL NOTE**

**Please observe the disposal regulations applicable in your area.**

#### **General**

All old/used parts, liquids and chemical agents should be disposed of according to local ordinance regulations.

#### **Packaging**

The disposal of the packaging is the customer's responsibility and has to take place in accordance with the current regulations of the country in which it has been removed.

#### **Liquids**

- **Engine oil:**  
Dispose of engine oil at the respective oil collecting point or hand it over to an approved disposal company
- **Coolant:**  
Dispose of coolant at the respective collecting point or hand it over to an approved disposal company
- **Fuel:**  
Dispose of fuel at the respective collecting point or hand it over to an approved disposal company

### **⚠ WARNING**

Flammable material must be placed at a sufficient distance from all sources of ignition, direct and strong sunlight, spotlights and heating devices, so that it cannot be ignited by such items.

### **ENVIRONMENTAL NOTE**

**Observe the safety instructions of the manufacturer of hazardous substances (coolant, oil) or fuels and the applicable regional waste disposal regulations.**

### **ENVIRONMENTAL NOTE**

**Work with the utmost care to ensure that no water pollutants can penetrate into the soil, water or the sewerage system.**

**Old/used parts**

Please return old/used parts (not periodic maintenance parts) from ROTAX® aircraft engines F.O.B to ROTAX® Authorized Distributors or their independent Service Centers.

**Chemical agents  
(cleaner, LOCTITE  
etc.)**

Please observe the safety and disposal instructions of the manufacturer.

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\_\_\_\_\_

Engine serial no.

\_\_\_\_\_

Type of aircraft

\_\_\_\_\_

Aircraft registration no.

