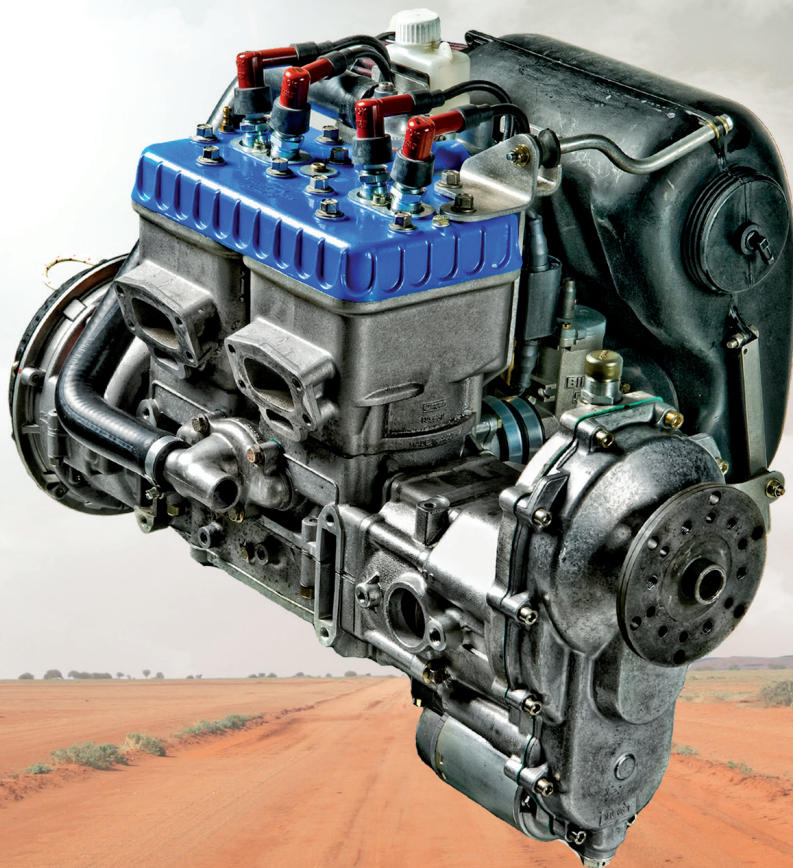


INSTALLATION MANUAL

FOR ROTAX[®] ENGINE TYPE 582 UL SERIES



ROTAX[®] 582 UL DCDI Mod. 99 WITH OPTIONS

ROTAX[®] 582 UL DCDI Mod. 17 WITH OPTIONS

WARNING

Before starting with engine installation, please read the Installation Manual completely as it contains important safety relevant information.

This Installation Manual for the ROTAX[®] aircraft engines should only be used as a general installation guide for the installation of ROTAX[®] engines into airframes. It should not be used as instruction for the installation of a ROTAX[®] aircraft engine in a specific type of airframe or airplane. BRP-Rotax GmbH & Co KG does not assume any warranty or liability in this context.

In no event shall the Installation Manual be used without following the specific instructions and/or requirements of the manufacture of an airframe or airplane (“Manufacturer”). For verification and/or for release of the engine installation, the respective Manufacturer must be contacted. Any modifications or adaptations to the airframe or airplane shall be carried out and/or be verified and released by the Manufacturer only.

Improper use of the Installation Manual and/or non compliance with the installation requirements of the Manufacturers can cause personal injury or property damage. BRP-Rotax GmbH & Co. KG disclaims any liability for any and all damage and/or injuries (including death) resulting from the improper use of Installation Manual and non compliance with the installation requirements of the Manufacturer.

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ROTAX[®] is a trade mark of BRP-Rotax GmbH & Co KG. In the following document the short form of BRP-Rotax GmbH & Co KG = BRP-Rotax is used.

Other product names in this documentation are used purely for ease of identification and may be trademarks of the respective company or owner.

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Translation into other languages might be performed in the course of language localization but does not lie within ROTAX[®] scope of responsibility.

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

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Chapter	INTRO – GENERAL NOTE
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Chapter: INTRO GENERAL NOTE

Foreword

Before carrying out engine installation related work on the engine, read this Installation Manual carefully. The manual will provide you with basic information on correct engine installation for safe engine operation.

If any passages of the manual are not clearly understood or if you have any questions, please contact a ROTAX® authorized distributor or their independent Service Center for ROTAX® aircraft engines.

BRP-Rotax GmbH & Co KG (hereinafter "BRP-Rotax") wishes you much pleasure and satisfaction flying your aircraft powered by this ROTAX® aircraft engine.

The structure of the manual follows, whenever possible, the structure of the ATA (Air Transport Association) standards. The aim is the compatibility with the aircraft manufacturers documentation, which means they still must adapt or incorporate the documentation to their standard.

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Chapter: LEP
LIST OF EFFECTIVE PAGES

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	Cover page			6	March 01 2018
				7	March 01 2018
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	3	March 01 2018		6	March 01 2018
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Chapter: TOA
TABLE OF AMENDMENTS

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

no.	chapter	page	date of change	remark for approval	date of approval from authorities	date of inclusion	signature
0	INTRO	all	March 01 2018	DOA*			
0	LEP	all	March 01 2018	DOA*			
0	TOA	all	March 01 2018	DOA*			
0	00-00-00	all	March 01 2018	DOA*			
0	10-10-00	all	March 01 2018	DOA*			
0	24-00-00	all	March 01 2018	DOA*			
0	61-00-00	all	March 01 2018	DOA*			
0	72-00-00	all	March 01 2018	DOA*			
0	73-00-00	all	March 01 2018	DOA*			
0	73-10-00	all	March 01 2018	DOA*			
0	75-00-00	all	March 01 2018	DOA*			
0	76-00-00	all	March 01 2018	DOA*			
0	78-00-00	all	March 01 2018	DOA*			
0	79-00-00	all	March 01 2018	DOA*			
0	80-00-00	all	March 01 2018	DOA*			

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Summary of amendments

Summary of the relevant amendments in this context, but without requirement on completeness.

current no.	chapter	page	date of change	comment
0	all	all	March 01 2018	new layout and change of company name

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Chapter: 00-00-00
GENERAL NOTE

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General.....**2**
Description of design**5**
 Standard version5
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Safety notice**10**
 Safety information 11
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GENERAL

In this Manual all of ROTAX® 582 UL engine is described.

NOTE

ROTAX® 582 UL includes 582 UL model 99 and model 17.

Documentation

This Installation Manual is to familiarize the owner/user of this aircraft engine with basic installation instructions and safety information.

For more 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, its maintenance or parts, you can also contact your nearest ROTAX® authorized Aircraft Engine Distributor or their independent Service Center.

ROTAX Distributors

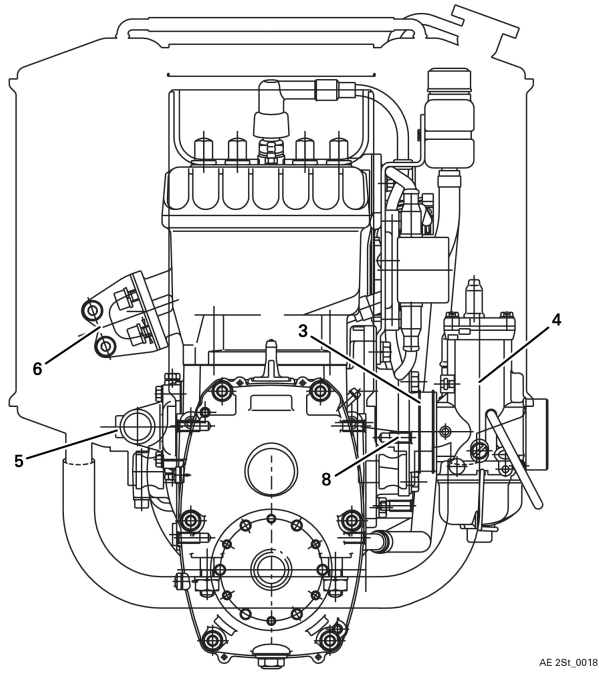
For ROTAX® Authorized Distributors of aircraft engines see the official website

www.FLYROTAX.com.

Engine components, engine views, numbering of cylinders

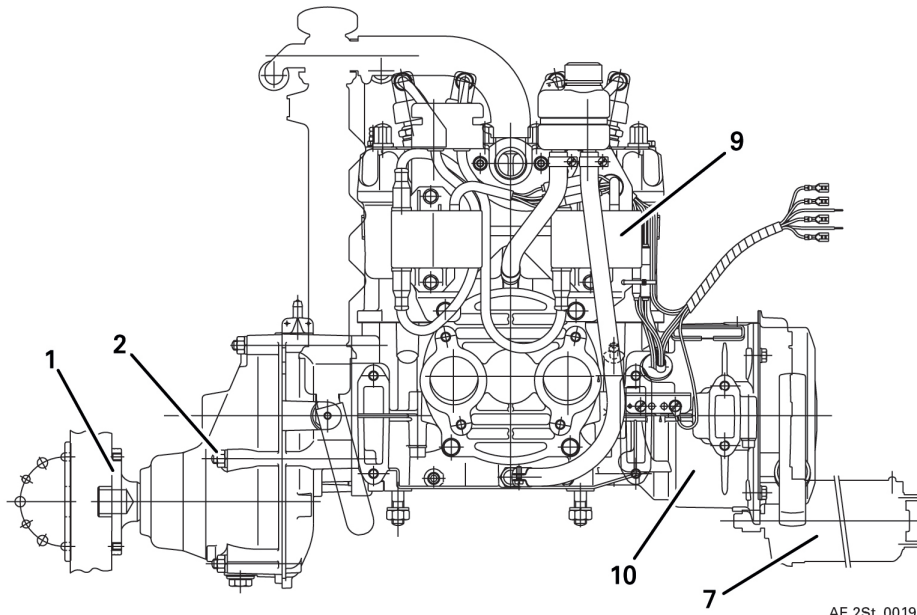
PTO	power take off side
MS	magneto side
A	points of attachment for engine transport
Cyl. 1	cylinder 1
Cyl. 2	cylinder 2

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AE 2St_0018

Figure 1.1



AE 2St_0019

Figure 1.2

1 Propeller flange

2 Propeller gearbox

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3	<i>Intake manifold</i>	4	<i>Carburetor</i>
5	<i>Coolant pump</i>	6	<i>Exhaust socket</i>
7	<i>Electric starter</i>	8	<i>Fresh oil lubrication pump</i>
9	<i>Electronic modules of ignition unit</i>	10	<i>Ignition housing</i>

Engine serial number

When making inquiries or ordering parts, always indicate unique ID given by the engine serial number, as the engine manufacturer might make modifications to the engine in the course of product improvement. The engine serial number is on top of the crankcase, magneto side, or ignition cover.

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DESCRIPTION OF DESIGN

Designation of type Refer to the latest Operators Manual 582 UL mod. 99 and mod. 17.

STANDARD VERSION

Standard engine design Refer to the latest Operators Manual 582 UL mod. 99 and mod. 17.

ATTENTION



Any equipment not included as part of the standard engine version and so does not be part of the engine is not in the scope of supply. Components especially developed and tested for this engine are readily available at BRP-Rotax.

Auxiliary equipment not tested The following auxiliary equipment has “not” been tested for safety and durability to the standards of aviation.

- Exhaust system
- Intake filter
- Coolant radiator
- Electric rev counter
- Hour-meter

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ABBREVIATIONS AND TERMS

Abbreviations	Description
*	Reference to another section
	center of gravity
	The drop symbol indicates use of sealing agents, adhesives or lubricants (only in the Illustrated Parts Catalog).
°C	Degrees Celsius (Centigrade)
°F	Degrees Fahrenheit
rpm	Revolutions per minute
A	Ampere
AAPTS	Ambient Air Pressure Temperature Sensor
AC	alternating current
Ah	Ampere hour
A/C	Aircraft
AR	as required
assy.	assembly
ASB	Alert Service Bulletin
ACG	Austro Control GmbH
ACL	Anti Collision Light
API	American Petrol Institute
ASTM	American Society for Testing and Materials
ATA	Air Transport Association
AWG	American Wire Gauge
CAN	Controller Area Network
Coil 1–4	Ignition coils 1–4
CPS 1+2	Crankshaft Position Sensor 1+2
CSA	Constant Speed Actuator
CTS	Cooling Temperature Sensor
CW	clockwise
CCW	counter-clockwise
CGSB	Canadian General Standards Board
DCDI	Dual Capacitor Discharge Ignition

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DC	direct current
DOA	Design Organisation Approval
DOT	Department of Transport
EASA	European Aviation Safety Agency
IM	Installation Manual
ECU	Engine Control Unit
EGT	Exhaust Gas Temperature
INTRO	Introduction
EMS	Engine Management System
EN	European Norm
ETFE	Ethylene Tetrafluoroethylene
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
hr.	hours
HIC A	Harness Interface Connector A
HIC B	Harness Interface Connector B
IFR	Instrument Flight Rules
INJ 1–8	Injector 1–8
IPC	Illustrated Parts Catalog
ips	inch per second
iRMT	independent ROTAX Maintenance Training
ISA	International Standard Atmosphere
kg	Kilograms
KNOCK	Knock sensor
MAPS 1+2	Manifold Air Pressure Sensor 1+2
MATS 1+2	Manifold Air Temperature Sensor 1+2
MON	Motor Octane Number
MAG	Magneto Side
N	Newton
n.a.	not available
NDT	Non Destructive Testing
Nm	Newtonmeter

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NVFR	Night Visual Flight Rules
OHM	Overhaul Manual
OHV	Over Head Valve
OM	Operators Manual
OPS	Oil Pressure Sensor
OTS	Oil Temperature Sensor
PCV	Pressure Control Valve
POA	Production Organisation Approval
PTFE	Polytetrafluoroethylene
PTO	Power Take Off
Rev.	Revision
ROTAX®	is a trademark of BRP-Rotax GmbH & Co KG
RON	Research Octane Number
RON 424	ROTAX® Norm 424
s.v.	still valid (only Illustrated Parts Catalog)
S/N	Serial Number
SAE	Society of Automotive Engineers
SB	Service Bulletin
SI	Service Instruction
SI-PAC	Service Instruction Parts and Accessories
SL	Service Letter
SMD	Surface Mounted Devices
TBO	Time Between Overhaul
TC	Type certificate
part no.	Part number
TOA	Table Of Amendment
TOC	Table of content
TSN	Time Since New
TSNP	Time Since New Part
TSO	Time Since Overhaul
V	Volt
VFR	Visual Flight Rules
LEP	List of Effective Pages

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MM	Maintenance Manual
XXXX	shows the serial component number

CONVERSION TABLE

Units of length:	Units of power:
1 mm = 0.03937 in 1 in = 25.4 mm 1 ft = 12 in = 0.3048 m	1 kW = 1.341 hp 1 hp = 0.7457 kW 1 kW = 1.3596 PS 1 PS = 0.7355 kW
Units of area:	Units of temperature:
1 cm ² = 0.155 sq. in (in ²) 1 sq. in (in ²) = 6.4516 cm ²	K = °C – 273,15 °C = (°F – 32) / 1,8 °F = (°C x 1.8) +32
Units of volume:	Units of velocity:
1 cm ³ = 0.06102 cu in (in ³) 1 cu in (in ³) = 16.3871 cm ³ 1 dm ³ = 1 l 1 dm ³ = 0.21997 gal (UK) 1 gal (UK) = 4.5461 dm ³ 1 dm ³ = 0.26417 gal (US) 1 gal (US) = 3.7854 dm ³	1 m/s = 3.6 km/h 1 ft/min = 0.3048 m/min = 0.00508 m/sec 1 m/s = 196.85 ft/min 1 kt = 1.852 km/h 1 km/h = 0.53996 kn
Units of mass:	spec. fuel consumption:
1 kg = 2.2046 lbs. 1 lb. = 0.45359 kg	1 g/kWh = 0.001644 lb/hph 1 lb/hph = 608.277 g/kWh
Density:	Units of torque:
1 g/cm ³ = 0.016018 lb/ft ³ 1 lb/ft ³ = 62.43 g/cm ³	1 Nm = 0.737 ft lb = 8.848 in lb 1 ft lb = 1.356 Nm 1 in lb = 0.113 Nm
Units of force:	Cable cross-section: Conversion table- Wire Gauge: AWG-mm²
1 N = 0.224809 lbf 1 lbf = 4.4482 N	AWG —> mm ² 4 —> 21 6 —> 13 8 —> 8.4 10 —> 5.3 12 —> 3.3 14 —> 2.1 16 —> 1.3 18 —> 0.8 20 —> 0.52
Units of pressure:	
1 Pa = 1 N/m ² 1 bar = 100 000 Pa / 1000 hPa / 100 kPa 1 bar = 14.503 lbf/in ² (psi) 1 in Hg = 33.8638 hPa	

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SAFETY NOTICE

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.

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SAFETY INFORMATION

Use for intended
purpose

⚠ WARNING

Non-compliance can result in serious injuries or death!

The user has to assume all risks possibly arising from utilizing auxiliary equipment.

⚠ 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 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.
- 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, ROTAX® makes no warranty or representation on the suitability of its engine's use on any particular aircraft. Further, ROTAX® makes no warranty or representation of this engine's suitability with any other part, component or system which may be selected by the aircraft manufacturer, assembler or user for aircraft application.
- 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 to the maintenance, operation and any additional information which may be given to you by your dealer.
- Select and use proper aircraft instrumentation. This instrumentation is not included with the ROTAX® engine package. Only approved instrumentation can be installed.
- 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.
- To prevent unauthorized use, never leave the aircraft unattended with the engine running.
- Keep an engine log 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.

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- Keep an engine log and enter any unusual engine behaviour. Do not fly unless you have corrected a given problem and recorded the correction in the log.
- Since special tools and equipment may be required, engine servicing should only be performed by an authorized ROTAX® engine dealer or a qualified trained mechanic approved by the local airworthiness authority.
- To eliminate possible injury or damage, ensure any loose equipment or tools are properly secured before starting the engine.
- 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.
- When in storage protect the engine and fuel system from contamination and exposure.
- Never operate the engine and gearbox without sufficient quantities of lubricating oil.
- Periodically verify level of coolant.
- Never exceed maximum rated rpm. and allow the engine to cool at idle for several minutes before turning off the engine.
- Operating the engine at high rpm. at low throttle position, for example during descent, may increase engine and exhaust temperatures and cause critical overheating. Always compensate and match rpm with throttle position.
- Maintain your engine in top condition and assume it's going to quit running at any time. Leave yourself a way out in the event of unexpected failure.
- Never mix fuel in an enclosed area, or where fumes could reach an ignition point.
- 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.
- 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.
- Check engine suspension frequently as well as the drive components, fuel lines, wiring, and fuel and air filters.
- Check for fuel contamination, air vents, etc. Protect engine while not in use from any contamination entering fuel or carburetor system, but be sure to remove storage protection before starting engine.

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INSTRUCTION

Engines require instructions regarding their installation, application, use, operation, maintenance and repair.

Technical documentation and regulations are useful and necessary complementary elements for trainings, but can by no means substitute for theoretical and practical instructions.

These instructions should cover explanation of the technical context, advice for operation, maintenance, installation, use and operational safety of the engine.

Safety notice

In this technical Manual passages concerning safety are especially marked. Pass on safety warnings to other users!

Accessories

This engine must only be operated with accessories supplied, recommended and released by BRP-Rotax. Modifications are only allowed after consent of the engine manufacturer.

Spare parts

See Illustrated Parts Catalog, latest issue.

ATTENTION

Only use genuine ROTAX® spare parts

Spare parts must meet the requirements defined by the engine manufacturer. This can only be guaranteed when using GENUINE-ROTAX®-spare parts and/or accessories (see IPC). Spare parts are available at ROTAX® Authorized Distributors and their independent Service Centers. Any warranty by BRP-Rotax will become void if other spare parts and or accessories than GENUINE-ROTAX®-spare parts and/or accessories are used (see latest Warranty Conditions).

Standard tools / Special tools

ATTENTION

Only use tools and appliances which are suitable for the relevant task according to the latest Manuals.

State of delivery

⚠ WARNING

Engine and gearbox are delivered in “dry“ conditions (without fuel, oil and coolant).

Before putting the engine into operation it must be filled with oil and cooling liquid. Use only oil and coolant as specified.

See latest Operators Manual for selection of the suitable operating fluids..

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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 for engine removal and installation. Concerning design of engine installation in depth knowledge of aircraft design is required.

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 Bulletin
- Service Bulletin
- Service Instruction
- Service Letter



Status

The status of the 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. 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 effected pages is given in the chapter LEP. The particular edition and revision number is given on the footer of each page.

Reference

This Manual for engine installation is only part of the technical documentation and will be supplemented by the respective Operators Manual, Maintenance Manuals and Illustrated Parts Catalog.

ATTENTION

Pay attention to references to other documentation, found in various parts of this Manual.

If not stated otherwise, any reference to a document refers to the latest edition issued by BRP-Rotax.

BRP-Rotax INSTALLATION MANUAL

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 5iS001) is of no significance for the content.

Some measurements are given in the drawings, these are manufacturing dimensions and are subject to corresponding tolerances.

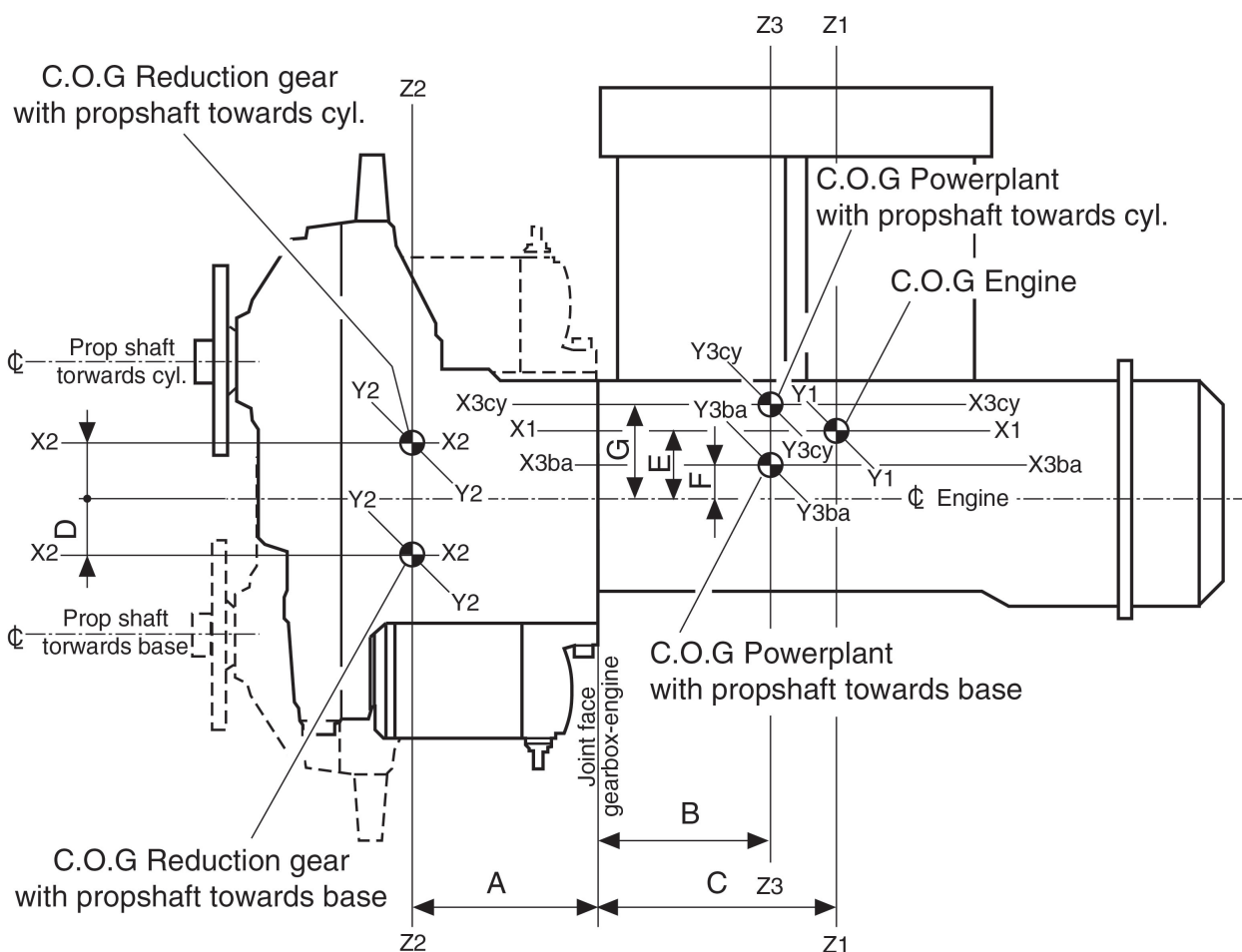


Figure 1.3

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NOTES

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Chapter: 10-10-00
STORAGE AND INSTALLATION

TOPICS IN THIS CHAPTER

Preparations for engine installation	2
State of delivery	2
Unpacking the engine	2
Engine storage	4
Engine suspension and installation position.....	5
Attachment points.....	5
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General directives for engine installation	7
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Verification of the throttle lever detent for max. continuous power.....	11

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PREPARATIONS FOR ENGINE INSTALLATION

ATTENTION

The stated directives are measures that must be observed during every engine installation to prevent any accidents and engine damage.

STATE OF DELIVERY

ATTENTION

Risk of consequential damage to engine and aircraft as a result of corrosion and damage. Under no circumstances is a corroded or damaged engine to be installed in an aircraft!

ATTENTION

The attachment screws are only for transport and must not be used in the aircraft.

Attachment

The engine can be attached with steel angles anchored on a timber plate.

- When the engine is delivered, check that the GENUINE-ROTAX® packing is not damaged.
- If the packing is damaged, contact the authorized distributor- or their independent Service Center for ROTAX® aircraft engines.

UNPACKING THE ENGINE

ATTENTION

The attachment screws are only for transport and must not be used in the aircraft.

ATTENTION

During engine installation take into account the total engine weight and ensure careful handling.

Unpacking the engine

When the engine is delivered, check for damage of the packaging. If the package is damaged, contact the authorized Distributor- or their independent Service Center for ROTAX® aircraft engines.

To unpack a new engine and for checking the state of delivery, proceed as follows:

Step	Procedure
1	Remove the wooden cover.
2	Remove the bag and protective wrapping around the engine.

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Step	Procedure
3	Check that the serial number and engine type on the type plate are identical to those shown on the delivery note. If the serial number or the engine type is deviating from the delivery contact a ROTAX® Authorized Distributor- or their independent Service Center for ROTAX® aircraft engines.
4	Check the engine for damage or corrosion. If the engine is damaged or corroded, contact a ROTAX® Authorized Distributor- or their independent Service Center for ROTAX® aircraft engines.
5	Screw off the transport bracket screws from wooden bottom of the box.
6	Remove transport brackets from engine.

ATTENTION

Protective coverings are only for use during transport and engine installation. They must be removed completely (including sealing materials) before the engine is operated.

All openings are protected against ingress of contamination and dampness. It is recommended to leave the protective plugs in place until installation of the specific feed line.

The protective coverings can be found at following locations:

Pos.	Installation location	Amount
1	Exhaust	adhesive tape
2	Fresh oil pump	1x plug
3	Vent screw, gearbox	1x cap
4	Carburetor inlet	1x each cover

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ENGINE STORAGE

The engine is preserved at BRP-Rotax thus guaranteeing proper protection against corrosion damage for at least 12 months after the date of delivery from BRP-Rotax.

This warranty is subject to the following conditions:

- The engine must be stored in the GENUINE-ROTAX®-packing as supplied by BRP-Rotax.
- The covers on various openings must not be removed.
- The engine must be stored in a suitable place (at min. -40 °C/-40 °F and max. +80 °C/176 °F).
- The flat bag (blue) surrounding the engine must not be damaged or removed, as it protects the engine from corrosion and oxidation.

If the engine is stored for a period longer than 12 months (or it is not stored in the GENUINE-ROTAX®-packing) then maintenance tasks must be carried out every 3 months as per the currently valid Maintenance Manual Line.

BRP-Rotax INSTALLATION MANUAL

ENGINE SUSPENSION AND INSTALLATION POSITION

ATTENTION

During engine installation take into account the total engine weight and ensure careful handling.

Engine suspension

The engine suspension is essentially determined by the aircraft design. Four attachment points are provided on the engine.

The engine is supplied with a tested and certified suspension frame for the fireproof bulk head. Installation in the aircraft is carried out using standard captive rubber mounts which also isolate vibration and noise from the aircraft frame.

ATTACHMENT POINTS

⚠ WARNING

Non-compliance can result in serious injuries or death!

The aircraft or fuselage manufacturer must design the engine suspension so that it can safely carry the maximum occurring operational loads without exceeding the max. allowable forces and bending moments on the engine housing and attachment points. Tighten all engine suspension screws as specified by the aircraft manufacturer.

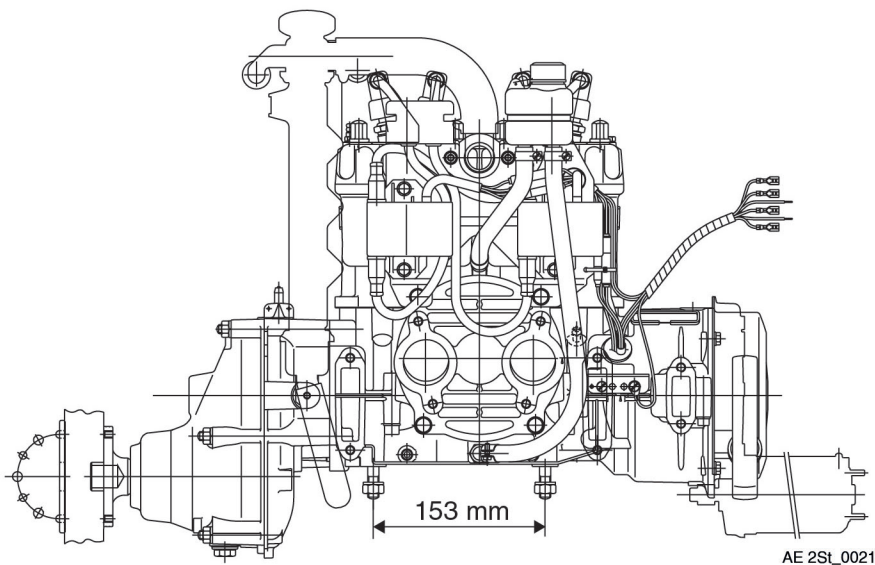


Figure 2.1: Attachment points

BRP-Rotax
INSTALLATION MANUAL

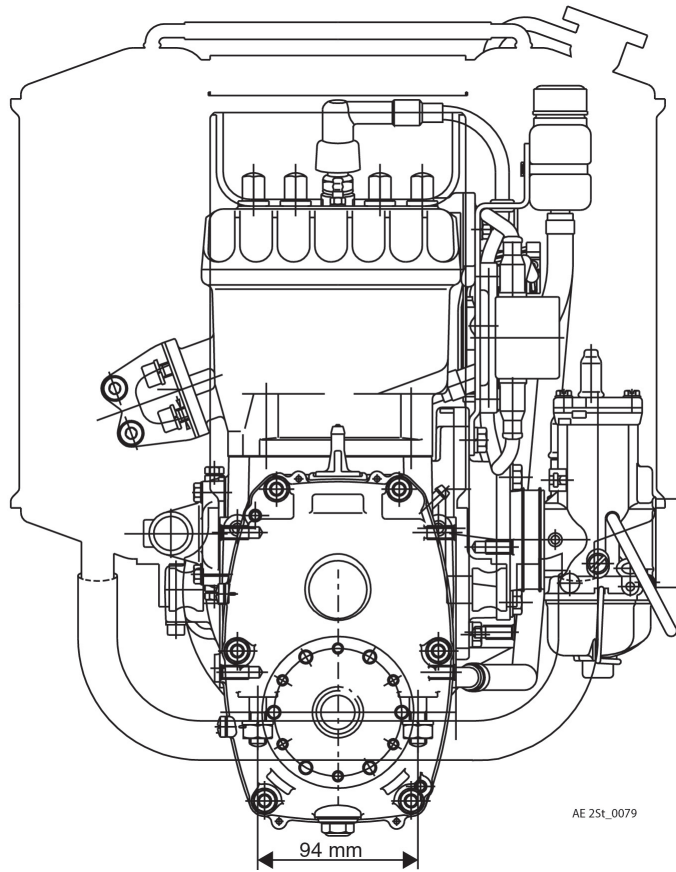


Figure 2.2: Attachment points

BRP-Rotax INSTALLATION MANUAL

PERMISSIBLE INSTALLATION POSITIONS

Take care that all limits are in compliance with the Operators Manual and Installation Manual.

ATTENTION

Ensure that the carburetors are positioned vertical in normal flying position to warrant proper operation of the floats inside.

GENERAL DIRECTIVES FOR ENGINE INSTALLATION

Isolation mounts must be used between engine and airframe to neutralize vibrations. Damping elements as generally used in the aircraft industry are suitable.

NOTE

The engine suspension must be designed to prevent any excessive engine movement and to minimize noise emission and vibration on the airframe side.

ATTENTION

Respect aircraft manufacturers recommended torques at engine installation.

BRP-Rotax
INSTALLATION MANUAL

PREPARATIONS FOR TRIAL RUN OF ENGINE

⚠ WARNING

Non-compliance can result in serious injuries or death!
For engine start and operation must be observed as described in the Operators Manual.

CHECKS BEFORE TRIAL RUN

⚠ WARNING

Non-compliance can result in serious injuries or death!
Always observe the engine from a safe place while it is running. Check that the cockpit is occupied by a competent operator.

NOTE

This checklist is not exhaustive. Consult all Instructions for Continuous Airworthiness.

- Review Operators Manual
- Review relevant Service Instruction for "Selection of suitable operating fluids"
- Check engine oil, coolant and fuel level
- Make sure that no tools remain in the engine compartment
- Check for other foreign or loose objects
- Check for tight fit of propeller and pitch setting
- Check for propeller control hits stops and operates on correct range of motion (if equipped)
- Fasten the aircraft to the ground in an appropriate way and use chocks for the wheels. Secure the area surrounding the propeller to exclude hazards to other persons
- Visual inspection of engine and accessories
- Check for leaks
- Check suspension of engine
- Check for a tight fit of oil filter
- Check oil hose connections are correct
- Check for correct oil system purging
- Check if other systems and instruments are installed appropriately
- Check gauges for accuracy
- Check wires routed properly and secured
- Check exhaust system for security and free of blockage

BRP-Rotax INSTALLATION MANUAL

- Preheat engine in cold weather

CONDUCT TEST RUN

See latest Operators Manual of the respective engine type.

Break-in procedure

Run the engine according to the following graph:

⚠ WARNING

Non-compliance can result in serious injuries or death!

The general safety information must be observed for all work on the aircraft engine and its surrounding components.

⚠ WARNING

Non-compliance can result in serious injuries or death!

Proper clothing, ear protection etc. should be used during any engine test run.

The time of compliance for break-in procedure is:

- when installing and using an overhauled (if not already performed by overhaul facility) or factory new engine
- if one or more cylinders, piston(s) or piston ring(s) were replaced (requiring new parts)

BRP-Rotax INSTALLATION MANUAL

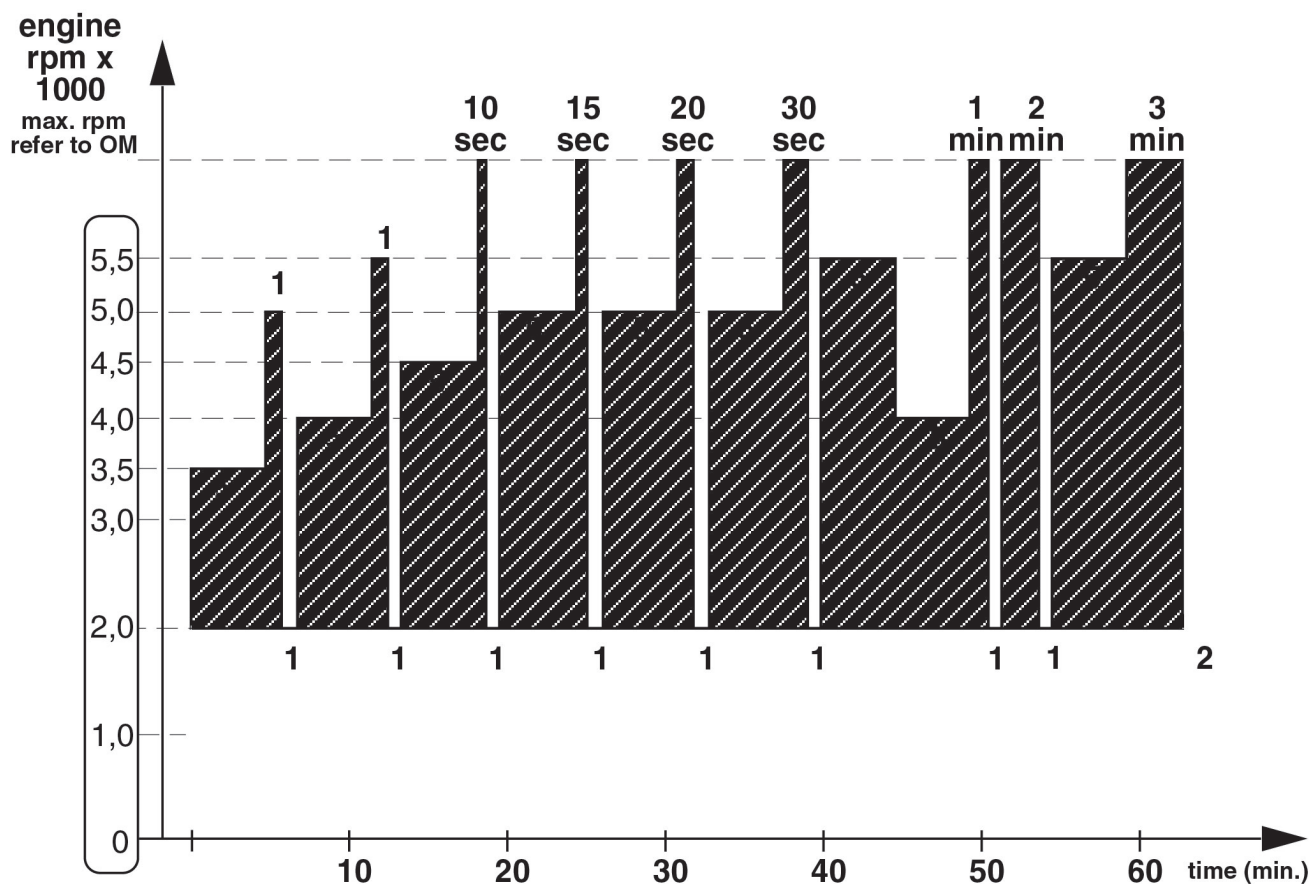


Figure 2.3: Engine rpm x 1000

Description

On a liquid cooled engine it is possible that the cooling air flow (speed) on ground is not enough to provide adequate cooling for extended periods of time. Therefore, it is necessary to observe carefully the temperature of the cooling liquid during test run to avoid overheating. Before exceeding the maximum allowed cooling temperature on cylinder head (outlet) of 80 °C / 180 °F interrupt the test run and cool down the engine at idle for approximately one minute and continue from where it was interrupted.

On a free air engine it is possible that the cooling air flow on ground is not enough to provide the necessary cooling for extended periods of time. Therefore, it is necessary to observe carefully the cylinder head temperature (CHT) during the test run and avoid overheating. Before exceeding the maximum allowed **CHT of 250 °C / 480 °F** interrupt the test run and cool down the engine at idle for approximately one minute and continue from where it was interrupted.

After test run

After test run the idle must be adjusted (see also latest Maintenance Manual). Then proceed with taxi test to verify proper cooling system. Then short take-offs can be conducted. After a few short full-load take-offs, but not later than after 2 hours total running time, the cylinder head nuts must be re-torqued to 22 Nm (195 in. lb.). For this procedure the cylinder cowl (if any) must be removed.

BRP-Rotax
INSTALLATION MANUAL

VERIFICATION OF THE THROTTLE LEVER DETENT FOR MAX. CONTINUOUS POWER

Performance check in accordance with Operators Manual.

If nominal performance won't be reached or is in excess of, examination of the installation and engine will be necessary.

ATTENTION

Don't conduct any test flights before fault has been traced and found.

NOTE

Make an entry of the details and test results into the engine log book.

BRP-Rotax
INSTALLATION MANUAL

NOTES

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INSTALLATION MANUAL

Chapter: 24-00-00
ELECTRIC SYSTEM

TOPICS IN THIS CHAPTER

Lighting circuit2
Installation notes3
 Wiring diagram for rectifier regulator part no. 2648703
Electronic revolution counter5

BRP-Rotax INSTALLATION MANUAL

LIGHTING CIRCUIT

General

In the stator 8 lighting coils are incorporated. The output is 170 W A.C. at 6000 l/min. This alternating current can be used directly to feed A.C. consumers, or via a rectifier-regulator for loading a battery and feeding direct current consumers.

To avoid the voltage to rise above permissible levels, a voltage regulator must be used. To operate loads requiring direct current (e.g. charging battery), a rectifier-regulator is required.

A rectifier-regulator part no. 866080 is available. As a power supply for lights only. This rectifier-regulator can be used without a battery. In this case the regulated RMS voltage will be between 11 V and 12 V as long as a minimum load of 1 A is provided.

If a battery is used, it must be capable of absorbing approx. 1 A minimum continuous charging load, even with full charge (suggested minimum battery capacity: 9 A/h, resp. 16 A/h with electric starter). Regulated voltage is 13.5 V to 14.5 V.

If using three-phase rectifier-regulator 264870 no minimum load is required.

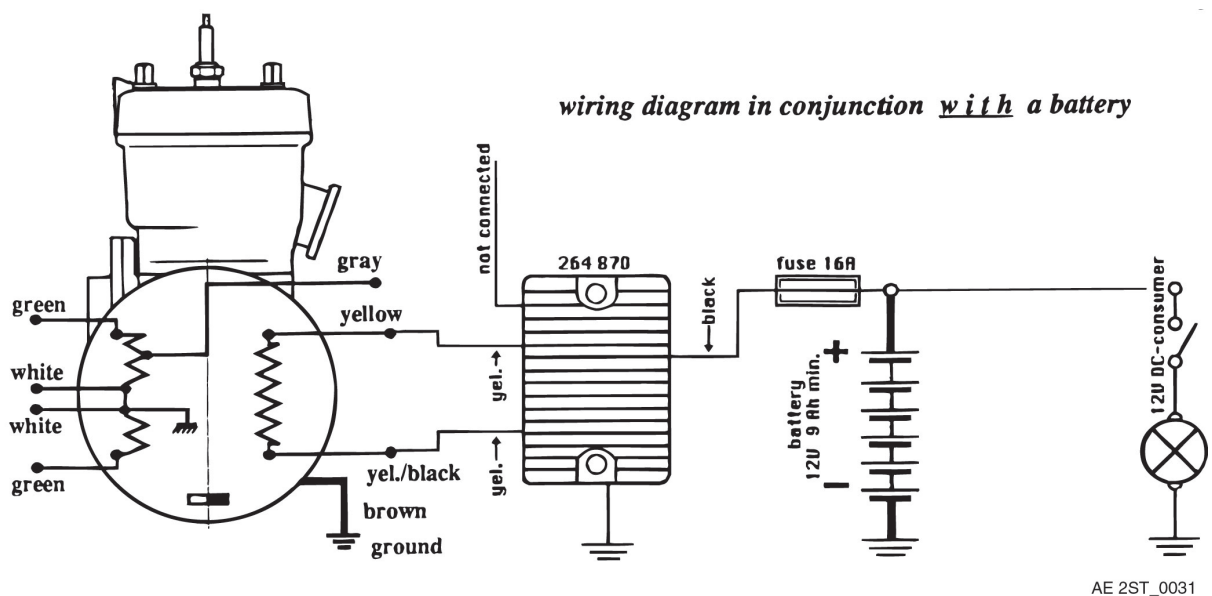
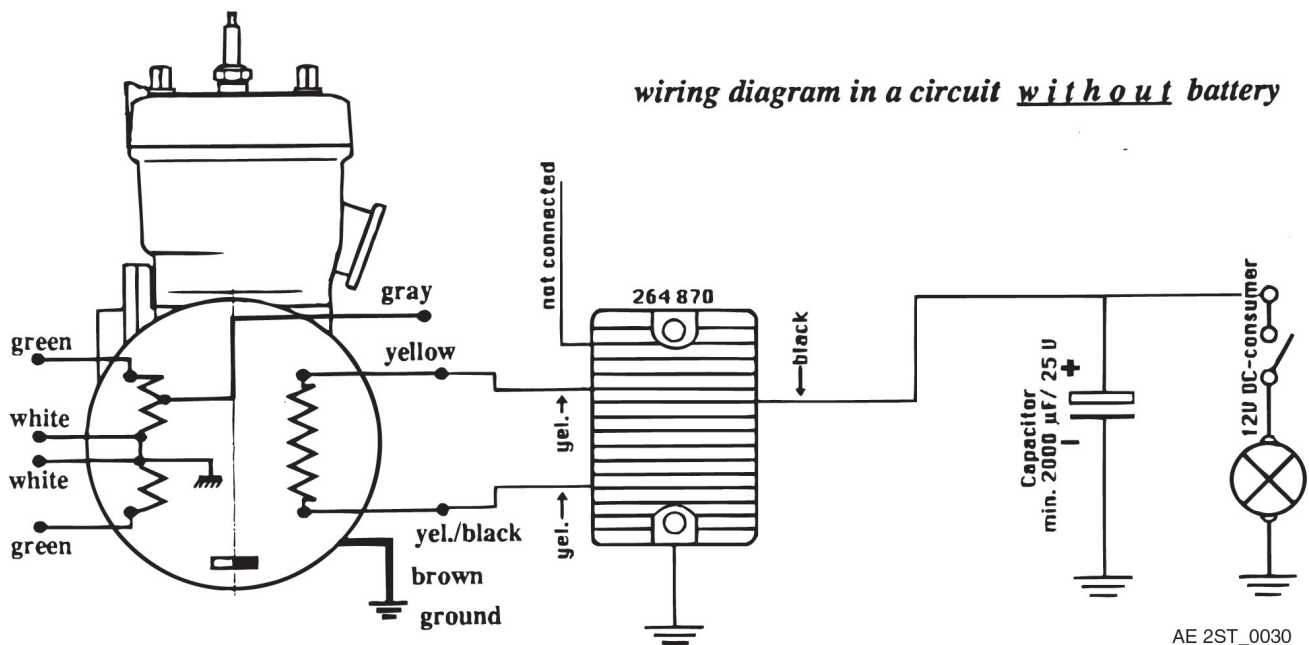
If no load is connected to the lighting coils, then the lighting coil must be short-circuited. Connect the yellow cable to the yellow/black cable.

BRP-Rotax
INSTALLATION MANUAL

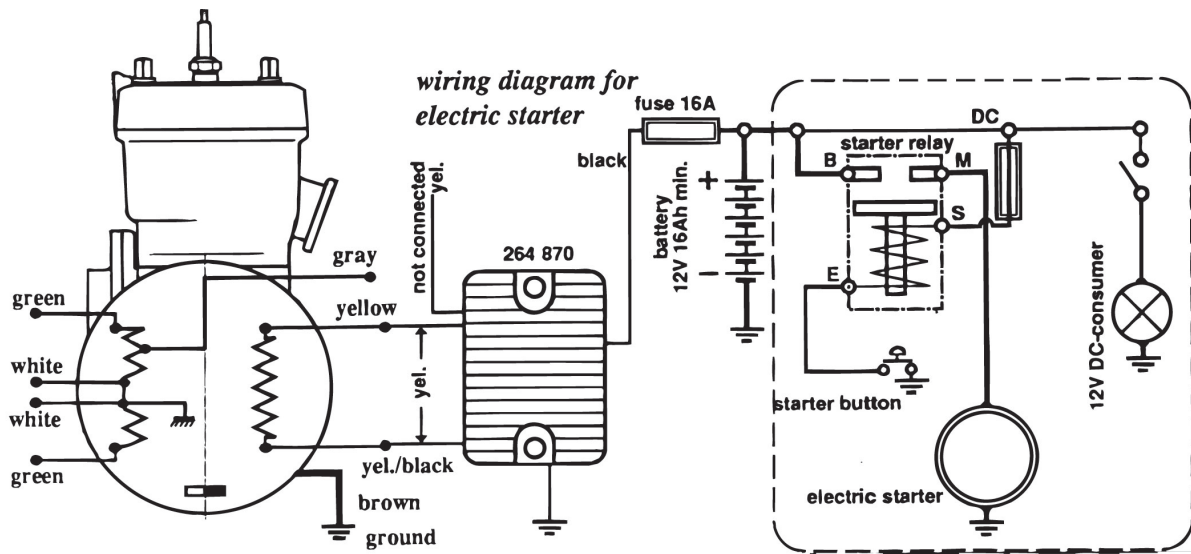
INSTALLATION NOTES

WIRING DIAGRAM FOR RECTIFIER REGULATOR PART NO. 264870

(not limited to minimum of 1 Ampere consumption)



BRP-Rotax INSTALLATION MANUAL



AE 2ST_0032

Figure 3.3

BRP-Rotax INSTALLATION MANUAL

ELECTRONIC REVOLUTION COUNTER

General

The revolution counter part no. 966404 has been specifically designed to be connected to the 12 pole flywheel generator used on the DUCATI CDI systems. The revolution counter measures the frequency of the pulses provided by one of the transducers supply winding where it is connected. It does not require any external power supply. It is connected by two wires without polarity. The indicating range is up to 8000 rpm. The weight is 235 grams.

Connection to dual ignition system

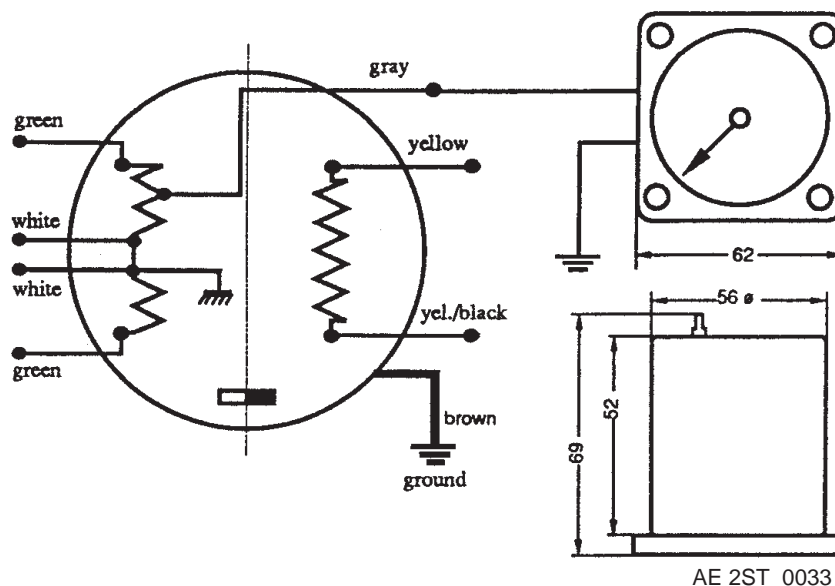


Figure 3.4

The generator integrated in the DUCATI dual ignition has a special gray cable for revolution counter connection. The revolution counter 966404 must be fitted between the gray cable and mass (brown cable).

The tachometer will indicate correct RPM even if one of the two ignition systems is turned off for ignition testing procedure or a transducer failure occurs.

Maximum allowed deviation: +/- 100 rpm

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INSTALLATION MANUAL

NOTES

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INSTALLATION MANUAL

Chapter: 61-00-00
PROPELLER DRIVE

TOPICS IN THIS CHAPTER

Propeller drive	2
Interface overview	2
Propeller gearbox	4
Installation and lubrication	4

BRP-Rotax INSTALLATION MANUAL

PROPELLER DRIVE

⚠ WARNING

Never operate the engine without propeller as this results in serious engine damage from overspeeding. Never fit the propeller directly on the crankshaft.

Normally, the propeller gearbox will be supplied and installed on the engine. If the gearbox is delivered separately, take note of the gearbox installation instructions.

INTERFACE OVERVIEW

Direction of rotation

The propeller flange turns clockwise, looking towards the face of flange.

“B” type gearbox

Reduction ratio	2.00 / 2.24 / 2.58
Attachment holes on propeller flange	

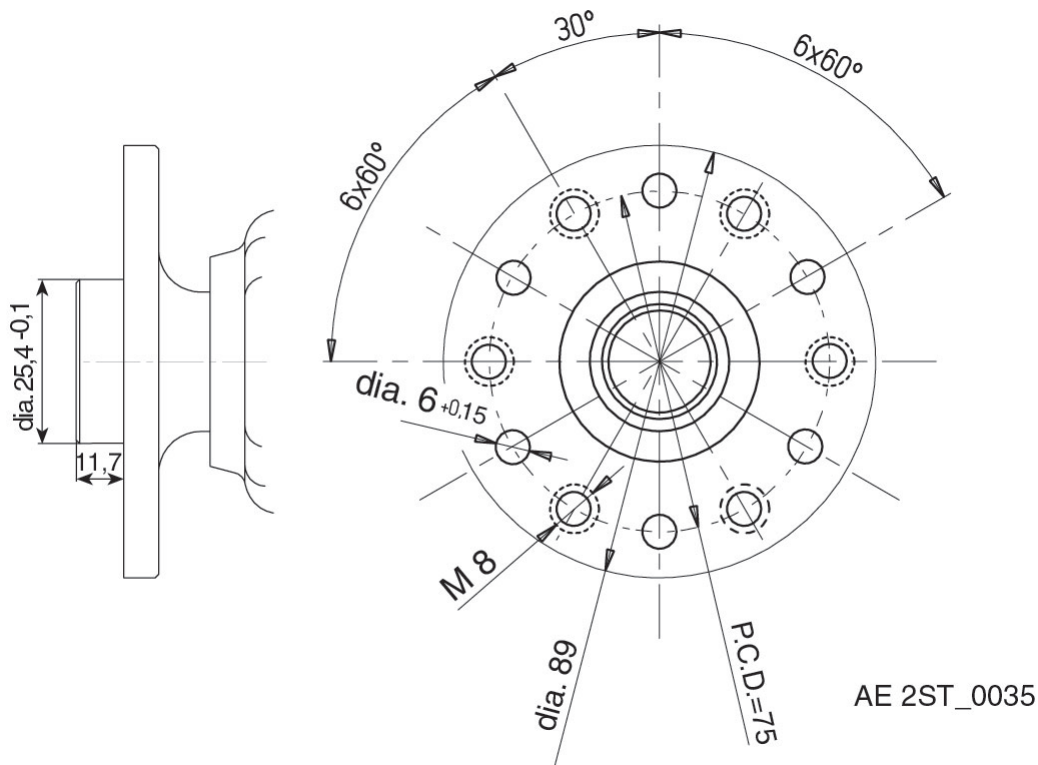


Figure 4.1: Attachment holes of propeller flange

BRP-Rotax
INSTALLATION MANUAL

**“C” (CL) - and “E”
 (EL) type gearbox**

Reduction ratio	2.62 / 3.00 / 3.47 / 4.00
-----------------	---------------------------

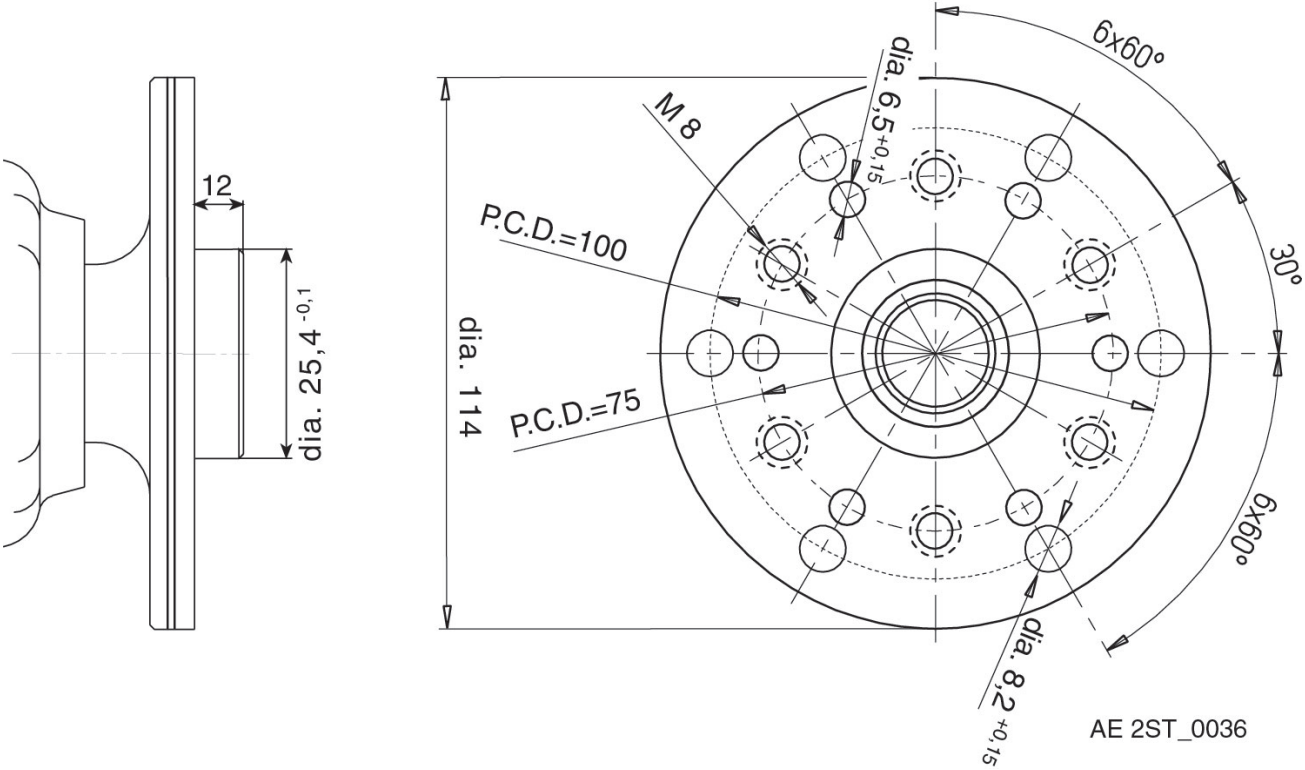


Figure 4.2: Attachment holes of propeller flange

BRP-Rotax
INSTALLATION MANUAL

PROPELLER GEARBOX

INSTALLATION AND LUBRICATION

ATTENTION

Only use brand name oil in accordance with the latest Operators Manual and the latest Service Instruction "Selection of suitable operating fluids" of the respective engine type.

Oil capacity of gearbox

See the latest Maintenance Manual Line.

The gearbox can be installed in two basic positions:

- SZ = upright with propeller shaft towards cylinder
- SS = inverted with propeller shaft towards engine base

Step	Procedure
1	According to position of gearbox, fit magnetic plug and sealing ring (1). Tightening torque 24 Nm (212 in.lb.)
2	Install vent screw with sealing ring (2). Tightening torque 6 Nm = (53 in.lb.)

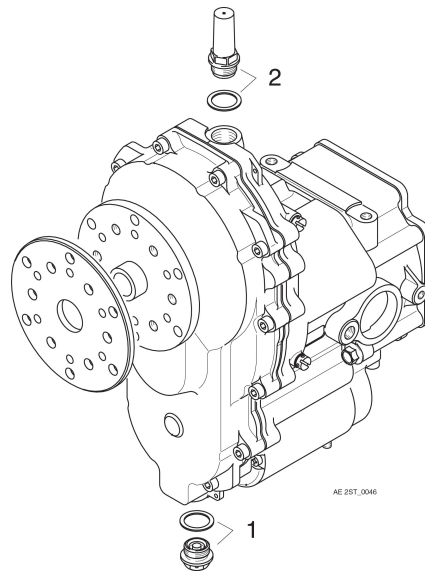


Figure 4.3

1 Magnetic plug with sealing ring

2 Vent screw with sealing ring

BRP-Rotax INSTALLATION MANUAL

ATTENTION

The two large ventilation bores on both sides of gear housing have to remain always open to warrant dissipation of heat.

Step	Procedure
3	Generally replenish oil, until oil emerges at the respective lower oil level plug (3).
4	Wire-secure magnetic plug (1), vent screw (2), oil level plug (3) and drain plugs (4).
5	The propeller flange (5) is furnished with 6 tappings M6 and 6 holes each of 6.5 mm and 8.2 mm dia., but these screws are not in the scope of supply.

NOTE

With the installation of an EL gearbox the tapped holes for radiator support are transferred from gearbox housing to adapter housing.

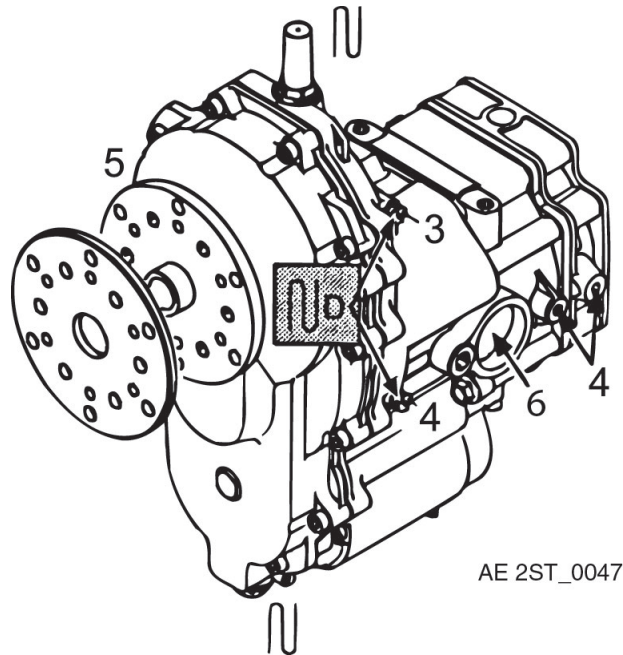


Figure 4.4

- 3 Oil level plug
- 4 Drain plug
- 5 Propeller flange
- 6 Large vent bores

BRP-Rotax INSTALLATION MANUAL

ATTENTION

With use of ROTAX gear box type "C" (CL) or "E" (EL) the moment of inertia of the propeller must not be in excess of 6000 kgcm² ("B" type gearbox: 3000 kgcm²). Enquire for moment of inertia and have it confirmed by the manufacturer of propeller in writing.

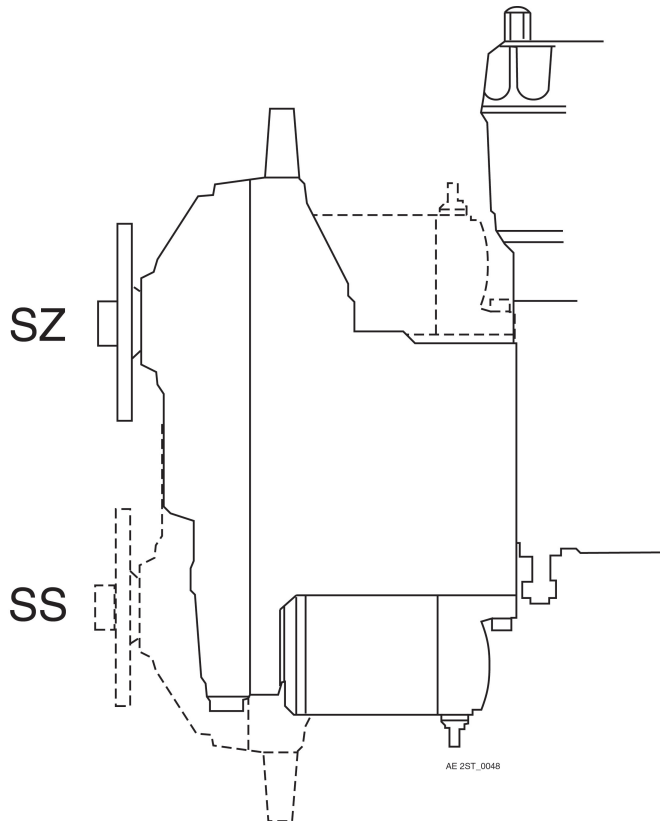


Figure 4.5

SZ = upright with propeller shaft towards cylinder

SS = inverted with propeller shaft towards engine base

BRP-Rotax
INSTALLATION MANUAL

Chapter: 72-00-00
ENGINE

TOPICS IN THIS CHAPTER

Interface overview2

BRP-Rotax
INSTALLATION MANUAL

INTERFACE OVERVIEW

Weights

Weight of “dry” engine and engine parts as following:

Part	Weight
Electric starter	3.5 kg (7.71 lb.)
Gearbox “B”	4.5 kg (9.99 lb.)
Gearbox	8.0 kg (17.64 lb.)
Gearbox	11.2 kg (24.69 lb.)
Generator 220 W DC	1.1 kg (2.42 lb.)
2 radiators (big)	2.2 kg (4.85 lb.)
Radiator 995697	1.0 kg (2.20 lb.)
Fresh oil pump	0.1 kg (0.22 lb.)
Intake silencer	1.1 kg (2.42 lb.)
Muffler	1.6 kg (3.52 lb.)

Centre of gravity and moments of inertia

Power plant	Engine assy. with carb and exhaust manifold								
	Engine type	Carb	Exhaust manifold	Weight (kg)	Location of C.O. G. (mm)		Moment of inertia around axis (kgcm ²)		
					C	E	x1 - x1	y1 - y1	z1 - z1
582 UL DCDI / mod. 99 and mod. 17	2 x BING	973122	30.2	154.5	58	3150	4684	4118	

Reduction gear assy.						
Type of gearbox	Weight (kg)	Location of C.O.G. (mm)		Moment of inertia around axis (kgcm ²)		
		A	D	x2 - x2	y2 - y2	z2 - z2
B	5.3	92	46	166	256	184
C	8.1	102	37	317	456	315
E	11.3	125	5	684	1005	554
EL	12.4	144	13.5	682	1186	717

BRP-Rotax
INSTALLATION MANUAL

Chapter: 73-00-00
ENGINE – FUEL AND CONTROL

TOPICS IN THIS CHAPTER

General.....2
Carburetor.....4
 Carburetor air intake5

BRP-Rotax INSTALLATION MANUAL

GENERAL

NOTE

*The design of the fuel system is the responsibility of the aircraft manufacturer.
The fuel system must be designed to ensure that the engine is supplied with sufficient fuel at the correct pressure in every operational situation.
Operating limits must be adhered to!*

Fuel contamination

Fuel contamination is a major cause of engine failure. The best place to avoid contamination is at the source. Once fuel is in your container, a very hazardous potential exists. Use a clean, safety and approved storage container. Filter all fuel entering and leaving this container. Do not over-fill container, allow for expansion.

⚠ WARNING

Non-compliance can result in serious injuries or death!

When handling with fuel, do not smoke or allow open flames. Gasoline and gasoline vapor are highly flammable and explosive under certain conditions.

System description

The carburetors are supplied with fuel by the fuel pump provided with the engine.

The pump is actuated pneumatically via an impulse line leading from the nipple on the crankcase to the fuel pump. This line should not be longer than 500 mm (20 in.) and must be of stiff and fuel-resistant material.

The fuel pump should be installed in a cool place (not on the engine itself) with the small vent bore near the impulse connection towards the bottom. This bore drains oil condensate from the pump diaphragm chamber.

If possible, the pump should be located below the fuel tank level.

If the fuel tank is considerably lower than the engine, an electric pump should be used.

This pump is to be connected in parallel as in case of series-connection the fuel pressure would be excessive.

The electric pump must produce a pressure of minimum 0.2 bar (3 psi), and together with the pneumatic pump max. 0.5 bar (7 psi) resp. max. 0.4 bar (6 psi) in case of a diaphragm carburetor, and must allow free flow-through, even when switched off.

A suitable fuel filter of 0.15 mm mesh size must be fitted between pump and carburetor.

Do not use paper filters. The fuel tank must have a drain cock for condensed water. A screen of 0.3 mm mesh size should be fitted to the fuel line in the tank. By no means the normal fuel flow should be restricted.

If the fuel tank is placed higher than the carburetor, the tank connection must have a fuel cock (with filter) to shut off the fuel supply when the engine is not running.

Fuel lines

Fuel lines have to be established to the applicable requirements by the aircraft manufacturer. The minimum diameter is 5 mm (0.2 in.).

NOTE

Secure fuel lines with suitable screw clamps or by crimp connection.

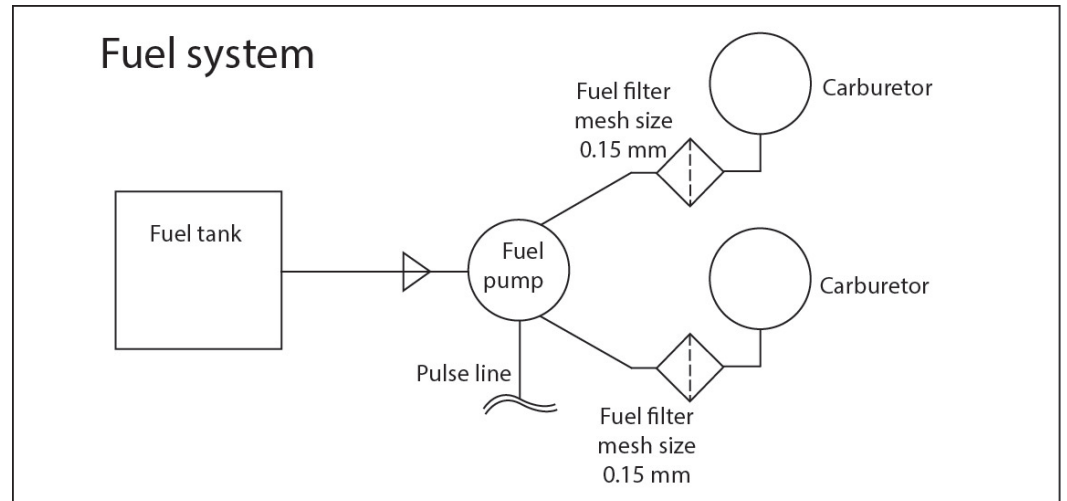
BRP-Rotax INSTALLATION MANUAL

⚠ WARNING

The carburetor needle valve is not sufficient tight to seal for a prolonged period of time and during transport.

National regulations may require a fuel cock to be fitted even if the fuel tank is below the carburetor.

The carburetor needle valve must not to be used as a fuel cock.



AE_2Stroke_0078

Figure 6.1

BRP-Rotax INSTALLATION MANUAL

CARBURETOR

The carburetor can be adjusted by jet replacement of various approved sizes, and by adjusting idle air/fuel mixture screw, carb piston stop adjustment, needle sizes, and needle position.

The air/fuel mixture at idle speed is adjusted by the air adjusting screw. The idle RPM is adjusted by the carburetor piston adjustment screw.

NOTE

These idle adjustments interact, so adjusting one may require minor adjustment of the other.

Replacement of parts should be done only after proper trouble shooting has been carried out and then, by an experienced two cycle mechanic.

Ensure that throttle cable and linkage do not stick and that carb piston valve can be fully opened and closed . Minor cable backlash can be adjusted at cable adjustment screw and lock nut.

Be certain that throttle linkage is not affected by engine or airframe movement. This will change throttle settings.

Air intake filtration and/or noise reduction devices must be in place for proper function.

See section on special operating conditions.

Special operating conditions, such as severe climate or altitude change may require different jetting. Contact your authorized ROTAX aircraft dealer or their independent Service Center.

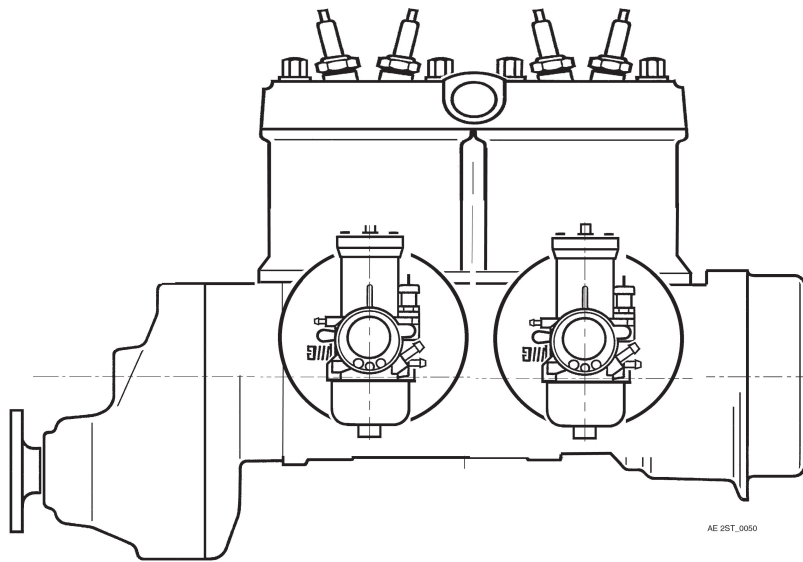


Figure 6.2

BRP-Rotax INSTALLATION MANUAL

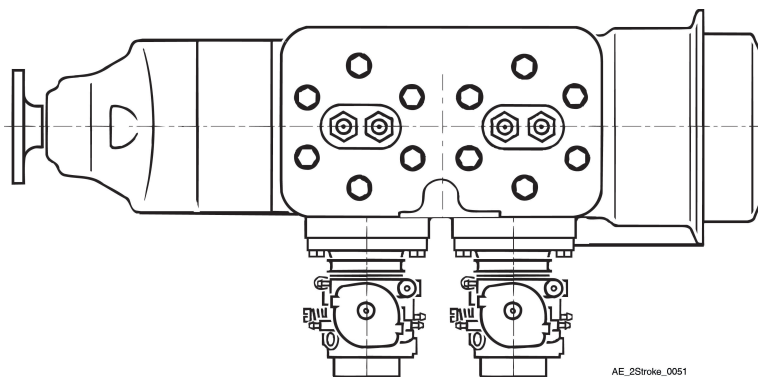


Figure 6.3

⚠ WARNING

Non-compliance can result in serious injuries or death!

In no case should jet changes be made by unqualified persons, only qualified technicians (iRMT) are allowed to work on this components.

CARBURETOR AIR INTAKE

General

The carburetor air intake must be protected against the ingestion of water, dirt and foreign material. Use a ROTAX approved air filter. Avoid paper, foam and synthetic material types that absorb water.

Equal air pressure conditions must prevail in the vicinity of the carburetor air intake and the carburetor float chamber vent pipes (i.e. the pressure must not be influenced by the propeller air stream).

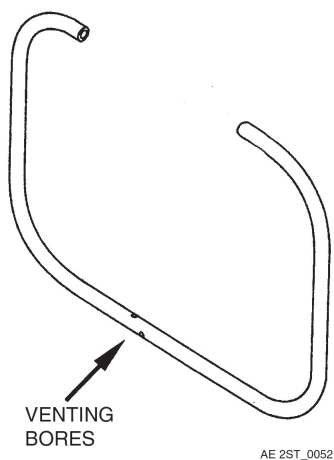


Figure 6.4: Bores for carburetor venting

BRP-Rotax

INSTALLATION MANUAL

If necessary, the carburetor intake should be shielded against effects of the slipstream by a sheet metal shield or air intake box, and the carburetor vent pipes should be routed to a calm air zone or connected to a vent chamber.

Engines supplied with an intake silencer must not be operated unless the carburetor calibration was changed. Consult the engine supplier or manufacturer (in writing) for details. The correct carburetor calibration is also described in the parts list.

Operation in climatic conditions, where carburetor icing is likely to occur, a heating system must be fitted.

No modifications should be made to the carburetor and air intake system without consulting the engine manufacturer (in writing).

BRP-Rotax
INSTALLATION MANUAL

Chapter: 73-10-00
AIR INTAKE SYSTEM

TOPICS IN THIS CHAPTER

Intake silencer (optional part).....2
Air filter4

BRP-Rotax
INSTALLATION MANUAL

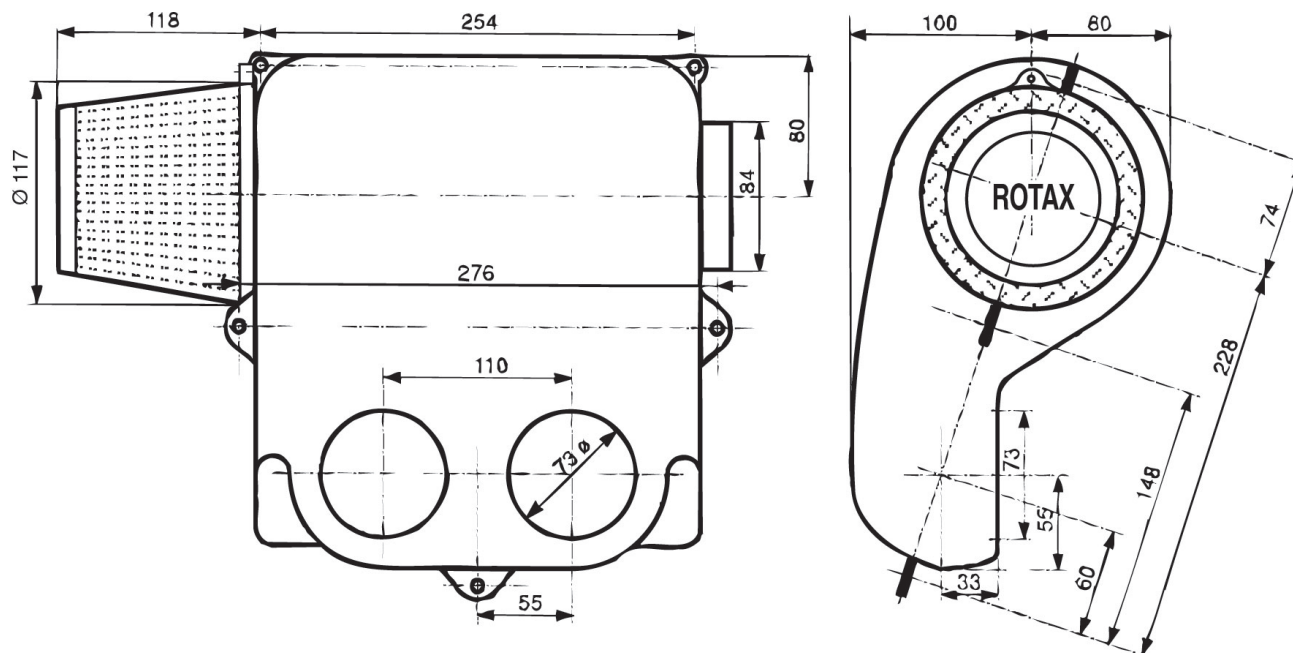
INTAKE SILENCER (OPTIONAL PART)

General

Intake silencers are option parts available from ROTAX®. Equal air pressure conditions must prevail in the vicinity of the carburetor air intake and the carburetor float chamber vent pipes (i.e. the pressure must not be influenced by the propeller air stream).

NOTE

Different carburetor jetting will be necessary by using an intake silencer.

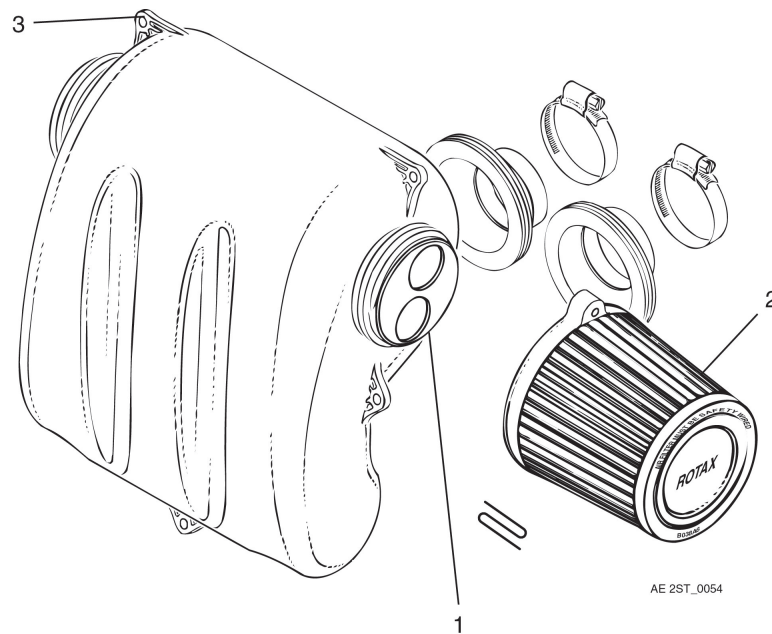


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Figure 7.1: Intake silencer

Step	Procedure
1	<p>Fit silencer parallel to crankshaft axis with screw-on filter (2) not pointing towards propeller.</p> <p>NOTE</p> <p><i>The double intake silencer (1) is available with either left or right hand side inlet opening, to suit respective position.</i></p>

BRP-Rotax INSTALLATION MANUAL



1 Double intake silencer

2 Screw-on filter (air filter)

3 Lug (for securing)

Figure 7.2: Intake silencer

⚠ WARNING

Screw-on filter and silencer must be wire-secured against slackening and loss on the assigned lug (3).

BRP-Rotax INSTALLATION MANUAL

AIR FILTER

General

Only air filters approved by ROTAX® are permitted for use. The air filters specified by ROTAX® are special K&N air filters. Dry filter elements of paper are not allowed for humid operating conditions, as they absorb water, thus reducing the air intake leading to enrichment of the fuel/air mixture ROTAX®.

Air filter types

Two kinds of filter design are applied: Single air filter (2) and double air filter (1).

NOTE

Either 2 single air filters or 1 double air filter may be fitted.

⚠ WARNING

Always secure air filters against loss.

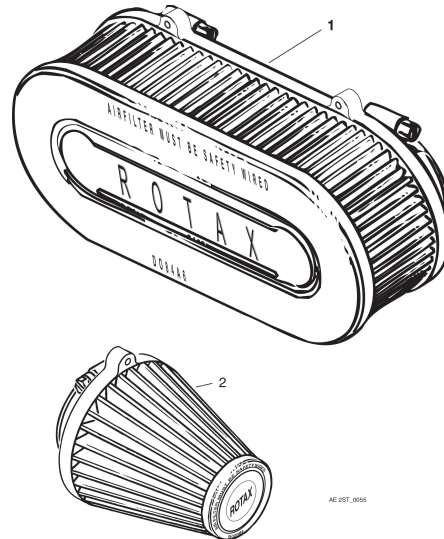


Figure 7.3

1 Double air filter

2 Single air filter

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INSTALLATION MANUAL

Chapter: 74-00-00
IGNITION SYSTEM

TOPICS IN THIS CHAPTER

Ignition system.....2
Wiring diagram3

BRP-Rotax INSTALLATION MANUAL

IGNITION SYSTEM

General

The engine equipped with breakerless 12 V 170 W DUCATI capacitor-discharge dual ignition system. It consists of a flywheel magneto generator, 2 double ignition coils complete with integrated control-circuit and 2 external trigger coils (pick-up).

The 12-pole flywheel generator is an outer rotor type with 12 integrated permanent magnets. The stator is equipped with 12 coils. 8 of them are used for feeding auxiliary equipment and 4 are used for the dual ignition.

The grey cable is foreseen for connection of a revolution counter.

Function of the ignition unit

Two charging coils fitted on the generator stator and independent from each other, each feed one ignition circuit. The energy supplied is stored in the ignition capacitor. At the moment of ignition the external trigger coils 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.

ATTENTION

During flight both ignition systems must be switched ON.

BRP-Rotax INSTALLATION MANUAL

WIRING DIAGRAM

General

After installing, all the connections must be protected with the supplied shrink tubing.

NOTE

When replacing wiring on the ignition system, connections must be as per wiring diagram below.

NOTE

Wiring diagram shows DCDI ignition.

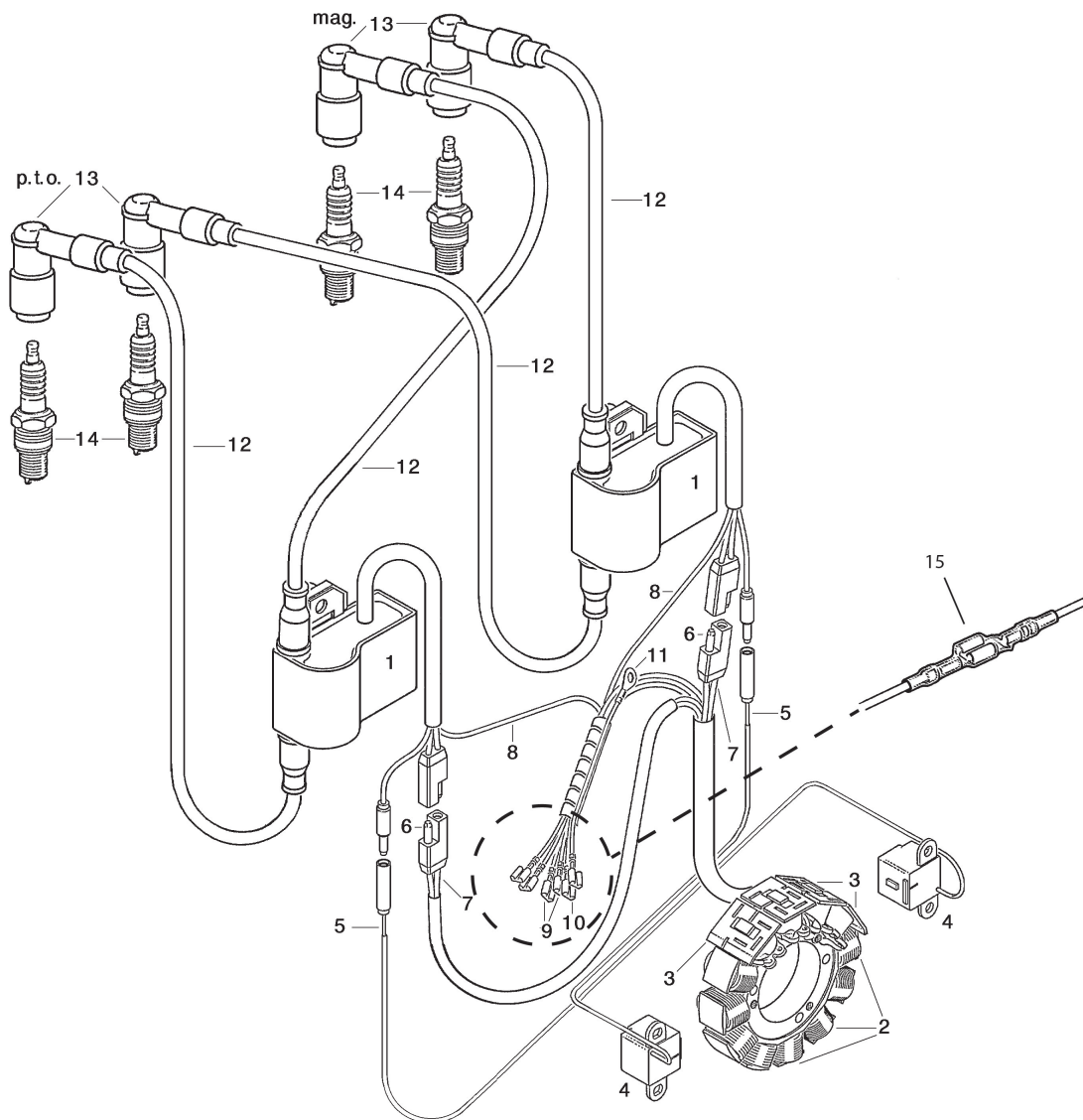


Figure 8.1: Wiring diagram

BRP-Rotax
INSTALLATION MANUAL

- | | | | |
|----|---|----|--------------------------------------|
| 1 | <i>Electronic box</i> | 2 | <i>8 lighting coils</i> |
| 3 | <i>4 charging coils</i> | 4 | <i>Pickup</i> |
| 5 | <i>Trigger cable, red</i> | 6 | <i>Charging cable, green</i> |
| 7 | <i>Charging cable, white</i> | 8 | <i>Shorting cables, black/yellow</i> |
| 9 | <i>Lighting cables, yellow - yellow/black</i> | 10 | <i>Rev. counter cable, gray</i> |
| 11 | <i>Mass cable, brown</i> | 12 | <i>Ignition cables</i> |
| 13 | <i>Spark plug connectors</i> | 14 | <i>Spark plug</i> |
| 15 | <i>Shrink tube</i> | | |

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INSTALLATION MANUAL

Chapter: 75-00-00
COOLING SYSTEM

TOPICS IN THIS CHAPTER

Liquid cooling6

General To avoid coolant pump cavitation, the cooling system must be under pressure. This is achieved by using a pressure cap with a release pressure of approx. 1.2 bar (17.4 psi).

Coolant hoses The coolant hoses must be installed in such a way that air and steam bubbles can escape from any point of the system towards the expansion chamber.

Overflow hose The overflow hose coming from the radiator neck is to be led into a vented overflow bottle. It should be half filled with coolant. The overflow hose must reach into the coolant or enter at the bottom of the overflow container.
The overflow bottle should be fitted not lower than 250 mm (10 inch) below the radiator cap. When the system cools down, the originally displaced liquid is sucked back through the breather valve in the radiator cap.

NOTE

If the coolant is not sucked back, the cooling system is faulty and must be checked.

NOTE

If at 582 UL DCDI model 99 a straight water outlet socket is used, vent the cooling system well, check after a short operating period at a temperature higher than 65 °C (150 °F), and refill coolant as required.

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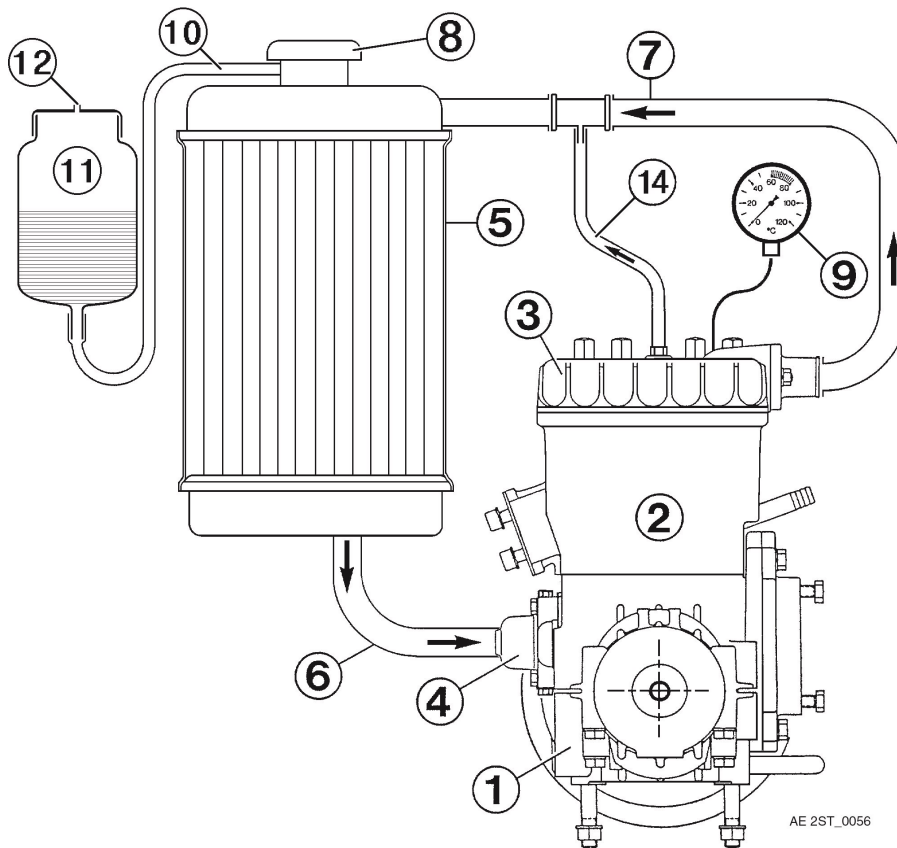


Figure 9.1: Cooling circuit (for engine with spark plugs UP)

- | | |
|---------------------------------------|--|
| 1 Crankcase | 2 Cylinder |
| 3 Cylinder head | 4 Water pump |
| 5 Radiator | 6 Hose from radiator to water pump |
| 7 Hose from cylinder head to radiator | 8 Radiator cap with excess pressure valve and return valve |
| 9 Temperature gauge for coolant | 10 Overflow hose |
| 11 Overflow bottle | 12 Bottle venting |

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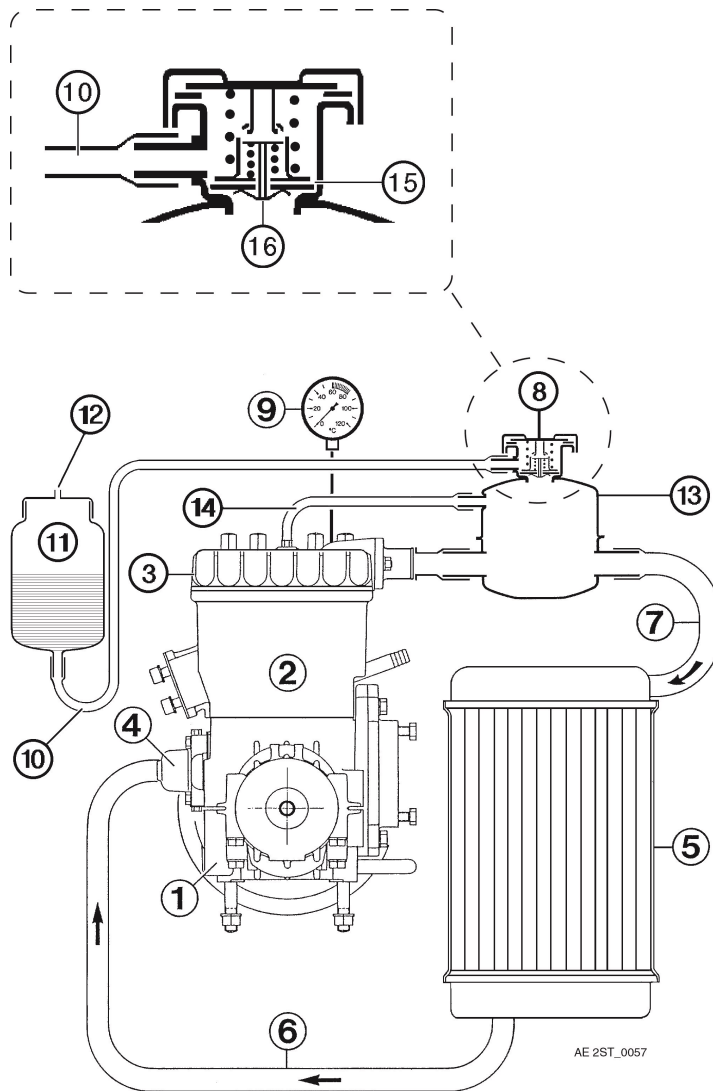


Figure 9.2: Cooling circuit (for engine with spark plugs UP)

- | | |
|---------------------------------------|--|
| 1 Crankcase | 2 Cylinder |
| 3 Cylinder head | 4 Water pump |
| 5 Radiator | 6 Hose from radiator to water pump |
| 7 Hose from cylinder head to radiator | 8 Radiator cap with excess pressure valve and return valve |
| 9 Temperature gauge for coolant | 10 Overflow hose |
| 11 Overflow bottle | 12 Bottle venting |
| 13 Expansion tank | 14 Cylinder head venting hose |
| 15 Excess pressure valve | 16 Return valve |

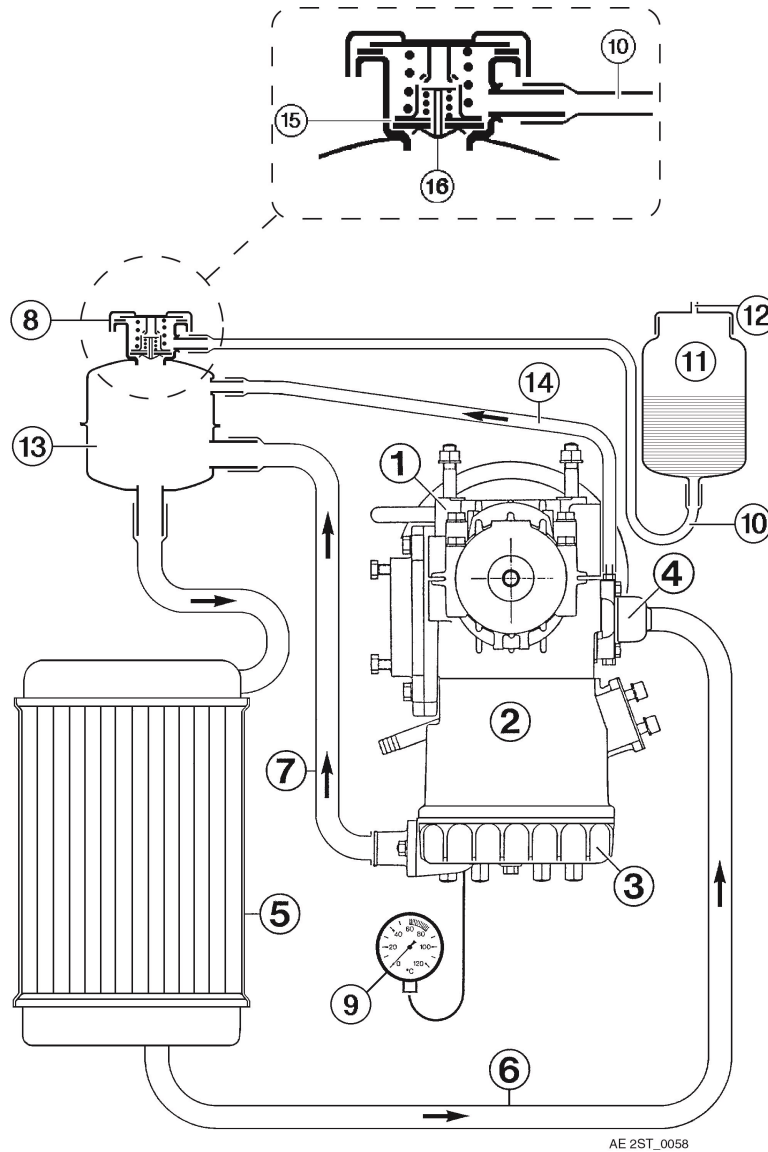
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Cooling circuit For engine installation with spark plugs down.

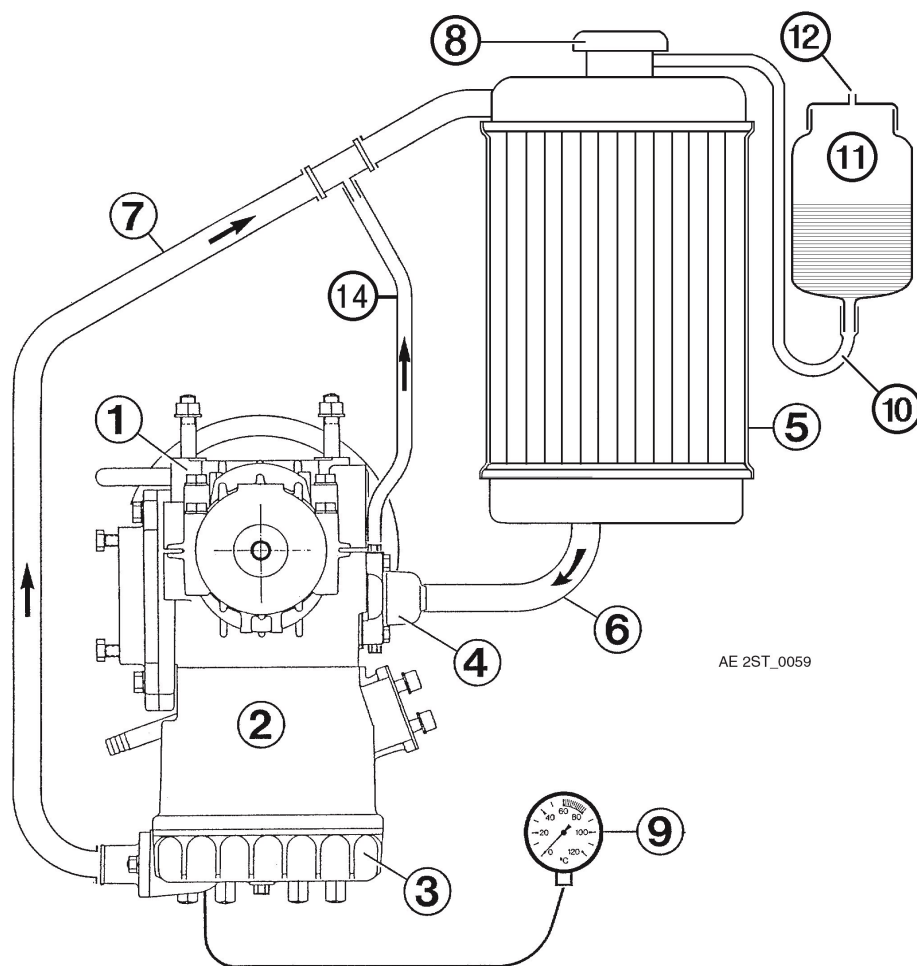
For this installation position, a venting hose must be connected on top of the water pump housing (4) leading to the expansion chamber (10) or to the water chamber of the radiator. Vent the cooling system well, check after a short operating period, and refill coolant as required. Only a perfectly vented cooling system will operate satisfactorily.

⚠ WARNING

Danger of severe burns and scalds! Always allow the engine to cool down to ambient temperature before starting any work.



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INSTALLATION MANUAL



AE 2ST_0059

Figure 9.3: Cooling circuit (for engine with spark plugs DOWN)

- | | |
|---------------------------------------|--|
| 1 Crankcase | 2 Cylinder |
| 3 Cylinder head | 4 Water pump |
| 5 Radiator | 6 Hose from radiator to water pump |
| 7 Hose from cylinder head to radiator | 8 Radiator screw cap with excess pressure valve and return valve |
| 9 Temperature gauge for coolant | 10 Overflow hose |
| 11 Overflow bottle | 12 Bottle venting |
| 13 Expansion tank | 14 Cylinder head |
| 15 Excess pressure valve | 16 Return valve |

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LIQUID COOLING

General

These engines have an integrated water pump. The cooling circuit must be arranged as shown in the figures at section beginning. Pay attention to the following:

NOTE

The 582 UL mod. 99 has a two way cooling system, see the latest Operators Manual.

Coolant flow

It should be in the range of 60 - 70 liters per minute at 6500 rpm.

Cooling liquid temperature

The radiator must be of sufficient size and the airstream of sufficient intensity to maintain the coolant temperature below the maximum permitted value of 80 °C (175 °F ~ under the most severe conditions, i.e. at full load operation (= at take-off).

The average coolant temperature should be between 60 and 80 °C (140 - 175 °F).

In case of a pusher propeller installation, take care that coolant radiator has sufficient air flow.

The max. temperature difference of the coolant between radiator entry and exit must not exceed 6 °C (43 °F), the average difference should be between 3 and 5 °C (37.4 - 41 °F).

⚠ WARNING

Non-compliance can result in serious injuries or death!

If temperature limits are exceeded or coolant flow rate is below specified values (excessive flow resistance), vapor is produced in the cylinder head, causing cooling breakdown and engine damage.

Anti-freeze additives

NOTE

Anti-freeze additives reduce the cooling effect. This should be taken into consideration at choice and installation of the radiator.

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Chapter: 76-00-00
ENGINE MANAGEMENT

TOPICS IN THIS CHAPTER

Connections for instrumentation.....2
 Sensor for cylinder head temperature3
 Air and coolant sensor3
 Exhaust gas temperature (EGT)3

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CONNECTIONS FOR INSTRUMENTATION

General

NOTE

Only the defined operating limits by ROTAX® (see latest Operators Manual) are valid for engine operation. The responsibility for adapting these operating limits to the cockpit instrumentation accordingly is up to the manufacturer of those instrumentation.

Installation plan

For sensors on 582 UL mod. 99.

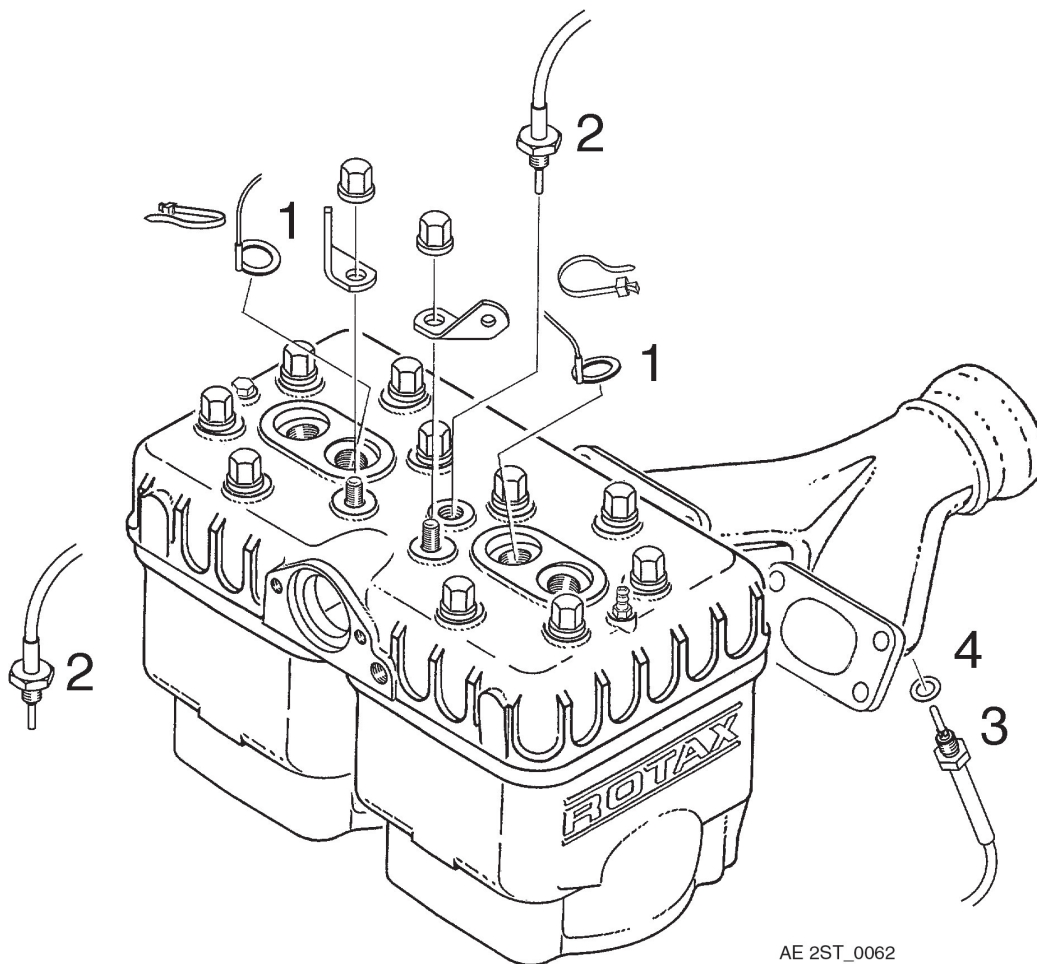


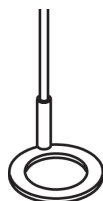
Figure 10.1: Installation plan

- | | |
|-----------------------------------|--------------------------------------|
| 1 Sensor at spark plug seat (CHT) | 2 Air- and liquid temperature sensor |
| 3 EGT-sensor | 4 Sealing ring |

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SENSOR FOR CYLINDER HEAD TEMPERATURE

Location and connection	Tightening torque
1 per cylinder fastened with a spark plug	Spark plug: 16 Nm (142 in. lb)

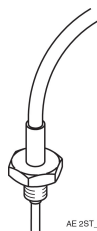


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Figure 10.2

AIR AND COOLANT SENSOR

Location and connection	Tightening torque
for coolant: on cylinder head	6 Nm (53 in. lb) + LOCTITE ANTI SEIZE
for air: location free to choose	

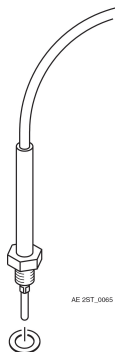


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Figure 10.3

EXHAUST GAS TEMPERATURE (EGT)

Location and connection	Tightening torque
Exhaust manifold assy.	20 Nm (177 in. lb) + LOCTITE ANTI SEIZE



AE 2ST_0065

Figure 10.4

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NOTES

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Chapter: 78-00-00
EXHAUST SYSTEM

TOPICS IN THIS CHAPTER

General notes on the exhaust system.....2
Installation of the exhaust system3
After-muffler system.....4
Exhaust gas temperature (EGT).....6

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GENERAL NOTES ON THE EXHAUST SYSTEM

The exhaust system is tuned for the respective engine and performance and must not be changed. If modifications are inevitable, then the mid length of inlet tube between exhaust flange and muffler must be maintained without fail (see following figure). For necessary modifications, ask for manufacturer's approval in writing. Check engine performance with serial exhaust system, prior to any modification.

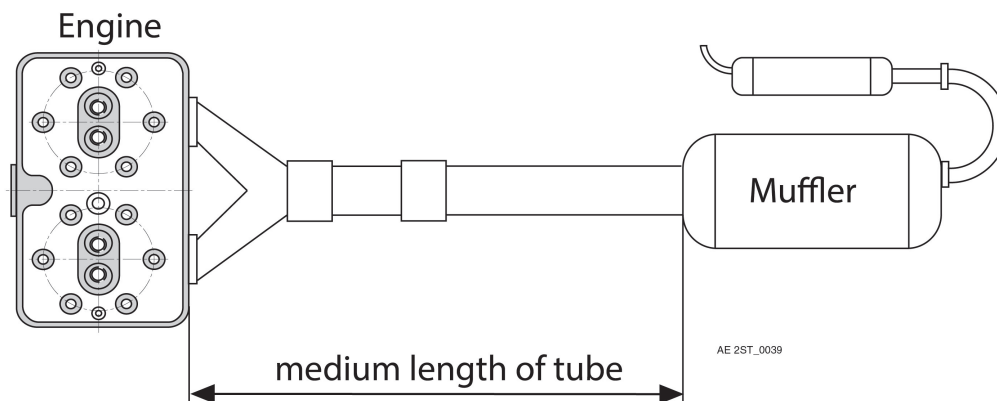


Figure 11.1

NOTE

Pay special attention to maintain medium length of tubes. If using bent tubes, refer to length of center line.

Engine type	Medium length of tube
ROTAX 582	660 mm (26 in.)

Check exhaust system prior to every flight for tightness, physical damage or changes in sound pattern. Especially inspect springs and hooks.

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INSTALLATION OF THE EXHAUST SYSTEM

The muffler must be supported on vibration damping blocks. All ball joints must be greased regularly with heat resistant lubricant (e.g. LOCTITE Anti-Seize, 297431) to avoid gripping or seizing of joints and consequent breaking of exhaust components. Springs used on exhaust system must be secured against loss and vibration (see Service Information 11 UL 87-E, page 5).

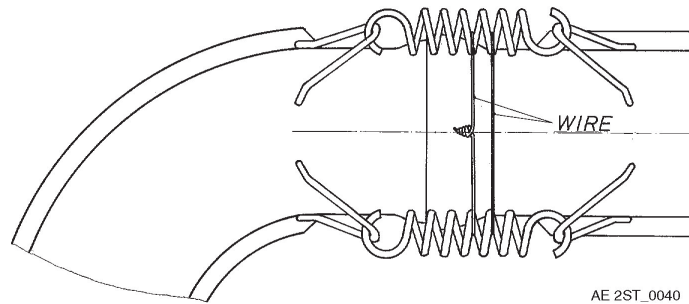


Figure 11.2

ATTENTION

Vibrations due to improper installation and maintenance is the most common reason for damage of the exhaust system.

ATTENTION

Don't use any sharp tool for removal of the tension spring for reason of possible damage of spring wire.

NOTE

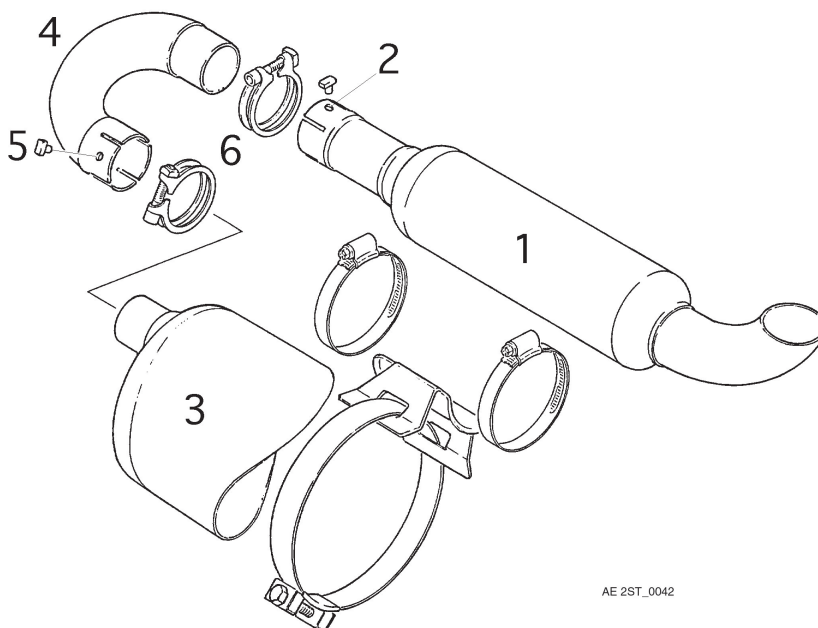
Ensure that exhaust system is properly supported and maintained.

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AFTER-MUFFLER SYSTEM

For noise reduction at the tail pipe, an after-muffler can be fitted. This after-muffler will only slightly affect engine performance and can be clamped to tail pipe of muffler.

Step	Procedure
1	At the installation of the after-muffler (1) in final position, drill the two 5.7 mm Ø holes in the bend and muffler end-pipe, for securing pin (5). The outer situated holes (2) have been already machined on the serial production line. NOTE <i>Remove accumulated chips from the exhaust system.</i>
2	To ensure lasting fixed position of the after-muffler during engine operation, the connections of muffler (3) to bend (4) and after-muffler (1) are to be secured against twisting by the securing pin (5).
3	Fit clamp (6) in the specific position that the Allen screw (7) prevents the securing pin (5) from dropping out.



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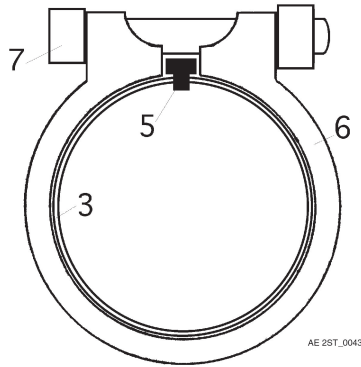


Figure 11.3

- | | | | |
|---|----------------------|---|--------------------------------|
| 1 | <i>After-muffler</i> | 2 | <i>Holes (serial produced)</i> |
| 3 | <i>Muffler</i> | 4 | <i>Bend</i> |
| 5 | <i>Securing pin</i> | 6 | <i>Clamp</i> |
| 7 | <i>Allen screw</i> | | |

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EXHAUST GAS TEMPERATURE (EGT)

Exhaust gas temperature will give the most rapid response in the event of improper mixture, pre-ignition or detonation. Ideally the exhaust temperature should be measured about 100 mm (4 in.) from the piston, with separate sensors for each cylinder.

EGT (max.) = 650 ° (1200 °F)

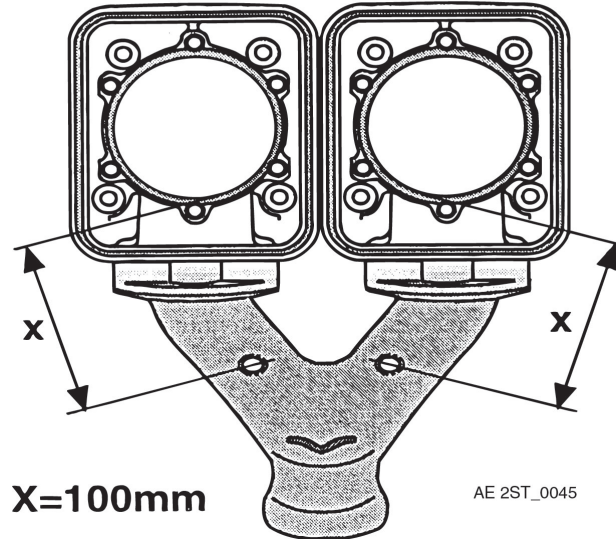


Figure 11.4

ATTENTION

The exhaust manifold is provided with tapped holes. If EGT is not measured, the holes must be closed with screws, which must be safety-wired.

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Chapter: 79-00-00
LUBRICATION SYSTEM

TOPICS IN THIS CHAPTER

Lubrication system	2
Installation	2
Rotary valve and water pump drive	4

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LUBRICATION SYSTEM

General

If the engine is to be used inverted (with spark plugs pointing down) select a lubricant which features low carbon deposits. Oil residues tend to drain to low points, i.e. spark plug cavities. If these residues fail to burn during normal operation, plug fouling will occur, possibly causing pre-ignition. Producers of suitable lubricants will issue warranty of their products.

Mixture lubrication

Refer to latest Operator's Manual.

Oil injection for engine lubrication

The oil pump driven by the crankshaft via the pump gear supplies fresh oil for engine lubrication. The oil pump is a piston type pump with a metering system.

Via diffuser jets in the intake cover or intake socket each cylinder is supplied with exactly proportioned quantity of two-stroke oil. The oil quantity consumed 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 flows to the pump from an oil tank by gravity.

⚠ WARNING

In case of fresh oil lubrication the carburetors are supplied with pure gasoline (no oil/gasoline mixture).

Technical data and configuration

Oil: Super 2-stroke oil.

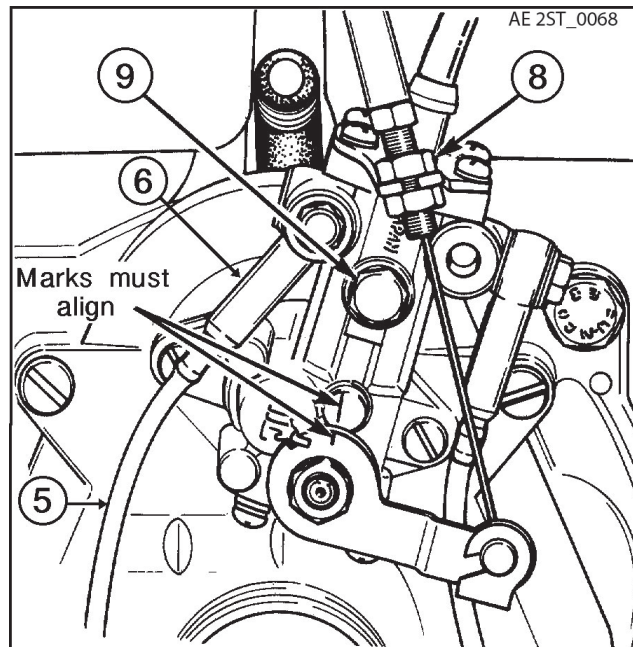
The oil pump assy. features an oil return nipple and two oil exit nipples with integrated check valve.

INSTALLATION

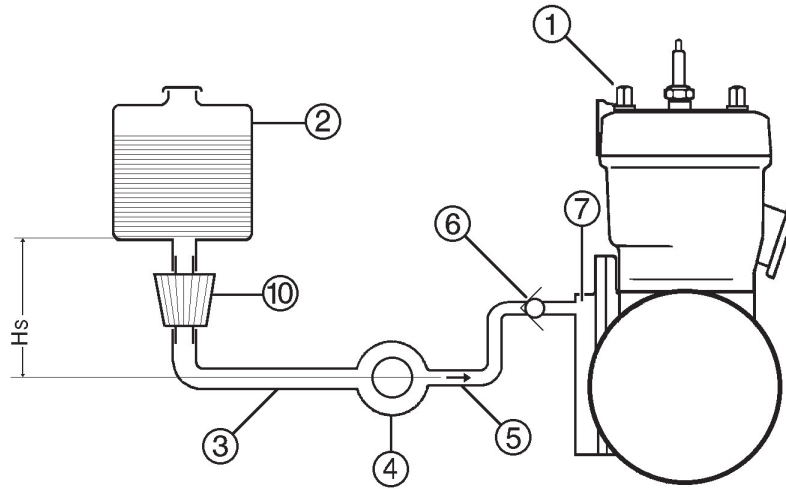
Step	Procedure
1	Oil tank capacity: The oil tank size should be more than 5 % of the fuel tank capacity.
2	The oil tank bottom outlet must not be below the oil pump inlet nipple, even at the greatest possible inclination of the aircraft (i.e. dimension HS must be greater than zero, see fig. below).
3	Use a firm, oil-resistant suction hose which cannot be squeezed. Secure it with clamps at the connections.
4	Install an adequate oil filter (10) between oil tank (2) and oil pump (7).
5	Install a Bowden cable (8) to actuate the pump lever simultaneously with the carburetors. NOTE <i>At a pump cable breakage or failure, the oil pump is set to minimum discharge.</i>

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6	Adjustment of oil pump alignment marks: At throttle lever idle position the 2 marks must align.
7	Vent the suction hose (3) before engine start by opening the vent plug (9) until all air is vented from that line. Close vent plug carefully.
8	It is recommended to fill the first tank of fuel with a gasoline oil mixture at a mixing ratio of 100: 1. This is for safety until the complete system is properly filled with oil. NOTE <i>This oil injection will not affect or replace the rotary valve gear lubrication nor the reduction gearbox lubrication.</i>



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Figure 12.1

- | | | |
|------------------|----------------|----------------|
| 1 Engine | 2 Oil tank | 3 Suction line |
| 4 Rotary valve | 5 Inlet line | 6 Check valve |
| 7 Oil pump assy. | 8 Bowden cable | 9 Vent plug |
| 10 Oil filter | | |

ROTARY VALVE AND WATER PUMP DRIVE

General

In the center of the crankcase a 90° transfers drive in oil bath is located.

Use 2-stroke motor-oil for the rotary valve drive (same as used for 2-stroke fuel mixture).

Oil quantity on a new installation: approx. 310 cc.

An oil hose leads from the oil tank to the bottom side of the crankcase, and a return line from top of the gear leads back to the tank for venting.

Before every operation check the oil level (approx. mid height of the oil tank). Check oil tubes for security and condition of connections.

In case of notable oil consumption (more than 1 c.c./hour) look for the leak and check the oil seals inside the crankshaft, as necessary.

Oil circuit (for engine with spark plugs "UP")

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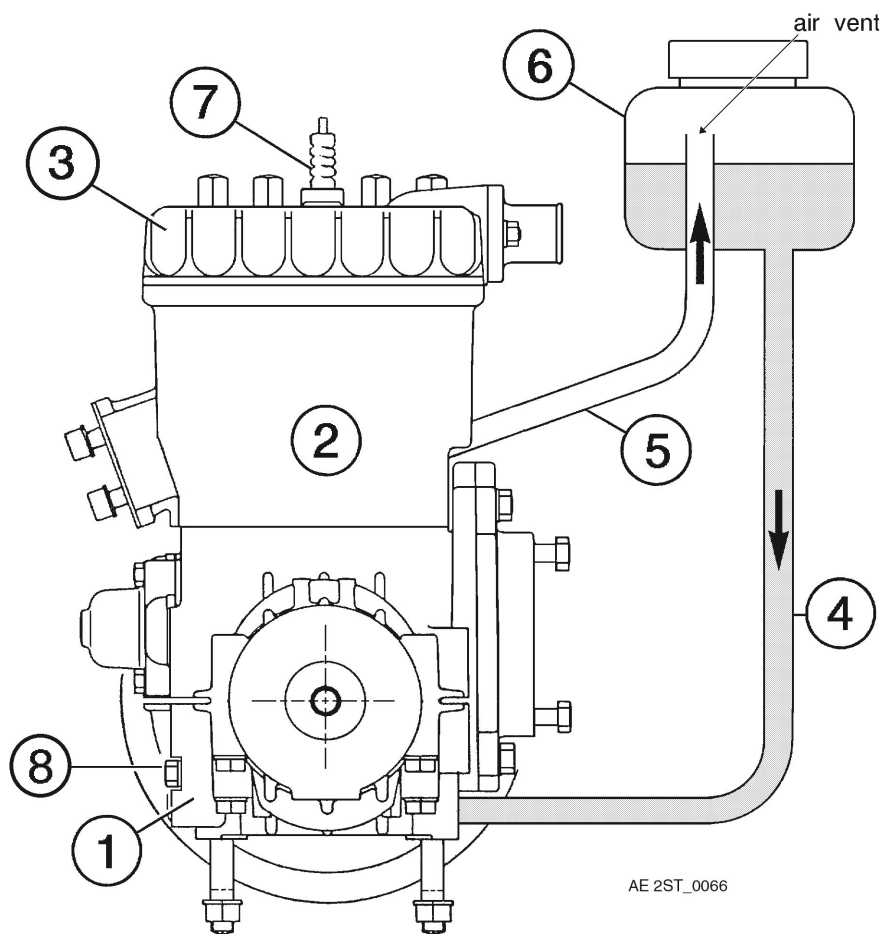


Figure 12.2: Oil circuit (for engine with spark plugs UP)

- | | |
|-----------------|--------------|
| 1 Crankcase | 2 Cylinder |
| 3 Cylinder head | 4 Inlet tube |
| 5 Return line | 6 Oil tank |
| 7 Spark plug | 8 Vent plug |

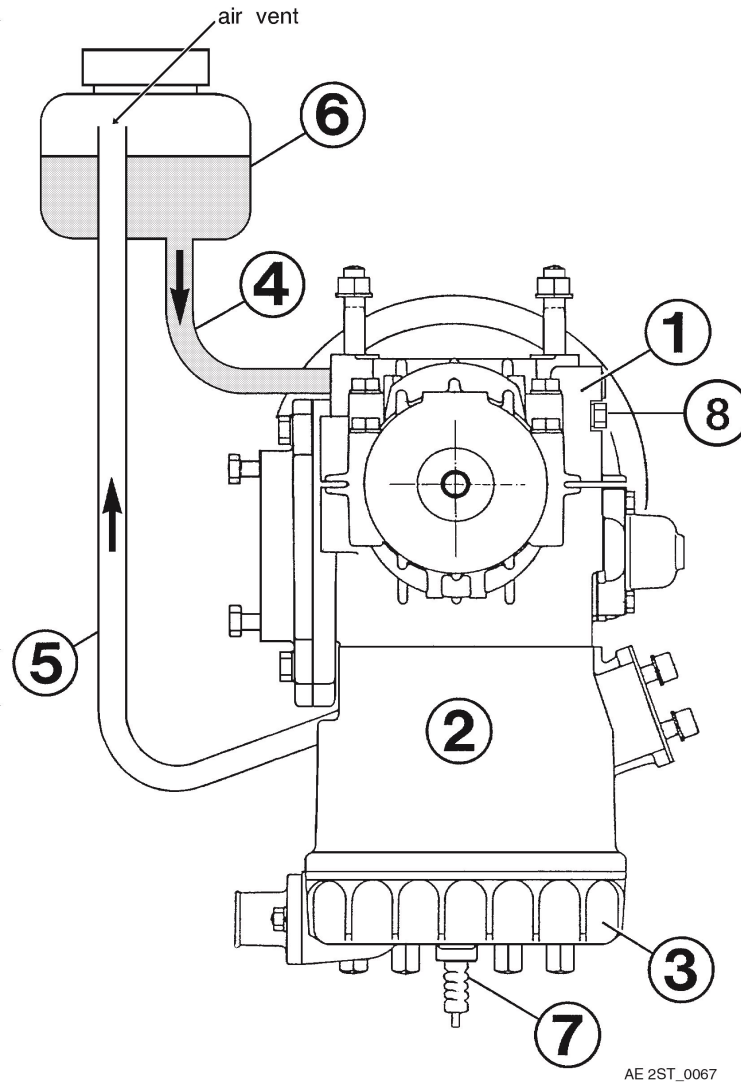
Oil circuit (for engine with spark plugs “DOWN”)

In this arrangement the oil system for rotary valve drive and water pump drive must be modified by the aircraft manufacturer as per the following illustration. The oil tank installation should not be below the oil inlet tube (4).

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ATTENTION

For inverted installation, the oil tank must be removed from the bracket and installed in a suitable location above the engine. Vent system by removing plug (8) when filling the oil tank (6).



AE 2ST_0067

Figure 12.3: Oil circuit (for engine with spark plugs DOWN)

- | | |
|-----------------|--------------|
| 1 Crankcase | 2 Cylinder |
| 3 Cylinder head | 4 Inlet tube |
| 5 Return line | 6 Oil tank |
| 7 Spark plug | 8 Vent plug |

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Chapter: 80-00-00
ELECTRIC STARTER

TOPICS IN THIS CHAPTER

Electric starter2

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ELECTRIC STARTER

General

Two types of electric starters can be fitted to ease starting procedures especially in flight. Electric starter fitted on "E" type gearbox. There is also the possibility to use a rewind start.

Electric starter fitted on magneto side. For use with engines utilizing ROTAX® gear reduction unit, however, this electric starter system prevents recoil start capability.

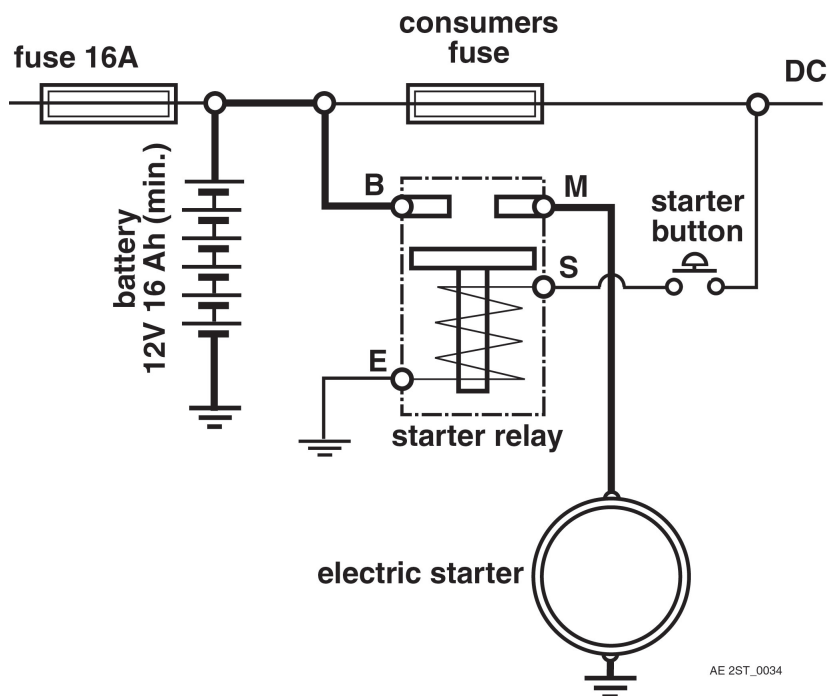


Figure 13.1

Battery

To ensure reliable starting, a battery of least 16 Ah (high-discharge battery) must be utilized. A higher battery amp-hour-rate would be preferable. Cables supplying power to the starter from the battery and to ground should be at least a 10 mm² flexible multi-strand cable.

Power source

from rectifier regulator

Starter relay (part no. 992819)

Starter control should be via starter relay (supplied with starter kit) wired as shown above.

Fuse

A 16 Ampere fuse must be installed between battery charging circuit and main power terminal.

ATTENTION

The aircraft manufacturer has to ensure that the permissible limits of the battery (etc. max. charging voltage) are never exceeded. Compliance with the operating limits of the battery must also be in case of malfunction in the charging system. This can be done, for example, by using a suitable battery management system.

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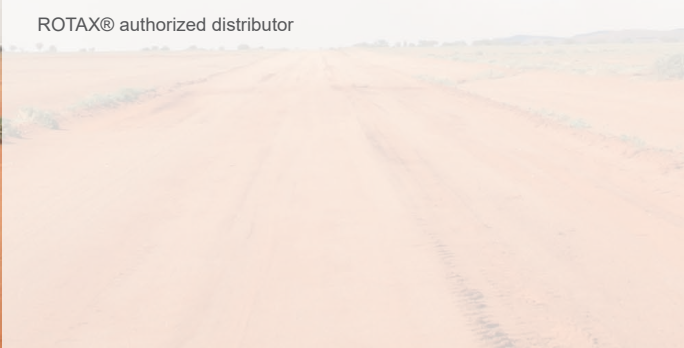
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Engine serial no.

Type of aircraft

Aircraft registration no.



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