BGA ENGINEERING NEWS

Number 8, September 2001

BGA Exposition

Thank you to all those who took the trouble to locate a copy of the new exposition and provide some very worthwhile feedback.
All the comments have been reviewed by myself and John Bradley, Chairman of the Technical committee and where ever possible, and appropriate, the suggestions will be incorporated.

The revised CAA Approval of the BGA is now in the final stages of completion. We anticipate completion within the next couple of months.
To that aim some changes are starting to be incorporated. The reappointment of M3 sites to carry out the C of A renewals on Motor Gliders and the adoption of the new inspector ratings at the forthcoming inspector renewal.

BGA M3 Sites

Those M3 sites listed in the BGA technical Procedures Manual will be invited to re-apply and carry out an audit of their facility. If you don't receive an invite in the next couple of weeks or you are not listed and wish to join the scheme please contact the BGA. Please remember that M3 is only required for the C of A renewal (3-year Star checks) on "G" registration aircraft.

Inspector Renewal 2001

Included in this newsletter is your inspector renewal application.
To enable us to grant "Grandfather" rights and transfer your ratings please complete the experience form. This need only be a brief résumé of your experience but is vital to allow us to transfer the ratings. Non completion will mean that you will only be granted 'Glider inspector' with fewer privileges than those that are enjoyed by a 'C' rated inspector at present.
Experience details are required equally for existing ratings i.e. M (MR), E (MG) and for new ratings i.e. WR, CR, SS details of the ratings fully explained on the renewal form.
Senior inspectors will have the 'A' carried over automatically.

Completed examples of the Inspector renewal and experience forms are included with this news letter to assist you.

Due to the high workload at this renewal there may be a short delay in receiving your new Authorisation certificate. If this is the case your existing inspector rating will remain valid. The only condition is that your application for renewal is received by the BGA on or before 30th September 01. Thank you for your co-operation and understanding.

Daily Inspections & Positive Control Checks

I have had reports of possible damage caused to lightweight flying controls by heavy handed and over zealous positive control checks.
In the interests of safety, if you see positive control checks where the 'wing man' is resisting the control movement please re-educate them!
Only very light pressure is required to confirm that the control is positively connected, it is **not** a proof load.
Hopefully, I will publish something in S & G soon.

BUGS

You have probably noticed that it is the BUG season. All those 'luv-bug' efforts, building homes in pitot tubes and any convenient aperture have paid off. Now the main objective is to commit hara-kiri on your nice clean canopy or leading edge. (Goggles for those intrepid T21 pilots).
The next problem is how to remove them. Bugs are organic, biodegradable and water-soluble so allow them to soak in a suitable detergent solution for a few minutes before cleaning. Please don't be tempted to use abrasive cleaners or vigorous rubbing, this will only scratch your canopy or wing surface. Patience is the name of the game! Allow them a nice soak.

Chocks Away

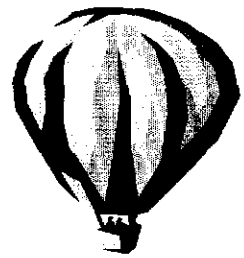
A recent incident has prompted me to remind everyone to use chocks. A Pawnee in this case but applicable to all aircraft with hydraulic parking brakes or poorly adjusted cable brakes.
The aircraft was parked to refuel and the brakes eased off allowing the aircraft to roll down an incline and damage itself.
Simple hydraulic brake systems do not contain accumulators to maintain the pressure and parking brakes rely on trapped pressure in the small bore brake line. This can easily decay due to internal leakage or temperature drop. It is the same with cable brakes, remember the Citroën that used to roll off down the road on their own after being parked for some time, well its the same syndrome.
But, the brakes on your aircraft are probably far more basic.
Please use Wheel Chocks whenever the aircraft is parked.

Placards

Limitation placards can become very worn and due to UV radiation become illegible. Please monitor them and replace if necessary. They are there for a reason and if someone misreads them they may get into trouble through incorrect loading or operation of the aircraft.

Airworthiness Defects and Human Factors

Some inspectors are very good at reporting defects that have an airworthiness impact but others are not.
Please report defects or occurrences if you think they could have an impact on airworthiness regardless of who may be to blame. The BGA under the guidance of John Bradley is trying to develop a no blame culture along with the rest of the industry and we would rather learn from our mistakes and prevent them from re occurring than chastise an individual. After all we are all human and mistakes do happen. No one is immune!



A Rare Sight Indeed

The other day I saw some hot air balloons aviating. It was a rare site indeed. What a welcoming sight to see other branches of recreational aviation enjoying themselves and observe some sense of normality returning (in deepest Sussex at least).
Lets hope my optimism extends to the rest of the country very soon.

Jim Hammerton.
CTO.

British Gliding Association
Kimberley House, Vaughan Way
Leicester. LE1 4SE.

SAMPLE

BGA Inspector Renewal - 2001

Your inspector Authorisation expires on 30th September. To renew your BGA inspector Authorisation please complete this application form. If you would like to apply for "Grandfather rights" for additional ratings to Glider Inspector please complete the attached experience sheet.

Please Print

Title	First name & initial	Surname	BGA Authorisation No. (Inspector No)
MR	FRED B.	SMITH	11C/9999 E

Address THE HOUSE
ANY STREET ANYTOWN

Post Code

Telephone	e-mail

Inspector Rating Applied for – Please Tick ✓

Ordinary Inspector $C					Senior Inspector $A				
$GL✓	*WR	*MR	*CR✓	*SS	*MG✓	#TG	#ST	CE	EO

$ Automatic transfer to new system
* Full Grandfather rights apply, please complete experience form BGA 224 Supp.
# Limited Grandfather rights apply, please complete experience form. Ratings limited to existing privileges. To be considered for full rating, please apply for an extension of ratings using a BGA inspector application form.
For CE Nomination required please contact CTO
For EO please apply using a BGA inspector application form.

BGA Inspector Ratings			
GL	Glider Inspector	WR	Wooden Airframe Repair
MR	Metal Airframe Repair	CR	Composite Airframe Repair
SS	Self Sustainer Sailplane Engine	MG	Powered Sailplane & Motor Glider
TG	Tug Inspector	ST	Senior Tug Inspector
CE	Chief Engineer	EO	Engine Overhaul

Note;
All inspectors must hold GL - Glider Inspector. (EO Exempt)
The privileges and limitations are detailed in the BGA Airworthiness Exposition, taking into account the new categories the ratings with "Grandfather Rights" generally enjoy the same privileges as previously published in the BGA Technical Procedures Manual
Overleaf you will find a Self-Certification section. Please complete and provide a specimen signature and stamp impression (if used). This is to enable verification of certification if required and comply with CAA requirements. Thank you.

British Gliding Association

Experience details for transfer of BGA Inspector ratings and granting of Grandfather rights. Not required for GL – Glider Inspector

Name	BGA Authorisation Number
FRED SMITH	1/c/9999 E

Rating Code	Rating Title
CR	COMPOSITE AIRFRAME REPAIR

Brief Experience Details with approximate dates.

1985 - 2001 C of A INSPECTIONS, MINOR & MAJOR REPAIRS TO ASK21, CROB ASTIR, VEGA AT THE GLIDER REPAIR SHOP, ANYTOWN.

2000 - 2001 REBUILD OF CROB 109 G-ABCD FOLLOWING HEAVY LANDING. LANDING GEAR STRUCTURE REPAIRS, FUSELAGE SKIN AND GEL REPAIRS.

Rating Code	Rating Title
MG	POWERED SAILPLANE / MOTOR GLIDER.

Brief Experience Details with approximate dates

1985 - 2001 50 HOUR AND ANNUAL INSPECTIONS ON T61F, SF25, CROB 109, DG 800. CYLINDER CHANGES, MAGNETO CHANGES. ENGINE REMOVAL/REFIT. GROUND RUNNING.

SAMPLE

British Gliding Association – Technical Committee

Technical News Sheet 07/08/01

Part 1 Airworthiness issues (all categories)

1.1 **Centrair ASW20F** SB 20-21 GSAC AD 2001-246A (Mandatory)
Hinge pins of Elevator and Ailerons.
Details enclosed (for SB see TNS 05/06/01)

1.2 **Centrair 101** SB 101-22 GSAC AD 2001-247A (Mandatory)
Hinge pins of Elevator and Ailerons.
Details enclosed (for SB see TNS 05/06/01)

1.3 **Centrair 201 Marianne** SB 201-19 GSAC AD 2001-248A (Mandatory)
Hinge pins of Elevator and Ailerons.
Details enclosed (for SB see TNS 05/06/01)

1.4 **Rolladen-Schneider LS8-a** TB 8010 LBA AD 2001-200 (Mandatory)
Increase of service life, inspection program approval. 3000 hrs.
Details enclosed

1.5 **Rolladen-Schneider LS8-a**
TB / AD Accomplishment list

1.6 **Rotax All 2 stroke UL engines** SL 2ST-005 (Recommended)
Running modifications on carburettors
Details enclosed

1.7 **Rotax 912 & 914 engines** SI 912-006
SI 914-008 (Recommended)
Replacement of the circlip in the sprag clutch housing.
Details enclosed

1.8 **Rotax 912 & 914 engines** SI 18-1997 (Mandatory)
Selection of motor oil and general operating tips
Details enclosed

1.9 **Rotax All 2 stroke UL engines** SI 06-1998 amendment
Reduction Gearbox type "C" and "E"
Details enclosed

1.10 **Rotax Service Letter and Instruction index** – Edition 4, 7/2001
Details enclosed. For further information or full size copies of Rotax SB's please contact *SKYDRIVE* 01926 612188

Part 2 Modifications

	Type;	Subject;	Mod No;	Contact;
2.1	ASK 7	Improved air brake control	BGA 2001/23	BGA
2.2	Silene E78B	Winch Hook reinforcement	BGA 2001/24	Rob Lockett
2.3	OLY 463	Canopy reprofile	BGA 2001/25	BGA
2.4	Mucha	Winch hook	BGA 2001/26	BGA

Part 3 General Matters

3.1 **All 2-stroke engines** reported by John McWilliam

If left to dry out the oil used in 2-stroke fuel can thicken and turn to a varnish like substance or if left can separate out of suspension. This will easily block the fine fuel filters but may not be easily visible. Please remember to drain all unused fuel form the tank and fuel system prior to laying up for the winter or any extended period of non-use.

3.2 **Engine Fuel piping** reported by J Riddoch

A letter from John is enclosed and makes good sense. Please read.

Compliance Statement:
All mandatory inspections and modifications have been included up to the following;

Airworthiness Notices, Contents issue 128
Mandatory Aircraft Modifications & Inspections Summary, issue 250
FAA Summary of Airworthiness Directives. Bi-weekly listing 2001-16
Foreign Airworthiness Directives Vol. I and II – CAA Additional Airworthiness Directives, issue 324
Foreign Airworthiness Directives Vol. III, issue 334
CAA Mandatory Permit Directives, issue 01/2

Jim Hammerton
Chief Technical Officer

TNS 07/ex/01 1-1

GSAC

AIRWORTHINESS DIRECTIVE

released by DIRECTION GENERALE DE L'AVIATION CIVILE

Inspection and/or modifications described below are mandatory. No person may operate a product to which this Airworthiness Directive applies except in accordance with the requirements of this Airworthiness Directive.

Translation of 'Consigne de Navigabilité' ref. : 2001-246(A)
In case of any difficulty, reference should be made to the French original issue.

SN CENTRAIR

ASW 20F sailplanes

Hinge pins of elevator and ailerons (ATA 27)

1. APPLICABILITY

Sailplanes ASW 20F and ASW 20FL all serial numbers on which one or several hinge pins of elevator and/or ailerons have been replaced with hinge pins delivered by SN CENTRAIR between February 20, 1995 and February 28, 2001.

2. REASONS

Due to a wrong manufacturing heat treatment, some hinge pins may have longitudinal incipient cracks, at any time. That may have an effect on the integrity of the hinge.

3. ACTIONS AND COMPLIANCE

Measure 1: At the latest, within the 3 months following the effective date of this Airworthiness Directive, check the hinge pins of the elevator rudder and ailerons using detailed visual inspection and penetrant inspection (for example with Ardrox 996+9D1) for longitudinal detection (see sketch on SN CENTRAIR Service Bulletin 20-21). Mention the compliance of this Airworthiness Directive in the glider log book. If a crack is found, report to SN CENTRAIR, and replace the affected pin with a new hinge pin referenced SY991A before further flights.

Measure 2: Re-inspect as described in measure 1 the hinge pins at intervals not exceeding five years.

Measure 3: The replacement of old hinge pins with new ones referenced SY991A, will cancel the requirement of repetitive inspection as per measure 2.

REF.: Service Bulletin SN CENTRAIR No. 20-21.

EFFECTIVE DATE : JULY 07, 2001

n/RH

TNS 07/08/01 1.2

GSAC

AIRWORTHINESS DIRECTIVE

released by DIRECTION GENERALE DE L'AVIATION CIVILE

Inspection and/or modifications described below are mandatory. No person may operate a product to which this Airworthiness Directive applies except in accordance with the requirements of this Airworthiness Directive.

Translation of 'Consigne de Navigabilité' ref. : 2001-247(A)
In case of any difficulty, reference should be made to the French original issue.

SN CENTRAIR

Type 101 sailplanes

Hinge pins of elevator and ailerons (ATA 27)

1. APPLICABILITY

Sailplanes type 101, serial numbers between 101A600 and 101A637 included.

Sailplanes type 101, all serial numbers on which one or several hinge pins of elevator and/or ailerons have been replaced with a hinge pin delivered by SN CENTRAIR between February 20, 1995 and February 28, 2001.

2. REASONS

Due to a wrong manufacturing heat treatment, some hinge pins may have longitudinal incipient cracks, at any time. That may have an effect on the integrity of the hinge.

3. ACTIONS AND COMPLIANCE

Measure 1: At the latest, within the 3 months following the effective date of this Airworthiness Directive, check the hinge pins of the elevator rudder and ailerons using detailed visual inspection and penetrant inspection (for example with Ardrox 996+9D1) for longitudinal detection (see sketch on SN CENTRAIR Service Bulletin No. 101-22). Mention the compliance of this Airworthiness Directive in the glider log book. If a crack is found, report to SN CENTRAIR, and replace the affected pin with a new hinge pin referenced SY991A before further flights.

Measure 2: Re-inspect as described in measure 1 the hinge pins at intervals not exceeding five years.

Measure 3: The replacement of old hinge pins with new ones referenced SY991A, will cancel the requirement of repetitive inspection as per measure 2.

REF.: Service Bulletin SN CENTRAIR No. 101-22.

EFFECTIVE DATE : JULY 07, 2001

n/RH

TNS07/05/01 1·3

GSAC

AIRWORTHINESS DIRECTIVE

released by DIRECTION GENERALE DE L'AVIATION CIVILE

Inspection and/or modifications described below are mandatory. No person may operate a product to which this Airworthiness Directive applies except in accordance with the requirements of this Airworthiness Directive.

Translation of 'Consigne de Navigabilité' ref. : 2001-248(A)
In case of any difficulty, reference should be made to the French original issue.

SN CENTRAIR

Type 201 sailplanes

Hinge pins of elevator and ailerons (ATA 27)

1. APPLICABILITY

Sailplanes 201 serial numbers between 201B102 and 201B107 included.

Sailplanes 201 all serial numbers on which one or several hinge pins of elevator and/or ailerons have been replaced with a hinge pin delivered by SN CENTRAIR between February 20, 1995 and February 28, 2001.

2. REASONS

Due to a wrong manufacturing heat treatment, some hinge pins may have longitudinal incipient cracks, at any time. That may have an effect on the integrity of the hinge.

3. ACTIONS AND COMPLIANCE

Measure 1: At the latest, within the 3 months following the effective date of this Airworthiness Directive, check the hinge pins of the elevator rudder and ailerons using detailed visual inspection and penetrant inspection (for example with Ardrox 996+9D1) for longitudinal detection (see sketch on SN CENTRAIR Service Bulletin No. 201-19). Mention the compliance of this Airworthiness Directive in the glider log book. If a crack is found, report to SN CENTRAIR, and replace the affected pin with a new hinge pin referenced SY991A before further flights.

Measure 2: Re-inspect as described in measure 1 the hinge pins at intervals not exceeding five years.

Measure 3: The replacement of old hinge pins with new ones referenced SY991A, will cancel the requirement of repetitive inspection as per measure 2.

REF.: Service Bulletin SN CENTRAIR No. 201-19.

EFFECTIVE DATE : JULY 07, 2001

n/RH

TNS 07/08/01 1.4.

Airworthiness Directive 2001-200

Luftfahrt-Bundesamt
Airworthiness Directive Section
Hermann-Blenk-Str. 26
38108 Braunschweig
Federal Republic of Germany

Rolladen-Schneider

Effective Date: July 26, 2001

Affected:

Kind of aeronautical product:	Sailplane
Manufacturer:	Rolladen-Schneider, Egelsbach, Germany
Type:	LS 8
Models affected:	only LS 8-a
Serial numbers affected:	all
German Type Certificate No.:	402

Subject:
Extension of the service time

Reason:
The results of fatigue tests (subsequently carried out on wing spar sections) have demonstrated that the time in service of GFRP sailplanes may be extended to 12000 hours, provided the airworthiness of each individual aircraft is evidenced by a special multi-stage inspection program, which is incorporated into the Maintenance Manual.

Action:
Perform an inspection according to the „Inspection program for extending the service time" in accordance with the Technical Notes of the manufacturer.

Compliance:
The action must be performed before reaching a service time of 3000 flight hours.

Technical publication of the manufacturer:
Rolladen-Schneider LS 8-a Technical Bulletin No. 8010 Edition 15. November 2000 which becomes herewith part of this AD and may be obtained from Messrs.:

Rolladen-Schneider
Flugzeugbau GmbH
Mühlstrasse 10

D- 63329 Egelsbach
Federal Republic of Germany
Phone: ++ 49 6103 204126
Fax: ++ 49 6103 45526

Accomplishment and log book entry:
Action to be accomplished by an approved service station and to be checked and entered in the log book by a licensed inspector.

Holders of affected aircraft registered in Germany have to observe the following:
As a result of the a.m. deficiencies, the airworthiness of the aircraft is affected to such an extent that after the expiry of the a.m. dates the aircraft may be operated only after proper accomplishment of the prescribed actions. In the interest of aviation safety outweighing the interest of the receiver in a postponement of the prescribed actions, the immediate compliance with this AD is to be directed

Instructions about Available Legal Remedies:
An appeal to this notice may be raised within a period of one month following notification. Appeals must be submitted in writing or registered at the Luftfahrt-Bundesamt, Hermann-Blenk-Str. 26, 38108 Braunschweig.

Enquiries regarding this Airworthiness Directive should be referred to Mr.Olaf Schneider, Airworthiness Directive Section at the above address, fax-no. 0049 531/2355-720. Please note, that in case of any difficulty, reference should be made to the German issue!

Luftfahrt-Bundesamt

Lufttüchtigkeitsanweisung
LTA-Nr.: 2001-200

Datum der Bekanntgabe: 26.07.2001

Muster: Rolladen-Schneider LS 8-a	**AD der ausländischen Behörde:** -keine-
Geräte-Nr.: 402	**Technische Mitteilungen des Herstellers:** Rolladen-Schneider LS8-a Technische Mitteilung Nr. 8010 vom 15.11.2000

Betroffenes Luftfahrtgerät:

Rolladen-Schneider
LS 8-a

- **Baureihen:** LS8-a

- **Werk-Nrn.:** alle

Betrifft:

Erhöhung der Betriebszeit

Die Ergebnisse der an Tragflächenholmen nachträglich durchgeführten Betriebsfestigkeitsversuche haben den Nachweis erbracht, daß die Betriebszeit der GFK/CFK-Segelflugzeuge auf 12000 Flugstunden erhöht werden kann, wenn für jedes Stück in einem speziellen Mehrstufenprüfprogramm die Lufttüchtigkeit nachgewiesen wird. Der Ablauf dieses speziellen Mehrstufenprüfprogrammes ist bereits im Wartungshandbuch enthalten.

Maßnahmen:

Durchführung des Prüfprogrammes zur Erhöhung der Betriebszeit gemäß den Angaben der Technischen Mitteilung.

Fristen:

Durchführung vor dem Erreichen von 3000 Flugstunden.

Durch die vorgenannten Mängel ist die Lufttüchtigkeit des Luftfahrtgerätes derart beeinträchtigt, daß es nach Ablauf der genannten Fristen nur in Betrieb genommen werden darf, wenn die angeordneten Maßnahmen ordnungsgemäß durchgeführt worden sind. Im Interesse der Sicherheit des Luftverkehrs, das in diesem Fall das Interesse des Adressaten am Aufschub der angeordneten Maßnahmen überwiegt, ist es erforderlich, die sofortige Vollziehung dieser LTA anzuordnen.

Rechtsbehelfsbelehrung:
Gegen diese Verfügung kann innerhalb eines Monats nach Bekanntgabe Widerspruch eingelegt werden. Der Widerspruch ist schriftlich oder zur Niederschrift beim Luftfahrt-Bundesamt, Hermann-Blenk-Str. 26, 38108 Braunschweig einzulegen.

LTAs werden auch im Internet unter http://www.iba.de publiziert

* * *

TWS 07/05/01 1.4.

Rolladen-Schneider Flugzeugbau GmbH **LBA.NSD.002**	Technical Bulletin No. 8010	LS8-a	Page 1 von 1 Edition 15.Nov.2000

Subject: Increase of Service Life, Inspection Program Approval

Effectivity: **LS8, Version LS8-a, all serial numbers.**

Accomplishment: Before reaching 3000 hours service life.

Reason: Results of supplementary serviceability tests at main spar booms for wings proved that service life of GRP-sailplanes maybe increased up to 12000 hours, if airworthiness of each single sailplane is checked according to a special multiple-stage inspection program as included in the Maintenance Manual.

Material and Instructions: None.
Valid Maintenance Manual already contains procedure "Inspection sequence to increase Service Life".

Remarks: This regulation does not affect annual inspections.

Inspections required in chapter "Inspection sequence to increase Service Life" of Maintenance Manual should only be carried out at the manufacturer or at an adequately licensed repair shop.

Results of inspections must be recorded in an inspection report, commenting to each inspection step. If inspections are not carried out at the manufacturer, a copy of the report must be sent to him for analysis.

LBA-approved:

09. 05. 01

LBA-AD 2001-200

Prepared: 15. November 2000	Verified:

D:\GS\TM\TM8010.doc

TNS 07/08/01 1.5

Serial Number: | Reg. Signs: | Year of Manuf.:

TB LBA-AD	Components concerned	Date	Steps / Modification	1*	periodical	Time Limit	Accomplishment Inspector
8001	*Preparation for LS8- 18*	*12.06.96*	*Structural Modifications during Manufacture*	*X*		*opt.*	
8002	*Modification from LS8-a to LS8-18*	*11.03.99*	*Outer wingtips (only with TB 8001)*	*X*		*opt.*	
8004/2 99-268/2	*Canopy jettison for 40 cm wide instrument panel*	*12.02.01*	*Installation of deflector 3R7-73 and edge protector*	*1**		*Before next flight*	
8005 2000-084	*Wing air brake levers*	*14.09.99*	*Check for corrosion and jamming*	*X*		*Before next flight*	
8006 / 2 2000-086	*Additional draining of both outer wingtanks*	*21.10.99*	*Closing of tubes when malfunction occurs*	*X*		*From case to case only*	
8007 2000-067	*Flight and Maintenance Manuals **LS8-a***	*25.11.99*	*LBA-approved manuals, Edition April 1999*	*X*		*Within 3 months*	
8008	*Maintenance Manual **LS8-18** in English language*	*06.04.00*	----------			-------	*N/A*
8009	*Flight Manual **LS8-a** in English language*	*31.05.00*	*Correction of water tank filling sequence*	*X*		*Before use of water*	
8010 2001-200	*Inspection Program Approval for increase of Service Life*	*15.11.00*	*None*	*X*		*Before 3000 hours*	

ROTAX
AIRCRAFT ENGINES

SERVICE LETTER

RUNNING MODIFICATIONS ON CARBURETORS FOR ROTAX® 2-STROKE UL AIRCRAFT ENGINES SL-2ST-005

Repeating symbols:

Please, pay attention to the following symbols throughout this document emphasizing particular information.

▲ WARNING: Identifies an instruction, which if not followed, may cause serious injury or even death.

■ CAUTION: Denotes an instruction which if not followed, may severely damage the engine or could lead to suspension of warranty.

◆ NOTE: Information useful for better handling.

1) Planning information

1.1) Engines affected:

- all 2-stroke UL aircraft engines

1.2) Concurrent ASB/SB/SI and SL

Further to this Service Letter the following additional Service Instruction must be observed and complied with:

- SI-07-1995 current issue

1.3) Reason

Owing to continious development and the standardization of carburetors a number of modifications have been introduced.

1.4) Subject

- Running modification on carburetors for ROTAX® 2-stroke UL aircraft engines.

1.5) References

In addition to this technical information refer to the current issue of:

- Operator's Manual (OM)
- Installation Manual (IM)
- Maintenance Manual (MM)
- Illustrated Parts Catalog (IPC)
- all relevant Service Instructions (SI)

1.6) Interchangeability of parts

- All parts are interchangeable

2) Material Information

2.1) Material - cost and availability

Price and availability will be supplied on request by ROTAX® Authorized Distributors or their Service Center.

2.2) Material volume

◆ NOTE: Introduction of the various modifications into serial production started with the following engine numbers:

- ROTAX 447 UL: from S/N 3,940.675
- ROTAX 503 UL: from S/N 4,795.201
- ROTAX 582 UL: from S/N 4,656.088
- ROTAX 582 UL mod. 99: starting with serial production (S/N 5.305.901)
- ROTAX 618 UL: from S/N 4,380.198

d01362

Carburetor overview:

Fig. Item no.	New part no.	Qty. per eng.	Description	Old part no.	application
(13)	887.815	1	Carb. 54/36/2001	590.905	447 UL with intake silencer
(13)	887.810	1	Carb. 54/36/2002	590.900	447 UL without intake silencer
(13)	887.825	1	Carb. 54/36/2003	590.885	503 UL with intake silencer
(13)	887.820	1	Carb. 54/36/2004	590.880	503 UL without intake silencer
(13)	887.827	2	Carb. 54/36/2005	590.887	503 UL with intake silencer
(13)	887.822	2	Carb. 54/36/2006	590.882	503 UL without intake silencer
(13)	887.835	2	Carb. 54/36/2101	590.915	582 UL 90/99 48 kW with intake silencer 582 UL 90/99 40 kW with intake silencer
(13)	887.832	2	Carb. 54/36/2102	n.a.	582 UL 90/99 40 kW without intake silencer
(13)	887.830	2	Carb. 54/36/2103	590.910	582 UL 90/99 48 kW without intake silencer
(13)	887.846	2	Carb. 54/36/2104	590.460	618 UL with intake silencer PTO-side
(13)	887.848	2	Carb. 54/36/2105	590.462	618 UL with intake silencer MAG-side
(13)	887.841	2	Carb. 54/36/2106	590.464	618 UL without intake silencer PTO-side
(13)	887.843	2	Carb. 54/36/2107	590.466	618 UL without intake silencer MAG-side

interchangeable parts per carburetor:

Fig. Item no.	New part no.	Qty. per carb.	Description	Old part no.	application
(3)	861.181	2	float	861.180	carburetor
(3)	827.347	1	spring cup	827.345	carburetor
(2)	831.715	1	O-Ring 2,5 x 15	-	carburetor
(10)*	830.890	1	sealing ring 6,2/8,9/1	-	carburetor
(11)*	940.557	1	hose nipple	-	carburetor

* New carburetors are supplied with a deprssion-connection for high altitude compensation (HAC-kit). Only these new carburetors can be retro-fitted with a HAC-kit.

3) Accomplishment / Instructions

Accomplishment

All the measures must be taken and confirmed by the following persons or facilities:

- ROTAX®-Airworthiness representative
- ROTAX®-Distributors or their Service Center
- Persons with type-specific training (applicable only for non-certified engines)

▲ WARNING: Proceed with this work only in a non-smoking area and not close to sparks or open flames. Switch off ignition and secure engine against unintentional operation.

- Secure aircraft against unauthorized operation.
- Disconnect negative terminal of aircraft battery.

▲ WARNING: Carry out work on a cold engine only.

▲ WARNING: Should removal of a locking device (e.g. lock tabs, self-locking fasteners, etc.) be required when undergoing disassembly/assembly, always replace with a new one.

TNS 07/08/01 1.6

3.1) Modifications on the carburetor

The new carburetor generation differs externally very little from the previous models, the modifications are on internal items.

The modifications are as follows:

- Damping of jet needle (1) against vibration by additional O-ring (2) 2,5x1,5 (see fig. 1).

■ NOTE: This O-ring can be installed on older carburetors only if a new spring cup (3) is fitted, as for the additional O-ring a recess (4) in the spring cup is necessary.

- Additional bore (6) Ø 2 mm in the cast fin for wire securing.

▲ WARNING: Secure all intake components or other parts that might come loose. See current issue of Service Instruction SI-07-1995.

- The suction side carburetor flange (7) is furnished with a thread groove to increase the hold of the intake system (airfilter, intake silencer etc.). See fig. 3.
- The idle air regulating screw (8) is provided with a hexagon head (wrench 13 mm) instead of knurled head. See fig. 3.

This means an improvement for carburetor adjustabilty, especially on 2-carburetor versions and intake silencer versions.

- All new carburetors have a depression connection for the high altitude kit (HAC kit). See fig. 3.

◆ NOTE: Normally this connection is plugged with a screw (9) M6x5. If the HAC kit is to be connected, this screw is replaced by the sealing ring (10) and hose nipple (11).

- The new carburetors are supplied only for choke actuation with Bowden cable (12). If choke with hand lever actuation is needed, the kit has to be ordered additionally.

■ CAUTION: Modification, jetting and all other works are only allowed to be carried out by an authorized ROTAX® distributor or their Service Centers in accordance with the last valid Repair Manual of the relevant engine type.

- All new carburetors are fitted with floats (13) of the optimized external shape.

- Connect negative terminal of aircraft battery.

3.2) Summary

▲ WARNING: Non-compliance with these instructions could result in engine damage, personal injury or death!

Approval of translation to best knowledge and judgement - in any case the original text in German language and the metric units (SI-system) are authoritative.

4) Appendix

The following drawings should convey additional information:

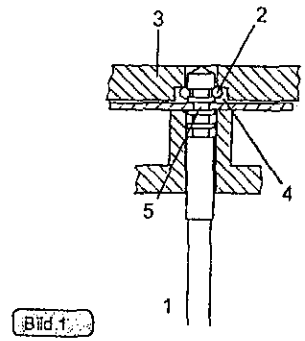


Bild 1

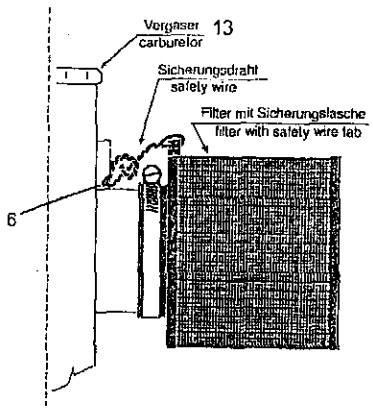


Bild 2

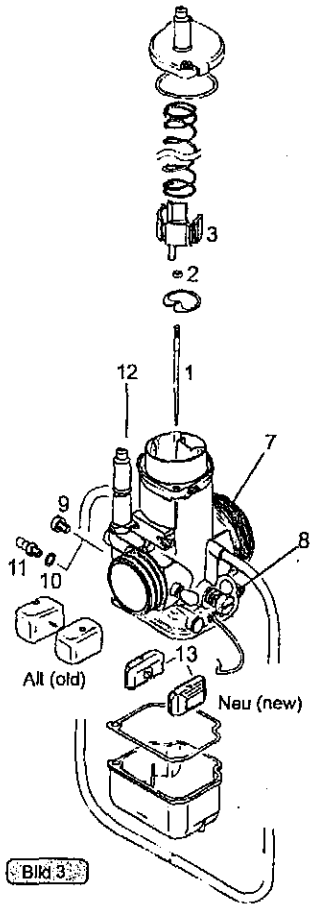


Bild 3

View: Carburetor / Air Filter
Fig.: 1, 2 and 3

The illustrations in this document show the typical construction. They may not represent full detail or the exact shape of the parts which have the same or similar function.

■ CAUTION: Our exploded views are no technical drawings and are fashioned in various scales. We have tried our best to depict true to the original but any deduction of dimensions and other information is not permissible.

ROTAX
AIRCRAFT ENGINES

SERVICE INSTRUCTION

REPLACEMENT OF THE CIRCLIP IN THE SPRAG CLUTCH HOUSING ON ROTAX® ENGINE TYPE 912 AND 914 (SERIES)

SI-912-006
SI-914-008

Repeating symbols:

Please, pay attention to the following symbols throughout this document emphasizing particular information.

▲ WARNING: Identifies an instruction, which if not followed, may cause serious injury or even death.

■ CAUTION: Denotes an instruction which if not followed, may severely damage the engine or could lead to suspension of warranty.

◆ NOTE: Information useful for better handling.

1) Planning information

1.1) Engines affected

All versions of the engine type:

- 912 A up to and including engine s/n 4,410.429
- 912 F up to and including engine s/n 4,412.809
- 912 S up to and including engine s/n 4,922.660
- 914 F up to and including engine s/n 4,420.267
- 912 UL up to and including engine s/n 4,404.188
- 912 ULS up to and including engine s/n 4,426.723
- 912 ULSFR up to and including engine s/n 4,429.601
- 914 UL up to and including engine s/n 4,417.988
- V912 pre-production
- V914 pre-production

on all engines on which the circlip on the sprag clutch has yet not been replaced in the course of repair or overhaul. On engines with s/n higher than the listed ones the new circlip was already fitted in serial production.

1.2) Concurrent ASB/SB/SI and SL

none

1.3) Reason

Introduction of a new circlip in the sprag clutch housing.

1.4) Subject

Replacement of the circlip in the sprag clutch housing.

1.5) Compliance

On repair of the sprag clutch or at engine overhaul.

1.6) Approval

not required

1.7) Manpower

- estimated man-hours:

engine installed in the aircraft - - - manpower time will depend on installation and therefore no estimate is available from the engine manufacturer.

1.8) Mass data

- change of weight - - - none
- moment of inertia - - - unaffected

d01386

1.9) Electrical load data

no change

1.10) Software accomplishment summary

no change

1.11) References

In addition to this technical information refer to current issue of

- Illustrated Parts Catalog (IPC)
- Maintenance Manual (MM)

1.12) Interchangeability of parts

- At exchange take care of the following:
  As the new circlip is slightly bigger as the one fitted previously, the end gap on the new circlip is smaller.
- all used parts and spare parts are unserviceable and must be scrapped.

2) Material Information

2.1) Material - cost and availability

Price and availability will be supplied on request by ROTAX® Authorized Distributors or their Service Centers.

2.2) Material requirement per engine

For the replacement of the circlip the following parts are required:

Item no.	New part no.	Qty.	Description	Old part no.	application
1	845425	1	circlip 70	845420	sprag clutch housing

2.3) Special tooling/lubricant-/adhesives-/sealing compound - Price and availability

Price and availability will be supplied on request by ROTAX® Authorized Distributors or their Service Centers.

TNS 07/08/01 1.7

3) Accomplishment / Instructions

Accomplishment

All the measures must be taken and confirmed by the following persons or facilities:

- ROTAX®-Airworthiness representative
- ROTAX®-Distributors or their Service Centers
- Persons approved by the respective Aviation Authority
- Persons with type-specific training (applicable only for non-certified engines)

▲WARNING: Proceed with this work only in a non-smoking area and not close to sparks or open flames. Switch off ignition and secure engine against unintentional operation.

- Secure aircraft against unauthorized operation.
- Disconnect negative terminal of aircraft battery.

▲WARNING: Carry out work on a cold engine only.

▲WARNING: Should removal of a locking device (e.g. lock tabs, self-locking fasteners, etc.) be required when undergoing disassembly/assembly, always replace with a new one.

3.1) Verification or replacement of the circlip (1):

see fig. 1 and 2

On repair work on sprag clutch (2) or at engine overhaul the circlip 68 part no. 845 420 has to be replaced by the circlip 70 part no. 845 425. Verify by Inspection if the new circlip 70 is already fitted. See fig. 1

■CAUTION: Make sure that the new circlip will be fitted as depicted in fig. 2 Detail A. To warrant a tight fit pay attention to correct position of the circlip ends (3).

- Reconnect minus pole of battery.

3.2) Test run

Conduct test run including ignition check and leakage test in accordance with the current Maintenance Manual of the respective engine type.

3.3) Summary

▲WARNING: Non-compliance with these instructions could result in engine damage, personal injury or death!

Approval of translation to best knowledge and judgement - in any case the original text in German language and the metric units (SI-system) are authoritative.

4) Appendix

the following drawings should convey additional information:

Circlip 68 part no. 845 420: end gap when fitted = 11mm (0.433 in)

Circlip 70 part no. 845 425: end gap when fitted = 5 mm (0.197 in)

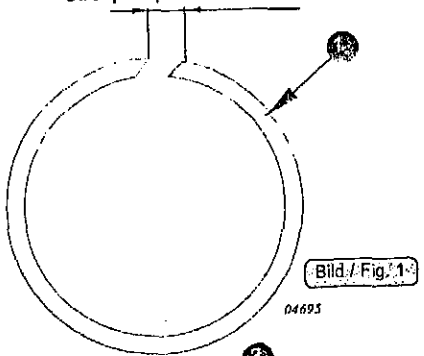
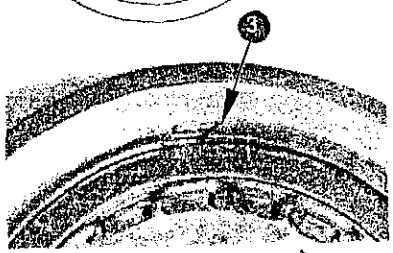
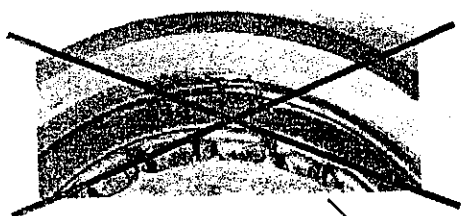


Bild / Fig. 1





DETAIL A: shows the correct position of the circlip

DETAIL B: shows the incorrect position of the circlip

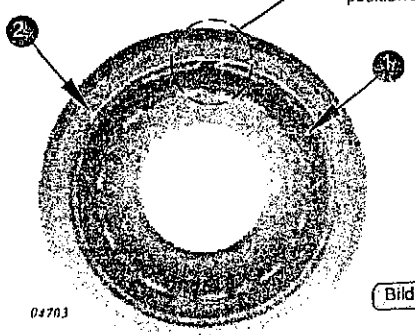
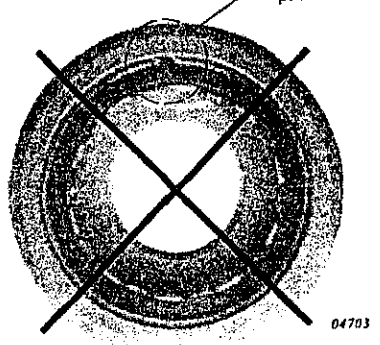


Bild / Fig. 2



◆NOTE: The illustrations in this document show the typical construction. They may not represent full detail or the exact shape of the parts which have the same or similar function.
Exploded views are no technical drawings and are for reference only. For specific detail, refer to the current documents of the respective engine type.

ROTAX
AIRCRAFT ENGINES

SERVICE INSTRUCTION

SELECTION OF MOTOR OIL AND GENERAL OPERATING TIPS FOR ROTAX® ENGINES TYPE 912 AND 914 (SERIES)

SI-18-1997

MANDATORY

Repeating symbols:

Please, pay attention to the following symbols throughout this document emphasizing particular information.

▲ WARNING: Identifies an instruction, which if not followed, may cause serious injury or even death.

■ CAUTION: Denotes an instruction which if not followed, may severely damage the engine or could lead to suspension of warranty.

◆ NOTE: Information useful for better handling.

1) Planning Information

1.1) Engines affected

All versions of the engine type:
- 912 (Series)
- 914 (Series)

1.2) Concurrent ASB/SB/SI and SL

none

1.3) Reason

- Field experience has shown that additional information about the choice of suitable motor oils and oil change and maintenance intervals for the ROTAX engines Type 912 and 914 is necessary.

Regardless of which brand of fuel is used, foreign particles are suspended in this motor oil. Heavy accumulation of particles on high temperature zones such as on piston rings, exhaust valve guides, may result in stuck piston rings and valves due to burning and coking of the oil.

On turbocharged engine, failing to ensure an adequate cool-down period prior to shut-off may lead to particle deposits on the turbocharger wheels. This could result in an unbalance of the turbo wheel and consequently to a complete destruction of the turbocharger. Particle deposits or coking may become loose in the engine and may block the lubrication system causing damage to the engine due to lack of oil.

- In some cases, high wear and excessive residues formation have been noted on above engine types. This is primarily due to the use of motor oils and oil change intervals that are unsuitable for operating conditions, mission profiles and type of fuel used.
- Excessive use of carburetor air pre-heating and prolonged periods of engine idling can cause rich mixture condition which accelerates the breakdown and contamination of engine oil.
- The lead content of currently available leaded AVGAS fuels is very high. The 100 LL AVGAS commonly available in North America contains up to 0.56 ml / litre of tetraethyl lead, more than 4 times the lead found in the leaded 80/87 AVGAS previously available. Due to this extremely high lead content, residue formation leading to operating difficulties with valve and piston ring sticking and cylinder wall glazing occurs more frequently when engines are primarily operated with leaded AVGAS fuels.

Lead deposits could cause glazing of the cylinder walls.

d01270

1.4) Subject

Selection of motor oil and general operating tips for ROTAX® engines type 912 und 914 (Series)
- This information is intended to assist the aircraft designer, manufacturer, builder and operator to achieve correct operating conditions and installation of the engine and consequently optimum performance and reliability.

1.5) Compliance

When mainly using leaded AVGAS fuels, and/or when operating conditions are severe, shorter maintenance intervals must be met.

▲ WARNING: Non-compliance with these instructions could result in engine damage, personal injury or death!

1.6) References

In addition to this technical information refer to
- current issue of the Operator's Manual (OM)
- Maintenance Manual (MM)

1.7) Other publications affected

The following documentations must be replaced as a consequence of this Service Instructions and will become invalid therefore.

Description	Part no.	Issue	Date	Rev.	Chapter	Page
SI-18-1997	-	0	January 1999	2		

2) Material Information

none

3) Accomplishment / Instructions

3.1) Remedy

- If possible, operate the listed engine types using **unleaded fuel or MOGAS.**
- Use of the recommended motor oils according to sections 3.2 and 3.3 of this Service Instruction.
- Use only oil with API classification **"SF"** or **"SG"** or higher!
- Due to high stresses in the reduction gears, oils with gear additives such as good quality 4 stroke motorcycle oils are highly recommended.
- Because of the incorporated friction clutch, oils with friction modifier additives are unsuitable as this could result in clutch slipping during standard operation.
- High quality, heavy duty semi or full synthetic (depending on fuel type used) motorcycle oils offer many advantages and are generally the best choice for 912/914 engines.
- Avoid oils designed strictly for use in Diesel engines. Oils designed for use primarily in Diesel engines may not be suitable due to insufficient high temperature properties and additives that may affect the operation of the slipper clutch in the gear box.
- In case of severe operating conditions (i.e. flight school, glider towing etc.) the time between maintenance intervals must be generally shorter and in particular, the frequency of oil changes must be increased regardless of the type of fuel mainly used (MOGAS or AVGAS).
- On turbocharged engines always conduct a cool-down run in accordance with the relevant Operators Manual. After heavy load operation (e.g. glider tug operation) the cool-down period should be prolonged to 3 to 5 minutes.
- Carefully observe of the engine operation tips found in section 3.4 of this Service Instruction.

◆ NOTE: Severe operating conditions may include but not be limited to flight training, glider tow operations, extended low RPM, prolonged use of carb heat etc.

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3.2) Operation with unleaded fuel or MOGAS

■ CAUTION: When operating primarily on unleaded fuels or MOGAS, the maintenance intervals remain unchanged from the published maintenance schedule found in the currently valid Maintenance Manual for the engine type..
In case of severe operating conditions, the time between maintenance intervals must be generally shorter, and in particular, the frequency of oil changes must be increased regardless of the type of fuel mainly used (MOGAS or AVGAS).

Use the following oils and observe the oil specification indicated:

Motor oils recommended (for use with unleaded fuel or MOGAS) *01462*

Marke / brand	Bezeichnung / description	Spezifikation / specification	Viskosität / viscosity	Code[1] / code[1]
Castrol®	Formula SLX	API SH/CF	SAE 0 W-30	3
Castrol®	GTX Magnatec	API SJ	SAE 10 W-40	4
Castrol®	GPS	API SG/CD	SAE 10 W-40	2
Castrol®	RS	API SG/CD	SAE 10 W-60	3
Castrol®	Superbike	API SG	SAE 5 W-40	1
Castrol®	Syntech Full Synthetic	API SJ	SAE 10 W-30	3
Castrol®	Syntech Full Synthetic	API SJ	SAE 20 W-50	3
Castrol®	Syntech Blend	API SJ	SAE 10 W-30	4
Castrol®	Syntech Blend	API SJ	SAE 5 W-50	4
ELF®	MOTO XT 4	API SG	SAE 10 W-50	1
MOTUL®	5100 Synthetic Blend	API SJ	SAE 10 W-40	2
Mobil®	Mobil1	API SJ/CF	SAE 15 W-50	3
SHELL®	Advance VSX 4	API SG	SAE 20 W-40	2
SHELL®	Advance Ultra 4	API SG	SAE 10 W-40	1
SHELL®	Formula Shell Synthetic Blend	API SJ	SAE 10 W-30	4
SHELL®	ROTELLA SB High Performance Synthetic Blend	API SH	SAE 10 W-40	4
Pennzoil®	Performax 100	API SJ	SAE 5 W-50	3
Valvoline®	High Performance Synthetic	API SJ	SAE 5 W-30	3
Valvoline®	High Performance Synthetic	API SJ	SAE 20 W-50	3
Valvoline®	DuraBlend Synthetic	API SJ	SAE 10 W-40	4

[1] recommendation code

1 Full-synthetic motorcycle oil with gear additives. Highly recommended for high temperature operation (higher than 120 °C / 250 °F) using only unleaded fuels.

2 Semi-synthetic motorcycle oils with gear additives. Highly recommended for normal (less than 120 °C / 250 °F) and high temperature (higher than 120 °C / 250 °F) operation using leaded or unleaded fuels.

3 Full-synthetic oil. Recommended for high temperature operation (higher than 120 °C / 250 °F) using only unleaded fuels.

4 Semi-synthetic oil. Recommended for normal (less than 120 °C / 250 °F) and high temperature (higher than 120 °C / 250 °F) operation using leaded or unleaded fuels.

◆ NOTE: The coefficient of viscosity indicates the tendency of oil to flow but it is not a quality code. Country specific deviations of the viscosity are possible but will hardly influence the oil characteristic. In cases of doubt compare the product specifications, notes and requirements, as for instance for highly fluid (low viscosity) oils as friction modifiers could have been added.

3.3) Operation with leaded AVGAS fuels

If the engine is mainly operated with leaded AVGAS fuels, the following maintenance operations are necessary by latest after every **50 operating hours:**

- change of oil filter
- change of engine oil
- check of oil level

In addition, compliance with following operating conditions is required:

- avoid extended or unnecessary use of carburetor air pre heating
- avoid prolonged periods of low speed idling

◆ NOTE: The engine is considered to be operated mainly on leaded AVGAS, when run for more than 30 % of engine operating time on leaded AVGAS fuel.

More frequent oil changes will assure timely removal of residues and oil sludge thus avoiding increased wear or operating troubles.

Use the following oils and observe the oil specification indicated:

Motor oils recommended (for use with leaded AVGAS) *01463*

Marke / brand	Bezeichnung / description	Spezifikation / specification	Viskosität / viscosity	Code[1] / code[1]
Castrol®	GTX Magnatec	API SJ	SAE 10 W-40	4
Castrol®	GPS	API SG/CD	SAE 10 W-40	2
Castrol®	GP	API SG	SAE 10 W-40	5
Castrol®	Syntech Blend	API SJ	SAE 10 W-30	4
Castrol®	Syntech Blend	API SJ	SAE 5 W-50	4
MOTUL®	5100 Synthetic Blend	API SJ	SAE 10 W-40	2
SHELL®	Advance VSX 4	API SG	SAE 20 W-40	2
SHELL®	Formula Shell Synthetic Blend	API SJ	SAE 10 W-30	4
SHELL®	ROTELLA SB High Performance Synthetic Blend	API SH	SAE 10 W-40	4
SHELL®	Formula Shell	API SJ	SAE 10 W-30	6
SHELL®	Formula Shell	API SJ	SAE 20 W-50	6
Pennzoil®	PZL Turbo Motor Oil	API SJ	SAE 10 W-30	6
Pennzoil®	GT Performance	API SJ	SAE 20 W-50	6
Valvoline®	DuraBlend Synthetic	API SJ	SAE 10 W-40	4
Valvoline®	All-Climate	API SJ	SAE 10 W-40	6
Valvoline®	All-Climate	API SJ	SAE 20 W-50	6

[1] recommendation code

2 Semi-synthetic motorcycle oils with gear additives. Highly recommended for normal (lower than 120 °C / 250 °F) and high temperature (higher than 120 °C / 250 °F) operation using leaded or unleaded fuels.

4 Semi-synthetic oil. Recommended for normal (lower than 120 °C / 250 °F) and high temperature (higher than 120 °C / 250 °F) operation using leaded or unleaded fuels.

5 Petroleum based motorcycle oils with gear additives. Highly recommended for use only when oil temperatures remain below 120 °C (250 °F) and when using leaded fuels.

6 Petroleum based oil. Recommended for use only when oil temperatures remain below 120 °C (250 °F) and when using leaded fuels.

◆ NOTE: The coefficient of viscosity indicates the tendency of oil to flow but it is no quality code. Country specific deviations of the viscosity are possible but will hardly influence the oil characteristic. In cases of doubt compare the product specifications, notes and requirements.

3.4) General engine operation requirements and operating tips

- Keep the motor oil temperature below 120° C (250° F) over most of the operating period.
- Always insure that the oil type used is adequate for climatic conditions and peak engine operating temperatures. If operational oil temperatures exceed 120 °C (250 °F), use of a mineral or petroleum based oil is not recommended.
- For turbocharged engines ensure an adequate running cool-down period to prevent deposits by coking of oil.
- When operating with unleaded fuels or MOGAS and when engine oil temperatures often exceed 120 °C (250 °F) use of a high quality full synthetic oil is recommended. See Remedy in section 3 on page 2 of this Service Instruction.
- To avoid formation of condensation water in the motor oil, the oil temperature must rise at least once every operational day to at least 100 °C (212 °F).
- When safe and sensible, avoid extended use of carburetor air pre-heating.
- The type of fuel used, operating conditions, and the demands of the engine mission profile may need to increase the frequency of oil changes to avoid the excessive build up of lead and other residues in the engine oil. Always adjust the engine oil change intervals to avoid excessive build up of sludge in the engine oil.

■ CAUTION: Do not use oil additives and observe the operating limits as per the relevant Operator's Manual.

Excessive engine vibration, particularly at low idle speeds, can impair the carburetor fuel metering system leading to a too rich mixture condition. This rich mixture condition can further lead to rough engine operation and excessive carbon and lead deposits. Observance of the following maintenance and operating tips can reduce engine vibration and maintain accurate carburetor fuel metering:

- Regular pneumatic synchronization of the carburetors and synchronization of bowden cable for throttle and choke adjustment can greatly improve the smoothness of engine operation.
- Proper adjustment of the engine idle speed and maintenance of the air induction system can also aid smooth engine operation and helps to maintain the correct air / fuel mixture. Proper air / fuel mixture will reduce the separation of the non-volatile components in leaded AVGAS, and helps to minimize the rate of lead deposition in the engine.
- Whenever safe and sensible, the engine should be operated at speeds between 2500 and 2750 crankshaft RPM (1100 to 1200 propeller RPM with 2,27:1 reduction ratio, 1050 to 1150 propeller RPM with 2,43:1 reduction ratio) after starting and during the initial warm up period.
- Avoid rapid changes in engine RPM immediately after start up.
- Rapid engine cooling down resulting from altitude changes performed at a low power setting, landing approaches flown at low power settings, or rapid engine shut down after landing or ground operations should be avoided.
- Maintain engine speed between 2500 and 2750 crankshaft RPM (1100 to 1200 propeller RPM with 2,27:1 reduction ratio, 1050 to 1150 propeller RPM with 2,43:1 reduction ratio) until engine temperatures have stabilized before stopping the engine.
- Maintaining high friction torque values on the gear reduction unit can reduce vibrations from the torsion load absorber, further reducing overall engine vibrations, particularly at low RPM.
- Correct balancing of the propeller to a tolerated value can greatly reduce engine vibration, decrease wear of engine and gear reduction unit components, improve engine performance, and add to engine life. Recent developments in electronic propeller balancing equipment now allow quick dynamic balancing of propellers without removing the propeller from the aircraft. Other benefits of correct propeller balance include the reduction of cockpit noise and vibration levels, and a reduction in fatigue of exhaust components, air boxes, sheet metal components, cowlings, engine linkages and aircraft sections.
- Regular compliance with SI-912-005 / SI-914-007 „Lubrication System for all ROTAX Engine Type 912 (series) and 914 (series) engines", (current version) will assure proper function of the engine lubrication system and optimum engine life.

3.5) Summary

▲ WARNING: The oil change has to be carried out as per the relevant Maintenance Manual and Operators Manual.

▲ WARNING: Non-compliance with this recommendations could result in engine damage, personal injury or death!

Approval of translation to best knowledge and judgement - in any case the original text in German language and the metric units (SI-system) are authoritative.

ROTAX.
AIRCRAFT ENGINES

SERVICE INSTRUCTION

AMENDMENT ON REDUCTION GEARBOX TYPE „C" AND TYPE "E" FOR ROTAX® 2-STROKE UL AIRCRAFT ENGINES
SI-06-1998

Repeating symbols:

Please, pay attention to the following symbols throughout this document emphasizing particular information.

▲ WARNING: Identifies an instruction, which if not followed, may cause serious injury or even death.

■ CAUTION: Denotes an instruction which if not followed, may severely damage the engine or could lead to suspension of warranty.

◆ NOTE: Information useful for better handling.

1) Planning information

1.1) Engines affected

All versions of engine Type

447 UL 503 UL 532 UL
582 UL 618 UL

up to gearbox production code A6 (clearly visible on the gear cover, see fig. 1);

◆ NOTE: Consists either of 2 letter or 1 letter plus 1 number. They are increasing in alphabetical order or numbers.
...AA,AB,AC,...AZ;A1,A2,...A8;
...MA,MB,...MZ;M1,...M8;
...NA..OV,OW - OX,OY,OZ;O1,O2,...
This production code is punched on the gearbox housing after the gear ratio (see fig. 1).

Example:

3,47 A6
- A6 → production code of modification
- 3,47 → reduction ratio

1.2) Concurrent ASB/SB/SI and SL

none

1.3) Reason

Gluing-in of the cone sleeve will reduce the tightening torque of the hex. nut.
Introduction of an installation sleeve to facilitate fitting of the cone sleeve.
Description of the production code in chapter 1.1, correction of the converted tightening torque value in chapter 3.1.1 and a new puller assy for the lay shaft gear in chapter 3.2 is the reason of revision 1.

1.4) Subject

Amendment on reduction gearbox type „C" and type „E" for 2-stroke UL aircraft engines.
This information is intended to assist the aircraft builder and operator in achieving the proper operating conditions, correct engine installation and consequently optimum performance and reliability.

1.5) Compliance

At the next disassembly of the gearbox.

▲ WARNING: Non-compliance with these instructions could result in engine damage, personal injury or death!

1.6) Approval

not required

d07413

1.7) Manpower

Estimated man-hours:
- engine installed in the aircraft --- manpower time will depend on installation and therefore no estimate is available from the engine manufacturer.
- engine removed from the aircraft --- appr. 1 h per unit.

1.8) References

In addition to this technical information refer to:
- current issue of the Operator's Manual (OM)
- current issue of the Illustrated Parts Catalog (IPC)
- all relevant Service Instructions (SI)
- Repair Manual (RM)
- Maintenance Manual (MM)

1.9) Other publications affected

The following Service Instruction must be replaced as a consequence of this Instruction and will become invalid therefore.

Description	Part no.	Issue	Date	Rev.
SI-06-1998 D/E		0	1998 10	0

1.10) Interchangeability of parts

All parts are interchangeable

2) Material Information

2.1) Special tooling - Price and availability

Price and availability will be supplied on request by ROTAX® Authorized Distributors or their Service Center.

parts requirement:

Item no.	New part no.	Qty.	Description	Old part no.	Remarks
5	877 810	1	installation sleeve		C and E gearbox
9	877 379	1	puller assy	877 375	C and E gearbox

3) Accomplishment / Instructions

Accomplishment

All the measures must be taken and confirmed by the following persons or facilities:
- ROTAX® -Distributors or their Service Center
- Persons with type-specific training (applicable only for non-certified engines)

▲ WARNING: Proceed with this work only in a non-smoking area and not close to sparks or open flames. Switch off ignition and secure engine against unintentional operation.
- Secure aircraft against unauthorized operation.
- Disconnect negative terminal of aircraft battery.

▲ WARNING: Carry out work on a cold engine only.

▲ WARNUNG: Should removal of a locking device (e.g. lock tabs, self-locking fasteners, etc.) be required when undergoing disassembly/assembly, always replace with a new one.

3.1) Instructions for gearboxes up to production code A6

see fig. 1, 2 and 3
- Disassemble the reduction gearbox in accordance with the current Repair Manual for engine type 462-532-582 to a state where the cone sleeve (1) can be removed.
- Clean and degrease cone sleeve (1).
- Degrease propeller shaft (2) and lay shaft gear (3).

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3.1.1) **Utilization of the installation sleeve assy**

◆ NOTE: Use of a different tool (screw driver etc.) is inadequate and could result in damage of cone sleeve and propeller shaft. Use exclusively installation sleeve assy (5) (part no. 877 810).

- Place cone sleeve (1) into installation sleeve assy (5). Make sure that the rotating shaft (6) of the pressure screw (7) comes to rest in the slot of the cone sleeve (1).
- Using a spanner move shaft (6) into slot until the cone sleeve (1) expands enough.

■ CAUTION: But ensure that the shaft will not move beyond inside dia. of the sleeve. Otherwise you risk damage to the propeller shaft.

- Apply LOCTITE 648 on inside of cone sleeve (1).

▲ WARNING: Make absolutely sure that no LOCTITE will enter into the ball bearing (4).

- After placing cone sleeve (1) into position on propeller shaft slacken the pressure screw (7) and remove the tool.
- Apply LOCTITE 648 on outside of cone sleeve (1).
- The tightening torque of the hex. nut (8) has been newly specified to **250 ±10 Nm (185 ±7 ft.lb)**.
- Reassemble reduction gearbox in accordance with the current Repair Manual for engine type 462-532-582.

■ CAUTION: Allow at least 12 h for curing of the adhesive.

3.2) Disassembly procedure, with taper sleeve glued in position

Because of the changed assembly procedure the puller (9) for the layshaft gear has been modified. The new tool is fashioned with a chamfering at the base of the puller (9), thus achieving the best stability at pulling-off procedure. Furthermore the other end of the puller is now flat sided 36 A/F to tighten the puller (9) into position.

3.2.1) **Procedure to pull-off the layshaft gear:**

- Disassemble the reduction gearbox in accordance with the current Repair Manual for engine type 462-532-582 to the stage where to pull-off the layshaft gear.
- Place the mushroom-shaped protection piece (10) part no. 877 415 into the centering of the propeller shaft (2).
- Preheat the layshaft gear (3) (gluing area) with a hot air gun to approximately 300°C (570°F) to reverse the glue effect.

■ CAUTION: Hot components risk of injury.

- Fit the puller assy. (9) part no. 877 379 on layshaft gear and tighten with open end wrench 36 A/F.
- Screw-in and tighten the puller screw. Remove propeller shaft assy complete with gear cover and puller assy from the fixture. If necessary separate the layshaft gear by a blow of the hammer on the tightened puller screw.

■ CAUTION: Use a suitable underlayer for not damaging the removed parts.

◆ NOTE: When refitting the cone sleeve again clean propeller shaft from residual or remains of LOCTITE first.
Renew sealing ring (11).

▲ WARNING: Non-compliance with these recommendations could result in engine damage, personal injury or death!

- Connect negative terminal of aircraft battery.

3.3) Test run

Start engine. Conduct test run including ignition check and leakage test in accordance with the current Maintenance Manual of the respective engine type.

3.4) Summary

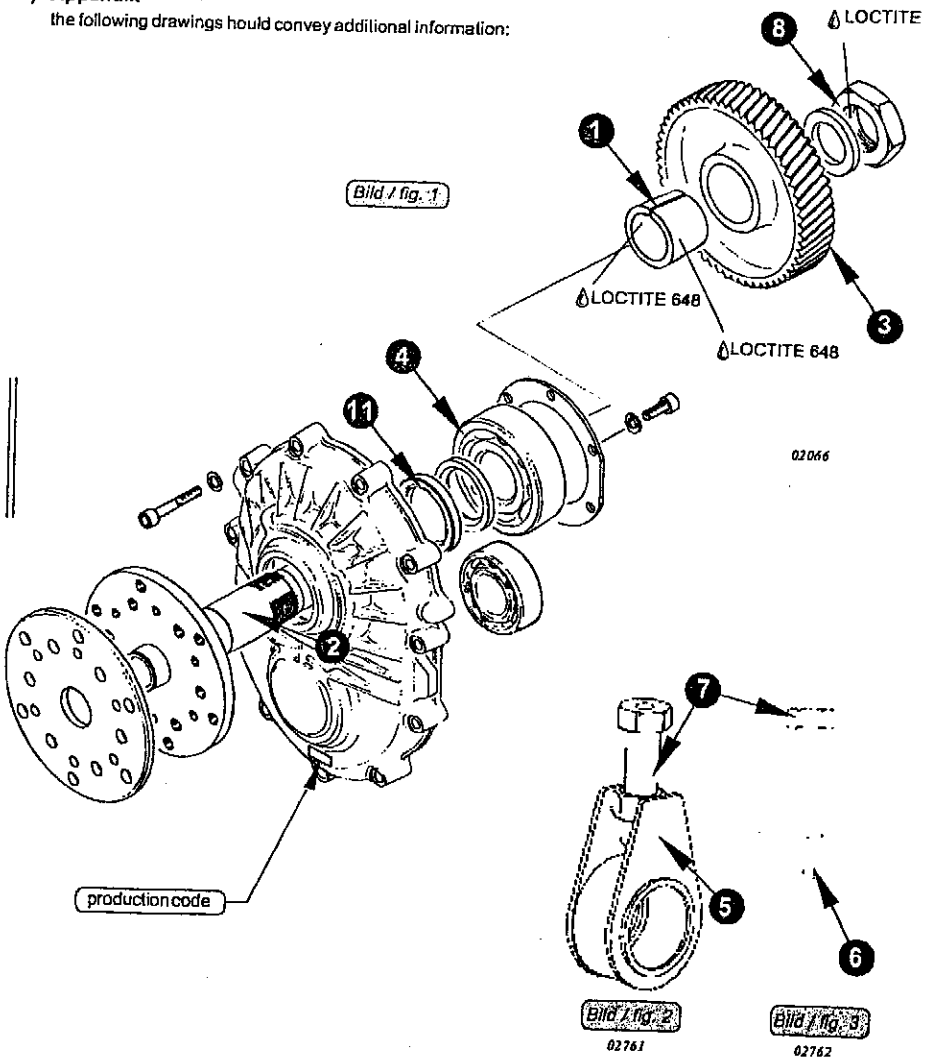
These instructions (section 3) have to be conducted in accordance with compliance in section 1.5

▲ WARNING: Non-compliance with these instructions could result in engine damage, personal injury or death!

Approval of translation to best knowledge and judgement - in any case the original text in German language and the metric units (SI-system) are authoritative.

4) Appendix

the following drawings hould convey additional information:



view: **installation sleeve assy / C-gearbox**
Fig. 1, 2 and 3

Bild / fig. 4
04963

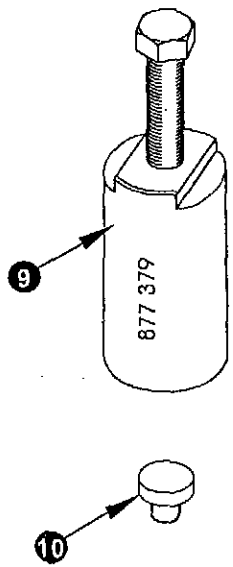
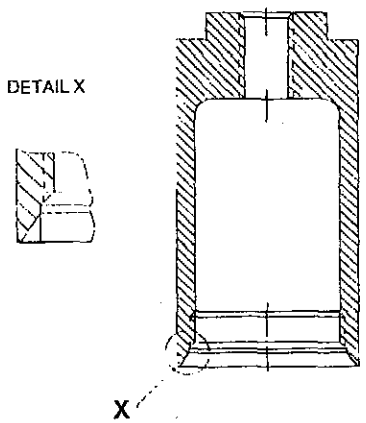


Bild / fig. 5
04792

puller assy for lay shaft gear



view: puller assy
Fig. 4 and 5

◆ NOTE: The illustrations in this document show the typical construction. They may not represent full detail or the exact shape of the parts which have the same or similar function.
Exploded views are no technical drawings and are for reference only. For specific detail, refer to the current documents of the respective engine type.

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SERVICE LETTER INDEX - EDITION 4, 7/2001

ROTAX COMPLIANCE CATEGORY KEY - I = INFORMATION
R = RECOMMENDED

CATEGORY	TITLE	REVISION	DESCRIPTION
I	SL-2ST-001 SL-912-001 SL-914-001	1 1 1	Change of designation of technical bulletins and service information in accordance with new Rotax standards.
I	SL-2ST-002		Documentation for Rotax two stroke UL engines and certified two stroke engines.
I	SL-912-002 SL-914-002		Standardisation of the reduction gearbox for Rotax 912/914
R	SL-912-003 SL-914-003 SL-2ST-003	2 2 2	List of documentation for Rotax two stroke aircraft engines and all versions of engine type 912/914
I	SL-912-004		Documentation for Rotax engine type 912 (series)
I	SL-914-004		Documentation for Rotax engine type 914 (series)
R	SL-912-005 SL-914-005 SL-2ST-004		Change of layout for Alert Service Bulletin (ASB), Service Bulletin) (SB), Service instruction (SI) and Service Letter (SL)
I	SL-912-006 SL-914-006		Use of Third Party After-Market Piston Kits in Rotax engines type 912 (Series) and 914 (Series)
I	SL-912-007		Rotax engine type 912 ULSFR - Version for France
R	SL-912-008		Operators & maintenance manual for Rotax type 912 Series
R	SL-914-007		Operators & maintenance manual for Rotax type 914 Series
R	SL-2ST-005		Running Modifications on Carburetters for Rotax 2-Stroke UL Aircraft Engines

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SERVICE INSTRUCTION INDEX - EDITION 4, 7/2001

ROTAX COMPLIANCE CATEGORY KEY - I = INFORMATION
R = RECOMMENDED
O = OPTIONAL

CATEGORY	TITLE	REVISION	DESCRIPTION
I	SI-2ST-001		Installation instructions for the new design piston for 582 UL with monohook piston pin circlip grooves.
I	SI-912-001 SI-914-001		Installation of rotary water pump seal / pump impeller
R	SI-914-002		Optimising of mixture distribution
I	SI-914-003		Checking and lubrication of the wastegate
R	SI-912-002 SI-914-004		Verification of the lubrication system and replacement of the oil pressure spring
O	SI-912-003 SI-914-005		Oil connections with UNF threads.
I	SI-912-004 SI-914-006		Modified carburettor flange for Rotax engine type 912 series and Rotax engine type 914
I	SI-912-005 SI-914-007		Lubrication system for all Rotax engines type 912 (series) and 914 (series)
R	SI-06-1998	1	Amendment on Reduction Gearbox Type 'C' and Type 'E' for Rotax 2 stroke UL Aircraft Engines
R	SI-912-006 SI-914-008		Replacement of the Circlip in the Sprag Clutch Housing on Rotax engine type 912 and 914 (series)
M	SI-18-1997	3	Selection of motor oil and general operating tips for Rotax engines type 912 and 914 (series)

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ROTAX FUEL PUMP PIPING 05. 06. 01.

To. MR. J. HAMMERTON CTO. BGA. From. J. S. RIDDOCH 1A/146/E

It is probably presumptious of me to add my comments to this TNS, but reading it reminded me of some of the problems caused by piping in the past. If I may elaborate on some of the causes of failure regarding piping carrying fuels and in this case connections to the crankcase.

1. There are special pipes that may carry petrol and appear to be black rubber, but are definitely not just rubber. Also it should not be assumed that these materials will survive the even more hostile environment of the crankcase fumes which attack rubber compounds fairly quickly.

2. The acids and water present in the crankcase; these products of combustion are highly corrosive and can be up to 20% dilution of the volume of the oil. This emulsion causes the oil to blacken if insufficient heat is developed in the oil through low usage. The darkening is a good indicator of the amount of dilution by water, acids etc. If left to stand after removal these acid bearing waters will separate giving a visual ratio of contaminants to oil.

3. The example of the clamp pinching the pipe is typical, but also is the interior of the pipe swelling and blocking up, and was endemic for many years on cars where rubber pipe was used to ventilate the rocker boxes, even though the pipe was remote from the sump contents.

4. Most older types of plastic piping used to suffer from the plasticizer being removed by the fuel causing hardening and cracking. Also very little strength when in contact with sump temperatures, sagging and blocking occuring between connections. Therefore not recommended to transmit pressure pulses to the fuel pump as in Rotax.

SUMMARY

Most modern engines are provided with flexible piping to carry petrol oils safely and for a long term. The specifications are not obvious, and are proof against the previous types of failures. It seems politic to warn against the use of any piece of piping that maybe handy, other than the correct specification, even as a temporary replacement. The quick fix is OK for motor mowers but not aircraft.

J. S. Riddoch 1A/146/E