

Inspection and/or replacement of the valve push-rod assy., rocker arm left and rocker arm right for ROTAX® Engine Type 912 i, 912 and 914 (Series)

ATA System: 72-30-00 Cylinder head

MANDATORY

1) Planning information

To obtain satisfactory results, procedures specified in this publication must be accomplished with accepted methods in accordance with prevailing legal regulations.

BRP-Rotax GmbH & Co KG cannot accept any responsibility for the quality of work performed in accomplishing the requirements of this publication.

1.1) Applicability

Criterion A) All versions of ROTAX® engine types:

Engine type	Serial number
912 iSc Sport	from S/N 4417438 up to S/N 4417441 inclusive from S/N 7702101 up to S/N 7702103 inclusive
912 A	from S/N 4411126 up to S/N 4411146 inclusive from S/N 4411401 up to S/N 4411492 inclusive
912 F	from S/N 4413066 up to S/N 4413067 inclusive from S/N 4413101 up to S/N 4413111 inclusive
912 S	from S/N 9563826 up to S/N 9563849 inclusive from S/N 9564301 up to S/N 9564508 inclusive from S/N 9564510 up to S/N 9564534 inclusive
914 F	from S/N 4421581 up to S/N 4421597 inclusive from S/N 4421701 up to S/N 4421833 inclusive

Criterion B) Spare parts:

Further, all engines are affected which have been equipped with valve push-rod assy. part no. 854861 during engine repair, maintenance or general overhaul as of June 08th, 2016.

NOTE: The valve push-rod assy. may have been removed from the initial engine and used on another one.

Engines with serial numbers higher than in criterion A have already been equipped with tested valve push-rod assy. and are therefore not affected.

For relevant information, see the maintenance records and/or the logbook.

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1.2) Concurrent ASB/SB/SI and SL

In addition to this Service Bulletin the following Service Instructions must be observed and complied with:

Service Instructions-SI-912-009/SI-914-010, title „Introduction of a new rocker arm bushing“, current issue.

1.3) Reason

Due to deviations in the manufacturing process of the valve push-rod assy., partial wear on the rocker arm ball socket may occur. This wear might lead to a rocker arm cracking / fracture which in consequence may lead to a malfunction of the valve train. Possible effects are rough engine running or an unusual engine operating behaviour.

1.4) Subject

Inspection and/or replacement of the valve push-rod assy., rocker arm left and rocker arm right for ROTAX Engine Type 912 i, 912 and 914 (Series).

1.5) Compliance

- Before the initial installation in an aircraft and/or the initial start-up thereafter.
- Carry out this inspection on the engines listed in section 1.1., according to the instructions in section 3 at the next ROTAX® scheduled maintenance event or within the next 25 hours of operation, but at the latest after 200 days (from the date of the initial issue of this Service Bulletin).
- At rough engine running, or unusual of engine operating behaviour carry out an inspection in accordance to this Service Bulletin before the next flight.

1.6) Approval

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

1.7) Labor time

Estimated labor hours:

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

1.8) Mass data

Change of weight - - - none.

Moment of inertia - - - unaffected.

1.9) Electrical load data

No change.

1.10) Software modifications

No change.

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1.11) References

In addition to this technical information refer to current issue of

- in general all relevant Service Instructions (SI) containing further information regarding the lubrication system and in particular Service Instruction (SI) SI-916 i B-003, SI-915 i-003, SI-912 i-004,SI-914-020,SI-912-018
- in general Maintenance Manual Line (MML) and in particular – Chapter 12-20-00 – section Purging of the oil system
- in general Maintenance Manual Heavy (MMH) and in particular – Chapter 72-00-00
- All references, sections and pages that pertain to removal and replacement of rocker arms, push-rods and valve covers

NOTE: The status of the Manuals can be determined by checking the table of amendments. The 1st column of this table shows the revision status. Compare this number to the one listed on the ROTAX website:

www.flyrotax.com. Updates and current revisions can be downloaded for free.

1.12) Other Publications affected

None.

1.13) Interchangeability of parts

- all affected parts cannot further be used and must be returned F.O.B to ROTAX® Authorized distributors or their independent Service Centers.
- further sale, use or shipment of all valve push-rods part no. 854861 produced in the affected time period (as of June 08th, 2016 until October 02nd, 2017), in stores (e.g. replacement parts) are also affected, and must undergo a visual inspection of valve push-rods as per section 3.1.2 and if found not OK must be returned F.O.B. to ROTAX® Authorized distributors or their independent Service Centers.

2) Material Information

2.1) Material

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

2.2) Company support information

- Shipping costs, downtime costs, loss of income, telephone costs etc. or costs of conversion to other engine versions or additional work, as for instance simultaneous engine overhauls are not covered in this scope and will not be borne or reimbursed by ROTAX®

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2.3) Material requirement per engine

parts requirement: Order parts as required for the relevant job task to be determined in section 3.).

Fig. no.		part no.	Qty/engine	Description	Application
1	required parts for replacement	854862*	as required	Valve push-rod assy.	cylinder head
1		854383	as required	Rocker arm left	cylinder head
1		854393	as required	Rocker arm right	cylinder head
2	required parts for inspection	840887	4	Allen screw M6x30 10.9	valve cover
2		927941	4	Washer 6.0/12/1	valve cover
2		881920	1 Set	O-Ring set	valve cover

* or relevant part as per supersedure history

2.4) Material requirement per spare part

None

2.5) Rework of parts

None.

2.6) Special tooling/lubricants- /adhesives- /sealing compounds

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

Description	Qty/engine	Part no.	Application
Valve spring mounting device	1*	877387	valve spring
Engine oil	as required	n.a**	rocker arm bearing

* Only needed if replacement task is required.

** or equivalent.

NOTICE

If using these special tools observe the manufacturers specifications.

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3) Accomplishment/Instructions

- ROTAX® reserves the right to make any amendments to existing documents, which might become necessary due to this standardization, at the time of next revision or issue.

NOTE: Before maintenance, review the entire documentation to make sure you have a complete understanding of the procedure and requirements.

Accomplishment

All measures must be implemented and confirmed by at least one of the following persons or organizations:

- ROTAX® - Airworthiness representatives
- ROTAX® - Authorized Distributors or their independent Service Centers
- Persons approved by the respective Aviation Authorities
- Persons with approved qualifications for the corresponding engine types. Only authorized persons (IRMT, Level Heavy Maintenance) are entitled to carry out this work

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



All work has to be performed in accordance with the relevant ROTAX® Instructions for Continued Airworthiness (ICA) of the respective engine type.

General

Further material on general inspection, maintenance and repair can be found also in relevant Advisory Circular AC 43.13 from FAA.

Advisory Circular

The Advisory Circular (AC) contains maintenance methods, techniques and practices.

Step	Procedure
1	Check the criteria given on page 1, section 1.1, if the aircraft engine is affected by this SB.
2	Check the engine logbook and maintenance documentation, if this SB has already been accomplished.

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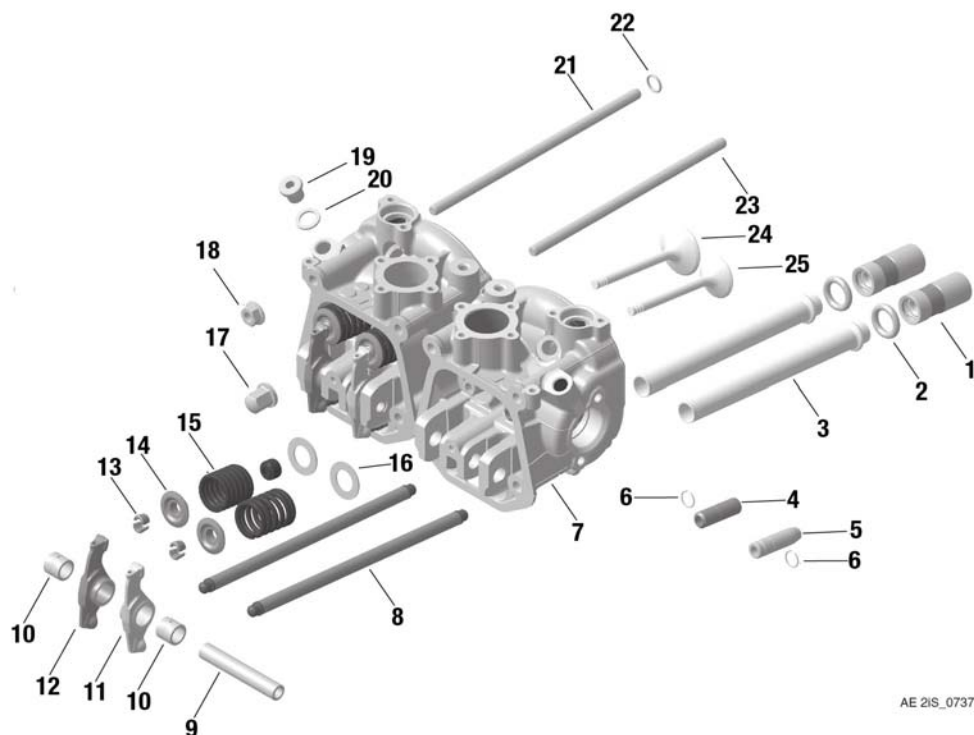
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3.1) Illustrated Parts Catalog - related information



See current Illustrated Parts Catalog (IPC) for the respective engine type.

See Fig. 1.



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1	Hydraulic valve tappet	2	O-ring 16x5	3	Oil return tube	4	Valve guide
5	Inlet valve guide	6	Retaining ring A12	7	Cylinder head	8	Valve push-rod assy.
9	Rocker arm shaft	10	Bushing	11	Rocker arm right	12	Rocker arm left
13	Valve cotter	14	Valve spring retainer	15	Valve spring	16	Shim 16/27.9/1
17	Collar cap nut M8	18	Hex. nut M8	19	Plug screw M12x1.5	20	Sealing ring A12
21	Stud M8x200	22	O-ring 10.82x1.78	23	Stud M8x186	24	Intake valve 38 mm
25	Exhaust valve 32 mm						

Fig. 1
 Spare parts

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3.2) Installation - related information



See current Installation Manual (IM) for the respective engine type.

3.3) Operation - related information



See current Operation Manual (OM) for the respective engine type.

3.4) Maintenance (Line) - related information



See current Maintenance Manual Line (MML) for the respective engine type and its periodical maintenance information

3.5) Maintenance (Heavy) - related information

3.5.1) Removing valve covers

See [Fig. 2](#)

Step	Procedure
1	Loosen Allen screw (1) M6x30 with washer (2) from valve cover (3), and remove it together with small and large O-rings (4 and 5).

- 1 Allen screw M6x30
- 2 Washer 6.0
- 3 Valve Cover
- 4 O-ring 6.4x1.8
- 5 O-ring 105x2.5

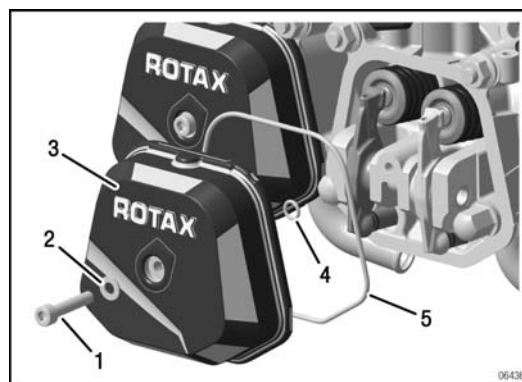


Fig. 2
Valve cover

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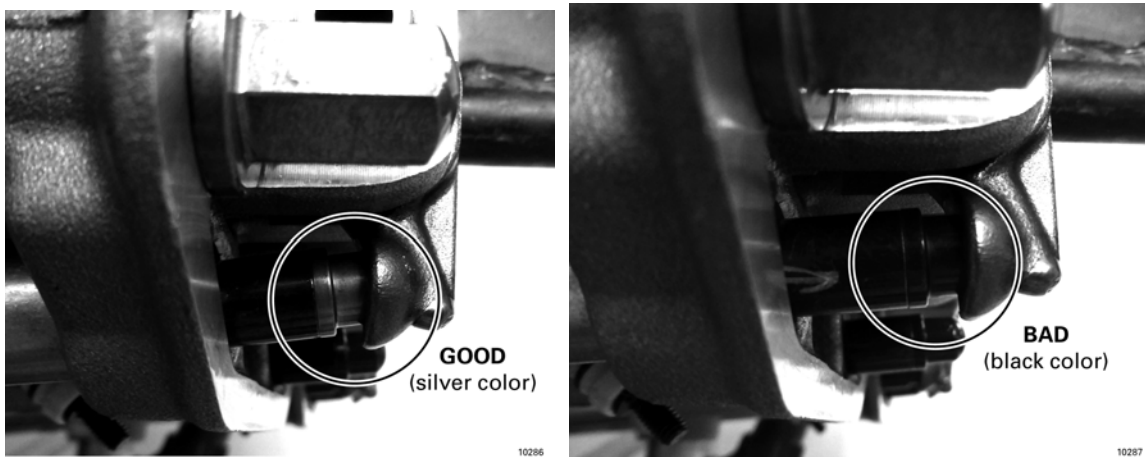
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3.5.2) Visual inspection of valve push-rods

Perform visual inspection of all push-rod ball sockets on all cylinders.

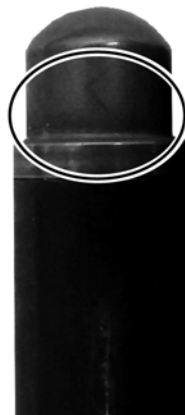
Check for color. See [Fig. 3](#).

Color	Evaluation
Silver surface	Valve push-rod is OK. No further action required for this valve push-rod.
Black surface	Valve push-rod is NOT OK. See section. 3.5.3) Replacement of affected parts .



comparison of spare parts:

GOOD
(silver color)



BAD
(black color)



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Fig. 3
Visual inspection

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3.5.3) Replacement of affected parts on affected cylinder positions (only in case visual inspection is NOT passed OK)

See [Fig. 4](#) and [Fig. 5](#).

On valve trains with valve push-rods found NOT OK the following steps need to be performed:

NOTE: On standard applications, the replacement of the push rods and rocker arms can be carried out with engine installed in aircraft.

Step	Procedure
1	Remove the spark plug connector and the four top spark plugs.

NOTICE Prevent entering of foreign substance through spark plug hole.

Step	Procedure
2	Turn crankshaft so that the respective piston is exactly on ignition top dead center. NOTE: Only when you have a Criterion B) Spare parts affected engine and only if engine is equipped with collar cap nuts M8 wrench size 13: Loosen the external collar cap nut (12) for easier disassembling of the rocker arm shaft.

NOTICE Do not loosen the collar nuts M8. There is no reason to remove or loosen the M8 collar nuts as the head stud may come loose requiring re-installation as per current Maintenance Manual. In the event that in loosening collar nuts M8, the stud becomes loose, re-torque the stud to 3 Nm (26 in.lb).

Step	Procedure
3	Attach the support plate (1) to the valve spring mounting device part no. 877387 (2) with 2 hex. screws (3) M6x16 at the attachment points (4) on the cylinder heads.
4	Put adapters (5) on the valve spring mounting device.
5	Attach the valve spring mounting device on cylinder head and support plate with 2 Allen screws (6) M6x70 and depress both valves with 3 turns.

WARNING When attaching the valve spring mounting device, take care to depress the valve with the valve spring simultaneously. Push the valve stem if need be, otherwise there is risk that the valve cotters will displace or may drop out.

Step	Procedure
6	This will relieve the pressure from both hydraulic tappets. Now the rocker arm shaft (7) may be easily pulled out. Lift out both rocker arms (8) and (9).
7	Replace only affected parts as per section 2.3). See also Fig. 5 .

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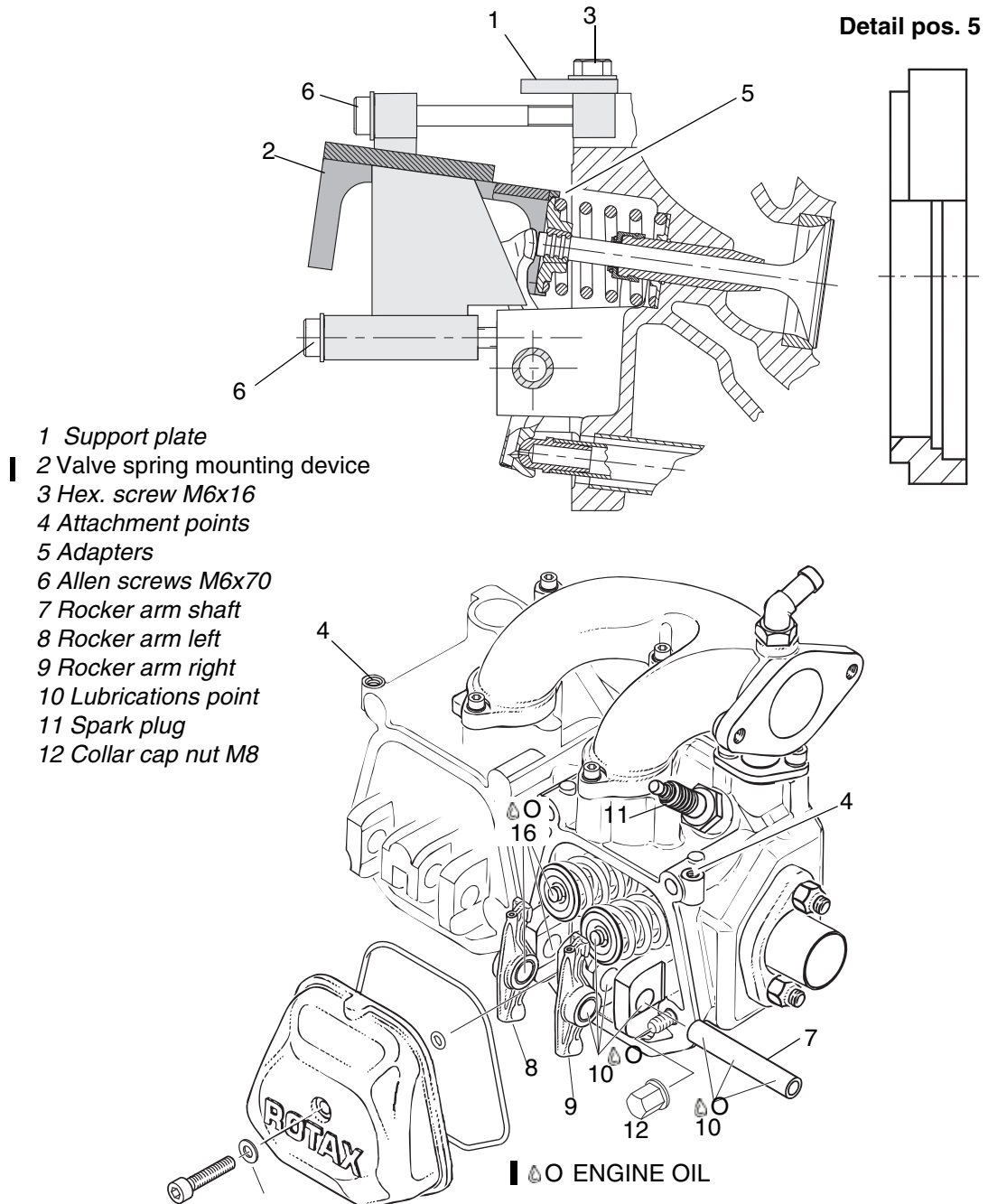


Fig. 4
 Replacement

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See Fig. 4 and Fig. 5.

Step	Procedure
8	Apply Engine oil (14) on both push-rod ball sockets and contact areas of rocker arm and slide push-rod into the oil return tube (13).
9	Check bushing and rocker arm shaft according to latest Maintenance Manual Heavy (MMH).
10	Lubricate the rocker arm shaft (on both sides), rocker arm bore and valve spring support with Engine oil.
11	Place rocker arm left (8) and rocker arm right (9) in cylinder head, apply Engine oil (10) on rocker arm shaft (7) and insert it into its bearing support.
12	Loosen valve spring mounting device and support plate.
13	When removing the valve spring mounting device, make sure the adapter rings (5) do not jam on the valve spring retainer.
14	NOTE: Only when you have an Criterion B) Spare parts affected engine and only if engine is equipped with collar cap nuts M8 wrench size 13: Torque collar cap nut (12) according to latest Maintenance Manual Heavy (MMH) or SI-912-025/SI-914-026/SI-912 i-010.
15	Lubricate all moving parts in the rocker arm space with engine oil or equivalent.

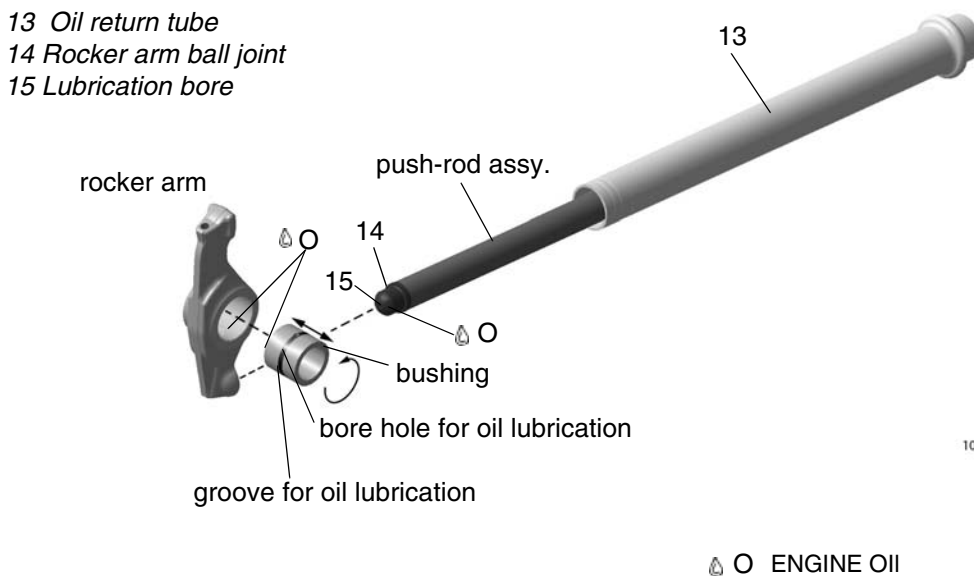


Fig. 5
 Push rod assy.

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3.5.4) Install valve cover

See Fig. 6.

NOTICE

The thread of screw and head must be cleaned from oil.

Step	Procedure
1	Clean the sealing surface of cylinder head and valve cover with a suitable lint-free cloth or equivalent.
2	Insert new O-ring (4) 6.4x1.8 and O-ring (5) 105x2.5 into the valve cover (3).
3	Fit valve cover (3).

NOTICE

Maintain a min. gap of 0.1 mm (0.004 in.) between valve covers. The covers must not touch each other.

Step	Procedure
4	Place on the valve (3) cover and fasten it with an Allen screw M6x30 (1) and (2) washer 6/12/1. Tightening torque 10 Nm (89 in.lb.).

WARNING

Carefully inspect the length of the valve cover screw. Inspect whether thread is damaged. If the screw is loose or the valve cover leaking, the oil will not return into the oil tank by "blow-by gas" and the oil system will not properly function. Improper installation of the valve cover could lead to loss of crankcase pressure.

- 1 Allen screw M6x30
- 2 Washer 6.0
- 3 Valve Cover
- 4 O-ring 6.4x1.8
- 5 O-ring 105x2.5

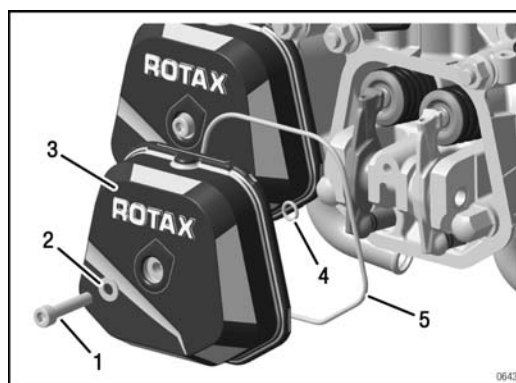


Fig. 6
Valve cover

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Step	Procedure
5	Purging of lubrication system in accordance with Maintenance Manual Line (MML) for the respective engine type, Chapter 12-20-00 section Purging the oil system, and according to SI-916 i B-003 / SI-915 i-003 / SI-912 i-004 / SI-912-018 / SI-914-020, current issue.
6	Refit the wiring and top spark plug (Fig. 4, pos. 11) as follows: - If genuine ROTAX® spark plugs installed: tighten the spark plugs to 16 Nm (142 in. lb.) on a cold engine. - If the old spark plug version NGK is still used: tighten to 20 Nm (15 ft.lb) or change all spark plugs to genuine ROTAX® spark plugs according to SI-912 i-013/SI-912-027/SI-914-028. Install spark plug connector according to marking sleeve.
7	Repeat the procedure on the remaining 3 cylinder heads.

- Restore aircraft to original operating configuration.
- Connect negative terminal of aircraft battery.

3.6) Test run

Conduct test run.

In case of uninstalled engines test run is accomplished with the mandatory test run after installation into aircraft.



See Chapter 12-20-00 of the latest Maintenance Manual Line (MML) for the respective engine type.

3.7) Summary

These instructions (section 3) have to be followed in accordance with the deadlines specified in section 1.5.

The execution of this mandatory Service Bulletin must be confirmed in the logbook.

NOTE: Work on EASA certified parts might affect the EASA Form 1 and does require appropriate documentation by authorized persons. Repairs must be entered into the engine logbook and also do apply for the EASA Form 1.

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

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.

3.8) Inquiries

Inquiries regarding this Service Bulletin should be sent to the ROTAX® Authorized Distributor of your area.

A list of all ROTAX® Authorized Distributors or their independent Service Centers is provided on www.flyrotax.com.

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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 **not technical drawings** and are for reference only. For specific detail, refer to the current documents of the respective engine type.