Chapter: LEP

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Chapter: TOA

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Approval*

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

Note: THE APPROVAL IS GIVEN TO ALL CHAPTERS EXCEPT THE AIRWORTHINESS LIMITATIONS SECTION 04-00-00 WHICH IS SUBJECT TO SPECIFIC APPROVAL OF THE EASA.

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Chapter: TOA

SUMMARY OF AMENDMENTS

Content

Summary of the relevant amendments in this context, but makes no claim to completeness.

Current No.	chapter	page	date of change	Comment
0	all	all	09 01 2012	New Edition.
0	05-00-00	5	09 01 2012	Valid time.
0	05-10-00	5, 8	09 01 2012	Storage period of engine, Time limit for fuel pump.
0	05-20-00	17	09 01 2012	Smooth performance of the engine
0	12-20-00	22, 49	09 01 2012	Inspect rotary seal for leakage, compressed air
1	05-10-00	6,7	01 01 2013	Footnote number changed.
1	05-20-00	11	01 01 2013	Change of text.
		12	01 01 2013	Change of 600 hr.
		13	01 01 2013	Change of reference.
		14	01 01 2013	Compression check changed to every 200 hr.
		14	01 01 2013	Carburetor synchronization changed to mech. and pneumatic synchronization.
		15	01 01 2013	Float chamber assy. check changed to every 200 hr.
		16	01 01 2013	Checking the propeller gearbox: footnotes added.
		16	01 01 2013	Oil change: footnote added, reference changed.
		16	01 01 2013	Check the oil tank: changed to every 200 hr.
		17	01 01 2013	Engine test run: Reference added.
		18	01 01 2013	Change of text.
1	05-50-00	1	01 01 2013	Change of text.
		3	01 01 2013	Chapt. 1.1: change of text.
		4	01 01 2013	Chapt. 1.2: change of text.
		9	01 01 2013	Chapt. 3.1: change of text.
		11	01 01 2013	Chapt. 3.4: change of text.
		12-23	01 01 2013	Change of chapter number.
		13	01 01 2013	Cylinder head temperature instead of coolant temperature.
1	12-20-00	1,5,7	01 01 2013	Change of text.
		9	01 01 2013	Text deleted.
		11	01 01 2013	Change of text.
		12	01 01 2013	Change of text.
		15	01 01 2013	Text deleted.
		24,25	01 01 2013	Graphic reference added. page 25 step 3 added.
		32	01 01 2013	Change of text.
		49	01 01 2013	Change of text.
		52	01 01 2013	Change of text. possible foreign matter added
		54	01 01 2013	Change of text.
		56	01 01 2013	Change of text.
		60	01 01 2013	Text deleted.
		68	01 01 2013	Checking the friction torque: formular added.

Current No.	chapter	page	date of change	Comment
2	05-10-00	8	02 01 2015	Change of text.
2	05-20-00	15	02 01 2015	Check of weight of the floater added.
2	05-50-00	8,9	02 01 2015	Change of text.
		13	02 01 2015	Change of text.
		14	02 01 2015	Exceeding of the coolant temperature added.
2	12-20-00	15	02 01 2015	Change of text.
		41	02 01 2015	Check of weight of the floater added.
		52-53	02 01 2015	Inspection of oil filter: change of text
		59	02 01 2015	Change of text

Engine Type description	engine affected engine S/N	TBO Time Between Overhaul
912 ULS	from 6,775.790	2000 hr. or 15 years, whichever comes first
912 ULSFR	up to and incl. 4,429.714	1200 hr. or 10 years, whichever comes first (1
912 ULSFR	from 4,429.715 up to and incl. 6,775.789	1500 hr. or 12 years, whichever comes first (1
912 ULSFR	from 6,775.790	2000 hr. or 15 years, whichever comes first

For the TBO of the specific engine type/version refer to the table below.

(1 Extension of the TBO is possible and will be specified by a Service Bulletin (SB) for the respective engine type. For extensions already effective refer to the engine log book or release certificate.

Authorized exceeding

Extension or exceeding of the TBO by 5 % or 6 months is allowed whichever comes first.

Shipment

The shipment to an authorized ROTAX overhaul facility must include the following:

1	Engine log book.
2	Maintenance records of the engine (i.e. all maintenance check lists, and reports of operation, of maintenance, of findings and of oil analyses).
3	The engine assembly as per supply volume. Additionally all added-on parts as in the supply volume such as carburetors, filters, fuel pump, external generator, sensors, ignition unit, electric starter, oil tank.
4	Indication of total engine operating hours (TSN) and where applicable, engine operating hours since a previous overhoul (TSO). NOTE: This information must be supplied to allow the service history of components to be traced.
5	Data about the type of aircraft used.
6	Useful remarks and observations concerning the engine.

2.1) Time limit for rubber parts

General note

NOTICE

This time limit must be followed **independently** and **in addition** to the visual inspections (see chap. 05-20-00 section: 5.1)) of the respective components.

Time limit

The following components and systems must be replaced every 5 years:

- venting hose of the carburetors	
- all rubber hoses of the cooling system	
- all rubber hoses of the fuel system (excluding all genuine ROTAX teflon hoses of the fuel system)	See SI-912-022, latest issue.
- venting hose of the fuel pump	
- all rubber hoses of the lubrication system which are part of the engine supply volume and if they are not in the maintenance schedule of aircraft manufacturer	
- carburetor sockets	
- connecting hose of the air intake system	
- diaphragm on both carburetors	
- rubber hoses on compensating tube	
- V-belt	

2.2) Time limit for fuel pump

General note

The fuel pump must be replaced every 5 years.

2.3) Time limit for the coolant

General note

Coolant must be replaced as per manufacturers instructions, at the latest during overhaul or when the engine is replaced.

2.4) Annual inspection

General note

A 100 hr. inspection is to be carried out periodically after every 100 hours of operation **or every 12 months**, whichever comes first.
See chap. 05-10-00 section: 2).

5.1) Maintenance Schedule

General note

Perform the following maintenance tasks at the intervals shown in the maintenance check list. See chapter 05-20-00 25 hr. check.

Legend: X = do the task
blank = no task required

NOTES: If the points 1-3 in order to continue with the maintenance schedule.
If one of the points 1-3 not OK, the engine must be checked and repaired in accordance with the BRP-Powertrain instructions for continued airworthiness.

Points of Inspection	Interval Operating hours		Chapter Reference	Signature
	as indicated	100 hr.		
1.) Visual inspection of the engine				
General visual inspection of the engine for damage or abnormalities. Check cooling air duct and cooling fins of the cylinders for obstruction, cracks, wear and good condition. Take note of changes caused by temperature influence.	recommended 50 hr.	X	12-20-00 sec. 3)	
Visual inspection of the temperature sensor and the oil pressure sensor. Inspect for tight fit and good condition.		X		
Inspect all coolant hoses for damage, including leakage, hardening from heat, porosity, loose connections and secure attachment. Verify routing is free of kinks and restrictions.		X	12-20-00 sec. 9.1)	
Carry out visual inspection of leakage bore at the base of the water pump for signs of leakage.		X	12-20-00 sec. 4)	
Inspect the expansion tank for damage and abnormalities. Check coolant level, replenish as necessary. Inspect radiator cap. Inspect protection rubber on expansion tank base for correct fit.		X	12-20-00 sec. 9.1,9.4) 12-10-00 sec. 3.1)	
Inspect the overflow bottle for damage and abnormalities. Verify coolant level, replenish as necessary. Inspect line from expansion tank to overflow bottle for damage, leakage and clear passage. Inspect venting bore in cap of overflow bottle for clear passage.		X	12-20-00 sec. 9.5) 12-10-00 sec. 3.1)	

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Points of Inspection	Interval Operating hours		Chapter Reference	Signature
	as indicated	100 hr.		
Inspect all oil lines for damage, leakage, hardening from heat, porosity, security of connections and attachments. Verify routing is free of kinks and restrictions.		X	12-20-00 sec. 4)	
Inspect all fuel lines for damage, leakage, hardening from heat, porosity, security connections and attachments. Verify routing is free of kinks and restrictions. In the case of steel fuel lines (912 F, 912 S and/or optional), also check for any cracks and/or scuffing marks.		X	12-20-00 sec. 4)	
Inspect the wiring and its connections for secure fit, damage and signs of wear.		X	12-20-00 sec. 13.1)	
Check the oil filter for damage, tightness and abnormal wear.			12-20-00 sec. 13.5)	
2.) Magnetic plug				
Check the magnetic plug.		X	12-20-00 sec. 12)	
3.) Compression check				
Check the compression by the differential pressure method. Test pressure_____hPa (psi) **Pressure drop (% or fraction)** **Cyl # | 1 | 2 | 3 | 4** **bar/psi** | | | |	every 200 hr.		12-20-00 sec. 5)	
4.) Checking the engine suspension				
Inspect engine suspension and fasteners for secure fit, including damage from heat, deformation, cracks.		X	12-20-00 sec. 3.1)	
5.) Checking the air intake system				
Inspect suspension and fasteners for secure fit, including damage from heat, deformation, cracks.		X		

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Points of Inspection	Interval Operating hours		Chapter Reference	Signature
	as indicated	100 hr.		
6.) Engine external parts				
Inspect screws and nuts of all external parts for tight fit. Inspect safety wiring, replace as necessary.		X		
7.) Engine cleaning				
Engine cleaning		X	12-20-00 sec. 1)	
8.) Checking the air filter				
Checking the air filter.		X	12-20-00 sec. 2)	
9.) Checking the carburetors				
Checking the idle speed.		X	12-20-00 sec.10.3.1)	
Checking the ventilation of the float chambers. Any trouble with the float chamber ventilation impairs engine and carburetor function and must therefore be avoided. Check that the passage of the ventilation lines is free and that no kinks can arise.	200 hr.			
Check for free movement of the carburetor actuation (throttle lever and starting carburetor). Check that the bowden cable allows the full travel of the throttle lever from stop to stop.		X	12-20-00 sec. 10.6)	
Removal/assembly of the two carburetors for carburetor inspection.	every 200 hr.		Heavy MM 73-00-00 sec. 3)	
Check carburetor synchronization. Mechanical and pneumatic synchronization.		X	12-20-00 sec. 10.1) 10.2) 10.3)	
Check weight of floater.	every 200 hr. (or annual check)		12-20-00 sec. 10.4.1)	
10.) Inspecting carburetor sockets and drip tray				
Inspect the carburetor sockets for damage and abnormalities, checking for cracks, wear and good condition. Take note of changes caused by temperature influence. (1 See SB-912-030 - latest edition.	every 200 hr. (1		Heavy MM 73-00-00 sec. 3.4.3)	
11.) Spark plug connectors				
Check that resistance spark plug connectors fit tightly on the spark plugs. Minimum pull-off force is 30 N (7 lb).	every 200 hr.			

Points of Inspection	Interval Operating hours		Chapter Reference	Signature
	as indicated	100 hr.		
12.) Spark plugs				
Remove all spark plugs, check the heat range designation, clean, check electrode gap and adjust if necessary. Replace as required.		X	12-20-00 sec. 13.2)	
Replacing spark plugs.	every 200 hr.	X(1	12-20-00 sec. 13.2)	
(1 use of leaded fuel more than 30% of operation.				
13.) Flushing the cooling system				
Flushing the cooling system where conventional coolants are used.	when replacing the coolant		12-20-00 sec. 9.3)	
14.) Checking the propeller gear box				
Check the friction torque in free rotation on gearboxes with overload clutch. Actual friction torque_____ Nm (in.lbs)		X	12-20-00 sec. 14.1)	
Gearboxes with overload clutch (1 use of leaded fuel more than 30% of operation. Inspect overload clutch.	every 600 hr.(1		05-50-00 sec. 2) SB-912-033	
Checking the propeller gearbox with overload clutch. (2 only for engine type 912 S/ULS/ULSFR	every 1000 hr.(2		12-20-00 sec. 14.2)	
Checking the propeller gearbox without overload clutch. (3 only for engine type 912 UL/ULS/ULSFR	every 600 hr.(3		12-20-00 sec. 14.2)	
15.) Oil change				
Drain oil from oil tank.	every 50 hr.(1	X	12-20-00 sec. 11.2)	
Check the oil tank and clean the oil tank if contaminated. (1 use of leaded fuel more than 30% of operation.	every 200 hr.	X(1	12-20-00 11.5)	
Remove old oil filter from engine and install new oil filter.	every 50 hr.(1	X	12-20-00 sec. 11.3)	
Cut old oil filter without producing any metal chips and inspect following components for wear and/or missing material Filter mat Findings:_____ _____	every 50 hr.(1	X	12-20-00 sec.11.4)	

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Points of Inspection	Interval Operating hours		Chapter Reference	Signature
	as indicated	100 hr.		
Filter cover Findings:_____ _____ Sealing lip (wear, cracks, missing material) Findings:_____ _____ Spring of bypass valve (small) Findings:_____ _____ Positioning spring (big) Findings:_____ _____				
Refill oil tank with approx. 3 litres of oil. For oil quality, see Operators Manual and SI-912 -016, latest edition.	every 50 hr.(1	X	12-20-00 sec. 11.2)	
(1 use of leaded fuel more than 30% of operation				
16.) Oil level check				
Verify oil level, replenish as necessary.		X	12-10-00 sec. 4.1)	
17.) Checking the V-belt tension				
On configurations with auxiliary generator, check the attachment and the V-belt tension.		X	12-20-00 sec. 6)	
18.) Smooth performance of the engine				
Inspection of turning of the crankshaft. For all engines with crankcase up to S/N 27811 inclusive. torque _____Nm NOTE: At engines with new crankecase S/N 06.0010 or higher only inspect in case of suspected hard movement.		X	05-50-00 sec. 3.13)	
19.) Engine test run				
Observe the safety instructions!				

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Points of Inspection	Interval Operating hours		Chapter Reference	Signature
	as indicated	100 hr.		
Start the engine and run to operating temperature. Limits see Operators Manual 912 series. Ignition check at _____ rpm engine speed. Speed drop without ignition circuit: A (Off)_____rpm B (Off)_____rpm A/B (difference)_____rpm Inspect carb heat system. Hit the preheating and make a note of speed drop. Speed drop_____rpm. Preheating “OFF“, engine idle running and make a note of idle speed running _____rpm. After engine test run, re-tighten the oil filter by hand (only at cold engine). Checks for leaks.		X	12-20-00 sec. 8) 12-20-00 sec. 4)	
General note				
All Service Bulletins are complied with.		X		

Return to service

At the identified engine (as per sec. 5), on (Date) _____ the_____hr.
Check at_____hr. (TSN___, TSO___) was carried out according to recommendations of the engine manufacturer and was recorded in the Engine Log book.

Location, Date_____

Inspector_____

Aircraft mechanic_____

Certificate No._____

Chapter: 05-50-00

UNSCHEDULED MAINTENANCE CHECKS

Introduction

NOTICE In the course of special checks specify if **additional checks** for components (e.g. hydraulic governor) is applicable.
After each special check/repair work, an engine test run and a leakage check must be carried out.

NOTICE Observe without fail all the specified instructions.

Special checks must be carried out immediately in the event of an engine fault (e.g. abnormal operation as defined in the Operators Manual) which impairs the airworthiness of the engine.

Table of contents

This chapter of the Maintenance Manual contains general information regarding unscheduled maintenance checks and their associated procedures.

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NOTES

3) Examination after engine failure

General note

In order to find possible causes of the failure, it is important to pass on all available data. Observations on the aircraft and the engine suspension can also be of help. It is important to pay particular attention to any of the following engine phenomena to facilitate troubleshooting.

Engine

Engine runs erratically and misfires	
part	**possible cause**
Fuel system	fuel supply vapour locks contamination float chamber venting false air intake due to defective carburetor flange carburetor icing
Ignition system (shorting cable, electronic module, charging coil) Spark plug	malfunction grounding defect wrong spark plug connection

Rough running

Rough running engine	
part	**possible cause**
Ignition	wiring (assignment fault)
Carburetor	fuel supply contamination in float chamber or float needle valve float chamber venting false air intake due to defective carburetor flange incorrect synchronization of the carburetor
Engine	engine temperature too low too lean carburetor jetting due to conditions prevailing in intake silencer

Engine stoppage

NOTICE

Should one of the above mentioned points occur even for a short time then a detailed check of the engine is necessary. The fault needs to be located and corrected.

Unintended engine stoppage by seizing	
part	**possible cause**
Oil system	oil pressure too low or no oil pressure oil shortage contamination incorrect venting
Oil pump	defect

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Unintended engine stoppage by seizing	
part	**possible cause**
Camshaft bearings/Conrod bearings	rather consequential damage wear (low oil pressure)
NOTICE The entire assembly must be dismantled, inspected and repaired.	

- The whole engine must be inspected, repaired or overhauled in accordance with the BRP-Powertrain instructions for continued airworthiness.
- Inspect all systems for correct functioning.
- Detailed inspection of affected engine components.

Cylinder head

A rise in cylinder head temperature or coolant temperature above normal operating limits (see Operators Manual) is a clear signal for a failure in the cooling system.

Cylinder head temperature or coolant temperature too high	
part	**possible cause**
Cooling system	not enough coolant bad venting
Return valve is not working	malfunction
Radiator	contaminated
Radiator cap	leaking
Pressure relief valve	malfunction
Water pump	malfunction

3.6) Exceeding of max. cooling system temperature

General note

NOTICE

If the maximum cooling system temperature is exceeded, other limits are also often exceeded, e.g. oil temperature. Please observe the relevant instructions.

NOTES: Any exceeding of the max. admissible cooling system temperature must be entered by the pilot into the engine log book, stating duration extent of excess temperature and pertinent detail.

3.6.1) Exceeding of max. cylinder head temperature (all engines affected with serial number without Suffi -01)

See SB-912-068, latest issue.

Graphic

Overview and proceed:

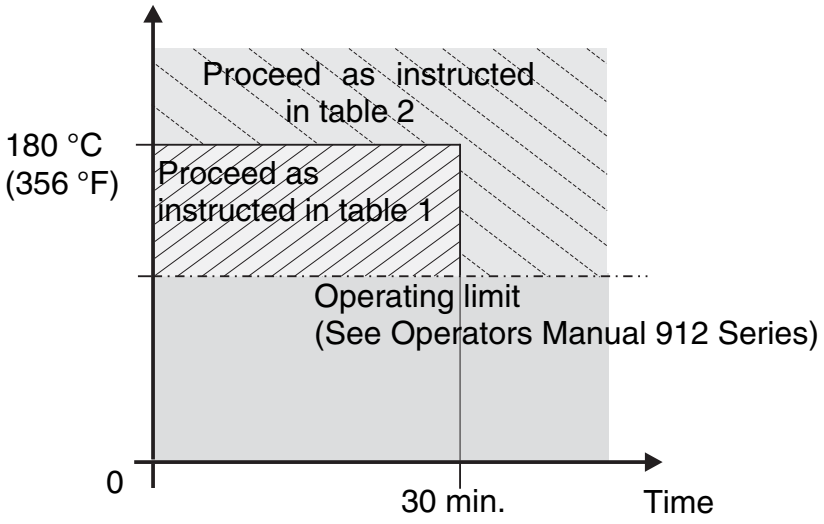

Fig. 2 07140

Exceeding up to 180 °C

Table 1.

Exceeding up to 180 °C (356 °F)- short-term	
Step	**Procedure**
1	The whole cooling system must be inspected, repaired or overhauled in accordance with the BRP-Powertrain instructions for continued airworthiness.
2	Inspect all further systems for correct functioning.
	Carry out detailed inspection of the affected engine components such as. - Leakage check on the cooling system. - Check that the cylinder head attachment is fitted securely. If the cylinder head nut is loose, proceed as instructed in sec. “Excess temperature of over 180 °C (356 °F) and/or for longer than 30 min.“ - Check all coolant fittings (feed/outflow) for secure fit.

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Exceeding over 180 °C

Table 2.

Excess temperature of over 180 °C (356 °F) and/or for longer than 30 min.	
Step	**Procedure**
1	The whole cooling system must be inspected, repaired or overhauled in accordance with the BRP-Powertrain instructions for continued airworthiness.
2	Inspect all further systems for correct functioning.
3	Carry out detailed inspection of the affected engine components.
4	Check compression by carrying out a differential pressure check.
5	All cylinder heads and cylinders must be removed and subjected to a detailed check including hardness testing. See chap. 72-00-00 in the Heavy Maintenance Manual.

3.6.2)Exceeding of max. coolant temperature (all engines affected with serial number with Suffi -01)

See SB-912-068, latest issue.

General note

NOTICE If the maximum coolant temperature is exceeded, other limits are also often exceeded, e.g. oil temperature. Please observe the relevant instructions.

NOTE: Any exceeding of the max. admissible coolant temperature must be entered by the pilot into the engine log book, stating duration, extent of excess temperature and pertinent detail.

Graphic

Overview and proceed:

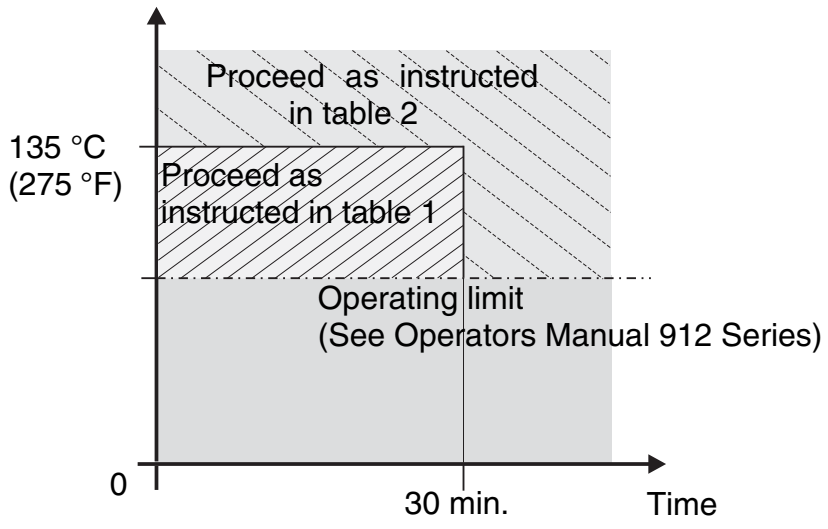

Fig. 3 07140

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3.7) Exceeding the max. permissible oil temperature

General note

NOTICE

If the max. permissible oil temperature is exceeded, other limits are often exceeded, too, e.g. the coolant system temperature. Please observe the relevant instructions.

NOTES: Any exceeding of the max. admissible oil temperature must be entered by the pilot into the engine log book, stating duration extant of excessive temperature and pertinent detail.

Graphic

Overview and proceed;

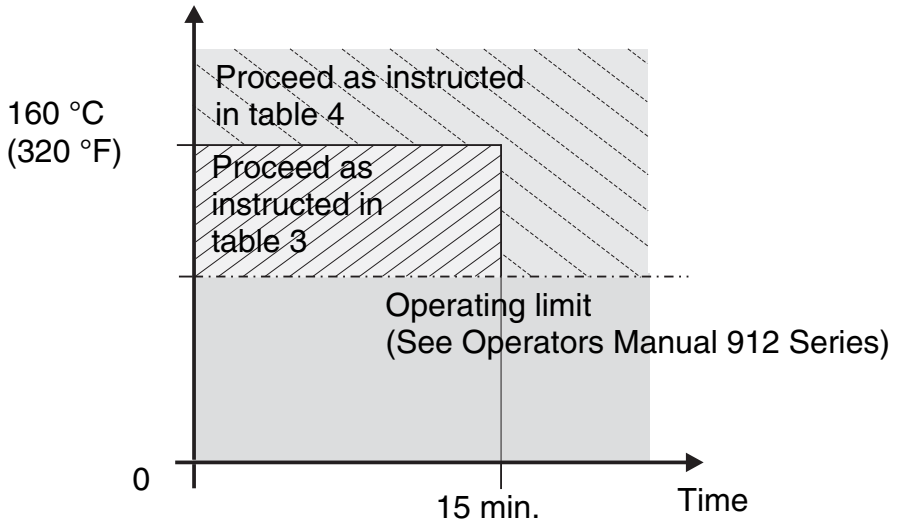

Fig. 4 07140

Exceeding up to max. 160 °C (320 °F)

Table 3.

Excess temperature up to max. 160 °C (320 °F) max. 15 min.	
Step	**Procedure**
1	The whole oil system must be inspected, repaired or overhauled in accordance with the BRP-Powertrain instructions for continued airworthiness.
2	Inspect oil level in the oil tank.
3	Inspect oil cooler for contamination and check the entire oil circuit for correct functioning.
4	Check that oil lines are routed correctly and undamaged.
5	Cut oil filter housing and inspect filter mat for foreign matter.
6	Carry out oil change.
7	Inspect all further systems for correct functioning.

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Exceeding over 160 °C (320 °F)

Table 4.

Excess temperature over 160 °C (320 °F) for longer than 15 min.	
Step	**Procedure**
1	The whole engine must be inspected, repaired or overhauled in accordance with the BRP-Powertrain instructions for continued airworthiness.
2	Inspect all further systems for correct functioning.
3	Carry out detailed inspection of the affected engine components.
4	The whole oil system (oil cooler, oil lines) must be inspected.
5	Cut oil filter housing and inspect filter mat for foreign matter.
6	Carry out oil change.

3) Visual inspection

General note

General visual inspection of the engine for damage or abnormalities. For definition and scope of visual inspection (See chap. 05-20-00 section: 3).

Abnormalities

Take note of changes caused by temperature influence.

During a visual inspection you should focus on the following points in particular:

- Exhaust system
- Airbox
- Engine suspension frame
- Heat shrink sleeve
- Oil cooler
- Venting hoses (oil tank)
- Fuel lines
- Cooler
- Coolant hoses
- Oil filter

3.1) Checking the engine suspension

General note

NOTICE Exactly observe the tightening torques for screws and nuts. Overtightening or too loose connection could cause serious engine damage.

Checking the engine suspension

Step	Procedure
1	Inspect the engine suspension points on the crankcase for tight fit and damage including cracks.
2	Inspect the surroundings of engine attachment on crankcase and gearbox. If there is discoloration of the crankcase around the attachment points (black ring), there may be loose attachments.
3	Inspect engine isolating mounts for heat damage, wear and cracks.
4	Visual inspection of the engine suspension frame for cracks.

3.2) Corrosion

Definition

Corrosion is a natural process which attacks and potentially damages metals via an electro-chemical reaction. For more detailed information about different types of corrosion and corresponding methods for dealing with corrosion refer to the FAA Advisory Circular AC 43.13.
See chapter “AC 43.13-1B Maintenance and Repair“.

10.4) Checking of the float chamber

General note

See Fig. 22.

⚠WARNING

Risk of severe burns or scalds!
Hot engine parts!
Always allow engine to cool down to ambient temperature before start of any work.

Instruction

To check of the float chamber the following steps are necessary:

Step	Procedure
1	Remove drip tray (1).
2	Open spring clip (2).
3	Remove float chamber (3) with gasket (4) and both float.
4	Remove both float (5) from the float chamber.
5	Accomplishment of chap. 10.4.1) Check of weight of the floater.
6	Inspect the float chamber for contamination and corrosion.

NOTICE

If any contamination on float chamber the find out what the cause is and take corresponding action to rectify the problem. Inspect and clean the complete fuel system including carburetor.

Step	Procedure
7	Assembly at the float chamber should be carried out analogously the disassembly.
8	Adjust with the idle speed adjustment. See chap. 12-20-00 section: 10.5).

10.4.1) Check of weight of the floater

The weight inspection shows whether the affected floats have absorbed fuel. This is only significant if the floats already had contact with fuel.

NOTE: This check is not relevant for new spare parts, that were not in contact with fuel.

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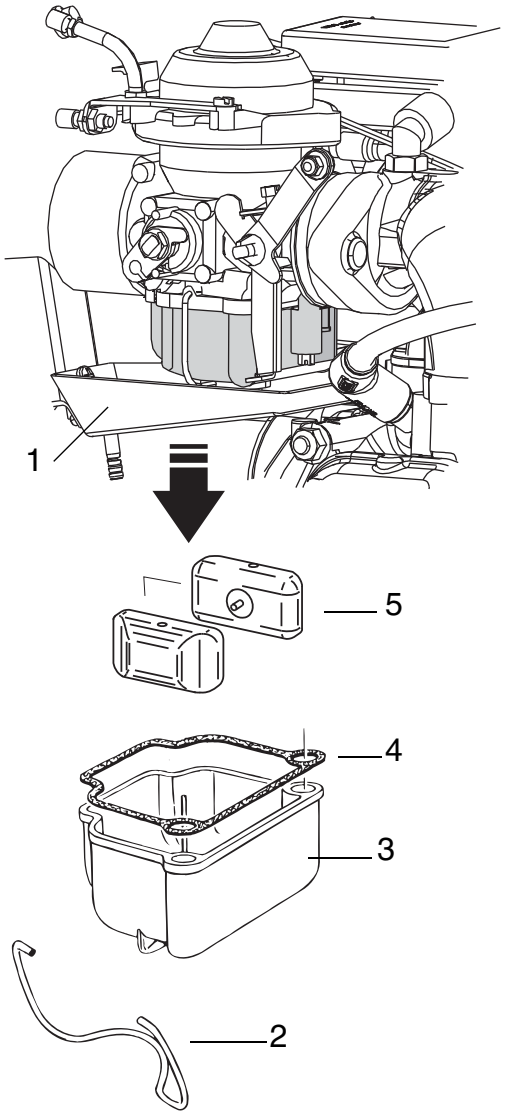
Step	Procedure
1	Let the floats dry for 1-2 minutes. Only weigh dry floats.
2	Check the weight of all affected floats using a calibrated balance. Measuring tolerance of the balance: max. 0.1 grams.
3	The results of the measurement must be documented in the maintenance records. The max. allowable weight (of both floats together) is 7 grams.

NOTICE Renew all floats which exceed the max. weight.

Graphic Float chamber



Part	Function
1	Drip tray
2	Spring clip
3	Float chamber
4	Gasket
5	Float

Fig. 22 *08653*

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10.5) Idle speed adjustment

General note

See Fig. 21.

NOTICE

If satisfactory idle speed adjustment cannot be achieved, inspection of the idle jet or additional pneumatic synchronization will be necessary.
See chap. 12-20-00 section: 10.3).

Idle adjustment

Always carry out idle speed adjustment when the engine is warm.

- Basic adjustment of the idle speed is first effected using the idle speed adjustment screw (2) of the throttle valve.
  See chap. 12-20-00 section: 10.2).

Optimizing engine running

Necessary only if not taken care of at synchronization.

Step	Procedure
1	Close idle mixture screw (4) by turning clockwise to screw in fully and then opening again by 1.5 turns counter clockwise.
2	Starting from this basic adjustment, the idle mixture screw (4) is turned until the highest idle speed is reached.
3	The optimum setting is the middle between the two positions at which an rpm. drop is noticed.
4	Then readjustment of the idle speed is carried out using the idle speed adjustment screw (2) and if necessary, by slightly turning the idle mixture screw again. NOTES: Turning the idle mixture control screw in clockwise direction results in a leaner mixture and turning counter clockwise in a richer mixture.

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10.6) Checking the carburetor actuation

General note

See Fig. 23.

Route bowden cables in such a way that carburetor actuation will not be influenced by any movement of engine or airframe, thus possibly falsifying idle speed setting and synchronization.

NOTES: Each carburetor is actuated by two bowden cables. At position (1) connection for throttle valve, and at position (2) connection for choke actuation.

⚠WARNING Risk of life threatening injuries caused by propeller! Adjust bowden cables so that the throttle valve and the choke actuation of the starting carburetor can be fully opened and closed. Bowden cables and lever must not jam!

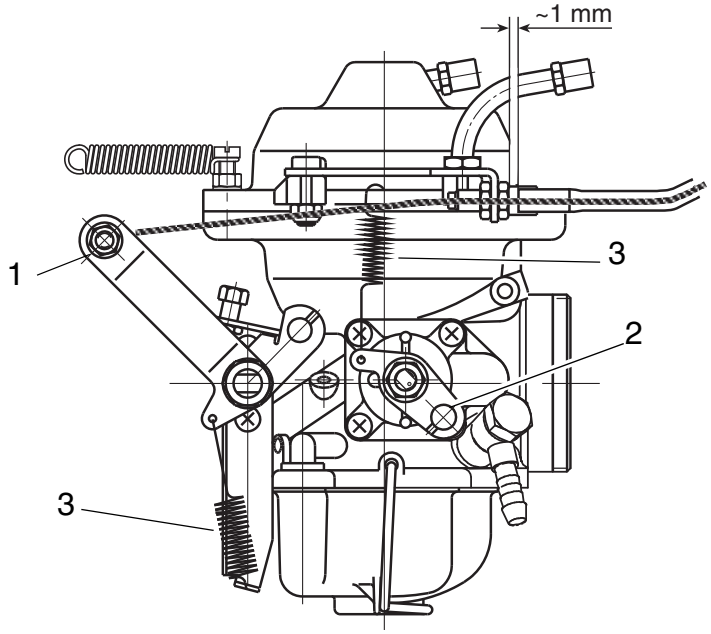
⚠WARNING Risk of life threatening injuries caused by propeller! With carburetor actuation not connected, the throttle valve is fully open. The initial position of the CD carburetor is **full throttle**! So never start the engine with the actuation disconnected.

Procedure

To test the carburetor actuation the following steps are necessary:

Step	Procedure
1	Inspect bowden cables and levers for free movement.
2	Bowden cable must allow full travel of lever from stop to stop.
3	Adjust throttle cables to a clearance of 1mm (0.04 in).
4	Inspect and lubricate linkage on carburetor and carburetor joints with engine oil.
5	Inspect return springs (3) and inspect engagement holes for wear.

Graphic Checking the carburetor actuation



Part	Function
1	Connection for throttle valve
2	Connection for choke actuation
3	Return springs

Fig. 23 *00352*

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11.2) Oil change

Procedure

NOTES: Run engine to warm oil before beginning oil change procedure.

To change the oil the following steps are necessary:

Step	Procedure
1	Crank engine by hand to transfer the oil from the crankcase. See chap. 12-10-00 section: 4.1).
2	Remove safety wire and oil drain screw from the oil tank, drain the used oil and dispose of as per environmental regulations.
3	Replace oil filter at each oil change and inspect the filter components. See chap. 12-20-00 section: 11.4).
4	After inspection dispose the oil filter components according to environmental regulations.
5	Install oil drain screw with new gasket with tightening torque 25 Nm (18 ft.lb) and safety wire.

NOTICE Only use brand name oil in accordance with the latest Operators Manual and SI-912-016, “Selection of suitable operating fluids“ latest issue.

NOTICE The engine must not be cranked when the oil system is open. When the crankshaft was turned, then the oil system must be purged.

NOTICE Compressed air must not be used to blow through the oil system (or oil lines, oil pump housing, oil bores in the housing).

ENVIRONMENT NOTE
Be careful that no oil enters the sewerage system or the soil -
Risk of contamination of drinking water!
Collect waste oil and take it to the recycling center.

Step	Procedure
6	Install new oil filter.
7	Pour in approx. 3l (0.8 gal (US)) of fresh oil.
8	After carrying out the oil change, the engine should be cranked by hand in the direction of engine rotation (approx. 20 turns) to completely refill the entire oil circuit.

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11.3) Oil filter replacement

General note

⚠WARNING Risk of severe burns and scalds!
Hot engine parts!
Always allow engine to cool down to ambient temperature before start of any work.

NOTICE To ensure correct functioning of the oil circuit and the forced flow lubrication, use GENUINE ROTAX-oil filter only. Only these filters will ensure correct pressure in the by-pass valve.

At every oil change, unscrew the oil filter and cut open using special tool taking care not to produce chips.

Special tool

To carry out the procedure the following steps are necessary:

part number	Description
part no. 877620*	(1) Oil filter wrench
part no. 877670*	(2) Cutting tool
* or equivalent	

Graphic

Special tool

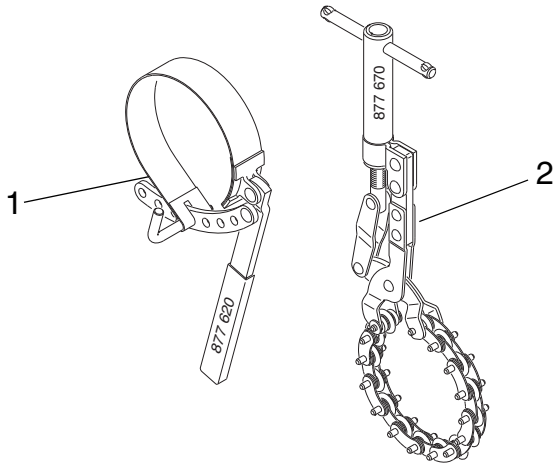

Fig. 25 02734

11.3.1) Install/Remove of oil filter

General note

See Fig. 26.

NOTICE After test run inspect tight fit of oil filter.

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Procedure

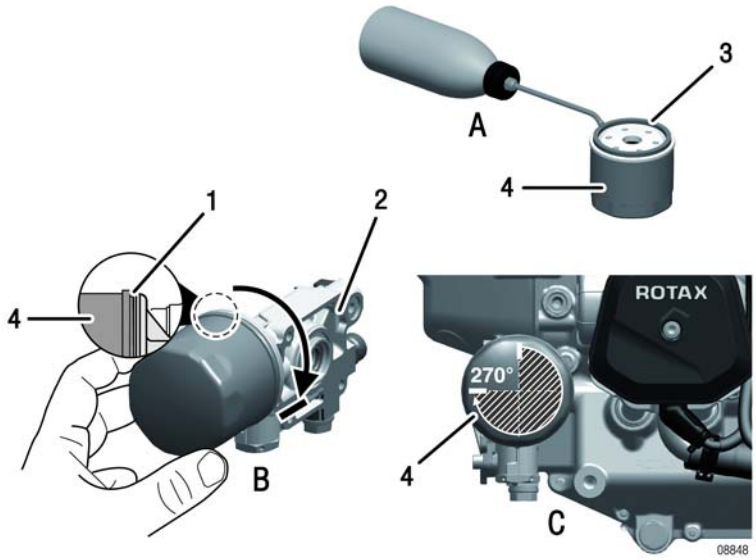
To install/remove the oil filter the following steps are necessary:

Step	Procedure
1	Remove used oil filter with oil filter wrench.
2	Clean the contact surface (1) of the oil pump housing (2) with a clean cloth.
3	Apply a thin film of engine oil on the gasket (3) of the new oil filter (4).
4	Install the new oil filter on the engine.
5	Screw on oil filter until oil filter gasket is seated solidly. NOTE: Sign 270 °C-mark on oil pump housing, so that the tightening of oil filter can be controlled.
6	Tighten oil filter with 3/4 turn (270°).
7	Inspection of used oil filter. See therefore chap. 12-20-00 section 11.4).

Inspect all systems for correct function.

Graphic

Install oil filter.



Part	Function
1	Contact surface
2	Oil pump housing
3	Gasket
4	Oil filter

Fig. 26 *08550*

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11.4) Inspection of the filter components

General note

NOTICE The filter components must be inspected carefully.

This inspection is important as it allows conclusions to be drawn regarding the internal condition of the engine and provides information about the possible cause of any damage.

Procedure

To carry out the procedure the following steps are necessary:

Step	Procedure
1	Oil filter cut open using special tool taking care not to produce chips.
2	Remove anti-drain membrane.
3	Cut top and bottom edges off the mat with a knife.
4	Remove filter mat, fold up and press remaining oil out.
5	Unroll and inspect it for metal chips, foreign matter, contamination and abrasion.
6	Pass over matt with a clean magnet and inspect for metal.
7	Inspect filter housing at the contact surfaces for increased wear.
8	Check both springs of oil filter for increased wear.
9	Check anti-drain membrane for damage in the area of filter contact.

Possible foreign matter

Steel chips	Bronze chips
Aluminium chips	Sliver of bearing material
Remains of sealing compound	Plastic (thrust washer)
Carbon fiber	Sliver of copper

Increased foreign matter

If an increased amount of metal particles is found, such as brass- or bronze chips or sliver from bearing abrasion, repair or overhaul the engine in accordance with the BRP-Powertrain instructions for continued airworthiness. If the filter mat is clogged by foreign matter, the lube oil reaches the bearing points unfiltered via the by-pass valve in the oil filter.

Unclear findings

In the case of unclear findings:

Step	Procedure
1	Flush the oil circuit.
2	Fit a new oil filter.
3	Engine test run. See chap. 12-20-00 section: 8).
4	Inspect the oil filter once more.

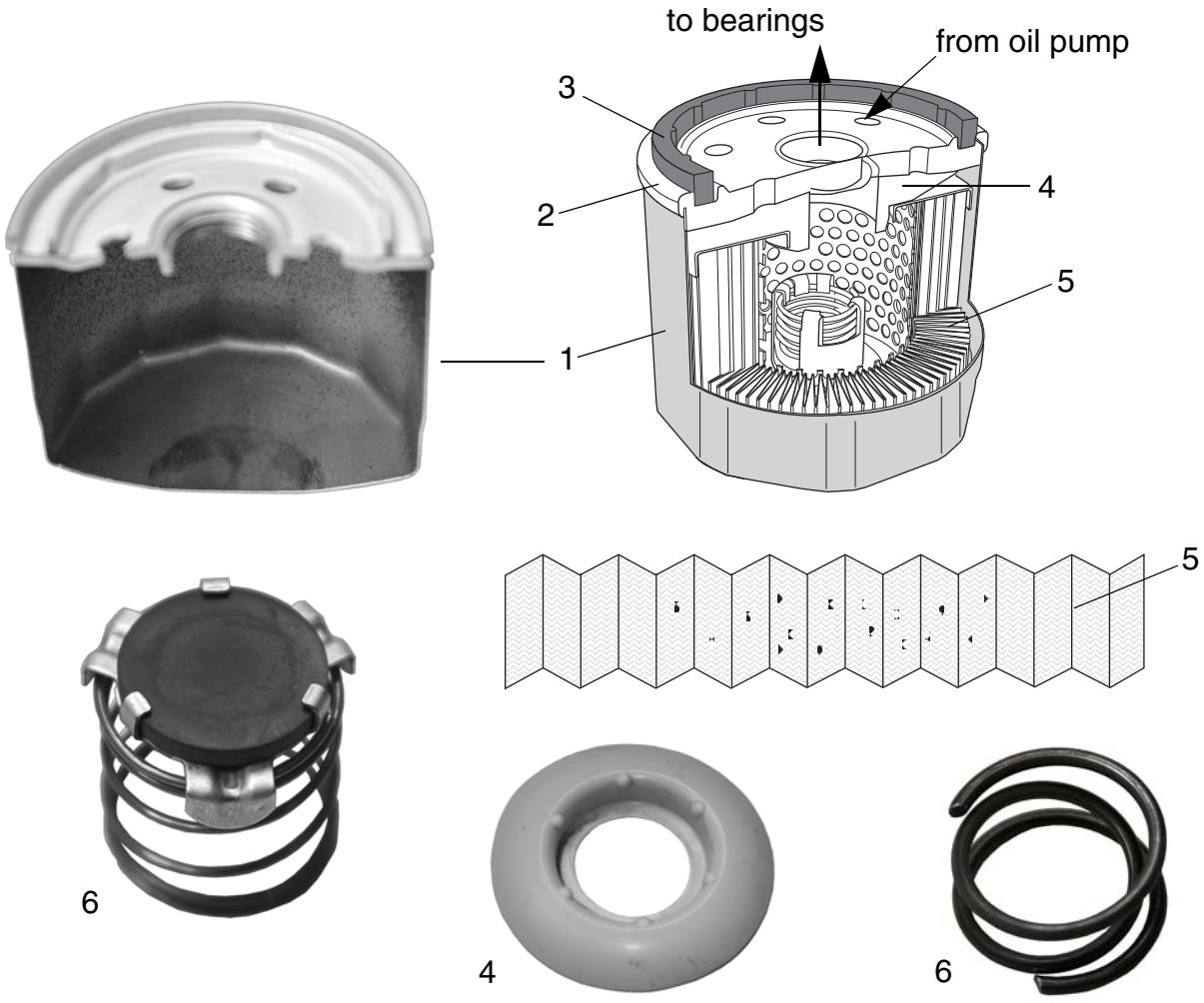
Contaminated

NOTICE

If the oil circuit is contaminated, replace the oil cooler and flush the oil circuit. See chap. 12-20-00 section: 11.7). Proper judgement requires years of experience in repair of piston engines.

Graphic

Oil filter



Part	Function	Part	Function
1	Filter housing	4	Anti-drain membrane
2	Filter cover	5	Filter mat
3	Gasket ring	6	Springs

Fig. 27

08427,00181,10228-10231

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11.5) Cleaning the oil tank

See Fig. 28.

Procedure

Procedure to clean the oil tank:

Step	Procedure
1	Detach the profile clamp (2) and remove the oil tank cover (3) together with the O-ring (4) and the oil lines.
2	Remove the inner parts of the oil tank such as the baffle insert (5) and the partition (6).
3	Clean oil tank (8) and inner parts (5, 6) and check for damage.

NOTICE Incorrect assembly of the oil tank components can cause engine faults or engine damage.

Step	Procedure
4	Fit hex.Double ignition screw (1) M12x12 with a new gasket ring (7). Tighten to 25 Nm (18.5 ft.lb).
5	Safety wire (9).
6	Reassemble the oil tank by following the same steps in reverse order.
7	Purge the oil system.

12) Inspecting the magnetic plug

General note

See Fig. 29.

NOTES: The magnetic plug is located on the crankcase between cylinder 2 and gearbox.

This inspection is important because it allows conclusions to be drawn on the internal condition of the gearbox and engine and reveals information about possible damage.

Procedure

Remove the magnetic plug and inspect it for accumulation of chips.

Steel chips in low numbers

Steel chips in low numbers as depicted in Fig. 29 can be tolerated if the accumulation is below 3 mm (0.125 in).

Steel chips in larger numbers

If there are larger accumulations of metal chips on the magnetic plug, the engine must be repaired or overhauled in accordance with the BRP-Powertrain instructions for continued airworthiness.

Unclear findings

In the case of unclear findings:

Step	Procedure
1	Flush the oil circuit.
2	Fit a new oil filter.
3	Install the magnetic screw.
4	Engine test run. See chap. 12-20-00 section: 8).
5	Inspect the magnetic screw once more.
6	Inspect the oil filter once more.

Contamination

NOTICE

If the oil circuit is contaminated, replace the oil cooler and flush the oil circuit.
See chap. 12-20-00 section: 11.7). Detailed inspection of affected engine components.

Trace the cause and remedy.

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Graphic Inspecting the magnetic plug.

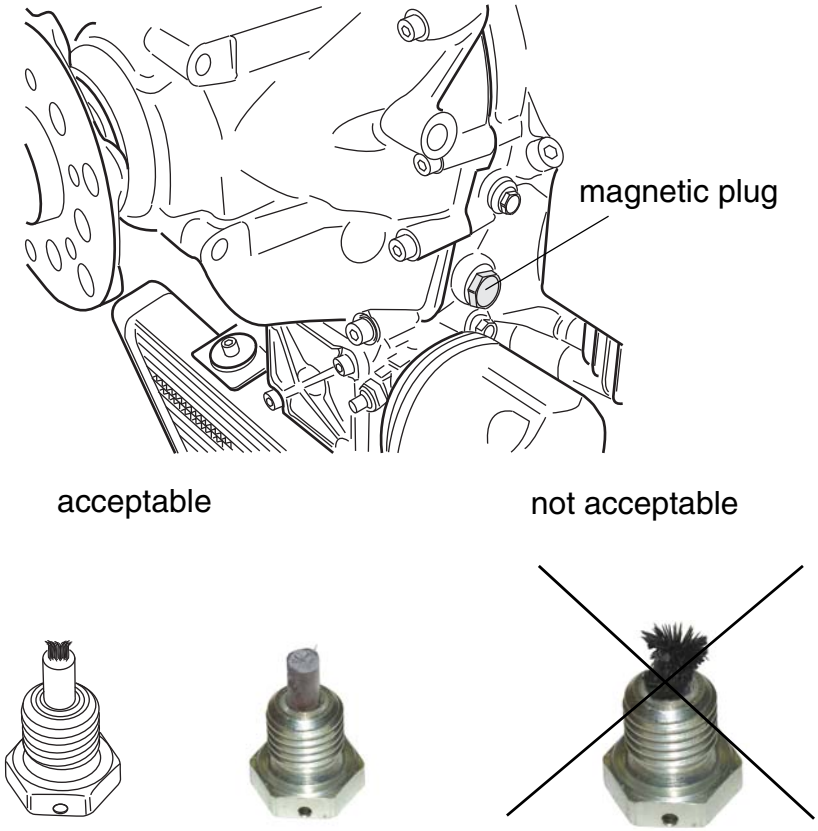

Fig. 29 *08565,08566,08564,08563*

12.1) Installation of the magnetic plug

Install The following steps are necessary:

Step	Procedure
1	Clean the magnetic plug and oil tank.
2	Install magnetic plug. Tightening torque 25 Nm (18 ft.lb)
3	Install safety wiring.

Inspect all system for correct function. Detailed inspection of affected engine components.