SERVICE INSTRUCTION

Introduction of a new fuel pump assy. for ROTAX® Engine Type 914 (Series)

ATA System: 73-00-00 Fuel System

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

All versions of ROTAX® 914 engines which are equipped with genuine ROTAX® fuel pump set part no. 996738.

Engine type	Serial number
914 F	up to and including S/N 4422159
914 UL	up to and including S/N 9577055

NOTE: On engines with S/N higher than the ranges listed above, new style fuel pump set packaged part no. 881365 has already been fitted in serial production.

1.2) Concurrent ASB/SB/SI and SL

None.

1.3) Reason

In the course of continuous product support of parts and accessories, a new fuel pump assy. has been introduced for ROTAX® Engine Type 914 (Series).

1.4) Subject

Introduction of a new fuel pump assy. for ROTAX® Engine Type 914 (Series).

1.5) Compliance

NONE - For Information Only.

1.6) Approval

The technical content of this document is approved under the authority of 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.

No labor credit will be provided for work performed for this part and accessory.

1.8) Mass data

Change of weight - - - depends on the aircraft installation and installation situation (parts chosen by the maintenance technician are not considered).

Moment of inertia - - - depends on the aircraft installation and installation situation (additional parts chosen by the OEM and maintenance technician are not considered).

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1.9) Electrical load data

No change.

1.10) Software modifications

No applicable.

1.11) References

In addition to this technical information refer to current issue of

- Illustrated Parts Catalog (IPC)
- Operators Manual (OM)
- Installation Manual (IM)
- Maintenance Manual Line (MML)
- Maintenance Manual Heavy (MMH)

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

NOTE: See also relevant changes and revisions of the aircraft manufacturer´s Instructions for Continued Airworthiness related to this topic.

1.13) Interchangeability of parts

Parts are not one to one interchangeable.

NOTE: See relevant changes on hose connections and electrical connectors in Chapter 3.

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

- Any possible support by BRP-Rotax will be provided on request by ROTAX® Authorized Distributors or their independent Service Centers.

2.3) Material requirement per engine

Parts requirement:

Fig. no.	New part no.	Qty/ engine	Description	Application
1	881365	2	FUEL PUMP SET PACKAGED	Fuel system
consist of:				
	889703	1	Fuel pump	Fuel system
	853482	1	Clamp 37x15	Fuel pump
	241237	1	Allen screw M6x16	Clamp
	827962	1	Washer A6.4	Clamp
	842042	1	Lock nut M6	Clamp
	951822	1	Hose clamp 15x9	Fuel pump (outlet)
	951824	1	Hose clamp 16x9	Fuel pump (outlet)
	951826	1	Hose clamp 19x9	Fuel pump (inlet)
	951828	1	Hose clamp 20x9	Fuel pump (inlet)
	881304	1	Connector set fuel pump	Fuel pump
not included in delivery:				
13	881367*	1	HOSE REDUCTION SET PACKAGED	Fuel system

NOTICE

* The hose reduction set is not a part of the Engine Type Design. The hose reduction set has been tested and released by BRP-Rotax, but it is not certified.
The correct function in conjunction with the entire system and the certification of the hose reduction set is the responsibility of the aircraft manufacturer and must be carried out jointly with the aircraft.

NOTE: * To be ordered as optional extra part (non-certified part) from your ROTAX® Authorized Distributor or their independent Service Centers.

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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
Adjustable crimp tool (DELPHI 12155975 or equivalent)	1	n.a.	Electrical connector

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® - Authorized Distributors or their independent Service Centers
- Persons with approved qualifications for the corresponding engine types. Only authorized persons (iRMT, Level Heavy Maintenance) are entitled to carry out this work.

NOTE: All work must be performed in accordance with the relevant Maintenance Manual.

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

Safety instruction

⚠WARNING

During work on fuel system there is a risk of injury due to pressure and fuel! Always wear safety goggles and gloves when working on the fuel system! Before starting repair work on the fuel system, ensure that it is no longer pressurised! Ensure that pressure cannot build up again by disconnecting the electric supply. At the workplace, ensure that drained fuel is handled according to the safety information.

ENVIRONMENTAL NOTE

Please observe the disposal regulations applicable in your area.

ENVIRONMENTAL NOTE

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

3.1) Illustrated Parts Catalog - related information

See Fig. 1 and Fig. 2.

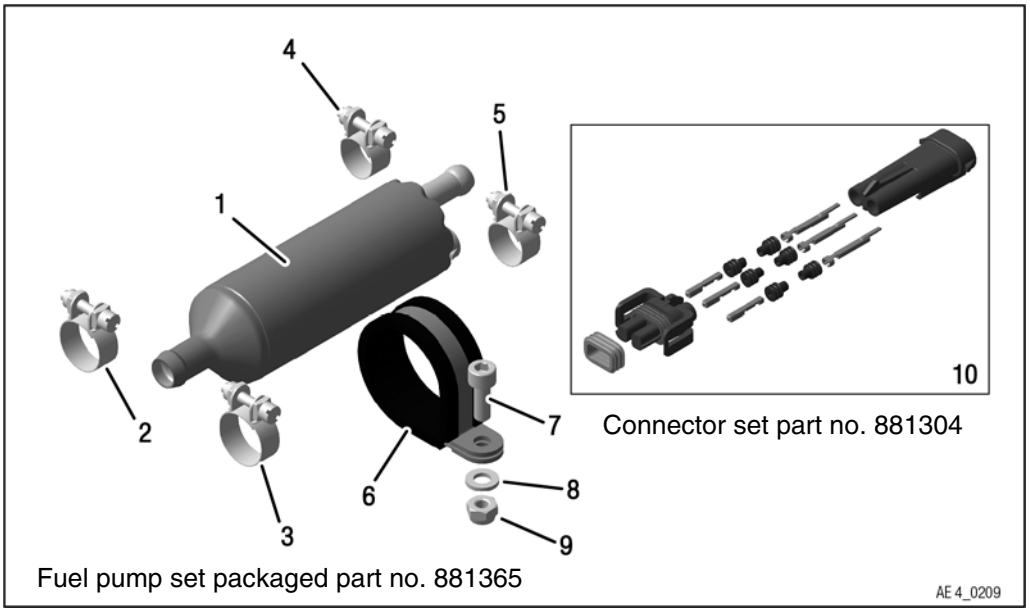

Fig. 1

Pos.	Description	Part no.	Pos.	Description	Part no.
1	Fuel pump assy.	889703	6	Clamp	853482
2	Hose clamp 19x9	951826	7	Allen screw M6x16	241237
3	Hose clamp 20x9	951828	8	Washer A6.4	827962
4	Hose clamp 15x9	951822	9	Lock nut M6	842042
5	Hose clamp 16x9	951824	10	Connector set fuel pump	881304

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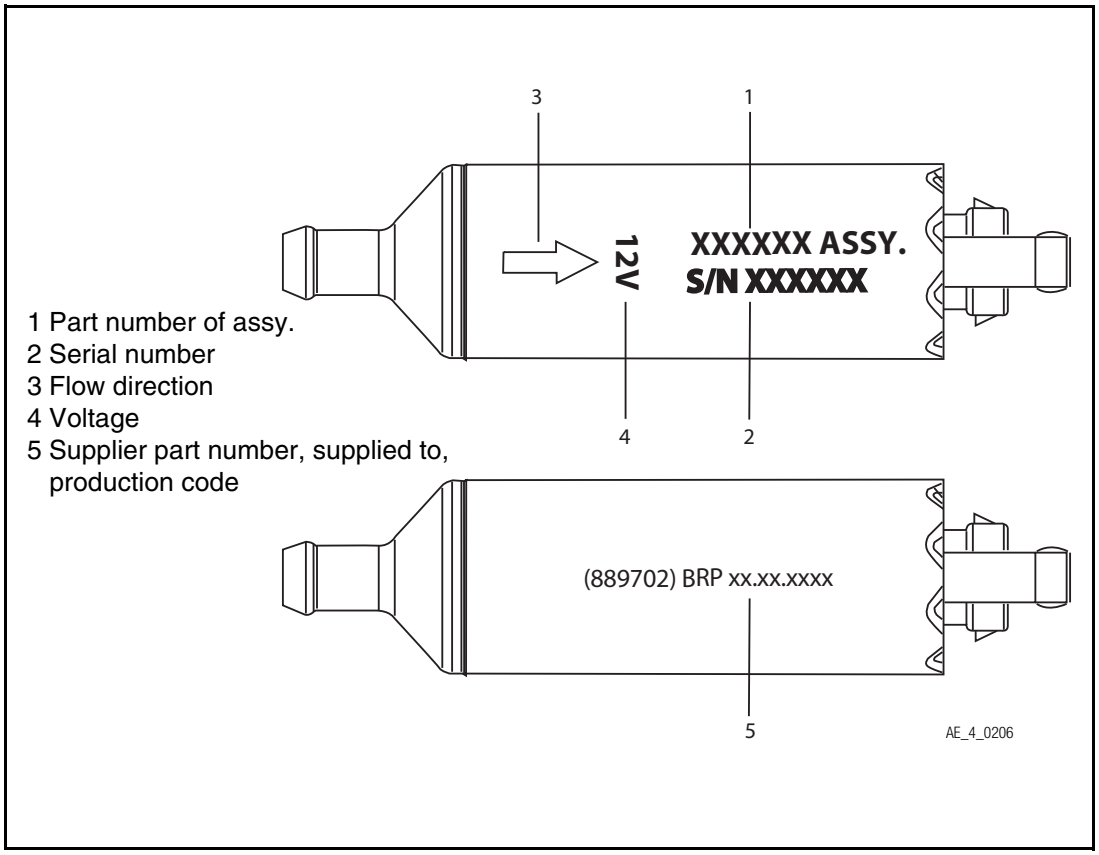
Fuel pump indentify:



1 Part number of assy.
2 Serial number
3 Flow direction
4 Voltage
5 Supplier part number, supplied to, production code

Fig. 2

3.2) Installation - related information

See Table 1.

Pay attention to the specifications of the latest version of the Installation Manual (IM) for the respective engine type.

ENVIRONMENTAL NOTE

Work with the utmost care to ensure that no water pollutants can penetrate into the soil, water or the sewerage system.
Dispose of fuel at the respective collecting point or hand it over to an approved disposal company.

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Technical data	
Technical specification**	
Operating temperature range:	Min. -25 °C (-13 °F)
	Max. +70 °C (158 °F)
Fuel inlet diameter:	13.8 mm (0.543 in.)
Fuel outlet diameter:	11.2 mm (0.441 in.)
Weight:	0.284 kg (0.63 lb)
Technical setup / test conditions The given measured values are only guideline valves and will not apply to all types of fuel pumps.	
Fuel	AVGAS
Ambient pressure	980 mbar (14.21 psi)
Pressure rise	1000 mbar (14.50 psi)
Temperature	20 °C (68 °F)
Voltage	14 V DC
Settings / normal use	
MAIN and AUX pump **ON**	
Fuel flow*	125 l/h (33.0 gal/h)
Current consumption MAIN pump	1.6 A
Current consumption AUX pump	1.9 A
Current consumption both	3.5 A
Suction height**	Depends on vapour pressure of fuel and its temperature and ambient pressure, e.g. AVGAS up to 8 meters (315 in.)
MAIN **ON** AUX pump **OFF**	
Fuel flow*	98 l/h (25.9 gal/h)
Current consumption MAIN pump	2.05 A
Suction height**	Depends on vapour pressure of fuel and its temperature and ambient pressure, e.g. AVGAS up to 8 meters (315 in.)
MAIN **OFF** AUX pump **ON**	
Fuel flow*	108 l/h (28.5 gal/h)
Current consumption AUX pump	2.13 A
Suction height**	Depends on vapour pressure of fuel and its temperature and ambient pressure, e.g. AVGAS up to 8 meters (315 in.)

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Technical data	
Settings / misuse	
Misuse MAIN **ON** and AUX **ON** against closed valve	
Pressure against closed valve	8 bar (116 psi)
Current consumption MAIN pump	3.95 A
Current consumption AUX pump	4.3 A
Current consumption both	8.25 A
Misuse single pump **ON** against closed valve	
Pressure against closed valve	5 bar (72.5 psi)
Current consumption	4.8 A
Requirements on filters	
Coarse filter	Min. surface 64.4 cm^2 (10 in^2)
	Free by pass area 18.4 cm^2 (2.85 in^2)
	Screen size 70 µm

Table. 1

* Flow rate might increase over time e.g. break in time of 30 minutes.
The given measured values are only guideline valves and will not apply to all types of fuel pumps.

NOTICE

** All measurement values depend from installation situation and the components use like valves, hoses etc. So, they may vary between different installations.

NOTICE

Do not use other fluids than gasoline as specified.

NOTICE

Do not operate pumps against closed valve.

3.2.1) Connecting dimensions, location of joints and directives for installation

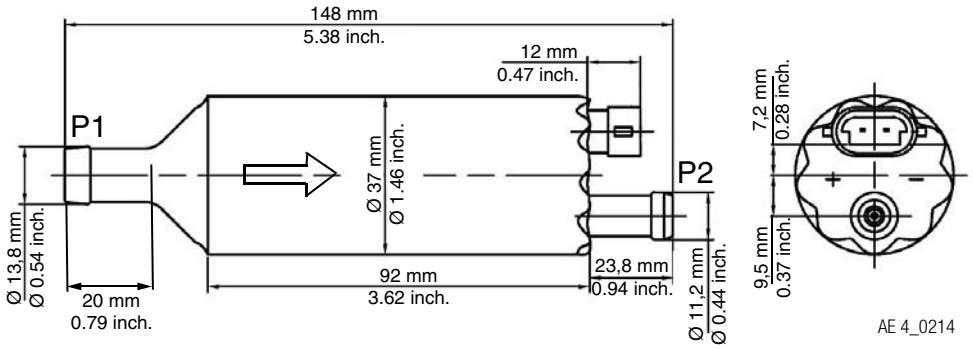
Electric fuel pump

See Fig. 3.

Design:	Self priming vane pump. NOTE: Avoid situations of pump being run dry.
Scope of supply:	Electric fuel pump with attachment kit, 2 hose clamps, electric connector and various attachment elements. See Fig. 1.
Fitting position:	Horizontal or vertical
Connections:	See Fig. 3. Inlet (P1) (suction side) Outlet (P2) (pressure side)

NOTICE

Utilize the complete slip-on length on all hose connections. Secure fuel hoses with supplied screw clamps.
Do not overstress the connection clamps, which might cause leakage or connections to collapse.
Pay attention to the recommended fastening torque of the clamps according to Standard Practices.



P1 Inlet (suction side)
P2 Outlet (pressure side)

Fig. 3

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3.2.2) Place of installation

See Fig. 4.

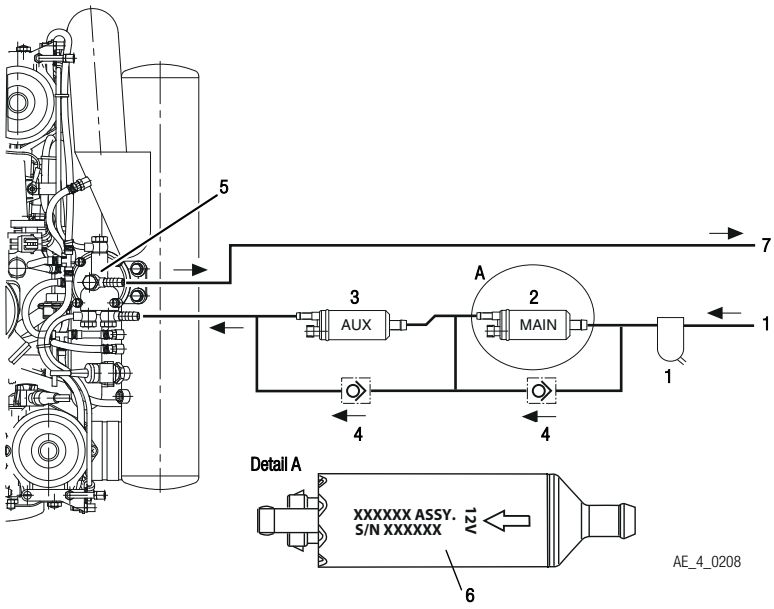
⚠WARNING Non-compliance can result in serious injuries or death!
The furnishing of proof in accordance to the latest FAR and EASA, has to be conducted by the aircraft manufacturer.

Install fuel pumps near the fuel tank to gain advantage of a cool location, especially at tendency to vapor lock.
Install the pump in low vibration-free positions, if possible below fuel tank. Therefore, fuel pump attached directly on the engine is not permitted. For max. suction height see Table 1.

Because of the risk of vapor formation on the suction side of the pumps and other safety reasons the pump installation is not permitted in the engine compartment.

⚠WARNING Non-compliance can result in serious injuries or death!
Installation in the engine compartment is not permitted since the components are not of a fire-resistant construction.

If possible the fuel pump should be installed in such a way that it is easily accessible for maintenance.



1 Inlet from the aircraft tank system via course filter
2 Main fuel pump (MAIN)
3 Auxiliary fuel pump (AUX)
4 Check valve
5 Fuel pressure regulator
6 Fuel filter integrated and not interchangeable
7 Outlet to aircraft tank system

Fig. 4

3.2.3) Fuel pumps - electrical connection

See Fig. 5.

⚠WARNING

Non-compliance can result in serious injuries or death!
An essential point is according to regulations, that the fuel pumps are connected on two completely independent power supplies.

NOTICE

The routing and connections have to be completed by the aircraft manufacturer in accordance to ASTM F2639 and effective certification FAR or EASA.

⚠WARNING

Non-compliance can result in serious injuries or death!
The furnishing of proof in accordance to the latest FAR and EASA, has to be conducted by the aircraft manufacturer.

Capacitor

NOTICE

To warrant proper radio interference suppression of the electrical fuel pumps the use of capacitor of at least 1 µF/100 V and a ferrite core (see Table 2) (mounted close to the fuel pump connectors) is necessary.

Properties	Test conditions	Value	Unit	Tolerance
Impedance @25 MHz 2 turn	25 MHz	607	Ω	typ.
Impedance @100 MHz 2 turn	100 MHz	755	Ω	typ.

Table 2

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Connections:

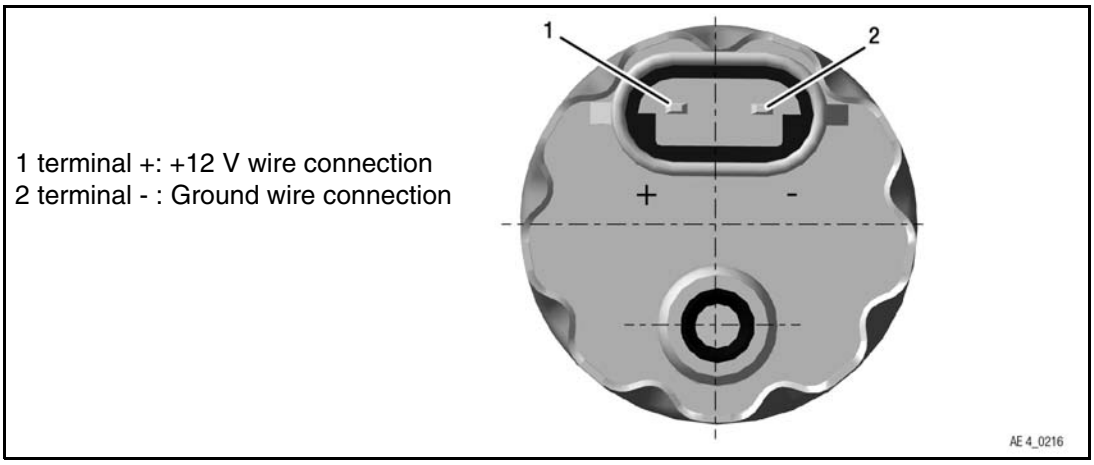

Fig. 5

Radio interference For radio interference suppression a capacitor and a ferrite core has to fitted as near as possible to the terminals.

Fuse Each of the two fuel pumps has to protected by a 5 A slow fuse or circuit breaker in accordance with Wiring diagram.

Pay attention to the specifications of the latest version of the Installation Manual (IM) for the respective engine type.

3.2.4) Internal consumer of electric power

⚠WARNING Non-compliance can result in serious injuries or death!
The power consumption of extra loads has to be limited to the extent that the internal need of power is always covered.

Refer to Table 1.

NOTE: A complete electrical load analysis covering all installed loads must be calculated by the aircraft manufacturer.

3.3) Operation - related information

See relevant Operator Manual for the respective engine type.

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⚠ WARNING Non-compliance can result in serious injuries or death!
Exceeding the max admissible fuel pressure will override the float valve of the carburetor and cause engine failure.

Fuel pressure

Max.	Airbox pressure + 0.35 bar (5.08 psi)
Min.	Airbox pressure + 0.15 bar (2.18 psi)
Normal	Airbox pressure + 0.25 bar (3.63 psi)

3.4) Maintenance (Line) - related information

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

NOTE: Fuel pump part no. 889703 has an internal fine filter which cannot be removed for cleaning. The internal fuel filter can be visually inspected. If a fuel pump screen becomes contaminated, the fuel pump must be replaced with new.

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Points of inspection	Interval Operating hours		Chapter reference
	100 h	1000 h	
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, also check for any cracks and/or scuffing marks.	x		Maintenance (Line) Chapter 12-20-00 section Leakage check
Check the electric fuel pumps for delivery rate as specified		x	Maintenance (Heavy) Chapter 73-00-00 section Fuel pump (on 914 Series)

3.4.1) Inspection of the fuel filter in the airframe

General note See Fig. 4.

In the fuel supply line between the aircraft fuel system (1) and the inlet to the two fuel pumps (2), a filter gascolater must be installed (3).

NOTICE The coarse filter is not included in delivery from BRP-Rotax. The aircraft manufacturer is responsible for the selection and the correct installation of the coarse filter.

NOTE: The filter can be in a configuration as filter/water trap (gascolator).

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Inspect this coarse filter as described in the Aircraft Maintenance Schedule.

Filter fuel pump

If the filter in the airframe is heavily contaminated, the two fuel pumps need to be replaced also as the pump internal fuel filters are not replaceable for service.

3.5) Maintenance (Heavy) - related

Pay attention to the specifications of the latest version of the Maintenance Manual Heavy (MMH) Chapter 73-00-00 Fuel system for the respective engine type.

3.6) Disassembly

Drain the fuel. See Maintenance Manual Line (MML) Chapter 12-20-00 Planned maintenance for the respective engine type.

NOTE: The position and type of positioning and attachment of the fuel pump depends on the aircraft type. See aircraft manufacturer documentation.

Step	Procedure
1	Disconnect electrical connectors from Main and AUX fuel pump.
2	Remove hose clamps.
3	Disassemble the fuel hose suction line and pressure line. NOTE: Do not use a knife or sharp object as this may cut, scratch or otherwise damage the fitting.

3.7) Checks

Step	Procedure
1	Check the suction line, pressure line, connecting line and check valve for deformation or scratch marks. NOTE: Longitudinal cuts or scratches are not allowed. If such marks are found the check valve or connecting line must be replaced.
2	Check the entire system for deposits and/or contamination in the lines, fuel pumps etc.

3.8) Retrofit of new fuel pumps

NOTICE Replacement must be carried out according to the relevant aircraft Maintenance Manual.

3.8.1) Power connections

See Fig. 6.

Step	Procedure
1	Place a cable grommet (1) over each of the fuel pump power supply wires so that the shoulder is facing the end of the wire.
2	Carefully strip off approximately 10 mm (0.39 in.) of insulation from each of the two wires. NOTE: Use a quality wire-stripping tool set to avoid damaging wire strands.
3	Fix the connector pin (2) and the cable grommet with appropriate crimping pliers (see special tools). The rubber grommet is held by the secondary crimp.
4	Option. Capacitor can also be installed in these crimps.

1 Cable grommet
2 Connector pin

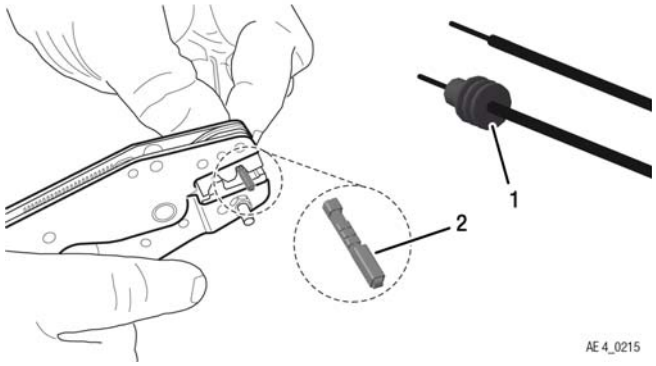

Fig. 6

See Fig. 7.

Step	Procedure
5	Fit the + connector pin (1) in position 1 and the ground connector pin (2) in position 2 of the 2-pole connector housing (3) until they lock in place. Check for tight fit.

1 + connector pin
2 Ground connector pin
3 Connector housing

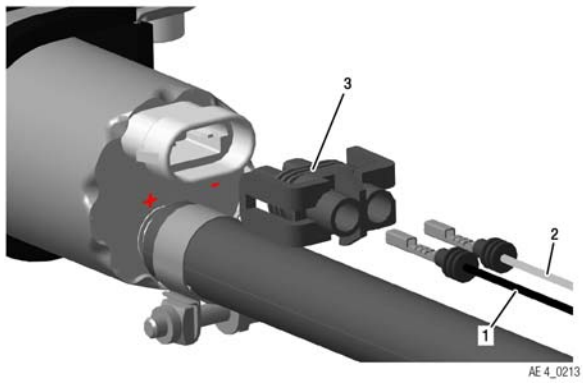

Fig. 7

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See Fig. 8.

Step	Procedure
6	The connector set fuel pump is provided with optional seals. Ensure that both connectors (2) are equipped with orange connector gasket (1).

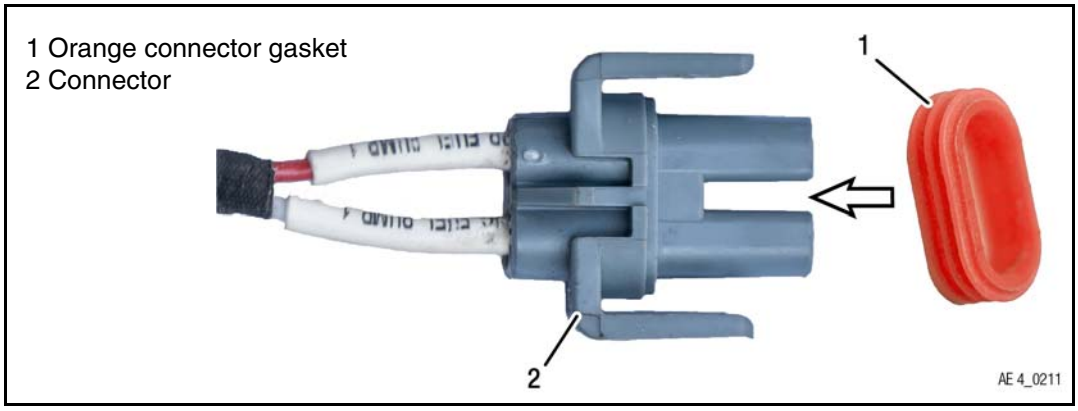

Fig. 8

3.9) Assembling of the fuel hoses assy.

See Fig. 9.

NOTICE Only use GENUINE ROTAX parts for part replacement.

NOTE: For easier hose assembly, fuel or brake cleaner can be used to lubricate the inside of the hose. Do not use oil, silicone or any type of grease!

NOTE: Make sure that all clamps are placed with 1.5 mm (0.06 in.) distance from hose end and are not positioned directly over the connector barb (see Fig. 12).

NOTE: Always use full slip on length of the hoses.

Step	Procedure
1	Position hoses on the fuel pumps.
2	Mount the two fuel pump clamps. Clamps (1) part no. 951824 are provided for 11.2 mm (0.543 in.) outlet side. Clamps (2) part no. 951828 are provided for 13.8 mm (0.441 in.) inlet side. NOTE: Do not overstress the clamps.

NOTE: Make sure to mount clamp (3) in the area of allowed positioning. Do not overstress the clamp on fuel pump housing.

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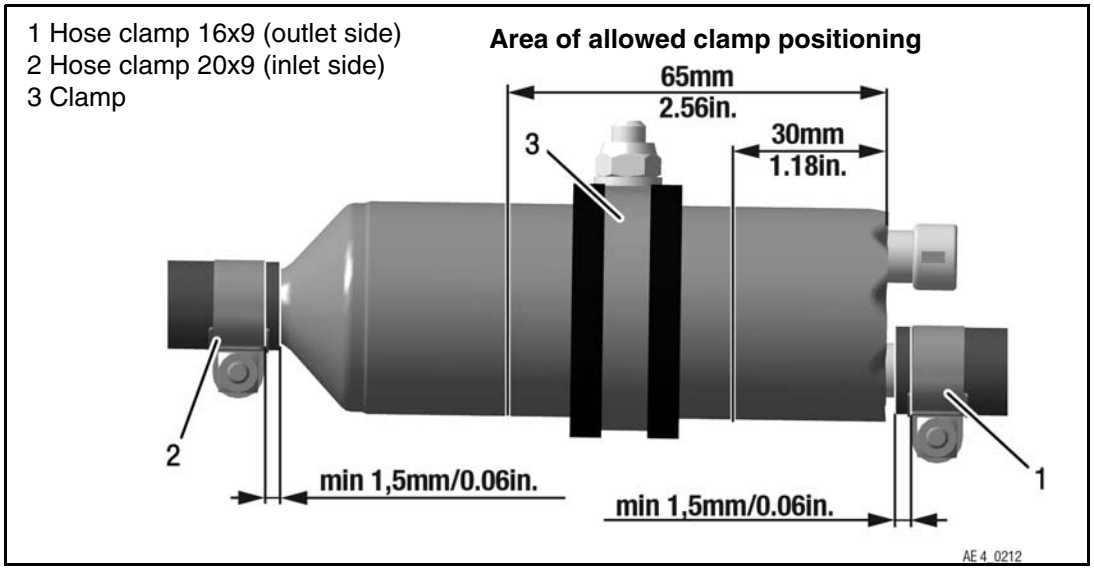

Fig. 9

NOTE: Inlet and outlet sizes differ between old and new style fuel pumps. Fuel pump set reduction piece part no. 881367 is available to adapt new pumps to previously installed fuel systems based on old pump dimensions. See Fig. 10.

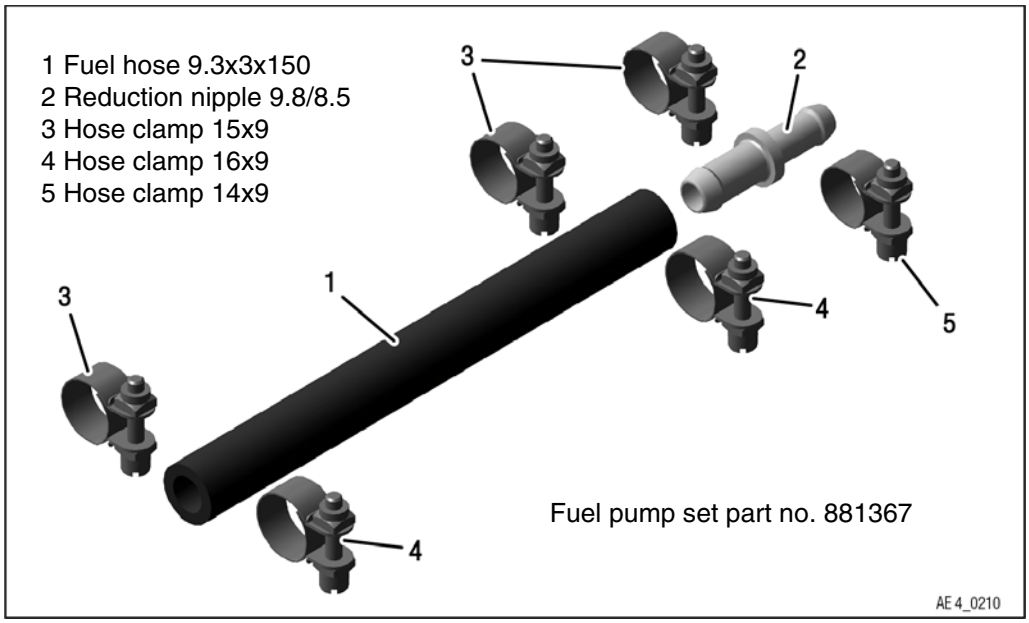

Fig. 10

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

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3.10) Test run

In case of uninstalled engines test run can be skipped as this is covered by the mandatory test run after installation.

Conduct test run. See Chapter 12-20-00 of the latest Maintenance Manual Line for the respective engine type. To purge the air switch on either MAIN or AUX fuel pump and visa versa.

3.11) Summary

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

The execution of the Service Instruction must be confirmed in the logbook.

I 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.

3.12) Inquiries

Inquiries regarding this Service Instruction 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.

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.