

# SERVICE INSTRUCTION

## RUNNING MODIFICATIONS ON

### ROTAX® ENGINE TYPE 912/914 (SERIES)

#### SI-912-020

#### SI-914-022

#### Repeating symbols:

Please, pay attention to the following symbols throughout the Service Bulletin 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 all                    - 912 pre-series engines all
- 914 Series all                    - 914 pre-series engines all

##### 1.2) Concurrent ASB/SB/SI and SL

none

##### 1.3) Reason

ROTAX® reserves the right to abandon or modify specifications, design, details, models or equipment at any time without obligation.

##### 1.4) Subject

Running modifications on ROTAX® engine type 912/914 (Series).

##### 1.5) Compliance

NONE - For Information Only

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

##### 1.6) Approval

The technical content is approved under the authority of DOA Nr. EASA.21J.048.

##### 1.7) References

In addition to this technical information refer to

- current issue of the Operators Manual (OM)
- engine data sheet
- power, torque and fuel consumption curves
- current issue of the Illustrated Parts Catalog (IPC)
- Installation Manual (IM)
- all relevant Alert Service Bulletins (ASB)
- all relevant Service Bulletins (SB)
- all relevant Service Instructions (SI)
- all relevant Service Letters (SL)
- Maintenance Manual (MM)
- Users Guide

- ◆ **NOTE:** The status of Manuals can be determined by checking the table of amendments of the Manual. The 1<sup>st</sup> column of this table is the revision status. Compare this number to that listed on the ROTAX WebSite: [www.rotax-aircraft-engines.com](http://www.rotax-aircraft-engines.com). Updates and current revisions can be downloaded for free.

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## 2) Material Information

### 2.1) Material - cost and availability

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

### 2.2) Special tooling/lubricant-/adhesives-/sealing compound -

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

## 3) Accomplishment / Instructions

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

- ROTAX<sup>®</sup> -Distributors or their Service Center
- Persons with the respective Aviation Authority

▲ **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:** Risk of scalds and burns! Allow engine to cool sufficiently and use appropriate safety gear while performing work.

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

◆ **NOTE:** All work has to be performed in accordance with the relevant Maintenance Manual.

◆ **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.

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) Documentation

### 4.1) List of the valid pages

Chapter	Page	Date	Chapter	Page	Date	Chapter	Page	Date
00-00-00	1	04 01 2008	75-00-00	1	04 01 2008	78-00-00	1	04 01 2008
	2	04 01 2008		2	04 01 2008		2	04 01 2008
	3	04 01 2008		3	04 01 2008			
	4	04 01 2008		4	04 01 2008			
73-00-00	1	04 01 2008	76-00-00	1	04 01 2008			
	2	04 01 2008		2	04 01 2008			
	3	04 01 2008		3	04 01 2008			
	4	04 01 2008		4	04 01 2008			
	5	04 01 2008						
	6	04 01 2008						

### 4.2) Table of amendments

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

Ser. No.	Section	Pages	Date of correction	Sign of acceptance	Date of accept. of resp. authority	Date of implementation	Sign/ Signature
0	00-00-00	all	04 01 2008	DOA*			
0	73-00-00	all	04 01 2008	DOA*			
0	75-00-00	all	04 01 2008	DOA*			
0	76-00-00	all	04 01 2008	DOA*			
0	78-00-00	all	04 01 2008	DOA*			

### 4.3) List of chapters

00-00-00	Introduction
73-00-00	Fuel system
75-00-00	Cooling system
76-00-00	Engine control
78-00-00	Exhaust system

NOTES

## SECTION 73-00-00

### 1) Introduction of a new flexible fuel line assy. part no. 874910 for ROTAX® 912 Series

#### 1.1) General Information

(see fig. 1 and 2)

In the course of continuous development and for better assembly and maintenance a new flexible fuel line (part no. 874910) has been introduced.

Installation of this new fuel line requires the following modifications:

- mechanical machining at the intake manifold for the attachment of the cable clamp. At engine repair/general overhaul be aware that the fixation of the flexible fuel line needs an appropriate contact surface. If necessary replace the intake manifold or machine the contact surface according to the following instruction.

The new fuel line have been already installed on the following engines:

- 912 A up to engine S/N 4,410.713
- 912 F up to engine S/N 4,412.923
- 912 S up to engine S/N 4,923.384
- 912 UL<sup>\*)</sup> up to engine S/N 4,408.199
- 912 ULS<sup>\*)</sup> up to engine S/N 5,647.489
- 912 ULSFR<sup>\*)</sup> up to engine S/N 4,430.445

<sup>\*)</sup> optional installation possible

#### parts requirement:

Fig item no	New part no	Qty per engine	Description	Old part no	application
1	874910	1	fuel line assy.	874294	912
2	940872	2	banjo bolt M8x1x24	-	flexible fuel line
3	847795	2	spacer	-	flexible fuel line
4	950141	6	sealing ring A8x13	-	banjo bolt
5	651430	2	cable clamp 12/M8	-	flexible fuel line
6	940481	2	hex. screw M8X30	240276	carburetor socket
8	942671	2	hex. nut M8	-	cable clamp
9	866719	2	clamp	-	flexible fuel line
10	950143	3	gasket ring 8.2/13/1.4	-	banjo bolt/ clamp block

◆ NOTE: It is not mandatory to retrofit engines with the old stainless steel fuel line!

For a retrofit to a flexible fuel line system the following new parts are required:

#### parts requirement:

Fig item no	New part no	Qty per engine	Description	Old part no	application
	881980	1	flex. fuel line retrofit kit		retrofitting flexible fuel line
consisting of:					
	874910	1	fuel line assy.	874294	912
	940872	2	banjo bolt M8x1x24	-	flexible fuel line
	847795	2	spacer	-	flexible fuel line
	950141	6	sealing ring A 8x13	-	banjo bolt
	651430	2	cable clamp 12/M8	-	flexible fuel line
	940481	2	hex. screw M8X30	240276	carburetor socket
	942671	2	hex. nut M8	-	cable clamp
	866719	2	clamp	-	flexible fuel line
	950143	5	gasket ring 8.2/13/1.4	-	banjo bolt/ clamp block
	851325	1	clamp block - 912	-	clamp block
	230150	1	gasket ring 10x14	-	clamp block
	641733	1	hex. screw M10x1x8	-	clamp block
	840511	1	hex. screw M5x16	-	clamp block
	941785	1	banjo bolt kpl.	-	clamp block

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APRIL 15<sup>th</sup>, 2008  
Initial Issue

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SI-912-020  
SI-914-022

**73-00-00**

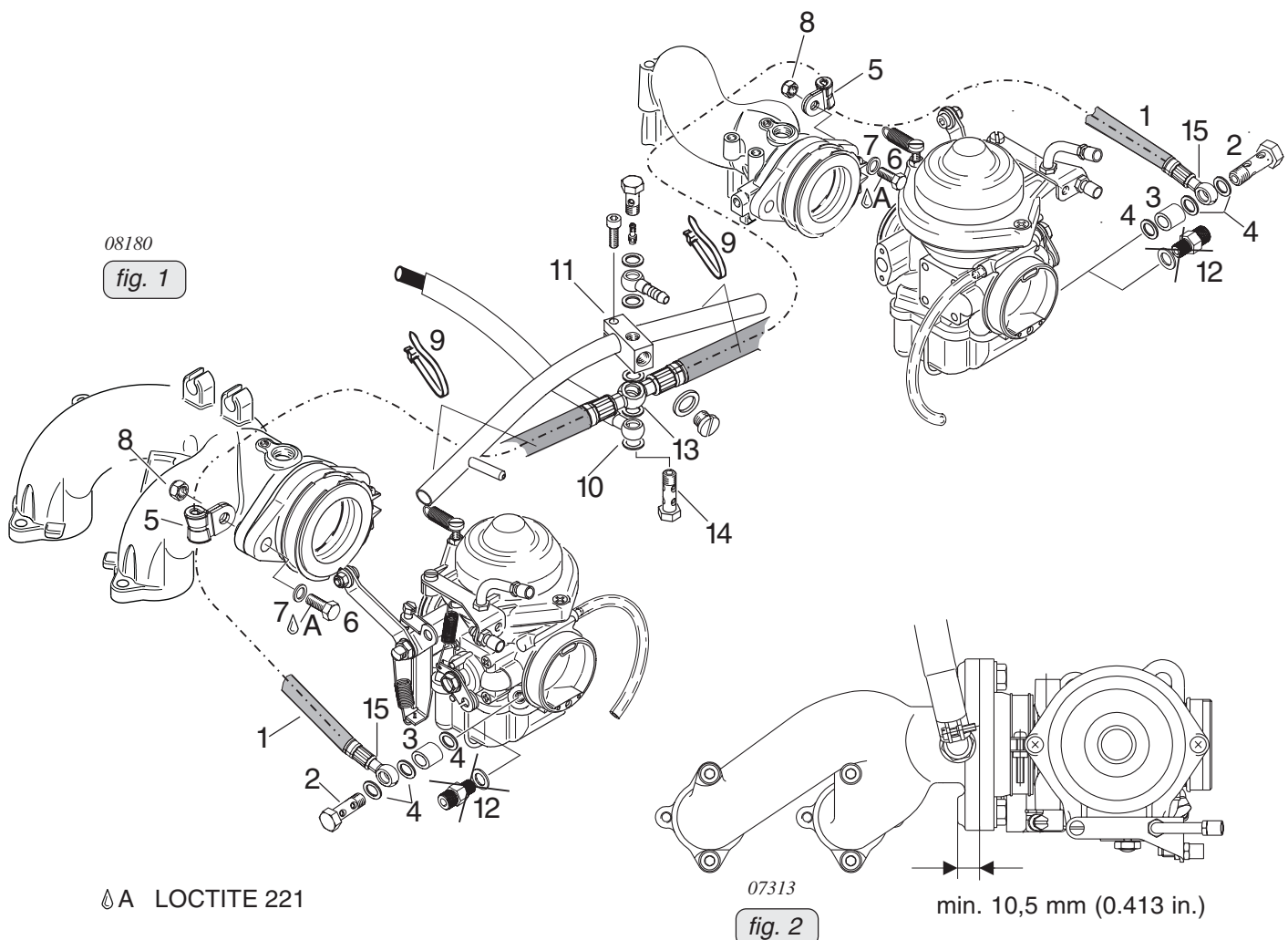
page 1 of 6

956312	1	ring hose nipple	-	return line
250311	2	washer 8.4	-	carburetor socket

- Install the flexible fuel line (1) with the double ring hose nipple (13) and sealing ring (10) on the clamp block (11). Tightening torque of banjo screw (14) 10 Nm (90 in. lb.) (see fig. 1).
- Install the ring hose nipple (15) with distance sleeve (3) and sealing ring (4) on the carburetors . Tightening torque of banjo screw (2) 10 Nm (90 in. lb.)
- ◆ **NOTE:** In case of a retrofit on configurations with steel fuel lines remove the screw connectors (12) and remove remaining sealant residues in a way that they do not get into the carburetor or the fuel system.
- For installation on an old style intake manifold perform the following: Remove the intake manifold and machine the nut/clamp contact area until the surface is parallel with the sealing surface of the carb socket. The thickness of the material must not be dressed down less than 10,5 mm (0.413 in.) and should be smooth and flat so that the nut/clamp assembly has an even contact surface (see fig. 2).
- Ensure proper support of the flexible fuel line. Install Hex. screw (6) and washer (7) with 15 Nm (133 in. lb.). Install the cable clamp (5) at the hex. screw (6) of the carburetor socket with the hex. nut (8). Tightening torque of hex. nut (8) 24 Nm (213 in. lb.)
- **CAUTION:** While tightening hex. nut (8), hold hex. screw (6) with a wrench to prevent it from loosening. Always fix the flexible fuel line at the compensation tube with clamps (9) in such a way that no wear is possible.

## 1.2) Illustration

the following drawings should convey additional information:



## 2) Introduction of a new gasket part no. 950226 for fuel pump ROTAX® 912 Series

### 2.1) General Information

(see fig.1)

In the course of continuous development a new gasket (1) (part no. 950226) has been introduced.

The new gasket has been already installed on the following engines:

- 912 A up to engine S/N 4,410.744
- 912 F up to engine S/N 4,412.929
- 912 S up to engine S/N 4,923.486
- 912 UL up to engine S/N 4,408.421
- 912 ULS up to engine S/N 5,648.605
- 912 ULSFR up to engine S/N 6,374.096

The new gasket has been already included in all fuel pumps delivered as spare part:

- fuel pump up to S/N 07.002119

#### parts requirement:

Fig item no	New part no	Qty per engine	Description	Old part no	application
1	950226	1	gasket	950225	fuel pump

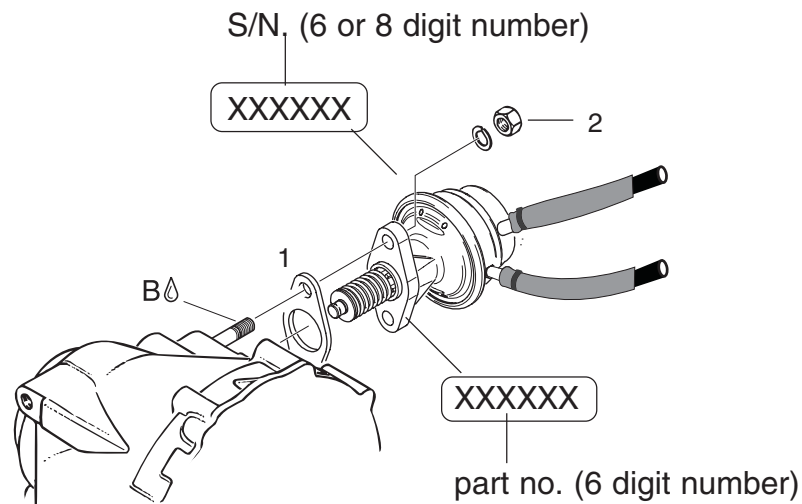
The gasket is interchangeable.

### 2.2) Illustration

the following drawings should convey additional information:

- ◆ NOTE: On the sealing surfaces of the gearbox housing and the fuel pump no sealing compound has to be used.

⚠ B LOCTITE 243



08353

fig. 1

### 3) Introduction of a new compensation tube part no. 924541 for ROTAX® 912/914 Serie

#### 3.1) General Information

(see fig. 1 and 2)

In the course of continuous development a new compensation tube (1) (part no. 924541) has been introduced which the synchronization to make it easier, the tube must not removed.

In this connection the following modifications became necessary:

- position of connection fitting (3) on compensation tube remains approximate constant
- additional screw (2) part no. 940980 for connection fitting (3)
- new tube (4) part no. 956143 (5) part no. 956141

The new compensation tube has been already installed on the following engines:

- 912 A up to engine S/N 4,410.807
- 912 F up to engine S/N 4,412.949
- 912 S up to engine S/N 4,923.676
- 912 UL up to engine S/N 4,409.113
- 912 ULS up to engine S/N 5,650.899
- 914 F up to engine S/N 4,420.807
- 914 UL up to engine S/N 6,772.763

#### parts requirement:

Fig item no.	New part no.	Qty per engine	Description	Old part no.	application
	924541	1	compensation tube assy.	924540	intake manifold
	*)	1	tube 81 mm (3.2 in.)	-	compensation tube
		1	tube 66 mm (2.6 in.)	-	compensation tube

\*) in a roll tube part no. 956141

◆ **NOTE:** In case of interchangeable it is not possible to exchange individual parts. The new compensation tube are only **together** interchangeable with the tube part no. 956141. In case of spare parts the relevant configurations must be observed.

#### Special tools:

Item no.	New part no.	Qty.	Description	Old part no.	Application
		1	hose clamping pliers <sup>*)</sup>		tube
		1	hose nipple	940557	intake manifold
		1	sealing ring 6.2/8.9/1	830890	intake manifold

<sup>\*)</sup> e.g. HAZET® **mean size** or equivalent. See fig. 2.

#### Pneumatic synchronization:

(see fig. 2)

The two carburetors are adjusted to equal flow rate (mechanical or pneumatical synchronisation) has to be performed in accordance with the relevant Maintenance Manual ROTAX® 912/914 and following changes must be observed:

#### additional variant (taking advantage of the new compensation tube):

1. Install the vacuum gauge.
2. Clamp the tube with hose clamping pliers (6). Observe the position! The tube (1) must not removed.
3. Unscrew the screw (7).
4. Install the hose nipple M6 (8) with the sealing ring (9).
5. After synchronization tightened the screw M6x6 (7) with LOCTITE 221.

#### Monitoring of the intake manifold pressure:

The monitoring of the intake manifold pressure has to be performed in accordance with the relevant Installation Manual ROTAX® 912/914 and following changes must be observed:

1. Unscrew the screw (2) from the connecting fitting (3) for indicating instrument.

◆ **NOTE:** If it is not possible to stabilize the intake manifold pressure, tighten the screw M3.5x6 (2) with LOCTITE 221. Install color markings on the screw.

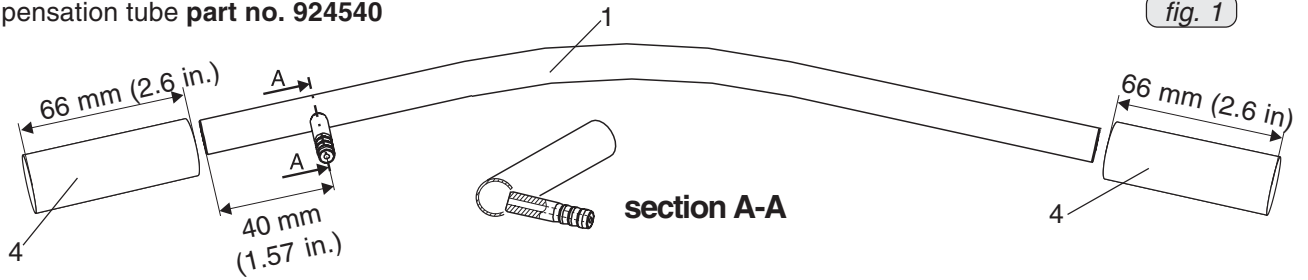
### 3.2) Illustration

the following drawings should convey additional information:

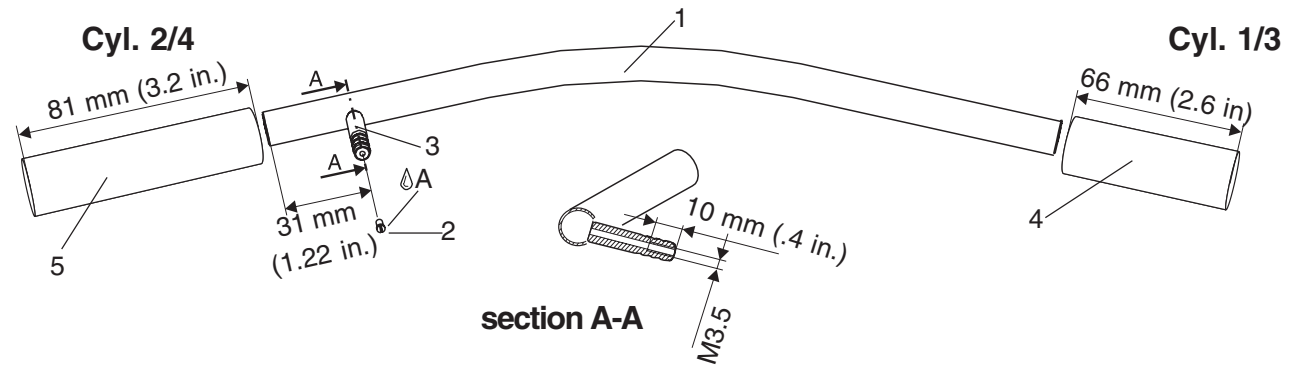
compensation tube **part no. 924540**

08371

fig. 1

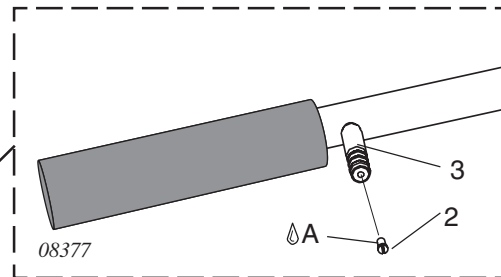


compensation tube **part no. 924541**



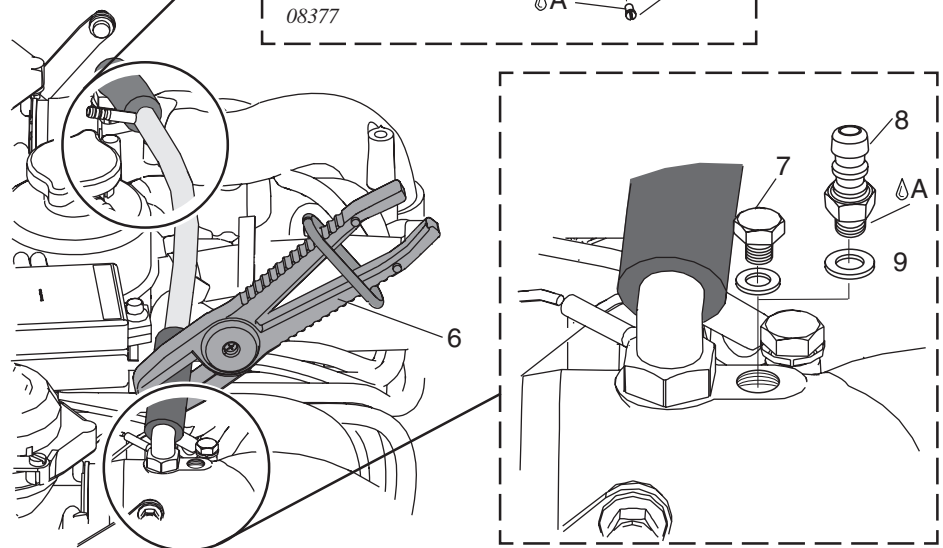
- 1 compensation tube
- 2 screw M3.5x6
- 3 connection fitting
- 4, 5 tube
- 6 hose clamp pliers
- 7 hex. screw M6x6
- 8 hose nipple M6
- 9 sealing ring 6.2/8.9/1

LOCTITE 221



08372

fig. 2



## NOTES

# SECTION 75-00-00

## 1.) Introduction of a new expansion tank assy.

### 1.1) General Information

(see fig 1, 2 and 3)

In the course of further development and standardization the position of the expansion tank (1) has been optimized!

In this connection the following modifications became necessary:

- position of connection (2) to overflow bottle (from 0° to 30±3°)
- position of connection (3) to radiator (from 51° to 27±3°)
- angle of inlet socket (4) from cylinder 4 (34° inclined)
- length of inlet socket (5) from cylinder 3 (length increased by 13,4±3 mm)
- length of coolant hose (6) from cylinder 1 (length increased from 270 mm to 285 mm)
- length of coolant hose (7) from cylinder 4 (shortened from 100 mm to 85 mm)
- new spring type hose clamps (8) to attach the coolant hoses (expansion tank and water pump)

The new expansion tank and the new type of hose clamps have been already installed on the following engines:

- 912 A up to engine S/N 4,410.419
- 912 F up to engine S/N 4,412.808
- 912 S up to engine S/N 4,922.606
- 912 UL up to engine S/N 4,404.020
- 912 ULS up to engine S/N 4,426.395
- 912 ULSFR up to engine S/N 4,429.589
- 914 F up to engine S/N 4,420.235
- 914 UL up to engine S/N 4,417.949

#### List of part no.:

Item no.	New part no.	Qty.	Description	Old part no.	Application
1	922665	1	expansion tank assy.	922398	cooling system
8	851640	16	spring type clamp	251875	cooling system
6	)	1	coolant hose 285 mm	922542	cylinder 1
7	)	1	coolant hose 85 mm	922541	cylinder 4

) water hose in meters part no. 922250.

◆ NOTE: Engines equipped with the old expansion tank, old hose clamps and coolant hoses of old length do not have to be retro fitted with the new equipment!

At engine repair/general overhaul be aware that because of the small distance of the tubes (between cylinder 1 and 3) the spring type hose clamps can not be fitted on the expansion tank part no. 922398.

Due to the different inlet and outlet positions on the expansion tanks, hoses of different length are required. Always verify correct hose length and slip-on length.

#### Special tools:

Item no.	New part no.	Qty.	Description	Old part no.	Application
	877840	1	spring clamp pliers <sup>)</sup>		spring type clamp

) e.g. HAZET®, BERNER® or equivalent. See fig. 3.

#### Assembly:

- Inspect the rubber plate (10).

◆ NOTE: Wear of up to 1 mm from original thickness can be tolerated!

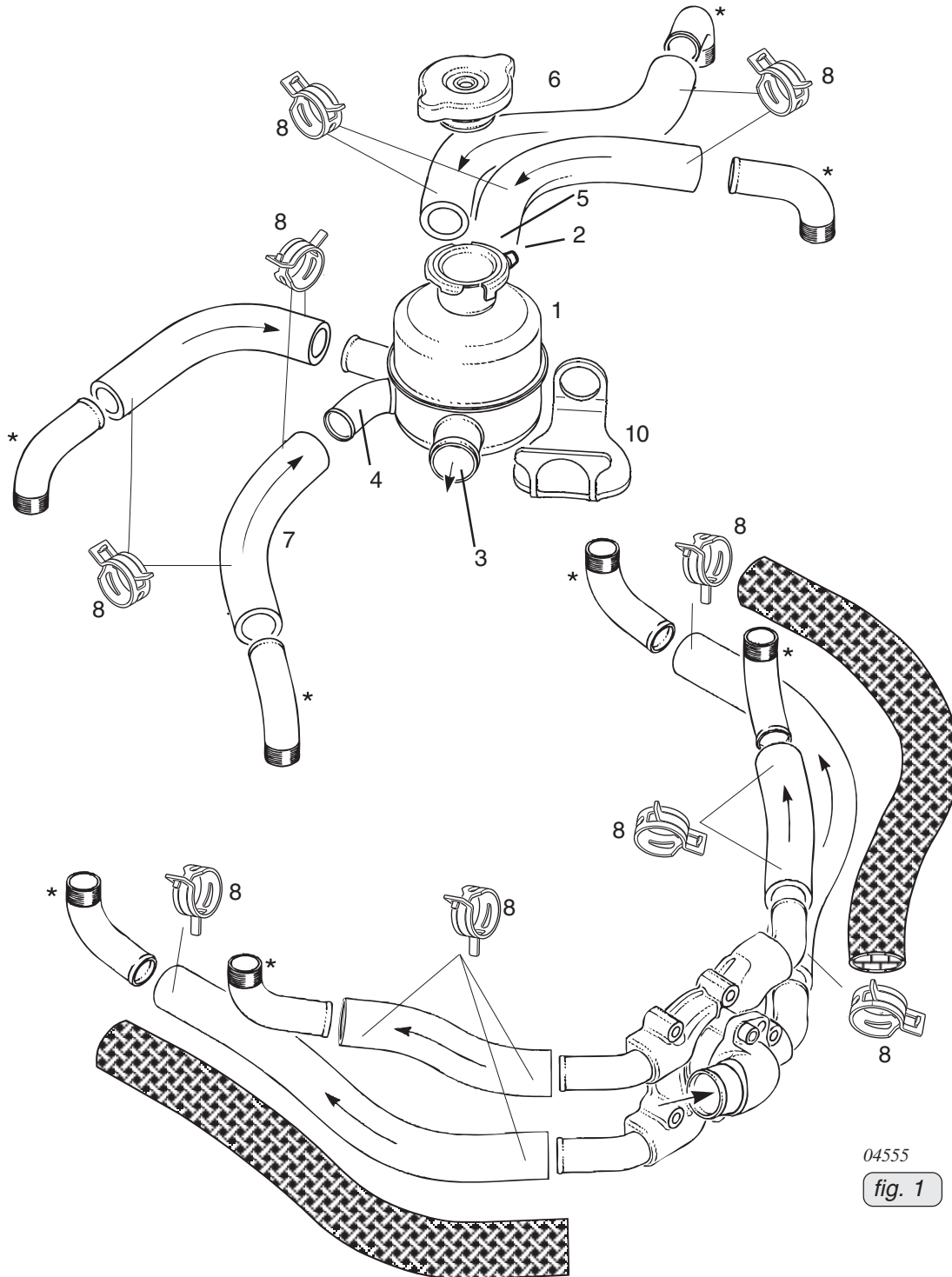
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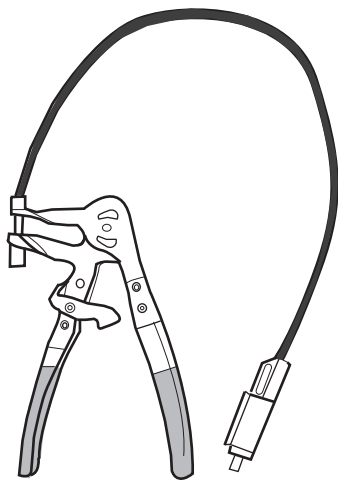
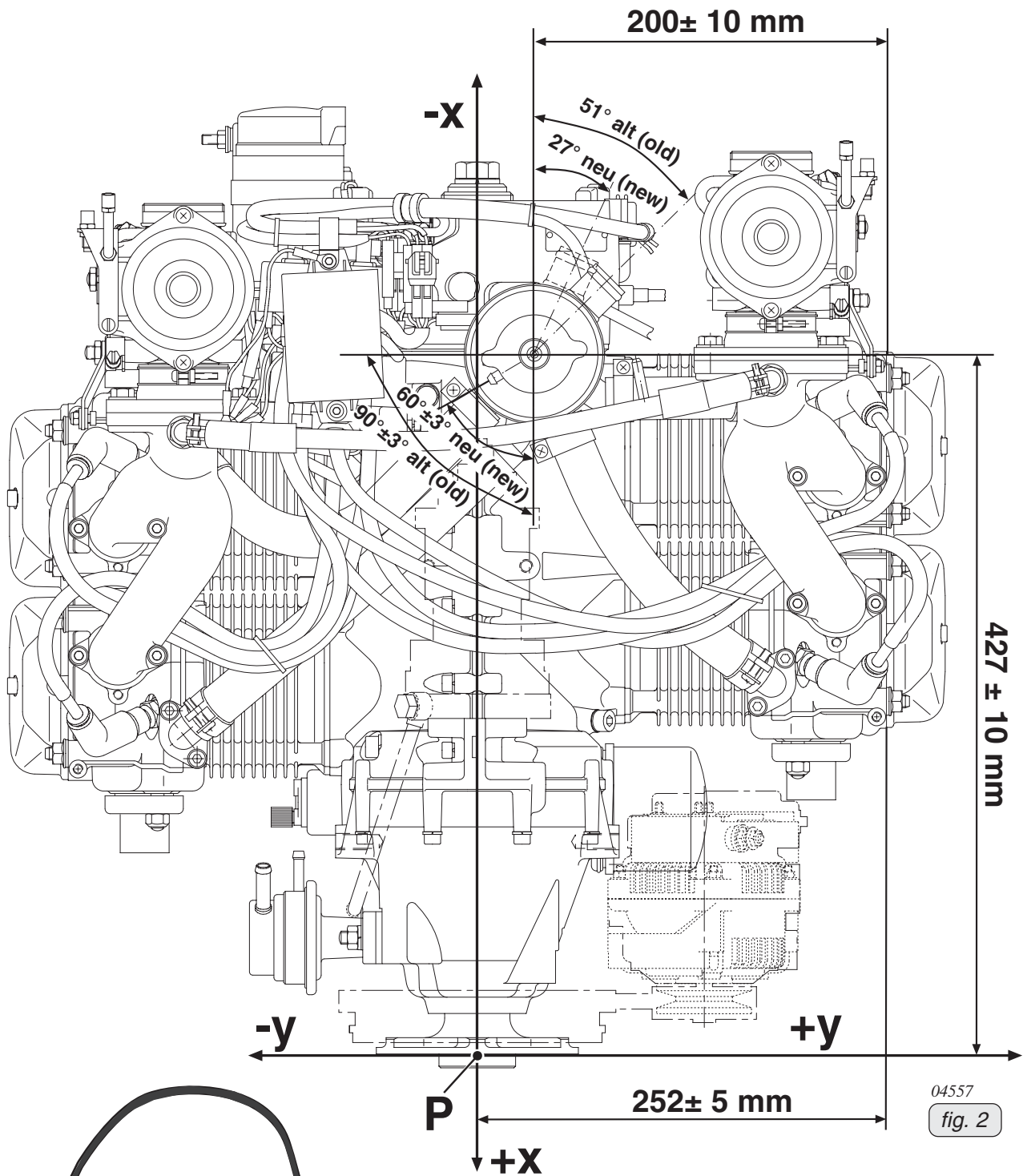
- Install the coolant hose (6) 285 mm to cylinder 1 and the new coolant hose (7) 85 mm to cylinder 4. For attaching all the coolant hoses from expansion tank, water pump, cylinders, use the new spring type clamps.

■ **CAUTION:** Take care of appropriate slip-on length of the coolant hoses on the corresponding connection socket. Verify tight fit of clamps and hoses and check for leakage. Always fit the clamps such that they can not wear on any component and use a suitable tool (see fig. 3) for fitting them.

## 1.2) Illustration

the following drawings should convey additional information:





NOTES

# KAPITEL 76-00-00

## 1.) Introduction of a new 3-way solenoid valve part no. 874313 for ROTAX® 914 Series

### 1.1) General Information

Owing to change of supplier from the new 3-way solenoid valve (part no. 874313) an adapted wiring harness and an airbox part no. 667574 have been introduced.

The new 3-way solenoid valve have been already installed on the following engines:

- 914 F up to engines S/N 4,420.710
- 914 UL up to engines S/N 4,419.744

#### 1.1.1) Interchangeability of parts

The current 3-way solenoid valve part no. 874310 is available anymore only in limited number of items. Particularly for repair, and exchange purposes the retrofit kit part no. 881040 is provided.

◆ NOTE: If replacement of wiring harness part no. 966490 is necessary the 3-way solenoid valve must be also replaced.

Accessories and attachment of the 3-way solenoid valve could differ because of the possible variants of the airbox.

**Variant 1:** for airbox part no. 667167 (see fig. 1 and 2)

◆ NOTE: all parts for Variant 1 are included in retrofit kit part no. 981040.

#### parts requirement - retrofit kit part no. 881040

Fig No.	New p/n	Qty/ engine	Decription	Old part no.	Application
1	874313	1	3-way solenoid valve	874310	airbox
2	666010	1	adapter cable	-	wiring harness
3	951040	2	bracket	-	3-way solenoid valve
4	840391	2	allen screw M6x14	-	bracket
5	842040	2	lock nut M6	-	bracket
6	866710	4	tie wraps	-	3-way solenoid valve

#### 1.1.2) Disassembly and assembly - Variant 1

Remove connection wiring harness (11) of 3-way solenoid valve (1).

Cut off tie wraps (6).

Loosen 3x clamps (12) from 3-way solenoid valve and remove lines.

Remove 3-way solenoid valve.

Connect adapter cable (2) to wiring harness.

Install bracket (3) onto airbox.

Tighten 3-way solenoid valve with allen screw (4) and lock nut (5). Tightening torque 8 Nm (70 in.lb).

■ CAUTION: Route all pressure connections such that there will be no sharp bends or chafing.

Push lines onto fittings as far as they will go and secure with clamps (12).

Position lines and adapter cable (2) and secure with clamps (6).

**Variant 2** for airbox part no. 867753 (see fig. 3 and 4)  
(attachment of the 3-way solenoid valve on the engine suspension frame)

**parts requirement:**

<b>Fig No.</b>	<b>New part no.</b>	<b>Qty/ engine</b>	<b>Description</b>	<b>Old part no.</b>	<b>Application</b>
-	981040*	1	retrofit kit	-	airbox
7	n.a**	1	bracket	-	3-way solenoid valve
8	241841	2	allen screw M5x12	-	bracket
9	927571	2	washer 5.3	-	bracket
10	842030	2	lock nut M5	-	bracket

\* following parts of the retrofit kit are not necessary for Variant 2:

2x bracket (3), 2x allen screw M6x14 (4), 2x lock nut M6 (5)

\*\* not yet available.

**1.1.3) Disassembly and assembly - Variant 2**

Remove connection wiring harness (11) of 3-way solenoid valve (1).

Cut off tie wraps (6).

Loosen 3x clamps (12) from 3-way solenoid valve and remove lines.

Loosen clamps (13) from engine suspension frame (14) and remove 3-way solenoid valve.

Connect adapter cable (2) to wiring harness.

Tighten the new 3-way solenoid valve with allen screw (8), washer (9) and lock nut (10) onto bracket (7). Tightening torque 8 Nm (70 in.lb).

Install 3-way solenoid valve with clamp (13) onto engine suspension frame.

■ CAUTION: Route all pressure connections such that there will be no sharp bends or chafing.

Push lines onto fittings of the 3-way solenoid valve and secure with clamps (12).

Position lines and adapter cable (2) and secure with clamps (6).

■ CAUTION: Always obey the additional instruction.

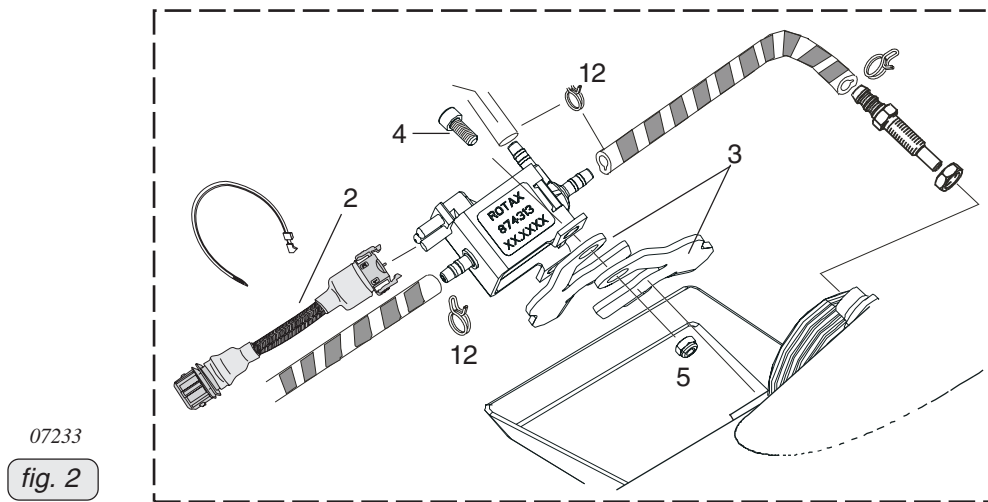
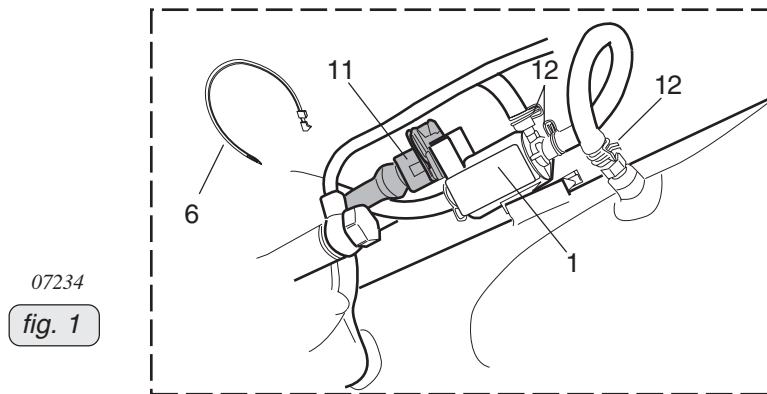
**1.2) Summary**

The instructions have to be conducted accordingly.

1.3) Illustration

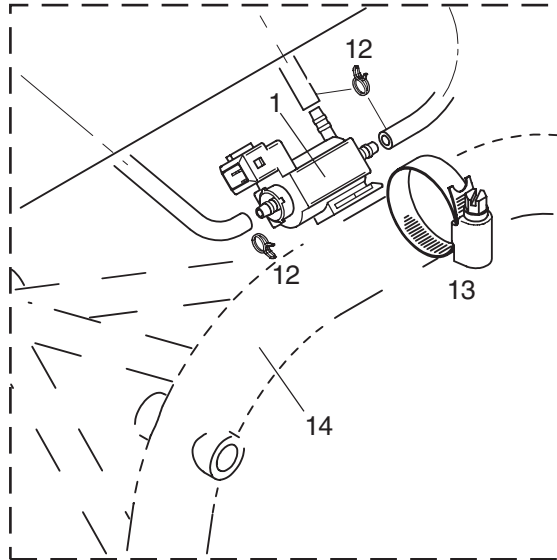
the following drawings should convey additional information:

Variant 1

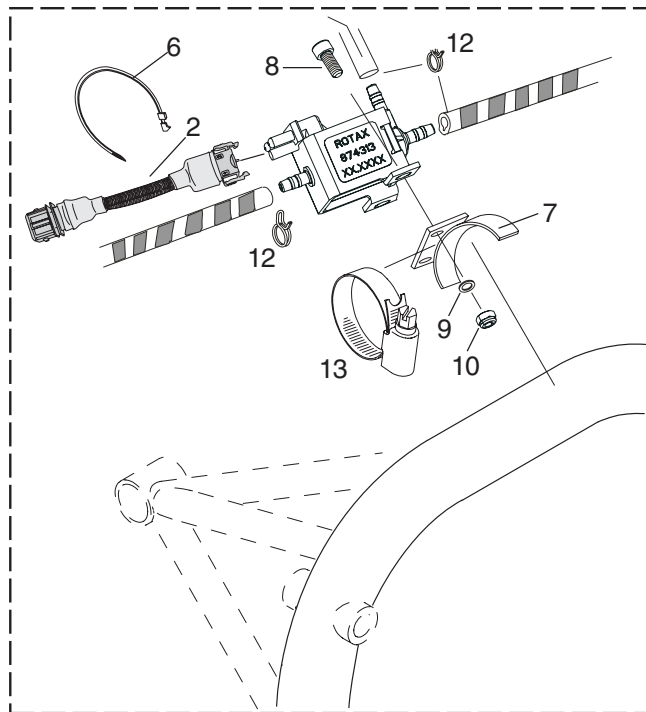


Variant 2

07231  
fig. 4



07232  
fig. 3



# SECTION 78-00-00

## 1.) Employment of exhaust mufflers on ROTAX® 912 engines:

### 1.1) General Information

The exhaust muffler part no. 973670 especially designed for the ROTAX® engines 912 S / ULS can be used also on the ROTAX engines 912 UL / A / F. Engine performance and specific fuel consumption remain unchanged or are slightly better when using this muffler part no. 973670.

The main advantage is the weight reduction. The weight is 2,2 kg, making this muffler 0,3 kg lighter than the muffler part no. 978482.

By optimizing the design of the muffler part no. 973670 the noise emission may seem subjectively higher compared with muffler part no. 978482. The exact measuring of the actual noise emission can be conducted only when the muffler is installed in the aircraft.

## 2) Introduction of new exhaust bends an exhaust manifold on ROTAX® 914

### 2.1) Allgemeine Information

(see fig. 1 to 3)

Owing to continuous further development, the exhaust bends were slightly re-worked. The couplings were optimized for their position.

- Position of the EGT connections (6) to the exhaust bends for cylinders 3 and 4 were routed such that installation of the new drip trays is possible.

The new exhaust bends and the new exhaust manifold have already been built into all of the following engines:

- 914 F commencing with engine S/N 4,420.364
- 914 UL commencing with engine S/N 4,418.248

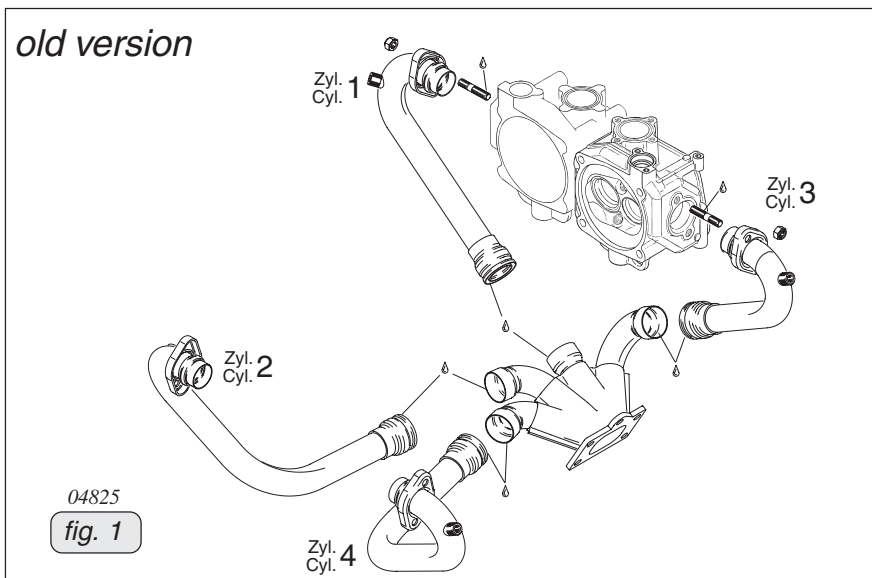
parts requirement:

Fig item no	New part no	Qty per engine	Description	Old part no	application
1	979425	1	exhaust bend assy cyl. 1	979420/421/422	ROTAX® 914
2	979435	1	exhaust bend assy cyl. 2	979430/431/432	ROTAX® 914
3	979445	1	exhaust bend assy cyl. 3	979440/441/442	ROTAX® 914
4	979455	1	exhaust bend assy cyl. 4	979450/451/452	ROTAX® 914
5	979413	1	exhaust manifold	979411	ROTAX® 914

◆ NOTE: If replacement of any single old part number is necessary, you must replace it with the same old part number. If the old part number is not available, the entire assembly including all 4 pipes and manifold must be replaced with new part numbers. New style pipes and manifold are not interchangeable with old style.

### 2.2) Illustration

the following drawings should convey additional information:



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new Version

