

**CHAPTER 28****FUEL SYSTEM****TABLE OF CONTENTS**

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GENERAL

1. INTRODUCTION

The fuel system of the Harmony LSA airplane serves for fuel storage in the airplane and for its transport to the engine in required quantity and quality.

The part of the fuel system that is part of the engine and ensures engine running and control is described in Chapter 73. The fuel system handling is described in Section 12-10; types of fuel are shown in Section 12-00.

The fuel system diagram of the airplane equipped ROTAX 912 ULS engine is shown in Fig. 28-1. The fuel system diagram of the airplane equipped ROTAX 912 ULS engine and Garmin G3X system is shown in Fig. 28-2.

The fuel system diagram of the airplane equipped ROTAX 912 iS Sport engine is shown in Fig. 28-3. The fuel system diagram of the airplane equipped ROTAX 914 UL engine is shown in Fig. 28-4.

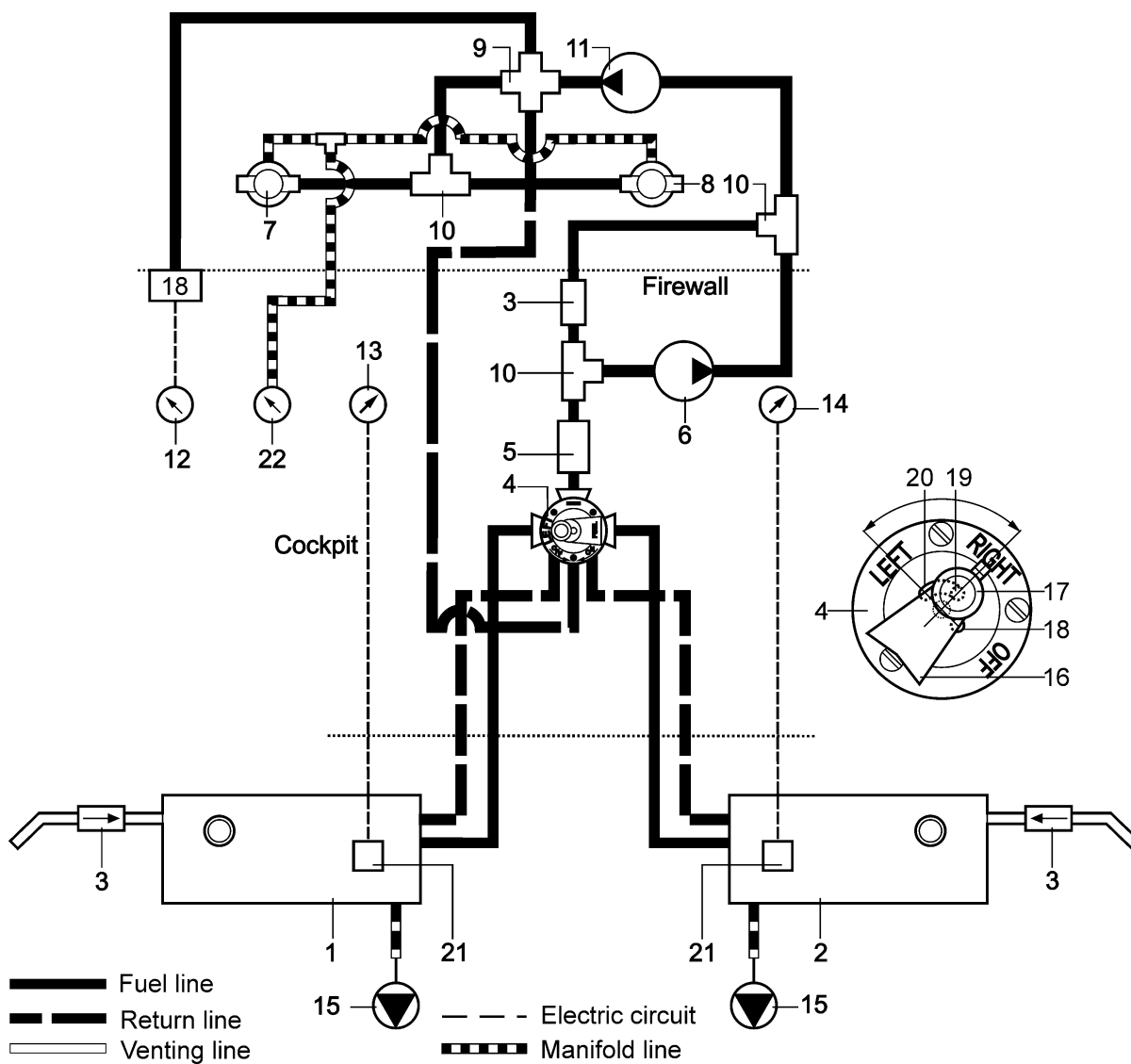


Fig. 28-1 Diagram of fuel system for engine Rotax 912 ULS (page 1 of 2)



Legend to Fig. 28-1

- | | | | |
|----|-------------------------|----|---------------------------------------|
| 1 | Left fuel tank | 13 | Fuel quantity indicator of left tank |
| 2 | Right fuel tank | 14 | Fuel quantity indicator of right tank |
| 3 | Check valve | 15 | Drain valve |
| 4 | Fuel cock | 16 | Fuel cock control |
| 5 | Fuel filter | 17 | Detent control |
| 6 | Electric fuel pump | 18 | Detent opening OFF |
| 7 | Left carburettor | 19 | Pin of the fuel cock detent |
| 8 | Right carburettor | 20 | Slot of positions LEFT, RIGHT |
| 9 | Four-way distributor | 21 | Fuel level sensor in tank |
| 10 | Three-way distributor | | For information: |
| 11 | Engine fuel pump | 22 | Manifold pressure sensor |
| 12 | Fuel pressure indicator | - | - |

Fig. 28-1 Diagram of fuel system for engine Rotax 912 ULS (page 2 of 2)

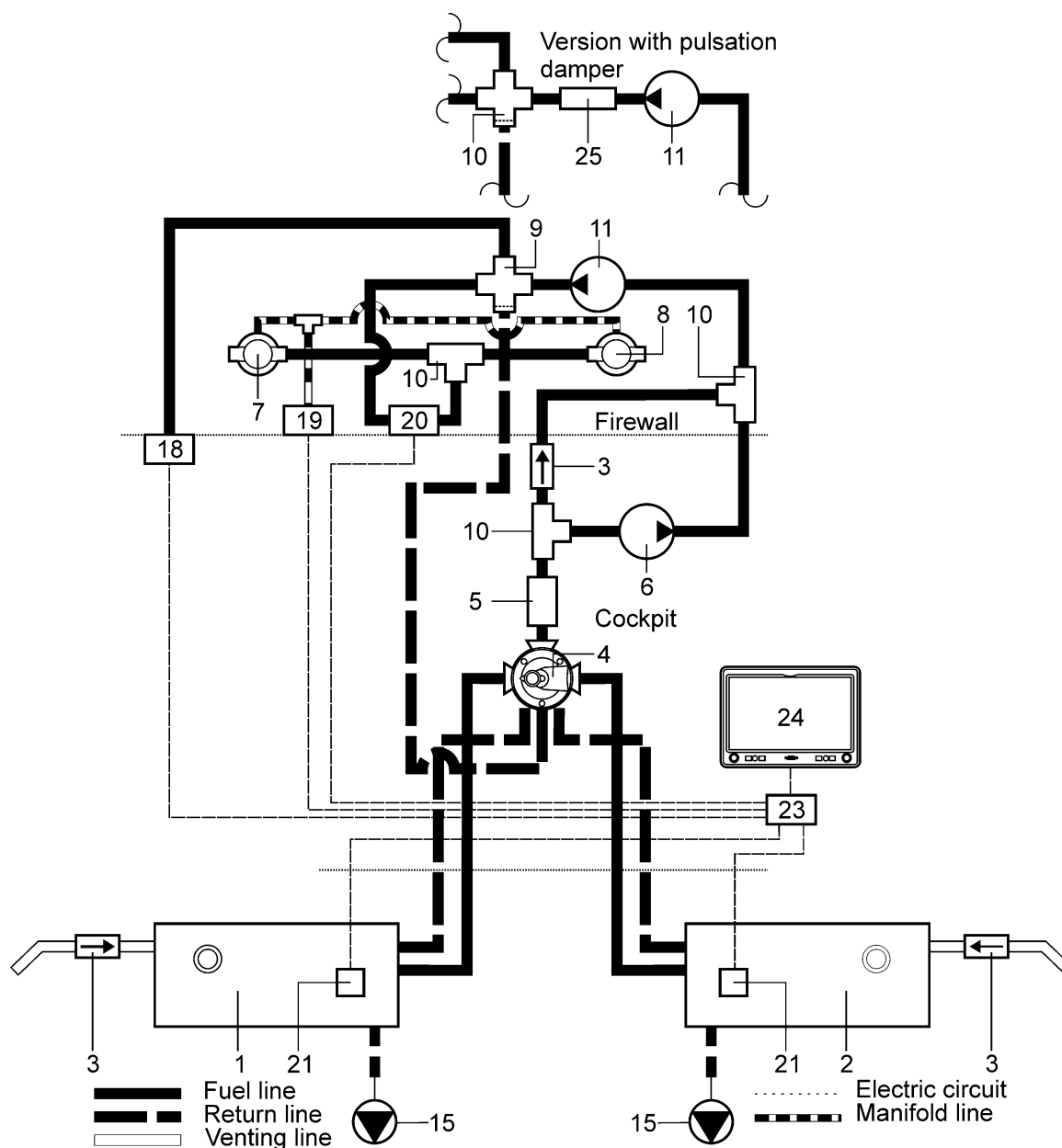


Fig. 28-2 Diagram of fuel system for engine Rotax 912 ULS and Garmin G3X system (page 1 of 2)



Legend to Fig. 28-2

1	Left fuel tank	14	-
2	Right fuel tank	15	Drain valve
3	Check valve	16	-
4	Fuel cock	17	-
5	Fuel filter	18	Fuel pressure sensor
6	Electric fuel pump	19	Manifold pressure sensor (only adjustable propeller installed)
7	Left carburettor	20	Flow meter
8	Right carburettor	21	Fuel level sensor in tank
9	Four-way distributor	22	Manifold pressure indicator (only adjustable propeller installed)
10	Three-way distributor	23	EIS GEA-24 unit
11	Engine fuel pump	24	MFD GDU 460
12	Fuel pressure indicator	25	Pulsation damper
13	-	-	-

Fig. 28-2 Diagram of fuel system for engine Rotax 912 ULS and Garmin G3X system (page 2 of 2)

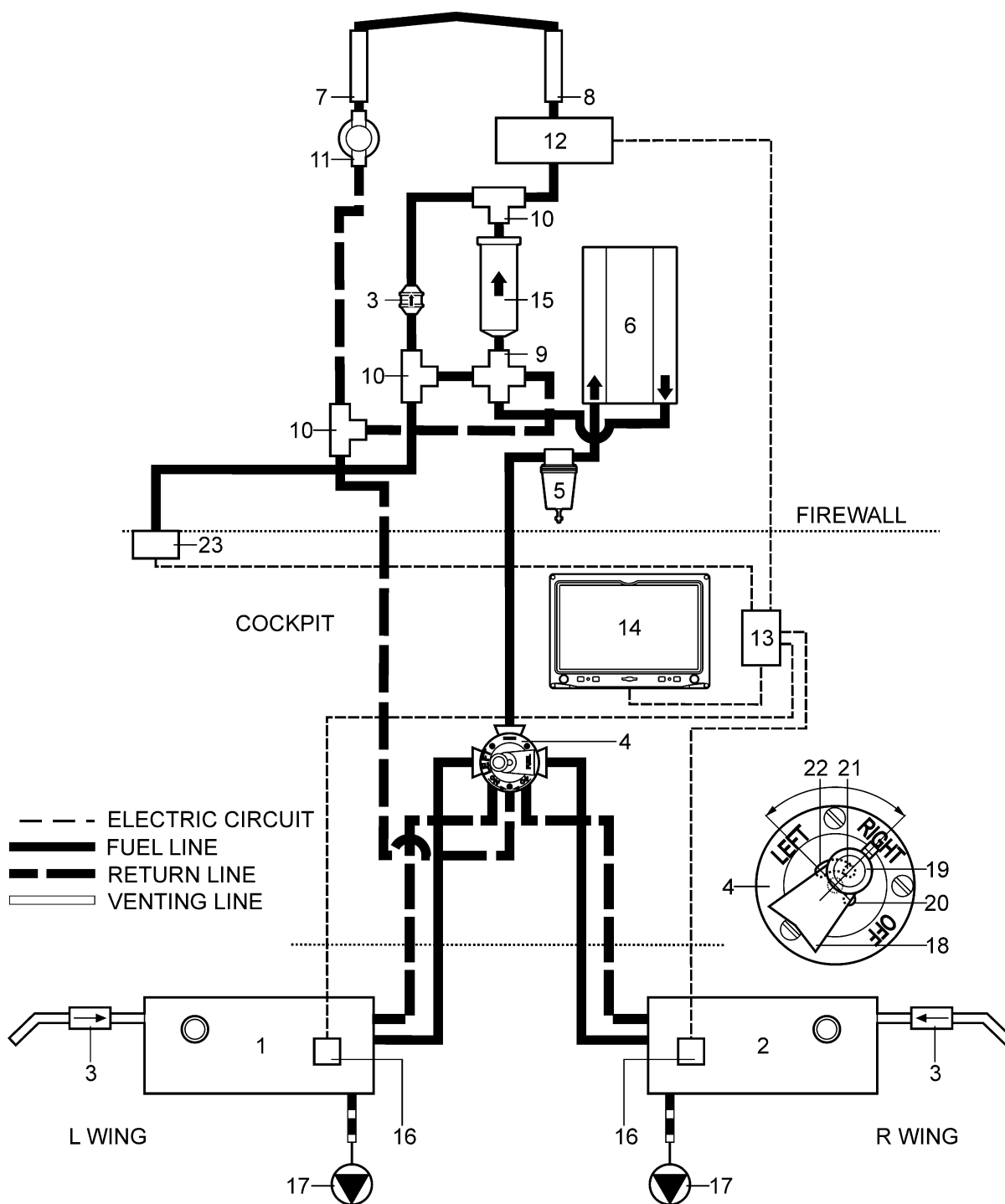


Fig. 28-3 Diagram of fuel system for engine Rotax 912 iS (page 1 of 2)



Legend to Fig. 28-3

1	Left fuel tank	13	EIS GEA 24
2	Right fuel tank	14	GDU 460 display
3	Return valve	15	Fuel filter
4	Fuel cock	16	Fuel quantity indicator R / L
5	Fuel filter with drain valve	17	Drain valve
6	Electric fuel pump	18	Handle of fuel selector
7	Left fuel rail	19	Safety button pin
8	Right fuel rail	20	Off position locking hole
9	Four-way distributor	21	Safety button pin
10	Three-way distributor	22	Groove of left and right position
11	Pressure regulator	23	Fuel pressure sensor
12	ECU	-	-

Fig. 28-3 Diagram of fuel system for engine Rotax 912 iS (page 2 of 2)

NOTE

The operating parameters of the R 912 iS engine are displayed only digitally.

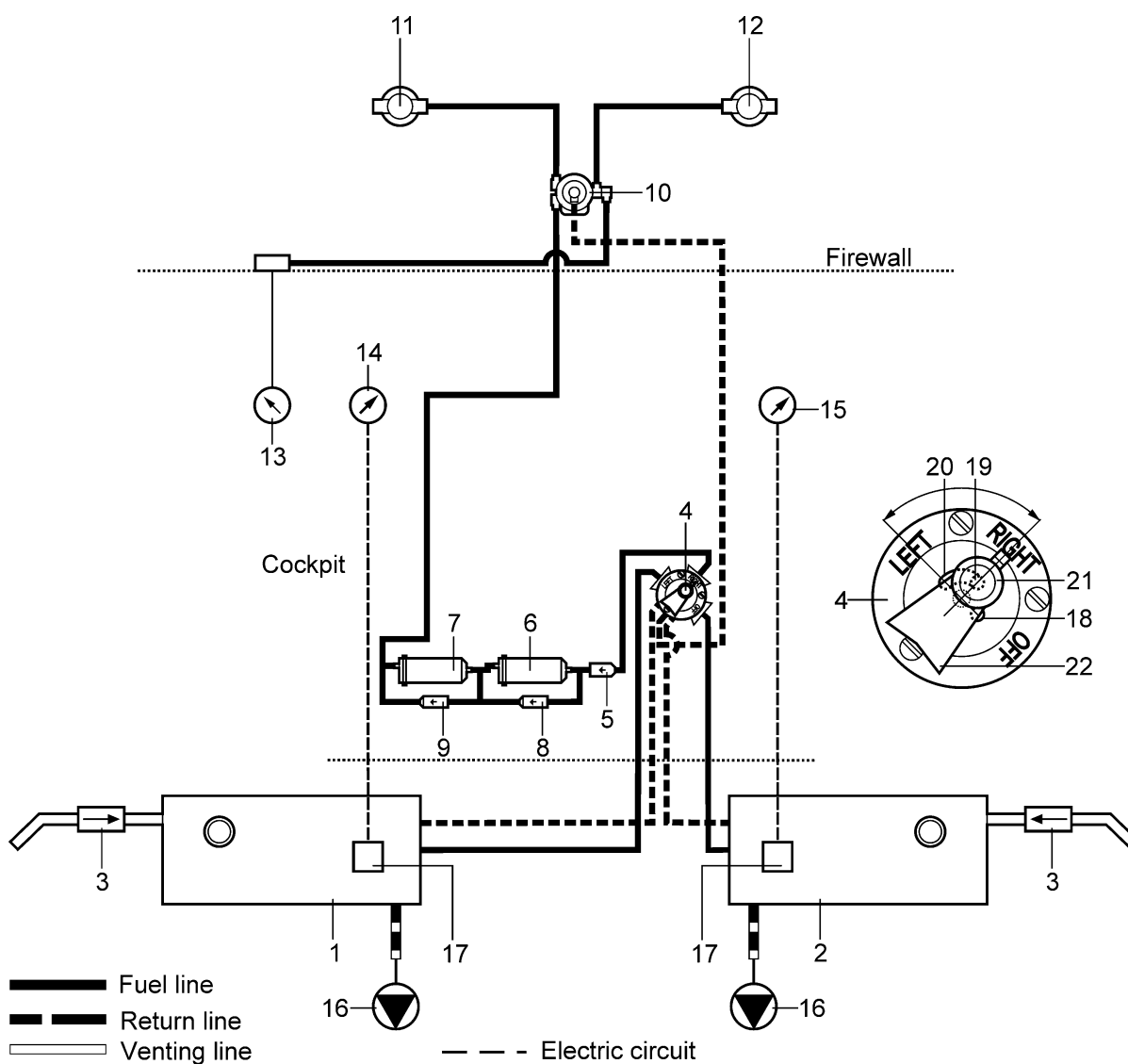


Fig. 28-4 Diagram of fuel system for engine Rotax 914 UL (page 1 of 2)

**Legend to Figure 28-4**

- | | |
|----------------------------|--|
| 1 Left fuel tank | 12 Right carburetor |
| 2 Right fuel tank | 13 Fuel pressure indicator |
| 3 Check valve | 14 Fuel quantity indicator of left tank |
| 4 Fuel cock | 15 Fuel quantity indicator of right tank |
| 5 Fuel filter | 16 Drain valve |
| 6 Main fuel pump | 17 Fuel level sensor in tank |
| 7 Aux. fuel pump | 18 OFF position locking hole |
| 8 Check valve | 19 Safety button pin |
| 9 Check valve | 20 Groove of left and right position |
| 10 Fuel pressure regulator | 21 Safety button |
| 11 Left carburetor | 22 Handle of fuel selector |

Fig. 28-4 Diagram of fuel system for engine Rotax 914 UL (page 2 of 2)



2. MAINTENANCE

In case of fuel contamination, flush the fuel system.

When handling fuel, carry out work with assistants and follow the safety precautions mentioned in Chapter 12.

A. Fuel system

Maintenance type: Line

Personnel qualification: Repairman (LSA) or Mechanic (A&P)

Recommended tools and material:

Item	Designation / Size	Quantity	Note
Fuel can	-	1 pc	
Compressed air source	-	1 pc	
Nonferrous wire	Diameter up to 0,3 mm (0.01 in)	-	
Gripping pliers	Cobra	1 pc	

- (1) Fuel system flushing for ROTAX 912 ULS and ROTAX 914 UL
 - (a) Ground the airplane (Section 12-10).
 - (b) Remove the engine cowlings (Section 71-10).
 - (c) Set the fuel cock control to **OFF** position.
 - (d) Drain the fuel from the fuel system (Section 12-10).
 - (e) Fill the fuel system with the clean fuel (Section 12-10); fill fuel through a suitable filter (filter can be a part of the filling device).
 - (f) Drain the fuel from the fuel system (Section 12-10).
 - (g) Fill the fuel system with the clean fuel again (Section 12-10) and repeat the procedure until the drained fuel is clean (min. 3 times).
 - (h) After the drained fuel is clean, fill the fuel system with the clean fuel (Section 12-10).
 - (i) Disconnect the inlet hoses from the carburettors.
 - 1 Release the clamps by means of pliers and pull the hoses from the necks of the carburettors.
 - 2 Use vessels to catch the fuel flowing from the inlet hoses to the carburettors.
 - (j) Visually check condition of the fuel filter; replace the contaminated filter (Section 28-20).
 - (k) Switch the electrical network on.
 - (l) Set the fuel cock control to the **LEFT** position.
 - (m) Start the electric fuel pump by the **FUEL PUMP** switch and drain at least 3 litres of the fuel from each tank; check cleanness of the drained fuel. Continue draining until the fuel is clean.
 - (n) Switch the electric fuel pump off.



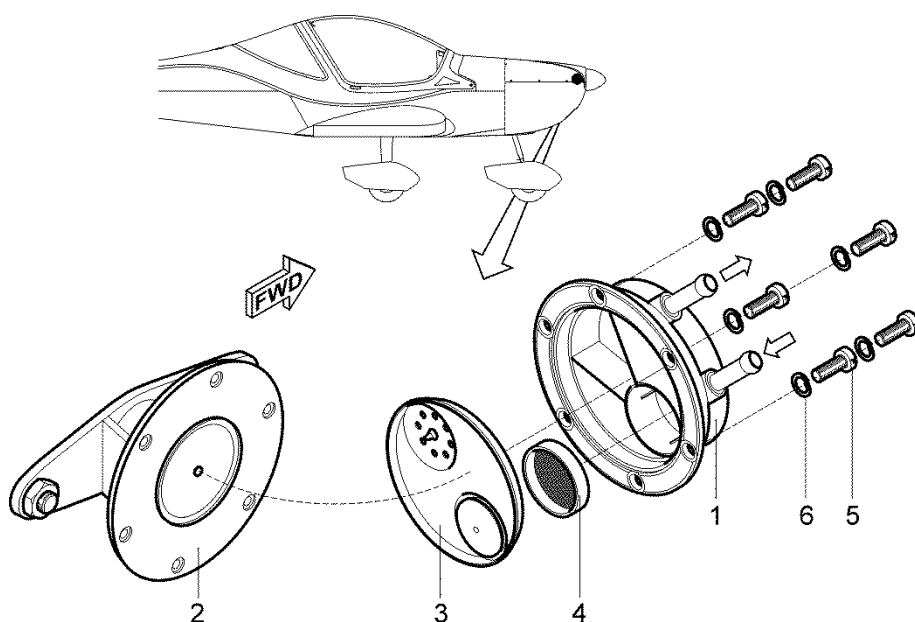
- (o) Set the fuel cock control to the **RIGHT** position and repeat procedure in accordance with points (m) and (n).
 - (p) Set the fuel cock control to the **OFF** position.
 - (q) Switch the electrical network off.
- If it is not possible to clean the fuel system as described above, proceed as follows:
- (r) As necessary, replace the fuel filter (Section 28-20).
 - (s) As necessary, clean the filter screen in the electric fuel pump (R 912 ULS):
 - 1 Release the clamp (8, Fig. 28–7) by pliers and pull the hose (4) from the neck of the pump (1).
 - 2 Remove the plastic filter screen from the inlet neck of the pump (1).
 - 3 Clean the filter screen.
 - 4 Put the filter screen to the inlet neck of the pump.
 - 5 Connect the hose (4) to the neck of the pump (1); secure the hose by the clamp (8) by means of pliers.
 - (t) As necessary, clean the filter screen in the engine fuel pump (R 912 ULS).
 - 1 Unscrew the bolts (5, Fig. 28–5) with washers (6) and remove the pump cover (1).
 - 2 Remove the circular valve baffle (3).
 - 3 Remove the filter screen (4) from the pump cover (1).
 - 4 Clean the filter screen.
 - 5 Put the filter screen into the inlet chamber of the pump cover (1); make sure to place the filter screen in the correct position in accordance with Fig. 28-2.
 - 6 Put the circular valve baffle (3) with the gasket ring into the inlet chamber of the pump cover (1); carefully press down.
 - 7 Put the pump cover (1) with the circular valve baffle (3) on the pump body, screw on the bolts (5) with washers (5); tighten the bolts crosswise.
 - (u) As necessary, remove the four-way distributor with the nozzle:
 - 1 Release the clamps by pliers and pull the hoses from the four-way distributor (Fig. 28–3).
 - 2 Check the nozzle throughput (Fig. 28–6).
Carefully blow out the clogged nozzle with the compressed air or purge by means of the nonferrous wire with diameter up to $\varnothing$ 0,3 mm (0.01 in).
 - 3 Connect the hoses to the four-way distributor, connect the hose of the return line to the neck with nozzle marked with the letter **V**; secure the hoses by the clamps by means of pliers.
 - (v) As necessary, clean the fuel cock:
 - 1 Remove the fuel cock (Section 28-20).
 - 2 Repeatedly flush the fuel cock with the clean fuel.
 - 3 Install the fuel cock back (Section 28-20).
 - (w) Connect the hoses to the neck of the carburetors; secure the hoses by the clamps by means of pliers.
 - (x) Do the tightness check of the fuel system (Section 28-10).



- (2) Fuel system flushing for ROTAX 912 iS
- (a) Ground the airplane (Section 12-10).
 - (b) Remove the engine cowlings (Section 71-10).
 - (c) Set the fuel cock control to **OFF** position.
 - (d) Drain the fuel from the fuel system (Section 12-10).
 - (e) Fill the fuel system with the clean fuel (Section 12-10); fill fuel through a suitable filter (filter can be a part of the filling device).
 - (f) Drain the fuel from the fuel system (Section 12-10).
 - (g) Fill the fuel system with the clean fuel again (Section 12-10) and repeat the procedure until the drained fuel is clean (min. 3 times).
 - (h) After the drained fuel is clean, fill the fuel system with the clean fuel (Section 12-10).
 - (i) Disconnect the hoses from the filter ANDAIR inlet (Fig. 28-19).
 - 1 Release the clamps (5) by means of pliers and remove the hose (6) from the inlet on the filter body (1).
 - 2 Use vessels to catch the fuel flowing from the inlet hoses.
 - (j) As necessary, clean the Andair filter screen:
 - 1 By turning the ring (2, Fig 28-19) in the direction of the black arrow, loosen the collector cup (3).
 - 2 Remove the collector cup (3) from the filter body (1).
 - 3 Remove the filter screen (4) from the filter body (1). Rotate the filter screen (4) follow the black arrow.
 - 4 Clean the filter screen.
 - 5 Install the filter screen (4) back into the filter body (1) by rotating in the direction of the white arrow.
 - 6 Install the collection cup (3) into the filter body (1). Set the pin on the upper edge of the filter into the grooves in the body.
 - 7 Tighten the threaded ring (2) of the cup attachment.
 - 8 Turn the threaded ring (2) in the direction of the white arrow.
 - 9 As necessary, replace the filter screen (4).
 - (k) Set the fuel cock control to the **LEFT** position.
 - (l) Drain at least 3 litres of the fuel from each tank; check cleanness of the drained fuel. Continue draining until the fuel is clean.
 - (m) Set the fuel cock control to the **RIGHT** position and repeat procedure in accordance with points (l).
 - (n) Set the fuel cock control to the **OFF** position.
- If it is not possible to clean the fuel system as described above, proceed as follows:
- (o) Replace fine filter ROTAX as needed (Fig. 28-6).



- (p) Remove the inlet and outlet hoses (7) from the nozzles (5) and (2) on the fine filter body.
Release the clamps (6) by means of pliers.
- (q) Unscrew the filter housing attachment the Torro clamp (4). Remove the filter (1).
- (r) Remove the 3-way distributor (2). Remove the sealing ring (9).
- (s) Remove the filter mouth piece (5). Remove the sealing ring (8).
- (t) Mount the new filter on the screw connection 3-way distributor (2) and the sealing ring (9).
- (u) Mount the new filter on the screw connection mouth piece (5) and the sealing ring (8).
- (v) Place the new filter (1) in the holder and install the Torro clamp (4).
- (w) Connect the hoses (6) and (10) to the filter (1). Secure the hoses by the clamps by means of pliers.
- (x) As necessary, remove the four-way distributor with the nozzle:
 - 1 Release the clamps by pliers and pull the hoses from the four-way distributor (Fig. 28-4).
 - 2 Check the nozzle throughput (Fig. 28-6).
Carefully blow out the clogged nozzle with the compressed air or purge by means of the nonferrous wire with diameter up to $\varnothing 0,3$ mm (0.01 in).
 - 3 Connect the hoses to the four-way distributor, connect the hose of the return line to the neck with nozzle marked with the letter **V**; secure the hoses by the clamps by means of pliers.
- (y) As necessary, clean the fuel cock:
 - 1 Remove the fuel cock (Section 28-20).
 - 2 Repeatedly flush the fuel cock with the clean fuel.
 - 3 Install the fuel cock back (Section 28-20).
- (z) Connect the hoses to the neck of filter; secure the hoses by the clamps by means of pliers.
- (aa) Do the tightness check of the fuel system (Section 28-10).



Legend to Fig. 28-5

- | | | | |
|---|-----------------------|---|---------------------------------|
| 1 | Fuel pump cover | 4 | Filter screen of the fuel inlet |
| 2 | Fuel pump body | 5 | Bolt |
| 3 | Circular valve baffle | 6 | Nut |

Fig. 28-5 Rotax 912 ULS engine fuel pump – removal / installation

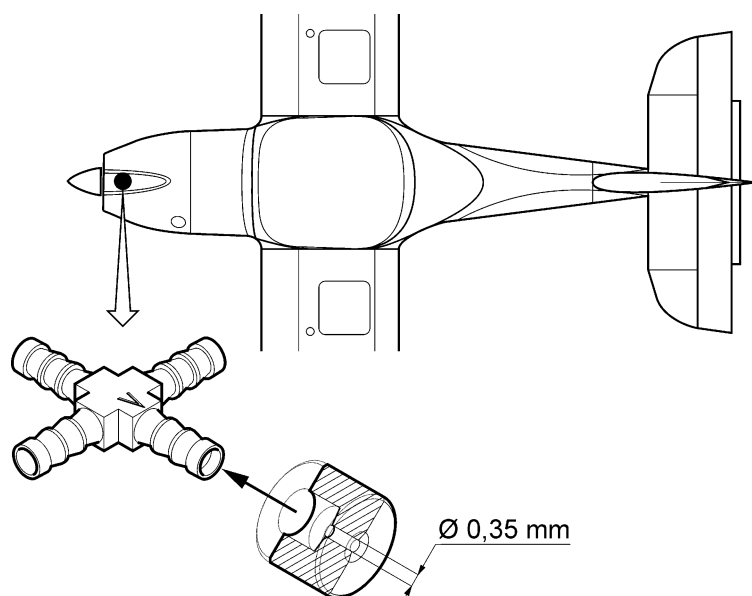


Fig. 28-6 Rotax 912 ULS four-way distributor with the nozzle



STORAGE

1. DESCRIPTION AND OPERATION

The fuel in the airplane is stored in two integral tanks (1; 2, Fig. 28-1; 28-2; 28-3; 28-4) in the right half and in the left half of the wing. The total volume of fuel tanks is 120 l (31.70 gal), it means 60 l (15.85 gal) in each tank.

Each half of the wing includes an integral fuel tank. The tank is located between the middle parts of ribs No. 2 and 4, it is bounded by the upper skin and the lower skin of the wing, by the front spar and the rear spar. The filler with the cap is located on the upper side of the wing at rib No. 4. The place of fuel offtake is located at the tank bottom on rib No. 2 and is formed by the grommet riveted on the rib. The cylindrical part of the grommet is provided with drilled holes that prevent gross impurities from entering the fuel system. The middle part of rib No. 3 is provided with a hole and serves, among others, as an obstacle preventing fuel from overflowing in the tank. All the spaces of the tank, i.e. rivets, covers and so on, are sealed by special sealants TM 2 and TM 3.

Each fuel tank has its own drain valve (1, Fig. 28-7), installed on the lower side of the wing. The drain valve can be also used for total fuel draining from the tank. The procedure for fuel draining is shown in Section 12-10.

The tank is vented by the tube that is led through the wing and has an outlet on the lower side of the wing tip. In the tube, there is a check valve (3, Fig. 28-1; 28-2; 28-3; 28-4) that prevents fuel from flowing from the tanks through the venting line.



2. MAINTENANCE

A. Drain valve

Maintenance type: Line

Personnel qualification: Sport pilot, Repairman (LSA), or Mechanic (A&P)

Recommended tools and material:

Item	Designation / Size	Quantity	Note
Flat screwdriver	-	1 pc	
Cleaning agent	Acetone	-	
Adhesive	Loctite 577	-	
Lint-free cloth	-	-	

NOTE

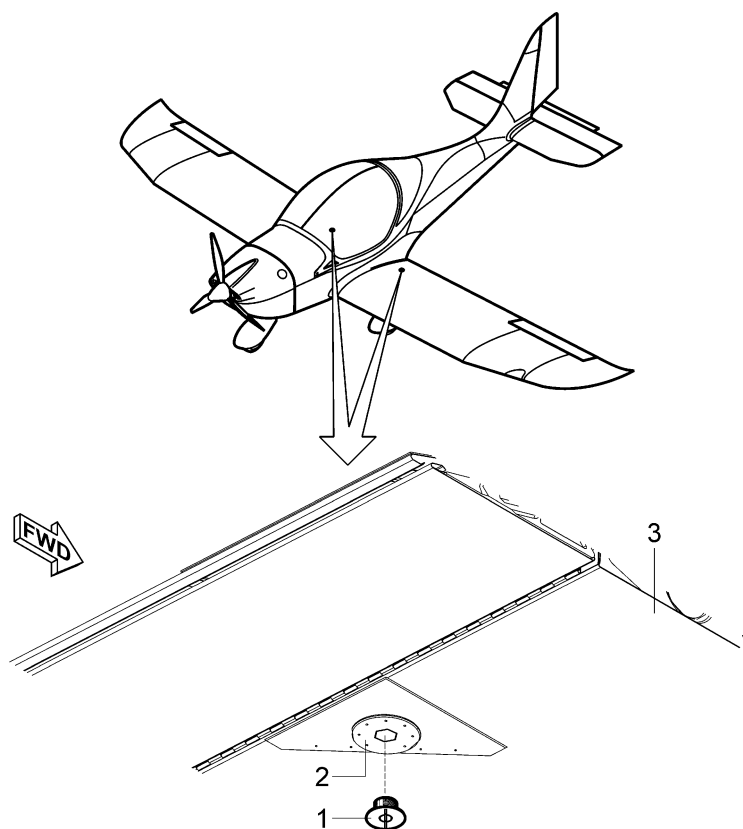
The procedure of removal / installation is identical for the drain valve on the left as well as on the right wing.

- (1) Removal – drain valve
 - (a) Drain the fuel from the fuel system (Section 12-10).
 - (b) Unscrew and remove the drain valve (1, Fig. 28-7).
 - (c) If the drain valve is not immediately installed back, close the hole on the lower skin by means of the blind plug.
- (2) Installation – drain valve
 - (a) Remove the blind plug from the hole on the lower skin of the wing.
 - (b) Thoroughly clean the seating surfaces of the drain valve (1, Fig. 28-7) and the flange (2) with a cloth soaked in cleaning agent.
 - (c) Apply adhesive onto the valve thread (1).

CAUTION

DURING ADHESIVE BONDING, PAY ENHANCED ATTENTION TO MAINTAIN PASSABILITY OF THE HOLES IN THE FLANGE AND FUNCIONALITY OF THE VALVE.

- (d) Screw the valve (1) into the flange (2) and tighten it.
- (e) Check the fuel system tightness (refer to Par.2. C(1)).
- (f) Fill the fuel system with fuel (Section 12-10) and check the valve function.



Legend to Fig. 28-7

1 Drain valve

2 Flange

For information:

3 Lower skin of wing

Fig. 28-7 Drain valve – removal / installation

**B. Vent check valve**

Maintenance type: Line

Personnel qualification: Repairman (LSA) or Mechanic (A&P)

Recommended tools and material:

Item	Designation / Size	Quantity	Note
Gripping pliers	Cobra	1 pc	
Pincers	-	1 pc	
Cable tie	2,5x99 mm 3/32x3.9 in	1 pc + 1 pc	

NOTE

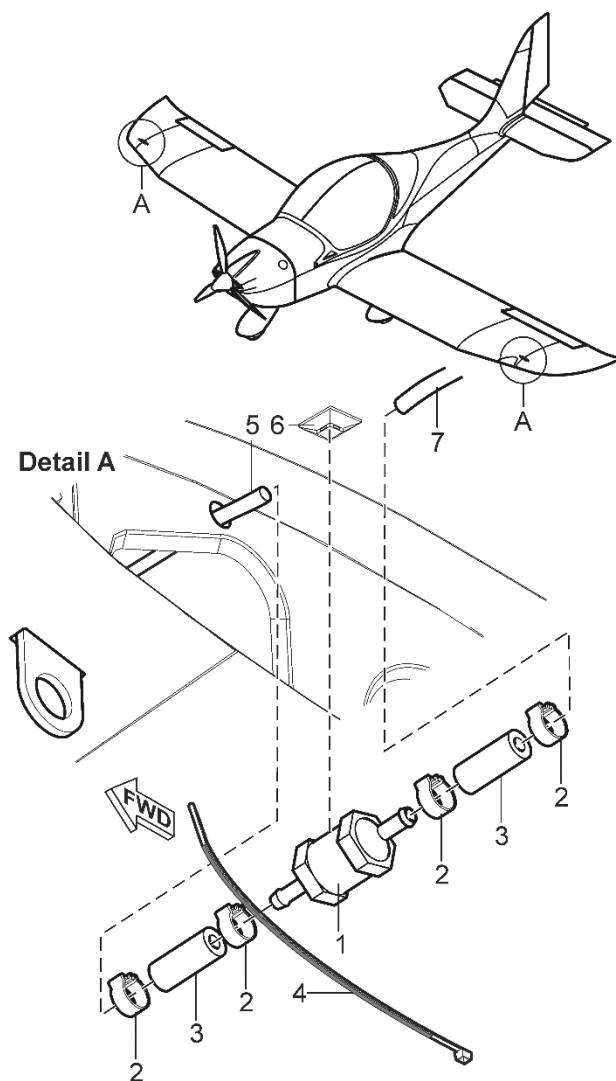
The procedure of removal / installation is identical for the check valve on the left as well as on the right wing.

- (1) Removal – vent check valve
 - (a) Remove the cover W4L / W4R (Fig. 06-2) on the lower side of the wingtip.
 - (b) Release the clamps (2, Fig. 28-8) by means of pliers and pull the hoses (3) from the necks of the check valve (1).
 - (c) Cut off the cable tie (4) and remove the check valve (1).
 - (d) Close the hoses and the check valve necks using blind plugs.
- (2) Installation – vent check valve
 - (a) Remove the blind plugs from the hoses and the check valve necks.
 - (b) Connect the hoses (3) to the necks of the check valve (1, Fig. 28-8); secure the hoses with the clamps (2) by means of pliers.

NOTE

The check valve must be installed in such a way that the arrow on the valve points to the tank.

- (c) Set the check valve (1) to position and fix it to the cable tie mount (6) using the cable tie (4).
- (d) Install the cover W4L / W4R (Fig. 06-2) to the lower side of the wingtip.



Legend to Fig. 28-8

- 1 Check valve
- 2 Clamp Cobra 11/7
- 3 Hose
- 4 Cable tie

For information:

- 5 Tube
- 6 Cable tie mount
- 7 Tube

Fig. 28-8 Vent check valve – removal / installation


C. Integral fuel tanks

Maintenance type: Line

Personnel qualification: Repairman (LSA) or Mechanic (A&P)

Recommended tools and material:

Item	Designation / Size	Quantity	Note
Pressurization device	-	1 pc	

- (1) Adjustment / check – check of tightness of integral tanks and fuel system by air

The checks of tightness of integral tanks and fuel system are performed in the case when it is necessary to verify the fuel system tightness, including the tightness of integral tanks.

Perform the check in a suitable and exactly defined space. During the check in this space and its vicinity, do not carry out any other work than the work necessary for performing the check.

WARNING

USE THE STANDARD SAFETY PRECAUTIONS DURING THE CHECK OF TIGHTNESS WHEN WORKING WITH FLAMMABLE MATERIALS. OXYGEN MUST NOT BE USED FOR CHECKING THE FUEL SYSTEM TIGHTNESS – DANGER OF EXPLOSION.

CAUTION

SPEED OF AIR PRESSURE INCREASE IN THE TESTED TANK DURING GENERATING THE REQUIRED OVERPRESSURE MUST NOT BE HIGHER THAN 5 kPa/min (0.725 PSI / min).

SPEED OF AIR PRESSURE DECREASE IN THE TESTED TANK DURING ELIMINATING OR REDUCING THE OVERPRESSURE MUST NOT BE HIGHER THAN 5 kPa/min (0.725 PSI / min).

IF THERE IS AN AIR OVERPRESSURE IN THE INTEGRAL TANK, IT IS PROHIBITED TO CARRY OUT ANY OTHER WORK ON THE FUEL INSTALLATION LOCATED IN THE WING. ABOVE ALL, IT IS PROHIBITED TO REPAIR LEAKAGES, TIGHTEN AND LOOSEN BOLTS, REMOVE BLIND PLUGS, COVERS, SLUDGE VALVE, ETC.

- (a) Drain the fuel from the fuel system (Section 12-10).
- (b) Disconnect the fuel hoses from the engine carburetors, close the hoses using the blind plugs that allow the check of fuel system installation tightness by air, close the carburettor sockets with the blind plugs.
- (c) Connect the hoses of the pressurization device to the venting line of the integral tank of left wing, set the fuel cock control to the **LEFT** position, create an air



overpressure of 10 kPa in the fuel system, close the overpressure in the fuel system.

- (d) After 10 minutes, adjust the air overpressure in the fuel system to a value of 10 kPa (1.45 PSI) again. Let act the mentioned air overpressure closed in the fuel system for 10 minutes and then check its value. A pressure drop is not allowed. The fuel system of the airplane must be absolutely tight. In the case of a pressure drop, identify the place of leakage by means of soap bubbles, cancel the overpressure in the fuel system, eliminate the leakage and repeat the check of tightness of fuel system.
- (e) Disconnect the hoses of the pressurization device from the venting line of the integral tank of left wing.
- (f) Connect the hoses of the pressurization device to the venting line of the integral tank of right wing, set the fuel cock control to the **RIGHT** position, create an air overpressure of 10 kPa (1.45 PSI) in the fuel system, close the overpressure in the fuel system.
- (g) After 10 minutes, adjust again the air overpressure in the fuel system to a value of 10 kPa (1.45 PSI). Let act the mentioned air overpressure closed in the fuel system for 10 minutes and then check its value. A pressure drop is not allowed. The fuel system of the airplane must be absolutely tight. In the case of a pressure drop, identify the place of leakage by means of soap bubbles, cancel the overpressure in the fuel system, eliminate the leakage and repeat the check of tightness of fuel system.
- (h) Disconnect the hoses of the pressurization device from the venting line of the integral tank of right wing; connect the fuel system hoses to the carburettor.



DISTRIBUTION

1. DESCRIPTION AND OPERATION

The fuel is taken from the tanks via the grommet riveted on rib No. 2, and is led by means of tubes to the fuel cock (4, Fig. 28-1; 28-2; 28-3; 28-4). The fuel cock is controlled by the **FUEL** selector located on the central console between the seats. The **FUEL** selector has three positions: **LEFT**, **RIGHT** and **OFF**. If the selector is in the **LEFT** / **RIGHT** position, then the fuel supplied to the engine is taken from the left / right tank. If the selector is in the **OFF** position, then the fuel supply to the engine is closed. Before setting the **FUEL** selector to the **OFF** position / from the **OFF** position, it is necessary to lift the button on the selector slightly.

Rotax 912 ULS engine

The fuel is led from the fuel cock through the piping to the fuel filter (5) located on the left side of the cockpit.

Rotax 912 iS Sport engine

The fuel is led from the fuel cock through the piping to the fuel filter (5) located on the front side of the firewall.

Rotax 914 UL engine

The fuel is led from the fuel cock through the piping to the fuel filter (5) located on the left side of the cockpit after main spar.

Fuel distribution for the engine Rotax 912 ULS. The fuel from the fuel filter (5, Fig. 28-1; 28-2) is led by one line via the distributor (10) to the electric fuel pump (6) and further via the distributor (9) to the engine fuel pump (11) that transports it via the distributors (9, 10) to the carburetors (7; 8). In the case of an electric fuel pump (6) failure, the fuel is led by the second line via the check valve (3) to the engine fuel pump (11), to the distributors (9, 10) and further to the carburetors (7; 8).

The electric fuel pump is controlled by the **FUEL PUMP** switch located on the left part of the instrument panel near the switches and circuit breakers.

The hose of the return line of fuel is led from the distributor (9) via the fuel cock (4) to both fuel tanks.

Fuel distribution for the engine Rotax 912 iS Sport. The fuel from the fuel filter (5, Fig. 28-3) is led by one line via the doubled electric fuel pump (6) to the four-way distributor (9) and further to fine fuel filter (15) via the distributor (10) to the ECU (12) and further to fuel rail (8 and 7). Pressure regulator (11) ensures the operating pressure of the fuel in the entire fuel line. Pressure is taken from three-way distributor (10) coupling to four-way distributor (9)

The electric fuel pump is controlled by the **FUEL PUMP** switches located on the left part of the instrument panel near the switches and circuit breakers.

The return line of fuel is led from the pressure regulator (11) and four-way distributor (9) to distributor (10) via the fuel cock (4) to both fuel tanks.

Fuel distribution for the engine Rotax 914 UL. The fuel from the fuel filter (5, Fig. 28-4) is led by one line to the electric fuel pump (6; 7) and further via the fuel pressure regulator (10) to the carburetors (11; 12).

The electric fuel pumps are controlled by the **FUEL PUMP A; B** switch located on the left part of the instrument panel near the switches and circuit breakers.

The hose of the return line of fuel is led via the fuel cock (4) to both fuel tanks.



2. MAINTENANCE

A. Fuel cock

Maintenance type: Line

Personnel qualification: Repairman (LSA), or Mechanic (A&P)

Recommended tools and material:

Item	Designation / Size	Quantity	Note
Socket wrench	No. 12	1 pc	
Gripping pliers	No. 17	1 pc	
Hex wrench	No. 2	1 pc	
Phillips screwdriver	No. 2	1 pc	
Cleaning agent	Acetone	-	
Adhesive	Loctite 577	-	
Lint-free cloth	-	-	

(1) Removal – fuel cock

- (a) Switch the electrical network off and disconnect the battery.
- (b) Drain the fuel from the fuel system (Section 12-10).
- (c) Depending on a version of the central console:
 - 1 Remove the cover of control IN1L / IN1R (Fig. 06-2) and the central console (Section 25-10) in the cockpit, or
 - 2 Remove the cover IN6L (Fig. 06-2) on the central console.
- (d) Loosen the bolt (4, Fig. 28-9; 28-10; 28-11) on the selector; remove the selector (3) from the fuel cock shaft (1).
- (e) Unscrew and remove the bolts (5) and the plate (2).
- (f) R 912 ULS - release the clamps (10, Fig. 28-9) by means of pliers and pull off the hoses (11; 12; 13; 14; 15; 16) of the connections (6; 9).
- (g) R 912 iS - release the clamps (10, Fig. 28-10) by means of pliers and pull off the hoses (11; 12; 13; 14; 15; 16) of the connections (6).
- (h) R 914 UL - release the clamps (10, Fig. 28-11) by means of pliers and pull off the hoses (11; 12; 13; 14; 15; 16) of the connections (6; 9).
- (i) Remove the fuel cock body (1).
- (j) Close the hoses and, if needed, the connections on the fuel cock using the blind plugs.
- (k) As needed, unscrew the banjo bolts (7) from the body (1), remove the washers (8), connections (6).
- (l) As needed, unscrew the connections (9, Fig. 28-9; 28-11).
- (m) Close the necks on the fuel cock body with the blind plugs.



- (2) Installation – fuel cock
- (a) Remove the blind plugs from the hoses and from the necks / connections on the fuel cock body.
 - (b) As needed, install the connections (6; 9) on the body (1, Fig. 28-9; 28-10; 28-11):
 - 1 Thoroughly clean the bolts (7) and the connections (9) by a cloth soaked in cleaning agent.
 - 2 Put the washers (8) and the connections (6) on the bolts (7)
 - 3 Apply adhesive onto the bolts thread (7), screw the bolts into the body (1) and tighten it; care must be taken that the connections (9) are oriented downwards and are parallel with the shaft.
 - 4 Apply adhesive onto the threads of connections (9); screw the connections into the body (1) and tighten them.
 - (c) As needed, install the connections (6) on the body (1, Fig. 28-9; 28-11):
 - 1 The connections (9) are oriented downwards and are parallel with the shaft.
 - 2 Apply adhesive onto the threads of connections (9); screw the connections into the body (1) and tighten them.
 - (d) Connect the hoses to the connections (9) in accordance with the figure (Fig. 28-9; 28-10; 28-11); secure the hoses with the clamps (10) using pliers.
 - (e) Connect the hoses to the connections (6) in accordance with the figure (Fig. 28-9; 28-10; 28-11) secure the hoses with the clamps (10) using pliers.
 - (f) Position the body of fuel cock (1, Fig. 28-9; 28-10; 28-11) from below to the central console (17) so that the fuel line from the left tank and the fuel line to the pump are oriented in forward direction.
 - (g) Position the plate (2) (the words **LEFT** and **RIGHT** forward) and attach it with the bolts (5).
 - (h) Set the selector (3) to position on the shaft and attach it with the bolt (4).
 - (i) Check the fuel system tightness (Section 28-10).
 - (j) Fill the fuel system with fuel (Section 12-10) and check the function of the fuel cock.
 - (k) Depending on a version of the central console:
 - 1 Install the cover of control IN1L / IN1R (Fig. 06-2) and the central console (Section 25-10) in the cockpit, or
 - 2 Install the cover IN6L (Fig. 06-2) on the central console.
 - (l) Install the central console (Section 25-10), or
 - (m) Install the cover of control IN1L / IN1R (Fig. 06-2) in the cockpit.
 - (n) Connect the battery.

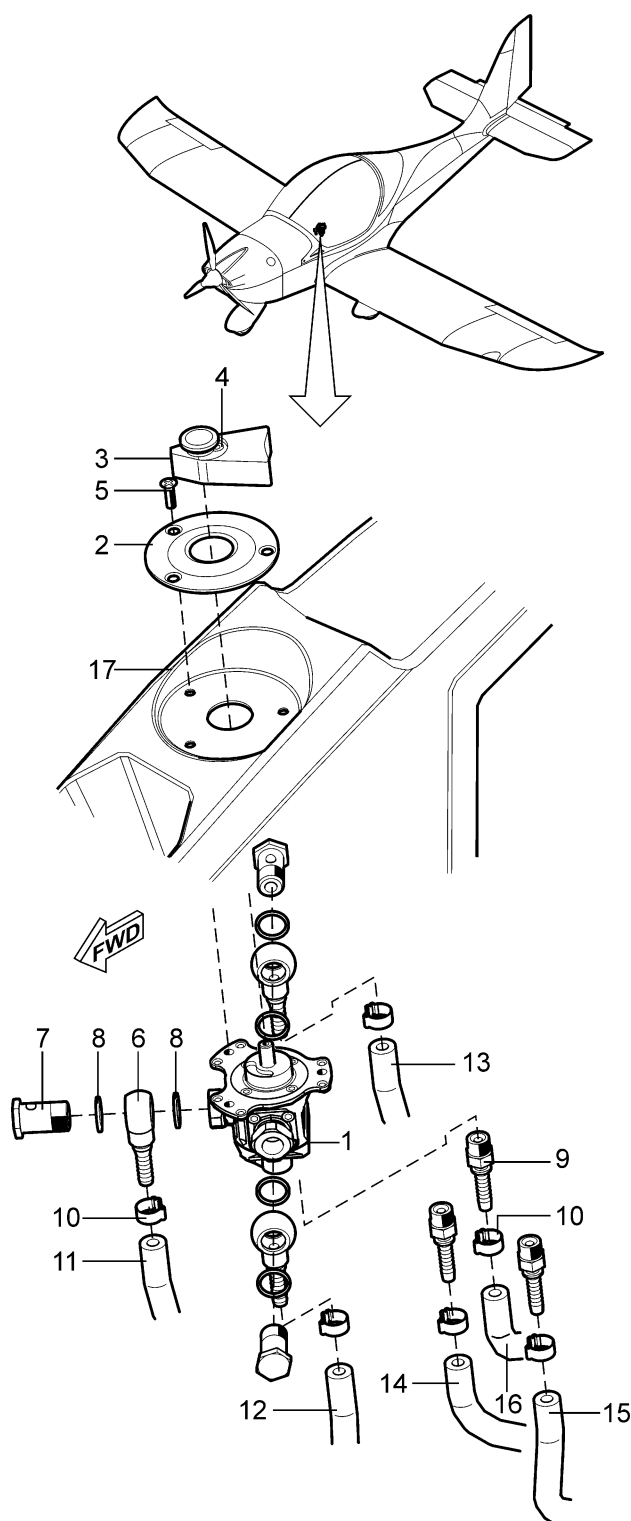


Fig. 28-9 Fuel cock Rotax 912 ULS – removal / installation (page 1 of 2)



Legend to Fig. 28-9

- | | |
|-----------------------|---|
| 1 Fuel cock body | 10 Clamp Cobra 11/7 (6 pcs) |
| 2 Plate of controller | 11 Hose (fuel from the left tank) |
| 3 Selector | 12 Hose (fuel from the right tank) |
| 4 Bolt | 13 Hose (fuel to the fuel pump) |
| 5 Bolt (3 pcs) | 14 Hose (return fuel to the left tank) |
| 6 Connection (3 pcs) | 15 Hose (return fuel from the engine) |
| 7 Banjo bolt (3 pcs) | 16 Hose (return fuel to the right tank) |
| 8 Gasket (6 pcs) | For information: |
| 9 Connection (3 pcs) | 17 Central console |

Fig. 28-9 Fuel cock Rotax 912 ULS – removal / installation (page 2 of 2)

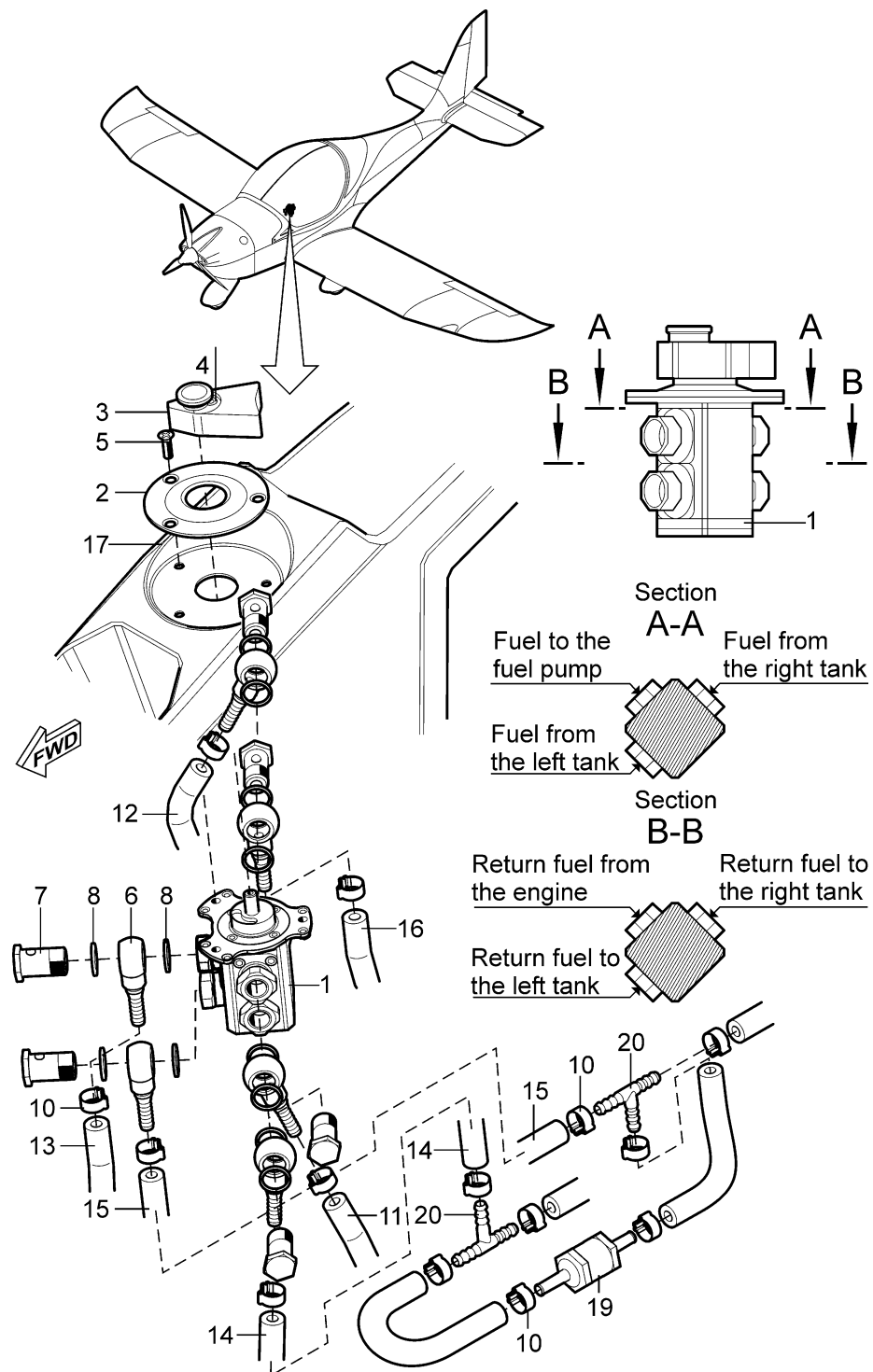


Fig. 28-10 Fuel cock Rotax 912 iS – removal / installation (page 1 of 2)



Legend to Fig. 28-10

- | | |
|-----------------------------------|---|
| 1 Fuel cock body | 12 Hose (fuel from the right tank) |
| 2 Plate of controller | 13 Hose (fuel to the fuel pump) |
| 3 Selector | 14 Hose (return fuel to the left tank) |
| 4 Bolt | 15 Hose (return fuel from the engine) |
| 5 Bolt (3 pcs) | 16 Hose (return fuel to the right tank) |
| 6 Connection (6 pcs) | For information: |
| 7 Banjo bolt (6 pcs) | 17 Central console |
| 8 Gasket (12 pcs) | 18 - |
| 9 - | 19 Check valve |
| 10 Clamp Cobra 11/7 (14 pcs) | 20 Three-way distributor |
| 11 Hose (fuel from the left tank) | |

Fig. 28-10 Fuel cock Rotax 912 iS – removal / installation (page 2 of 2)

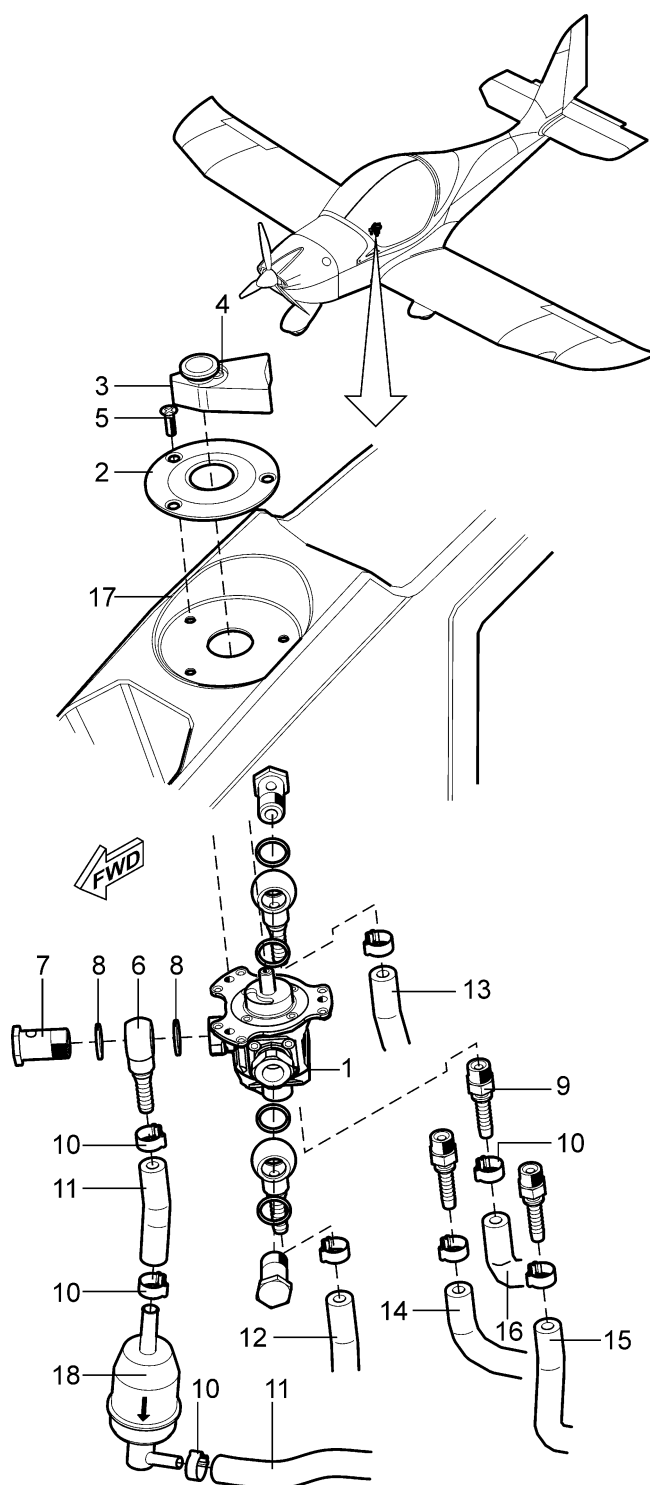


Fig. 28-11 Fuel cock Rotax 914 UL – removal / installation (page 1 of 2)



Legend to Fig. 28-11

- | | |
|-----------------------------|---|
| 1 Fuel cock body | 11 Hose (fuel to the fuel pump) |
| 2 Plate of controller | 12 Hose (fuel from the left tank) |
| 3 Selector | 13 Hose (fuel from the right tank) |
| 4 Bolt | 14 Hose (return fuel from the engine) |
| 5 Bolt (3 pcs) | 15 Hose (return fuel to the left tank) |
| 6 Connection (3 pcs) | 16 Hose (return fuel to the right tank) |
| 7 Banjo bolt (3 pcs) | For information: |
| 8 Gasket (6 pcs) | 17 Central console |
| 9 Connection (3 pcs) | 18 Fuel filter |
| 10 Clamp Cobra 11/7 (6 pcs) | 19 |

Fig. 28-11 Fuel cock Rotax 914 UL – removal / installation (page 2 of 2)

B. Electric fuel pump

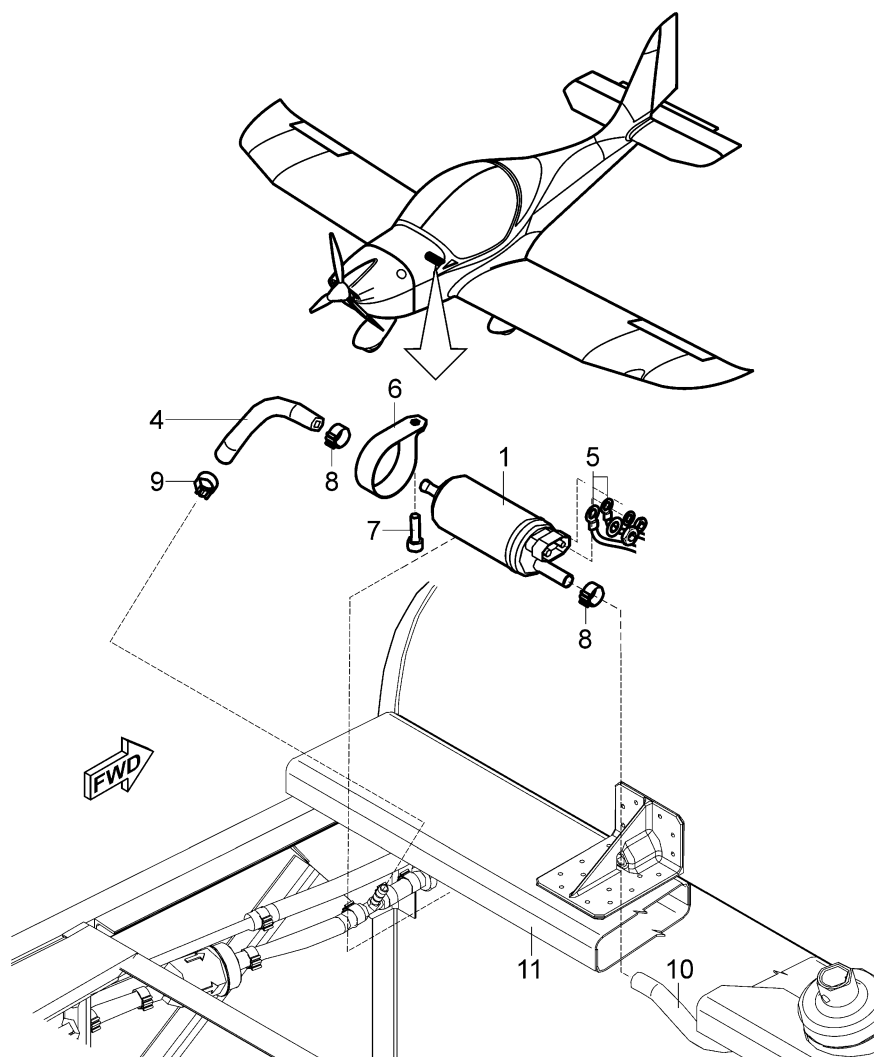
Maintenance type: Line

Personnel qualification: Repairman (LSA) or Mechanic (A&P)

Recommended tools and material:

Item	Designation / Size	Quantity	Note
Gripping pliers	Cobra	1 pc	
Nut wrench	No. 7	1 pc	
Nut wrench	No. 8	1 pc	
Hex wrench	No. 5	1 pc	
Cleaning agent	Acetone	-	
Adhesive	Loctite 243	-	
Lint-free cloth	-	-	

- (1) Removal – original electric fuel pump Rotax 912 ULS
 - (a) Switch the electrical network off and disconnect the battery.
 - (b) Drain the fuel from the fuel system (Section 12-10).
 - (c) Release the clamps (8, Fig. 28-12) by pliers and pull the hoses (4; 10) from the necks of the pump (1).
 - (d) Unscrew and remove the nuts with washers and disconnect the wires (5).
 - (e) Unscrew and remove the bolt (7) and the pump (1) with the sleeve (6).
 - (f) Close the hoses and the necks of pump with the blind plugs.



Legend to Fig. 28-12

- | | | | |
|---|--------------------|----|------------------|
| 1 | Electric fuel pump | 7 | Bolt M6x20 |
| 2 | - | 8 | Clamp Cobra 11/7 |
| 3 | - | 9 | Clamp Cobra 12/8 |
| 4 | Hose | 10 | Hose |
| 5 | Wires | | For information: |
| 6 | Sleeve | 11 | Strut |

Fig. 28-12 Electric fuel pump Rotax 912 ULS (original) – removal / installation

- (2) Installation – original electric fuel pump Rotax 912 ULS
 - (a) Remove the blind plugs from the hoses and from the necks of the pump (if installed).
 - (b) Thoroughly clean the bolt (7, Fig. 28-12) using a cloth soaked in cleaning agent.



- (c) Apply adhesive onto the bolt thread (7).
- (d) Position the pump (1) with the sleeve (6) to the anchor nut on the strut (11) and attach it with the bolt (7); tighten the bolt.

NOTE

The pump must be installed in such a way that the arrow on the pump points to the engine.

- (e) Put the eyes of wires (5) on the corresponding terminals of the pump, screw on and tighten the nuts with washers.
 - (f) Connect the hoses (4; 10) on the necks of the pump (1); secure the hoses with the clamps (8) using pliers.
 - (g) Check the fuel system tightness (Section 28-10).
 - (h) Fill the fuel system with fuel (Section 12-10).
 - (i) Connect the battery, switch the electrical network on and check the function of the pump.
- (3) Removal – electric fuel pump Facet
- (a) Switch the electrical network off and disconnect the battery.
 - (b) Drain the fuel from the fuel system (Section 12-10).
 - (c) Release the clamps (4, Fig. 28-13) by pliers and pull the hoses (7; 8) from the necks of the pump (1).
 - (d) Unscrew and remove the bolt (10) and nuts (11) with washers (12) and disconnect the wires (3, 9).
 - (e) Unscrew and remove the bolt (5) with washers (6) and remove the pump (1).
 - (f) Close the hoses and the necks of pump with the blind plugs.
- (4) Installation – electric fuel pump Facet
- (a) Remove the blind plugs from the hoses and from the necks of the pump (if installed).
 - (b) Thoroughly clean the bolt (5, Fig. 28-13) using a cloth soaked in cleaning agent.
 - (c) Apply adhesive onto the bolt thread (5).
 - (d) Position the pump (1) to the place and attach it with the bolt (5) with washers (6); tighten the bolt.

NOTE

The pump must be installed in such a way that the arrow on the pump points to the engine.

- (e) Put the eyes of wires (3; 9) on the corresponding terminals of the pump, screw on and tighten the nuts with washers.
- (f) Connect the hoses (7; 8) on the necks of the pump (1); secure the hoses with the clamps (4) using pliers.
- (g) Check the fuel system tightness (Section 28-10).



- (h) Fill the fuel system with fuel (Section 12-10).
- (i) Connect the battery, switch the electrical network on and check the function of the pump.

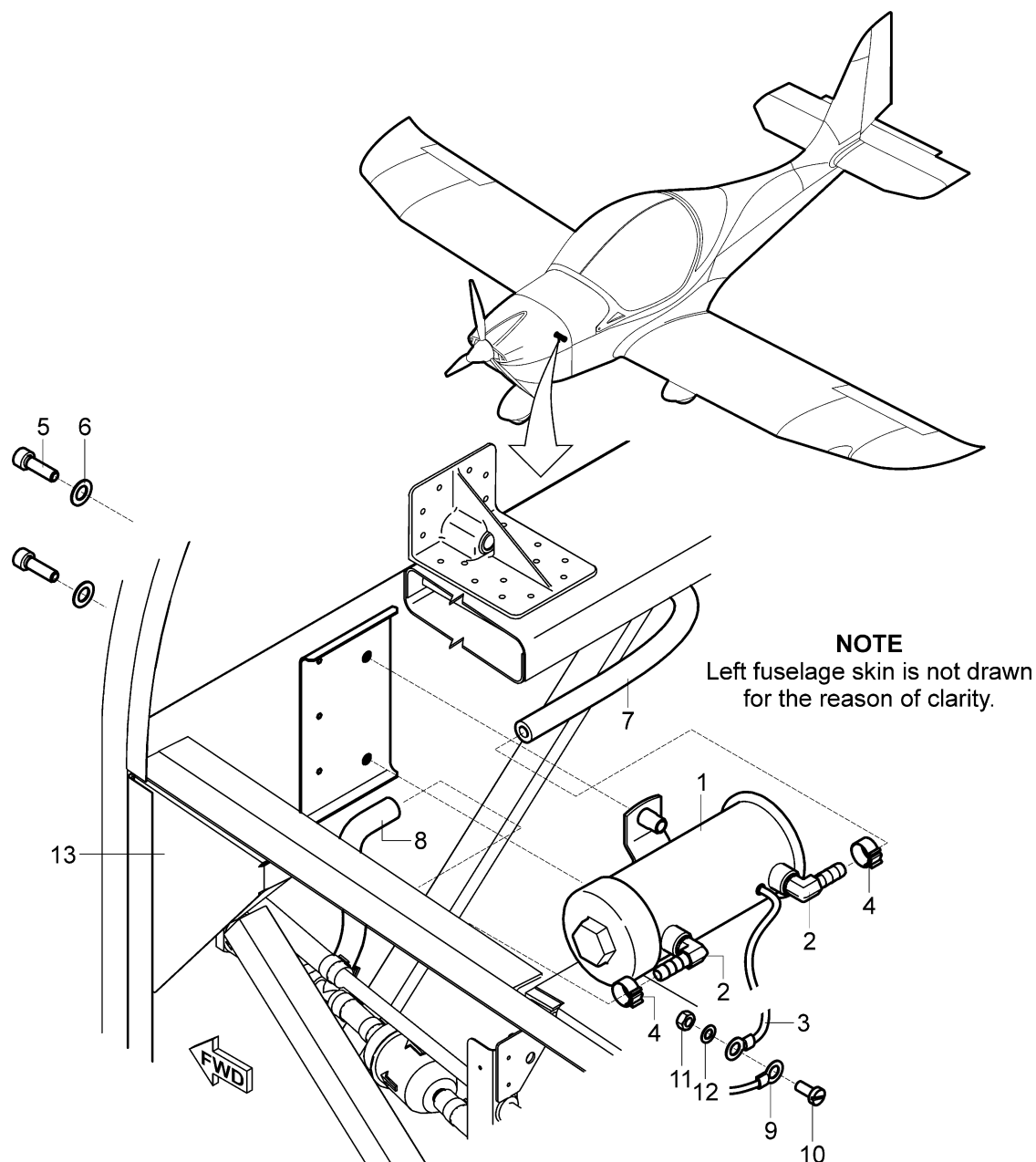


Fig. 28-13 Electric fuel pump Rotax 912 ULS – removal / installation (page 1 of 2)

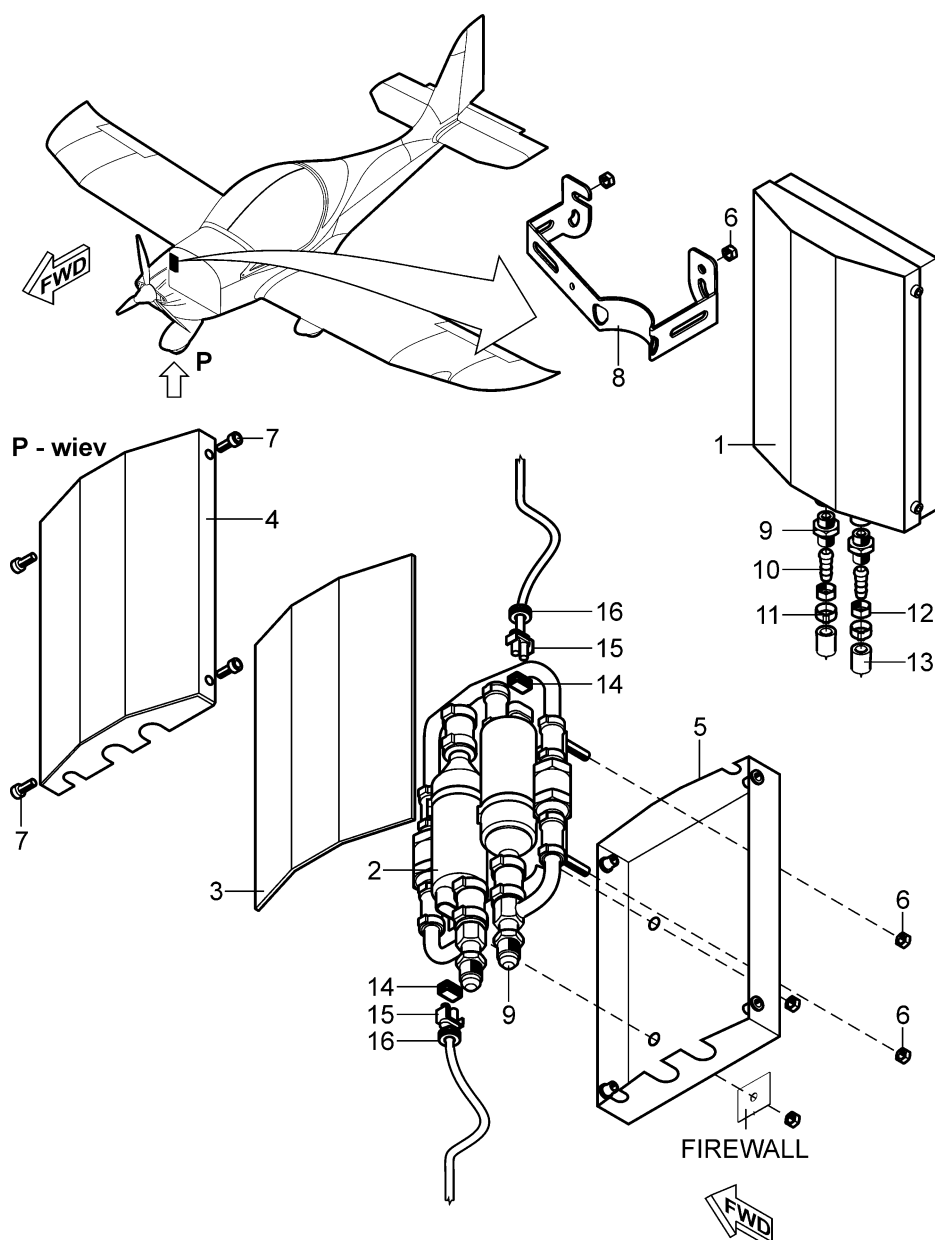


Legend to Fig. 28-13

- | | |
|----------------------|--------------------|
| 1 Electric fuel pump | 7 Bolt M6x20 |
| 2 - | 8 Clamp Cobra 11/7 |
| 3 - | 9 Clamp Cobra 12/8 |
| 4 Hose | 10 Hose |
| 5 Wires | For information: |
| 6 Sleeve | 11 Strut |

Fig. 28-13 Electric fuel pump Rotax 912 ULS – removal / installation (page 2 of 2)

- (5) Removal – electric fuel pump Rotax R 912 iS
 - (a) Switch the electrical network off and disconnect the battery.
 - (b) Drain the fuel from the fuel system (Section 12-10).
 - (c) Release the clamps (11, Fig. 28-14) by pliers and pull the hoses (13) from the necks of the pump (1).
 - (d) Remove the screw (7) and front cover (4).
 - (e) Remove heat protection (3) and disconnect the cable connector (15).
 - (f) Remove the nut (6) and remove holder (8)
 - (g) Remove the pumps assembly (2).
 - (h) Close the hoses and the necks of pump with the blind plugs.
- (6) Installation – electric fuel pump Rotax R 912 iS
 - (a) Remove the blind plugs from the hoses and from the necks of the pump (if installed).
 - (b) Position the pump (1, Fig. 28-14) with the housing (5). Connected connectors (15).
 - (c) Install the heat protection (3) and front cover (4).
 - (d) Install the screw (7); tighten the screw.
 - (e) Install the holder (8) and nut (6); tighten the nuts.
 - (f) Remove the blind plugs from the hoses and from the necks of the pump (if installed).
 - (g) Connect the hoses (13) on the necks of the pump (1); secure the hoses with the clamps (11) using pliers.
 - (h) Check the fuel system tightness (Section 28-10).
 - (i) Fill the fuel system with fuel (Section 12-10).
 - (j) Connect the battery, switch the electrical network on and check the function of the pump.



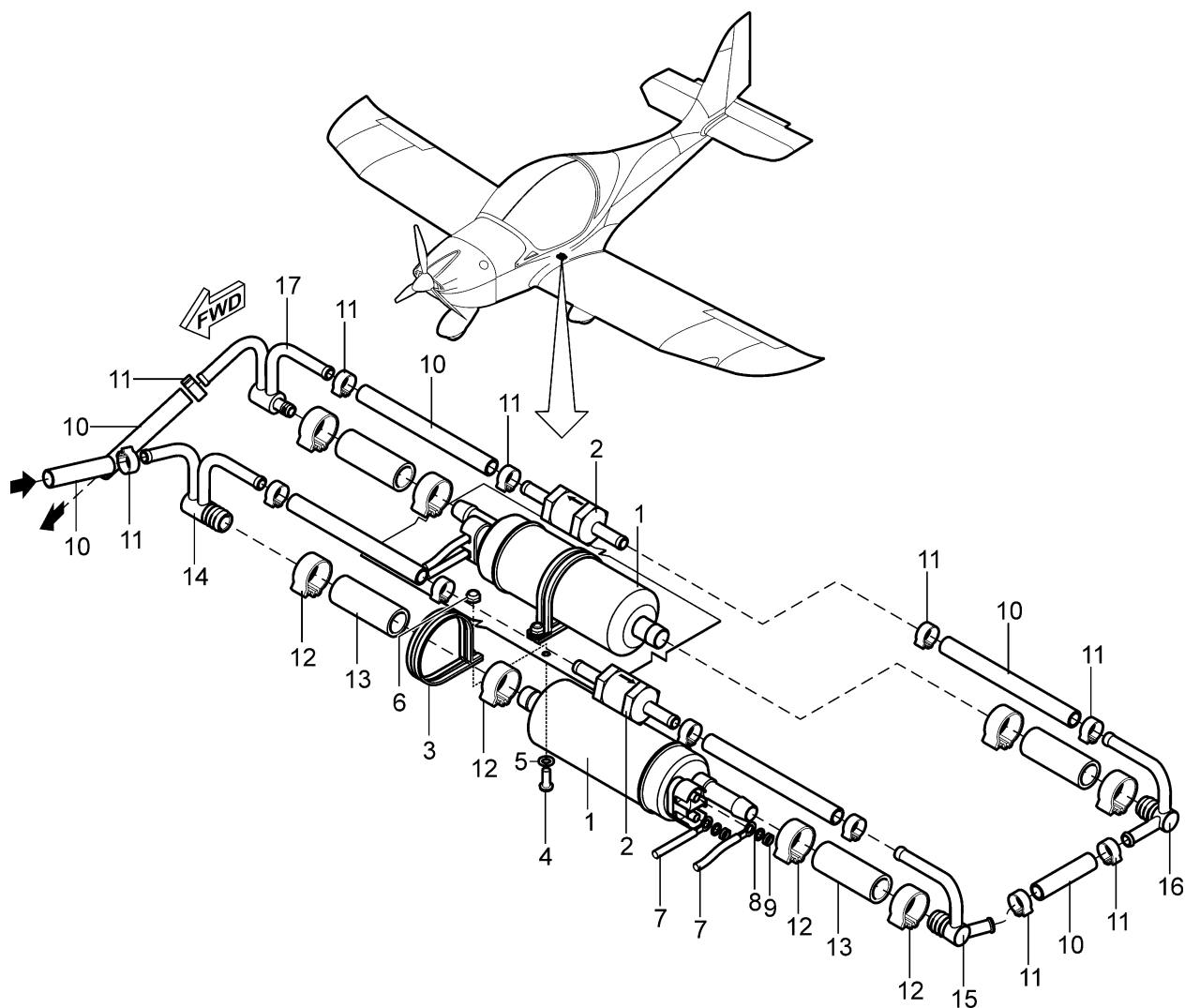
Legend to Fig. 28-14

- | | |
|-------------------------------|-----------------------|
| 1 Electric fuel pump assembly | 9 Reduction piece |
| 2 Electric fuel pump | 10 Neck |
| 3 Heat protection | 11 Clamp Cobra 14/8 |
| 4 Cover | 12 Sleeve nut M14x1.5 |
| 5 Housing | 13 Hose |
| 6 Nut M6 | 14 Connector gasket |
| 7 Screw M5x12 | 15 Connector |
| 8 Check valve holder | 16 Rubber grommet |

Fig. 28-14 Electric fuel pump Rotax 912 iS - removal / installation



- (7) Removal – electric fuel pump Rotax R 914 UL
 - (a) Switch the electrical network off and disconnect the battery.
 - (b) Drain the fuel from the fuel system (Section 12-10).
 - (c) Release the clamps (11; 12, Fig. 28-15) by pliers and pull the hoses (10; 13) from the necks of the pump (1).
 - (d) Unscrew and remove the screw (4), washer (5) and nut (6) and the pump (1) with the sleeve (6).
 - (e) Remove nut (9), washer (8) and disconnect the cable (7).
 - (f) Close the hoses and the necks of pump with the blind plugs.
- (8) Installation – electric fuel pump Rotax R 914 UL
 - (a) Put the eyes of wires (7) on the corresponding terminals of the pump, screw on and tighten the nuts (9) with washers (8).
 - (b) Position the pump (1, Fig. 28-15) with sleeve (6), instal screw (4), washer (5) and nut (6).
 - (c) Remove the blind plugs from the hoses and from the necks of the pump (if installed).
 - (d) Connect the hoses (10; 13) on the necks of the pump (1); secure the hoses with the clamps (11; 12) using pliers.
 - (e) Check the fuel system tightness (Section 28-10).
 - (f) Fill the fuel system with fuel (Section 12-10).
 - (g) Connect the battery, switch the electrical network on and check the function of the pump.

**Legend to Fig. 28-15**

- | | | | |
|---|--------------------|----|--------------------------------|
| 1 | Electric fuel pump | 10 | Hose Super Flex 6.4 |
| 2 | Check valve | 11 | Clamp Cobra 12/8 |
| 3 | Sleeve | 12 | Clamp Cobra 20/8 |
| 4 | Screw M 6x16 | 13 | Hose Super Flex 12.7 |
| 5 | Washer 6.4 | 14 | Fuel pump inlet 13 S6 60-33 01 |
| 6 | Nut M 6 | 15 | Fuel pump outlet 8 S6 60-34 01 |
| 7 | Wire | 16 | Fuel pump inlet 13 S6 60-35 01 |
| 8 | Washer Rotax | 17 | Fuel pump outlet 8 S6 60-36 01 |
| 9 | Nut Rotax | - | - |

Fig. 28-15 Electric fuel pump Rotax 914 UL – removal / installation



C. Check valve installation

Maintenance type: Line

Personnel qualification: Repairman (LSA) or Mechanic (A&P)

Recommended tools and material:

Item	Designation / Size	Quantity	Note
Gripping pliers	Cobra	1 pc	

- (1) Removal – check valve Rotax 912 ULS
 - (a) Drain the fuel from the fuel system (Section 12-10).
 - (b) Release the clamps (4; 5, Fig. 28-11) using pliers and pull off the hoses (2; 3) from the necks of the valve (1).
 - (c) Remove the valve (1).
 - (d) Close the necks of the three-way distributor, grommet, and valve with the blind plugs.

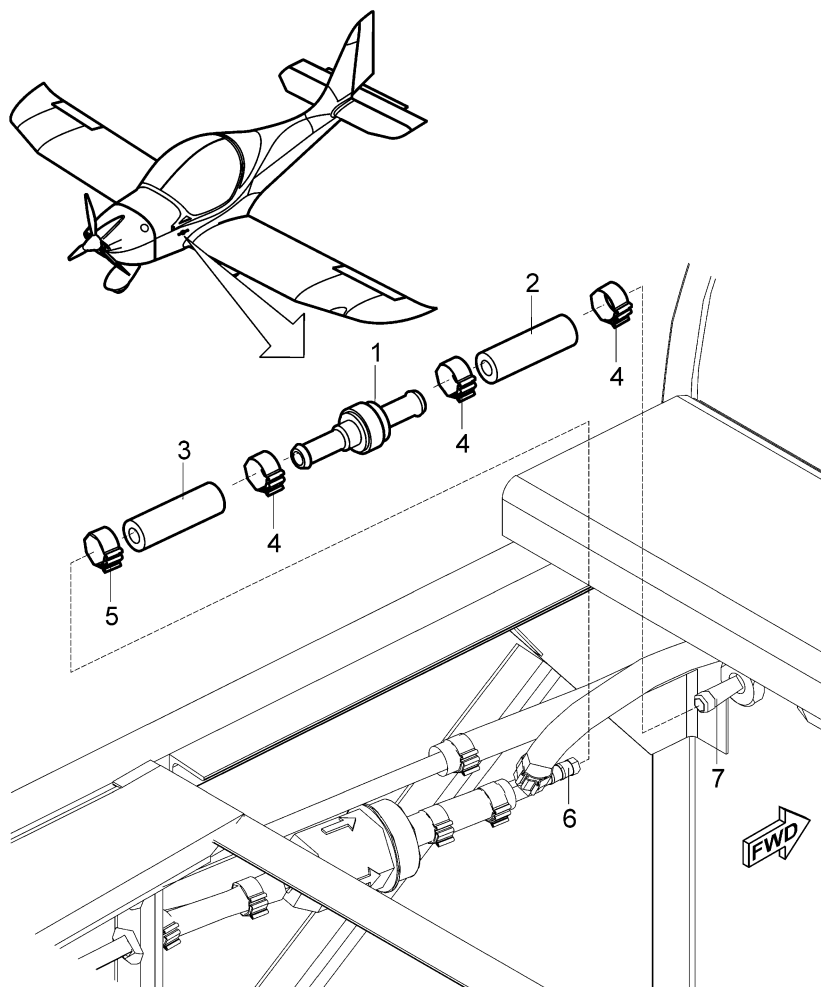


Fig. 28-16 Check valve Rotax 912 ULS .– removal / installation (page 1 of 2)



Legend to Fig. 28-16

- | | |
|--------------------|-------------------------|
| 1 Check valve | 5 Clamp Cobra 12/8 |
| 2 Hose | For information: |
| 3 Hose | 6 Three-way distributor |
| 4 Clamp Cobra 11/7 | 7 Grommet |

Fig. 28-16 Check valve Rotax 912 ULS – removal / installation (page 2 of 2)

(2) Installation – check valve Rotax 912 ULS

- (a) Remove the blind plugs from the necks of the three-way distributor, grommet, and valve.
- (b) Connect the hoses (2; 3) on the necks of the valve (1, Fig. 28-11); secure the hoses with the clamps (4; 5) using pliers.

NOTE

The valve must be installed in such a way that the arrow on the valve points to the engine.

- (c) Check the fuel system tightness (Section 28-10).
- (d) Connect the battery.

(3) Removal – check valve Rotax 912 iS

- (a) Drain the fuel from the fuel system (Section 12-10).
- (b) Release the clamps (4; Fig. 28-17) using pliers and pull off the hoses (3) from the necks of the valve (1).
- (c) Using the cutting pliers and remove the cable tie (2).
- (d) Remove the valve (1).
- (e) Close the necks of the valve and hoses with the blind plugs.

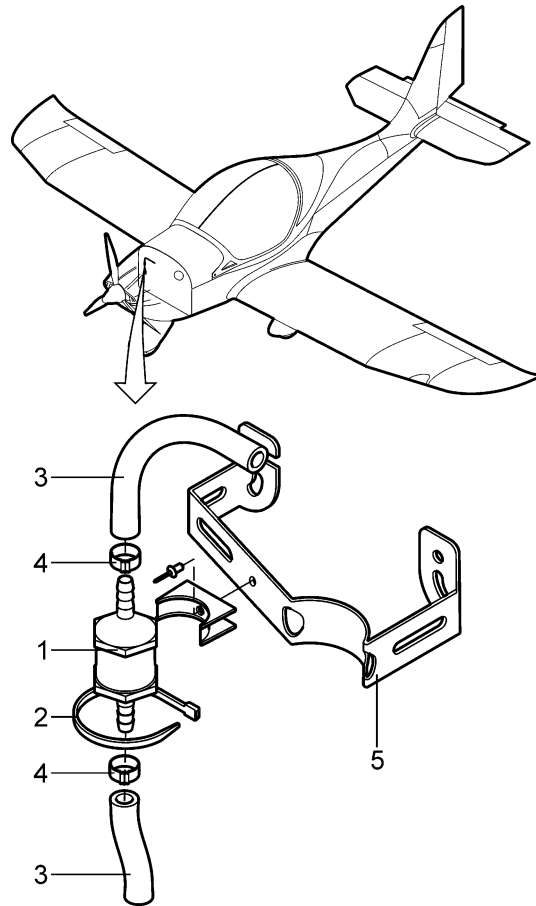
(4) Installation – check valve Rotax 912 iS

- (a) Remove the blind plugs from the necks of the valve.
- (b) Connect the hoses (2, Fig. 28-11) on the necks of the valve (1); secure the hoses with the clamps (4) using pliers.
- (c) Install the cable tie (2).

NOTE

The valve must be installed in such a way that the arrow on the valve points to the engine.

- (d) Check the fuel system tightness (Section 28-10).
- (e) Connect the battery.



Legend to Fig. 28-17

- | | |
|---------------|--------------------|
| 1 Check valve | 4 Clamp Cobra 13/8 |
| 2 Clamp | 5 Holder |
| 3 Hose | - - |

Fig. 28-17 Check valve Rotax 912 iS – removal / installation

- (5) Removal – check valve Rotax 914 UL
 - (a) Drain the fuel from the fuel system (Section 12-10).
 - (b) Release the clamps (11; Fig. 28-15) using pliers and pull off the hoses (10) from the necks of the valve (2).
 - (c) Remove the valve (2).
 - (d) Close the necks of the valve and hoses with the blind plugs.

- (6) Installation – check valve Rotax 914 UL
 - (a) Remove the blind plugs from the necks of the valve.
 - (b) Connect the hoses (10, Fig. 28-15) on the necks of the valve (2); secure the hoses with the clamps (11) using pliers.



NOTE

The valve must be installed in such a way that the arrow on the valve points to the engine.

- (c) Check the fuel system tightness (Section 28-10).
- (d) Connect the battery.

**D. Fuel filter**

Maintenance type: Line

Personnel qualification: Repairman (LSA) or Mechanic (A&P)

Recommended tools and material:

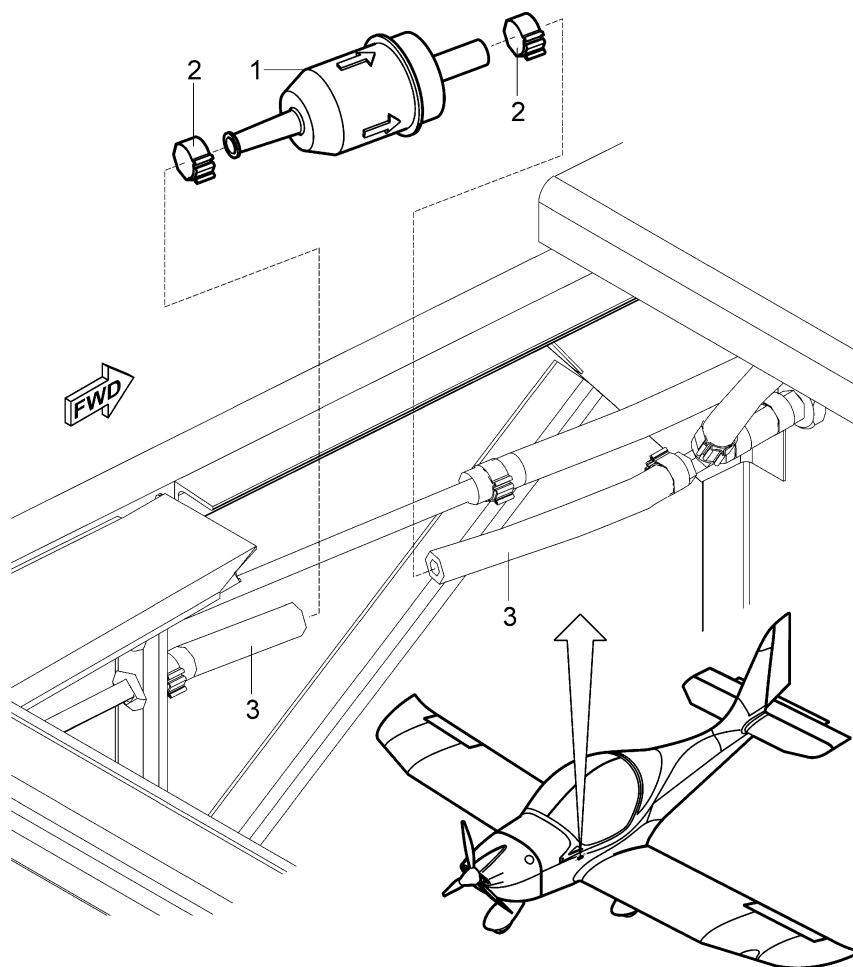
Item	Designation / Size	Quantity	Note
Gripping pliers	Cobra	1 pc	

- (1) Removal – fuel filter Rotax 912 ULS
 - (a) Switch the electrical network off and disconnect the battery.
 - (b) Drain the fuel from the fuel system (Section 12-10).
 - (c) Remove the left sidewall of cabin (Section 25-10).
 - (d) Release the clamps (2, Fig. 28-18) using pliers and pull the hoses (3) from the necks of the filter (1).
 - (e) Remove the filter (1).
 - (f) Close the hoses and the necks of the filter (if reinstalled) using blind plugs.
- (2) Installation – fuel filter Rotax 912 ULS
 - (a) Remove the blind plugs from the hoses and the necks of the filter.
 - (b) Connect the hoses (3) on the necks of the filter (1, Fig. 28-18); secure the hoses with the clamps (2) using pliers.

NOTE

The filter must be installed in such a way that the arrow on the filter points to the engine.

- (c) Check the fuel system tightness (Section 28-10).
- (d) Install the left sidewall of cabin (Section 25-10).
- (e) Connect the battery.



Legend to Fig. 28-18

- | | |
|--------------------|--------|
| 1 Fuel filter | 3 Hose |
| 2 Clamp Cobra 11/7 | |

Fig. 28-18 Fuel filter Rotax 912 ULS install. – removal / installation



- (3) Removal – fuel filter Andair
 - (a) Switch the electrical network off and disconnect the battery.
 - (b) Drain the fuel from the fuel system (Section 12-10).
 - (c) Remove the engine cowling F2 and F3 (Section 06-40).
 - (d) Release the clamps (5, Fig. 28-19) using pliers and pull the hoses (6) from the necks of the fuel filter body (1).
 - (e) Unscrew and remove the screw (7).
 - (f) Remove the filter.
 - (g) Close the hoses and the necks of the filter (if reinstalled) using blind plugs.
- (4) Installation – fuel filter Andair
 - (a) Remove the blind plugs from the hoses and the necks of the filter.
 - (b) Install screw (7, Fig. 28-19).
 - (c) Connect the hoses (6) on the necks of the filter (1); secure the hoses with the clamps (5) using pliers.

NOTE

The filter must be installed in such a way that the arrow on the filter points to the engine.

- (d) Check the fuel system tightness (Section 28-10).
 - (e) Install the engine cowling F2 and F3 (Section 06-40).
 - (f) Connect the battery.
- (5) Removal – fuel filter Rotax
 - (a) Switch the electrical network off and disconnect the battery.
 - (b) Drain the fuel from the fuel system (Section 12-10).
 - (c) Remove the engine cowling F2 and F3 (Section 06-40).
 - (d) Release the clamps (6, Fig. 28-20) using pliers and pull the hoses (7) from the necks (2; 5) of the fuel filter body (1).
 - (e) Remove the Torro clamp (4).
 - (f) Remove the filter.
 - (g) Close the hoses and the necks of the filter (if reinstalled) using blind plugs.
- (6) Installation – fuel filter Rotax
 - (a) Remove the blind plugs from the hoses and the necks of the filter.
 - (b) Install screw (7, Fig. 28-19).
 - (c) Connect the hoses (7, Fig. 28-20) on the necks (2; 5) of the filter (1); secure the hoses with the clamps (6) using pliers.

NOTE

The filter must be installed in such a way that the arrow on the filter points to the engine.



- (d) Check the fuel system tightness (Section 28-10).
- (e) Install the engine cowling F2 and F3 (Section 06-40).
- (f) Connect the battery.

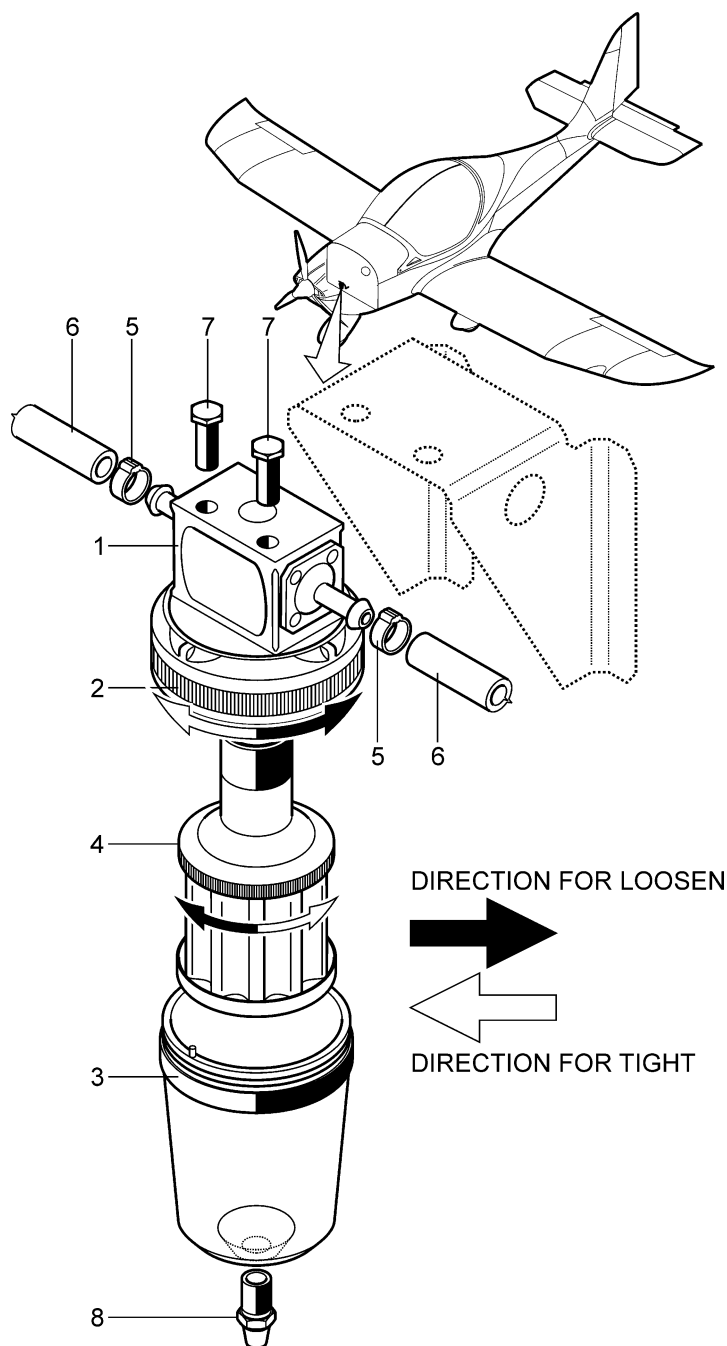


Fig. 28-19 Andair fuel filter – removal / installation (page 1 of 2)



Legend to Fig. 28-19

- | | | | |
|---|------------------|---|-------------------|
| 1 | Fuel filter body | 5 | Cobra clamp 14x18 |
| 2 | Thread ring | 6 | Fuel hose |
| 3 | Collector cup | 7 | Screw |
| 4 | Filter screen | | |

Fig. 28-19 Andair fuel filter – removal / installation (page 2 of 2)

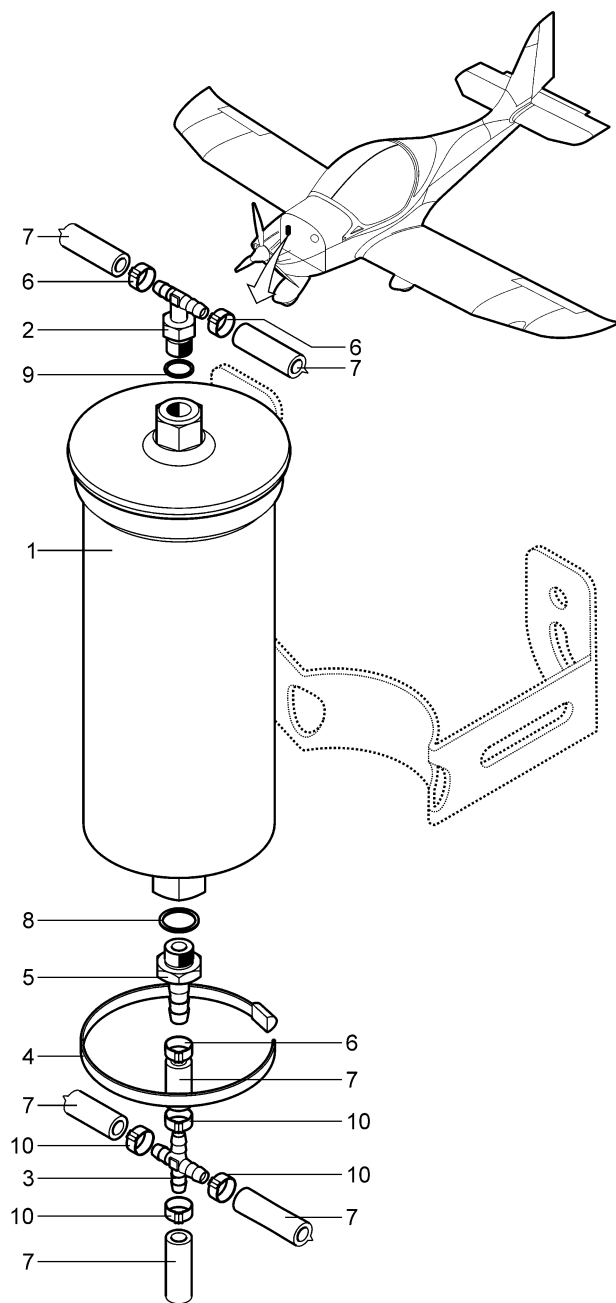


Fig. 28-20 Rotax fine fuel filter – removal / installation (page 1 of 2)



Legend to Fig. 28-20

- | | | | |
|---|-----------------------|----|-------------------|
| 1 | Fine fuel filter | 6 | Cobra clamp 13x18 |
| 2 | Three-way distributor | 7 | Fuel hose |
| 3 | Four-way distributor | 8 | Sealing ring12x16 |
| 4 | Torro clamp 50-70/9 | 9 | Sealing ring14x18 |
| 5 | Filter mouth piece | 10 | Cobra clamp 14/8 |

Fig. 28-20 Rotax fine fuel filter – removal / installation (page 2 of 2)



INDICATING

1. DESCRIPTION AND OPERATION

The fuel measurement system measures the following parameters:

- fuel quantity in the tanks
- fuel pressure
- fuel flow rate

A. Measurement of fuel quantity

Analog display

The fuel quantity is measured in each tank by the float type fuel level sensor coupled with the variable resistor – potentiometer. The signal from the potentiometer is led to the fuel quantity indicators with the airplane equipped with analogue instruments.

In the case of analogue fuel quantity indicators, the fuel quantity is calibrated in these levels: empty tank 0, 1/4, 1/2, 3/4 and full tank 1/1.

The wiring diagram of measurement of fuel quantity is given in Chapter 91.

Digital display (Fig. 28-23)

The fuel quantity is measured in each tank by the float type fuel level sensor coupled with the variable resistor – potentiometer. The signal from the potentiometer is led to the EIS GEA 24 unit and to GDU 460 display.

The wiring diagram of measurement of fuel quantity is given in Chapter 91.

B. Measurement of fuel pressure

Analog display

The fuel pressure is measured after the fuel pump (11, Fig. 28-1; 28-2; 28-4); from there it is led via the hose to the fuel pressure sensor (18). The fuel pressure sensor is located on the firewall. The value of fuel pressure is converted into an electrical signal in the fuel pressure sensor. The signal from the sensor is led to the fuel pressure indicator with the airplane equipped with the analogue instruments.

The wiring diagram of fuel flow meter is given in Chapter 91.

Digital display (Fig. 28-21)

The fuel pressure is measured after the fuel pump (6, Fig. 28-3); from there it is led via the hose to the fuel pressure sensor (23). The fuel pressure sensor is located on the firewall. The value of fuel pressure is converted into an electrical signal in the fuel pressure sensor. The signal from the sensor is led to the EIS GEA 24 and to GDU 460 display.

The wiring diagram of fuel flow meter is given in Chapter 91.

C. Measurement of fuel flow rate

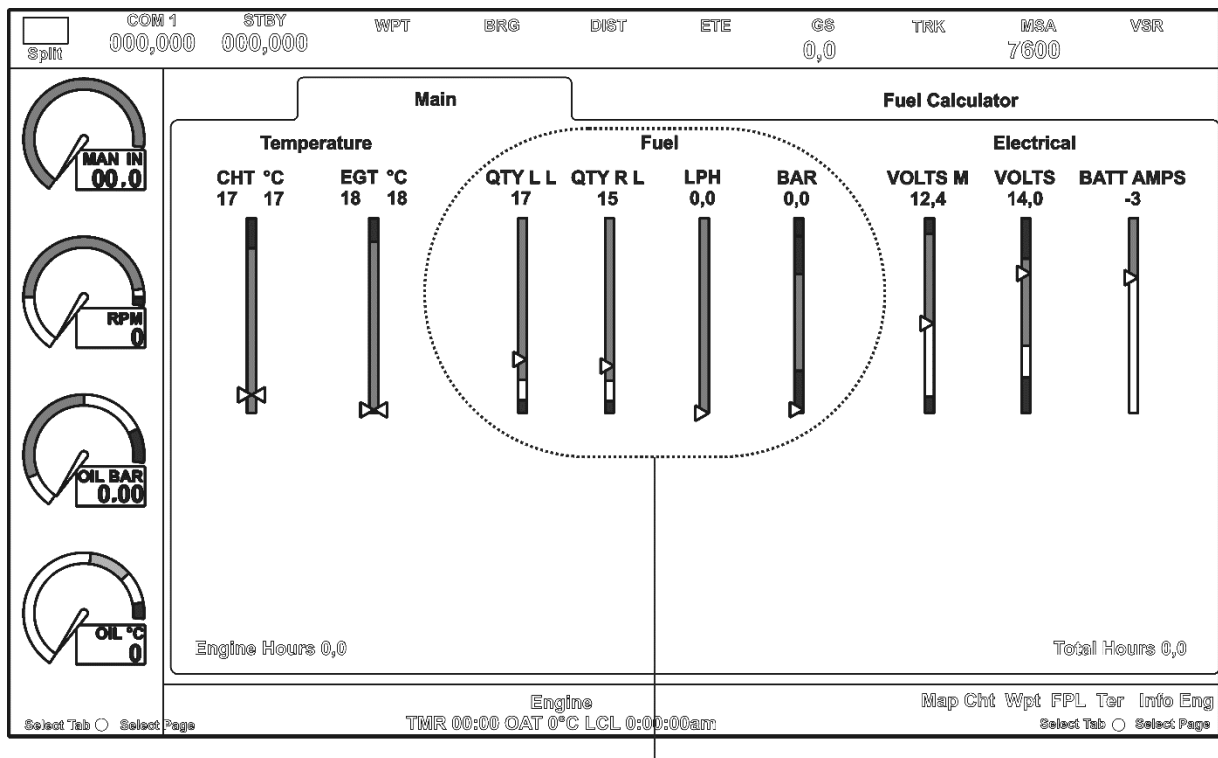
The airplanes equipped with Garmin G3X system have the fuel flow transducer installed on the firewall in the engine compartment.



In the airplanes with R 914 UL engine installed, there are two fuel flow meters installed. One of the two flow meters is situated on the supply fuel line between the fuel pump and the fuel pressure regulator. The second flow meter is situated on the return fuel line. Fuel flow sensors convert the movement of fuel to a series of digital pulses. The signal from the fuel flow meters is led to the EIS unit Garmin GEA 24. The indicated value on the MFD is the difference between the supply fuel flow and the return fuel flow measurements.

In the airplanes with R 912 iS engine installed, the fuel flow data are monitored by ECU and then send to GEA 24 EIS unit. The values are indicated on the MFD.

The wiring diagram of fuel flow meter is given in Chapter 91.



FUEL VALUES IN DIGITAL DISPLAY

- **QTY L L** The fuel quantity is measured in left tank
- **QTY R L** The fuel quantity is measured in right tank
- **LPH (GPH)** Fuel flow rate
- **BAR (PSI)** Fuel pressure

Fig. 28-21 Display of fuel measurement values fuel on the display GDU 460

NOTE

If the ROTAX 912 iS engine is installed, only digital display is possible.



2. MAINTENANCE

A. Fuel level sensor

Maintenance type: Line

Personnel qualification: Repairman (LSA) or Mechanic (A&P)

Recommended tools and material:

Item	Designation / Size	Quantity	Note
Socket wrench	No. 8	1 pc	
Nut wrench	No. 7	1 pc	
Nut wrench	No. 8	1 pc	
Flat screwdriver	-	1 pc	
Calibrated vessel	-	1 pc	Volume of 5 or 10 l (1.3 – 2.6 gal)
Ohmmeter	-	-	Calibration of fuel indicators

(1) Removal – fuel level sensor

- (a) Switch the electrical network off and disconnect the battery.
- (b) Drain the fuel from the fuel system (Section 12-10).
- (c) Remove the wing (Section 57-40).
- (d) Remove the cover W6L / W6R (Fig. 06-2) on the lower side of the wing.
- (e) Pull the wires (7, Fig. 28-22) from the terminals of the fuel sensor.
- (f) Remove the bolts (5) with washers (6) by means of which the fuel sensor flange is attached to the flange on rib No. 2.
- (g) Remove the washer (4) and gasket (3).
- (h) Carefully remove the fuel level sensor (1) from the flange and remove the gasket (2).
- (i) Close the hole in the flange with the blind plug.

(2) Installation – fuel level sensor

- (a) Remove the blind plug from the hole in the flange.
- (b) Carefully position the fuel level sensor (1, Fig. 28-22) with the gasket (2) to the flange (8); pay attention to a correct position of the fuel sensor so that the plane of float movement is perpendicular to the fuselage reference plane (view P).
- (c) Position the gasket (3) with the washer (4) to the fuel level sensor (1).



CAUTION

TIGHTEN THE BOLTS CROSSWISE – THE GASKET BETWEEN THE FUEL INDICATOR AND THE FLANGE MUST BE UNIFORMLY COMPRESSED!

- (d) Attach the flange of the fuel sensor to the flange on rib No. 2 – screw on and carefully tighten the bolts (5) with the washers (6).
- (e) Put the eyes of wires (7) on the corresponding terminals of the fuel sensor.
- (f) Install the cover W6L / W6R (Fig. 06-2) on the lower side of the wing.
- (g) Install the wing (Section 57-40).
- (h) Check the fuel system tightness (Section 28-10).
- (i) Fill the fuel system with fuel (Section 12-10).
- (j) Connect the battery, switch the electrical network on.
- (k) Check the function of the fuel level sensor; calibrate the fuel measurement system as needed (refer to Par. 2 A.(3)).

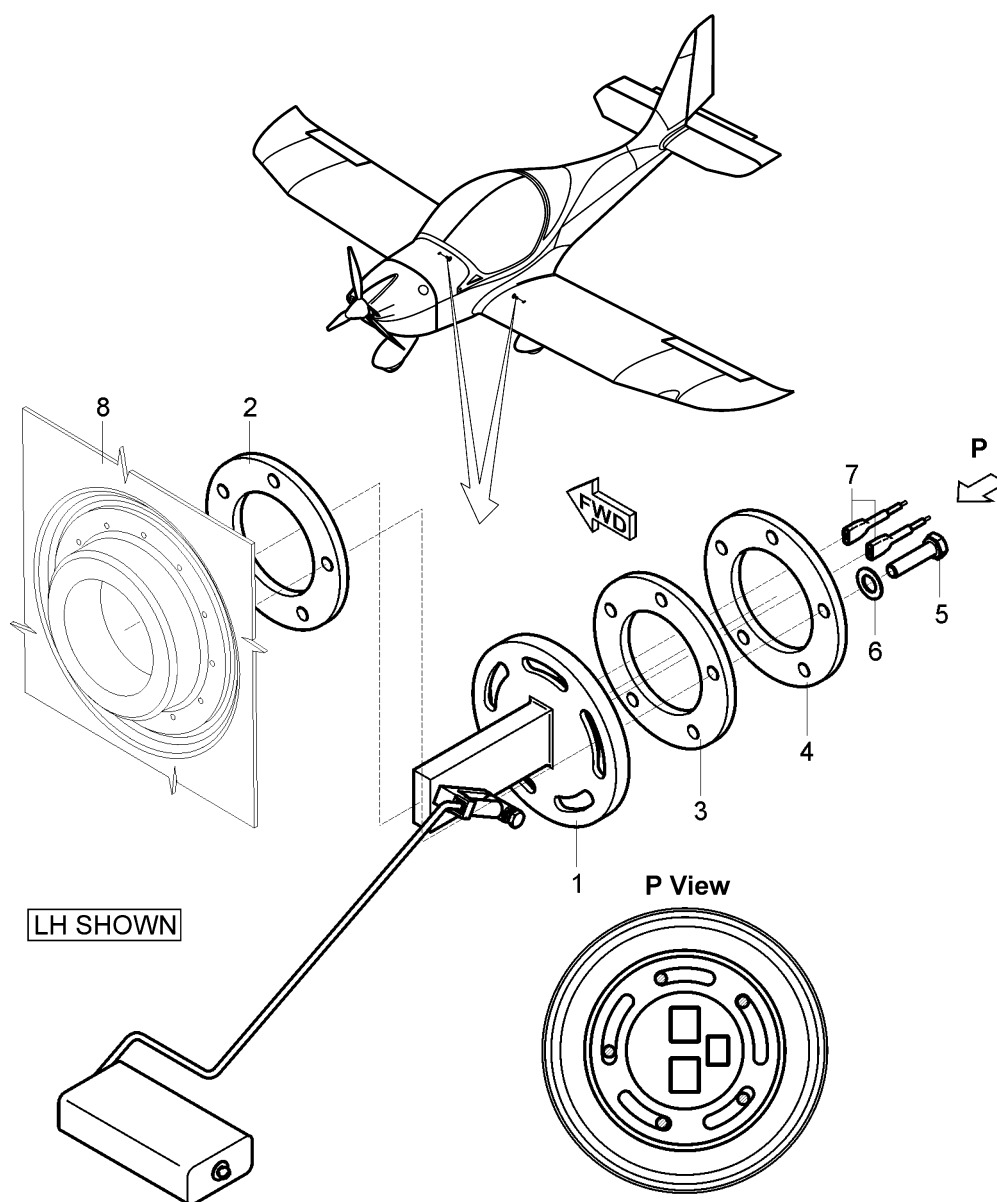


Fig. 28-22 Fuel level sensor – removal / installation (page 1 of 2)



Legend to Fig. 28-22

- | | |
|----------------------|--|
| 1 Fuel level sensor | 6 Washer 5,3 (5 pcs) |
| 2 Gasket | 7 Wires |
| 3 Gasket | For information: |
| 4 Washer | 9 Rib No. 2 with fuel indicator flange |
| 5 Bolt M5x20 (5 pcs) | |

Fig. 28-22 Fuel level sensor – removal / installation (page 2 of 2)

- (3) Adjustment / check – calibration and check of a correct function of the measurement system and indication of fuel quantity

Carry out this check on the airplane with finished fuel installation.

Perform the check in a suitable and exactly defined space. During the check in this space and its vicinity, do not carry out any other work than the work necessary for performing the check.

As working and test medium for this check, use motor gasoline Natural 95 or aviation gasoline Avgas 100LL.

During this check, perform the tank filling with fuel by means of the calibration device or the calibration vessel so that it is possible to determine a precise quantity of added fuel. For the same reason, use the calibration device or the calibration vessel also when draining fuel from the tank. When handling fuel, use the clothing that does not contain artificial fabrics.

The airplane with analogue instruments:

- (a) Level the airplane (Section 08-10).
- (b) Electrically ground the airplane (for example using the exhaust pipe of the airplane) to the grounding point.
- (c) Verify whether both wing tanks are empty (by means of ohmmeter, measure a fuel indicator value of 2 – 3 Ohm); otherwise, drain the fuel (Section 12-10).
- (d) Check the closing of the drain valves of both tanks and remove the tank filler caps.
- (e) Switch the electrical network on.
- (f) Slowly add fuel into the left tank and monitor at which quantity of the fuel added into the tank the first reaction of the pointer of the left tank fuel indicator occurred. Record this measured quantity of fuel (in litres).
- (g) In accordance with the readout of fuel indicator of the left tank, fill the left tank with fuel to the level that is indicated on the fuel indicator as 1/4. Record the readout of fuel indicator and the actual quantity of fuel in the left tank.
- (h) In accordance with the readout of fuel indicator of the left tank, fill the left tank with fuel to the level that is indicated on the fuel indicator as 1/2. Record the readout of fuel indicator and the actual quantity of fuel in the left tank.
- (i) In accordance with the readout of fuel indicator of the left tank, fill the left tank with fuel to the level that is indicated on the fuel indicator as 3/4. Record the readout of fuel indicator and the actual quantity of fuel in the left tank.



- (j) In accordance with the readout of fuel indicator of the left tank, fill the left tank with fuel to the level that is indicated on the fuel indicator as 1/1. Record the readout of fuel indicator and the actual quantity of fuel in the left tank.
- (k) Fill the left tank with fuel up to the full level (up to the neck); record the actual quantity of fuel in the left tank.
- (l) Repeat the procedure in accordance with points (f) up to (k) for the right tank.
- (m) Add the values of fuel quantity to the corresponding labels (3, Fig. 11-2) and stick them onto the corresponding fuel indicators.
- (n) Switch the electrical network off.
- (o) Disconnect the electrical grounding of the airplane.

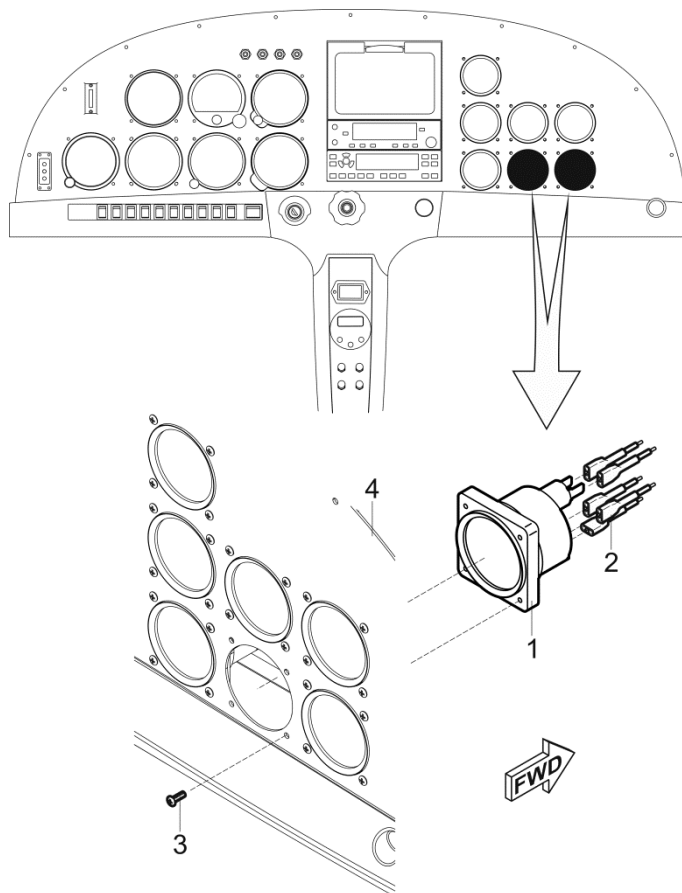
**B. Fuel quantity indicator**

Maintenance type: Line

Personnel qualification: Repairman (LSA) or Mechanic (A&P)

Recommended tools and material:

Item	Designation / Size	Quantity	Note
Phillips screwdriver	No. 2	1 pc	



Legend to Fig. 28-23

1 Fuel quantity indicator

2 Wires

3 Bolt (4 pcs)

For information:

4 Instrument panel

Fig. 28-23 Fuel quantity indicator – removal / installation



- (1) Removal – fuel quantity indicator
 - (a) Switch the electrical network off and disconnect the battery.
 - (b) Remove the cover of the upper part of the fuselage F4 (Section 53-30).
 - (c) Disconnect the wires (2, Fig. 28-23).
 - (d) Unscrew the bolts (3) and remove the fuel indicator (1).
- (2) Installation – fuel quantity indicator
 - (a) Insert the fuel indicator (1, Fig. 28-23) into the hole in the instrument panel (4); screw on the bolts and tighten them (3).
 - (b) Connect the wires (2).
 - (c) Install the cover of the upper part of the fuselage F4 (Section 53-30).
 - (d) Connect the battery, switch the electrical network on.
 - (e) Check the fuel quantity indicator function; as needed, calibrate the fuel measurement system (refer to Par. 2 A(3)).

C. Fuel pressure sensor

Maintenance type: Line

Personnel qualification: Repairman (LSA) or Mechanic (A&P)

Recommended tools and material:

Item	Designation / Size	Quantity	Note
Nut wrench	No. 8	1 pc	
Nut wrench	No. 17	1 pc	
Nut wrench	No. 24	1 pc	
Gripping pliers	Cobra	1 pc	
Cleaning agent	Acetone	-	
Adhesive	Loctite 577	-	
Lint-free cloth	-	-	
Stainless lockwire	ø 0,8 mm (ø 1/32 in)	-	
Fuel can	-	1 pc	

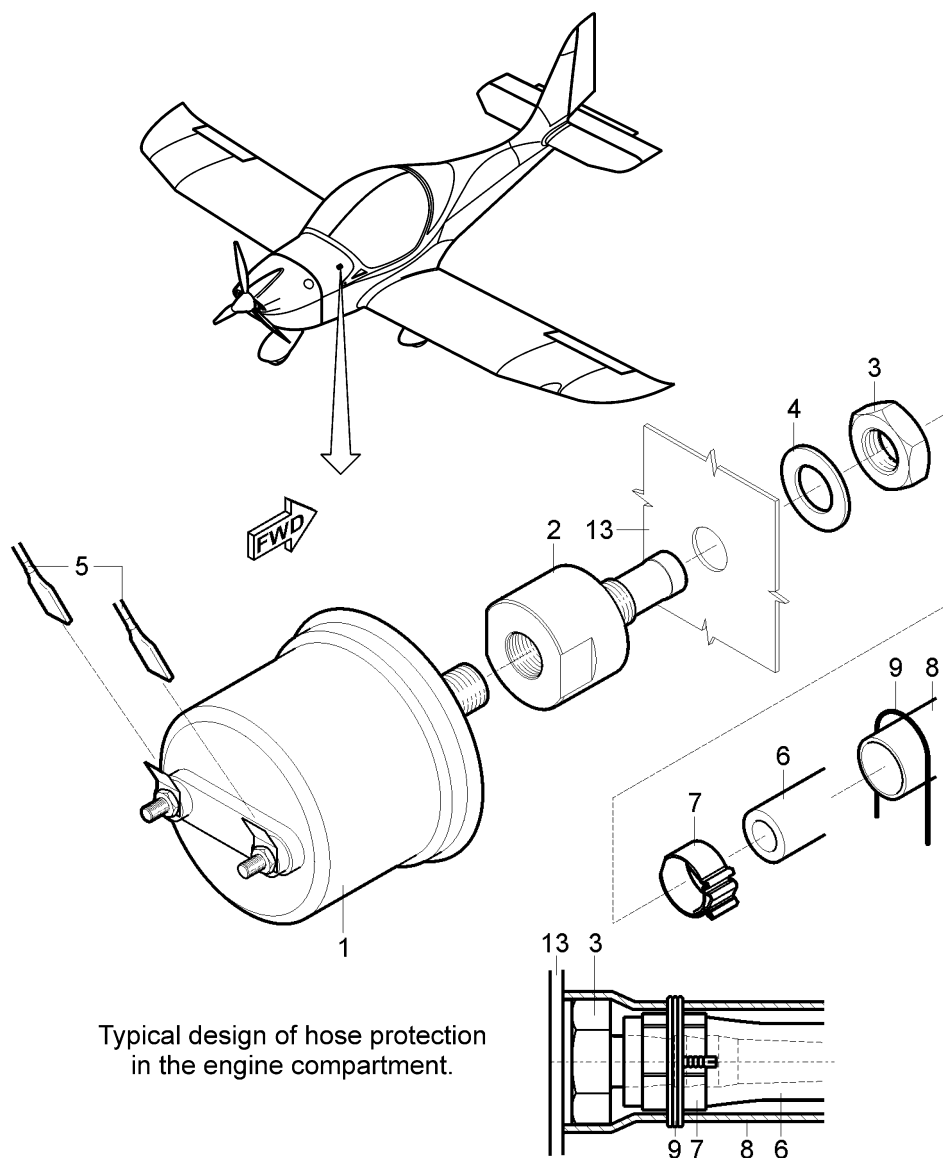
- (1) Removal – fuel pressure sensor Rotax 912 ULS and Rotax 912 iS
 - (a) Switch the electrical network off and disconnect the battery.
 - (b) Drain the fuel from the fuel system (Section 12-10).
 - (c) Remove the cover of the upper part of the fuselage F4 (Section 53-30).
 - (d) For the airplane equipped with analogue instruments:
 - 1 Disconnect the wires (5, Fig. 28-24)
 - 2 Unscrew and remove the fuel pressure sensor (1).
 - (e) Remove the screw fitting as needed:
 - 1 Remove the engine cowlings (Section 71-10).



- 2 Cut off the lockwire (9) and pull off the pyro jacket (8).
 - 3 Release the clamp (7) by means of pliers and pull off the hose (6) from the neck of the screw fitting (2).
 - 4 Unscrew and remove the nut (3), washer (4) and remove the screw fitting (2).
 - (f) Close the hose and the neck of the sensor (if it will be installed again) with the blind plugs.
 - (2) Installation – fuel pressure sensor Rotax 912 ULS and Rotax 912 iS
 - (a) Remove the blind plugs from the hose and the neck of the sensor.
 - (b) Install the screw fitting as necessary:
 - 1 Insert the screw fitting (2, Fig. 28-24) into the hole in the firewall (10) and attach it with the nut (3) and the washer (4).
 - 2 Connect the hose (6) on the neck of the screw fitting (2); secure the hose by the clamp (7) using pliers.
 - 3 Pull the pyro jacket (8) over the screw fitting and secure it by lockwire (9) (Section 20-20).
 - (c) For the airplane equipped with analogue instruments:
 - 1 Thoroughly clean the screw fitting on the sensor with a cloth soaked in cleaning agent.
 - 2 Apply adhesive onto the screw fitting thread on the sensor (1).
 - 3 Connect the wires (5).
 - (d) Check the fuel system tightness (Section 28-10).
 - (e) Install the engine cowlings (Section 71-10).
 - (f) Install the cover of the upper part of the fuselage F4 (Section 53-30).
 - (g) Fill the fuel system with fuel (Section 12-10).
 - (h) Connect the battery, switch the electrical network on.
 - (i) Do the engine check and check the function of the fuel pressure sensor.

NOTE

TYPE OF THE INSTALLED FUEL PRESSURE SENSOR CAN DIFFER, THE SCREW FITTING IS THE SAME FOR BOTH – ROTAX 912 ULS AND ROTAX 912 IS ENGINE.



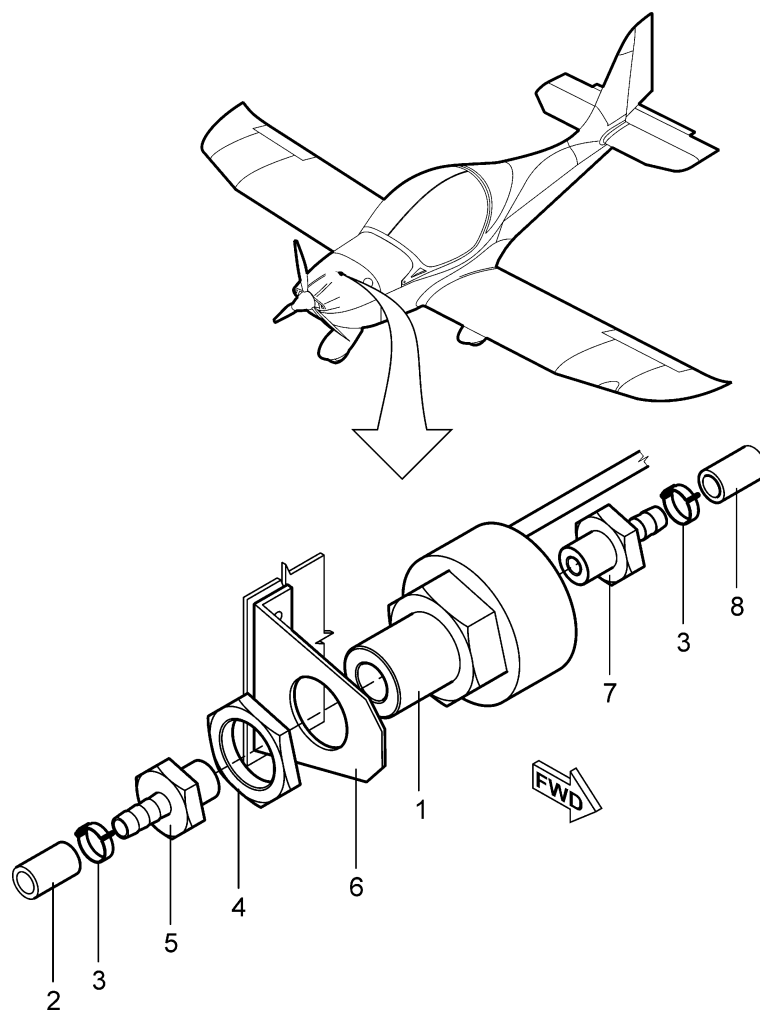
Legend to Fig. 28-24

- | | |
|------------------------|--------------------|
| 1 Fuel pressure sensor | 7 Clamp Cobra 11/7 |
| 2 Screw fitting | 8 Pyro jacket |
| 3 Nut M 10 | 9 Lockwire |
| 4 Washer 10,5 | For information |
| 5 Wires | 13 Firewall |
| 6 Hose | |

Fig. 28-24 Fuel pressure sensor Rotax 912 ULS – removal / installation



- (3) Removal – fuel pressure sensor (sender) Rotax 914 UL
 - (a) Switch the electrical network off and disconnect the battery.
 - (b) Drain the fuel from the fuel system (Section 12-10).
 - (c) Remove the engine cowlings (Section 71-10).
 - (d) Cut off the lockwire (9, Fig. 28-24) and pull the pyro jacket (8) off from the screw fitting (5, Fig. 28-25).
 - (e) Release the clamps (3) on both hoses (2; 8) by means of pliers.
 - (f) Pull the hoses (2; 8) off the sockets of the screw fittings (5; 7).
 - (g) Remove both screw fittings (5;7) from the sensor (1).
 - (h) Remove the nut fitting (4) from the sensor and remove the sensor (1).
 - (i) Close the hoses and the neck of the sensor (if it will be installed again) with the blind plugs.
- (4) Installation – fuel pressure sensor (sender) Rotax 914 UL
 - (a) Remove the blind plugs where necessary.
 - (b) Clean the screw fitting (5; 7, Fig. 28-25) thread with a cloth soaked in cleaning agent.
 - (c) Apply adhesive onto the screw fitting (7) thread.
 - (d) Install the screw fitting with socket (7) on the fuel pressure sensor (1).
 - (e) Install the fuel pressure sensor (1) with nut (4) into the mounting (6) on the firewall.
 - (f) Connect the hose (8) to the socket of the screw fitting (7) and secure it with clamp (3).
 - (g) Apply adhesive onto the screw fitting (5) thread.
 - (h) Install the screw fitting (5) to the sensor (1).
 - (i) Connect the hose (2) to the screw fitting socket (5) and secure it with clamp (3).
 - (j) Pull the pyro jacket (8, Fig. 28-24) over the screw fitting (5, Fig. 28-25) and secure it with a lockwire (9, Fig. 28-24).
 - (k) Check the fuel system tightness (Section 28-10).
 - (l) Install the engine cowlings (Section 71-10).
 - (m) Install the cover of the upper part of the fuselage F4 (Section 53-30).
 - (n) Fill the fuel system with fuel (Section 12-10).
 - (o) Connect the battery, switch the electrical network on.
 - (p) Do the engine check and check the function of the fuel pressure sensor.



Legend to Fig. 28-25

- | | |
|------------------------|-----------------------------|
| 1 Fuel pressure sensor | 5 Screw fitting with socket |
| 2 Hose | 6 Mounting |
| 3 Clamp Cobra | 7 Nut fitting |
| 4 Nut fitting | 8 Hose |

Fig. 28-25 Fuel pressure sensor Rotax 914 UL – removal / installation

**D. Fuel pressure indicator**

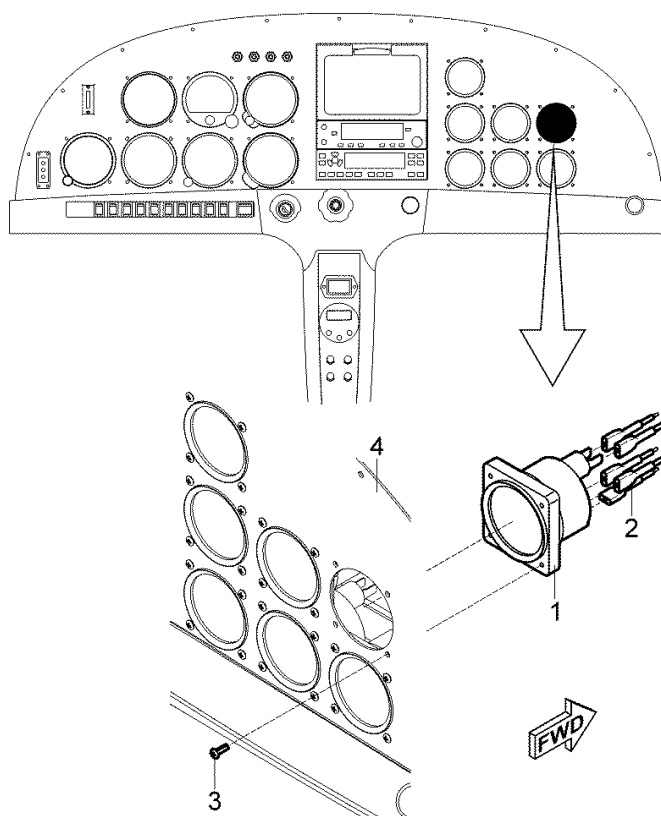
Maintenance type: Line

Personnel qualification: Repairman (LSA) or Mechanic (A&P)

Recommended tools and material:

Item	Designation / Size	Quantity	Note
Phillips screwdriver	No. 2	1 pc	

- (1) Removal – fuel pressure indicator
 - (a) Switch the electrical network off and disconnect the battery.
 - (b) Remove the cover of the upper part of the fuselage F4 (Section 53-30).
 - (c) Disconnect the wires (2, Fig. 28-26).
 - (d) Unscrew the screws (3) and remove the fuel pressure indicator (1).



Legend to Fig. 28-26

1 Fuel pressure indicator

2 Wires

3 Screw (4 pcs)

For information:

4 Instrument panel

Fig. 28-26 Fuel pressure indicator – removal / installation



- (2) Installation – fuel pressure indicator
 - (a) Insert the fuel pressure indicator (1, Fig. 28-26) into the hole in the instrument panel (4); screw on and tighten the screws (3).
 - (b) Connect the wires (2).
 - (c) Install the cover of the upper part of the fuselage F4 (Section 53-30).
 - (d) Connect the battery, switch the electrical network on.
 - (e) Do the engine test and check the function of the fuel pressure indicator.

E. Fuel flow meter

Maintenance type: Line

Personnel qualification: Repairman (LSA) or Mechanic (A&P)

Recommended tools and material:

Item	Designation / size	Quantity	Note
Wrench	No. 17	1 pc.	
Hex wrench	No. 5	1 pc.	
Gripping pliers	Cobra	1 pc.	
Stainless lockwire	ø 0,8 mm (ø 0.03 in)	-	

- (1) Removal – fuel flow meter Rotax 912 ULS and Rotax 914 UL
 - (a) Switch the electrical network off and disconnect the battery.
 - (b) Drain the fuel from the fuel system (Section 12-10).
 - (c) Remove the engine cowlings (Section 71-10).
 - (d) Disconnect the wire (3, Fig. 28-27).
 - (e) Cut off the lockwire (10) and pull off both pyro jackets (9).
 - (f) Release the clamps (8) by means of pliers and pull off the hoses (7) from the screw fitting (2).
 - (g) Unscrew and remove the nuts (5), washers (6) and bolts (4).
 - (h) Remove the flow meter (1).
 - (i) As needed, unscrew the screw fitting (2) from the flow meter.
 - (j) Close the hoses and the holes in the flow meter (if reinstalled) by means of blind plugs.



- (2) Installation – fuel flow meter Rotax 912 ULS and Rotax 914 UL
 - (a) Remove the blind plugs from the hoses and the holes in the flow meter.
 - (b) As needed, screw the screw fitting (2) into the flow meter (1, Fig. 28-27).
 - (c) Position the flow meter (1) between the angle pieces on the firewall (11) and fasten them by means of bolts (4), washers (6) and nuts (5).
 - (d) Connect the hoses (7) to the neck of the screw fitting (2); secure the hoses by the clamps (8) by means of pliers.
 - (e) Pull the pyrojacket (9) over the screw fitting and secure it with lockwire (10) (Section 20-20).
 - (f) Connect the wires (3).
 - (g) Check the system tightness (Section 28-10).
 - (h) Install the engine cowlings (Section 71-10).
 - (i) Fill the fuel system with fuel (Section 12-10).
 - (j) Connect the battery, switch the electrical network on.
 - (k) Do the engine check and check the function of flow meter.

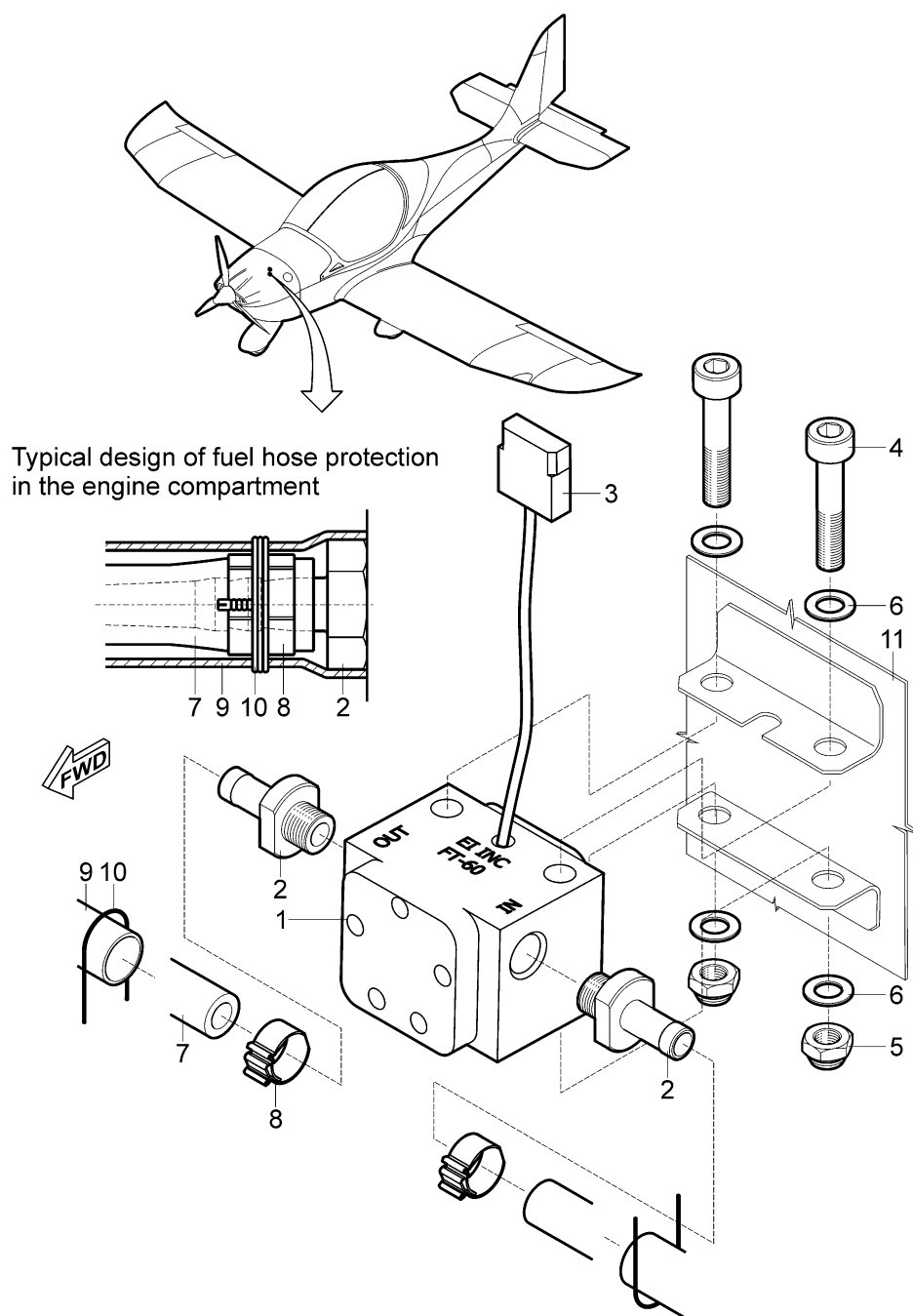


Fig. 28-27 Fuel flow meter Rotax 912 ULS / Rotax 914 UL – removal / installation (page 1 of 2)



Legend to Fig. 28-27

- | | |
|-----------------------|--------------------|
| 1 Fuel flow meter | 7 Hose |
| 2 Screw fitting | 8 Clamp Cobra 11/7 |
| 3 Wire with connector | 9 Pyrojacket |
| 4 Bolt M6x50 (2 pcs.) | 10 Lockwire |
| 5 Nut M6 (2 pcs.) | For information: |
| 6 Washer 6,4 (2 pcs.) | 11 Firewall |

Fig. 28-27 Fuel flow meter Rotax 914 UL – removal / installation (page 2 of 2)

F. GDU 460 display

- (1) Removal GDU 460 display
 - (a) Remove the GDU 460 display (Section 34-10).
- (2) Installation GDU 460 display
 - (a) Install the GDU 460 display (Section 34-10).



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