

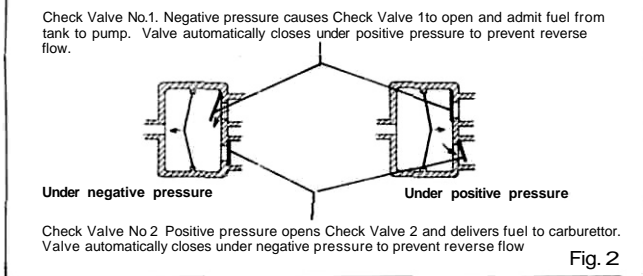
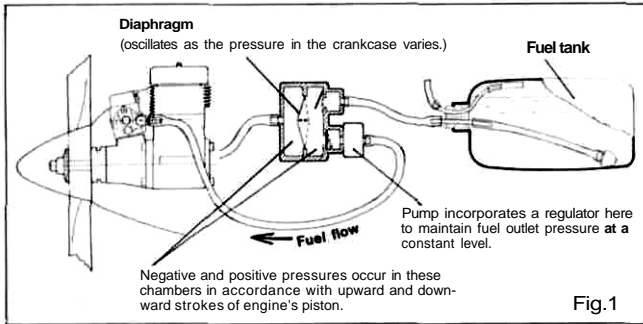
INSTRUCTIONS FOR O.S. PA-104 PUMP SYSTEM

The O.S. PA-104 Pump System consists of the unique O.S. Type PD-04 diaphragm fuel pump and matching large-throat carburettor (O.S. Type 46), and has been developed specifically for O.S. MAX-40SF, 46SF, 40VF and 46VF engines.

The O.S. Pump System provides more power and ensures that fuel is delivered to the carburettor at the pressure required to maintain the optimum mixture strength, irrespective of fuel tank location or aircraft attitude.

Note: This pump system cannot be fitted to the O.S. MAX-40FSR or 45FSR since the Type 46 carburettor cannot be installed in these engines.

PRINCIPLE OF THE DIAPHRAGM PUMP



Figs 1 & 2 are merely diagrammatic to explain the principle of the diaphragm pump. Actual construction is more complicated.

INSTALLATION OF PRESSURE NIPPLE AND CARBURETTOR

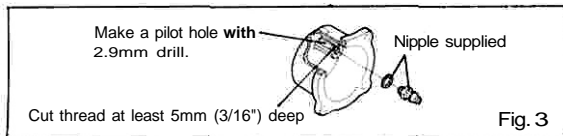
* Remove the crankcase cover-plate (backplate) from the engine. Drill and tap cover-plate boss with M3.5x0.6 Metric thread and fit nipple supplied.

Important! After tapping, be sure to wash out screw hole thoroughly with kerosene.

Note:

For this modification, an M3.5 tap set, including a 2.9mm drill for the pilot hole, is available as an optional extra (Code No. 27901002). Alternatively, for owners who do not care to do this work, a replacement cover-plate, complete with nipple installed, is also obtainable (Code No.25407001).

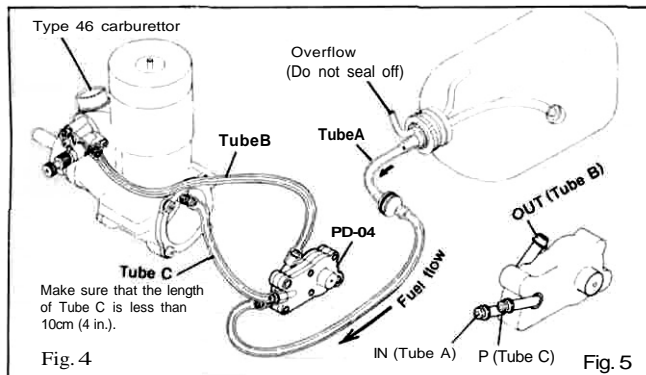
* Refit cover-plate and install the O.S. Type 46 carburettor.



PIPING

* For piping, use heavy duty silicone fuel tubing of approximately 2.5mm bore and 5mm outer diameter.

* A feature of the O.S. Pump System is that the fuel tank does not have to be placed close behind the engine, but tube lengths should be kept as short as possible. Take care not to cause any kinks in the "plumbing".

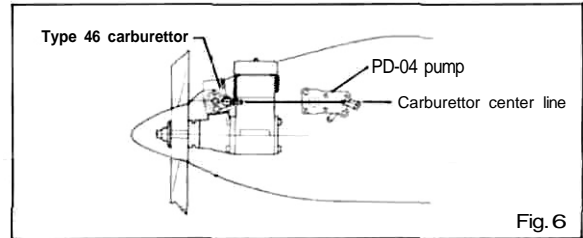


Tube A: To draw fuel from the fuel tank to the pump.
 Tube B: To deliver fuel from the pump to the carburettor.
 Tube C: To deliver the crankcase pressure pulse to the pump.

INSTALLATION

Here are examples of typical installations. (Figs 6 & 7)

* The ideal location for the pump is one in which the center of the pump is on the same level as the axis of the carburettor barrel as shown in Fig. 6. In many cases, this cannot be achieved, precisely, within the existing structure of the airframe. However, try to fit the pump as closely as possible to this optimum location. If the pump is installed more than 5cm (2 in) above or below the ideal position, there may be a slight variation in fuel/air mixture strength between level and inverted flight.

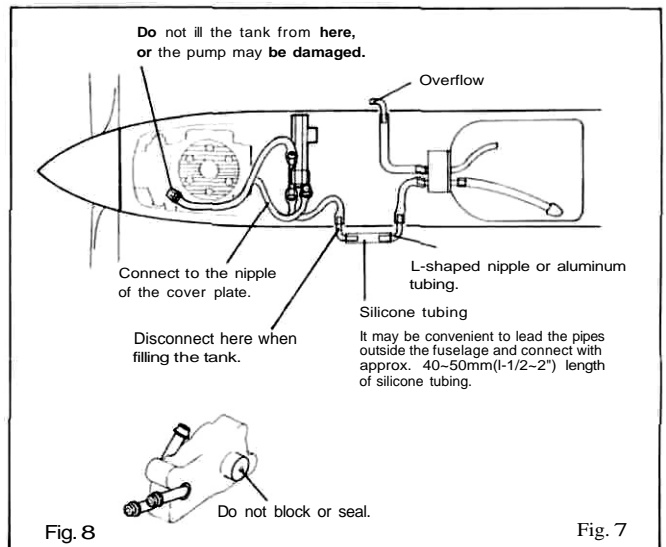


Fix the pump on the firewall, front bulkhead, or side of the engine compartment with 3mm self-tapping screws. It is advisable to insert a piece of sheet rubber between the pump and mounting surface. DO NOT attach the pump directly to any part of the engine.

If it is not possible to mount the pump as described, it may be possible to wrap it in foam rubber and insert it into a convenient space in the engine compartment, but make sure that it does not touch the engine itself.

Caution:

When installing the pump, take care that the vent hole in the pump body is not obstructed.



WARNINGS

* **Do not disassemble the pump**

Never take the pump unit apart. Once the pump has been dismantled, its original performance may not be restored when it is reassembled.

* **Do not insert anything into the nipples**

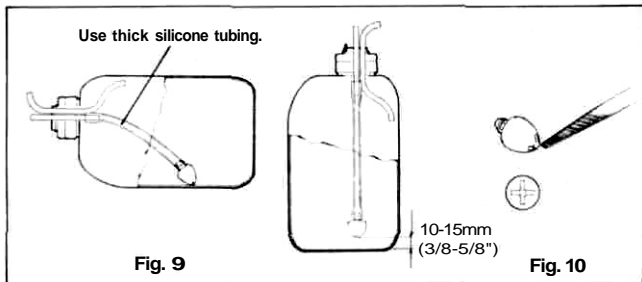
Inserting a pin, etc., into the nipples and/or air vent hole is likely to damage the pump and render it inoperative.

* **Use fuel filters**

Any foreign matter entering the Pump System may interfere with its correct functioning and may even damage the pump diaphragm. Be sure to filter, all fuel before filling the tank and, most important, use a good quality fine filter in the delivery tube between the tank and pump.

FUEL TANK

If the fitting of the "klunk" type fuel pick-up weight in the fuel tank is incorrect, the weight may stick to the tank wall, resulting in an irregular fuel flow to the carburettor, or, alternatively, in the fuel flow being cut off during the course of sharp acrobatic manoeuvres. Therefore, it is advisable to make slots in the end of the weight, with a file or hacksaw blade, as shown in Fig. 10. Thoroughly wash out the weight to remove any minute particles of metal before reinstalling it in the tank.



STARTING THE ENGINE

1. Fill the fuel tank.
2. From its fully closed position, open the needle-valve approximately 1 to 1-1/4 turns (when the standard O.S. 873 silencer is used), or 1-1/2 to 2 turns (when a tuned silencer is used).
3. Open the throttle fully.
4. Placing your finger over the carburettor to choke the intake, turn the propeller by hand until fuel is pumped as far as the carburettor.
5. When fuel is seen to reach the carburettor, remove your finger from the intake immediately.
6. Close the throttle to the idling position and turn the propeller through two extra revolutions to prime the engine. DO NOT turn the prop more than this, or the engine will be over-primed.
7. Connect the battery to the glowplug and start the engine.

Note:

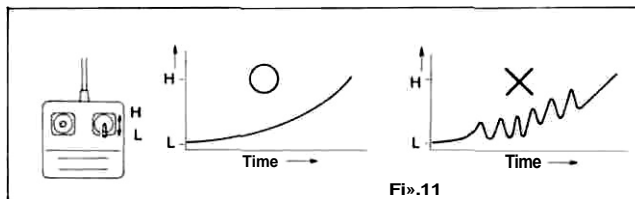
- If the engine is over-primed (i.e. flooded), pinch the fuel delivery tube (Tube B) with a suitable clip or clamp before attempting to start the engine. If the engine remains over-primed and unwilling to start, close the needle-valve completely, remove the glowplug and flip the propeller briskly to eject excess fuel from the cylinder via the glowplug hole.
8. Check that sufficient fuel can reach the engine to cause it to run rich (for running-in purposes, etc.) when the needle-valve is more than 3 turns open. If the engine cannot be made to run rich, check as follows:
 - * Make sure that the fuel filter or carburettor is not partially obstructed with foreign matter.
 - * Make sure that there are no holes in the piping or air bubbles in the fuel flow.
 - * Make sure that the fuel does not "froth" in the tank when the engine is running. This can occur if the tank is not properly insulated from vibration.

- * Make sure that the fuel pick-up weight is not being partially obstructed by contact with the tank wall. (Refer to previous instructions under "FUEL TANK".)

In the unlikely event that the engine cannot be persuaded to run rich, after checking the above, it is possible that a fault has developed in the pump. In this case, consult the O.S. engine distributor in your country.

Caution:

In the throttle is 'blipped' rapidly and repeatedly between the idling and medium speed positions during (for example) taxiing, an excess of fuel will be pumped into the engine. The engine may then refuse to pick up speed, even when the throttle is opened fully, and may stop. The throttle lever should be opened gradually to match the engine's natural acceleration under load. The recommended pre take-off check is to fully open the throttle, once, with the aircraft under restraint. The throttle is then returned to the idling position, before being smoothly advanced for the take-off run.



ADJUSTMENTS

Adjustment of the PA-104 System is confined to the Type 46 carburettor. No adjustments to the pump are called for. Carburettor adjustment broadly follows the procedure for setting up a conventional suction-feed system. See separate instruction leaflet for O.S. Type 46 carburettor.

MAINTENANCE

If, after use, the fuel system is left unattended for a lengthy period, there will be a tendency for the methanol content of the fuel to evaporate sufficiently for the oil content to "gum" the internal parts of the pump. Therefore, it is advisable, at the end of the day's flying, to empty the fuel tank, invert the engine, and pump out the remaining fuel in the system by rotating the propeller until no more fuel is ejected from the carburettor.

If the pump is not in use for a while (more than one month), remove the pump and wash out its interior by injecting methanol or kerosene through the "IN" nipple. Fit the sealing caps (provided) to the nipples, after draining out the methanol or kerosene.

Note:

If you use kerosene, take care not to allow this to come into contact with the fuel tubing, otherwise the tubing will swell and deteriorate.

O.S. PUMP SYSTEM
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 States by permission of
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