SKYDRIVE
THE DRIVING FORCE IN LIGHT AVIATION

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THE CYCLONE COOLANT CARBURETTER HEATER

Please read these instructions thoroughly before attempting to fit or use the Cyclone coolant carburetter heater.

THE CYCLONE coolant carburetter heater is suitable for Rotax two stroke liquid cooled engines (Types 462, 532, 582/90, 582/99 and 618), fitted with the Bing type 54 carburetter.

The carburetter heater is intended to add a small amount of heat to the carburetter body in order to keep the temperature of the body above freezing point. The intention is that any ice formed will not adhere to the carburetter throat.

Because there is no significant heating of the intake air when hot coolant is circulating through the carb heater(s), there will be a negligible loss of full engine power. It is therefore recommended that the carburetter heat system is permanently connected and operating. Only if the engine is operated in conditions where carb icing is extremely unlikely (very ***high air*** temperature and low humidity) should the system be disconnected and the inlet and outlet connections on the engine be plugged. Such conditions would not normally occur in Great Britain. (Alternatively a special tap may be fitted into the carb heater coolant pipe so that the system may be turned on or off. This tap is available at extra cost it required).

It is recommended to use the coolant carburetter heater system in conjunction with a Rotax thermostat, fitted into the cylinder head. The thermostat will ensure a more rapid warm up and a more stable temperature of the carb heat system. If your engine is not already fitted with a thermostat, this may be purchased separately for retrofitting.

INSTALLATION

STEP 1
If carburetter is installed on an engine, firstly remove the complete throttle slide assembly and choke mechanism; disconnect the fuel pipe and remove the carburetter from the engine. Make sure all fuel is emptied from the float chamber.

STEP 2
In order to ensure an efficient transfer of heat to the carburetter, the heater body is a tight press fit onto the carburetter. The heater is fitted onto the carburetter with its flat side towards the carburetter body, and with the water passage positioned vertically and towards the front of the aircraft. (The water passage may be on the left or the right of the carburetter, depending on whether the engine is a pusher or tractor, and whether the engine is upright or inverted).

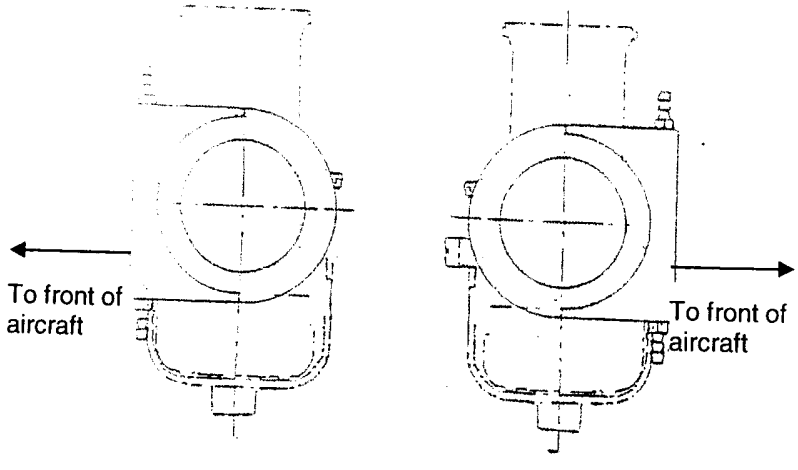

Figure 1: Alternative fitting positions of carb heater.

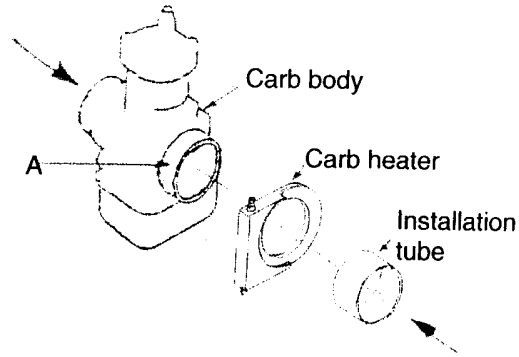

Figure 2: Heater Installation

See Figure 1 for the two alternative mounting positions of the heater. The heater may be pushed onto the carburetter body using a press or a wide jawed vice or may be carefully knocked on manually. Strips of wood should be used to protect the carburetter from damage during this operation. Figure 2 shows the method of installation. (Before fitting ensure that diameter A on the carburetter is free from casting flash and damage, and free from oil or grease). The installation tube supplied should be used to push the heater fully home to the shoulder on the carburetter body. For twin carburetter installation, the flow passage on both heaters must be vertical and towards the front of the aircraft. The installation tube may be discarded after the heaters have been fitted to the carbs.

STEP 3: Fit the cylinder head outlet nipple.

A) 462 ENGINES.

On 462 engines this is fitted at position B on Figure 3. The plug already fitted at position B should be drilled through using the 5mm drill supplied. Then tap an M6 thread through using the tap provided, using a suitable tap wrench. Ensure that the tap is held perfectly square during this process and lubricate the tap with a little oil or grease. This Procedure is best carried out with the cylinder head removed, but if carried out with the head installed the drill and tap should be well greased, to catch metal particles and prevent them from entering the water jacket. Once the thread has been tapped, remove all traces of grease from the thread and fit one of the brass nipples with a small aluminium or copper washer under it and a small amount of high strength retainer on the thread. Tighten nipple to 4.ONm (2.9 lbs.ft). Over-tightening may shear the nipple off or strip the thread. Any owner who feels unable to carry out this procedure can send the cylinder head to Skydrive Ltd who will fit the nipple for a small charge plus return postage. Move onto section 4 A).

B) 532 & 582 ENGINES.

On these engines a connection already tapped with an M6 thread is provided on both ends of the cylinder head (except for early 532 engines). One of these tappings should already be fitted with a brass nipple connected to the coolant expansion tank (C on Figure 4). The other tapping should be used as the cylinder head connection by removing the M6 screw (D on Figure 4) and fitting the other brass nipple with a small aluminium or copper washer and using a small amount of high strength retainer on the thread. Tighten the nipple to 4.ONm (2.9lbs.ft.). Over-tightening may shear the nipple off or strip the thread. Move onto section 4 A)

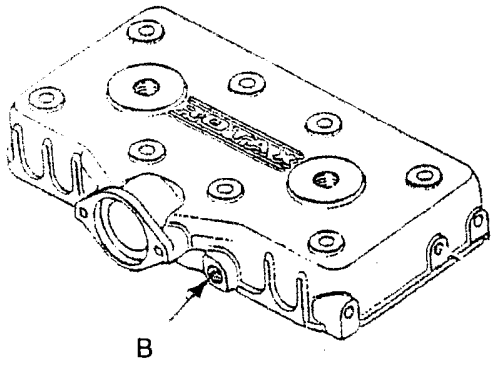

Figure 3: 462 engine, position of cylinder head outlet nipple.

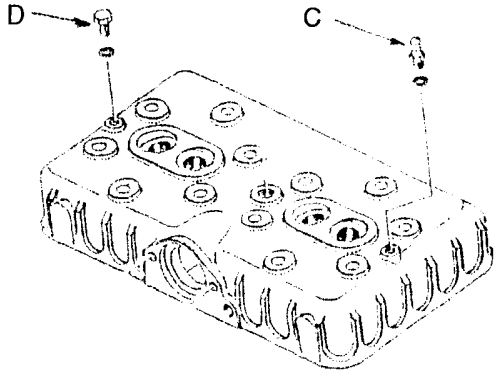

Figure 4: 532 & 582 engines, position of cylinder head outlet nipple.

STEP 4: Fit water pump inlet nipple.

A) 462, 532 and 582/90 (see section B for 582/99 engines)Engines

Referring to Figure 5, remove lower hose from water pump housing (E) and remove the housing from the engine, making a note which way it is fitted, so it can be reassembled correctly. Drill through the centre of the housing at F, using the 5mm drill supplied (Note - some housings have a plug screwed into the centre at F, some do not. If a plug is fitted, drill straight through the middle of the plug. If a plug is not fitted, drill through the aluminium housing, but only to a depth of 15mm, to prevent the drill being pulled off line by the web inside the water pump. Carefully tap an M6 thread through the drilled hole using the tap provided, and using a suitable tap wrench to turn the tap. Ensure that the tap is perfectly square with the housing during this process, and lubricate the tap witha little oil or grease. Once the thread has been tapped, remove-all traces of grease from the thread, and fit the brass nipple with a small aluminium or copper washer underneath it, and a small amount of high strength retainer on the thread. Tighten the nipple to 4.ONm (2.9lbs.ft). Over-tightening may shear the nipple off or strip the thread.

- Any owner who feels unable to carry out this procedure can send the water pump housing to Skydrive Ltd who will fit the nipple for a small charge plus return postage.

Refit the water pump housing in the original position using the new gasket provided. Use a little nutlock on the threads of the four taptite screws that secure the housing. Tighten the screws to 8Nm (5.8lbs.ft.) only. Over-tightening will strip the threads in the crankcase and necessitate a very expensive repair! Reconnect the water hose and tighten the clamp. Move onto section 5.

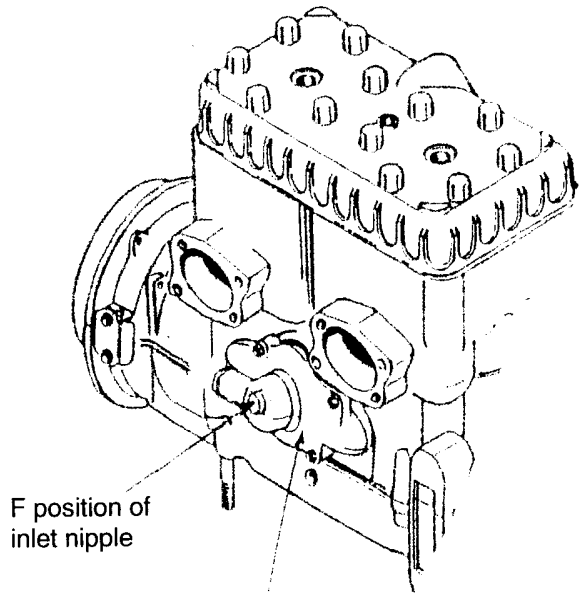

Figure 5: Position of water pump inlet nipple.

B) 582/99 and 618 ENGINES.

The water pump housing on 582/99 and 618 engines differs from the other engines in that it does not have a cast boss into which the water pump inlet nipple can be fitted. Instead the inlet to the water pump is achieved by fitting a special T piece in the bypass hose close to the water pump, the side connection of which provides the return inlet to the water pump.

Referring to Figure 6. Cut cleanly through the bypass hose approx. 40mm from its end close to the water pump housing. Fit the enclosed T piece, using the two clamps provided, thus rejoining the bypass hose and providing a side connection for the return hose from the carb heaters. Select the final radial position of the side connection to suit the installation and ensure that the small return hose is kept clear of the exhaust.

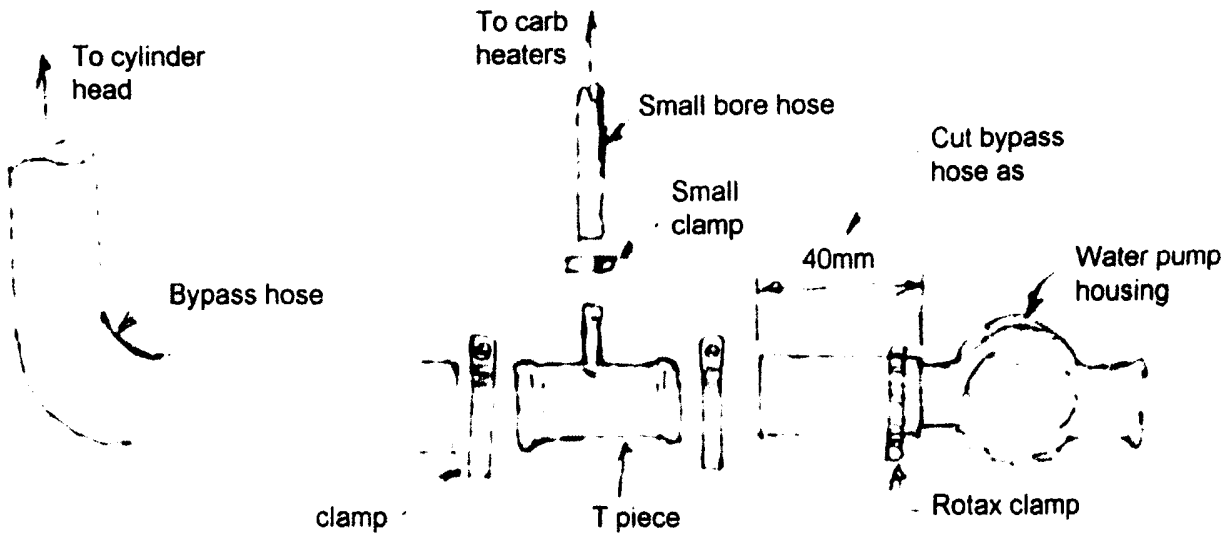

Figure 6: 582'99 and 618 installation.

STEP 5: Refit carburetters to engine.

Refit throttle slide(s) and ensure that no distortion has occurred to the carburetter bodies by checking that the throttles slide freely from the fully closed to the fully open position. In the unlikely event that there is slight sticking, then any high spots on the carburetter barrel must be rubbed down lightly with emery cloth, until the slide is completely free. Make sure all traces of abrasive are removed before reassembly.

STEP 6: Connect the hoses to the Carb heater(s).
Using the hose provided, and cutting to length to suit the particular installation, connect the hoses in the following sequence (see also Figure 7). Connect from cylinder head outlet nipple to the nipple on top of the carb heater which is towards the front of the aircraft. Connect the bottom of this carb heater directly to the water pump inlet nipple for single carb installations, or to the bottom of the rear carburetter heater for twin carb installations. On twin carb installations connect the top nipple of the rear carb heater to the water pump inlet nipple. Secure all connections except for the cylinder head nipple, with the hose clips provided. Take care not to over-tighten the clips or the threads will strip. Two spare clips are provided in the kit. Ensure that none of the hoses are chafing on any other parts of the engine or airframe. If necessary use the cable ties provided to secure the hoses and prevent chafing.

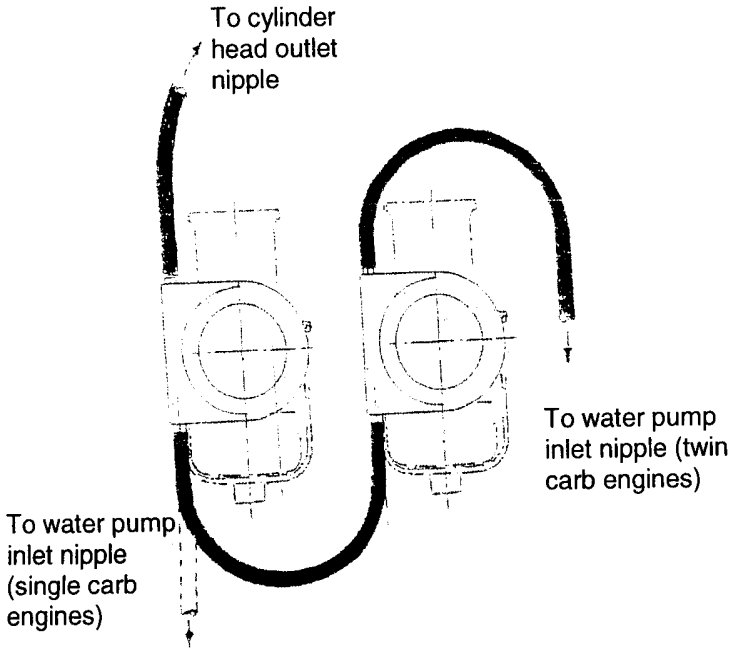

Figure 7: Hose Connections

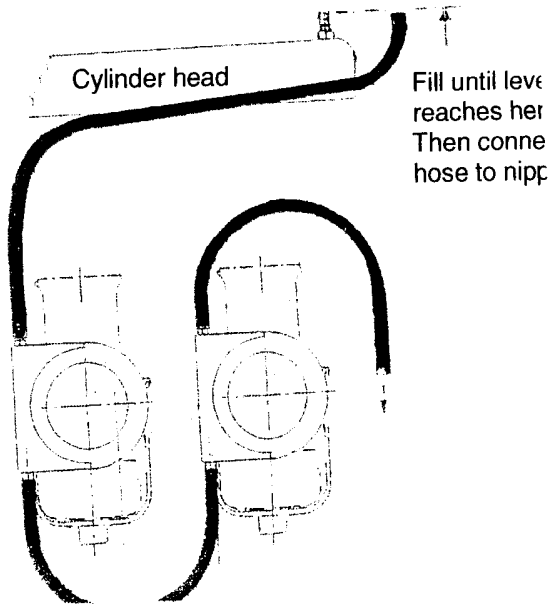

Figure 8: Venting the system

STEP 7: Venting the System
With the cylinder head nipple disconnected, hold the hose normally connected to the nipple, on the same level as the head nipple (Figure 8), and slowly fill the engine with coolant. When the level of coolant simultaneously reaches the nipple and the open end of the hose, reconnect the hose to the nipple and secure the hose clip. Continue filling with coolant until the whole system is full. Refit radiator or expansion tank cap and inspect for leaks.

STEP 8: Refit Air Filters
Refit the air filters or intake silencer. It is recommended to secure the air filters with locking wire to prevent them completely falling off if they come loose. The intake silencer, if fitted, should be bracketed to the engine to support its weight and to prevent loss of the silencer if the clamps come loose.

STEP 9: Test Run
Run the engine on the ground until thoroughly warm. If possible without getting too close to the propeller, check for coolant leaks while the engine is running. Stop the engine. Check for coolant leaks. Check that the carb heaters are warm; if not re-vent the system and repeat the procedure. During the first few hours of operation, frequently check for coolant leaks and security of all components.

The effectiveness of the carb heat system can be monitored by fitting a permanent carburetter temperature gauge to each carburetter (available from Skydrive).

The remaining high strength retainer and nutlock should be kept safely in your tool box, as these adhesives are extensively used in other locations on the Rotax engine.