

	<b>Standard Modification</b> Issue 1	Mod No. SM12915
		Page : 1 of 3
		Compiled : A Draper
		Approved : F Donaldson

## TITLE : Thermostatic Coolant Bypass Valve

APPLICABILITY : **Rotax 91x series engines**

Mod Type : **New build & Retro-fit**

### 1. Introduction

The fitting of a thermostatic coolant bypass valve between the engine and the coolant radiator offers the following benefits: -

- 1) Quicker initial engine warm-up.
- 2) Overcooling in cold conditions is prevented.

This modification describes the installation of the thermostatic coolant bypass valve. The valve opens up a path for the coolant to flow around the engine while bypassing the radiator. As the coolant temperature reaches about 80°C, the thermostat causes a piston to move to open a valve and allow coolant through the radiator.

The valve must not be fitted without reference to the aircraft manufacturer and adherence to any detailed instructions they may have.

Some cooling systems do not naturally fill fully and therefore particular care must be exercised to ensure proper bleeding of the cooling system.

### 2. Parts List

Qty	Part No.	Description	Source
1	COL-021 or COL-030	Coolant Thermostatic valve	ConAir Sports Ltd Wayland House Station Fields Fenny Compton
1	922250	17mm bore coolant hose as required	
1	COL-020	25-17-6-25mm unequal double Tee	
4	JUB-001 30-45 Jubilee clip	Hose clamps for 25mm bore hose (may vary depending on hose wall thickness)	Southam CV47 2XD
2	JUB-006 16-25 Jubilee clip	Hose clamps for 17mm bore hose (may vary depending on hose wall thickness)	tel 01295 771088 <a href="http://www.conairsports.co.uk">www.conairsports.co.uk</a>
A/R	JUB-003 Clamp12	Coolant carb heater hose clamp (only if required)	

### List of related Drawings / Photo's

Drawing No.	Title / Description	Issue
Figure 1	General view of coolant thermostat	1

	<b>Standard Modification</b> Issue 1	Mod No. SM12915
		Page : 2 of 3
		Compiled : A Draper
		Approved : F Donaldson

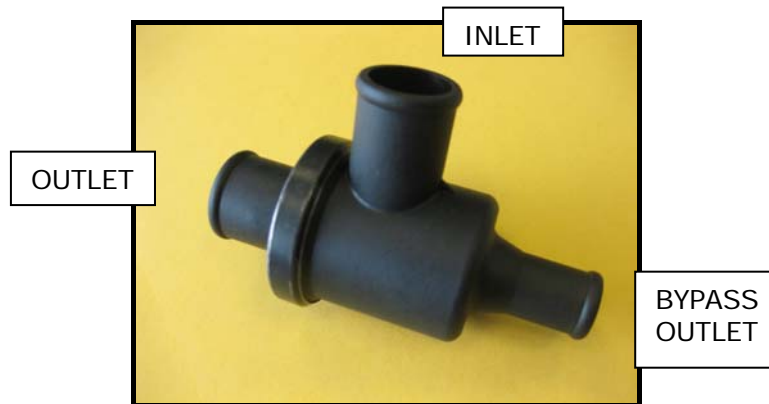


Figure 1. General view of thermostat.

### 3 Action

#### 3.1 Installation Overview.

See any instructions provided by the aircraft manufacturer and study the installation instructions provided by ConAir Sports and the coolant hose arrangement in the engine installation to be modified.

Disable the electrical supply to the engine's starter motor.

Given the stiffness of the coolant hoses it is not essential to firmly mount the valve to the aircraft structure. If loosely mounted, it is essential to ensure that the valve is not allowed to move sufficiently to contact any surrounding structure. Mount the valve clear of fuel hoses & other temperature sensitive components. In extreme cases the valve's body could reach a temperature of 150°C.

#### 3.2 Coolant hoses.

Having decided on where and how the valve will be installed within the cooling system plumbing, drain the coolant and remove the appropriate coolant hoses referring to any appropriate aircraft manufacturer's instructions.

#### 3.3 Connections.

See the ConAir Sports instructions and install the valve and unequal Tee fitting as appropriate: -  
 If a Skydrive coolant carb heater is installed remove the 25-6-25 unequal Tee and replace it with the COL-020 unequal 25-17-6-25 double Tee.

- a) Connect the large diameter (25mm) ends of the unequal double Tee in the hose between the radiator outlet and the coolant pump as close to the coolant pump as practical.
- b) Connect the large diameter (25mm) side port of the valve with the header tank outlet.
- c) Connect the large diameter (25mm) end port of the valve with the radiator inlet.
- d) Connect the small diameter (17mm) end port of the valve with the unequal double Tee piece.
- e) If a coolant type carburettor heater is installed connect the 6mm hose to the remaining connection on the unequal double Tee. If the carburettor heater connection of the unequal double Tee is not required blank it off with a short piece of 6mm bore hose, a blanking plug and suitable clamps.

Do not install the hoses with small radius bends but use elbow hoses as required. Only use hoses that meet the temperature and pressure requirements as specified in the Rotax installation manual. See section 12.

Secure but do not over-tighten the hose clamps.

Before final installation, weigh the valve, hoses and clamps to be added and removed and make a record of the total added weight.

	<b>Standard Modification</b> <b>Issue 1</b>	Mod No. SM12915
		Page : 3 of 3
		Compiled : A Draper
		Approved : F Donaldson

### 3.5 Testing.

Restore the aircraft to the original operating configuration and remove any radiator blanking that may have been installed. Ground-run the engine for a short time then check for coolant leaks and top up with coolant as necessary.

If no leaks or other problems are found run the engine again until the coolant temperature has reached at least 90°C to open the thermostat then allow to cool before topping up with coolant and re-bleeding as necessary.

Next run the engine once again, this time until the coolant temperature has stabilised.

During all ground runs monitor all engine parameters, paying particular attention to the coolant temperature indications. Carry out magneto checks at the appropriate rpm, and then run the engine at full throttle for at least 1 minute. After engine shut down, check again for leaks, hose clamp security, lack of coolant and any other problems and correct any found before further engine running.

## 4 Weight and Balance

	Weight (lb/kg)	CG (in/mm)	Moment (lb.in)
Existing A/C			
+/- Weight Change	+		
Post Mod A/C			

Amend the aircraft weight and balance schedule accordingly.


## 5 Flight Test and Special Instructions

5.1 Before the modified aircraft may be flown, a suitable LAA inspector must check the installation. When satisfied, the inspector will make an appropriate logbook entry, including the modification number SM12915 and sign a Permit Maintenance Release (PMR).

5.2 Conduct a flight including a 5 minute continuous climb at best rate of climb speed,  $V_Y$  and at full throttle. Do not allow engine to exceed limits. Monitor the coolant temperature throughout the flight and record the maximum. Check also that the thermostat acts to limit overcooling in low ambient temperatures and low power settings.

## 6 Continued airworthiness

It is recommended that, regardless of condition, the coolant thermostatic valve should be replaced at intervals of no more than 5 years.

Approved:	F Donaldson B.Tech C.Eng FRAeS Chief Engineer	Signed:	
-----------	--	---------	---