



US005724931A

# United States Patent [19]

[11] Patent Number: **5,724,931**

Hollis

[45] Date of Patent: **Mar. 10, 1998**

## [54] SYSTEM FOR CONTROLLING THE HEATING OF TEMPERATURE CONTROL FLUID USING THE ENGINE EXHAUST MANIFOLD

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[21] Appl. No.: **576,609**

[22] Filed: **Dec. 21, 1995**

[51] Int. Cl.<sup>6</sup> ..... **F02N 17/02**

[52] U.S. Cl. .... **123/142.5 R; 123/41.08**

[58] Field of Search ..... **123/142.5 R, 41.01, 123/41.08, 41.1, 41.29, 41.31**

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### ABSTRACT

[57] A temperature control system is provided for an internal combustion engine having an engine block, a water pump, and an exhaust manifold and a radiator. The system includes a first sensor for sensing an engine operation parameter indicative of engine oil temperature and provides an engine operation parameter signal indicative thereof. A second sensor senses an ambient condition and provides an ambient condition signal indicative of the ambient condition. An exhaust heat assembly is positioned adjacent to the exhaust manifold and is adapted for receiving a flow of temperature control fluid. The exhaust heat assembly permits heat conduction from the exhaust manifold to the temperature control fluid. A first control valve controls flow of temperature control fluid between the engine and radiator. A second control valve controls flow of temperature control fluid between the engine and the exhaust heat assembly. An engine computer controls the actuation of the control valves based on (i) a comparison of the engine operation parameter signal to a first engine temperature threshold value and (ii) a comparison of the engine operation parameter signal and the ambient condition signal to a set of predetermined values which have an ambient condition component and an engine operation parameter component. Methods for controlling the temperature of the temperature control fluid are also described.

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**34 Claims, 11 Drawing Sheets**

