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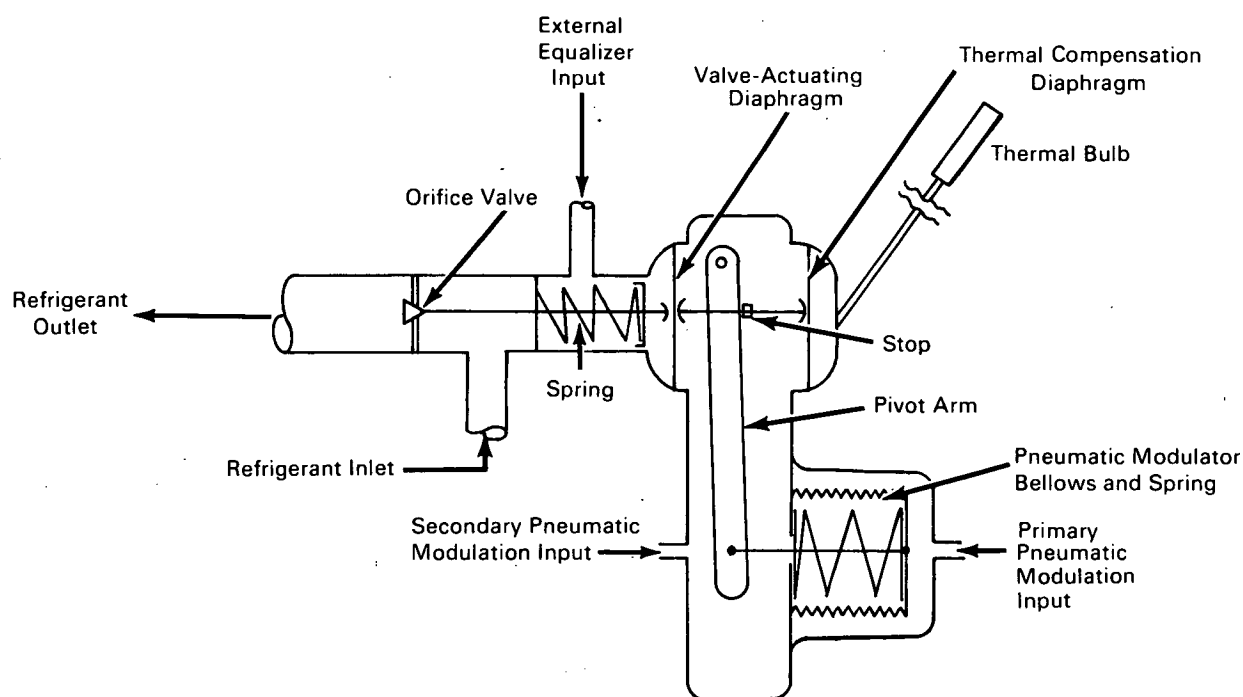
Brief 70-10101

# NASA TECH BRIEF



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## Thermostatic Expansion Valve Improved by Dual Pneumatic Modulation



Refrigerant Thermostatic Expansion Valve with Dual Pneumatic Modulation

Standard pneumatic modulating devices used on thermostatic expansion valves could be improved by adding a secondary pneumatic modulation input. Such valves, as shown in the diagram, normally meter incoming refrigerant flow through an orifice valve controlled by a valve-actuating diaphragm.

Several forces act on this diaphragm: first, a spring acts to keep the valve closed in the absence of other applied forces; second, vacuum, applied through the external equalizer input, acts against the spring to

open the valve; and third, pressure derived from a thermal bulb, applied to a thermal-compensation diaphragm, presses a mechanical linkage against the opposite side of the valve-actuating diaphragm to open the valve.

Pressure from a suitable pneumatic controller, applied through the primary pneumatic modulation input, acts through a bellows and spring to control the position of a pivot arm, which acts against a stop to control the application of the thermal bulb pres-

(continued overleaf)

sure to the actuating diaphragm. The applied pressure is normally modulated, thus providing a modulated flow through the orifice valve.

Available devices for supplying modulating pressure to the valve include manual pressure regulators, temperature-sensing controllers, pressure-sensing controllers and remotely adjustable (electrical) regulators. Problems arise because sensor-type controllers have no provision for remote control or adjustment, and manual or remotely adjustable controllers have no sensing capability unless used with elaborate electronic equipment. These problems may be solved by connecting a sensor-type controller to the primary pneumatic modulation input, and by connecting another, remotely adjustable controller to the proposed secondary pneumatic modulation input.

**Note:**

No additional documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer  
Kennedy Space Center

Kennedy Space Center, Florida 32899  
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**Patent status:**

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

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