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[Continued on next page]

(54) Title: HEAT PUMP AND METHOD OF OPERATION

(57) Abstract: A heat pump is provided having a first heat exchanger (34) and a second heat exchanger (52). A compressor (62) is fluidly coupled to the first heat exchanger (34) and the second heat exchanger (52). A reversing valve (60) is fluidly coupled between the first heat exchanger (34) and the second heat exchanger (52). The reversing valve (60) is adapted to flow of a refrigerant from the compressor (62) to the first heat exchanger (34) during heating mode and to the second heat exchanger (52) during a cooling mode. A thermal expansion valve (42) is positioned between the first heat exchanger (34) and the second heat exchanger (52). An electronic expansion valve (48) is positioned between the first heat exchanger (34) and the second heat exchanger (52). A controller (54) is electrically coupled to operate the electronic expansion valve (48) between a fully open, a fully closed and a modulated position depending on the operation of the compressor (62).

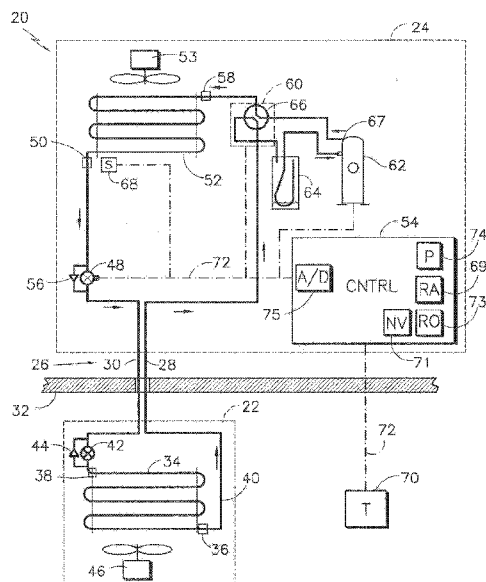


FIG. 1

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2010/026010**A. CLASSIFICATION OF SUBJECT MATTER*****F25B 30/02(2006.01)i, F25B 41/04(2006.01)i, F25B 41/06(2006.01)i, F25B 49/02(2006.01)i***

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F25B 30/02; F25B 5/02; F25B 41/00; F24F 11/02; F25B 13/00; F25B 1/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: expansion valve, modulate, control

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2001-248931 A (FUJITSU GENERAL LTD.) 14 September 2001 See Paragraph [0008]-[0012], figures.	1-20
A	JP 3967033 B2 (NTT POWER & BUILDING FACILITIES INC.) 08 June 2007 See abstract and claims.	1-20
A	JP 2000-314563 A (HITACHI LTD.) 14 November 2000 See abstract and figures.	1-20
A	US 5187944 A1 (JAROSCH; GEORGE W.) 23 February 1993 See abstract and figures.	1-20

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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JP 3967033 B2	08.06.2007	JP 2000-274786 A	06.10.2000
JP 2000-314563 A	14.11.2000	None	
US 5187944 A1	23.02.1993	None	