

Title (en)  
Supercritical-cycle heat pump

Title (de)  
Wärmepumpe mit superkritischem Zyklus

Title (fr)  
Pompe à chaleur à cycle supercritique

Publication  
**EP 2551612 A3 20140326 (EN)**

Application  
**EP 12177749 A 20120725**

Priority  
JP 2011166353 A 20110729

Abstract (en)  
[origin: EP2551612A2] A supercritical-cycle heat pump (1) that employs CO<sub>2</sub> refrigerant as a working medium that is provided with an injection circuit (11) for injecting intermediate-pressure refrigerant gas being separated by a gas-liquid separator 6 into a sealed housing (14), having intermediate pressure in the interior thereof, in a multistage compressor (2), a controller (25) is provided, which determines the viscosity of the POE oil (17) on the basis of the solubility of the POE oil (17) in the CO<sub>2</sub> refrigerant and temperature of the POE oil (17), the solubility of the POE oil (17) in the CO<sub>2</sub> refrigerant being determined by pressure and temperature of intermediate-pressure refrigerant and which controls the pressure of the intermediate-pressure refrigerant by controlling a first electronic expansion valve (5) so that the pressure thereof is controlled within a preset usage limit range in order to keep the viscosity of the POE oil (17) above the certain viscosity zone.

IPC 8 full level  
**F25B 1/10** (2006.01); **F25B 9/00** (2006.01); **F25B 31/00** (2006.01); **F25B 49/02** (2006.01)

CPC (source: EP)  
**F25B 1/10** (2013.01); **F25B 9/008** (2013.01); **F25B 31/002** (2013.01); **F25B 41/39** (2021.01); **F25B 49/02** (2013.01); **F25B 2309/061** (2013.01); **F25B 2400/13** (2013.01); **F25B 2400/23** (2013.01); **F25B 2500/16** (2013.01); **F25B 2600/2513** (2013.01); **F25B 2700/1931** (2013.01); **F25B 2700/1933** (2013.01); **F25B 2700/21151** (2013.01); **F25B 2700/21152** (2013.01)

Citation (search report)  
• [A] EP 2175212 A1 20100414 - DAIKIN IND LTD [JP]  
• [A] GB 2446062 A 20080730 - GRASSO GMBH REFRIGERATION TECH [DE]  
• [A] EP 0976991 A2 20000202 - ZEXEL CORP [JP]  
• [A] US 2006032267 A1 20060216 - KAMIMURA ICHIRO [JP], et al

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CN111306827A; CN106524546A; CN112303957A; CN114963528A; CN103363749A; CN108139119A; EP2952833A3; CN106225287A; DE102014100093A1; EP3026370A1; CN107036331A; CN107461955A; US10309704B2; US9482454B2

Designated contracting state (EPC)  
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Designated extension state (EPC)  
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**EP 12177749 A 20120725;** JP 2011166353 A 20110729