

Title (en)  
Supercritical-cycle heat pump

Title (de)  
Wärmepumpe mit superkritischem Zyklus

Title (fr)  
Pompe à chaleur à cycle supercritique

Publication  
**EP 2551612 A2 20130130 (EN)**

Application  
**EP 12177749 A 20120725**

Priority  
JP 2011166353 A 20110729

Abstract (en)  
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)

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

Designated contracting state (EPC)  
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

Designated extension state (EPC)  
BA ME

DOCDB simple family (publication)  
**EP 2551612 A2 20130130**; **EP 2551612 A3 20140326**; **EP 2551612 B1 20150722**; JP 2013029269 A 20130207; JP 5798830 B2 20151021

DOCDB simple family (application)  
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